New Bedford Harbor Superfund Site

Aerovox Interim Sediment Cap 100% Design

U.S. Army Corps of Engineers New England District

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Acronyms and Abbreviations

ACO	Administrative Consent Order
ADCP	acoustic doppler current profiler
AECOM	AECOM Technical Services, Inc.
Aerovox Inc.	Aerovox Incorporated
Aerovox facility	former Aerovox Corporation property
ASTM	American Society for Testing and Materials International
ATSDR	Agency for Toxic Substances and Disease Registry
AVX	AVX Corporation
bgs	below ground surface
CεC	compressibility index
cis-1,2-DCE	cis-1,2-dichloroethene
cm	centimeter
cm/sec	centimeters per second
COC	Contaminant of Concern
CSO	Combined Sewer Outfall
CVOC	chlorinated volatile organic compound
cy	cubic yards
Deltares	Deltares USA, Inc.
DNAPL	dense non-aqueous phase liquid
DQO	data quality objective
EPA	United States Environmental Protection Agency
ERDC	Engineer Research and Development Center
ESD	Explanation of Significant Difference
ft.	feet
ft/ft	feet per foot
FW	Foster Wheeler, Inc.
h	horizontal
HDPE	high density polyethylene
IA	immunoassay
in.	inch
ITRC	Interstate Technology and Regulatory Council
Jacobs	Jacobs Engineering Group, Inc.
Lally	Lally Consulting, LLC
$l/m^2/d$	liters per square meter per day
MassDEP	Massachusetts Department of Environmental Protection

MCP	Massachusetts Contingency Plan
mph	miles per hour
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
$mg/m^2/yr$	milligrams per square meter per year
ml	milliliter
N/m^2	Newtons per square meter
NAE	(USACE) New England District
NAPL	non-aqueous phase liquid
NAVD88	North American Vertical Datum of 1988
NBH	New Bedford Harbor
NBHSS	New Bedford Harbor Superfund Site
ND	non-detect
NOAA	National Oceanic and Atmospheric Administration
NTCRA	non-time critical removal action
OL	Organic Low plasticity (Atterburg Liquid Limit <50)
PCB	polychlorinated biphenyl
pcf	pounds per cubic foot
PED	polyethylene devices
ppb	parts per billion
ppm	parts per million
ppt	parts per trillion
PRC	performance reference compound
psf	pounds per square foot
PVC	polyvinyl chloride
QA	quality assurance
QC	quality control
RAC	Remedial Action Contract
RAG	Response Action Goal
RCRA	Resource Conservation and Recovery Act
ROD	Record of Decision
RTK-DGPC	Real Time Kinematic-Differential Global Positioning System
TCE	trichloroethylene
UH	Upper Harbor
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey

v	vertical
VOC	volatile organic compound
YSI	Yellow Springs Instrument
µg/L	micrograms per liter
µm	micrometer
3-D	three dimensional

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1. Introduction

1.1 Background

The former Aerovox facility consists of a rectangular 10-acre plot in New Bedford, MA (Figure 1). The intertidal and subtidal area abutting the former Aerovox facility is identified as the Aerovox Remedial Unit (versus the former Aerovox facility or facility) in the text and figures of this document. The Aerovox Remedial Unit is characterized by polychlorinated biphenyl (PCB) contamination in the range of 10 to 27,000 milligrams per kilogram (mg/kg), contamination depths of 25 feet (ft.) below top of sediment, and potentially mobile dense non-aqueous phase liquid (DNAPL). Chlorinated volatile organic compounds (CVOCs), primarily trichloroethylene (TCE), are also found in high concentrations at some locations.

Originally constructed in the early 1900's, Aerovox Incorporated (Aerovox Inc.) occupied the facility from 1938 through 2001, and used PCBs in the manufacture of electrical components from approximately 1947 to 1978. During this period, PCBs used in manufacturing were released within the building and on the site, as well as to the municipal sanitary sewer system and the adjacent harbor, resulting in extensive contamination of the building, the property itself, and harbor sediments.

Prior remedial actions performed at the former Aerovox facility included installation of a sheet-pile cutoff wall and capping of unpaved surfaces adjacent to the harbor, removal of fuel oil storage tanks and contaminated soils, and removal of stored chemicals and wastes from the buildings.

In 1982, as part of a consent order, United States Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Quality (now Massachusetts Department of Environmental Protection [MassDEP]) required Aerovox to install a shallow sheet-pile cutoff wall along the boundary between the site and the Upper Harbor (UH), with additional sections running from the harbor to the former Aerovox building, as shown in Figure 2. The sheet-pile wall was designed to serve as a barrier between PCB-contaminated soils on the site and New Bedford Harbor (NBH) by eliminating the direct connection between the shallow groundwater system and the harbor. This wall was intended to extend down to a shallow peat layer located 9 to 13 ft. below ground surface (bgs).

The building was demolished during a Non-Time Critical Removal Action (NTCRA) in 2011. The NTCRA also included a 3-inch (in.) asphalt cap across the site as an interim measure. The sheet pile wall installed in the 1980s administratively separates the former Aerovox facility from the New Bedford Harbor Superfund Site (NBHSS).

Ongoing site investigation and remediation work at the former Aerovox facility is currently being conducted under Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan (MCP) by AVX Corporation (AVX).

The former Aerovox facility is located on the western shore of the UH (Figure 1). Industrial wastes were discharged from the facility directly to the harbor through open trenches and discharge pipes or indirectly through the City of New Bedford's sanitary sewer system (EPA 1998). In addition, the excavation of capacitors during dredging operations may indicate that wastes were dumped directly from the shore (AECOM Technical Services, Inc. [AECOM] 2015).

Contaminants of Concern (COCs) include PCBs, chlorobenzenes, and CVOCs. Historic investigations determined that soil and groundwater impacts exist. Soil impacts range in depth from ground surface to greater than 28 ft. bgs

(AECOM 2015). Groundwater impacts were found in the shallow overburden (3 to 15 ft. bgs), deep overburden (greater than 15 ft. bgs), and in bedrock (greater than 25 ft. bgs). DNAPL was identified during Phase II investigations in two monitoring wells located in the northeast corner of the site (deep overburden and bedrock).

In March 2006, EPA prepared a conceptual site model, which provided a summary of available information regarding PCB contamination present at the Aerovox facility (ENSR 2006). Existing site data were reviewed, and a limited investigation was performed to provide information on storm water runoff as well as groundwater beneath the former Aerovox property. The data provided a screening-level assessment of PCB transport from the Aerovox facility to the adjacent waters of NBH. The data indicated a very low potential for significant transport (ENSR 2006); however, the assessment noted that building deterioration could increase the potential for mobilization and transport of PCBs.

In 2008, approximately 6,900 cubic yards (cy) of highly contaminated sediment abutting the Aerovox shoreline were removed using land-based mechanical excavation (Jacobs Engineering Group, Inc. [Jacobs] 2009). This work was done as part of the remediation conducted pursuant to a 1998 Record of Decision (ROD). The area of the harbor east of the Aerovox shoreline was hydraulically dredged in 2009 and 2010. A total of 26,000 cy was removed during this effort (Jacobs 2010, 2011).

In 2012 and 2015 Jacobs performed additional sediment/soil borings advanced to bedrock in the near-shore Aerovox area to obtain vertical profiles of remaining PCBs and select solvents in and under the marine sediments (Jacobs 2017a). These investigations found non-aqueous phase liquid (NAPL) levels of PCBs and VOCs (defined as >1,000 parts per million (ppm) remaining in sediments near the outfalls of two site drainage trenches, but relatively low levels elsewhere.

The scope of this design is to provide an interim 10-year life (minimum) remedial remedy addressing the PCB impacts in NBH adjacent to the former Aerovox facility. The interim remedy consists of a temporary cap over the sediment most highly contaminated with PCBs to prevent their redistribution into the harbor. The interim sediment cap will allow final pass NBHSS dredging to occur nearby prior to the 21E remedy at Aerovox being completed, thus minimizing the threat of recontamination from the Aerovox area. Design activities outlined in this document include field sampling performed by Jacobs and Battelle, interim cap design and modeling, and interim cap work plan associated with the cap construction. The work will be implemented under the Jacobs Remedial Action Contract, (RAC) Contract Number W912WJ-15-D-0001.

1.2 2017 Site Investigation

Field Investigation activities were conducted by Battelle and Jacobs during 2017 to evaluate the current NBH conditions adjacent to the former Aerovox facility.

1.2.1 Battelle Passive Sampling

Battelle of Norwell, Massachusetts conducted a passive sampler study to evaluate dissolved PCBs in sediment porewater and surface water. The results were used to evaluate concentration gradients and diffusive flux between the sediment and water column. A copy of the Final Aerovox Passive Sampler Survey Summary Data Report (Battelle 2017) is included in Appendix A.

1.2.1.1 Description

In July 2017, twenty-two (22) polyethylene devices (PEDs) were deployed near the former Aerovox facility (see Figure 3). Sample locations were placed in a roughly 100-ft. grid pattern. The PEDs consisted of 25.4 micrometer (µm) thick polyethylene sheeting spiked with a known concentration of performance reference compound (PRC). The PRC included PCB-38, PCB-78, PCB-79 and PCB-186. Each PED was placed such that approximately 50 percent of the device was in the sediment and the other half was exposed to surface water.

The PEDs were retrieved in August 2017 after 34 days of field deployment and analyzed for PRC concentration to determine its fractional equilibrium and PCB concentration. As indicated in the Final Aerovox Passive Sampler Survey Summary Data Report (Battelle 2017), fractional equilibrium results indicated one PRC achieved equilibrium in 89 percent of the samples, and two or more PRCs achieved equilibrium in 36 percent of the samples. A mass transfer model was utilized to determine equilibrium water concentrations of each PCB congener, which was then used to determine the PCB diffusive flux. Details relating to the calculations and tabulated data are found in the Battelle report located in Appendix A.

1.2.1.2 Results

Surface water PCB concentrations in the sample area ranged from 1.69 to 3.48 micrograms per liter (µg/L). The sediment porewater PCB concentrations ranged from 1.81 to 36.9 µg/L. PCB sediment porewater concentrations were greater in areas not previously dredged when compared to those in dredged areas. Battelle's report (Appendix A) determined that five sample locations had a negative diffusive flux, indicating a transfer of PCB concentration from surface water to sediment. The negative diffusive flux ranged from -3.05 to -25.3 milligrams per square meter per year ($mg/m^2/yr$). Positive diffusive flux, indicating a transfer from the sediment porewater to surface water, yielded results of 5.04 to 2,380 $mg/m^2/yr$. Figures 3, 4 and 5 illustrate sampling results for surface water, sediment porewater and diffusive flux as calculated by Battelle.

1.2.2 Jacobs Sediment Sampling

Jacobs performed sediment sampling in September and October 2017 to determine physical and chemical characteristics of sediment adjacent to the former Aerovox facility. Jacobs also installed temporary well points to determine where groundwater from the Aerovox facility was discharging into the harbor.

Sediment sample collection utilized different methodologies. Piston core technology was used to collect shallow sediment samples and rotary sonic was used for deeper sample collection.

Piston core samples were manually collected from sediment water interface to refusal, approximately 3 to 3.5 ft. below sediment surface. Each piston core was advanced by hand. Sample locations are shown on Figure 6. Each sample location was mapped in the field using Real Time Kinematic-Differential Global Positioning System (RTK-DGPS). Surface water levels were recorded at each sample location using a stadia rod. Each piston core sample was contained within a polycarbonate sleeve and end caps. Each sample was labeled for the location and collection depth. Cores were opened at the end of each day and the material was inspected and classified according to the Unified Soil Classification System (USCS).

Rotosonic drilling technology was used to collect and characterize sediment samples from three boring locations. The rotary sonic drill rig was mounted on a self-propelled barge containing a moon pool, hydraulic spuds, crane and support vessel. Each sample was collected from the sediment water interface to bedrock refusal. Each

boring's lithology was detailed and samples collected for laboratory and immunoassay (IA) analysis. Rotosonic sample cores were collected using 5-ft. Lexan sleeves. Each sleeve was capped and labeled for the appropriate interval. Sample locations were recorded using RTK-DGPS. Samples were inspected at the end of each day and classified according to USCS.

The liners from all the borings were transported back to the on-site laboratory and described. Boring logs are located in Appendix B.

1.2.2.1 Chemical Characterization

Sediment samples were collected and analyzed for PCB concentrations utilizing field and laboratory analysis.

1.2.2.1.1 Description

Sediment samples were analyzed for PCBs by a combination of IA screening analysis and sum of total congeners. IA is a technique that uses antibodies to identify and quantify organic compounds. Antibodies have been developed to bind with a target compound or class of compounds. Sensitive colorimetric reactions, linked to the immobilization of the target compound by the antibody, are used to identify analyte concentrations. The determination of the target analyte's presence is made by comparing the color developed by a sample of unknown concentration with the color formed by the standard containing the analyte at a known concentration. The concentration of the analyte is determined by the intensity of color in the sample.

One out of every ten IA samples was submitted under chain of custody to AECOM's subcontracted laboratory Alpha Analytical for analysis of PCB congeners utilizing EPA Method 1254 and PCB Aroclor using EPA Method SW8082A.

Sediment samples were also analyzed for a suite of volatile organic compounds (VOCs) using EPA Method SW8260C.

1.2.2.1.2 Analysis and Results

Sediment sample results are shown on Table 1. Samples were collected from 0-0.5 ft. in the upper Organic silt/clay with Low plasticity (OL) sediments, 0.5 ft. above the OL/marine deposit transition, and 0.5 ft. into the marine deposits. Higher concentrations of VOCs and PCBs were found in the OL material and concentrations declined considerably in the marine deposits. Total VOC concentrations ranged from 0.112 to 334 mg/kg. The most common VOCs were cis-1,2-dichloroethene (cis-1,2-DCE), TCE, and vinyl chloride with cis-1,2-DCE as the most common. The PCB concentrations ranged from 0.088 to 1,910 mg/kg for IA, non-detect (ND) to 538 mg/kg for Aroclors and 0.00112 to 604 mg/kg for total congeners. No DNAPL or free product was observed in any sample and an oil test screening kit using Oil Red O was used for each sample. All samples recorded negative readings for NAPL using the oil screening kit.

1.2.2.2 Physical Characterization

Sediments were evaluated for their physical and chemical characteristics and the applicability to support the groundwater model for the discharge to the harbor. A series of three sonic borings were advanced to collect these data (Figure 7). Previous investigations identified five major stratigraphic layers that may be used as layers in the

groundwater model. These include: OL, marine deposits, glacial outwash, glaciolacustrine deposits, and glacial till. These stratigraphic units (if present) were sampled from three borehole investigations.

1.2.2.2.1 Description

The three sonic borings were installed to capture the variability of sediments within the harbor east of the Aerovox sheet pile wall. Additional volume was collected at each of the three boring locations for OL and marine deposits by piston core to ensure that there was sufficient sample to conduct all analyses. The locations are oriented roughly northeast to southwest and approximately 180 ft. apart. Sediment borings were collected using a mini-sonic 100 drill rig that was securely mounted on a self-propelled barge equipped with a moon pool, spuds, crane, and support vessel. Prior to sediment boring, the subsurface was cased off to the top of the desired boring elevation. During this casing advancement, high pressure water was injected from the drill head down through the casing to remove soil cuttings and prevent heave. Once the casing reached the desired depth, the core barrel was lowered within the casing, consisting of a 4-in. Lexan liner, to the top of the boring elevation and advanced (vibrated) into undisturbed sediment. The length of the core was compared to the penetration depth to measure core recovery. This process was repeated until the top of bedrock was encountered and the boring terminated.

Sonic drill rig borings were cased and drilled to the bedrock interface, or to refusal based on drilling characteristics. Bedrock was not penetrated. Sediments were collected in 5-ft. core sections within the 4-in. Lexan liners. Immediately upon recovery, the ends of the boring liners were capped with a high density polyethylene (HDPE) core tube cap. For the piston cores, a 2.75-in. poly liner was used and handled similarly.

Stratigraphic units present in the harbor adjacent to Aerovox were identified in each liner and the stratigraphic units were sampled by cutting each liner to a specified length and shipped to the laboratory for analysis.

1.2.2.2.2 Analysis

The whole stratigraphic section representing OL, marine deposits, glacial outwash or glacial till were cut into 8- to 10-in pieces, and submitted to the laboratory intact in order to preserve the undisturbed features of the sediment. The laboratory sub-sectioned or sub-sampled the section as necessary to perform the analytical assessment. Each sediment strata were characterized with respect to the following parameters:

- Bulk Density. American Society for Testing and Materials International (ASTM) Method D2937.
- Particle Size. Sieve and hydrometer methods ASTM Method D422.
- Atterburg Limits. ASTM Method D4318.
- Soil Classification. ASTM D2487.
- Soil Moisture. ASTM D2216.
- Total Carbon. ASTM D2974.
- Particle Density. Also known as specific gravity ASTM D854.
- Sulfide/Sulfate. ASTM D516.
- pH. ASTM D4972.
- Saturated Hydraulic Conductivity. ASTM D2434.

1.2.2.2.3 Results

Results for the 2017 investigation are recorded in Tables 2 to 7. The upper organic material had little or no coarse materials and had a clay content between 10 and 19 percent. Organic matter ranged between 5.5 and 10 percent. It had the lowest bulk densities between 88.21 and 91.31 pounds per cubic foot (pcf). It also had high liquid limits

over 100 percent and relatively high plasticity indices ranging between 58 and 75. Hydraulic conductivity was very low, between 6.3E-08 to 2.2E-06 centimeters per second (cm/sec).

The marine deposits had similar clay contents as the OL between 17 and 19 percent and similar organic matter contents between 8.7 and 9.6 percent. Bulk densities ranged from 87.57 to 90.9 pcf and liquid limits over 100 percent. Hydraulic conductivities were slow from 1.4E-07 to 3.2E-07 cm/sec. Based on the physical properties, there is little to distinguish the OL from the marine deposits.

The glacial outwash was sandier from 46.5 to 87.3 percent and little clay (around 1 percent). Bulk densities were greater (131 to 145.3 pcf) and the material was determined to be non-plastic. Organic matter was less than 1 percent in all samples.

The one sample of glacial till was gravelly with an even mixture of sand and silt, with about 5 percent clay. Bulk density was high at 131 pcf with a low liquid limit of 23 percent. Hydraulic conductivity was also slow at 1.2E-07 cm/sec.

1.2.3 Jacobs Pore/Ground Water Sampling

Nested temporary microwells were placed on a roughly 100- x 100-ft. grid across the proposed cap area. A barge mounted mini-Sonic 100 was used to drill and install these microwells. Prior to well installation, the subsurface was cased off to the top of the desired boring elevation. During this casing advancement, high pressure water was injected from the drill head down through the casing to remove soil cuttings and prevent heave. Once the casing reached the desired depth, the device was pulled. The drilling team noted the location of the silty marine deposit interface with the sandy glacial outwash. Nested microwells were placed in each borehole. The microwells consisted of 1-in. schedule 40 polyvinyl chloride (PVC) pipe (2.5-in. outer diameter) with a 2-ft. long well screen, and a slot size of 0.0010 in (10-slot). The screen was packed with 20/40 grade environmental sand. Bentonite chips were added above each screen and to the top of the sediment surface such that the two microwells were separated by a bentonite seal. The core barrel was pulled and the deep well was installed such that the 2-ft. screen was clearly located within the glacial outwash deposits. The screen was filter packed and then isolated with bentonite. The second shallow microwell was then installed within the silty marine deposits and treated similarly. Upon placement, risers were added to the microwells to ensure top of casing elevation above a high tide event.

1.2.3.1 Description

Groundwater/porewater samples were collected from each well using flexible Teflon tubing and a peristaltic pump set for low flow (250 milliliters (ml) per minute). The groundwater was monitored with a Yellow Springs Instrument (YSI) portable meter for temperature, dissolved oxygen, pH, oxidation reduction potential, and turbidity. Once the readings were stabilized, the volume of water was monitored to ensure that three well volumes had been purged prior to sampling. Samples were then collected in the appropriate sampling vessel and placed on ice for transport to the appropriate laboratory. Field records for the groundwater sampling are included in Appendix C.

Following collection of samples, two low tide events were selected for collection of water levels for a synoptic event. Water levels were collected as close to a peak low tide as possible to determine peak hydraulic gradients and determine a maximum flux as this would occur during low tides. The synoptic water levels were collected on October 16 and November 15, 2017.

1.2.3.2 Analysis

The analytes for this sampling effort include:

- Total PCBs (as Aroclors)—EPA SW8082A
- Total PCBs (as congeners)—SW8270-SIM
- Total VOCs—EPA SW8260C
- Methane—RSK 175
- Sulfide—SW9030B
- Total Dissolved Metals (Ca, Mg, Na, K, Fe, Mn)—EPA SW6010C
- Sulfate-Chloride-Nitrate—E300.0
- Total Alkalinity—E310.1

1.2.3.3 Results

Results of the groundwater/porewater investigation are presented in Table 2. Results of the synoptic water level events are presented in Table 7. Total VOC concentrations ranged from 0.142 milligrams per liter (mg/L) to 72 mg/L. The primary VOC was cis-1,2-DCE followed by TCE and vinyl chloride. Total PCB concentrations ranged from 0.103 µg/L to 52.5 µg/L. Anions in the groundwater contained chloride (530 µg/L to 17,200 µg/L) and sulfate (88.4 µg/L to 2,310 µg/L) with four detections of nitrate and no detections of sulfide. Sodium was the most common metal followed by calcium, potassium and magnesium with lesser amounts of iron and manganese.

Synoptic water level readings were taken on October 16 and November 15, 2017. Thirteen well pairs were analyzed on October 16. Of those, 10 had upward gradients (0.011 to 0.141 feet per foot [ft/ft]) and three had downward gradients (0.026 to 0.265 ft/ft). For the November 15 synoptic event, 11 well pairs were measured. Of those, nine had upward gradients (0.0115 to 0.141 ft/ft) and two had downward gradients (0.213 to 0.448 ft/ft).

1.2.4 Gas Ebullition Sampling

Field measurements of gas ebullition from the sediment were made using gas collection apparatus developed according to the methods of Rockne, et al. (Viana, Rockne and Yin 2012). Gas ebullition was measured over a period of approximately 40 days from September 28, 2017 to November 7, 2017. Gas production was measured over time and the results reported as a flux based upon the area of the gas collector funnel and sampling time (liters per square meter per day ($l/m^2/d$)). Each collector consisted of a 26-centimeter (cm) (10-in.) external diameter inverted funnel connected to a 1-in. PVC tube connected to a gas-tight ball valve which could be opened for gas collection. Each of the eight collectors were anchored in place and set up to ensure that the funnel remained at least 20 cm above the sediment surface. Once in position on the harbor bottom, the collector intercepts bubbles released from the sediment rising toward the surface. As gas bubbles entered the funnel and then the calibrated vessel, water within the funnel and vessel was displaced. Measurement of the amount of gas that was collected in the vessel coupled with the depth of the vessel (translating to the pressure the submerged gas is subjected to) allows for calculation of gas production rate at standard atmospheric pressure.

Gas samplers were deployed in eight locations around the footprint of the proposed cap and allowed to sit for a period of time. After eight weeks of deployment and multiple checks of gas collection, none or very limited gas flux was measured by the devices.

1.2.5 Ice/Scour Investigation

The ice regime of the UH was investigated and potential ice effects on contaminated sediment remediation measures identified. The ice study included field observations during the winter of 2017, discussions with project personnel, review of newspaper archives and analysis of hydro-meteorological data.

In spite of its northerly location, climatic conditions along the southern coast of Massachusetts and New Bedford in particular are quite mild due to the maritime influence on its weather. As a result, historic ice covers on the harbor were found to be extremely rare with a calculated annual probability of 13 percent of the ice thickness exceeding 6 in. In addition to the typically mild winter air temperatures, factors inhibiting ice formation on the UH are the brackishness and top-to-bottom mixing of the water as a result of tide cycles and the low freshwater input of the Acushnet River (Tuthill 2017).

In the remediated project, the area most vulnerable to potential ice damage will likely be the shorelines and intertidal zones. It is expected that for the subtidal areas, the proposed 2-ft. minimum depth of the completed project will be sufficient to avoid ice damage. This is because the predominant ice type in subtidal areas will be single-layer sheet ice less than 6 in. in thickness.

A limited inspection of shoreline sites in the UH revealed no evidence of past ice action and, in general, the shorelines under existing conditions appeared to be quite stable in terms of resisting disturbances due to waves and an ice action. The shorelines on the deeper, industrialized western side of the UH are largely armored with rip rap while the eastern shorelines remain in a more natural marshland condition and would probably experience more ice growth and retention.

The study included a background review of ice processes in more northerly estuaries and salt marshes including ice scouring and transport of sediments and plants by rafted ice. Possible signs of these processes, such as detached peat clumps, were observed in the UH but only to a minor degree and are difficult to attribute to ice action.

Provided the post-project remediated shorelines are similar in nature and their ability to resist natural disturbances to the existing shorelines, ice is not expected to be a significant factor in the UH. Based on this review and analysis, it is not expected that ice action will have a significant effect on the proposed contaminated sediment remediation measures at the NBHSS. A copy of the draft report is in Appendix D.

1.2.6 Storm/CSO Outfalls

Two storm drains are located on or in close proximity to the Aerovox property. A site storm drain system within the Aerovox property drains the site into the harbor, and a City storm drain is located at the end of Hadley Street south of the boundary for the Aerovox property. Both are considered potential sources of PCB contamination to the harbor (AECOM 2015).

1.3 Groundwater Modeling

Groundwater modeling was conducted to understand the flow regime of the groundwater under the harbor and to determine and estimate the fate and transport of PCBs in the sediments under the harbor as they discharge into the harbor.

1.3.1 Methodology

Detailed groundwater flow and fate-transport analyses were conducted to delineate the COC discharge to the harbor from the current Aerovox facility via groundwater and to aid in the cap design. The modeling investigation applied numerical modeling tools that have been used previously at NBHSS.

1.3.2 Groundwater Flow Model

A site-specific three-dimensional (3-D) groundwater flow model was developed based on the latest information obtained from this investigation, along with all previous existing site-specific data to predict the groundwater flow pattern and discharge into the harbor under various conditions.

Simulation of groundwater flow in the site was performed using MODFLOW, a finite-difference groundwater flow code developed by the U.S. Geological Survey (USGS). MODFLOW is capable of simulating both transient and steady-state saturated groundwater flow in three dimensions. A number of different boundary conditions are available, including general head, areal recharge, injection or extraction wells, evapotranspiration, drains, and streams or rivers. The code simulates groundwater flow using a block-centered, finite-difference approach. Aquifers can be simulated as unconfined, confined, or a combination of unconfined and confined. The finite-difference equations may be solved using a strongly implicit procedure, slice-successive over-relaxation, or preconditioned conjugate gradient method. MODFLOW was selected for the site because it is in the public domain, is widely used by the scientific community, has been rigorously tested and verified, and a variety of software tools are publicly available for graphical pre-processing and post-processing. The model code has been used at NBHSS in several projects (Foster Wheeler, Inc. [FW] 2001; Jacobs 2009, 2015; Brown and Caldwell 2017).

The site-specific 3-D model includes all of the Aerovox facility and abutting harbor area. All site-specific features were represented. Model simulations to represent various conditions (tidal condition and recharge) were conducted. Detailed information of the model construction and simulations is provided in the modeling report, located in Appendix E.

1.3.3 Groundwater Transport Model

Based on flow simulations, fate-transport modeling analyses were conducted to evaluate and quantify the potential dissolved PCB mass migration and discharge to the harbor.

MT3D (Zheng 1990), a fate-transport model code, was used to predict the future contaminant movement and resulting concentrations. MT3D is a comprehensive 3-D numerical model for simulating solute transport in complex hydrogeologic settings. MT3D is a numerical simulation code that models the fate and transport of dissolved, single-species contaminants in saturated ground-water systems. MT3D calculates concentration distributions, concentration histories at selected receptor points and hydraulic sinks (e.g., extraction wells), and the mass of contaminants in the ground-water system. The code can simulate 3-D transport in complex steady-state and transient flow fields and can represent anisotropic dispersion, source-sink mixing processes, first-order transformation reactions, and linear and nonlinear sorption. MT3D is linked with the USGS groundwater flow simulator, MODFLOW, and is designed specifically to handle advective-dominated transport problems without the need to construct refined models specifically for solute transport. The MT3D model has also been used in the NBHSS (Jacobs 2009, 2015).

All the physical, chemical, and biological processes that potentially influence contaminant fate and transport of COCs in groundwater and harbor discharge were considered in the modeling. These include advection, hydrodynamic dispersion, retardation, and biodegradation whenever applicable. To model COC fate and transport, input parameters were developed to describe hydrodynamic dispersion, retardation, and degradation processes based on site-specific data from this investigation and previous activities. Detailed information on the fate-transport modeling is included in Appendix E.

1.4 Hydrodynamic Modeling

Lally Consulting, LLC (Lally) and Deltares USA, Inc., (Deltares) developed a coupled flow and wave numerical model representing the New Bedford Harbor estuary using the DELFT3D numerical modeling system. Three well-structured, orthogonal curvilinear grids encompassing Buzzards Bay, Lower and Outer Harbor, and Upper Harbor were constructed. The UH grid was developed to be the highest resolution practicable, in support of planning and analysis of more complex remedial action areas. Model calibration was performed wherein parameters including bathymetry, grid resolution, viscosity, bottom roughness and wind stress settings were formed. Initial validation of the models was performed using available measurements of hydrodynamic and physical processes data, including acoustic doppler current profiler (ADCP) velocity survey data acquired in the Upper Harbor, wind data from area meteorological stations, and National Oceanic and Atmospheric Administration (NOAA) tide gage data. Initial model simulations were conducted with consideration for planning and design work underway at the site. For each scenario, the model was run for both tides and wind; and tides, wind and wave components. Model results of flow velocities and maximum bed shear stresses across the UH domain were produced from each of the simulations. Analysis of the model results reveals that magnitudes and distribution patterns of both the flow velocities and bed shear stresses are within reasonable ranges. Initial observations can be made of the UH's hydrodynamic conditions based on the model results (Lally 2018a).

The hydrodynamic model was also run to estimate flow velocities and bed shear stresses for the Aerovox interim cap area. Four separate model runs were conducted applying 30-year recurrence interval windspeeds for this project. Two runs applied winds coming from the north, and two runs from the south-southwest. These directions generally align with the longest fetches over which wind fields have opportunity to generate currents and waves in the UH.

Resulting maximum bed shear stress values in the vicinity of Aerovox interim cap area were estimated to range from .001 Newtons per square meter (N/m^2) to 8.008 N/m^2 for the modeled recurrence interval storm scenarios. The minimum particle size that will remain stable under the influence of the higher critical bed shear stress is estimated to be approximately 0.5 in., or medium to coarse gravel (Lally 2018b).

1.5 Column Study

US Army Corps of Engineers Engineering Research and Development Center (ERDC) performed a column study evaluating the proposed cap design and its potential performance. Samples of NBH sediment and DNAPL were provided to ERDC. Their study utilized an accelerated flow rate through two columns to determine the potential for cap design breakthrough. The study concluded the cap design would experience potentially 7.6 parts per trillion (ppt) PCB breakthrough in approximately 26 years. A copy of the ERDC report is included in Appendix F.

1.6 Sediment Characteristics

Sediment sampling for PCBs has been performed at numerous locations at NBH as well as adjacent to the former Aerovox facility. Sampling efforts have indicated the highest PCB concentrations are located near the former Aerovox facility and that the sediments also contain high concentrations of VOCs.

Physical properties testing was performed to evaluate the performance of native material subject to loading as a result of the interim cap placement. In 2017, Jacobs collected sediment samples for analysis of primary consolidation, triaxial shear, hydraulic conductivity, specific gravity, as well as VOCs and PCBs. See Tables 4, 5 and 6. Stress strain curves calculated during triaxial shear testing and one dimensional consolidation testing graphs are contained in Appendix G. One dimensional consolidation results were used to determine Compression Index and Expansion Index used to calculate the ultimate settlement of the sediment layer. Additional consolidation discussion is in Section 2.1.3.

In general, PCB concentrations in the sediments are greatest in the top 12 in. The highest concentrations are located near the surface drain outfalls on the former Aerovox property, see Figure 8.

The sediments adjacent to the former Aerovox facility are generally characterized in three distinct layers:

- The surface layer (Layer 1) is characterized as soft black organic material appearing to be very soft and fluid;
- The second layer (Layer 2) is characterized as a marine deposit of soft silt, fairly compact; and,
- The bottom layer (Layer 3) is characterized as glacial outwash consisting of coarse sands and gravels.

Generally, the top two layers have low strength characteristics for their respective classifications. This is observed in the triaxial shear test reports found in Appendix G. Consolidation testing was performed to determine time-rate consolidation. Sieve analysis was performed and results indicated the NBH sediment consists predominantly of silts (approximately 83.1 percent to 93.5 percent passing the No. 200 sieve). The bulk density ranged from 88.98 to 90.0 pcf, water content ranged from 87.8 percent to 99.8 percent and time rate consolidation to achieve 95 percent consolidation was calculated at approximately 180 days. Consolidation calculations are provided in Appendix H.

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2. Design

2.1.1 Purpose

Pursuant to the 1998 NBHSS ROD and subsequent Explanation of Significant Differences (ESDs), EPA is remediating NBH. During previous dredging operations, sediments in the vicinity of the former Aerovox property were determined to be impacted with CVOCs as well as PCBs. Excavation of Aerovox sediment along the shoreline conducted in 2008 resulted in materials exceeding Resource Conservation and Recovery Act (RCRA) hazardous waste characteristics. These materials are currently contained in a lined cell at the Sawyer Street EPA facility. Due to the high PCB and CVOC levels remaining in the near-shore sediments at Aerovox, EPA directed the U.S. Army Corps of Engineers (USACE), New England District (NAE) to develop an interim subaqueous cap stabilizing and temporarily containing the PCB-impacted sediments, until the VOC and PCB sources at the former Aerovox facility are addressed pursuant to the state 21E program.

The remedial goals established for the interim sediment cap include:

- Establishing a physical exposure barrier to prevent impact to human health and the environment;
- Temporarily prevent the migration and resuspension of PCB-impacted sediment through the interim cap to the surface water;
- Temporarily prevent the migration of dissolved PCB constituents into the surface water; and
- Temporarily provide a suitable environmental habitat for ecological receptors.

Design documents and regulatory publications were reviewed to establish an interim cap design. These documents included *Guidance for In-Situ Subaqueous Capping of Contaminated Sediments* (Palermo 1998a), *The Evolution of Subaqueous Cap Design* (Palermo 2007), *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (USEPA 2005), *Shore Protection Manual* (USACE 1984), *Coastal Engineering Manual* (USACE 2011), *Subaqueous Cap Design* (Clarke 2001), *Design Considerations Involving Active Sediment Caps* (Barth and Reible 2009), *Predicting Contaminant Exposure from Dredging Operations* (Schroeder, et al. 2007), *Contaminated Sediment Remediation Guidance for Hazardous Waste Sites* (USEPA 2005), *Guidance for Subaqueous Dredged Material Capping* (Palermo et al. 1998b) and *Contaminated Sediments Remediation* (Interstate Technology and Regulatory Council [ITRC] 2014). These documents provide detailed procedures for site and sediment characterization, cap design, cap placement operations and monitoring for subaqueous capping. Caps designed according to the EPA and USACE guidance have demonstrated protectiveness towards human health and the environment (USEPA 2005).

2.1.2 Subaqueous Cap Modeling

Modeling software was used to calculate the interim cap design performance. Various software packages were reviewed for performance outputs, industry acceptance and ease of use. Two models systems were selected from Reible Research Group at Texas Tech University.

2.1.2.1 CapSim

The CapSim model developed by Reible and Lampert was used to evaluate the fate and transport of surficial sediment. The model utilizes specific processes including bioturbation, benthic mass transfer, consolidation, advection, diffusion and linear sorption. The model simulates multiple cap layer and sediment behaviors to estimate a cap's performance.

This model was utilized to determine the most cost effective capping scenario to achieve the goals established in Section 2.1.1. Copies of the model outputs as well as model input data and screen shots are included as Appendix I. Analytical data obtained during the 2017 field investigation were used in the model run development as well as PCB solubility values to establish a conservative capping strategy. In addition, conservative or worst case scenario values, including the greatest hydraulic conductivity and steepest hydraulic gradient, were used. This allowed for a conservative model, assuming maximum concentration possibilities and the greatest groundwater flow at the steepest gradient (see Table 8).

Model input data were sourced from EPA, USACE, ERDC, Agency for Toxic Substances and Disease Registry (ATSDR), *Octanol/Water Partitioning Coefficients of PCB Mixtures for Environmental Fate and Transport* (Cicilio 2013) and the CapSim model database for compound specific molecular weights, molecular diffusivity in water, organic and dissolved organic carbon partition coefficients, and first order decay rates. Hydraulic conductivity, bulk density, specific gravity and organic content values from site specific laboratory analysis were used to assess the Darcy velocity and sediment consolidation.

Hydraulic conductivity values determined in the 2017 field investigation, indicated results of 2.2E-06 cm/sec to 5.4E-08 cm/sec for marine clay. Hydraulic conductivity for the area closest to the shoreline was 6.4E-08 cm/sec. The former Aerovox property contains a sheet pile wall that extends from ground surface to a varying depth of 9 to 13 ft bgs. The presence of the sheet pile may affect the PCB concentration flux to NBH. However, no monitoring points or historical data indicating the change in hydraulic gradient or groundwater flux rate to NBH as a result of the sheet pile is currently available. As a result, the highest conductivity value was assumed to be representative of both the shoreline and subtidal areas.

The CapSim model runs incorporate PCB Aroclors 1242, 1248 and 1254. These Aroclors were selected because these are the most prevalent at the former Aerovox property. Aroclor 1248 and 1254 are referred in the model as PCB 80 and 82, respectively. Physical properties of these site specific Aroclors were available in the CapSim modeling software database. CVOC compounds, TCE and cis-1,2-DCE were analyzed as part of the fate and transport analysis. Theoretical porewater PCB concentrations as well as field data from 2017 activities were evaluated. Theoretical porewater calculations are contained in Appendix J. The analysis concluded conservative values using PCB solubility values would provide the worst case scenario, as a result these conservative concentration values of PCBs were input into the model. This assumption included concentrations greater than those observed during the 2017 field testing. The model output indicates the cap design would adequately provide at least 10 years of protection for NBH. Model assumptions and sourced data are contained within Appendix K.

2.1.2.2 Reible Steady State

The steady state analytical model evaluates the long-term behavior of a cap, after both the biologically active layer and the underlying cap layer are influenced by contaminant migration from below. It estimates the maximum concentration or flux that can ever be expected from a cap assuming that the underlying concentration is constant. The model is a two-layer steady state system, which predicts concentrations and fluxes in a chemical isolation layer or in the near surface biologically active zone or bioturbation layer (Reible 2011). Copies of the models are contained in Appendix L.

The proposed multiple layer interim sediment cap, from bottom to top includes 6 to 12 in. of medium clean sand, 6 in. of medium clean sand with 15 percent organoclay by weight, 6 in. clean medium sand and 6 in. clean 1 ½ inch

stone. The model was run for PCB 1242, 1248 and 1254 at concentrations similar to those run in the CapSim model.

The steady state model determined the isolation layer breakthrough time, as well as the porewater concentration at the surface water interface when breakthrough occurs. The model determined an initial PCB 1242 porewater concentration of 240 parts per billion (ppb) would achieve a porewater concentration of 1.15 ppb or 0.48 percent in 14,450.8 years. Similar model runs were completed for PCB 1248 and PCB 1254. An initial concentration of PCB 1248 (54 ppb) yielded a 0.48 percent porewater concentration of 0.25 ppb in 60,289.7 years and PCB 1254 (12 ppb) achieved a porewater concentration of 0.06 ppb in 85,434.9 years.

2.1.3 Consolidation as a Result of Capping

The cap material itself will be granular and is expected to undergo elastic settlement within the period of construction. A consolidation evaluation has been performed to determine an estimate for the final capping design elevation. The subsurface sediment profile was developed from the numerous boring logs shown in Appendix B, which represent an average 2-ft. OL layer, followed by on average a 3-ft. native silt (CL) layer, overlain by 20-ft. of sand, and finally bedrock. The sediment properties applied to the OL and CL soil layers were determined by laboratory testing also shown in Appendix G.

The ASTM D2435 procedure for a one- dimensional incremental load test was performed to determine the compressibility index (CεC) of the OL layer, which was calculated from the stress-strain graphical results to be 0.24. This information was used to estimate both the ultimate settlement of the sand cap loading as well as the time rate of consolidation. The applied surcharge load of the 2-ft. sand used in the cap design is 250 pounds per square foot (psf), which considers 125 pcf for the saturated unit weight of sand. It is also important to note that the load felt by the OL and CL layers is reduced due to the effective stress relationship of subaqueous sediment. The design parameters were then calculated for the ultimate or 95 percent consolidation settlement of a normally consolidated material. It was determined that the ultimate settlement of the underlying marine sediment will be 0.7-ft with a time rate to reach 95 percent consolidation of approximately 280 days.

In addition, a 3-D model was developed using Settle3D software to further model the consolidation effect of the cap design. The Settle3D model applied non-linear primary consolidation and secondary consolidation using the compressibility parameters and sediment properties for the OL and CL layers and immediate settlement for the underlying sand layer. This resulted in 0.85 ft. of ultimate settlement, which has close agreement with the attached hand calculations. Refer to Appendix H for the supporting calculations and Settle3D resulting figures. It is important to note that this ultimate settlement is an average for the entire interim cap area. The laboratory results for the incremental load test show a compressibility index of CεC equal to 0.24 from the stress-strain relationship, and when plotted with a void ratio effective stress relationship, show a CεC equal to 1.1. However, the laboratory results also reported an initial void ratio of 4.98, which equates to an initial moisture content of 200 percent. Literature from Landva et al. represent a graphical relationship between the compressibility index and moisture content of organic soil, which shows a moisture content of 200 percent yields a Cc equal to approximately 2.0. Therefore, the sand cap could result in maximum consolidation and ultimate settlement greater than 0.85-ft. for areas with large OL layers, however the 0.85-ft. is still considered a representative average.

2.1.4 Evaluation of Capping System

The interim cap at NBH will prevent direct contact of human and ecological receptors with the PCB-impacted sediment and will minimize the migration of these constituents into the water column. A properly designed,

constructed and maintained interim capping system is effective in isolating impacted sediments as well as minimizing the potential for resuspension of PCB containing sediments into the water column. Conceptual design standards have been developed for the interim cap, which are predicted to achieve response action goals for NBH.

2.1.4.1 Identification of Response Action Goals

The design goals for the interim sediment cap are to:

- Create a temporary physical exposure barrier consisting of clean material over the PCB-impacted sediments;
- Prevent the migration of dissolved PCBs from the sediments through the interim cap to the water column for a period of at least ten years; and
- Prevent the erosion or physical displacement of the sediment or capping materials in those areas potentially subject to wind, wave, ice and man-made discharges from surface runoff or storm drain outfalls.

These Response Action Goals (RAGs) will limit PCB-impacted sediment exposure to human and ecological receptors for the interim 10-year period or longer.

A review of historic documents as well as the 2017 field investigation was used to develop an understanding of the existing or background concentrations present in NBH. In addition, bathymetric data collected in December 2017 were used to establish current harbor bottom elevations.

2.1.4.2 Cap Design Standards

The interim cap design was engineered using detailed guidance for *in situ* capping developed by EPA and USACE. These documents previously listed above, provide detailed procedures for site and sediment characterization, cap design, cap placement operations and monitoring of cap performance. Consistent with the referenced guidance, the interim cap was designed based on the following components:

- Chemical isolation of contaminants
- Bioturbation
- Consolidation
- Erosion
- Operational considerations (gas generations, placement inaccuracies, long term monitoring and other pertinent processes.

Given the variability of site conditions (PCB concentrations, shoreline and subtidal topography), the cap design includes two different systems, interlocked to provide consistent isolation of PCB impacts. The sediment capping system to be installed will consist of a shoreline design and a subtidal design that include the following:

- A transition layer of medium sand with a minimum thickness of 6 inches;
- A minimum 6-in. isolation layer consisting of medium sand and organoclay;
- A minimum 6-in. medium sand subtidal bioturbation layer;
- A minimum 6-in 1 ½-in stone subtidal erosion control layer; and
- A minimum 12-in shoreline armor layer consisting of 8- to 10-in. rip rap, incorporated along the shoreline as necessary to prevent erosion.

2.1.4.3 Evaluation of Capping System

The interim cap system components are evaluated based upon two different areas contributing to the PCB concentrations adjacent to the former Aerovox facility. The shoreline area has a varying slope of existing rip rap, while the subtidal area contains low-strength PCB-impacted sediments. As a result, these two areas require different capping strategies to achieve the interim cap goals.

The existing shoreline and subtidal bathymetric elevations are shown in Figures 9 through 16 as well as subsurface material composition. Technical calculations and evaluations were developed and performed as part of the design process. These details are included in the appendices.

2.1.4.3.1 Shoreline

The existing shoreline contains a sheet pile wall and rip rap slope which varies from a vertical face to 3 horizontal (h) to 1 vertical (v). Figure 12 through 16 illustrate the existing shoreline topography as well as mean high-high and low-low water elevations. The existing shoreline will require a smoothing/isolation layer installed over the existing rip rap to form a uniform surface with similar slope (see Figure 17). This dual purpose layer will provide chemical isolation of PCBs as well as create a consistent profile along the shoreline. This layer will consist of clean medium sand free from contaminants and contain 15 percent organoclay by weight. This will provide reduction in the PCB flux from the existing shoreline to the surface water and will address the physicochemical process of molecular diffusion (in the absence of groundwater flow) that contribute to the migration and transfer of PCBs. Appendix M provides material specifications and catalog cut sheets for the sand, rip rap and organoclay.

The smoothing/isolation layer minimum thickness if 6-in. increases the transport length necessary for PCBs to reach the cap surface water interface by increasing the availability of sorptive materials that retard the transport process. Predictive modeling, described in previous sections, evaluates the cap system to determine its effectiveness. The transport of PCBs was estimated through the use of steady state models as well as fate and transport models. This estimate assumed worst case scenario concentrations of PCBs due to the absence of analytical measurements in the shoreline area.

Several potential forms of erosion including hydrodynamic flows, ice scour, wind induced waves vessel induced wakes were evaluated in the interim cap design. Erosive forces in the shoreline, specifically vessel generated waves (prop wash) were evaluated for the interim cap shoreline area. The calculations, included in Appendix N, indicate the design of 8- to 10-in. rip rap would be sufficiently protective of the shoreline cap. The armor layer overlies a geotextile non-woven fabric, which is placed over the isolation layer to prevent mixing between the two layers. Appendix M includes specification details for the geotextile fabric. Section 2.1.4.5 further details the specifics of armoring.

The interim cap effectiveness was evaluated using two criteria. The first is the time duration during which the isolation layer limits the release of PCBs. The second is the reduction in PCB flux from the sediment to the water column. Without considering increased transport length related to deposition of new sediment over the cap, the modeling results indicate the interim cap would sufficiently isolate the PCB-impacted materials from the surface water for at least ten years. The results of this evaluation demonstrate that a properly installed smoothing/isolation layer consisting of medium sand with 15 percent organoclay by weight at a minimum thickness of 6 in. will prevent the release of PCBs for the interim period, and reduce potential contact to human as well as ecological receptors. Cap installation processes and methods are further described in Section 2.2.

2.1.4.3.2 Subtidal

The existing subtidal area contains previously dredged locations, as well as areas of DNAPL. The harbor bottom elevation adjacent to the former Aerovox facility varies from -4 ft. to -8 ft. North American Vertical Datum of 1988 (NAVD88) (see Figure 18). While the slope between the elevations varies, the maximum observed slope is 5h:3v. To minimize slope variability in the cap area, a smoothing layer of clean medium sand will be placed over the existing sediment to an elevation of -6 ft. NAVD88 (see Figure 19). Once this material is placed, an additional 6 in. to 12 in. of clean medium sand will be placed over the entire interim cap area. Locations with elevations shallower than -6 ft. NAVD88 will have 12 in. of clean medium sand. This will provide the transition to the isolation, bioturbation and armoring layers. It is assumed the bottom 6 inches of the smoothing layer sand will be intermixed with the existing sediment. An isolation layer will be placed over the smoothing layer. This will provide reduction in the PCB flux from the existing sediment to the surface water and will address the physicochemical process of molecular diffusion as well as advection/dispersion that contribute to the migration and transfer of PCBs to the surface water. A 6-in. minimum isolation layer will consist of clean medium sand with 15 percent organoclay by weight (see Figure 17).

The isolation layer increases the transport length necessary for PCBs to reach the cap surface water interface by increasing the availability of sorptive materials that retard the transport process. Predictive modeling described previously evaluates the cap system to determine effectiveness. The transport of PCBs via diffusion and advection/dispersion was estimated through the use of steady state models as well as fate and transport models.

The interim cap effectiveness was evaluated using two criteria. The first is the time duration during which the isolation layer limits the release of PCBs. The second is the reduction in PCB flux from the sediment to the water column. Without considering increased transport length related to deposition of new sediment over the cap, the modeling results indicate the interim cap would sufficiently isolate the PCB impacted materials from the surface water for at least ten years. The results of this evaluation demonstrate that a properly installed isolation layer consisting of medium sand with 15 percent organoclay by weight at a minimum thickness of 6 in. will prevent the release of PCBs for the interim period, and reduce potential contact to human as well as ecological receptors. Cap installation processes and methods are further described in Section 2.2.

The seaward perimeter of the subtidal cap will be completed with a 3h:1v slope (see Figure 20 for detail).

2.1.4.4 Bioturbation Layer

The subtidal area will contain a bioturbation layer consisting of 6 in. of 1 ½-in. stone and 6 in. of clean medium sand over the isolation layer respectively. The medium sand layer will prevent mixing between the isolation and armor layers, and provide sandy habitat for organisms that are found in NBH. Bioturbation is the sediment processing by aquatic organisms during burrowing, feeding, movement and respiratory activities. Bioturbation may affect vertical and horizontal movement of porewater and sediment, decreased sediment cohesion, and increase porewater exchange (ERDC 2001), thus the need to provide for this layer above the isolation layer. NBH species include mollusks, crustaceans, invertebrates (Whitlatch, 1989), which typically occupy the top 5 to 30 cm (2 to 12 inches).

Consistent with documentation published by Palermo et al., in 2002, the bioturbation layer and erosion control layer may be concurrent and not independent thicknesses. That is, depending on the material used the erosion control or armoring layer can serve as protection from physical forces as well as provide habitat to accommodate bioturbation.

2.1.4.5 Armoring Layer

The interim capping system bioturbation layer will provide a habitat for ecological receptors (6-in. sand); however, this layer may not be capable of withstanding all potential erosion issues related to wind, wave, ice, prop wash, Combined Sewer Outfall (CSO) and culvert outfalls and tidal action. Therefore, an erosion control layer or armor layer will be installed over the bioturbation layer.

The characteristics of the erosion control layer (i.e., stone weight, layer thickness and extent of armor placement) have been designed based on protection against the maximum anticipated wind-induced wave height, bed shear stresses related to wind, tide and wave action, prop wash associated with recreational vehicles and ice formation. The USACE *Shore Protection Manual* (USACE 1984) and the Coastal Engineering Manual (USACE 2011) were used to develop the shoreline and subtidal armoring layers. Calculations and details using the USACE 1984 and 2011 guidance documents is included in Appendix N.

Hydrodynamic forces were evaluated and compared to previous modeling results (Lally 2017 and ERDC 2015). These calculations indicated maximum wave heights of approximately 3.5 ft with 30-year wind speeds of 50 miles per hour (mph). These data indicated a minimum 12 inches of 8- to 10-in. rip rap would sufficiently protect the interim shoreline cap. The rip rap will extend from the sheet pile wall at a 3H:1V slope and interface with the subtidal cap armor. The shoreline armor will be completed with a cap toe. See Figure 20 fordetails. The subtidal areas were calculated to require 1 ½-in. stone for erosion control and protection from propeller wash associated with recreational water craft having a motor horsepower of 25 or less as well as wind/wave and tide action. Calculations associated with subtidal armoring are included in Appendix N. In addition, institutional controls will also be implemented around the perimeter of the cap. The anticipated finished cap elevation will allow for approximately 2 ft. of water during low tide. As a result, signage and buoys will be placed around the cap to prevent accidental grounding of recreational vehicles. To allow usage of PEDs during post-cap monitoring, as well as to retain some habitat value, the design approach is to use 1 ½-in. stone rather than cobbles as the top surface of the cap, together with the use of signage and buoys to dissuade motor-boating within the cap area. Future cap monitoring will also be performed to determine if boating related impacts to the cap are occurring. Calculations and details used to determine erosion control are in Appendix N.

2.2 Sediment Capping

The interim capping system will consist of a shoreline and subtidal design. Design details are summarized in previous sections of this report; detailed calculations, model results and detail drawings are provided in the appendices. Technical specifications including project-specific construction requirements are outlined and detailed in the following sections.

Prior to conducting interim cap related activities, protection of the asphalt currently present at the former Aerovox facility will be required. Figure 21 includes the proposed asphalt protection requirements and Figure 22 shows the location of the asphalt protection areas. Areas subject to heavy equipment or machinery will require a support system to transfer the equipment load over a larger area. As shown in Figure 21, geotextile fabric will be placed over the asphalt cap area. Dense grade structural fill will be placed in the areas adjacent to the sheet pile wall and extend 30 ft. west. The dense grade will be placed over the geotextile in two 6-in. lifts and compacted. Composite mats within interlocking panels will be placed over the dense grade. Care will be taken to not disrupt or damage the existing sheet pile wall. Areas designated as lay down and not within the 30-ft. dense grade area will have interlocking composite mats installed to protect the asphalt surface.

2.2.1 Shoreline Capping

Site preparation activities and site control measures will be implemented prior to work, including:

- Site security and traffic control;
- Work area controls, including track mats or equivalent methods to prevent tracking of materials offsite;
- Identification and protection of utilities;
- Staging and handling of materials; and
- Erosion and sedimentation controls.

These items are outlined in the Construction Quality Control Plan (Jacobs 2017c), Generic Site Work Plans (Jacobs 2017a, 2018) and Accident Prevention Plan (Jacobs 2017d). Specific items related to the capping work are addressed in the following section.

2.2.1.1 Surface Preparation

Prior to installation of the cap materials, all vegetation and miscellaneous debris will be removed from the shoreline and properly disposed. If practical, approximately 12 inches of existing rip rap will be moved from the top of the shoreline to account for the cap installation, and placed as needed in other shoreline areas to assist in creating a more consistent slope along the shoreline. At no time will the existing sheet pile wall be disturbed.

2.2.1.2 Material Staging

Prior to any cap placement activities, the staging area designated at the former Aerovox facility will be inspected and documented. Appendix O contains the Existing Site Conditions Report. Photographs will be collected documenting the current condition of the asphalt cap, asphalt lot, sheet pile wall, storm drain structures and other ancillary features. This work will be repeated after all capping activities are completed to provide documentation of any potential cap damage during construction activities.

Throughout construction activities, appropriate erosion control measures will be implemented in association with active construction areas. Erosion control measures including silt fence, hay bales, coir logs or other suitable approved technology will be installed where needed to limit the potential for the erosion of disturbed areas and/or staged materials and related storm-water runoff. Where erosion control matting is used on bare soil, it will consist of matting that is composed of 100 percent non-synthetic biodegradable material (e.g., jute mesh) and will be anchored only with biodegradable stakes. In addition, similar measures will be used where needed to divert rainfall runoff from entering work areas and open excavations. Material stockpiles will be covered on a nightly basis and/or during precipitation events. All erosion and sediment control will remain in place throughout the cap construction process. Figure 23 illustrates the locations of proposed erosion control.

Asphalt protection measures including the use of interlocking composite mats will be placed as shown on Figure 21. All asphalt in the work areas shown will be protected. Specifications on the composite mats are included in Appendix M. In areas adjacent to the sheet pile wall, a minimum of 12 inches of dense grade (1 ½-in. minus crushed gravel) will be placed and compacted over the composite mats. The dense grade will be placed on either side of the sheet pile wall to a thickness greater than the height of the exposed sheet pile plus 4 inches. Filter fabric consisting of nonwoven geotextile fabric (Mirafi 180N or equivalent) will be placed between the dense grade material and the interlocking composite matting. Geotextile specifications are included in Appendix M.

Prior to cap placement activities, materials will be stockpiled in designated areas at the former Aerovox facility. Stockpiles will be designated for each type of material (sand, armor stone, organoclay). Materials will be delivered as needed by truck. Equipment boxes or tubs used for mixing sand and organoclay will be stored on the composite mats. No materials will be stored directly on the asphalt cap.

2.2.1.3 Turbidity Control

Prior to the initiation of construction-related activities, turbidity control measures will be installed at or in the vicinity of the Aerovox cap. Such measures will be installed to minimize the potential for transport of solids suspended in the water column. Similar to the control measures used during NBH dredging activities, 3-ft.-long silt curtains will be deployed. This design will allow for progressive settling and retention of suspended materials, but also prevents the curtains from folding during low tide. The silt curtains will be visually inspected on a daily basis and maintained throughout the construction period to maximize their effectiveness.

In general, turbidity from interim cap operations is a function of the material and degree of material washing prior to placement. To mitigate turbidity from interim cap operations, sand and stone will be washed prior to delivery to the site, such that the percent passing the US No. 200 sieve is less than 5 percent by weight. In addition, mechanical placement of the cap materials will be done in close proximity to the harbor bed, which will prevent localized dumping of material and minimize the potential for resuspension of harbor sediment. Figure 24 identifies the location of the silt curtain location. Appendix P contains the cap edge coordinates to be used for locating the silt curtain.

2.2.1.4 NAPL Contingency Measures

During the course of shoreline sediment interim cap and armor stone placement, a variety of preventative controls measures may be implemented. These measures may be deployed during construction to minimize potential NAPL impacts to NBH in the event NAPL is observed.

Prior to initiating interim cap construction, turbidity controls such as silt curtains or equivalent method will be deployed. Absorbent booms will be installed inside the silt curtain prior to the onset of construction activities. During shoreline cap construction, sorbent materials will be available for deployment if visible NAPL is observed leaching from the existing slope. If during construction NAPL is observed in the work area, work in the immediate area will temporarily cease, and absorbent materials deployed. EPA will be notified of the observation. Appropriate corrective measures will be implemented on a location-specific basis. In the unlikely event that drums, capacitors or other unanticipated items are unearthed during cap installation activities, the following procedures will be implemented:

- Immediate notification of any such discover to USACE and EPA.
- Segregation, over packing, characterization and offsite disposal of any liquid containing vessels, capacitors or drums, as well as any potentially contaminated non-liquid containing vessels.
- Discussion with USACE and EPA regarding notification to MassDEP and if any follow up activities, if necessary.

2.2.1.5 Subtidal Dredging

The Aerovox interim cap is within UH Subtidal Dredge Area I/N on the western shoreline. Currently, the interim capping and subtidal dredging operations are sequenced simultaneously. Therefore, a buffer zone surrounding the interim cap area and Dredge Area I have been designed to consider the slope stability of the applied surcharge

load of the interim cap and the *in situ* sediment properties. The buffer zone design applies a 10-ft. horizontal offset into the cap area to allow for interim cap armor toe stability and 20-ft. horizontal offset from the extent of the interim cap to reduce disturbance from dredging and to minimize the potential for contamination of the cap from abutting dredging operations, see Figure 24. Prior to the placement of the interim cap, the entire perimeter will be dredged to result in a clean interface and allow for an undisturbed buffer zone. The cut depth will be a minimum 1.5 ft. The slope stability analysis of the dredge cuts shows that a 3H:1V slope will be stable. The analysis is included as Appendix Q.

2.2.1.6 Shoreline Cap Placement

Mechanical methodology will be used to place the shoreline cap materials using an excavator or equivalent terrestrial equipment. Care will be taken to ensure the minimum layer thicknesses are achieved. Mechanical placement methodology will be used for a controlled, accurate placement of thin lifts, placed no more than 3 inches at one time. The mechanical equipment will be outfitted with a position and control system that accurately monitors the location and elevation to within 2-in. accuracy.

The equipment will be outfitted with DREDGEPACK or equivalent survey software system. The system will update the plan view with real time bucket position and color gradients to easily show the operator an updated color coded view of the cap surface. These data, along with other inspection methods and measurements discussed in Section 2.2.1.10, will be utilized to ensure the minimum cap thicknesses are achieved.

The following equipment is installed to receive RTK GPS coordinates on the machine:

- (2) Trimble antennas - one positional antenna and one heading antenna.
- (1) SPS461 Trimble Heading Receiver.
- (1) 450 MHz radio antenna (to communicate with the base station).

The following equipment is installed on the machine to correlate the GPS positioning for calculating vertical elevation of the bucket cutting plane:

- (2) Inclinometers – one mounted on the boom and one mounted on the stick.
- (2) Inclinometers – both mounted behind the cab or on the roof of the cab of the machine to compensate for pitch and roll of the barge deck.
- Rotation sensor and shaft encoder – Installed on the bucket to determine its orientation relative to the machine.

The instrumentation setup procedure is similar to previously installed systems at the site (i.e. Sennebogen 850 material handler) with different input parameters to the computer system based on the different geometries of the boom and stick and the differences in the buckets used on the machine. The setup procedures are:

1) The pitch and roll sensors are calibrated with the machine on land where its pitch and roll can be leveled or measured accurately. Both sensors are then calibrated in DREDGEPACK® to match the actual pitch and roll of the excavator on land.
2) The boom and stick inclinometers are calibrated by measuring the actual rotation angle at several geometries with a calibrated RTK GPS rover and confirming measurements with a tape measure.
3) The offset position of the Trimble antennae from the boom trunnion pin is recorded with an RTK rover.
4) The xyz coordinates measured during equipment setup are imported into AutoCAD.
5) The lengths of the boom, stick and bucket are calculated using AutoCAD. These lengths are also checked against the tape measurements.

6) Measurements of the boom pin, bucket pin, and ground surface under the bucket are taken with an RTK GPS rover. These measurements are entered into DREDGEPACK® to complete the boom and stick inclinometer calibration.
7) With all four rotation sensors calibrated and the Trimble RTK GPS installed, a final elevation of the bucket or grapple is obtained in DREDGEPACK® (x, y, and z).
8) Bucket orientation is determined by a rotational sensor on the bucket assembly. An aluminum encoder ring with equally spaced magnets is mounted on the top of the bucket below the rotation point. Two magnetic sensors are mounted on the bucket above the rotation point in such a way to leave the sensors ¼-in. above the magnetic ring. For calibration the bucket is rotated to the zero position and the sensor is zeroed out. To verify proper orientation and operation, the bucket is rotated from zero to 90 and 90 to -90 degrees and is compared to the angle on the DREDGEPACK® display in the operator's cab.

A final calibration check of the bucket position is performed against the RTK GPS rover in multiple locations on land and water to ensure the boom, stick, and rotational sensors are accurate. Results of the calibration are documented in the Daily Report to NAE. The shoreline cap placement will occur from north to south in 40-ft. grid sections. The grid sections will be used for daily reporting of areas completed (e.g., grid E5 was completed today).

Actual placement technique will involve the operator removing cap materials from a truck bed and rotating the bucket into position. The operator will orient himself with the computer screen and plan where the materials will be placed. The operator will begin the placement operation by:

- Lowering the bucket to within 1 to 2 feet of the water surface.
- Pressing a "record" button in the software prior to opening the bucket to record the motion arc/travel path of the bucket.
- The operator will crack the bucket and begin a sweeping arc motion as materials are released.
- Once the bucket has been emptied, the operator will stop recording the sweeping arc.
- The screen will be color coded to indicate where cap materials have been placed. Different color will be used for different material types.

The 40-ft. grids will also be used as a general guideline for how many tons of materials needs to be placed in each grid cell and to guide cap placement.

It is anticipated the shoreline grid section will be sequenced after the abutting subtidal grid section is completed to allow construction of the toe detail shown in Figure 17. This sequence will occur subtidal to shoreline, in a north to south pattern, until the shoreline is completed. See Figure 25 sequencing grids, and Figures 26 through 29 for constructability sequencing.

The interim shoreline cap will consist of two layers: a smoothing/isolation sand-clay layer to achieve a relatively consistent surface of similar slope along the shoreline followed by rip rap. The slope will be approximately 3H:1V and will extend the full length of the former Aerovox property to Precix as shown on Figure 17.

The shoreline consists of existing rip rap and the smoothing/isolation layer must be placed so that the material contacts and fills the existing rip rap void space. The smoothing/isolation layer along the shoreline will consist of medium sand with 15 percent organoclay by weight and a minimum thickness of 6 inches. The sand will be placed to construct a uniform surface and a 3H:1V grade to meet the subtidal isolation layer elevation. The shoreline and subtidal isolation layers will provide continuous uninterrupted confinement of PCB impacts. A geotextile layer consisting of Mirafi 180N or equivalent and erosion control armor stone will be placed over entire the shoreline smoothing/isolation layer (Figure 17). Care will be taken during the rip rap placement to not damage or move the geotextile fabric. The termination points of the geotextile fabric will be folded and anchored in place for stability

during rip rap placement. Each end will be folded such that at least 6 inches of fabric is anchored as shown on Figure 17. The 8- to 10-inch rip rap material will be placed in 6-in. lifts using caution to prevent damaging the geotextile fabric. Prior to placement of the armor stone, the subtidal cap area abutting the shoreline will need to be installed. As shown on Figure 17, the shoreline armor is placed over the subtidal armor layer.

The geotextile fabric roll will be suspended from the excavator stick using a bridle and steel spreader bar. The fabric will be weighted with sand bags. Divers will ensure proper overlap of the fabrics. The fabric will be installed from the shoreline outward towards the deeper water. Once one “ribbon” is placed the next section will be placed from the channel back towards the shoreline with approximately 2 ft. of overlap. To efficiently and accurately place the fabric, the excavator will extend the boom and stick out and walk the machine down the barge unrolling he fabric in a straight line. The fabric will have to be weighted at the starting point to prevent it from slipping or pull away from the sediment surface as it is unrolled. Approximately two sections wide will be placed before capping operations begin. The cap material (sand, stone, etc.) leading edges (north to south) will be staggered so when the barge moves south, there will be an edge to connect to with the pervious layers (i.e., a staircase of different materials). Armor stone placement will include a toe berm to prevent armor layer failure, including but not limited to shearing of slope surfaces, pot holing of the cap surface or slippage of the armor exposing the underlying cap. The berm will interface with the subtidal armor layer as shown in Figure 17. Armor stone placement will occur from the subtidal toe interface to the sheet pile interface to prevent the rip rap from sliding during installation.

Verification of cap placement materials will be completed using visual inspection to ensure cap thickness and uniformity of placement. Push core samples will be collected if visual inspection indicates a potential discrepancy. Upon completion of each layer, an elevation survey will be completed to verify installed layer thickness and elevation utilizing GPS or suitable approved equivalent.

2.2.1.7 Subtidal Surface Preparation

Recent bathymetric surveys were reviewed for potential debris, but none are anticipated. Low tide assessment will be conducted during cap perimeter preparation. Any debris located will be removed prior to capping activities and disposed according to the *Generic Upper Harbor Hybrid Generic Work Plan* (Jacobs 2017b).

2.2.1.8 Subtidal Capping

Prior to interim cap activities, the perimeter of the cap will be dredged. The area is approximately 30 feet wide. The perimeter will include 10 feet into the cap area with a cut of 1.5 feet and an area 20 feet outside the cap area with a 6 inch cut. This activity is being conducted as part of the subtidal area I, N and O remediation outlined in the subtidal work plan submitted under separate cover (Jacobs 2018).

In addition, prior to interim cap activities, shallow areas within the cap footprint where the dock/barge could contact existing sediments at low tide will be covered with six inches of clean medium sand, to prevent suspension of existing PCB-contaminated sediments. The dredging will create a level surface for the subtidal cap toe placement.

Mechanical placement operations will include the use of 40-ft. by 200-ft. floating platform stabilized at each edge with hydraulic spud. Spuds will be placed in the excavated perimeter for stability. Stability calculations were conducted and are included as Appendix R. Typical platform construction is included as Figure 25. The floating platform will be located immediately south of the cap construction lane. The platform will be connected to the shoreline with ramps for access. The ramps at no time will rest on the sheet pile wall. The ramps will be hinged at the floating platform allowing for flexibility and raising of the ramps when the floating platform needs to be moved.

The floating platform will be moved after each capping lane is completed by use of a cable winch system using the sheet piles placed around the cap perimeter. The cable winches will avoid the use of work boats with potential propeller scour and resuspension in the cap area. If work boats are required to reset the cables, they will be operated at low propeller speed over the cap area.

An excavator equipped with a material handling clamshell or level cut bucket will place the layer materials in thin lifts. Methodology and equipment will be similar to that discussed in Section 2.2.1.6. Each lift will be a maximum of 3 inches. Each lift will be completed by the equipment operator positioning the bucket at the water line and slowly releasing the material evenly over the area. The capping excavator will be outfitted with a position and control system that accurately monitors the location and elevation to within 2-inch accuracy (DREDGEPACK or equivalent survey software system). The system will update the plan view with real time bucket position and color gradients to easily show the operator an updated color coded view of the cap surface. Quality assurance (QA) and quality control (QC) will be performed during cap placement activities, which is addressed in Sections 2.2.19 and 2.2.2. Materials will be delivered by dump truck or equivalent vehicle. Materials will be removed from the truck by the excavator and then placed over the cap area. Materials are not anticipated to be stockpiled on the floating platform. They will be delivered as needed using an off-road dump truck.

The existing subtidal bathymetric elevations vary between -4 ft. and -8 ft. NAVD88. Clean medium sand will be placed mechanically to smooth the existing elevation to a new surface of -6 ft. NAVD88. An additional 6 to 12 inches of clean medium sand will then be placed over the entire cap area. Areas with elevations between -4 ft. NAVD and -5 ft. NAVD88 are anticipated to have the thickest layer of OL. These areas will receive 12 inches of medium sand. It is anticipated at least 6 inches of mixing will occur. All other areas will receive 6 inches of medium sand. Care will be taken during placement to ensure minimal sediment disturbance during the initial sand placement. The cap area will be covered with clean medium sand, as described previously, prior to placement of the isolation area.

The isolation layer consisting of 15 percent organoclay and 85 percent medium sand by weight will be installed over the entire cap lane. Mixing of the organoclay and sand will require onsite blending that will occur in batches, as needed, at the designated capping material stockpile area. Batches will consist of material weighing a total of up to 100 tons. Each batch will be numbered and corresponding weight of components blended will be documented. The proportional blending of organoclay and sand will ultimately be dependent on the organoclay source density and the organoclay percentage needed to achieve the desired permeability. Blending of sand and organoclay will be conducted by loading materials into two variable speed feed hopper drives conveying material into a quad-screw feed hopper. Each hopper has discharge opening baffles that can be adjusted, along with the speed of the belt, to attain desired mix ratios. Initially, approximate known volumes will be loaded to each hopper and adjustments will be made as necessary to calibrate to the desired feed/flow rates. The blended material will exit the quad-screw hopper and conveyed to a small blended pile. Blending of the material will be completed to the satisfaction of the QC staff and visual observations for homogeneity.

Samples will be laboratory tested for differences in bulk density and specific gravity to determine the percent weight of organoclay present. Samples will be collected to verify proper mixing.

This layer finish elevation will meet the shoreline isolation layer elevation. This will provide a continuous isolation layer. The isolation layer will be covered by 6 inches of medium sand. This layer will provide the surface necessary for bioturbation. The armor layer will then be placed over the entire cap lane and will consist of 1 ½ inch washed

stone. The subtidal armor layer will approach the shoreline cap and be covered by the shoreline armor (see Figure 17).

The subtidal cap toe, see Figure 20, will be constructed into the pre-capping dredge area. The layers will be placed as shown, so that the medium sand mixing layer will be at the bottom of the dredge area, followed by 6 inches of the isolation layer. The cap layers will continue with the medium sand bioturbation layer and the armor stone. A toe will be constructed to prevent the armor layer from sliding. During subtidal cap placement, resuspension of sediments will be minimized.

2.2.1.9 NAPL Contingency Measures

During the course of subtidal sediment interim cap and armor stone placement, a variety of preventative controls measures may be implemented. These measures may be deployed during construction to minimize potential NAPL impacts to NBH in the event NAPL is observed. Prior to initiating interim cap construction, turbidity controls such as silt curtains or equivalent method will be deployed. An absorbent boom will be installed with the turbidity control. During cap construction, sorbent materials will be available for deployment if visible NAPL is observed. The potential exists for NAPL to be present in areas of shallow elevations (between -4 ft. and -6 ft. NAVD88).

If during construction NAPL is observed in the work area, work in the immediate area will temporarily cease, and absorbent materials will be deployed. EPA will be notified of the observation. Appropriate measures will be implemented on a location-specific basis.

2.2.1.10 Cap Placement and In Situ Sampling

Cap materials will be placed mechanically in thin lifts of no more than 3 in. Each lift will be placed and allowed to settle to the sediment surface before successive lifts are added, thus minimizing bottom disturbance.

Prior to delivery of all cap materials, samples will be provided for visual inspection and testing. Material suppliers will be required to provide gradation certifications prior to delivery. All loads will be visually inspected to ensure the materials meet the requirements and are free of deleterious materials. If visual inspection indicates changes in material quality or consistency, materials will be tested prior to use. Testing requirements are included in Section 2.2.2.

Cap materials will be staged and mixed, if necessary, onsite in the staging areas proposed at the former Aerovox facility or the Area C facility on Sawyer Street. Isolation layer materials will be tested prior to placement, at a frequency of once per 500 cy, to ensure the minimum organoclay content of 15 percent by weight was obtained. Once the materials are prepared and approved for placement, the materials will be placed in controlled, thin, accurate layers via mechanical means using a monitoring system DREDGEPACK or approved equivalent. Placement methodology and equipment are detailed previously in Section 2.2.1.6. Mechanical placement will be designed to optimally dissipate the energy and flow of sand placement. Verification of cap placement materials will be completed using visual, catch pans and push core samples. Samples will be collected at the completion of each layer or when visual inspection indicates a potential discrepancy. Samples will be collected using 100-ft. square grids, see Figure 31 for locations. Elevation surveys will be conducted after sample collection verifies the appropriate layer thickness was installed. Surveys will be used to record cap thickness and elevation for each installed layer.

2.2.2 Construction Quality Control

The Construction Quality Control plan developed by Jacobs (Jacobs 2017c) establishes project specific QC plans that also apply to work conducted by subcontractors, fabricators and suppliers. Effective implementation of the detailed QA/QC procedures, requirements and reports developed from this plan ensure the completed work is in compliance with the applicable work contract requirements. This CQC Plan is available for review under separate cover. In addition to the requirements specified in the CQC Plan, interim capping QA activities will require documentation of capping materials and subsequent placement. Cap materials will be visually inspected prior to placement to ensure no objectionable or deleterious content is present. In addition, material suppliers will be required to provide documentation of granular material source as well as the following:

- Grain Size (ASTM D422-63).
- *In Situ* Moisture Content (ASTM 2216).
- Uncompacted weight per unit volume (ASTM D5057).
- Specific Gravity (ASTM D5057).

Materials testing listed above will be provided prior to initial material delivery and every 1,000 cy. The interim cap construction will require documentation of each layer's thickness and extent. This will be achieved using various industry accepted measurement techniques including but not limited to:

- Mechanical placement using RTK GPS.
- Belt scale.
- Manual calculations based upon material volume fed to a belt or hopper system.
- Physical *in situ* measurement with catch pans, push core or equivalent technique that collects a relatively undisturbed sample of the placed material.

Compliance with minimum layer thickness will be based on verification of the minimum specified thickness over 80 percent of the area with 90 percent confidence or greater. To meet the statistical criteria, it is anticipated that 95 percent or more of the samples will meet the minimum thickness.

2.2.3 Drainage Features and Utilities

Existing outfalls at and around the former Aerovox facility include two surface culverts (the north and south trenches), one storm drain outfall pipe that penetrates through the sheet pile wall, surficial runoff associated with the end of Graham Street, a potentially abandoned sewer outfall from Precix to NBH and the Hadley Street storm sewer outfall. See Figure 32. For any outfalls that are considered active or for which the status could not be confirmed, protective measures (e.g., outfall aprons, armor stone) will be put in place to protect the sediment cap from surface scour. In the absence of location-specific design hydraulic data, during the design process, conservative hydraulic energy grades and/or discharge velocities have been used to determine the appropriate stone size for and/or the need for additional protective measures. The invert elevation of active pipes has also been considered prior to armor stone placement, and as necessary, some pipes will be extended to facilitate the flow of discharge water. Details related to the protective measures selected for the outfalls scheduled to be maintained are included in Figures 33 and 34. Calculations relative to outfall velocity and erosion control are in Appendix S.

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3. Periodic Inspection and Monitoring of Cap Effectiveness

As part of the ongoing ROD activities, an interim cap inspection and monitoring plan will be developed to specify the sampling and monitoring program needed to ensure the cap system meets the design standards. The plan will include sample locations and monitoring procedures, as well as analyses, data quality objectives (DQOs) and QA/QC procedures.

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Figures

Legend

N

0 600 Feet

1:7,200

Aerial Photography MASSGIS 2009

JACOBS™

NBH Area Map

New Bedford Harbor Superfund Site

NAME: jpiccuito Date: 2/26/2013

Figure 1

Path: Y:\NBH\Projects\35BG0708\20130225\ArcGIS\Aerovox_NBH_Location_Map_Final.mxd

Legend

Sheet Pile Location

Aerial Photography MASSGIS 2014

0 50 100 Feet

1:1,200

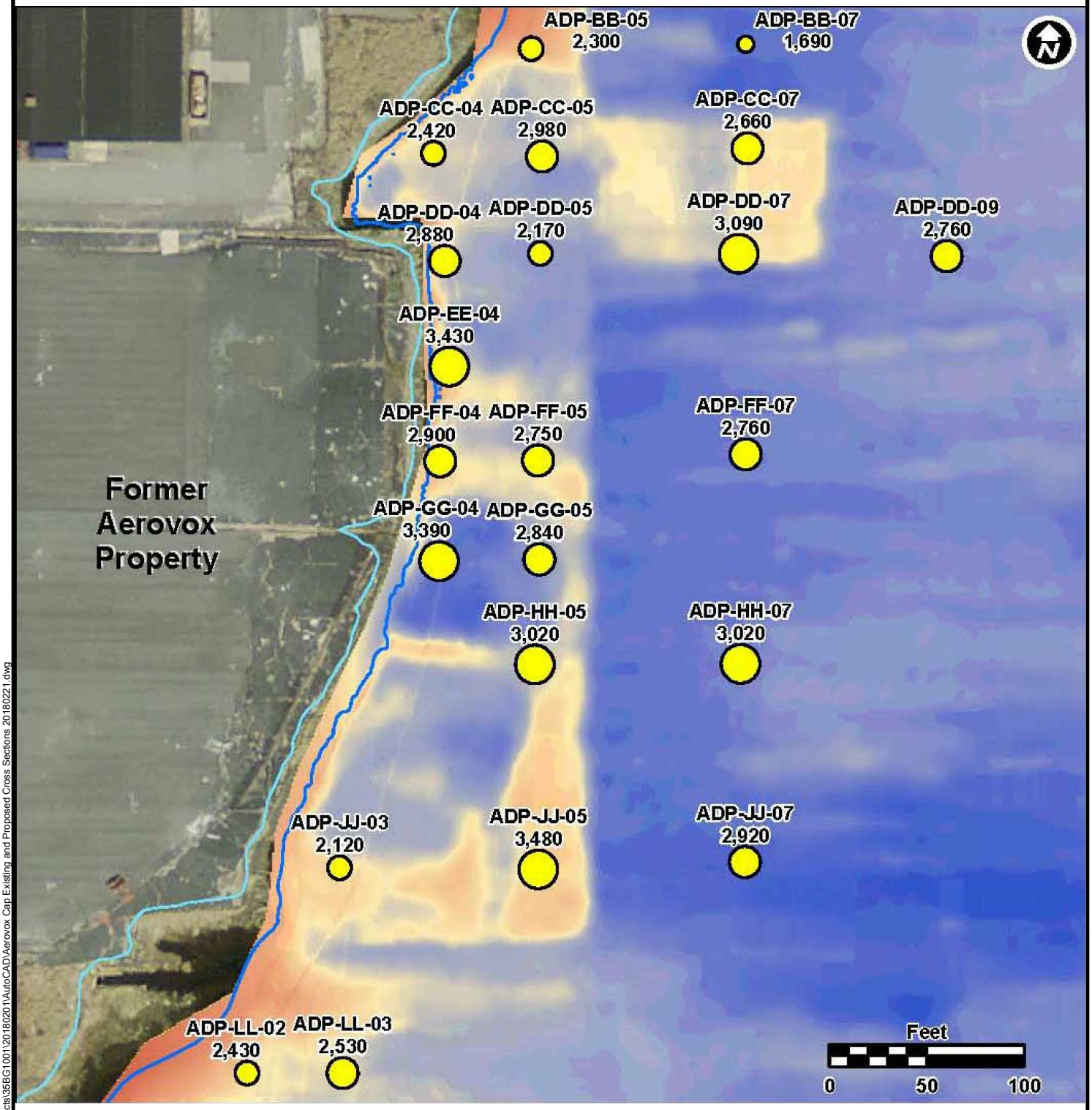
JACOBS

Former Aerovox Site Plan

New Bedford Harbor Superfund Site

NAME: gscott Date: 4/12/2018 **Figure 2**

Path: Y:\NBHP\Projects\35BG1001\20180201\ArcGIS\Figure_2_Aerovox_Site_Plan_20180319.mxd



Legend

Final Aerovox Passive Sampler Report, Battelle, 2017

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

1 2 3 4 5 6 7 8 9 10

MHHW
MLLW

PCB (ng/L)
- <2,000
- 2,000 - <2,500
- 2,500 - <3,000
- ≥3,000

JACOBS™

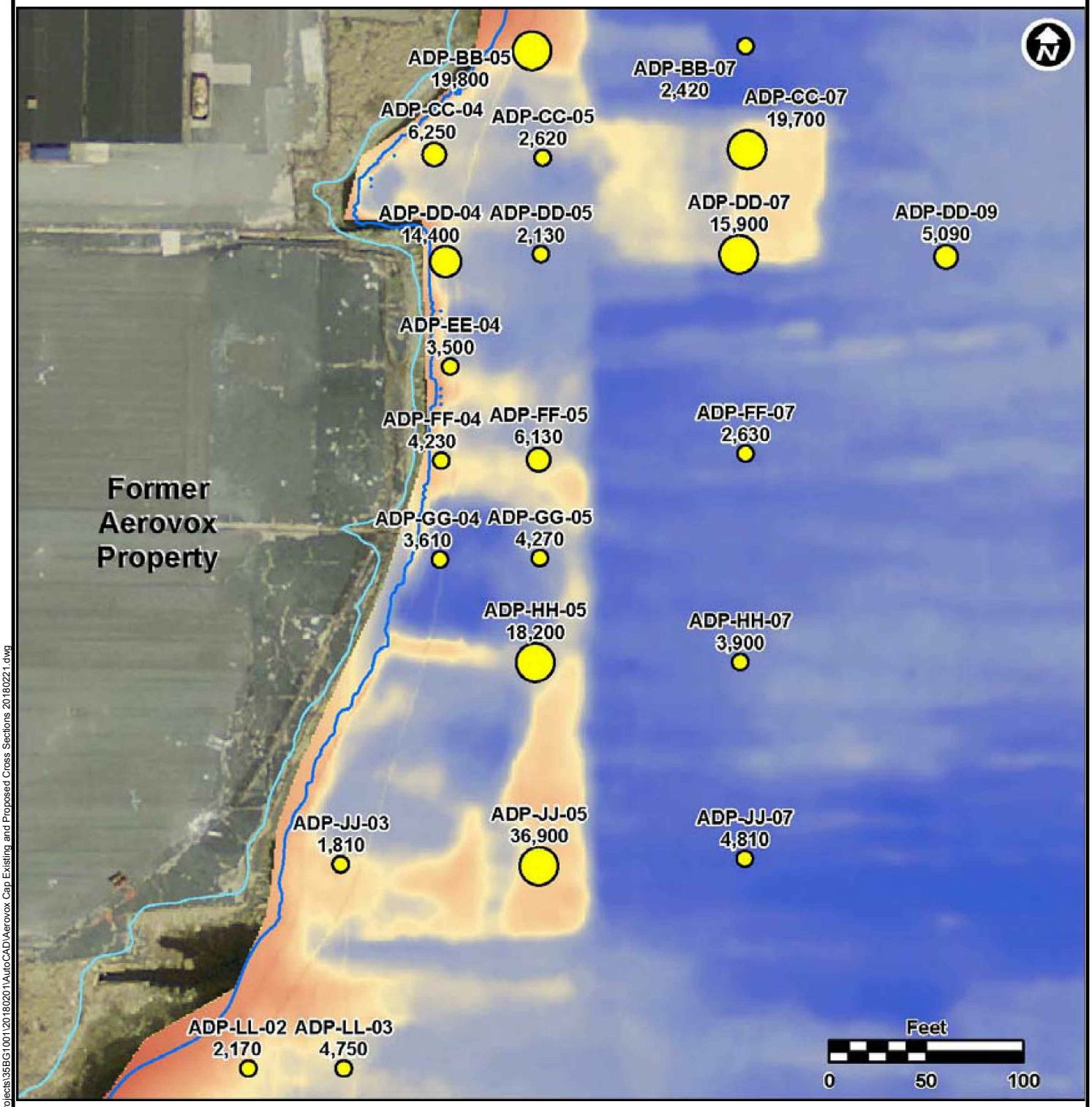
Passive Sampler
Surface Water Sampler Results
PCB Concentration (ng/L)

New Bedford Harbor Superfund Site

02/21/18 | Figure 3

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg

last modified: 02/21/18 printed: 02/21/18 by sc



Legend

Final Aerovox Passive Sampler Report, Battelle, 2017

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

1 2 3 4 5 6 7 8 9 10

MHHW
MLLW

PCB (ng/L)
- <5,000
- 5,000 - <10,000
- 10,000 - <15,000
- ≥15,000

JACOBS™

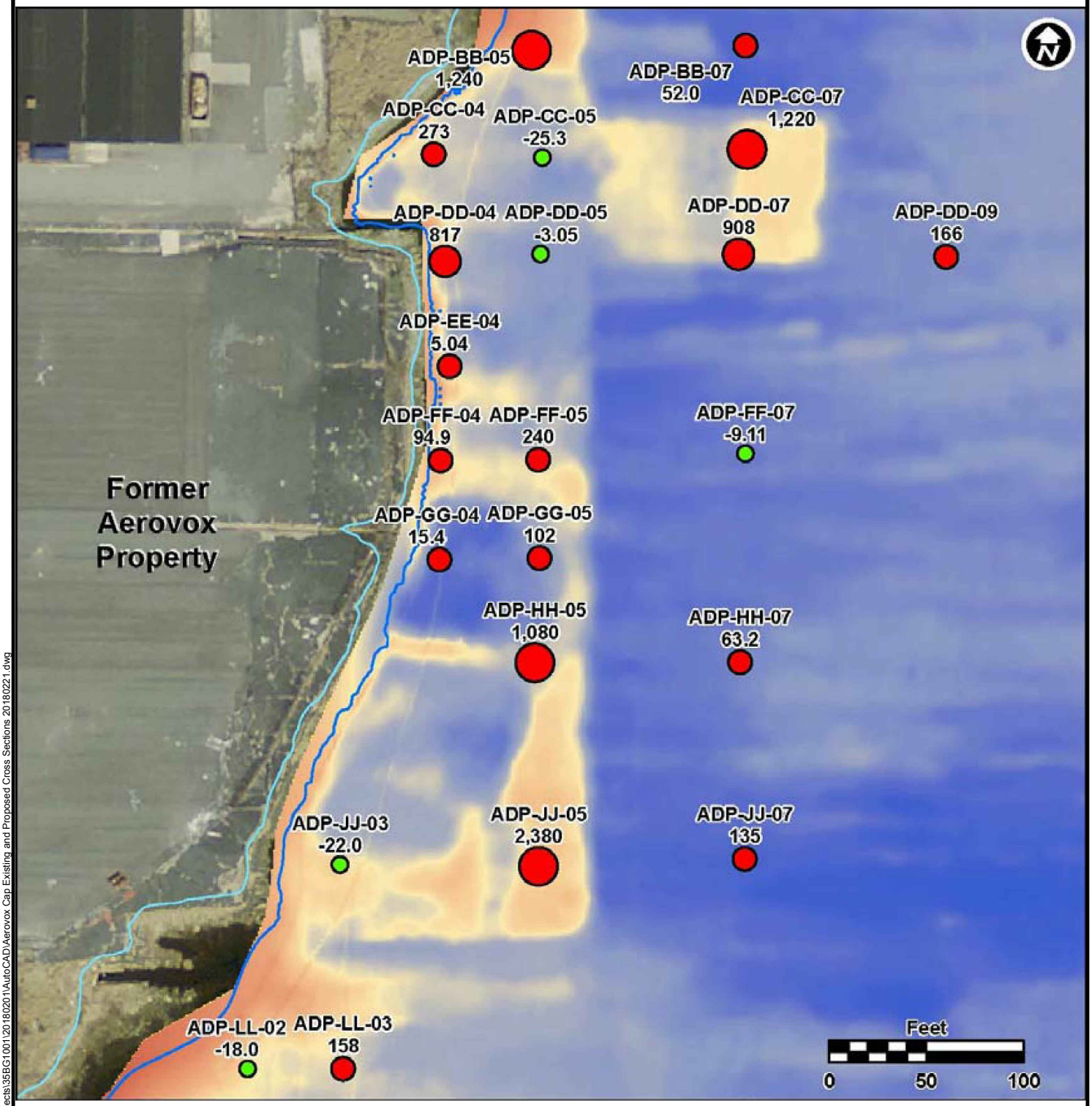
Passive Sampler
Sediment Pore Water Results
PCB Concentration (ng/L)
New Bedford Harbor Superfund Site

02/21/18

Figure 4

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg

last modified: 02/21/18 printed: 02/21/18 by sc



Legend

Final Aerovox Passive Sampler Report, Battelle, 2017

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

1 2 3 4 5 6 7 8 9 10

MHHW
MLLW

PCB Flux (mg/m²/yr)

- <0
- 0 - <500
- 500 - <1,000
- ≥1,000

JACOBS™

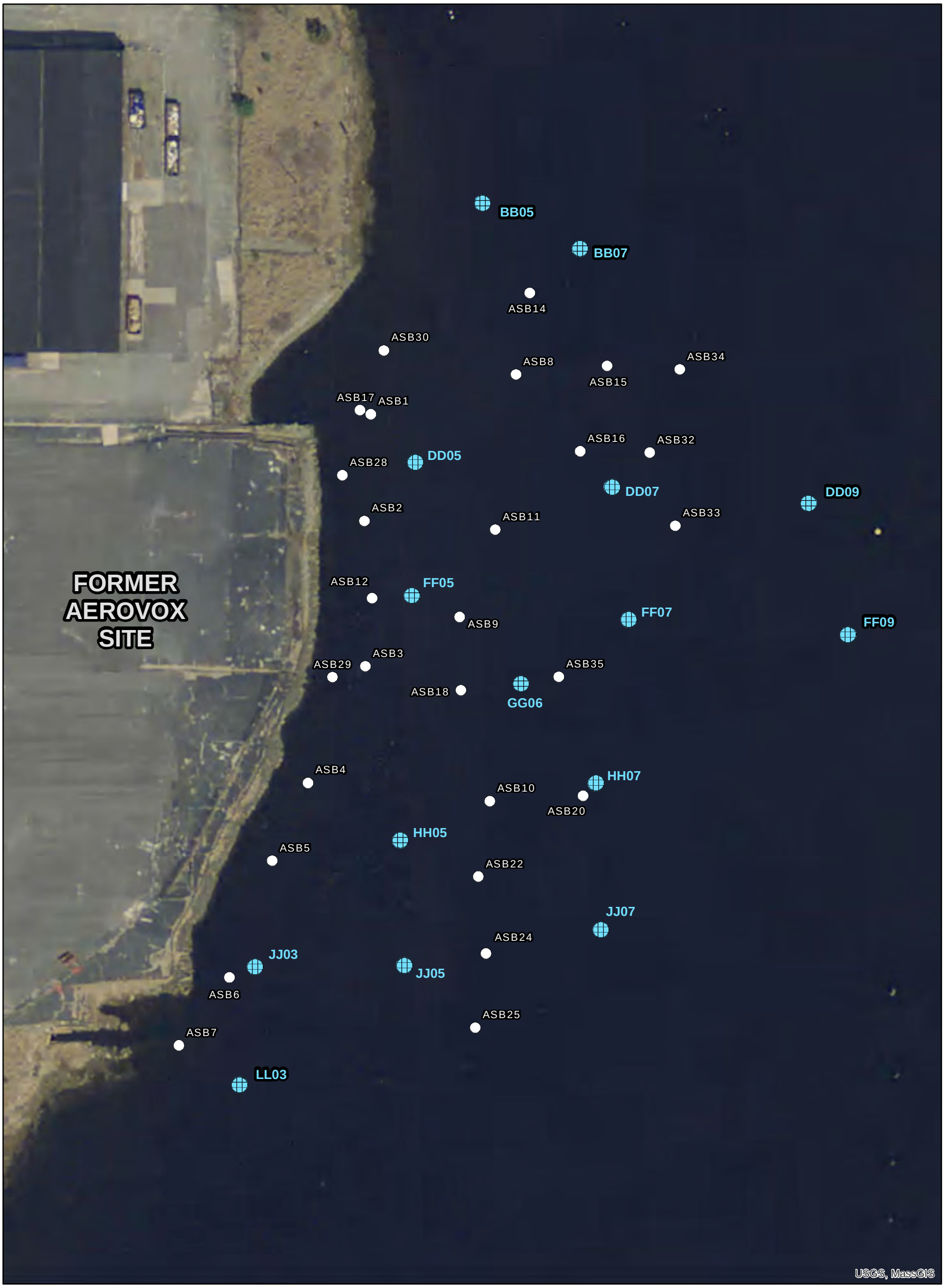
Passive Sampler
Diffusive Flux
PCB Flux (mg/m²/yr)

New Bedford Harbor Superfund Site

02/21/18 | Figure 5

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg

last modified: 02/21/18 printed: 02/21/18 by sc



Legend

- Aerovox Boring Location
- Aerovox Microwell Location

N

0 30 60 Feet 1:720

JACOBS

Boring and Microwell Locations
September - October 2017

New Bedford Harbor Superfund Site

Date: 2/21/2018

Figure 6

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox Borings and Microwell Locations_20180221.mxd

Legend

Aerovox Boring Location

Aerovox Sonic Boring Location

N

0 25 50 Feet 1:600

JACOBS

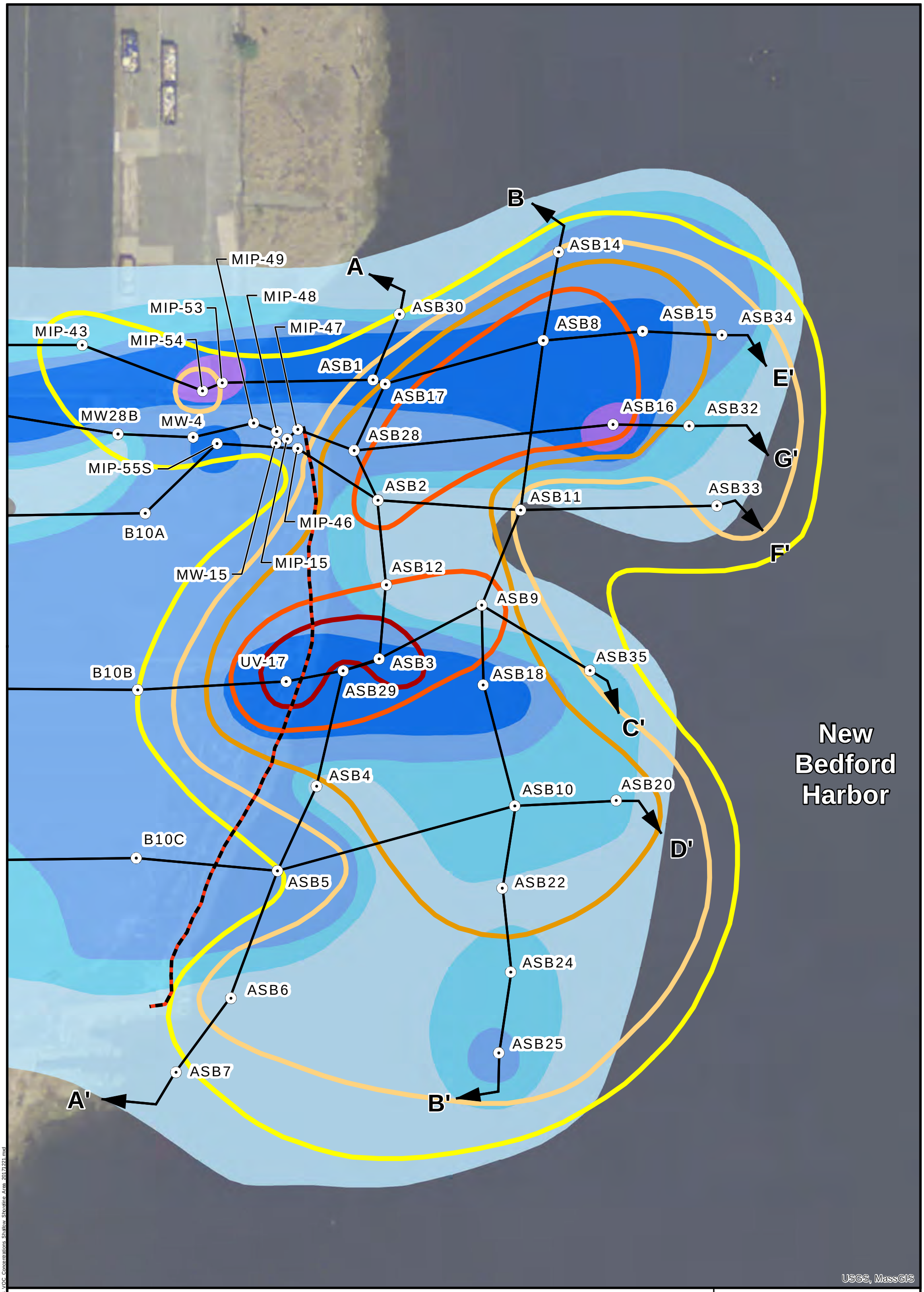
Soil Boring Locations
September - October 2017

New Bedford Harbor Superfund Site

Date: 7/5/2017

Figure 7

Path: Y:\NBH\Projects\35BG1001\20170629\ArcGIS\Aerovox_boring_locations_sampling_20170705.mxd



Legend

- Aerovox Boring Location
- Aerovox Cross Section Location
- Sheet Pile Location

Shallow Soils/Sediments
Aerovox Site: 0-13 ft bgs
New Bedford Harbor: 0-7 ft bgs

Total VOC
Concentration (mg/kg)
- 1-10
- 10-100
- 100-1,000
- 1,000-10,000
- >10,000

Total PCB
Concentration (mg/kg)
- 1-10
- 10-100
- 100-1,000
- 1,000-10,000
- >10,000

0 20 40 Feet 1:600

Aerial Photography MASSGIS 2014

JACOBS

PCB and VOC Distribution Map
Shallow Soils/Sediments

New Bedford Harbor Superfund Site

Date: 12/21/2017 | Figure 8

Path: Y:\NBH\Projects\35BG1001\20171219\ArcGIS\Aerovox_PCB_VOC_Concentrations_Shallow_Shoreline_Area_20171221.mxd

Legend

- Aerovox Boring Location
- Aerovox East - West Cross Section Location
- Aerovox North - South Cross Section Location
- Sheet Pile Location
- Proposed 1 ft. Contour (NAVD88)
- Shoreline Cap Area
- Seaward Extent of Cap

Aerial Photography MASSGIS 2014

75 37.5 0 75 Feet

1:900

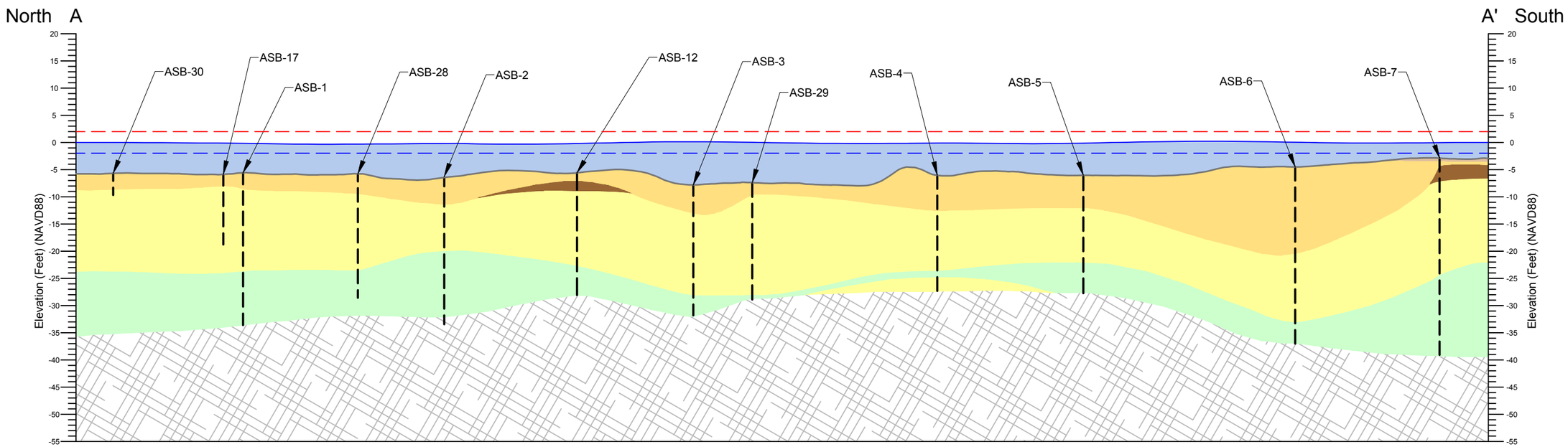
JACOBS

Cross Section Locations for Cap Area Showing Proposed Finished Surface Contours Zone 3

New Bedford Harbor Superfund Site

NAME: gscott Date: 4/19/2018 **Figure 9**

Path: Y:\NBHP\Projects\35BG1001\20180201\ArcGIS\Figure_9_Aerovox_XSect_Finish_1ft_Contours_in_Zone_3_20180319.mxd



Legend

- Aerovox Boring Location
- Elevation Line
- MHHW (NAVD88)
- MLLW (NAVD88)
- Harbor Water
- Marine Deposits
- Glacial Outwash
- Glacial Till
- Peat
- Fill
- Retaining Wall
- Bedrock

0 V: 20 H: 40
Scale in Feet

JACOBS™

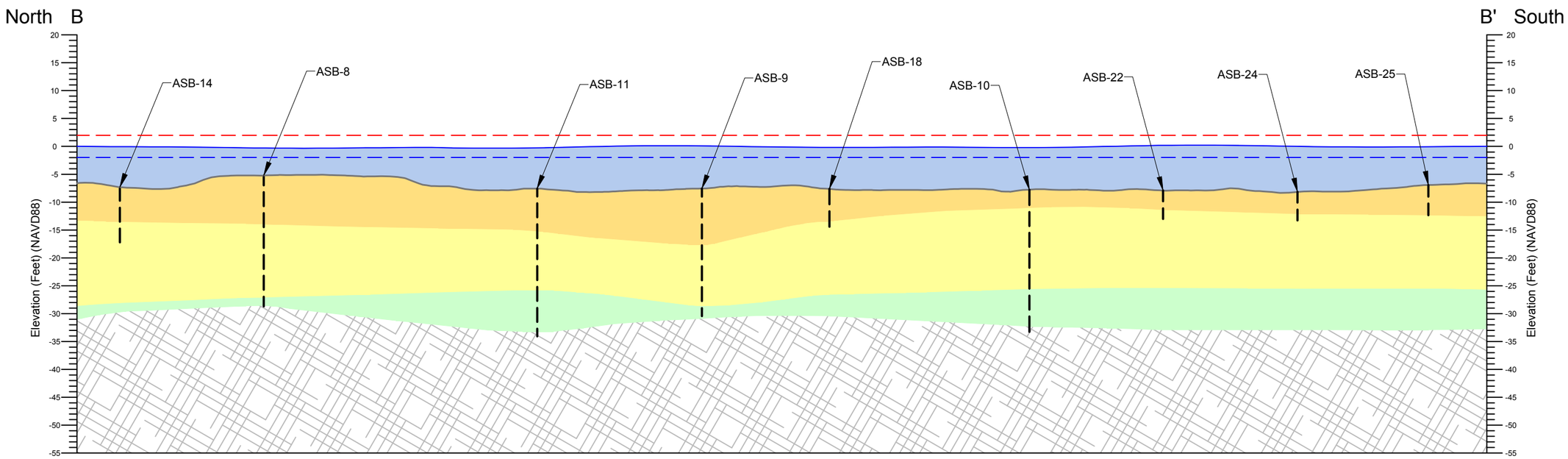
Aerovox Cross Section A - A'

New Bedford Harbor Superfund Site

02/09/18

Figure 10

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottgal\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

- Aerovox Boring Location
- Elevation Line
- MHHW (NAVD88)
- MLLW (NAVD88)
- Harbor Water
- Marine Deposits
- Glacial Outwash
- Glacial Till
- Peat
- Fill
- Retaining Wall
- Bedrock

0 V: 20 H: 40
Scale in Feet

JACOBS™

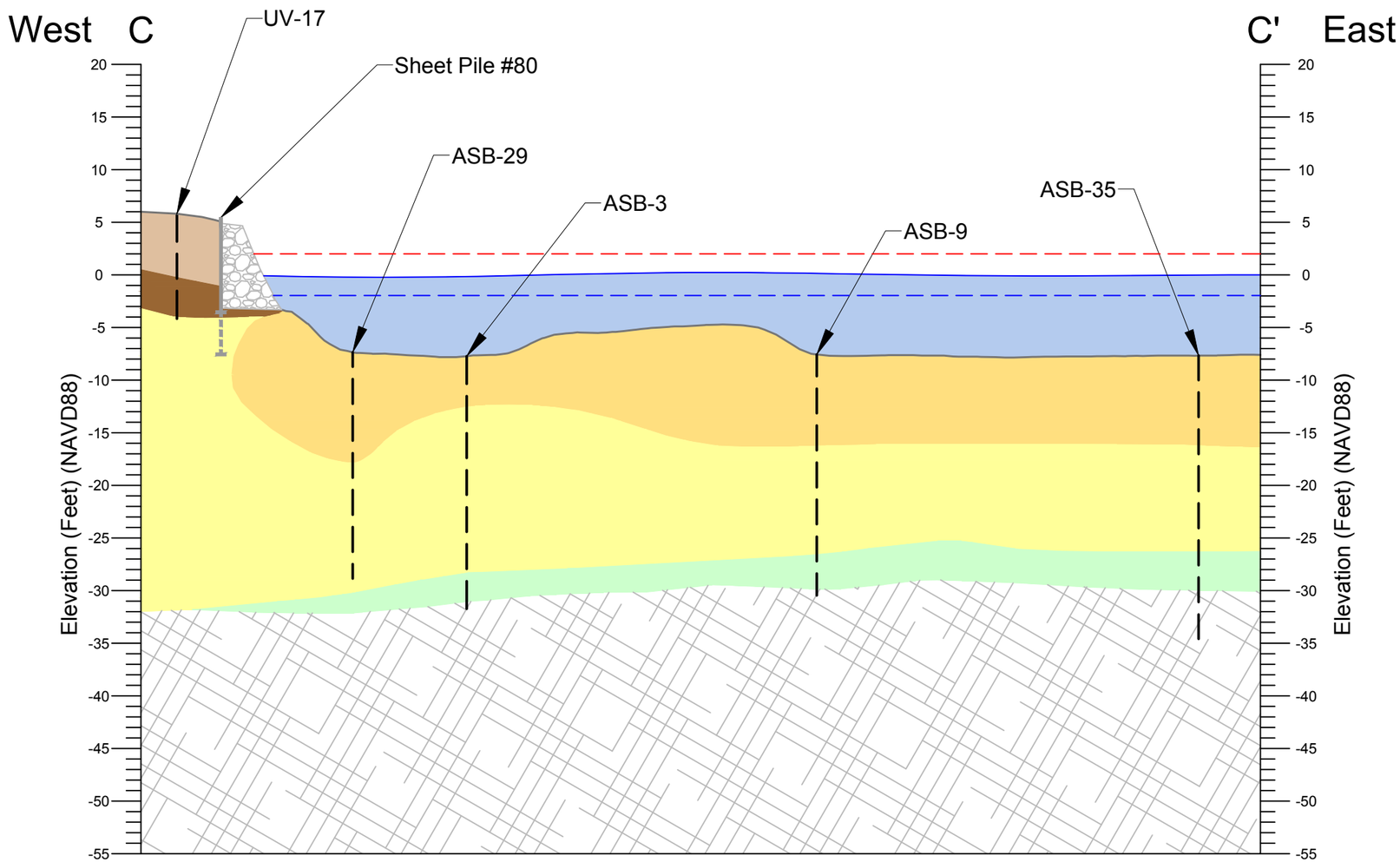
Aerovox Cross Section B - B'

New Bedford Harbor Superfund Site

02/09/18

Figure 11

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottga\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

Aerovox Boring Location

Elevation Line

MHHW (NAVD88)

MLLW (NAVD88)

Harbor Water

Marine Deposits

Glacial Outwash

Glacial Till

Peat

Fill

Retaining Wall

Bedrock

Sheetpile # 95

Sheetpile at 9 ft bgs

Sheetpile at 13 ft bgs

ft bgs = feet below ground surface

0

V: 15
H: 30

Scale in Feet

JACOBS™

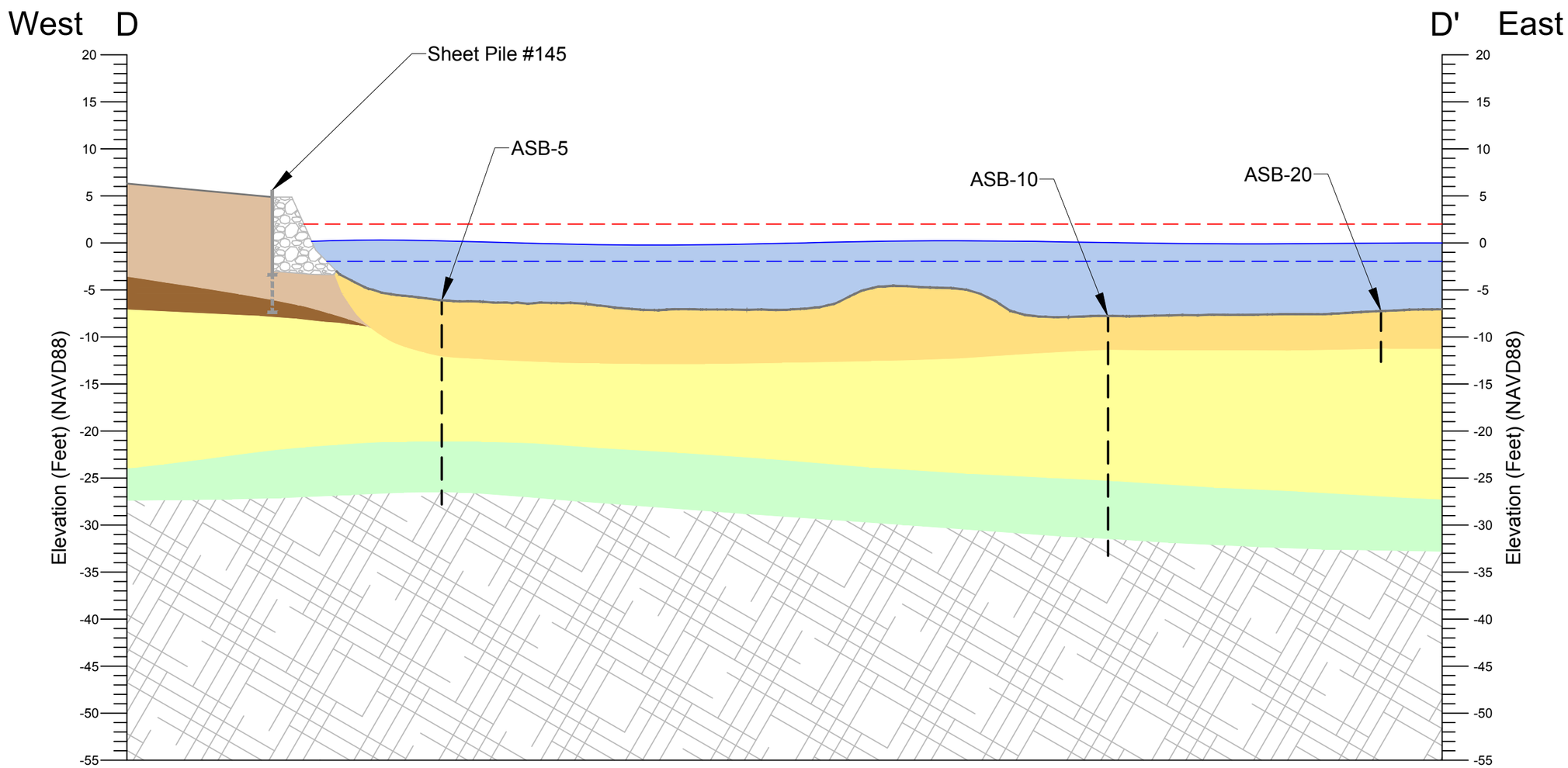
Aerovox Cross Section C - C'

New Bedford Harbor Superfund Site

02/09/18

Figure 12

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottgat\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

Aerovox Boring Location

Elevation Line
MHHW (NAVD88)
MLLW (NAVD88)

Harbor Water
Marine Deposits
Glacial Outwash
Glacial Till
Peat
Fill
Retaining Wall
Bedrock

Sheetpile # 95
Sheetpile at 9 ft bgs
Sheetpile at 13 ft bgs

ft bgs = feet below ground surface

0 V: 15 H: 30
Scale in Feet

JACOBS™

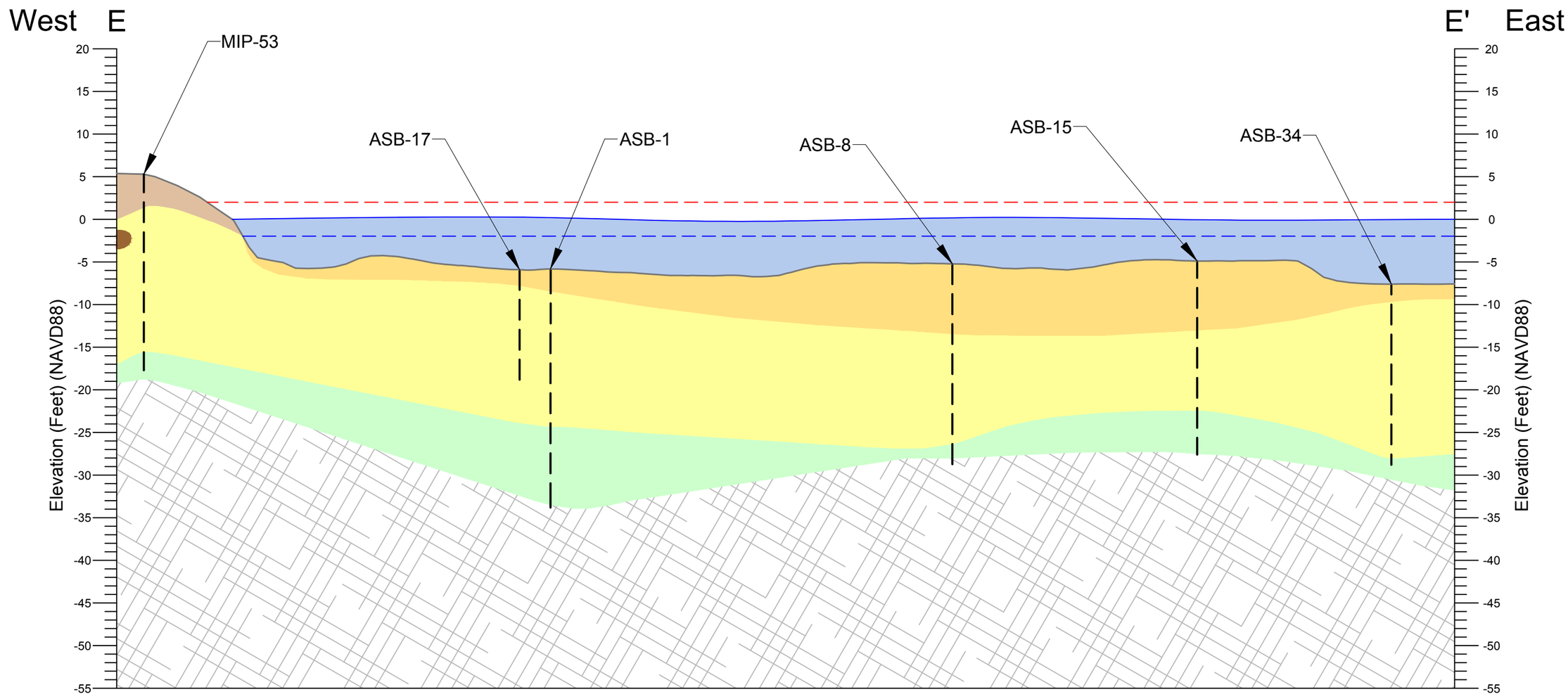
Aerovox Cross Section D - D'

New Bedford Harbor Superfund Site

02/09/18

Figure 13

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottga\Documents\NBH_2017-Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

- Aerovox Boring Location
- Elevation Line
- MHHW (NAVD88)
- MLLW (NAVD88)
- Harbor Water
- Marine Deposits
- Glacial Outwash
- Glacial Till
- Peat
- Fill
- Retaining Wall
- Bedrock

0 — V: 15 H: 30 — Scale in Feet

JACOBS™

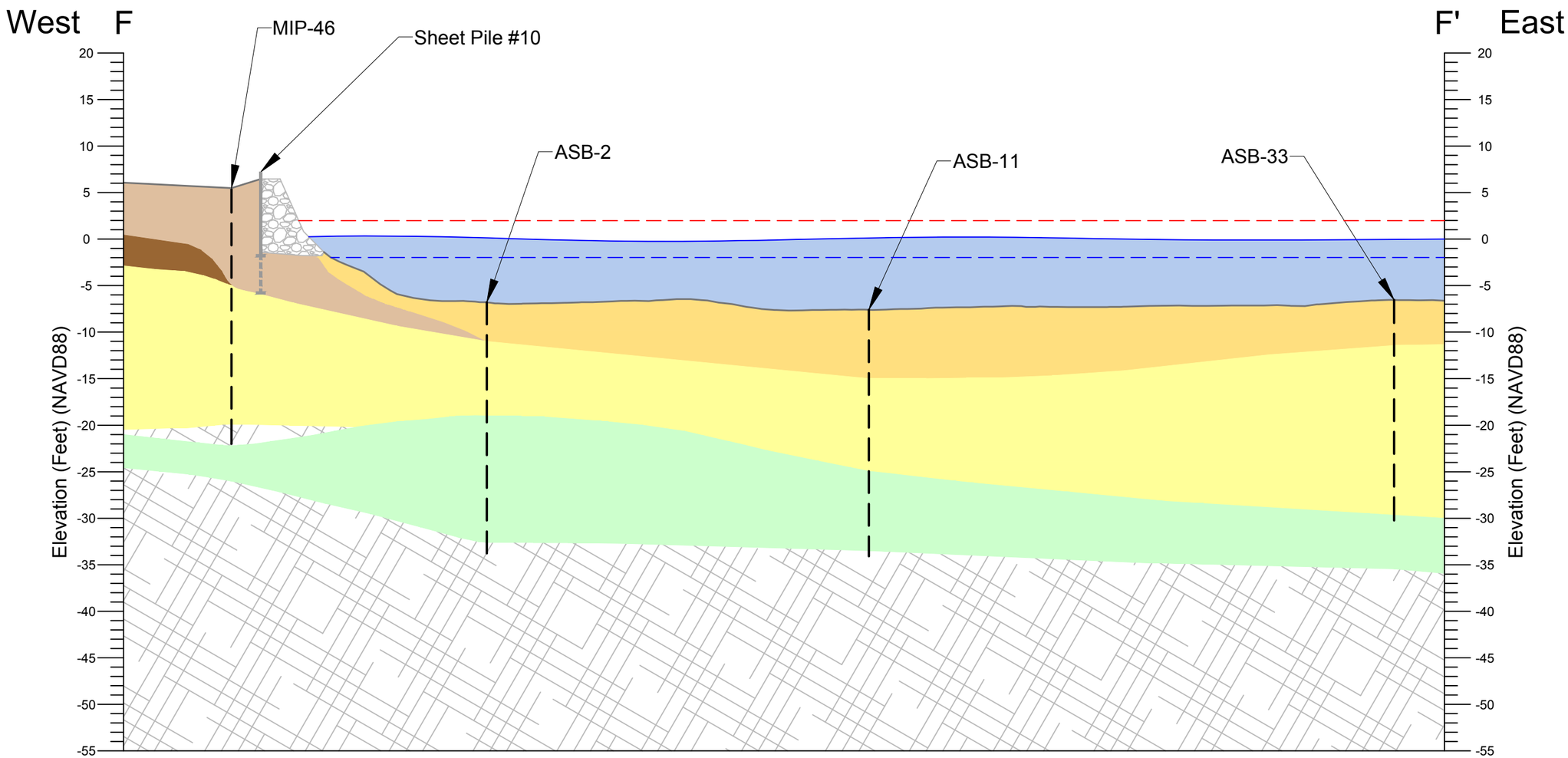
Aerovox Cross Section E - E'

New Bedford Harbor Superfund Site

02/09/18

Figure 14

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottga\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

Aerovox Boring Location

Elevation Line
MHHW (NAVD88)
MLLW (NAVD88)

Harbor Water
Marine Deposits
Glacial Outwash
Glacial Till
Peat
Fill
Retaining Wall
Bedrock

Sheetpile # 95
Sheetpile at 9 ft bgs
Sheetpile at 13 ft bgs

ft bgs = feet below ground surface

0
V: 15
H: 30
Scale in Feet

JACOBS™

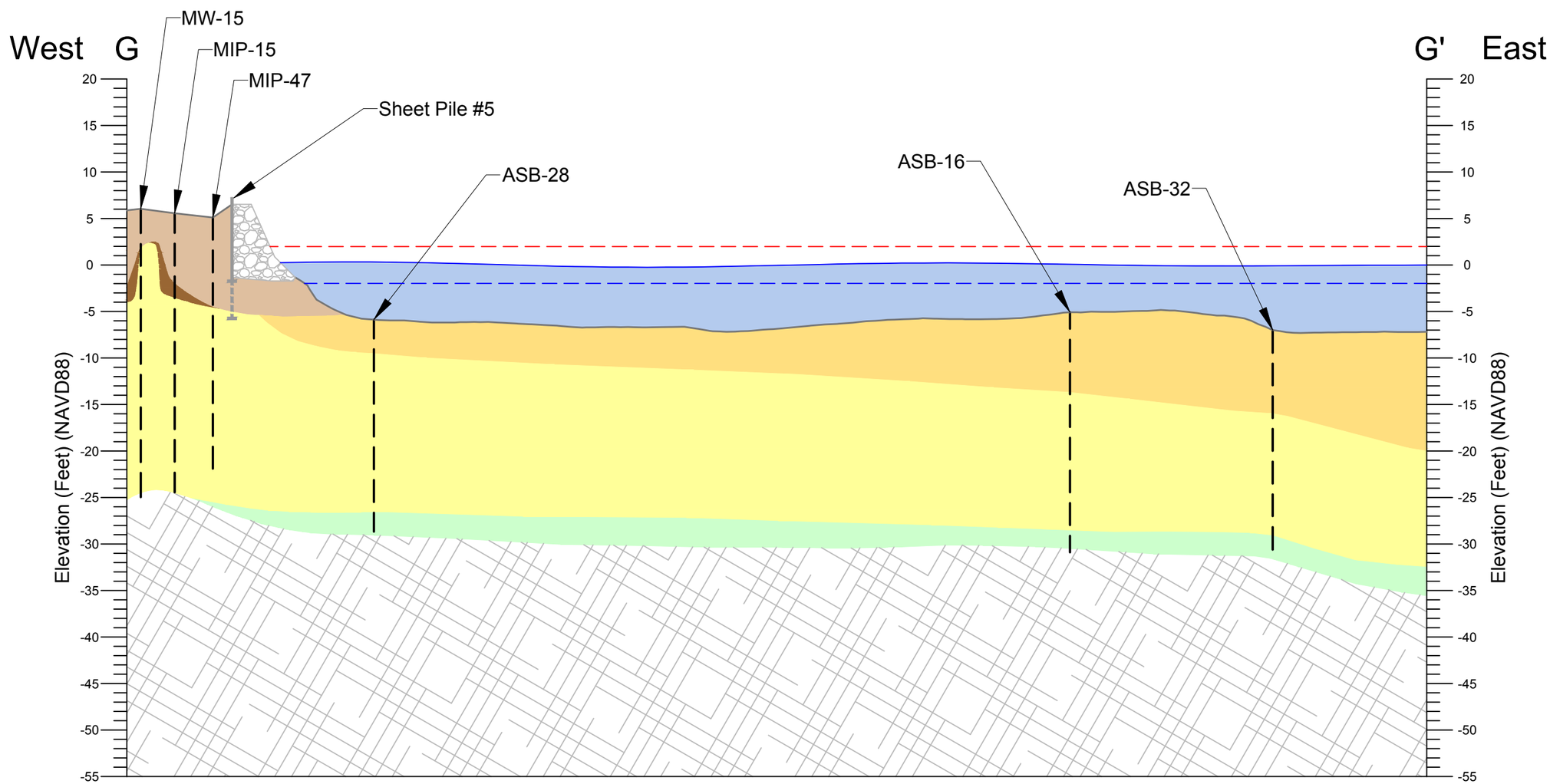
Aerovox Cross Section F - F'

New Bedford Harbor Superfund Site

02/09/18

Figure 15

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottga\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Legend

Aerovox Boring Location

Elevation Line
MHHW (NAVD88)
MLLW (NAVD88)

Harbor Water
Marine Deposits
Glacial Outwash
Glacial Till
Peat
Fill
Retaining Wall
Bedrock

Sheetpile # 95
Sheetpile at 9 ft bgs
Sheetpile at 13 ft bgs

ft bgs = feet below ground surface

0
V: 15
H: 30
Scale in Feet

JACOBS™

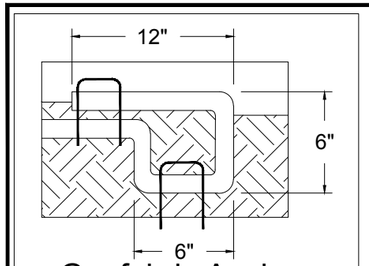
Aerovox Cross Section G - G'

New Bedford Harbor Superfund Site

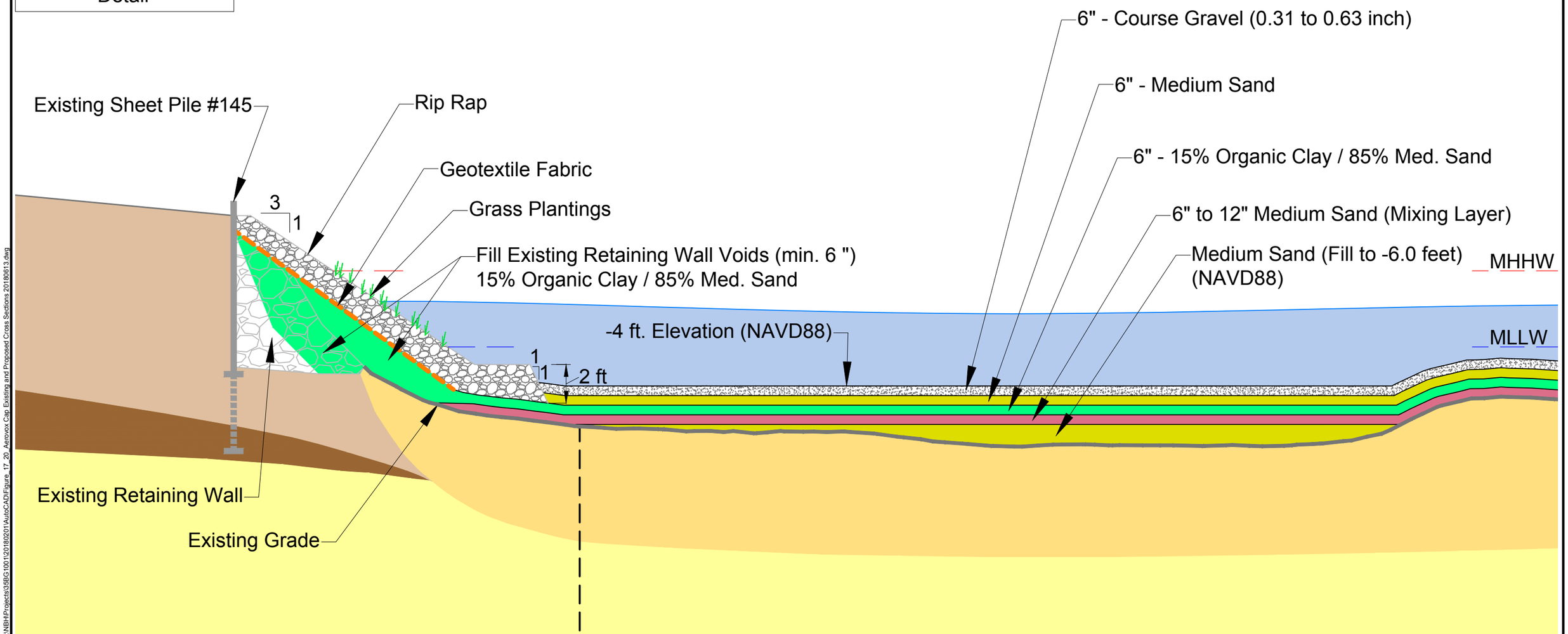
02/09/18

Figure 16

last modified: 02/09/18 printed: 02/09/18 by sc:C:\Users\scottgal\Documents\NBH_2017\Aerovox Cross Sections for Beth\Aerovox Cap Cross Sections 20180207.dwg



Geofabric Anchor Detail



Legend

- Aerovox Boring Location
- Existing Grade
- MHHW (1.99 ft, NAVD88)
- MLLW (-1.97 ft, NAVD88)
- Harbor Water
- Marine Deposits
- Glacial Outwash
- Glacial Till
- Peat
- Fill
- Retaining Wall
- Bedrock

Sheetpile # 95

Sheetpile at 9 ft bgs

Sheetpile at 13 ft bgs

ft bgs = feet below ground surface

Elevation Data: NAVD88

0 5 V: 5 H: 10

Scale in Feet

JACOBS™

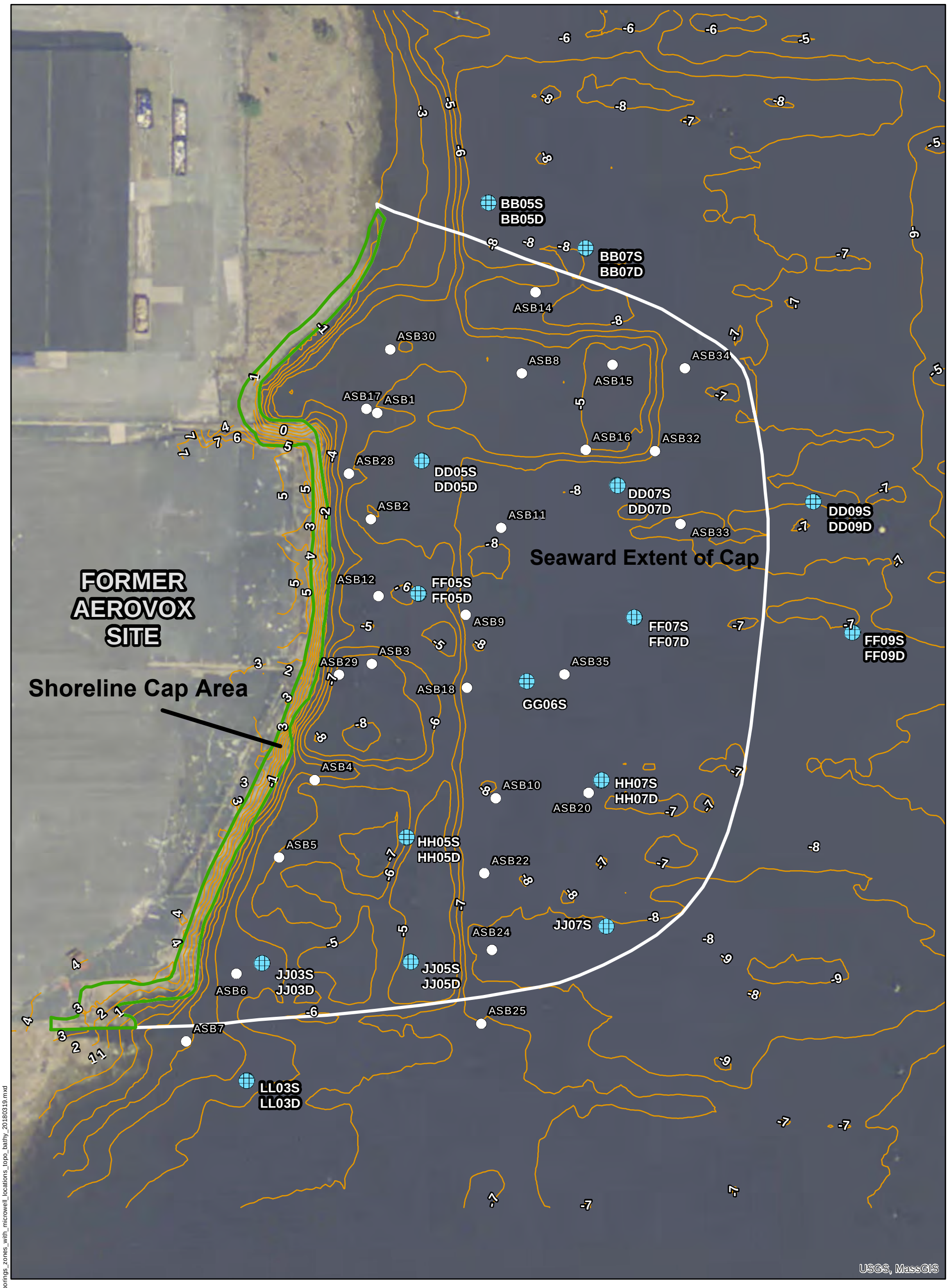
Aerovox Cross Section

Typical Shoreline and Subtidal Cap Detail

New Bedford Harbor Superfund Site

06/13/18 | Figure 17

last modified: 06/13/18 printed: 06/13/18 by sc: Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Figure_17_20_Aerovox Cap Existing and Proposed Cross Sections 20180613.dwg



Legend

Elevation Data NAVD88

- Aerovox Boring Location
- Aerovox Microwell Location
- 1ft contours line (Dec 2017)
- Shoreline Cap Area
- Seaward Extent of Cap

N

0 30 60 Feet 1:720

JACOBS

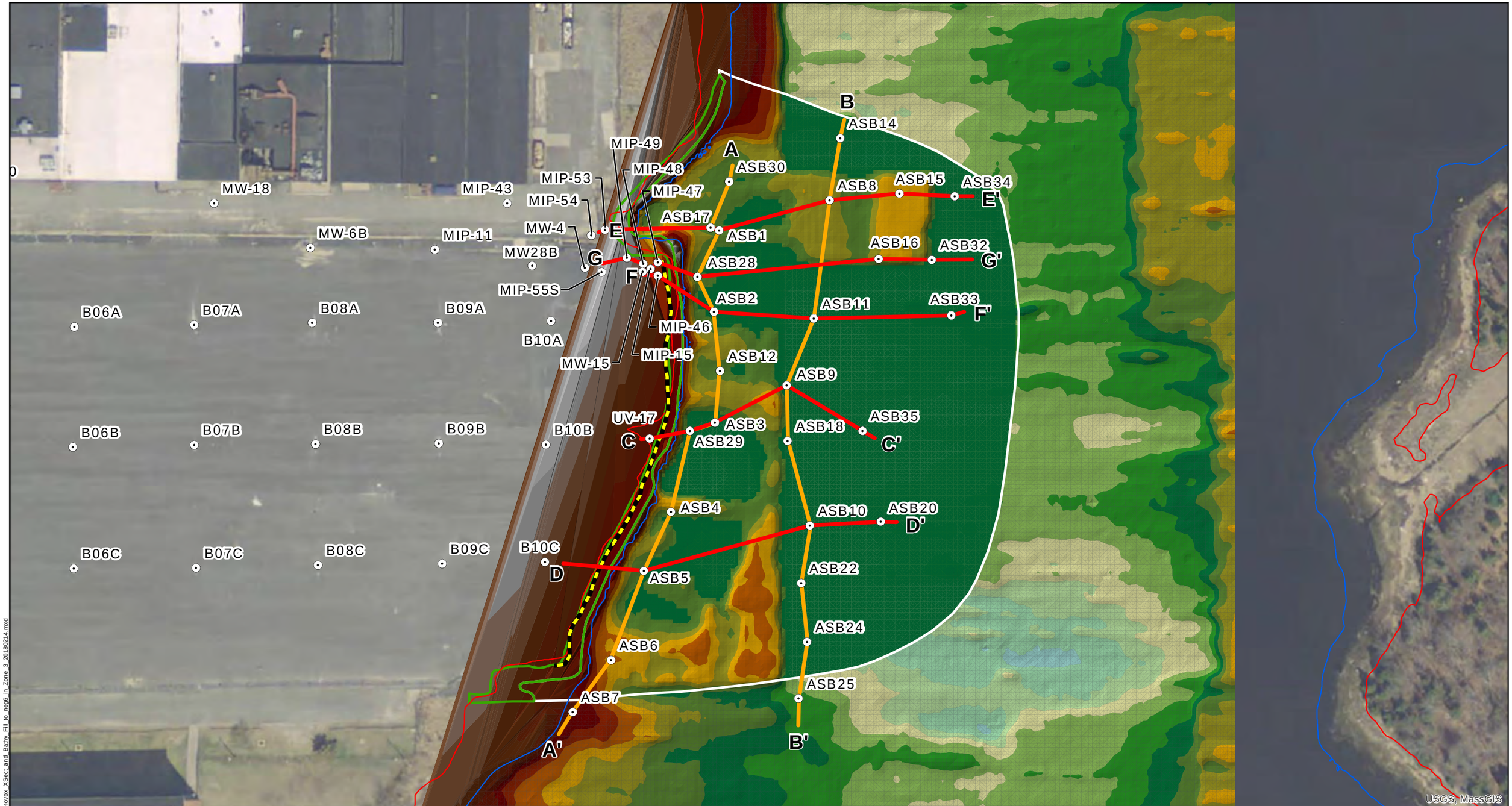
Existing NBH Bathymetric Elevations 1ft Contours

New Bedford Harbor Superfund Site

Date: 3/19/2018

Figure 18

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Figure_18_Aerovox_borings_zones_with_microwell_locations_topo_bathy_20180319.mxd



Legend

- Aerovox Boring Location
- Aerovox East - West Cross Section Location
- Aerovox North - South Cross Section Location
- Sheet Pile Location
- Shoreline Cap
- Seaward Cap

Bathymetry (NAVD88 Feet)

1 - 1.5	-2.5 - -2	-6 - -5.5
0.5 - 1	-3 - -2.5	-6.5 - -6
0 - 0.5	-3.5 - -3	-7 - -6.5
-0.5 - 0	-4 - -3.5	-7.5 - -7
-1 - -0.5	-4.5 - -4	-8 - -7.5
-1.5 - -1	-5 - -4.5	-8.5 - -8
-2 - -1.5	-5.5 - -5	-9 - -8.5
		-9.22 - -9

Aerial Photography MASSGIS 2014

N

1:900

JACOBS

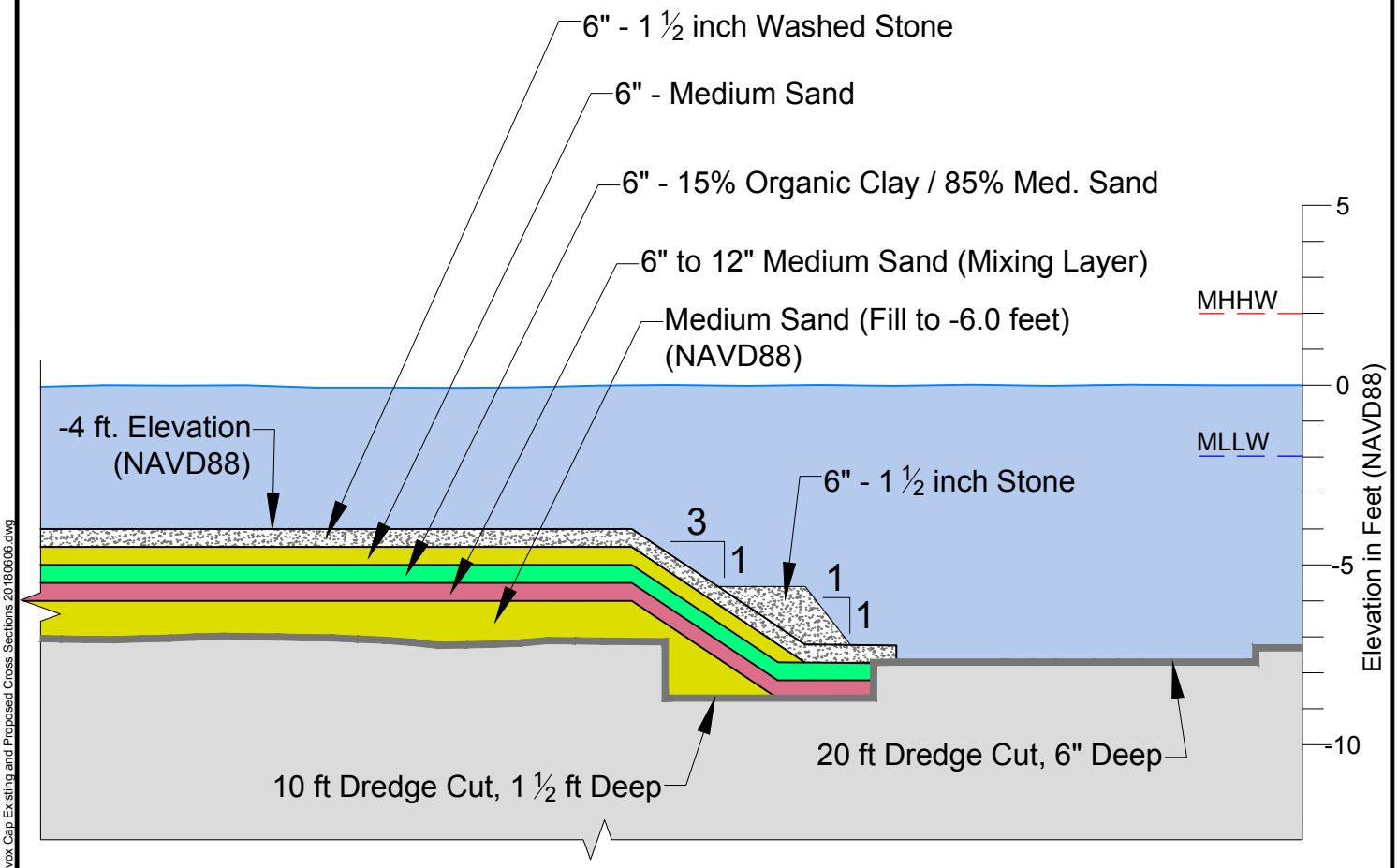
Pre Cap Bathymetric Elevations with Smoothing Layer

New Bedford Harbor Superfund Site

NAME: gscott Date: 2/14/2018

Figure 19

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_XSect and Bathy_Fill to neg6 in Zone 3_20180214.mxd



Legend

- Existing Grade
- Harbor Water
- MHHW (1.99 ft, NAVD88)
- MLLW (-1.97 ft, NAVD88)

Elevation Data: NAVD88

0 5 V: 5 H: 10

Scale in Feet

JACOBS™

Aerovox Cross Section

Typical Subtidal Cap Edge Detail

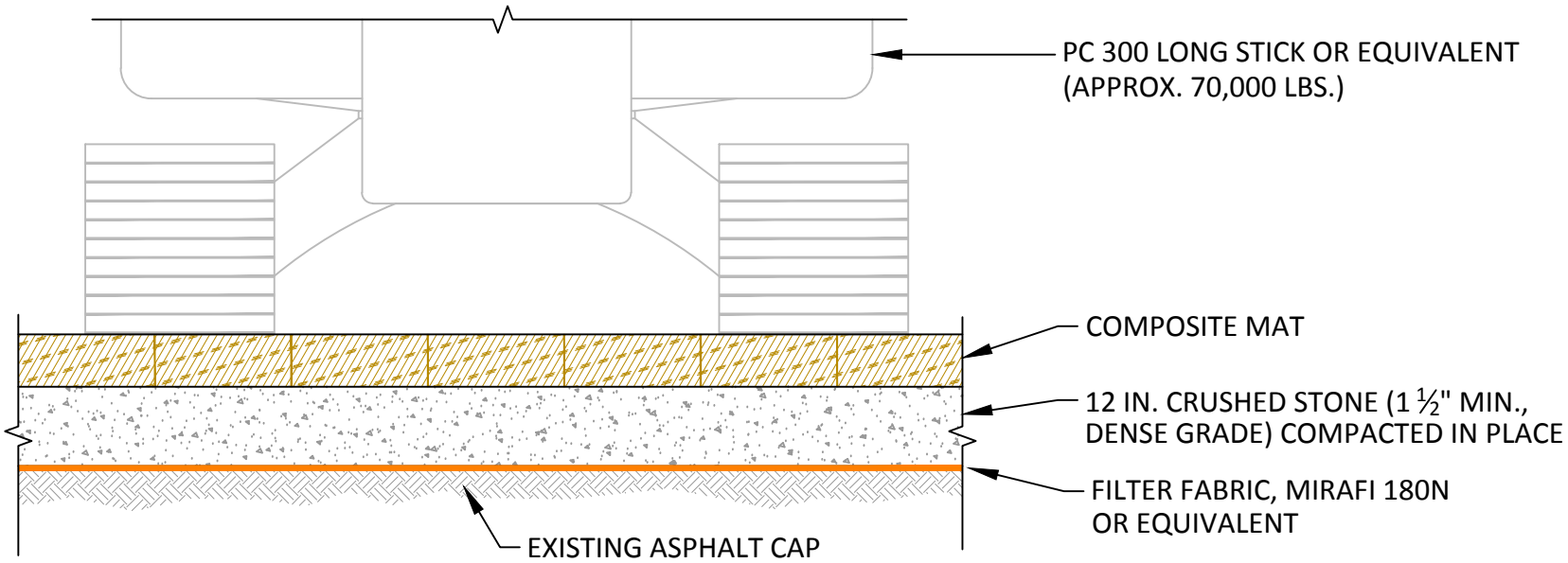
New Bedford Harbor Superfund Site

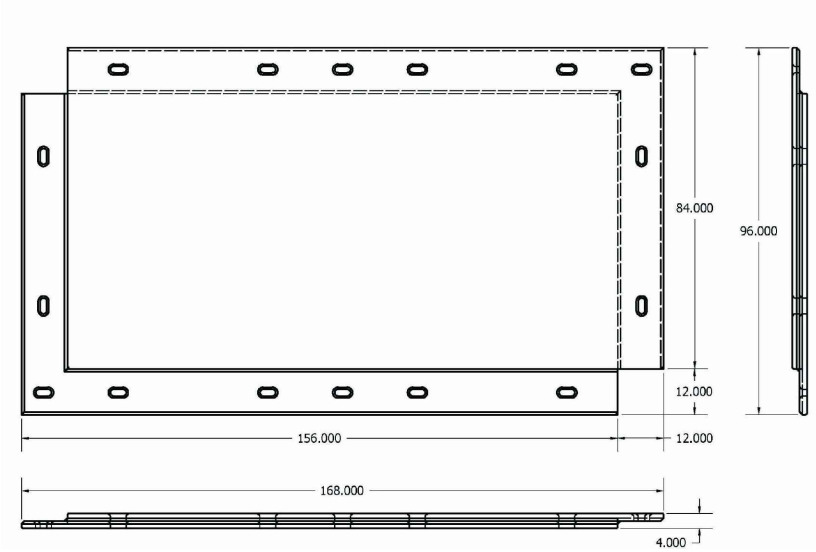
06/06/18

Figure 20

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Figure_17_20_Aerovox_Cap Existing and Proposed Cross Sections 20180606.dwg

last modified: 06/06/18 printed: 06/06/18 by sc





DURA-BASE Composite Mat System

outside dimension: 8' x 14' x 4"
usable surface area: 7' x 13' x 4"
weight: 1,000 lbs

all dimensions & weight are nominal

Manufacturer:
Newpark Mats & Integrated Services LLC
Product of U.S.A. origin

Not To Scale

JACOBS™

Aerovox
Asphalt Protection System

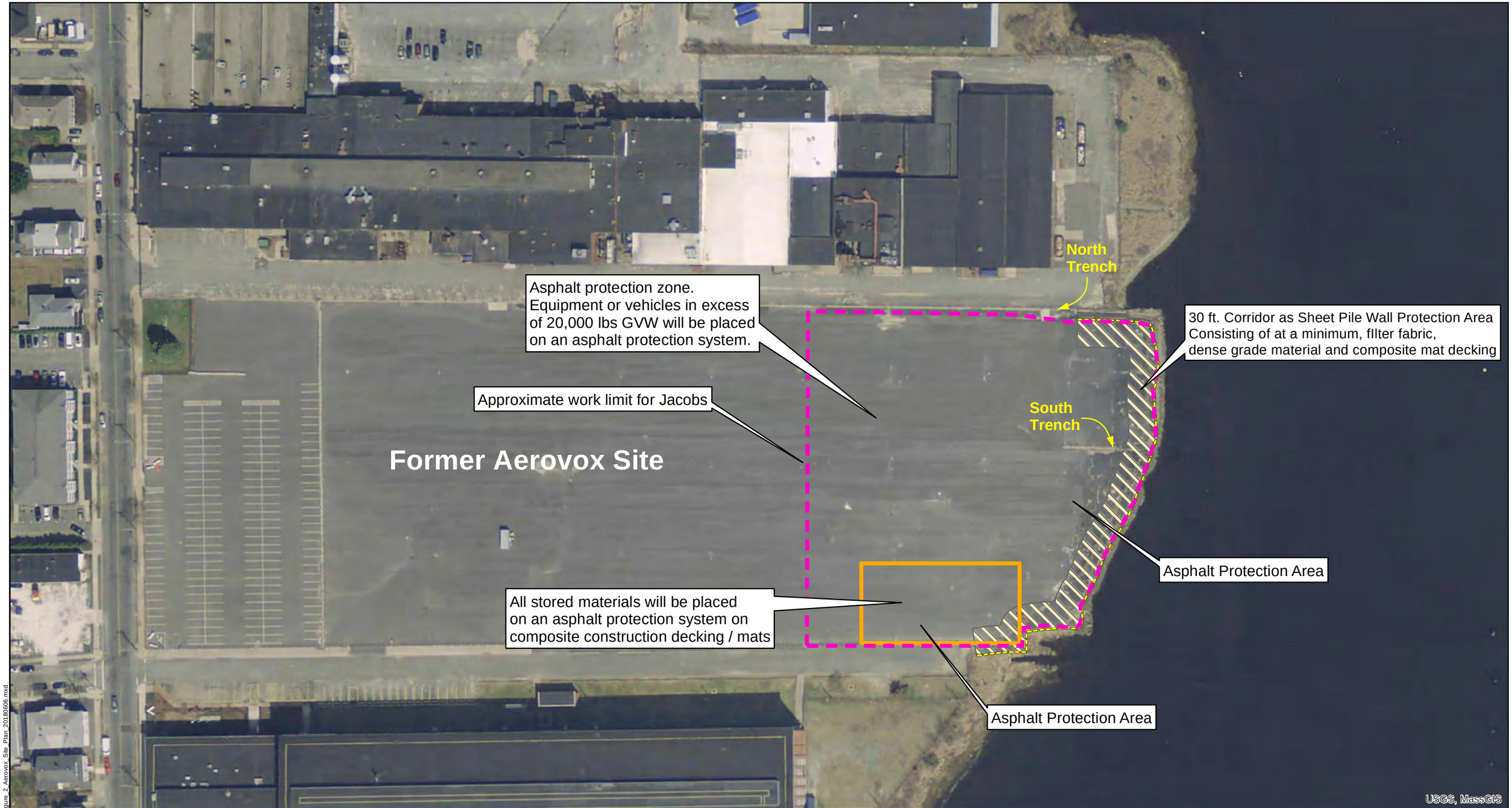
New Bedford Harbor Superfund Site

04/12/18

Figure 21

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Asphalt Protection System 20180405.dwg

last modified: 04/12/18 printed: 04/12/18 by JP



Legend

- Sheet Pile Location
- 30 ft. Sheet Pile Protection Buffer
- Proposed Laydown and Storage Area
- Proposed Cap Protection Area

Aerial Photography MASSGIS 2014

N

0 50 100 Feet

1:1,200

JACOBS

AVX Asphalt Protection Areas

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/6/2018

Figure 22

Path: Y:\NB\Projects\35BG1001\20180201\ArcGIS\Figure_2_Aerovox_Site_Plan_20180606.mxd

Aerial Photography MASSGIS 2014

Legend

- Proposed Haybales
- Proposed Coir Logs
- Existing Sheet Pile Location

0 20 40 60 Feet

1:720

JACOBS

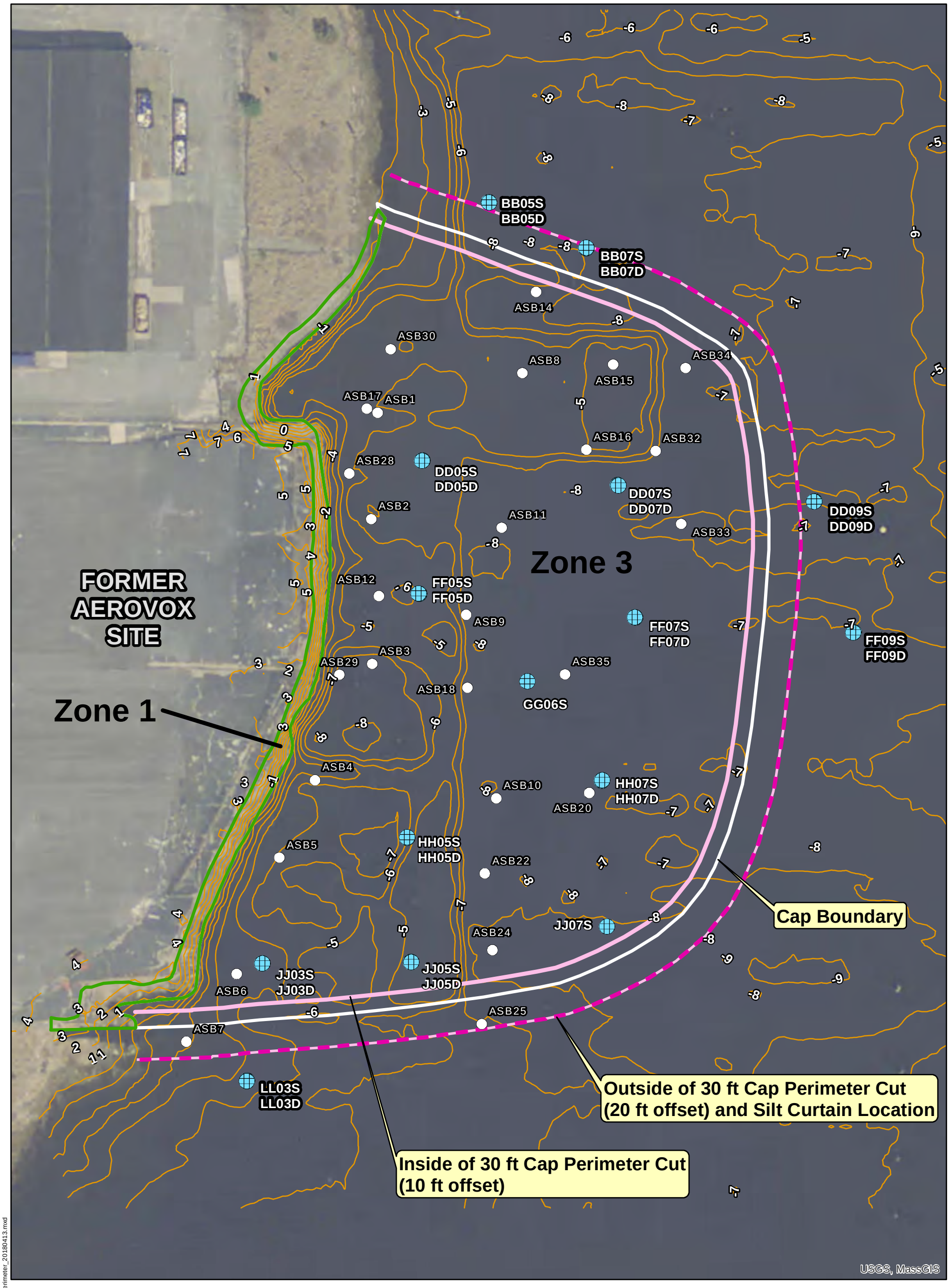
Aerovox
Erosion Control Locations

New Bedford Harbor Superfund Site

Date: 4/16/2018

Figure 23

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_Erosion_Control_Plan_20180416.mxd



Legend

Aerovox Boring Location

Aerovox Microwell Location

1ft contours line (Dec 2017)

Shoreline Cap Area

Seaward Extent of Cap

Elevation Data NAVD88

N

0 30 60 Feet

1:720

JACOBS

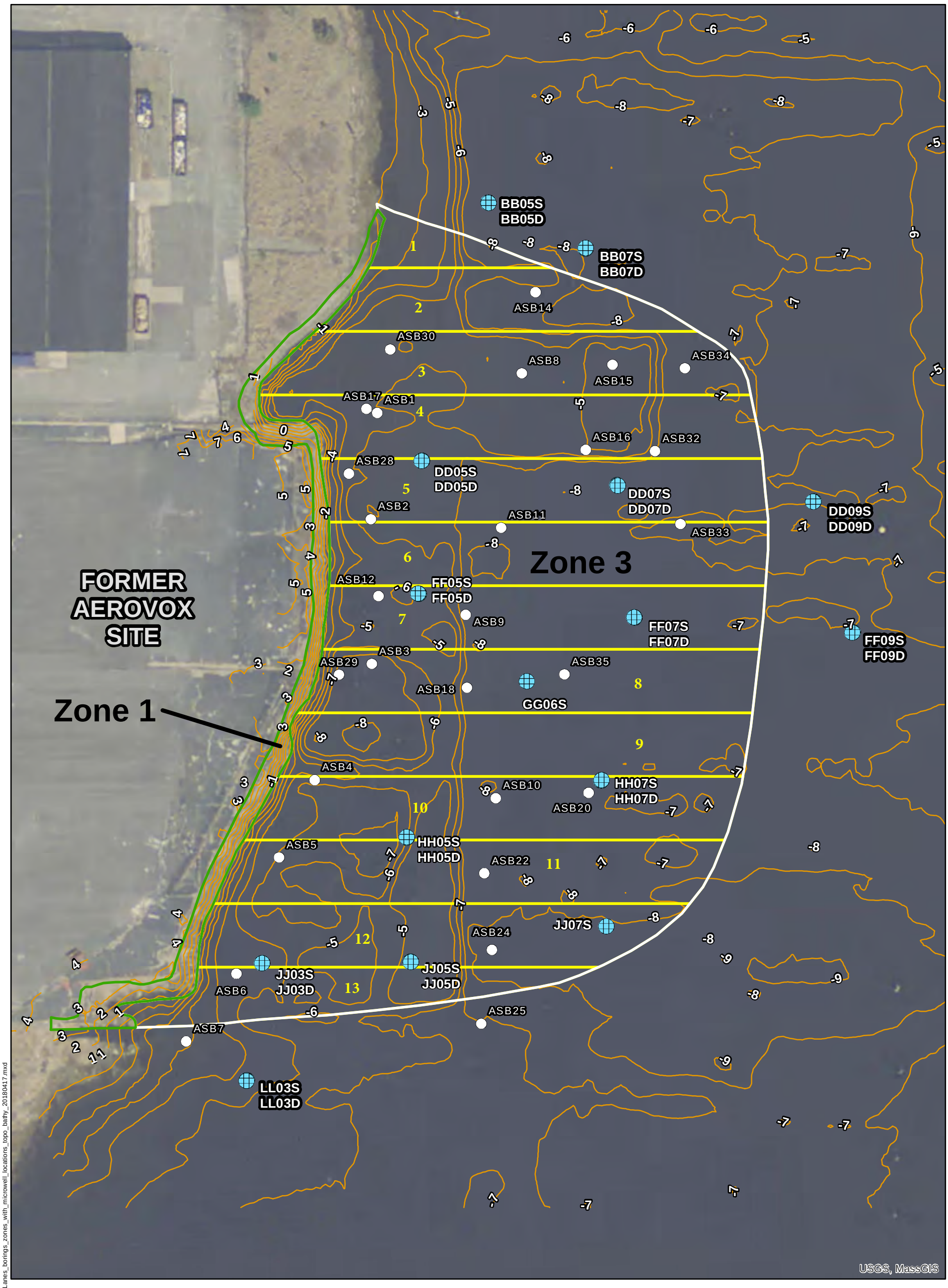
Silt Surtain and Cap Perimeter Dredge Area

New Bedford Harbor Superfund Site

Date: 4/13/2018

Figure 24

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_30ft_Cap_Perimeter_20180413.mxd



Legend

Elevation Data NAVD88

- Aerovox Boring Location
- Aerovox Microwell Location
- 1ft contours line (Dec 2017)
- Cap Installation Work Lanes
- Shoreline Cap Area
- Seaward Extent of Cap

N

0 30 60 Feet 1:720

JACOBS

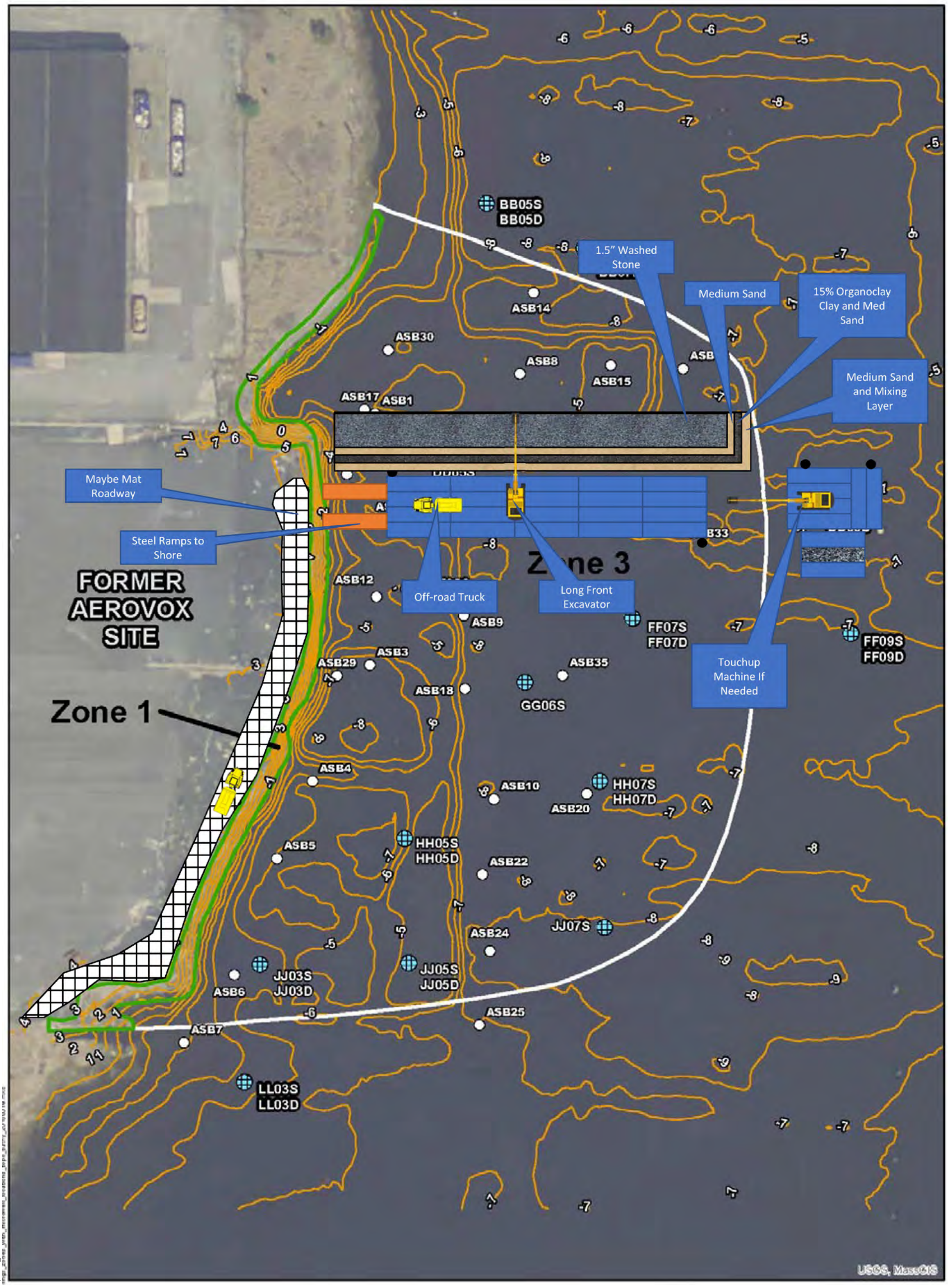
Cap Sequence Grid Pattern

New Bedford Harbor Superfund Site

Date: 4/17/2018

Figure 25

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_Cap_Work_Lanes_borings_zones_with_microwell_locations_topo_bathy_20180417.mxd



Legend

Aerovox Boring Location

Aerovox Microwell Location

1ft contours line (Dec 2017)

Shoreline Cap Area

Seaward Extent of Cap

Elevation Data NAVD88

N

0 30 60 Feet

1:720

JACOBS

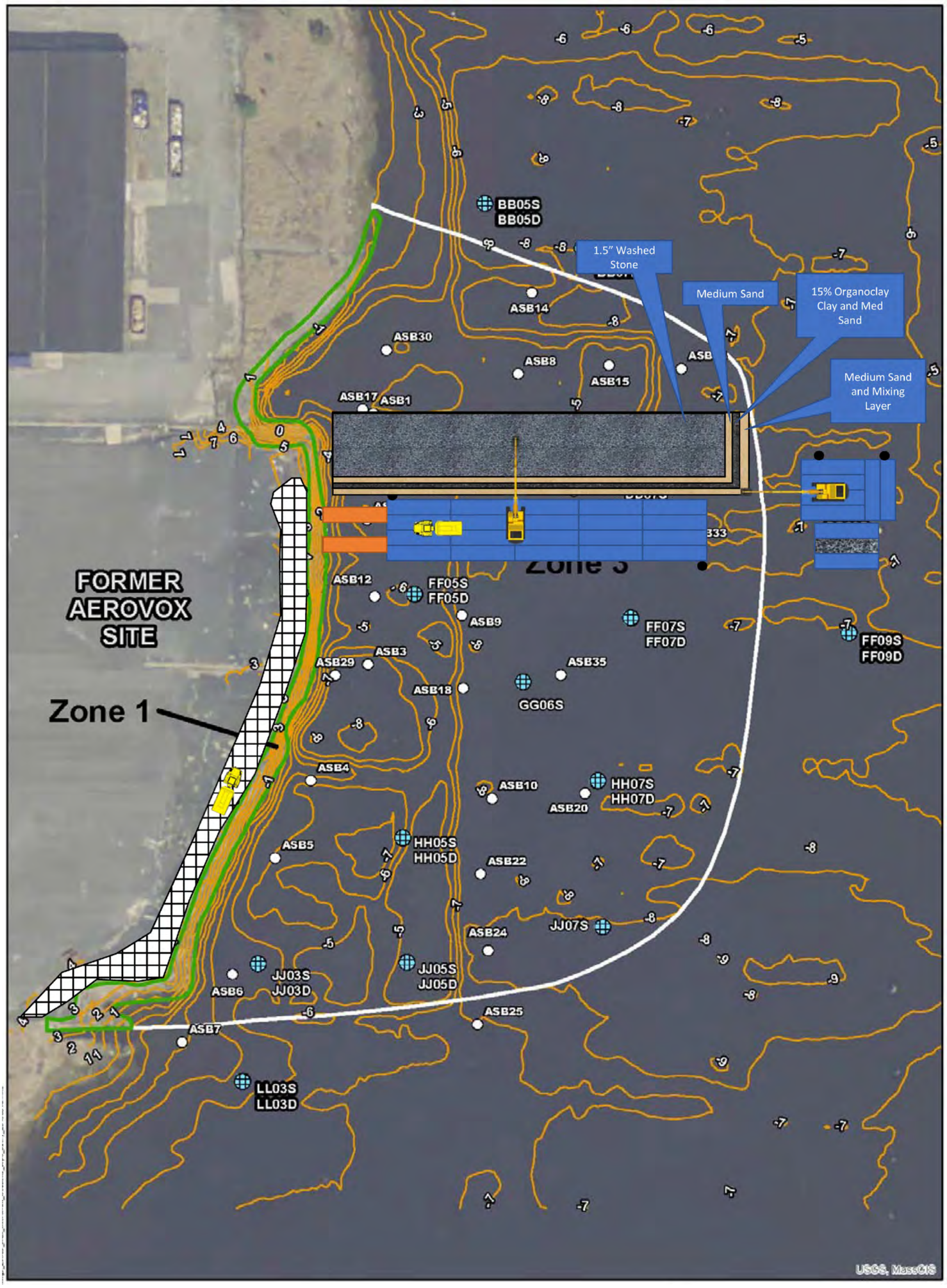
Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 26

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Figure_25_Aerovox_Sequence_20180420.mxd



Legend

Aerovox Boring Location

Aerovox Microwell Location

1ft contours line (Dec 2017)

Shoreline Cap Area

Seaward Extent of Cap

Elevation Data NAVD88

N

0 30 60 Feet

1:720

JACOBS

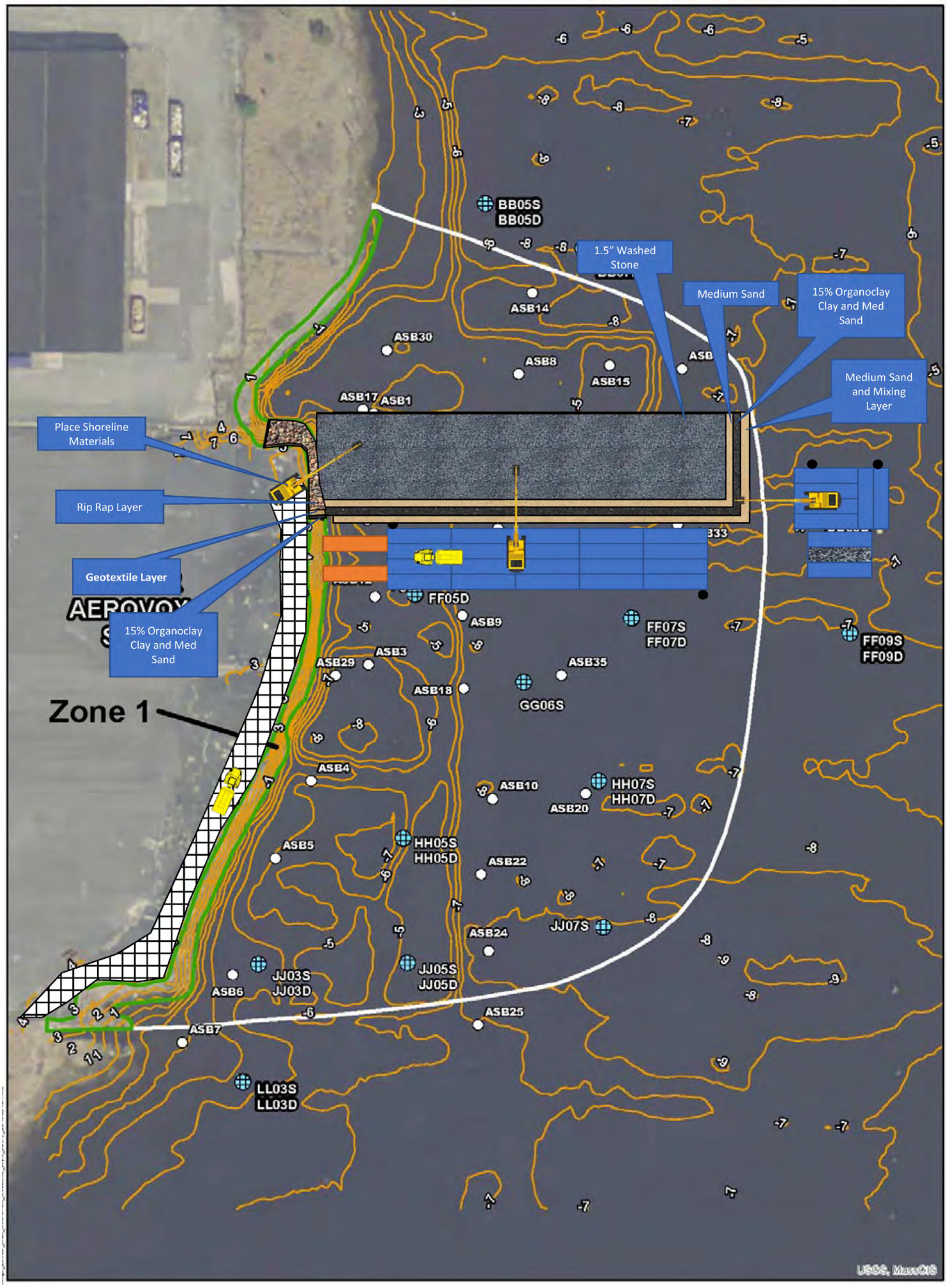
Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 27

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Figure_26_Aerovox_Sequence_20180420.mxd



Legend

Aerovox Boring Location

Aerovox Microwell Location

1ft contours line (Dec 2017)

Shoreline Cap Area

Seaward Extent of Cap

Elevation Data NAVD88

N

0 30 60 Feet

1:720

JACOBS

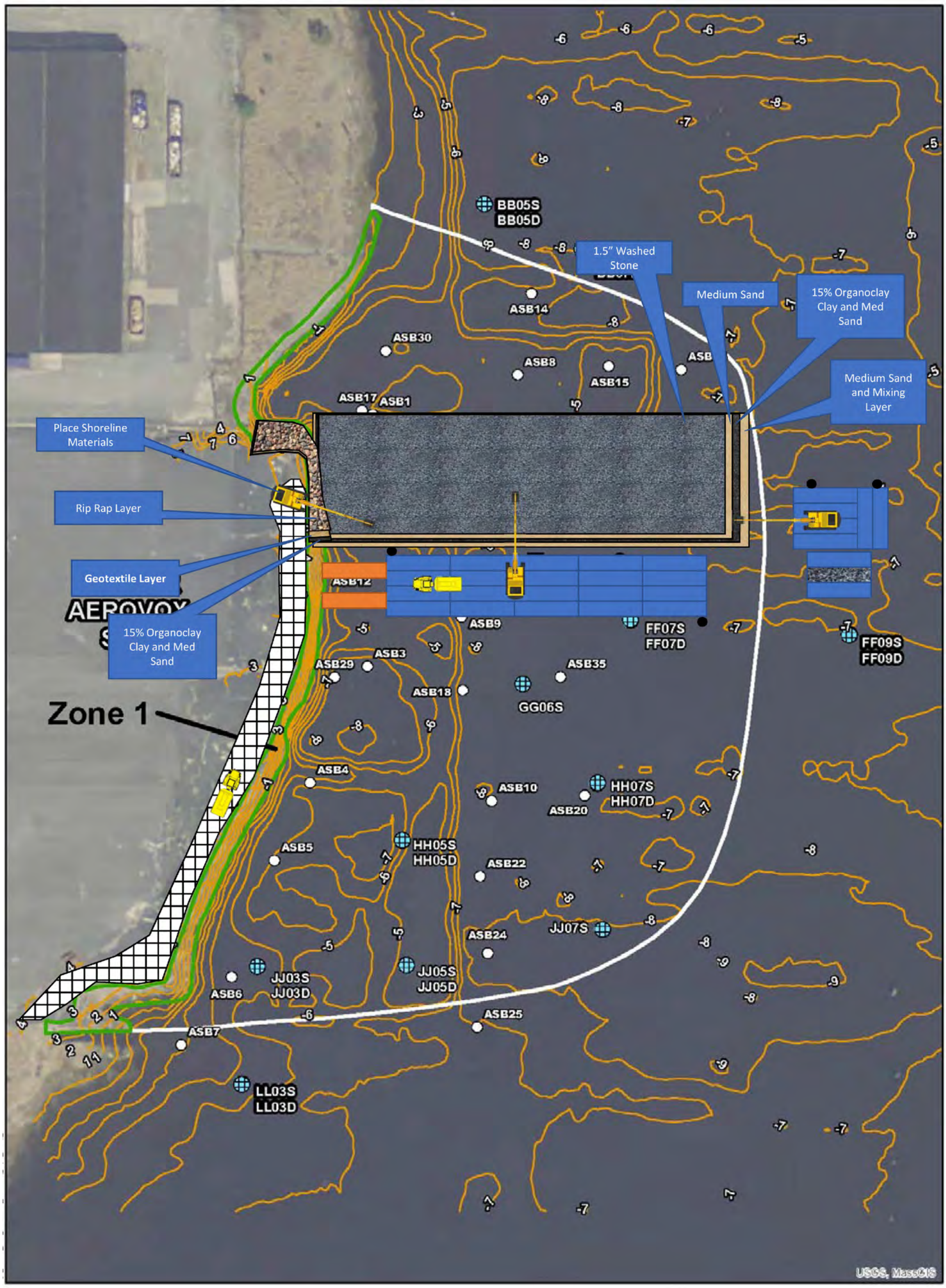
Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 28

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Figure_27_Aerovox_Sequence_20180420.mxd



Legend

Aerovox Boring Location

Aerovox Microwell Location

1ft contours line (Dec 2017)

Shoreline Cap Area

Seaward Extent of Cap

Elevation Data NAVD88

N

0 30 60 Feet

1:720

JACOBS

Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

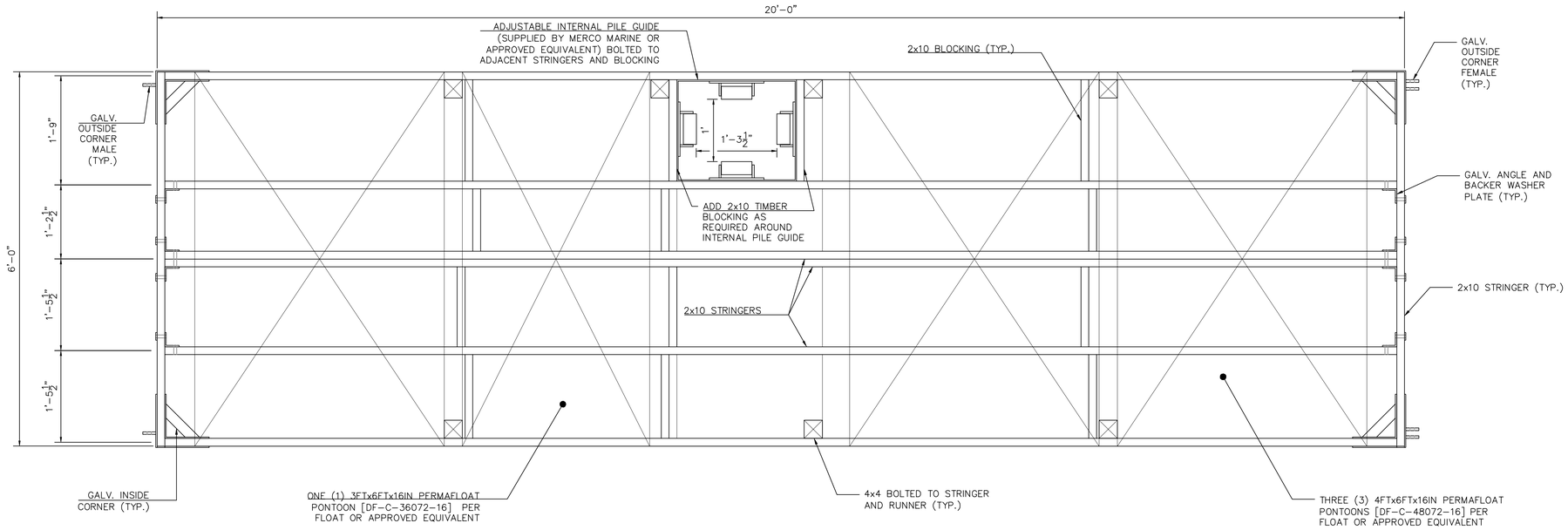
Date: 4/20/2018

Figure 29

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Figure_28_Aerovox_Sequence_20180420.mxd

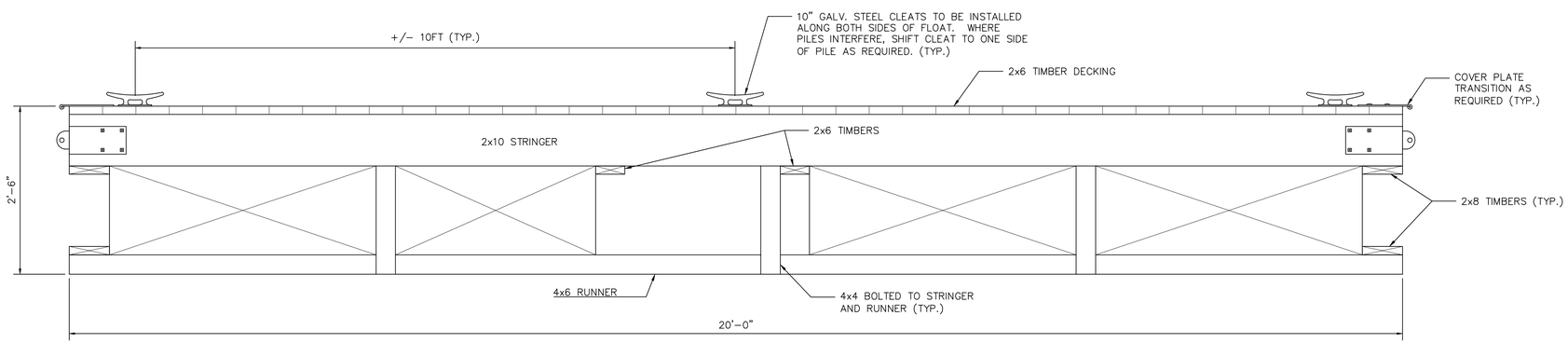
NOTES:

1. FLOATS WITHOUT INTERNAL PILE GUIDES SHALL INCLUDE FOUR (4) 4FTx6FTx16IN PERMAFLOAT PONTOONS [DF-C-48072-16] PER FLOAT OR APPROVED EQUIVALENT. ADJUST SPACING OF 2x10 STRINGERS SUCH THAT THEY ARE SPACED EQUALLY. INTERNAL TRANSVERSE TIMBER MEMBERS SHOULD BE INCREASED IN SIZE FROM 2x6 TO 2x8 TIMBERS.
2. CLEATS SHALL BE 10" LONG MADE OF GALVANIZED STEEL. ALMAG "S" CLEATS ARE PROHIBITED. CLEATS SHALL BE SECURELY BOLTED TO THE DOCK FRAMEWORK WITH THROUGH BOLTS RATHER THAN LAG BOLTS.



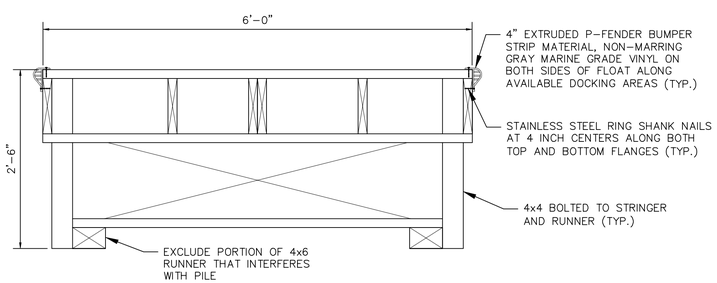
TIMBER FLOAT FRAMING PLAN

1"=1'-0"



TIMBER FLOAT ELEVATION

1"=1'-0"



TIMBER FLOAT SECTION

1"=1'-0"

GRAPHIC SCALE

1 0 1/2 1 2 4

(in feet)
1"=1FT

JACOBS

No.	Revision	Date	App.

Designed By: | Drawn by: | Checked by:

Scale: AS SHOWN | Date: 04/16/2018

Project Title:

FIGURE 30

New Bedford Harbor Superfund Site

New Bedford, MA

Client/Owner:

USACE

Issued for:

Aerovox 65% Design

Drawing Title:

TYPICAL TIMBER FLOAT DETAILS

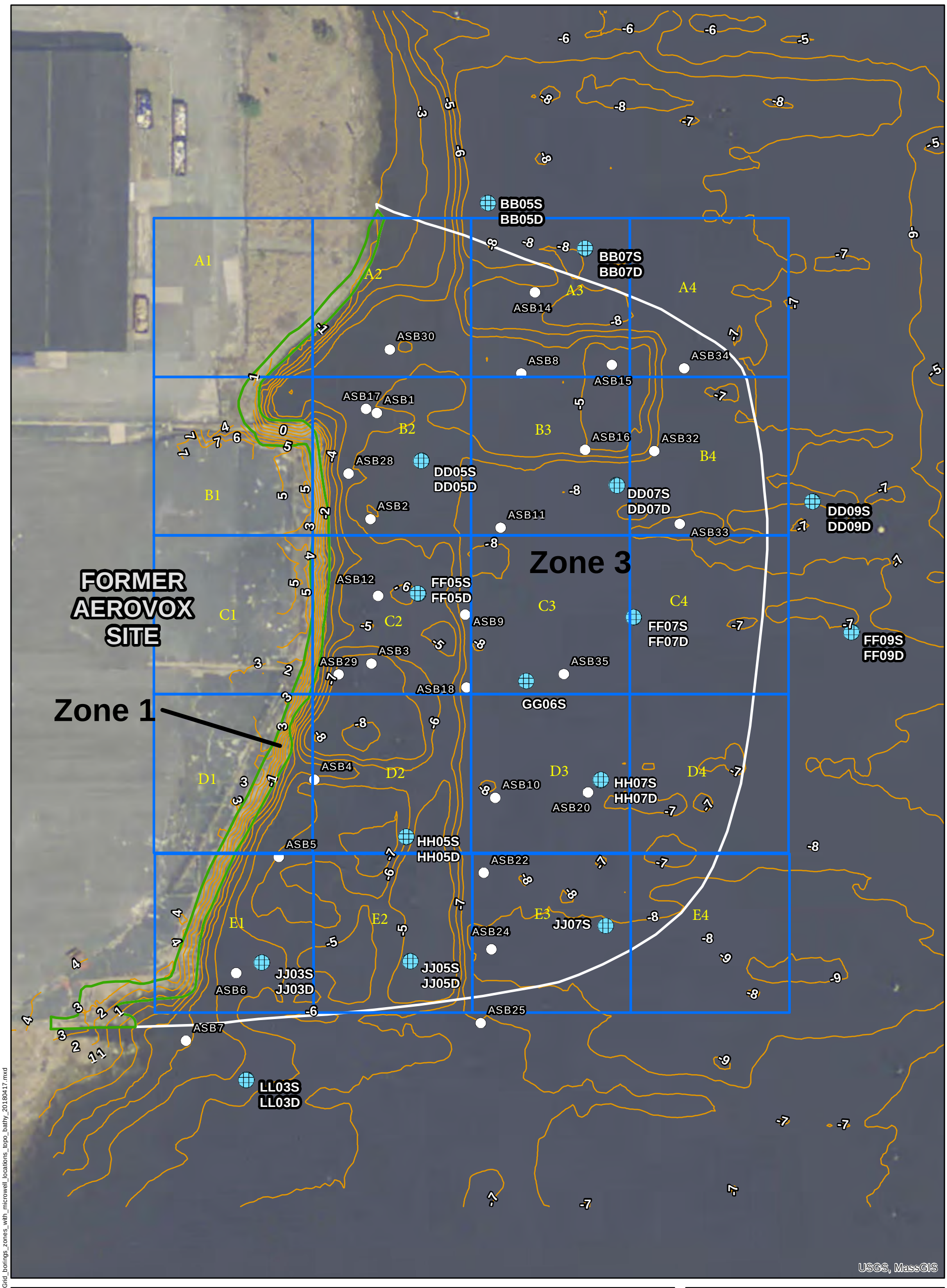
Drawing Number:

Sheet of

Project Number:

Survey Index:

– –



Legend

Elevation Data NAVD88

- Aerovox Boring Location
- Aerovox Microwell Location
- 1ft contours line (Dec 2017)
- 100 ft Cap Thickness Verification Grid
- Shoreline Cap Area
- Seaward Extent of Cap

N

0 30 60 Feet 1:720

JACOBS

Cap Grid Sample Locations

New Bedford Harbor Superfund Site

Date: 4/17/2018

Figure 31

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_100ft_Cap_Grid_borings_zones_with_microwell_locations_topo_bathy_20180417.mxd

Legend

- 021618_PRECIX_Pts_20180226
- 020616_AVX_Drain_pts
- AVX Half Foot 20180226
- PRECIX Half Foot 20180226

N

0 25 50 Feet

1:600

JACOBS

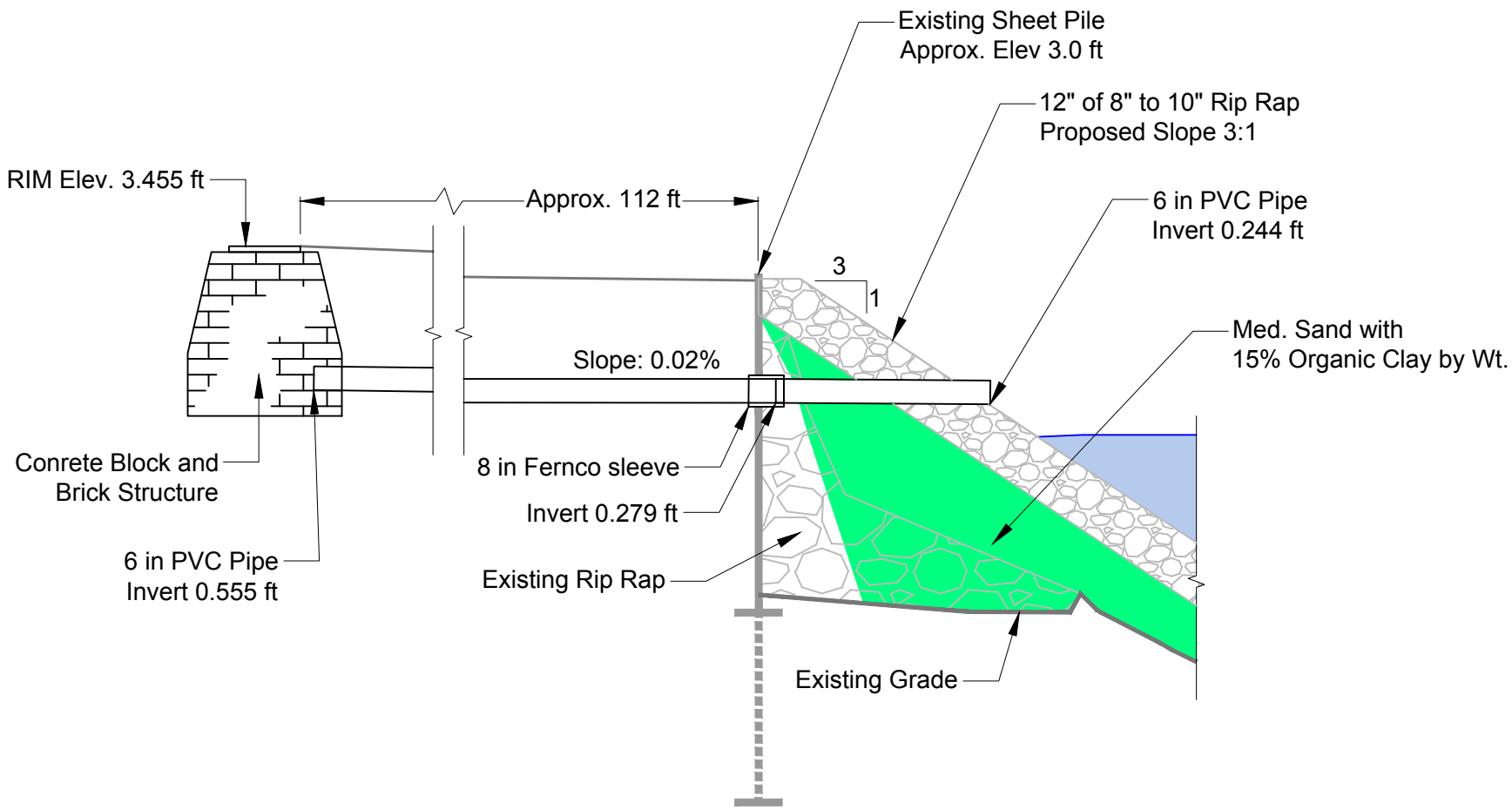
Drainage and Outfall Locations with Topographic Elevations

New Bedford Harbor Superfund Site

Date: 2/26/2018

Figure 32

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox Drain Elevation Contours 20180226.mxd



Connection made with Fernco rubber coupling and stainless steel hose clamps.

Not To Scale

Elevation Data: NAVD88

JACOBS™

Catch Basin and Discharge Cross Section

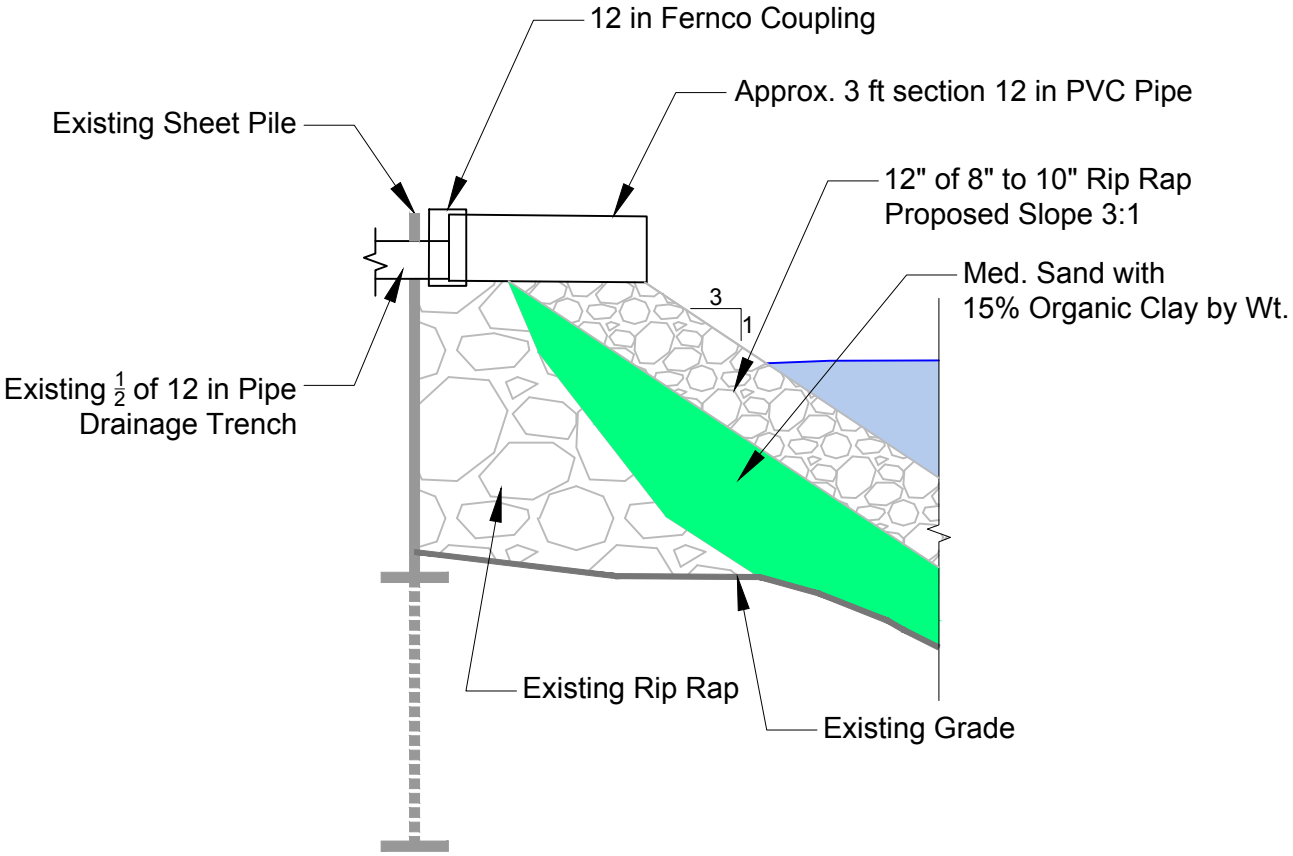
New Bedford Harbor Superfund Site

04/17/18

Figure 33

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Aerovox Drainage Detail 20180416.dwg

last modified: 04/17/18 printed: 04/17/18 by sc



Not To Scale

Elevation Data: NAVD88

JACOBS™

North and South Trench Drainage Detail

New Bedford Harbor Superfund Site

04/17/18

Figure 34

Y:\NBH\Projects\35BG1001\20180201\AutoCAD\Aerovox Drainage Detail 20180416.dwg

last modified: 04/17/18 printed: 04/17/18 by sc

Tables

Table 1
Aerovox Sediment Data Gap Results

Location	Depth	PCBs			VOCs																							
		PCBs (IA)	PCBs (Congeners)	PCBs (Aroclors)	1,1,2-TRICHLOROETHANE	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,2-DICHLOROPROPANE	1,3-DICHLOROBENZENE	1,4-DICHLOROBENZENE	1,2-DICHLOROETHANE	ACETONE	BENZENE	CARBON DISULFIDE	CIS-1,2-DICHLOROETHENE	ETHYLBENZENE	M,P-XYLENE (SUM OF ISOMERS)	METHYL ETHYL KETONE (2-BUTANONE)	NAPHTHALENE	O-XYLENE (1,2-DIMETHYLBENZENE)	SEC-BUTYLBENZENE	TETRACHLOROETHENE (PCE)	TOLUENE	TOTAL 1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE (TCE)	VINYL CHLORIDE	XYLENES, TOTAL
	ft	mg/kg			µg/kg																							
AA-05-00-05	0-0.5	1070	-		ND	ND	ND	ND	14J	20J	ND	240J	ND	20J	4.9J	ND	ND	56J	ND	ND	ND	ND	ND	4.9J	ND	ND	ND	ND
AA-05-00-05-FD	0-0.5	191	-		ND	ND	ND	ND	30J	47J	ND	240J	ND	41J	7J	ND	ND	61J	ND	ND	4.4J	ND	ND	7J	ND	ND	ND	ND
AA-05-05-11	0.5-1.0	19.2	-		ND	ND	ND	ND	ND	ND	ND	200	ND	33	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	9.6J	ND
AA-05-28-33	2.8-3.3	0.887	-	-	ND	ND	ND	ND	ND	ND	ND	58	ND	23	31	ND	ND	ND	ND	ND	ND	ND	ND	34	2.4J	ND	ND	ND
AA-06-00-05	0-0.5	346	265	72	ND	ND	ND	ND	5.6J	9.6J	ND	560	ND	14	ND	ND	ND	150	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
AA-06-06-11	0.6-1.1	0.164	-	-	ND	ND	ND	ND	ND	ND	ND	49JB	ND	56	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
AA-06-28-33	2.8-3.3	1.01	-	-	ND	ND	4.1J	ND	ND	ND	32	170	ND	160	2700	ND	ND	30J	ND	ND	ND	ND	ND	3000	150	180	370	ND
BB-08-00-05	0-0.5	823	-	-	ND	ND	ND	ND	23	46	ND	250	ND	52	ND	ND	ND	48J	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
BB-08-08-13	0.8-1.3	1.29	0.387	0.244	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3000	ND	ND	ND	ND	ND	ND	ND	ND	3500	450J	ND	3200	ND
BB-08-28-33	2.8-3.3	0.769	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	25000	ND	ND	ND	ND	ND	ND	ND	ND	26000	350J	ND	5400	ND
CC-09-00-05	0-0.5	75.3	-	-	ND	ND	ND	ND	6.4J	13J	ND	150	ND	57	ND	ND	ND	29J	ND	ND	ND	ND	ND	0	ND	ND	7.7J	ND
CC-09-10-15	1.0-1.5	0.920	-	-	ND	ND	9.9J	11	ND	ND	ND	71	ND	140	5500	ND	ND	ND	ND	ND	ND	ND	ND	5900	170	ND	14000	ND
CC-09-29-34	2.9-3.4	396	-	-	ND	3.6J	72	25	ND	ND	ND	62	2.2J	120	87000	ND	ND	ND	ND	ND	ND	ND	ND	88000	590J	6.8J	12000	ND
DD-09-00-05	0-0.5	920	-	-	ND	ND	ND	ND	3.9J	8.6J	ND	620	ND	20J	ND	ND	ND	150	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
DD-09-10-15	1.0-1.5	0.395	-	-	ND	ND	ND	ND	ND	ND	ND	51	ND	50	3.2J	ND	ND	ND	ND	ND	ND	ND	ND	8.5J	5.3J	ND	2J	ND
DD-09-29-34	2.9-3.4	1.30	0.00304	ND	ND	ND	20	ND	ND	ND	ND	71	ND	76	12000	ND	ND	ND	ND	ND	ND	ND	ND	12000	170	87	5000	ND
FF-08-00-05	0-0.5	1160	604	112	ND	ND	ND	ND	4J	10J	ND	570	ND	ND	ND	ND	ND	110J	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
FF-08-12-17	1.2-1.7	5.22	-	-	ND	ND	ND	ND	ND	ND	ND	150	ND	200	6.8J	ND	ND	ND	ND	ND	ND	ND	ND	26J	19	6.4J	5.3J	ND
FF-08-28-33	2.8-3.3	0.580	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	33000	ND	ND	ND	ND	ND	ND	ND	ND	34000	850J	460J	1700	ND
GG-08-00-05	0-0.5	808	-	-	ND	ND	ND	ND	8.2J	22	ND	430	ND	38	ND	ND	ND	86J	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
GG-08-14-19	1.4-1.9	3.61	0.990	1.89	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13000	ND	ND	ND	ND	ND	ND	ND	ND	13000	190J	190J	3800	ND
GG-08-29-34	2.9-3.4	1.29	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	74000	ND	ND	ND	ND	ND	ND	ND	ND	74000	ND	25000	950	ND
AS-II-07-00-05	0.0-0.5	0.198	-	-	ND	ND	ND	ND	ND	1.2J	ND	58	ND	270	19	ND	ND	ND	ND	ND	ND	ND	ND	19J	ND	1.6J	10J	ND
AS-II-07-1.2-1.7	1.2-1.7	0.0639	-	-	ND	7.4J	100	ND	ND	ND	ND	94	ND	350J	180000	1.9J	ND	23J	ND	ND	ND	ND	10	180000	ND	27	19000	ND
AS-II-07-2.5-3.0	2.5-3.0	0.632	0.00641	ND	2.7J	10J	200	ND	ND	ND	ND	140	ND	300	230000	5.5J	ND	35J	ND	ND	ND	ND	19	230000	1800J	300	12000	ND
AS-II-07-2.5-3.0-FD	2.5-3.0	0.907	0.00112	ND	6.2J	15	330	ND	ND	ND	ND	140	2.7J	320	320000	12J	ND	33J	ND	ND	ND	4.8J	30	320000	3000J	450E	9400J	ND
JJ-07-00-05	0.0-0.5	246	426	71	ND	15	570	ND	30	28J	ND	720	2.8J	370	150000	20J	4.3J	220	ND	3.6J	ND	190J	20	150000	2200J	700J	5300J	8J
JJ-07-17-22	1.7-2.2	0.185	-	-	ND	12J	260	ND	ND	ND	ND	130	ND	300	66000	4.4J	ND	22J	ND	ND	ND	15	9.8J	67000	820J	83	9100	ND
JJ-07-29-34	2.9-3.4	0.832	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
KK-07-00-05	0.0-0.5	185	-	-	ND	ND	ND	ND	28	93	ND	410	ND	71	200	ND	ND	72J	ND	ND	ND	ND	ND	210	4J	ND	7.8J	ND
KK-07-19-24	1.9-2.4	1.28	1.03	538	ND	ND	ND	ND	ND	ND	ND	88B	ND	74	31	ND	ND	ND	ND	ND	ND	ND	ND	49	19	ND	7.9J	ND
KK-07-30-35	3.0-3.5	1.25	-	-	ND	ND	18	ND	ND	ND	ND	86B	ND	120	5000	ND	ND	ND	ND	ND	ND	ND	ND	5200	200	5J	4100	ND
LL-02-00-05	0.0-0.5	183	596	112	ND	ND	ND	ND	18J	50	ND	740	ND	120	15J	ND	ND	160J	ND	ND	ND	ND	ND	22J	7.1J	4.4J	6.6J	ND
LL-02-17-22	1.7-2.2	0.0899	-	-	ND	ND	ND	ND	ND	ND	ND	140	ND	160	ND	ND	ND	20J	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
LL-02-23-28	2.3-2.8	0.0088	-	-	ND	ND	ND	ND	ND	ND	ND	86	ND	100	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
LL-04-00-05	0.0-0.5	238	-	-	ND	ND	ND	ND	15J	41	ND	620	ND	12J	14J	ND	ND	120	ND	ND	ND	ND	ND	14J	ND	ND	4.8J	ND
LL-04-10-15	1.0-1.5	5.74	-	-	ND	ND	ND	ND	ND	ND	ND	120	ND	200	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	4.5J	ND
LL-04-30-35	3.0-3.5	1.02	0.00295	-	ND	ND	ND	ND	ND	ND	ND	120	ND	170	ND	ND	ND	23J	ND	ND	ND	ND	ND	0	ND	ND	2.8J	ND
LL-06-00-05	0.0-0.5	233	-	-	ND	ND	ND	ND	56	170	ND	280	ND	64	4J	ND	ND	48J	ND	ND	ND	ND	ND	4J	ND	ND	ND	ND
LL-06-15-20	1.5-2.0	14.4	-	-	ND	ND	ND	ND	ND	ND	ND	44J	ND	64	ND	ND	ND	ND	8.5J	ND	ND	ND	ND	0	ND	ND	ND	ND
LL-06-15-20-FD	1.5-2.0	17.3	-	-	ND	ND	ND	ND	ND	ND	ND	56J	ND	86	ND	ND	ND	ND	ND	ND	ND	ND	ND	0	ND	ND	ND	ND
LL-06-30-35	3.0-3.5	5.11	-	-	ND	ND	ND	ND	ND	ND	ND	50J	ND	57	160	ND	ND	ND	ND	ND	ND	ND	ND	170	13J	ND	160	ND

ND = not detected
J = estimated value
B = detected in blank
E =
ft = feet
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
VOC = volatile organic compound

Table 2
Aerovox Microwell Groundwater VOC and PCB Results

		VOCs																						PCBs	
Well	Date	1,1-DICHLOROETHANE	1,1-DICHLOROETHENE	1,1,2-TRICHLOROETHANE	1,2-DICHLOROBENZENE	1,2-DICHLOROETHANE	1,2,3-TRICHLOROBENZENE	1,2,4-TRICHLOROBENZENE	1,3-DICHLOROBENZENE	1,4-DICHLOROBENZENE	CARBON DISULFIDE	CHLOROFORM	CIS-1,2-DICHLOROETHENE	ETHYLBENZENE	M,P-XYLENE (SUM OF ISOMERS)	O-XYLENE (1,2-DIMETHYLBENZENE)	TETRACHLOROETHENE (PCE)	TOLUENE	TOTAL 1,2-DICHLOROETHENE	TRANS-1,2-DICHLOROETHENE	TRICHLOROETHENE(TCE)	VINYL CHLORIDE	XYLENES, TOTAL	Congeners	Aroclors
		µg/L																						µg/L	
BB-05D	10/25/2017	ND	0.85J	ND	ND	ND	ND	ND	ND	ND	ND	0.53J	130	ND	ND	ND	1.8	ND	130	0.85J	220	2	ND	0.862	-
BB-05S	10/25/2017	ND	0.53J	ND	ND	0.93J	4.8J	22	ND	ND	ND	ND	98	ND	ND	ND	ND	ND	99	1.5	29	12	ND	1.12	-
BB-07D	11/1/2017	0.46J	0.93J	ND	0.41J	4.2	ND	ND	9.4	8	ND	0.54J	170	ND	ND	ND	1.4	ND	170	0.97J	180	2.5	ND	3.54	2.44
BB-07S	11/1/2017	0.63J	1.8	ND	ND	5.7	ND	ND	ND	ND	ND	ND	480J	ND	ND	ND	ND	ND	480	2.8	14	15	ND	0.780	0.659
BB-07S dup	11/1/2017	0.67J	1.8	ND	ND	5.9	ND	ND	ND	ND	ND	ND	340J	ND	ND	ND	ND	ND	390	2.9	14	14	ND	0.610	0.683
DD-05D	10/26/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9500	ND	ND	ND	ND	ND	9600	ND	380	560	ND	21.6	-
DD-05S	10/26/2017	ND	ND	ND	ND	ND	ND	5.8	7.2	5.3	1J	ND	82	2.5	0.63J	0.36J	ND	ND	84	2	3.3	94	0.99J	22.5	-
DD-07D	10/31/2017	ND	ND	ND	ND	22	28J	170U	31	51	ND	ND	1600	ND	ND	ND	ND	ND	1700	13	540J	140	ND	101	156
DD-07S	10/31/2017	ND	14J	ND	ND	20	ND	76J	31	75	ND	ND	4700	ND	ND	ND	ND	11J	4700	52	13	580	ND	30.0	52.5
DD-09D	11/2/2017	ND	1.1	0.44J	ND	ND	ND	2.5J	ND	ND	ND	ND	410	ND	ND	ND	ND	ND	350	1.9	140	0.89J	ND	1.00	2.11
DD-09S	11/2/2017	ND	15J	ND	ND	ND	ND	ND	ND	ND	ND	ND	9300	ND	ND	ND	ND	ND	11000	76	35J	2600	ND	0.0765	0.103
FF-05D	10/26/2017	ND	46J	ND	ND	ND	ND	170J	ND	110	ND	ND	9100	ND	ND	ND	ND	ND	9200	ND	45J	630	ND	12.2	-
FF-05S	10/26/2017	ND	ND	ND	ND	ND	ND	ND	ND	89	ND	ND	5600	70	ND	ND	ND	ND	5600	ND	ND	2700	ND	19.4	-
FF-07D	10/31/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3400	ND	ND	ND	ND	ND	3400	7.4J	1100	91	ND	0.474	0.107
FF-07S	10/31/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	350	ND	ND	ND	ND	ND	350	3.2J	150	640	ND	44.2	15.4
FF-09D	11/2/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	820	ND	ND	ND	ND	ND	830	ND	1900	11J	ND	7.66	8.85
FF-09D dup	11/2/2017	ND	4.5J	5.7J	ND	ND	ND	ND	ND	ND	ND	ND	780	ND	ND	ND	ND	ND	780	ND	1800	ND	ND	6.51	8.46
FF-09S	11/2/2017	1.1	0.68J	0.9J	ND	ND	ND	ND	ND	ND	1.5J	0.58J	260	ND	ND	ND	ND	ND	240	3.4	80	140	ND	1.28	2.03
GG-06S	11/1/2017	7.8J	29	ND	ND	ND	26J	88	10	8.9J	ND	ND	4800	ND	ND	ND	ND	ND	4100	17	81	220	ND	0.272	0.205
HH-05D	10/27/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	37000	ND	ND	ND	ND	ND	37000	ND	690000	ND	ND	19.0	-
HH-05S	10/27/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11000	ND	ND	ND	ND	ND	11000	19J	300	2100	ND	19.3	-
HH-07D	11/1/2017	ND	19J	ND	ND	ND	ND	58J	ND	ND	ND	ND	4000	ND	ND	ND	ND	ND	5000	25	120	190	ND	4.79	0.618
HH-07D dup	11/1/2017	ND	17J	ND	ND	ND	ND	63J	ND	ND	ND	ND	4200	ND	ND	ND	ND	ND	5000	24	110	190	ND	4.14	0.595
HH-07S	11/1/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6300	ND	ND	ND	ND	ND	6400	84J	ND	9800	ND	0.27	0.336
JJ-03D	10/24/2017	ND	ND	ND	ND	ND	ND	ND	25J	ND	ND	ND	2200	ND	ND	ND	ND	ND	2200	ND	ND	1200	ND	11.6	-
JJ-05D	10/27/2017	ND	11J	ND	ND	ND	ND	ND	ND	ND	ND	ND	3900	ND	ND	ND	ND	ND	4000	35	780	110	ND	14.1	-
JJ-05S	10/27/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2100	ND	ND	ND	ND	ND	2100	18J	92	570J	ND	0.610	-
JJ-07S	11/1/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7500	ND	ND	ND	ND	ND	7600	68J	730	1300	ND	4.86	5.11
LL-03D	10/23/2017	ND	ND	ND	ND	ND	ND	ND	0.6J	ND	ND	ND	79	ND	ND	ND	ND	ND	79	ND	76	16	ND	1.54	-
LL-03S	10/23/2017	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9	ND	ND	ND	ND	ND	9	ND	ND	6.4	ND	1.44	-

J = estimated

U = not detected

ND = non-detect

VOC = volatile organic compound

PCB = polychlorinated biphenyl

µg/L = micrograms per liter

Table 3
Aerovox Microwell Groundwater Metals and Anions Results

		Metals									Anions			
		ALKALINITY, TOTAL (AS CACO3)	DISSOLVED ORGANIC CARBON	METHANE	CALCIUM	IRON	MAGNESIUM	MANGANESE	POTASSIUM	SODIUM	SULFIDE	CHLORIDE (AS CL)	NITROGEN, NITRATE (AS N)	SULFATE (AS SO4)
Well	Date	mg/L	mg/L	µg/L	µg/L						mg/L			
BB-05D	10/25/2017	45.5	1.2	8.5	67900	194J	67300	5020	25700	651000	ND	1180	0.57	158
BB-05S	10/25/2017	102	2.2	170	229000	715	652000	1940	204000	5940000	ND	11100	ND	1460
BB-07D	11/1/2017	44.6	1.3	35	96300	2860	109000	7190	32100	851000	ND	1590	0.088	214
BB-07S	11/1/2017	105	2.3	990	216000	527	575000	4140	174000	4250000	ND	13000	ND	1140
BB-07S dup	11/1/2017	130	2.3	940	205000	559	541000	4570	166000	4150000	ND	7920	ND	1520
DD-05D	10/26/2017	45.8	3.1	620	85300	8560	83300	6500	24500	840000	ND	1410	ND	234
DD-05S	10/26/2017	460	13.1	9000	228000	339	555000	1750	175000	5120000	ND	9270	ND	1320
DD-07D	10/31/2017	46.3	1.1	150	56800	580	74400	7990	28000	610000	ND	1220	ND	158
DD-07S	10/31/2017	57.1	1.1	1300	63800	3820	69600	5420	28700	595000	ND	1090	ND	111
DD-09D	11/2/2017	86.7	2.3	22	270000	132J	865000	3220	261000	6510000	ND	13300	0.1	1790
DD-09S	11/2/2017	256	5.6	5100	124000	147J	210000	334	87200	1630000	ND	3190	ND	168
FF-05D	10/26/2017	60.4	3.5	350	76900	5180	139000	12100	48000	1300000	ND	2220	ND	384
FF-05S	10/26/2017	86	4.7	560	46300	3610	60100	5390	27400	754000	ND	1100	ND	224
FF-07D	10/31/2017	37.5	2	420	102000	16600	163000	9100	63400	1570000	ND	2950	0.12	384
FF-07S	10/31/2017	-	4.6	1500	362000	171J	406000	774	154000	4020000	ND	-	-	-
FF-09D	11/2/2017	82.9	0.72	67	45100	2380	41000	7320	22000	296000	ND	579	ND	88.4
FF-09D dup	11/2/2017	26.4	0.58J	68	46500	2480	42200	7570	22800	301000	ND	530	ND	90
FF-09S	11/2/2017	295	6.8	6600	110000	193	232000	1320	102000	2230000	ND	4020	ND	275
GG-06S	11/1/2017	35.7	3.1	1100	67200	5070	70100	13000	27000	739000	ND	1310	ND	266
HH-05D	10/27/2017	480	3.8	1000	53100	3800	70200	5650	35700	456000	ND	914	ND	122
HH-05S	10/27/2017	1070	22.6	39	269000	80.6J	558000	187	190000	5750000	ND	10500	ND	318
HH-07D	11/1/2017	38.7	1.5	1300	52600	6740	45600	10100	25600	503000	ND	905	ND	147
HH-07D dup	11/1/2017	34.5	1.4	1300	54900	6870	47800	10400	26500	525000	ND	940	ND	148
HH-07S	11/1/2017	102	2.3	600	129000	1140	237000	2840	82100	2180000	ND	3000	ND	355
JJ-03D	10/24/2017	147	7	2300	34900	680	83600	48.6	47200	955000	ND	1540	ND	305
JJ-05D	10/27/2017	70.1	3.4	730	47500	6310	44000	6120	19500	457000	ND	812	ND	201
JJ-05S	10/27/2017	179	3.4	1600	62000	1990	79000	1970	34000	995000	ND	1570	ND	281
JJ-07S	11/1/2017	191	3.3	290	277000	3240	691000	2630	202000	5630000	ND	8580	ND	1060
LL-03D	10/23/2017	102	2.5	120	349000	92.8	1160000	51.3	357000	8760000	ND	17200	ND	2290
LL-03S	10/23/2017	105	2.3	350	354000	475	1150000	48.3	356000	8720000	ND	16600	ND	2310

J = estimated value

mg/L = milligrams per liter

µg/L = micrograms per liter

ND = non-detect

Table 4
Aerovox ASB-36 Sediment Results

Depth (ft)	Parent Material	Group Name	USCS	Gravel %	Sand %	Fines %	Clay %	Moisture Content %	Ash Content %	Organic Matter %	Bulk Density (pcf)	Dry Density (pcf)	pH	pH (CaCl2)	Specific Gravity (g/cm^3)	Liquid Limit	Plastic Limit	Plasiticity Index	Liquidity Index	Sulfide (mg/kg)	Sulfate (as SO4) (mg/kg)	Hydraulic Conductivity (cm/sec)
0-1.0	Organic Marine	Organic Silt	OH	0	6.5	93.5	~18	99.8	92.3	7.7	88.98	44.53	6.4	6.2	2.54	109	51	58	0.8	ND	750	1.4E-07
1.0-2.0	Marine	Organic Silt with Sand	OH	0	16.9	83.1	~19	87.8	91.3	8.7	90.9	48.41	6.1	6.1	2.54	122	49	73	0.5	ND	920	3.2E-07
11.8-12.8	Outwash	Poorly graded sand with silt and gravel	SP/SM	31.1	61.8	7.1	1	11.2	99.9	0.1	141.9	127.6	6.8	6.4	2.65	-	non-plastic	-	-	ND	ND	-

ft = feet
USCS = unified soil classification system
% = percent
pcf = pounds per cubic foot
CaCl2 = calcium chloride
ND = non-detect
mg/kg = milligrams per kilogram
cm/sec = centimeters per second
g/cm^3 = grams per cubic centimeter

Table 5
Aerovox ASB-37 Sediment Results

Depth (ft)	Parent Material	Group Name	USCS	Gravel %	Sand %	Fines %	Clay %	Moisture Content %	Ash Content %	Organic Matter %	Bulk Density (pcf)	Dry Density (pcf)	pH	pH (CaCl2)	Specific Gravity (g/cm^3)	Liquid Limit	Plastic Limit	Plasiticity Index	Liquidity Index	Sulfide (mg/kg)	Sulfate (as SO4) (mg/kg)	Hydraulic Conductivity (cm/sec)
0-1.0	Organic Marine	sandy organic clay	OH	0.4	33.4	66.2	~10	86.9	94.5	5.5	91.31	48.84	5.8	5.8	2.51	115	40	75	0.6	ND	290	2.2E-06
1.0-2.0	Outwash	silty sand	SM	10.5	64.3	25.2	~3	16.6	99.6	0.4	137.8	118.3	5.6	5.4	2.63	Non-Plastic	-	-	-	ND	72	-
7.4-8.4	Outwash	poorly graded sand with silt	SP-SM	7.3	87.3	5.4	~1	17.3	99.9	0.1	145.3	123.8	5.8	5.6	2.64	Non-plastic	-	-	-	ND	70	-

ft = feet
USCS = unified soil classification system
% = percent
pcf = pounds per cubic foot
CaCl2 = calcium chloride
ND = non-detect
mg/kg = milligrams per kilogram
cm/sec = centimeters per second
g/cm^3 = grams per cubic centimeter

Table 6
Aerovox ASB-38 Sediment Results

Depth	Parent Material	Group Name	USCS	Gravel %	Sand %	Fines %	Clay %	Moisture Content %	Ash Content %	Organic Matter %	Bulk Density (pcf)	Dry Density (pcf)	pH	pH (CaCl2)	Specific Gravity (g/cm^3)	Liquid Limit	Plastic Limit	Plasiticity Index	Liquidity Index	Sulfide (mg/kg)	Sulfate (as SO4) (mg/kg)	Hydraulic Conductivity (cm/sec)
0-1.0	Organic Marine	organic clay with gravel	OH	13.6	7.9	78.5	~17	95.9	89.2	10.8	88.21	45.02	6.5	6.4	2.51	109	42	62	0.8	ND	330	6.4E-08
1.0-2.0	Marine	organic clay with sand	OH	3.2	19.7	77.1	~17	110.1	90.4	9.6	87.57	41.67	7	6.9	2.44	121	46	75	0.9	ND	330	1.4E-07
12.4-13.4	Outwash	poorly graded sand with silt and gravel	SP-SM	46.2	46.5	7.3	~1	9.3	99.8	0.2	143.2	131.1	6.5	6.5	2.68	non-plastic	-	-	-	ND	ND	-
23.0-24.0	Glacial Till	clayey gravel with sand	GC	49.9	28.9	21.2	~5	7.5	99.6	0.4	131	121.8	8.1	7.8	2.66	23	14	9	-0.7	ND	ND	1.2E-07

ft = feet
USCS = unified soil classification system
% = percent
pcf = pounds per cubic foot
CaCl2 = calcium chloride
ND = non-detect
mg/kg = milligrams per kilogram
cm/sec = centimeters per second
g/cm^3 = grams per cubic centimeter

Table 7
Aerovox Synoptic Water Levels

Well	Date	Time	Water Level					
			Water Level (ft BTOC)	Top of Casing (ft)	Elevation (ft NAVD88)	Mid-Screen elevation	High Tide	Low Tide
			(ft BTOC)	(ft)	(ft NAVD88)	(ft NAVD88)	time	time
BB-05D	10/16/2017	1220	5.43	4.202	-1.228	-20.126	0551	1201
BB-05S	10/16/2017	1220	5.16	3.242	-1.918	-15.226	0551	1201
BB-07D	10/16/2017	1300	5.12	4.203	-0.917	-19.3	0551	1201
BB-07S	10/16/2017	1300	4.65	3.44	-1.21	-12.9	0551	1201
DD-05D	10/16/2017	1210	4.71	3.258	-1.452	-13.281	0551	1201
DD-05S	10/16/2017	1210	5.08	3.213	-1.867	-10.281	0551	1201
DD-07D	10/16/2017	1255	6.77	5.869	-0.901	-14.806	0551	1201
DD-07S	10/16/2017	1255	6.67	5.755	-0.915	-10.806	0551	1201
DD-09D	10/16/2017	1315	6.13	4.167	-1.963	-16.305	0551	1201
DD-09S	10/16/2017	1315	5.24	4.15	-1.09	-11.305	0551	1201
FF-05D	10/16/2017	1200	5.68	4.499	-1.181	-12.164	0551	1201
FF-05S	10/16/2017	1200	5.54	3.938	-1.602	-8.164	0551	1201
FF-07D	10/16/2017	1250	4.47	3.277	-1.193	-14.651	0551	1201
FF-07S	10/16/2017	1250	5.71	3.584	-2.126	-11.151	0551	1201
FF-09D	10/16/2017	1310	5.56	4.645	-0.915	-16.956	0551	1201
FF-09S	10/16/2017	1310	6.57	5.122	-1.448	-10.956	0551	1201
GG-06S	10/16/2017	1245	7.08	5.666	-1.414	-12.81	0551	1201
HH-05D	10/16/2017	1155	5.04	4.004	-1.036	-12.972	0551	1201
HH-05S	10/16/2017	1155	5.44	3.628	-1.812	-8.972	0551	1201
HH-07D	10/16/2017	1240	2.64	6.54	3.9	-21.525	0551	1201
HH-07S	10/16/2017	1240	5.69	4.47	-1.22	-10.825	0551	1201
JJ-03D	10/16/2017	1140	3.79	2.579	-1.211	-11.102	0551	1201
JJ-03S	10/16/2017	1140	2.83	2.547	-0.283	-7.602	0551	1201
JJ-05D	10/16/2017	1145	5.77	4.779	-0.991	-21.249	0551	1201
JJ-05S	10/16/2017	1145	5.14	4.302	-0.838	-15.449	0551	1201
JJ-07D	-	-	-	4.533	-	-15.817	0551	1201
JJ-07S	10/16/2017	1230	7.77	4.862	-2.908	-10.817	0551	1201
LL-03D	10/16/2017	1130	4.43	3.523	-0.907	-15.892	0551	1201
LL-03S	10/16/2017	1130	4.97	3.378	-1.592	-9.892	0551	1201
BB-05D	11/15/2017	1150	4.45	4.202	-0.248	-20.126	0524	1132
BB-05S	11/15/2017	1150	4.18	3.242	-0.938	-15.226	0524	1132
BB-07D	11/15/2017	1155	4.46	4.203	-0.257	-19.3	0524	1132
BB-07S	11/15/2017	1155	3.78	3.44	-0.34	-12.9	0524	1132
DD-05D	11/15/2017	1145	3.74	3.258	-0.482	-13.281	0524	1132
DD-05S	11/15/2017	1145	3.98	3.213	-0.767	-10.281	0524	1132
DD-07D	11/15/2017	1205	6.1	5.869	-0.231	-14.806	0524	1132
DD-07S	11/15/2017	1205	6.22	5.755	-0.465	-10.806	0524	1132
DD-09D	11/15/2017	-	-	4.167	-	-16.305	0524	1132
DD-09S	11/15/2017	1210	4.36	4.15	-0.21	-11.305	0524	1132

Table 7
Aerovox Synoptic Water Levels

Well	Date	Time	Water Level					
			Water Level (ft BTOC)	Top of Casing (ft)	Elevation (ft NAVD88)	Mid-Screen elevation	High Tide	Low Tide
			(ft BTOC)	(ft)	(ft NAVD88)	(ft NAVD88)	time	time
FF-05D	11/15/2017	1140	4.88	4.499	-0.381	-12.164	0524	1132
FF-05S	11/15/2017	1140	4.74	3.938	-0.802	-8.164	0524	1132
FF-07D	11/15/2017	1220	4.61	3.277	-1.333	-14.651	0524	1132
FF-07S	11/15/2017	1220	4.17	3.584	-0.586	-11.151	0524	1132
FF-09D	11/15/2017	1245	4.83	4.645	-0.185	-16.956	0524	1132
FF-09S	11/15/2017	1245	5.62	5.122	-0.498	-10.956	0524	1132
GG-06S	11/15/2017	1135	6.11	5.666	-0.444	-12.81	0524	1132
HH-05D	11/15/2017	1130	4.18	4.004	-0.176	-12.972	0524	1132
HH-05S	11/15/2017	1130	4.51	3.628	-0.882	-8.972	0524	1132
HH-07D	11/15/2017	1225	6.57	6.54	-0.03	-21.525	0524	1132
HH-07S	11/15/2017	1225	4.71	4.47	-0.24	-10.825	0524	1132
JJ-03D	11/15/2017	1120	2.85	2.579	-0.271	-11.102	0524	1132
JJ-03S	11/15/2017	-	-	2.547	-	-7.602	0524	1132
JJ-05D	11/15/2017	1125	4.91	4.779	-0.131	-21.249	0524	1132
JJ-05S	11/15/2017	1125	4.67	4.302	-0.368	-15.449	0524	1132
JJ-07D	11/15/2017	-	-	4.533	-	-15.817	0524	1132
JJ-07S	11/15/2017	1235	6.38	4.862	-1.518	-10.817	0524	1132
LL-03D	11/15/2017	1115	3.53	3.523	-0.007	-15.892	0524	1132
LL-03S	11/15/2017	1115	3.91	3.378	-0.532	-9.892	0524	1132

BTOC = below top of casing

ft = feet

NAVD88 = North American Vertical Datum 88

Table 8
Observed Groundwater Gradients

Well	Date	Time	Water Level (ft BTOC)	Top of Casing (ft)	Elevation (ft NAVD88)	Mid-Screen elevation	High Tide	Low Tide	Gradient	Notes
LL-03D	10/16/2017	1130	4.43	3.523	-0.907	-15.892	0551	1201	-0.11	
LL-03S	10/16/2017	1130	4.97	3.378	-1.592	-9.892	0551	1201		
JJ-03D	10/16/2017	1140	3.79	2.579	-1.211	-11.102	0551	1201	0.27	
JJ-03S	10/16/2017	1140	2.83	2.547	-0.283	-7.602	0551	1201		
JJ-05D	10/16/2017	1145	5.77	4.779	-0.991	-21.249	0551	1201	0.03	
JJ-05S	10/16/2017	1145	5.14	4.302	-0.838	-15.449	0551	1201		
HH-05D	10/16/2017	1155	5.04	4.004	-1.036	-12.972	0551	1201	-0.19	
HH-05S	10/16/2017	1155	5.44	3.628	-1.812	-8.972	0551	1201		
FF-05D	10/16/2017	1200	5.68	4.499	-1.181	-12.164	0551	1201	-0.11	
FF-05S	10/16/2017	1200	5.54	3.938	-1.602	-8.164	0551	1201		
DD-05D	10/16/2017	1210	4.71	3.258	-1.452	-13.281	0551	1201	-0.14	
DD-05S	10/16/2017	1210	5.08	3.213	-1.867	-10.281	0551	1201		
BB-05D	10/16/2017	1220	5.43	4.202	-1.228	-20.126	0551	1201	-0.14	
BB-05S	10/16/2017	1220	5.16	3.242	-1.918	-15.226	0551	1201		
JJ-07S	10/16/2017	1230	7.77	4.862	-2.908	-10.817	0551	1201		
BB-07D	10/16/2017	1300	5.12	4.203	-0.917	-19.3	0551	1201	-0.05	
BB-07S	10/16/2017	1300	4.65	3.44	-1.21	-12.9	0551	1201		
HH-07D	10/16/2017	1240	2.64	1.534	-1.106	-21.525	0551	1201	-0.01	
HH-07S	10/16/2017	1240	5.69	4.47	-1.22	-10.825	0551	1201		
GG-06S	10/16/2017	1245	7.08	5.666	-1.414	-12.81	0551	1201		
FF-07D	10/16/2017	1250	4.47	3.277	-1.193	-14.651	0551	1201	-0.27	
FF-07S	10/16/2017	1250	5.71	3.584	-2.126	-11.151	0551	1201		
DD-07D	10/16/2017	1255	6.77	5.869	-0.901	-14.806	0551	1201	0.00	
DD-07S	10/16/2017	1255	6.67	5.755	-0.915	-10.806	0551	1201		
DD-09D	10/16/2017	1315	6.13	4.167	-1.963	-16.305	0551	1201	0.17	
DD-09S	10/16/2017	1315	5.24	4.15	-1.09	-11.305	0551	1201		
FF-09D	10/16/2017	1310	5.56	4.645	-0.915	-16.956	0551	1201	-0.09	
FF-09S	10/16/2017	1310	6.57	5.122	-1.448	-10.956	0551	1201		
LL-03D	10/23/2017	0900	2.68	3.523	0.843	-15.892	1119	1626	0.06	
LL-03S	10/23/2017	0900	2.18	3.378	1.198	-9.892	1119	1626		
JJ-03D	10/24/2017	0740	2.09	2.579	0.489	-11.102	1138	1706	-0.04	
JJ-03S	10/24/2017	0740	2.19	2.547	0.357	-7.602	1138	1706		
JJ-05D	10/27/2017	0735	4.9	4.779	-0.121	-21.249	1354	0643	0.01	
JJ-05S	10/27/2017	0735	4.35	4.302	-0.048	-15.449	1354	0643		
HH-05D	10/27/2017	1030	3.47	4.004	0.534	-12.972	1354	0643	-0.16	
HH-05S	10/27/2017	1030	3.75	3.628	-0.122	-8.972	1354	0643		
FF-05D	10/26/2017	1005	3.02	4.499	1.479	-12.164	1307	1843	-0.07	
FF-05S	10/26/2017	1005	2.74	3.938	1.198	-8.164	1307	1843		
DD-05D	10/26/2017	0800	2.15	3.258	1.108	-13.281	1307	1843	-0.21	
DD-05S	10/26/2017	0800	2.72	3.213	0.493	-10.281	1307	1843		
BB-05D	10/25/2017	0950	3.34	4.202	0.862	-20.126	1221	1750	0.02	
BB-05S	10/25/2017	0950	2.27	3.242	0.972	-15.226	1221	1750		
JJ-07D	11/1/2017	1020	3.87	4.533	0.663	-15.817	0600	1159	-0.46	
JJ-07S	11/1/2017	1020	6.51	4.862	-1.648	-10.817	0600	1159		
BB-07D	11/1/2017	1225	4.58	4.203	-0.377	-19.3	0600	1159	-0.02	
BB-07S	11/1/2017	1225	3.97	3.44	-0.53	-12.9	0600	1159		
HH-07D	11/1/2017	0740	4.18	6.54	2.36	-21.525	0600	1159	-0.09	
HH-07S	11/1/2017	0740	3.02	4.47	1.45	-10.825	0600	1159		
GG-06S	11/1/2017	1525	5.23	5.666	0.436	-12.81	0600	1159		
FF-07D	10/31/2017	1205	3.98	3.277	-0.703	-14.651	1731	1126	-0.23	
FF-07S	10/31/2017	1205	5.08	3.584	-1.496	-11.151	1731	1126		
DD-07D	10/31/2017	0930	6.06	5.869	-0.191	-14.806	1731	1126	0.02	
DD-07S	10/31/2017	0930	5.87	5.755	-0.115	-10.806	1731	1126		
DD-09D	11/2/2017	0735	2.23	4.167	1.937	-16.305	0648	1244	-0.07	
DD-09S	11/2/2017	0735	2.55	4.15	1.6	-11.305	0648	1244		
FF-09D	11/2/2017	NA	NA	4.645	NA	-16.956	0648	1244	NA	damaged well
FF-09S	11/2/2017	NA	NA	5.122	NA	-10.956	0648	1244		
LL-03D	11/15/2017	1115	3.53	3.523	-0.007	-15.892	0551	1132	-0.09	
LL-03S	11/15/2017	1115	3.91	3.378	-0.532	-9.892	0551	1132		
JJ-03D	11/15/2017	1120	2.85	2.579	-0.271	-11.102	0551	1132	0.61	potentially silted up
JJ-03S	11/15/2017	1120	0.68	2.547	1.867	-7.602	0551	1132		
JJ-05D	11/15/2017	1125	4.91	4.779	-0.131	-21.249	0551	1132	-0.04	
JJ-05S	11/15/2017	1125	4.67	4.302	-0.368	-15.449	0551	1132		
HH-05D	11/15/2017	1130	4.51	4.004	-0.506	-12.972	0551	1132	-0.01	
HH-05S	11/15/2017	1130	4.18	3.628	-0.552	-8.972	0551	1132		
FF-05D	11/15/2017	1140	4.88	4.499	-0.381	-12.164	0551	1132	-0.11	
FF-05S	11/15/2017	1140	4.74	3.938	-0.802	-8.164	0551	1132		

Table 8
Observed Groundwater Gradients

Well	Date	Time	Water Level (ft BTOC)	Top of Casing (ft)	Elevation (ft NAVD88)	Mid-Screen elevation	High Tide	Low Tide	Gradient	Notes
DD-05D	11/15/2017	1145	3.74	3.258	-0.482	-13.281	0551	1132	-0.09	
DD-05S	11/15/2017	1145	3.98	3.213	-0.767	-10.281	0551	1132		
BB-05D	11/15/2017	1150	4.45	4.202	-0.248	-20.126	0551	1132	-0.14	
BB-05S	11/15/2017	1150	4.18	3.242	-0.938	-15.226	0551	1132		
JJ-07S	11/15/2017	1235	6.38	4.862	-1.518	-10.817	0551	1132		
BB-07D	11/15/2017	1155	4.46	4.203	-0.257	-19.3	0551	1132	-0.01	
BB-07S	11/15/2017	1155	3.78	3.44	-0.34	-12.9	0551	1132		
HH-07D	11/15/2017	1225	6.57	1.534	-5.036	-21.525	0551	1132	0.45	
HH-07S	11/15/2017	1225	4.71	4.47	-0.24	-10.825	0551	1132		
GG-06S	11/15/2017	1135	6.11	5.666	-0.444	-12.81	0551	1132		
FF-07D	11/15/2017	1220	4.61	3.277	-1.333	-14.651	0551	1132	0.21	
FF-07S	11/15/2017	1220	4.17	3.584	-0.586	-11.151	0551	1132		
DD-07D	11/15/2017	1205	6.1	5.869	-0.231	-14.806	0551	1132	-0.06	
DD-07S	11/15/2017	1205	6.22	5.755	-0.465	-10.806	0551	1132		
DD-09D	11/15/2017	1210	NA	4.167	NA	-16.305	0551	1132	NA	DD-09D damaged
DD-09S	11/15/2017	1210	4.36	4.15	-0.21	-11.305	0551	1132		
FF-09D	11/15/2017	1245	4.83	4.645	-0.185	-16.956	0551	1132	-0.05	
FF-09S	11/15/2017	1245	5.62	5.122	-0.498	-10.956	0551	1132		

Appendix A

Final Aerovox Passive Sampler Survey Data Report, Battelle

FINAL

Aerovox Passive Sampler Survey
Summary Data Report

Environmental Monitoring, Sampling, and Analysis
New Bedford Harbor Superfund Site
New Bedford, Massachusetts

USACE Contract No. W912WJ-12-D-0004
Task Order No. 10

Prepared for

U.S. Army Corps of Engineers
New England District
Concord, Massachusetts

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December 2017

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Acronyms

EDV	Environmental Data Validation, Inc.
EPA	(U.S.) Environmental Protection Agency
FSP	Field Sampling Plan
GPS	global positioning system
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
PCB	polychlorinated biphenyl
PED	polyethylene device
PRC	performance reference compound
QA	quality assurance
QC	quality control
SWI	sediment-water interface
UFP-QAPP	Uniform Federal Policy Quality Assurance Project Plan
USACE NAE	U.S. Army Corps of Engineers New England District

1. Introduction

This report presents the results of a passive sampler survey performed at the New Bedford Harbor Superfund Site in 2017 to characterize polychlorinated biphenyl (PCB) concentrations in porewater and surface water in the Upper Harbor adjacent to the former Aerovox facility. Passive samplers are devices made of organic polymers that are placed in contact with sediment and surface water, ideally with sufficient time to allow the target contaminants to reach equilibrium with the sampler (EPA, 2017). After deployment, PCB concentrations in the passive samplers were measured using laboratory extraction and analysis methods, and the results were used to calculate freely-dissolved PCB concentrations in porewater and surface water and PCB flux across the sediment-water interface (SWI). Passive sampler survey results will be used by the United States Army Corps of Engineers New England District (USACE NAE) and the United States Environmental Protection Agency (EPA) to support remediation planning efforts.

1.1. SITE LOCATION AND DESCRIPTION

The New Bedford Harbor Superfund Site (Site), located in Bristol County, Massachusetts, extends from the shallow northern reaches of the Acushnet River estuary south through the commercial harbor of New Bedford and into adjacent portions of Buzzards Bay. Industrial and urban development surrounding the harbor has resulted in sediments becoming contaminated with high concentrations of many pollutants, notably PCBs and heavy metals. The source of the PCB contamination has been attributed to two electrical capacitor manufacturing facilities that operated between the 1940s and 1970s. One facility, the former Aerovox Corporation, is located near the northern boundary of the Site, and the other, Cornell-Dubilier Electronics, Inc., is located immediately south of the New Bedford Harbor hurricane barrier (Figure 1). EPA added New Bedford Harbor to the National Priorities List in 1983 as a designated Superfund Site. USACE NAE is responsible for carrying out the design and implementation of remedial measures at the site through an Interagency Agreement with EPA.

1.2. SCOPE OF WORK

Freely-dissolved PCB concentrations in porewater and surface water adjacent to the former Aerovox facility were measured using polyethylene devices (PEDs). The PEDs consisted of sheets of 25.4 µm thick polyethylene spiked with performance reference compounds (PRCs) prior to field deployments to allow assessment of the degree of equilibrium between the PED and the porewater or surface water achieved during deployment. PEDs were deployed at 22 stations near the former Aerovox facility (Table 1, Figure 2). The stations were generally positioned on a 100-foot grid, with several stations added in areas of suspected groundwater flux and areas with high PCB concentrations in adjacent upland soil. The PEDs were deployed across the SWI to obtain a porewater and surface water measurement at each station. Details of the sampling site selection and PED deployment and recovery are described in the *Aerovox Passive Sampler Survey Draft Final Field Sampling Plan* (FSP) (Battelle, 2017a).

2. Methods

The field, laboratory, and data analysis methods used for the passive sampler survey are summarized below. There were no deviations from the methods described in the FSP (Battelle, 2017a) except in the selection of a mass transfer model for non-equilibrium correction of the calculated porewater and surface water concentrations. This deviation is described in detail in Section 2.4.1.

2.1. PED PREPARATION

PEDs were prepared for deployment in Battelle's Norwell, Massachusetts laboratory as described in the FSP (Battelle, 2017a). Briefly, 14 x 40-cm (5.9 x 15.7-in) polyethylene sheets (25.4 µm thick) were

precleaned with solvents, then spiked with four PRCs: PCB-38, PCB-78, PCB-79, and PCB-186. PEDs were then mounted in solvent-cleaned stainless steel frames, wrapped in aluminum foil, packed in zip-lock bags and stored frozen until deployment. Two PEDs from each spiking batch were retained at the laboratory for determination of the initial PRC spiking loads.

2.2. FIELD METHODS

PEDs were deployed from Battelle's Research Vessel *Gale Force*, a 20-foot pontoon boat. PED frames were pushed halfway into the sediment using a pole with a custom-designed PED frame hold/release mechanism. A small buoy was attached to each PED frame using a thin floating polypropylene line to facilitate retrieval.

PEDs were retrieved by gently pulling on the line. If excess sediment was present, the frame was gently rinsed with site water. The PEDs were photographed, then wrapped in aluminum foil together with the frame, packed in zip-lock bags and placed on ice in a cooler until being transferred to the laboratory where they were stored frozen until processing.

Field quality control (QC) activities are described in Section 2.5.

2.3. LABORATORY ACTIVITIES

2.3.1. PED Sectioning

The PEDs were unwrapped from aluminum foil, carefully examined to determine the position of the SWI before sectioning, and then photographed. The location of the SWI was determined by noting the area of biofouling, which was assumed to indicate water column exposure. The goal was to cut two sections from each PED: the 6-inch interval above the SWI (surface water sample) and the 6-inch interval below the SWI (porewater sample). Sectioning results are summarized in Section 3.2.1.

2.3.2. PED Extraction and Analysis

PED extraction and analysis followed Battelle's internal standard operating procedure with modifications as described in the FSP (Battelle, 2017a). Each PED section was placed in a glass extraction container, spiked with PCB surrogate internal standards, and extracted three times with hexane. The combined extracts were dried over sodium sulfate, concentrated, and cleaned as needed using alumina and size exclusion chromatography. The final extract was further concentrated and spiked with internal recovery standards prior to analysis for 139 PCB congeners plus four PRCs. The target analyte list is provided in the Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) Addendum Worksheet #15 (Battelle, 2017b). The 139 congeners represent 95% or more of the PCBs in the environment and include the congeners found in the nine major Aroclor formulations. Post-extraction, PEDs were dried and weighed to five decimal places for data reporting purposes. All data reported from the laboratory were in nanograms per gram (ng/g) of PED.

2.4. CALCULATIONS

The goal of the calculations was to convert the PED PCB concentrations to freely-dissolved porewater or surface water PCB concentrations. The concentration gradient between the porewater and the surface water was then used to calculate the PCB flux across the SWI.

2.4.1. Freely Dissolved PCB Concentrations

The fractional equilibration between the PED and the surrounding porewater or surface water was calculated from the loss of PRCs during the deployment to determine whether PEDs reached equilibrium with the sampled water. As described in the FSP (Battelle, 2017a), a sample would be considered at equilibrium if the fractional equilibrations exceeded 0.9. Because equilibrium of all four PRCs was only

achieved by one sample (porewater part of the PED from station ADP-JJ-07), it was necessary to equilibrium-correct all of the data[1].

According to the FSP (Battelle, 2017a), a diffusion model and a first order model would be used to calculate porewater and surface water PCB concentrations, respectively. However, fractional equilibrations of over 0.9 were achieved by at least one PRC in about 89% of the samples, and were achieved by two or more PRCs in about 36% of the samples. While high fractional equilibrations are generally advantageous as they decrease the potential for error associated with the data correction, PRC data with fractional equilibrations of over 0.9 should be excluded from the mass transfer model when using the diffusion model (Gschwend et al., 2014). Omitting these data would result in PRC corrections for some samples based only on three or fewer PRCs, which potentially would increase the data correction error.

For that reason, a different, more suitable mass transfer model was selected. The sampling rate model (Rusina et al., 2010) allows inclusion of all PRC data, even those with fractional equilibrations of over 0.9, therefore increasing confidence in the accuracy of the PRC corrections. The model is suitable for both porewater and surface water samples, eliminating the need to use two different models. For comparability among samples, the sampling rate model was used for all surface water and porewater data.

To obtain water concentrations from non-equilibrium passive sampling data, the sampling rate was first determined from the loss of PRCs during PED deployment. The sampling rate (R_s) is controlled by a range of environmental factors, including water flow velocity, temperature, and the degree of biofouling on the sampler's surface (Rusina et al., 2010). Experimentally-measured retained fractions of PRCs were used to determine the parameters of the modeled retained fraction ($f_{modeled}$) which is considered a continuous function of the PED-water partition coefficient (K_{PED}) and R_s (Booij and Smedes, 2010):

$$f_{modeled} = \exp\left(-\frac{R_s \cdot t}{K_{PED} \cdot m_{PED}}\right)$$

where t is the exposure time, m_{PED} is the weight of the PED, and R_s is equal to (Rusina et al., 2010):

$$R_s = FAM^{-0.47}$$

where FA is an adjustable parameter or proportionality factor that also included factors to adjust the units, and M is the molecular weight. The FA parameter was fitted to minimize the sum of squares difference between the modeled and experimental values using the unweighted nonlinear least-squares method (Booij and Smedes, 2010)[2].

After calculating the R_s, degree of equilibration (DEQ) of each PCB congener was calculated as:

$$DEQ = 1 - f_{modeled}$$

[1] Even though the porewater sample from station ADP-JJ-07 was at equilibrium and it was not necessary to correct it, the data were still corrected for greater internal consistency. The corrected and uncorrected (DEQ = 1) congener data for this sample resulted in practically the same total PCB concentration (4,812 vs. 4,816 ng/L, respectively) because the correction was minimal.

[2] Customizable spreadsheet with least-squares fit calculation formula was obtained from rs.passivesampling.net.

Equilibrium water concentrations of each congener ($C_{w\infty}$) were then calculated through simple scaling of the obtained concentration of each congener in PED at the end of exposure period ($C_{PED,t}$) using the PED-water partition coefficient and the degree of equilibration:

$$C_{w\infty} = \frac{C_{PED,t}}{K_{PED} \cdot DEQ}$$

2.4.2. PCB Flux

Diffusive flux (F) of total dissolved PCB[3] across the SWI was calculated as described in the FSP (Battelle, 2017a) using first Fick's law, following the method described by Fernandez et al. (2014):

$$F = -\frac{D_w}{\delta_{BL}}(C_w - C_{PW})$$

where D_w is the average PCB diffusivity in water, δ_{BL} is the boundary layer thickness, C_W is the total PCB concentration in surface water, and C_{PW} is the total PCB concentration in porewater. C_W and C_{PW} were calculated by summing equilibrium concentrations of all analyzed PCB congeners calculated using the methods described in Section 2.4.1. D_w for total PCB was calculated as an average of diffusion coefficients for each congener, which were calculated using equation from Schwarzenbach et al. (1993). The value of D_w used in this survey was 4.52×10^{-6} cm^2/s. Boundary layer thickness for passive samplers in the water column is typically in the range of 50 to 500 µm, depending on the water flow conditions (Apell et al., 2015); in this survey, the value of 200 µm (Fernandez et al., 2014) was used. Positive value of F indicates flux from sediment into the water column, while negative F indicates flux from the water column into the sediment.

2.5. QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Field QC procedures included global positioning system (GPS) calibration checks and collection of a trip blank. The GPS calibration was checked twice daily before and after deployment and recovery trips; the results were recorded in the Summary of Daily Field Activities log. The trip blank was a PRC-spiked PED in a metal frame transported to the field during deployment and recovery, where it was unwrapped from the aluminum foil and exposed to the air for about the same amount of time as it takes to deploy/recover a PED.

Routine laboratory QC samples consisted of a method blank, a laboratory control sample (LCS) and laboratory control sample duplicate (LCSD), surrogate recovery standards, and internal standards. The frequency and measurement performance criteria were as defined in Battelle (2017b) for PCB congeners in solid samples (Worksheets #12 and #28). The analytical results were validated by Battelle's subcontractor, Environmental Data Validation, Inc. (EDV), for validation at the Tier 1 Stage 2A level using the following guidelines:

- EPA New England Environmental Data Review Supplement for Regional Data Review Elements and Superfund Specific Guidance/Procedures, April 2013 (EPA, 2013); and
- EPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, June 2008 (EPA, 2008)

All water concentration and flux calculations were verified by Battelle's project quality assurance (QA) officer.

[3] Total dissolved PCB was calculated as the sum of 139 congeners with non-detects counted as zeros.

3. Results

3.1. FIELD SUMMARY

PEDs were deployed on July 11, 2017 and were successfully retrieved from all 22 stations on August 14, 2017 after a 34-day deployment. Field logs are provided in Appendix A.

3.2. LABORATORY SUMMARY

3.2.1. PED Sectioning

Most PEDs were heavily biofouled above the SWI and clear below the SWI (Figure 3). The sections of PEDs above the SWI were cleaned using Kimwipes and Milli-Q water (i.e., ultrapure water of resistivity 18.2 MΩ·cm at 25 °C) to remove biofouling. The sections below the SWI were cleaned in the same manner but only where black residue was present. PED inspection and processing observations are summarized below.

PED insertion depths were within approximately 1 inch of the target depth. A few PEDs had only light biofouling (Stations ADP-BB-07, ADP-DD-09, ADP-FF-07, ADP-HH-07 and ADP-JJ-07; see Figure 4). On some PEDs, black-colored deposits or stains (spots) were visible on the metal frames or on the plastic itself, either below or near the SWI. Deposits located below the SWI had a sulfide odor and were wiped off with a Kimwipe (in most cases some discoloration remained) prior to sectioning for analysis. Patchy deposits located immediately above the SWI on one PED (Station ADP-DD-04) had a sulfide and slight hydrocarbon odor (Figure 5). This stained section of PED (about 1 inch thick) was not included in the sample for analysis because it was not believed to be representative of the water column (the stained section was archived instead). Narrow sections (about 0.5- to 1.0-inch thick) were also excluded from several other PEDs with similar staining immediately above the SWI (Stations ADP-GG-05, ADP-HH-07, and ADP-JJ-07), and from two PEDs where the exact position of the SWI was not clear due to a gradational color transition (e.g., PEDs from Stations ADP-FF-04 and ADP-HH-05; see Figure 6).

The PED from Station ADP-JJ-05 had a sharp SWI, but the SWI was oriented at an angle of about 45 degrees to the frame (Figure 7). Two other PEDs showed signs of initial upright insertion with subsequent tilting of the PEDs and equilibration at an angle (Stations ADP-BB-07 and ADP-DD-07; see Figure 8). The triangular parts of the PED that were believed to be exposed to both porewater and surface water during the deployment were archived. Sections that appeared to be exposed only to porewater or only to surface water were sectioned for analysis. The data are considered to be usable despite the apparent movement of the samplers during the deployment.

One PED (Station ADP-EE-04) had only minimal biofouling above the SWI, suggesting that the PED may have been pulled out of the sediment and laid flat on the sediment surface for most of the deployment period, or something inhibited the development of biofouling at this location (Figure 9). This PED was sectioned into two 6-inch intervals above and below the SWI.

3.2.2. Laboratory Analysis

The results of laboratory analysis of the PED extracts in ng/g of PED are provided in Appendix B. The extracts required dilution due to high levels of PCB contamination in the sampled area.

3.3. QA/QC SUMMARY

Seven PCB congeners were detected in the trip blank at concentrations above the method detection limit. However, the PCB concentrations in the trip blank were two to five orders of magnitude lower than the concentrations in the post-deployment PEDs; therefore, contamination of the PEDs during transport and deployment did not affect the final results. The other 132 congeners were not detected in the trip blank.

All laboratory-based QC sample results met the UFP-QAPP criteria, with the exception that one to two congeners (out of 139) were recovered slightly above the acceptance limits in two of the three LCS/LCSD pairs and the relative percent difference between LCS/LCSD recoveries were above the acceptance limits by up to 20 percent in one of the three LCS/LCSD pairs. In addition, one of the two surrogate recovery standards (PCB-34) was recovered above the acceptable range for all field-deployed PEDs but within normal range for unexposed PEDs, the trip blank and all laboratory-based QC samples. The fact that only field-deployed samples were affected indicates that the issue is sample-related, and not an analytical problem. Overall, results from the field- and laboratory based QC samples indicate that the sampling and analytical methods were in control and that the data are useable.

Data validation results confirmed that, in general, sample analysis was in control. LCS percent recovery or LCS/LCSD RPDs exceeded the QAPP criteria in two analytical batches. Validation U or UJ qualifiers were applied to affected congener results. Surrogate percent recoveries exceeded the QAPP criteria in all three analytical batches. Validation J qualifiers were applied to affected congener results.

3.4. EQUILIBRIUM WATER CONCENTRATIONS

A summary of the PCB congener data used to calculate the equilibrium water concentrations is provided in Appendix C. Appendix C contains the PED concentration data that were used in further data analyses, initial and final PRC concentrations, fractional equilibrations of PRCs, calculated porewater and surface water concentrations (by congener), and congener octanol-water partition coefficients (K_{ow}s) and PED-water partition coefficients (K_{PED}s).

As expected, fractional equilibrations of PRCs were inversely proportional to the compound's octanol-water partition coefficient: the less hydrophobic PRCs (e.g., PCB-38) achieved higher fractional equilibrations than the more hydrophobic PRCs (e.g., PCB-186). This trend was evident in most porewater and surface water samples (Appendix C).

Even though sample-to-sample variability in the fractional equilibrations was low across the survey area, each sample was evaluated separately to provide a correction most appropriate to the specific environmental conditions experienced by each PED. Fractional equilibration of PEDs in surface water depends on the degree of biofouling (significant variation was evident as shown in Figures 3 through 9 and Table 1), water temperature, and flow conditions. In porewater, equilibration rates are mostly dependent on sediment properties such as porosity, tortuosity, or organic carbon content; physical disturbance of the sediment by wave action or bioturbation; and porewater chemistry.

The freely-dissolved total PCB concentrations for porewater and overlying surface water samples are presented in Table 1 and mapped in Figures 10 and 11 [4]. Surface water concentrations were similar throughout the area (as expected for a well-mixed water body), ranging from 1,690 to 3,480 ng/L and with an average value of 2,750 ± 443 ng/L. Porewater values had significantly more spatial variability, with dissolved total PCB concentrations from 1,810 to 36,900 ng/L and with an average of 8,420 ± 8,810 ng/L. The highest porewater concentrations correspond to the sampling stations in the areas that were not previously dredged (higher elevation areas on bathymetric map in Figure 10). The six stations with the highest porewater concentrations (exceeding 10,000 ng/L) were ADP-BB-05, ADP-CC-07, ADP-DD-04, ADP-DD-07, ADP-HH-05, and ADP-JJ-05.

3.5. PCB FLUX

The results of the calculations of the diffusive flux of dissolved total PCB are presented in Table 1 and Figure 12[5]. At five of the 22 sampling stations, the calculated flux had a slightly negative value (from -3.05 to -25.3 mg/m^2/yr) indicating near-static conditions or possible downward flux from surface water into the sediment porewater. At the remaining 17 stations the flux was positive (ranging from 5.04 to 2,380

[4] All concentration values are rounded to three significant figures.
[5] All flux values are rounded to three significant figures.

mg/m^2/yr), indicating that the PCBs are diffusing from the porewater into the overlying water. Because of the relatively uniform concentration of PCBs in the surface water throughout the surveyed area, the flux values are mostly driven by the variation in the porewater concentrations. Very strong correlation between flux values and the porewater concentrations was observed (R^2 = 0.998). The areas with the highest flux correspond to the undredged parts of the harbor where high porewater concentrations of PCBs were detected (see Section 3.4).

The PCB flux estimate for Station ADP-EE-04, where the PED showed minimal biofouling above the SWI, was relatively low; however, the porewater and surface water PCB concentrations were similar to results from nearby stations. The results for ADP-EE-04 are considered usable because the evidence of potential disturbance of the PED during deployment is inconclusive.

4. Summary

A passive sampler survey was conducted in the Upper Harbor adjacent to the former Aerovox facility to characterize freely dissolved PCB concentrations in porewater and surface water and PCB flux across the SWI. Total PCB concentrations in the surface water were similar throughout the survey area (as expected from a well-mixed system), and ranged from 1,690 to 3,480 ng/L. Total PCB concentrations in the porewater were more spatially variable, and ranged from 1,810 to 36,900 ng/L. The highest porewater concentrations corresponded to sampling stations in areas that were not previously dredged. Diffusive flux of dissolved total PCB occurs from the surface water down into the sediment porewater at five of the survey locations, ranging from -3.05 to -25.3 mg/m^2/yr. Diffusive flux of dissolved total PCB occurs from the porewater into the overlying water at 17 of the survey locations, ranging from 5.04 to 2,380 mg/m^2/yr. Flux values correspond strongly with the porewater concentrations, and areas of the highest flux generally correspond to undredged areas of the harbor where higher porewater concentrations of PCBs were measured.

5. References

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Figures

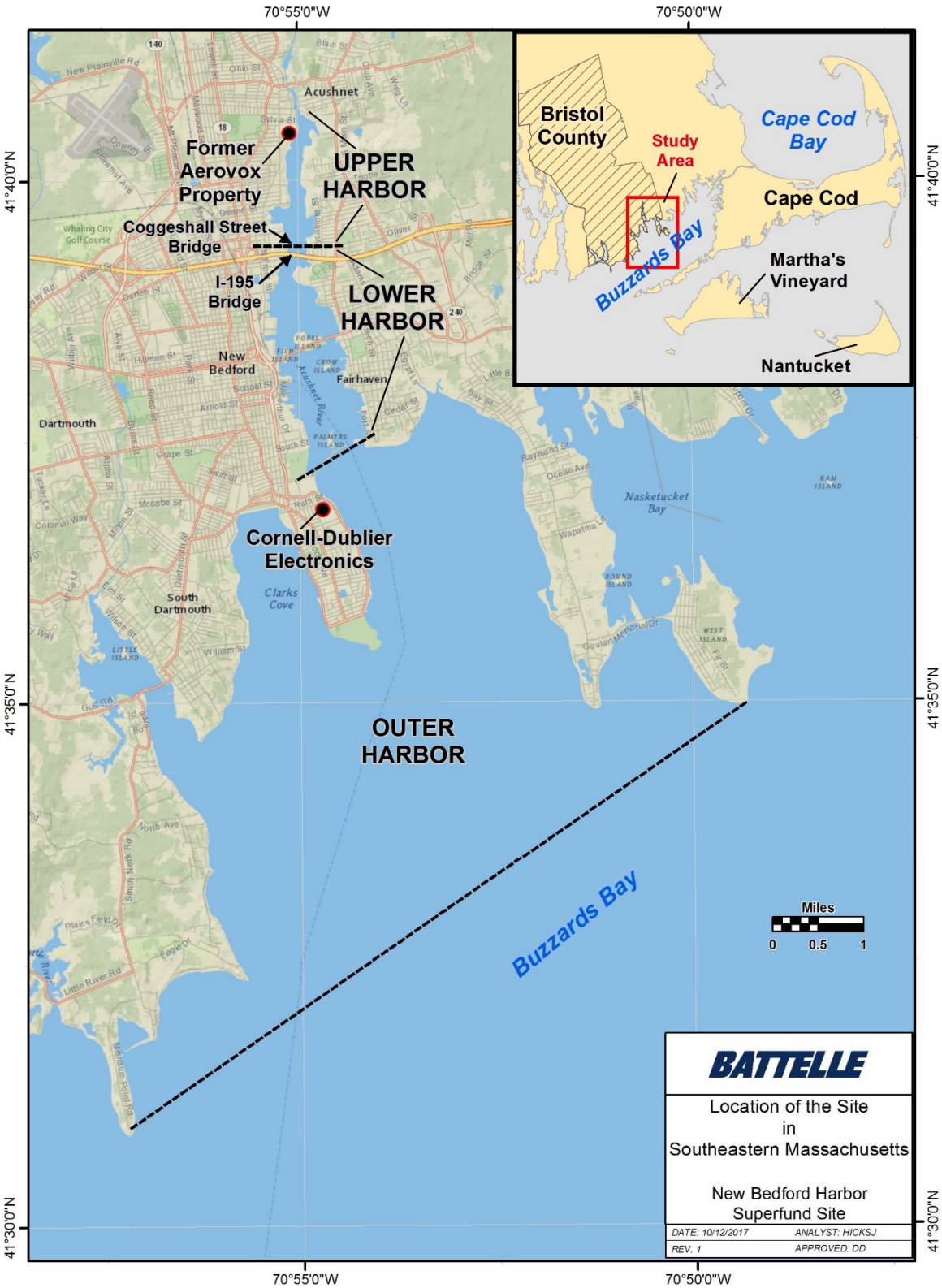


Figure 1. Location of the former Aerovox facility within the New Bedford Harbor.

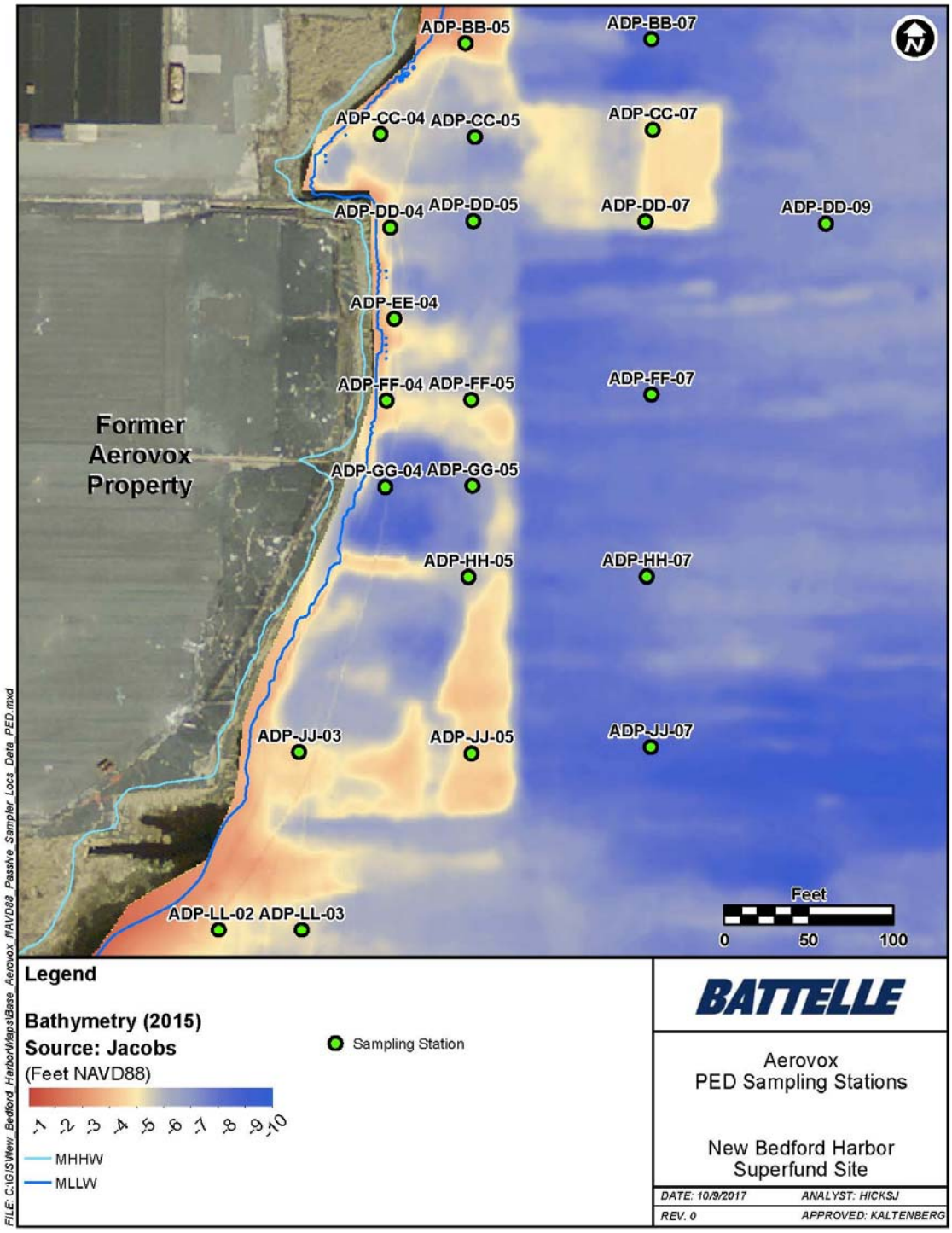


Figure 2. PED Deployment Locations.

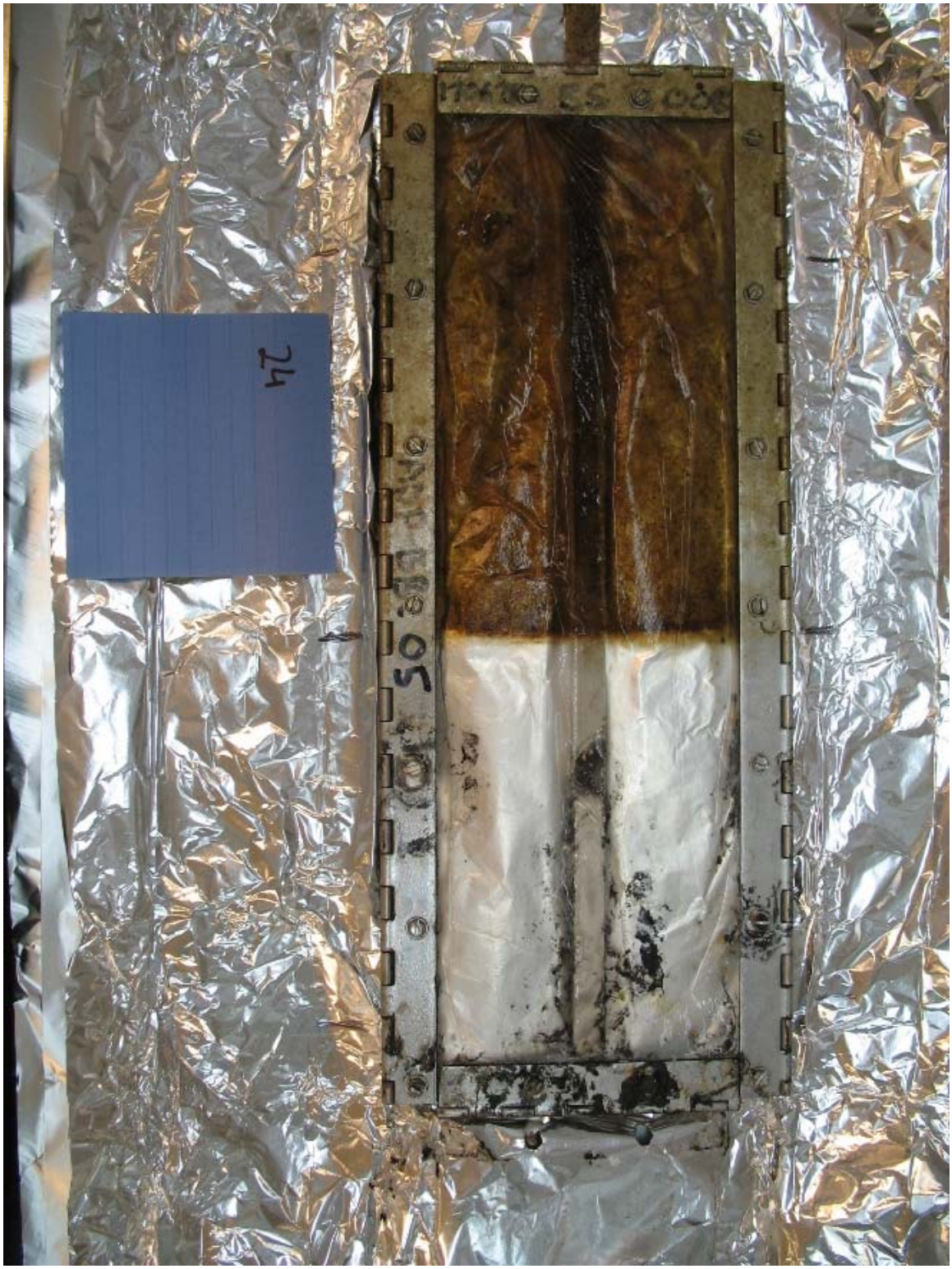


Figure 3. Laboratory Picture of PED Prior to Sectioning. Station ADP-BB-05. Heavy Biofouling Above the SWI.

Figure 4. Laboratory Picture of PED Prior to Sectioning. Station ADP-DD-09. Light Biofouling Above the SWI and Dark Sulfide Deposits Below the SWI.

Figure 5. Laboratory Picture of PED Prior to Sectioning. Station ADP-DD-04. PED with Patchy, Black Deposits near the SWI; Deposits Had Hydrocarbon Odor.

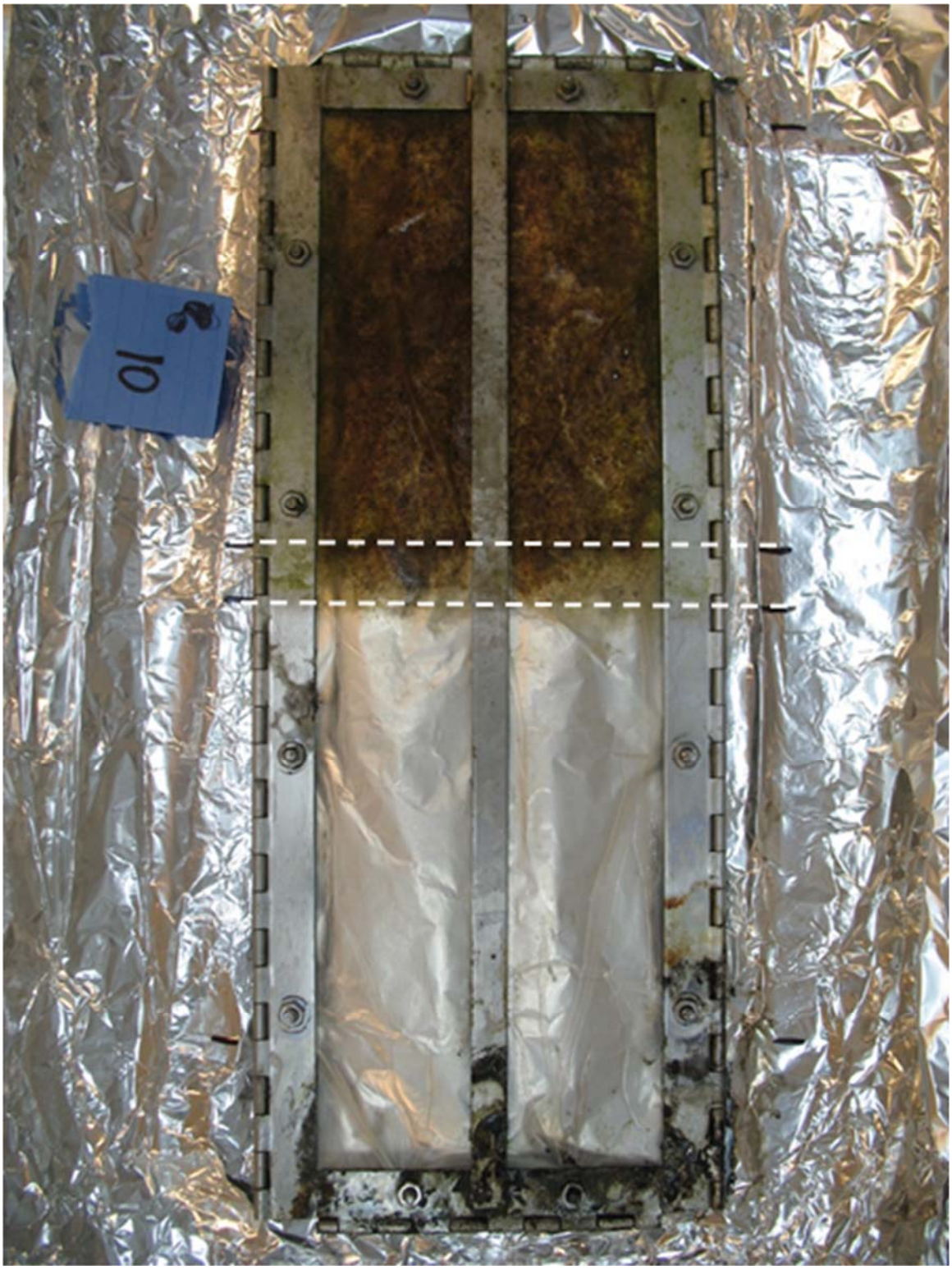


Figure 6. Laboratory Picture of PED Prior to Sectioning. Station ADP-FF-04. PED with Gradational Color Change Over the SWI. Section Between the Dashed Lines Was Not Included in the Surface Water or Porewater Samples Sectioned for Analysis.

Figure 7. Laboratory Picture of PED Prior to Sectioning. Station ADP-JJ-05. PED with Angled but Sharp SWI.

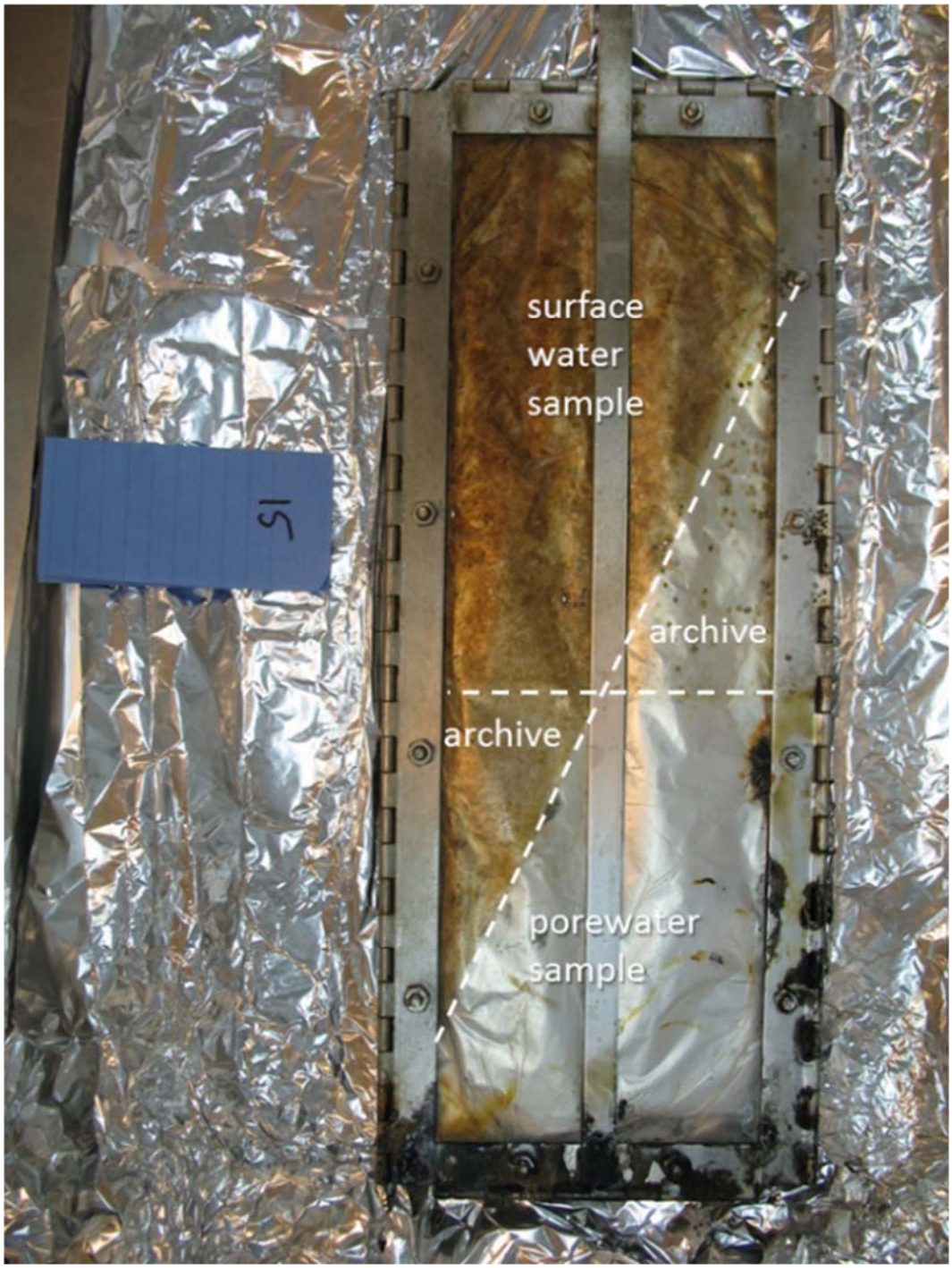


Figure 8. Laboratory Picture of PED Prior to Sectioning. Station ADP-DD-07. PED That Was Initially Inserted Vertically (Color Change Visible along the Horizontal Dashed Line) but Was Subsequently Tilted (New Interface Marked by the Diagonal Dashed Line). The Two Triangular Sections That Were Exposed to Both Surface Water and Porewater Were Not Included in the Samples for Analysis, but Were Archived.

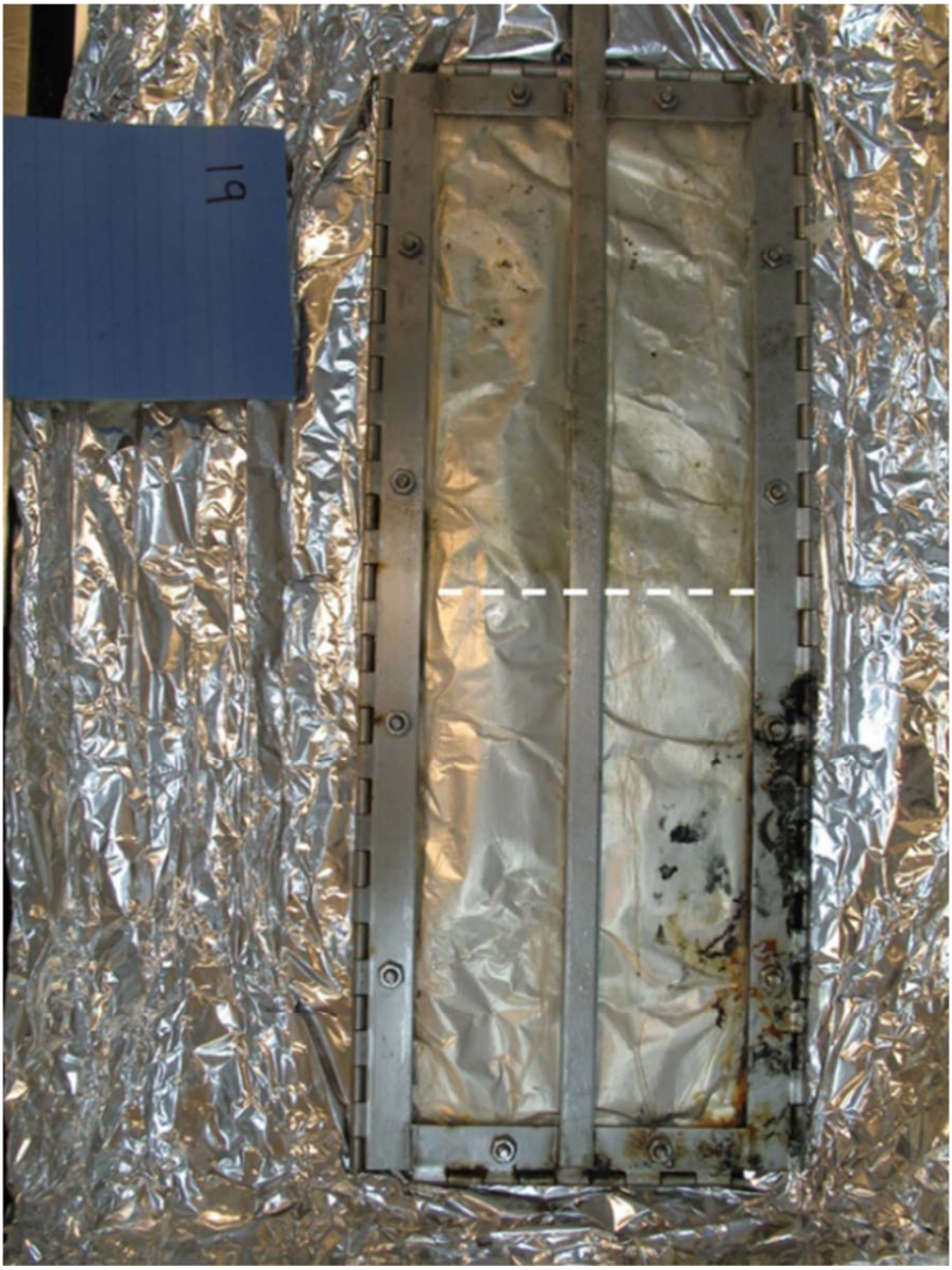


Figure 9. Laboratory Picture of PED Prior to Sectioning. Station ADP-EE-04. PED Appears to Have Been Pulled out of the Sediment and May Have Laid Flat on the Sediment Surface or Biofouling Was Inhibited by Environmental Factors at the Site. The Dashed Line Indicates the SWI Location at the Time of Deployment.

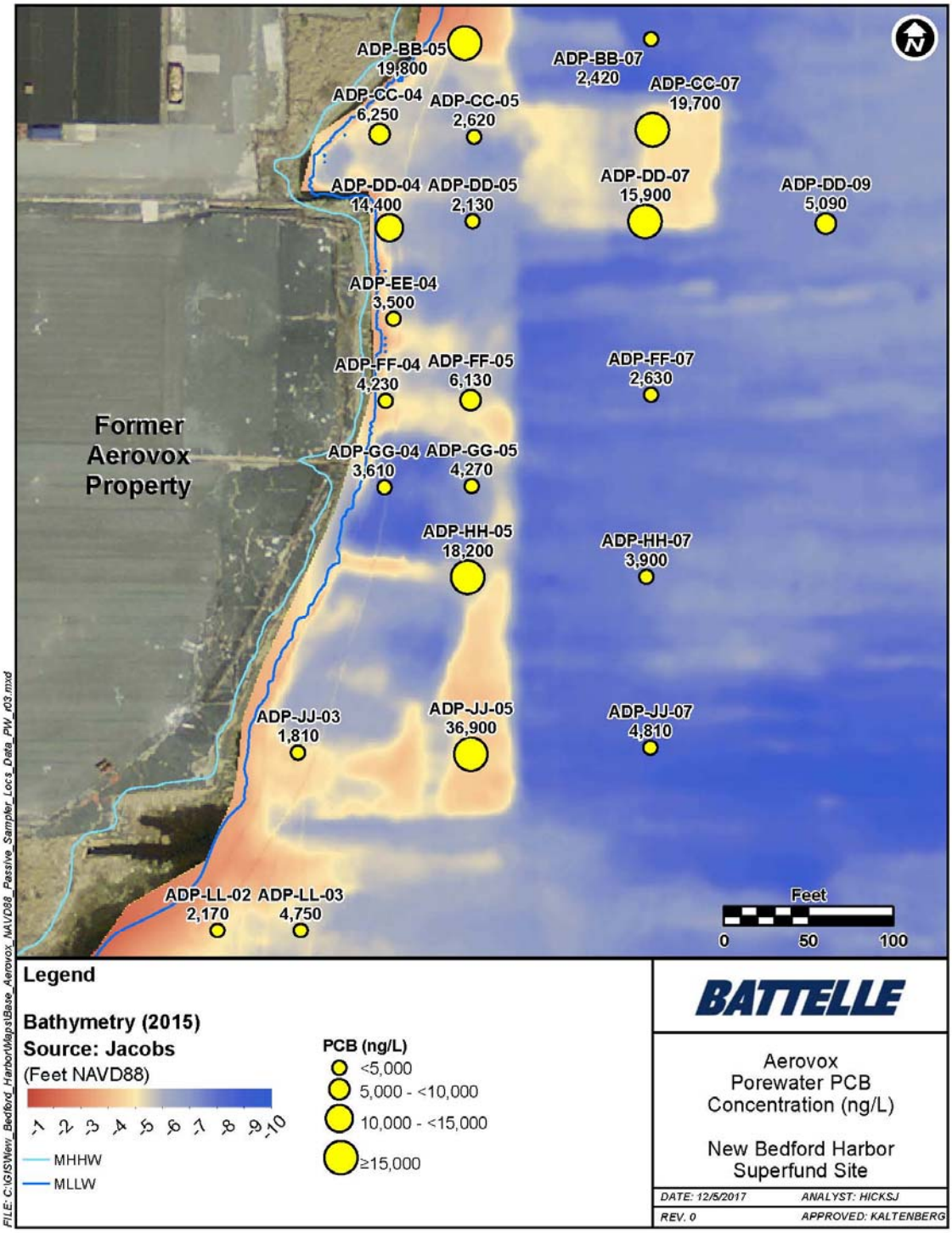


Figure 10. Total Dissolved PCB in the Top 6 Inches of Porewater near the Former Aerovox Facility.

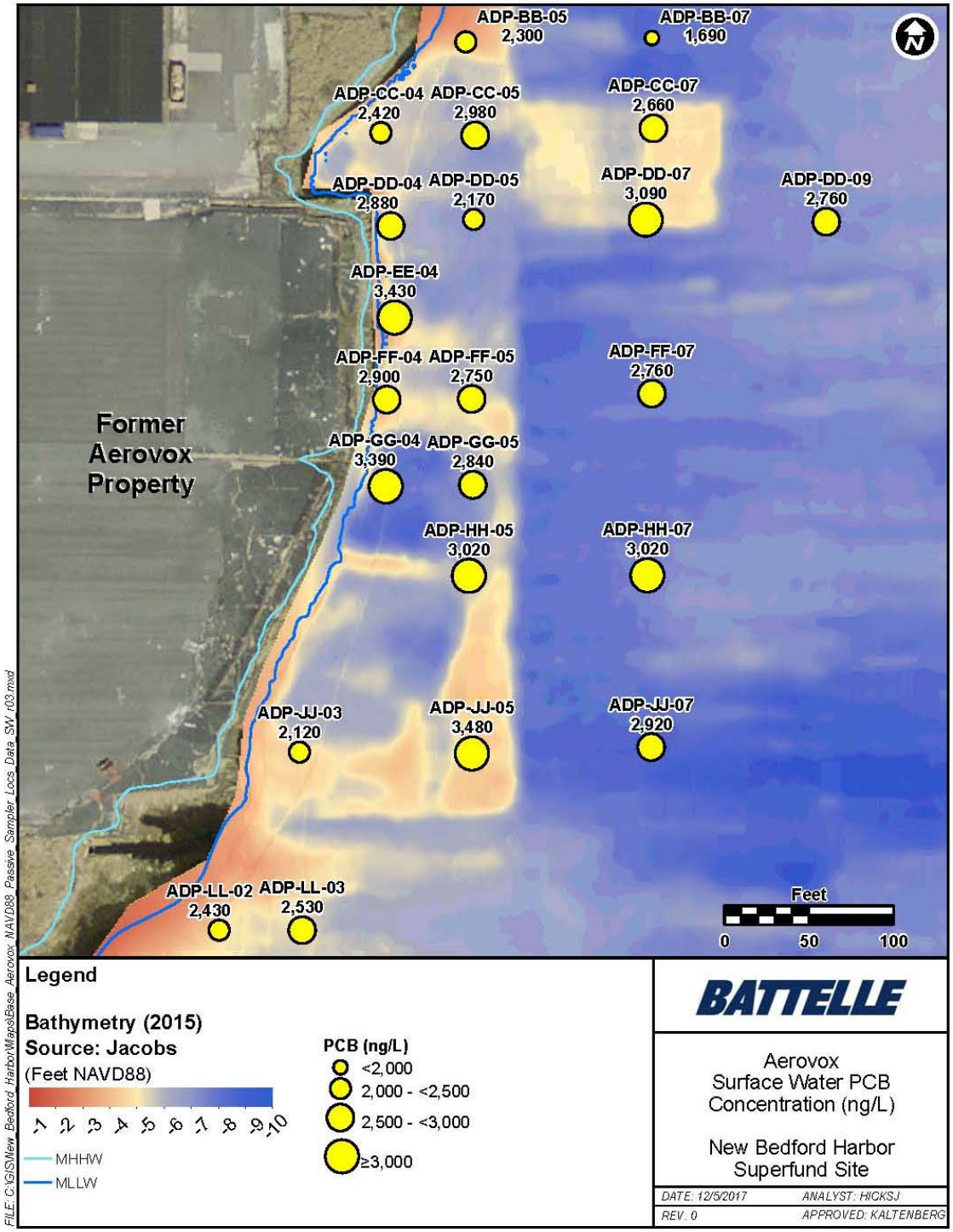


Figure 11. Total Dissolved PCB in the Bottom 6 Inches of Surface Water near the Former Aerovox Facility. Note: the Scale (Circle Size) is Different Than in Figure 9 to Better Represent Spatial Variability of the Data.

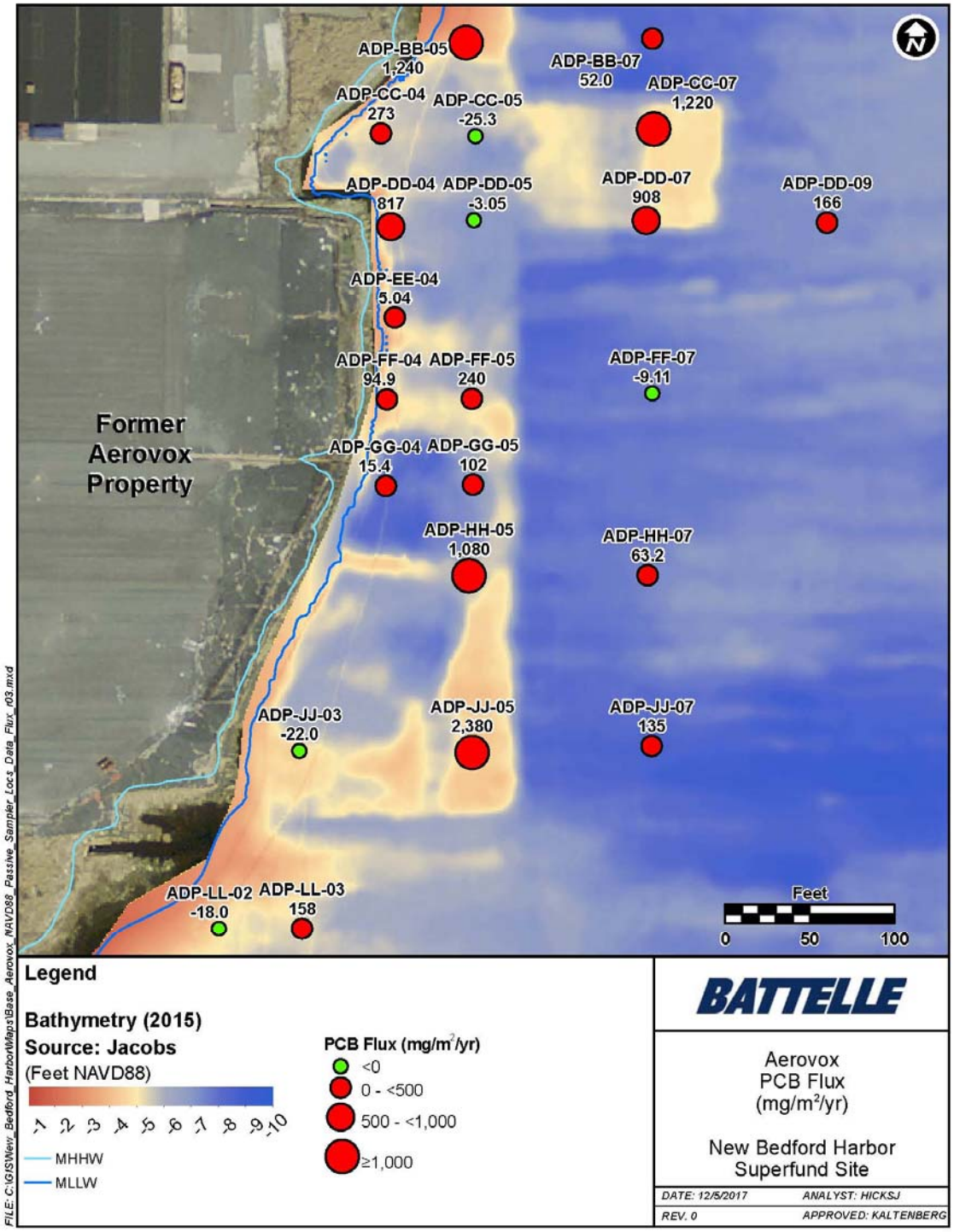


Figure 12. Diffusive Flux of Total Dissolved PCB Across the Sediment-Water Interface near the Former Aerovox Facility. Negative Flux Values Indicate Flux from Water Column Down into the Sediment; Positive Flux Values Indicate Flux from Porewater up into the Water Column.

Tables

Table 1. Location of the Sampling Stations and the Results of Surface Water, Porewater, and Flux Calculations. Results Rounded to Three Significant Figures.

Station ID	Northing	Easting	Sediment surface elevation	PED Conditions at Recovery		Surface water Total PCB (ng/L)	Porewater Total PCB (ng/L)	PCB Flux ($mg/m^2/yr$)
	NAD83, MA State Plane (ft)		NAVD88, MA State Plane (ft)	Sediment-water interface angle	Degree of PED Biofouling			
ADP-BB-05	2707120.0	815680.2	-3.9	horizontal	heavy	2,300	19,800	1,240
ADP-BB-07	2707122.3	815790.2	-8.0	~ 45 deg.	light	1,690	2,420	52.0
ADP-CC-04	2707066.6	815629.9	-5.3	~ 10 deg	heavy	2,420	6,250	273
ADP-CC-05	2707064.9	815685.7	-6.3	horizontal	moderate	2,980	2,620	-25.3
ADP-CC-07	2707069.0	815791.1	-4.9	~20 deg	moderate	2,660	19,700	1,220
ADP-DD-04	2707011.5	815635.7	-5.5	horizontal	moderate	2,880	14,400	817
ADP-DD-05	2707015.4	815684.8	-7.0	horizontal	moderate/heavy	2,170	2,130	-3.05
ADP-DD-07	2707015.2	815786.6	-5.3	~ 60 deg.	moderate	3,090	15,900	908
ADP-DD-09	2707013.9	815893.3	-7.1	~ 10 deg.	light	2,760	5,090	166
ADP-EE-04	2706957.5	815638.1	-5.1	horizontal	minimal	3,430	3,500	5.04
ADP-FF-04	2706909.1	815633.4	-5.1	horizontal	heavy	2,900	4,230	94.9
ADP-FF-05	2706909.5	815683.6	-5.9	horizontal	heavy	2,750	6,130	240
ADP-FF-07	2706912.6	815790.2	-7.7	horizontal	light	2,760	2,630	-9.11
ADP-GG-04	2706858.0	815632.8	-7.8	horizontal	moderate	3,390	3,610	15.4
ADP-GG-05	2706858.8	815684.3	-7.1	horizontal	heavy	2,840	4,270	102
ADP-HH-05	2706805.2	815681.9	-5.9	horizontal	moderate/heavy	3,020	18,200	1,080
ADP-HH-07	2706805.4	815787.5	-7.3	horizontal	light	3,020	3,900	63.2
ADP-JJ-03	2706701.3	815581.7	-4.2	horizontal	heavy	2,120	1,810	-22.0
ADP-JJ-05	2706700.4	815683.7	-4.7	~ 45 deg.	heavy	3,480	36,900	2,380
ADP-JJ-07	2706704.2	815789.8	-8.6	horizontal	light	2,920	4,810	135
ADP-LL-02	2706596.3	815534.2	-4.8	horizontal	moderate	2,430	2,170	-18.0
ADP-LL-03	2706596.3	815583.3	-5.6	horizontal	moderate	2,530	4,750	158

Appendix A:

Field Log Sheets

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBL, MRF, CF
Vessel: GALE FORCE	Buoy Number: 1		Station ID: ADP-LL-02
Recorder: PBL	Time of Deployment (local): 0824		
Northing: 2706596.261	Easting: 815534.239	Elevation (ft.): 0.944	DGPS Accuracy (ft): H: 0.063 V: 0.096
Water depth (ft): 5.7	Predicted Tidal Height (ft.): 2.94		
PED ID(s): 170628AS012	Sample ID(s): ~~170628AS012~~ ① P-176-ADP-LL-02		
Comments / Observations: ① w/c PBL 11 July 2017			

RECOVERY	Date: ~~11 July 2017~~ ① 14 AUG 2017		Staff initials: ~~PBL, MRF, CMF~~ ① PBL/MRF
Vessel: ~~GALE FORCE~~ ① Gale Force	Buoy Number: 1		Station ID: ADP-LL-02
Recorder: PBL	Time of Recovery (local): 1002		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):		
PED ID(s): 170628AS012	Sample ID(s): P-176-ADP-LL-02		
Comments / Observations: ① w/c PBL 11 July 2017 ③ NOT RECORDED PBL / 14 AUG 2017			

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF	
Vessel: Gale Force	Buoy Number: 2	Station ID: ADP-LL-03	
Recorder: PBC	Time of Deployment (local): 0838		
Northing: 2706596.257	Easting: 815583.329	Elevation (ft.): 0.891	DGPS Accuracy (ft): H: 0.059 V: 0.125
Water depth (ft): 6.5	Predicted Tidal Height (ft.): 2.71		
PED ID(s): 170628AS013	Sample ID(s): P-176-ADP-LL-03		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017	Staff initials: MRF / PBC	
Vessel: GALE FORCE	Buoy Number: 2	Station ID: ADP-LL-03	
Recorder: PBC	Time of Recovery (local): 0958		
Northing:	Easting:	Elevation (ft.): (1)	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):		
PED ID(s): 170628AS013	Sample ID(s): P-176-ADP-LL-03		
Comments / Observations:			
(1) NOT RECORDED PBC 14 Aug 2017			

DEPLOYMENT	Date: 11 July 2017		Staff initials: CNF, MRF, PBC
Vessel: Gale Force	Buoy Number: 3		Station ID: ADP-JJ-03
Recorder: PBC	Time of Deployment (local): 0925		
Northing: 2706701.315	Easting: 815581.719	Elevation (ft.): 2.002	DGPS Accuracy (ft): H: 0.051 V: 0.114
Water depth (ft): 6.2	Predicted Tidal Height (ft.): 3.32		
PED ID(s): 170628AS011	Sample ID(s): P-176-ADP-JJ-03		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017		Staff initials: PBC/MRF
Vessel: GALE FORCE	Buoy Number: 3		Station ID: ADP-JJ-03
Recorder: PBC	Time of Recovery (local): 0954		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):		
PED ID(s): 170628AS011	Sample ID(s): P-176-ADP-JJ-03		
Comments / Observations:			

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBC, CNF, MRF
Vessel: Gale Force	Buoy Number: 4		Station ID: ADP-JJ-05
Recorder: PBC	Time of Deployment (local): 0933		
Northing: 2706700.441	Easting: 815683.742	Elevation (ft.): 1.659	DGPS Accuracy (ft): H: 0.047 V: 0.069
Water depth (ft): 6.4	Predicted Tidal Height (ft.): 3.32		
PED ID(s): 170628AS010	Sample ID(s): P-176-ADP-JJ-05		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017		Staff initials: MRF / PBC
Vessel: GALE FORCE	Buoy Number: 4		Station ID: ADP-JJ-05
Recorder: PBC	Time of Recovery (local): 0949		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):	①	
PED ID(s): 170628AS010	Sample ID(s): P-176-ADP-JJ-05		
Comments / Observations:			
① NOT RECOVERED PBC 14 AUG 2017			

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, MRF, CNF
Vessel: Gale Force	Buoy Number: 5	Station ID: ADP-JJ-07
Recorder: PBC	Time of Deployment (local): 0946	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706704.227	815789.792	1.502	H: 0.046 V: 0.078

Water depth (ft):	Predicted Tidal Height (ft.):
10.1	3.85

PED ID(s):	Sample ID(s):
170628AS009	P-17G-ADP-JJ-07

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC
Vessel: Gale Force	Buoy Number: 5	Station ID: ADP-JJ-07
Recorder: PBC	Time of Recovery (local): 0945	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):

PED ID(s):	Sample ID(s):
170628AS009	P-17G-ADP-JJ-07

Comments / Observations:

DEPLOYMENT	Date: 11 July	Staff initials: MRF, PBC, CNF
Vessel: GALE FORCE	Buoy Number: 6	Station ID: ADP-HH-05
Recorder: PBC	Time of Deployment (local): 0955	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706805.190	815681.942	1.768	H: 0.045 V: 0.074

Water depth (ft):	Predicted Tidal Height (ft.):	
7.7	3.81	

PED ID(s):	Sample ID(s):
170628AS08	P-176-ADP-HH-05

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC
Vessel: GALE FORCE	Buoy Number: 6	Station ID: ADP-HH-05
Recorder: PBC	Time of Recovery (local): 0933	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	①

PED ID(s):	Sample ID(s):
170628AS08	P-176-ADP-HH-05

Comments / Observations:

① NOT RECORDED PBC 14AUG2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, MRF, CWF
Vessel: Gale Force	Buoy Number: 7	Station ID: ADP-HH-07
Recorder: PBC	Time of Deployment (local): 1004	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706805.449	815787.504	2.235	H: 0.047 V: 0.075

Water depth (ft):	Predicted Tidal Height (ft.):
9.5	3.85

PED ID(s):	Sample ID(s):
170628AS007	P-17G-ADP-HH-07

Comments / Observations:

RECOVERY	Date: 14 Aug 2017	Staff initials: PBC-MRF
Vessel: Gale Force	Buoy Number: 7	Station ID: ADP-HH-07
Recorder: PBC	Time of Recovery (local): 0937	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
—	Ø		H: V:

Water depth (ft):	Predicted Tidal Height (ft.):
—	—

PED ID(s):	Sample ID(s):
170628AS007	P-17G-ADP-HH-07

Comments / Observations: Ø NOT Recovered PBC 14 AUG 2017

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBC
Vessel: Gale Force	Buoy Number: 8		Station ID: ADP-GG-05
Recorder: PBC	Time of Deployment (local): 1015		
Northing: 2706858.826	Easting: 815684.282	Elevation (ft.): 1.953	DGPS Accuracy (ft): H: 0.048 V: 0.073
Water depth (ft): 9.1	Predicted Tidal Height (ft.): 3.87		
PED ID(s): 170628AS005		Sample ID(s): P-17G-ADP-GG-05	
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017		Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 8		Station ID: ADP-GG-05
Recorder: PBC	Time of Recovery (local): 0824		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):	①	
PED ID(s): 170628AS005		Sample ID(s): P-17G-ADP-GG-05	
Comments / Observations:			
① NOT RECORDED PBC 14 Aug 2017			

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBC, CNF, MRF
Vessel: Gale Force	Buoy Number: 9		Station ID: ADP-GG-04
Recorder: PBC	Time of Deployment (local): 1025		
Northing: 2706857.995	Easting: 815632.820	Elevation (ft.): 2.107	DGPS Accuracy (ft): H: 0.045 V: 0.072
Water depth (ft): 9.9	Predicted Tidal Height (ft.): 3.85		
PED ID(s): 170628AS006	Sample ID(s): P-17G-ADP-GG-04		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017		Staff initials: PBC / MRF
Vessel: Gale Force	Buoy Number: 9		Station ID: ADP-GG-04
Recorder: PBC	Time of Recovery (local): 0928		
Northing:	Easting:	Elevation (ft.): ①	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):		
PED ID(s): 170628AS006	Sample ID(s): P-17G-ADP-GG-04		
Comments / Observations: ① NOT Recovered PBC 14AUG2017			

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF
Vessel: Gale Force	Buoy Number: 10	Station ID: ADP-FF-04
Recorder: PBC	Time of Deployment (local): 1039	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706909.107	815633.419	1.775	H: 0.044 V: 0.069

Water depth (ft):	Predicted Tidal Height (ft.):	
6.9	3.82	

PED ID(s):	Sample ID(s):
170628AS004	P-17G-ADP-FF-04

Comments / Observations:

RECOVERY	Date: 14 Aug 2017	Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 10	Station ID: ADP-FF-04
Recorder: PBC	Time of Recovery (local): 0857	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	①

PED ID(s):	Sample ID(s):
170628AS004	P-17G-ADP-FF-04

Comments / Observations: ① NOT RECORDED PBC 14AUG2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBL, CNF, MRF
Vessel: GALE FORCE	Buoy Number: 11	Station ID: ADP-FF-05
Recorder: PBL	Time of Deployment (local): 1047	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706909.509	815683.596	1.346	H: 0.047 V: 0.071

Water depth (ft):	Predicted Tidal Height (ft.):
7.2	3.76

PED ID(s):	Sample ID(s):
170628AS003	P-176-ADP-FF-05

Comments / Observations:

RECOVERY	Date: 14 August 2017	Staff initials: PBL/MRF
Vessel: Gale Force	Buoy Number: 11	Station ID: ADP-FF-05
Recorder: PBL	Time of Recovery (local): 0901	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
		(1)	H: V:

Water depth (ft):	Predicted Tidal Height (ft.):

PED ID(s):	Sample ID(s):
170628AS003	P-176-ADP-FF-05

Comments / Observations: (1) NOT RECORDED PBL 14AUG2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, MRF, CNF
Vessel: Gale Force	Buoy Number: 12	Station ID: ADP-FF-07
Recorder: PBC	Time of Deployment (local): 1055	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706912.633	815790.209	1.608	H: 0.052 V: 0.070

Water depth (ft):	Predicted Tidal Height (ft.):	
9.3	3.69	

PED ID(s):	Sample ID(s):
170628AS002	P-17G-ADP-FF-07

Comments / Observations:

RECOVERY	Date: ① 14 AUG 2017	Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 12	Station ID: ADP-FF-07
Recorder: PBC	Time of Recovery (local): 0920	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	

PED ID(s):	Sample ID(s):
170628AS002	P-17G-ADP-FF-07

Comments / Observations: ① SD 14 AUG 2017 (clarity)

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, MRF, CNF	
Vessel: Gale Force	Buoy Number: 14	Station ID: ADP-DD-09	
Recorder: PBC	Time of Deployment (local): 1119		
Northing: 2707013.924	Easting: 815893.349	Elevation (ft.): 2.009	DGPS Accuracy (ft): H: 0.062 V: 0.110
Water depth (ft): 9.1	Predicted Tidal Height (ft.): 3.5		
PED ID(s): 170628BS004	Sample ID(s): P-17G-ADP-DD-09		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC/MRF	
Vessel: Gale Force	Buoy Number: 14	Station ID:	
Recorder: PBC	Time of Recovery (local): ~~094~~ 0916 (1)		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):	(2)	
PED ID(s): 170628BS004	Sample ID(s): P-17G-ADP-DD-09		
Comments / Observations: (1) PBC S/B 14 AUG 2017			
		(2) NOT RELOADED 14 AUG 2017	

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CWF, MRF
Vessel: Gale Force	Buoy Number: 15	Station ID: ADP-DD-07
Recorder: PBC	Time of Deployment (local): 1129	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2707015.182	815786.612	1.749	H: 0.070 V: 0.121

Water depth (ft):	Predicted Tidal Height (ft.):	
7.0	3.38	

PED ID(s):	Sample ID(s):
BS003 ① 170628~~B003~~	P-17G-ADP-DD-07

Comments / Observations:

① S/B PBC 11 July 2017

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC / MRF
Vessel: Gale Force	Buoy Number: 15	Station ID: ADP-DD-07
Recorder: PBC	Time of Recovery (local): 0905	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	②

PED ID(s):	Sample ID(s):
170628BS003	P-17G-ADP-DD-07

Comments / Observations:

② NOT RECORDED 14 AUG 2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF
Vessel: Gale Force	Buoy Number: 16	Station ID: ADP-DD-05
Recorder: PBC	Time of Deployment (local): 1141	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2707015.370	815684.777	1.397	H: 0.069 V: 0.087

Water depth (ft):	Predicted Tidal Height (ft.):
8.4	3.24

PED ID(s):	Sample ID(s):
170628BS002	P-17G-ADP-DD-05

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC / MRF
Vessel: Gale Force	Buoy Number: 16	Station ID: ADP-DD-05
Recorder: PBC	Time of Recovery (local): 0832	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
		(1)	H: V:

Water depth (ft):	Predicted Tidal Height (ft.):

PED ID(s):	Sample ID(s):
170628BS002	P-17G-ADP-DD-05

Comments / Observations: (1) NOT RECORDED PBC 14AUG2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF
Vessel: Gale Force	Buoy Number: 17	Station ID: ADP-DD-04
Recorder: PBC	Time of Deployment (local): 1151	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2707011.496	815635.705	1.325	H: 0.061 V: 0.091

Water depth (ft):	Predicted Tidal Height (ft.):
6.8	3.63

PED ID(s):	Sample ID(s):
170628BS001	P-17G-ADP-DD-04

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 17	Station ID: ADP-DD-04
Recorder: PBC	Time of Recovery (local): 0849	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	(1)

PED ID(s):	Sample ID(s):
170628BS001	P-17G-ADP-DD-04

Comments / Observations:

(1) NOT RECORDED PBC 14AUG2017

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF
Vessel: GALE FORCE	Buoy Number: 19	Station ID: ADP-EE-04
Recorder: PBC	Time of Deployment (local): 1210	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2706957.455	815638.057	1.075	H: 0.052 V: 0.079

Water depth (ft):	Predicted Tidal Height (ft.):
6.2	2.77

PED ID(s):	Sample ID(s):
170628AS001	P-17G-ADP-EE-04

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 19	Station ID: ADP-EE-04
Recorder: PBC	Time of Recovery (local): 0853	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):

PED ID(s):	Sample ID(s):
170628AS001	P-17G-ADP-EE-04

Comments / Observations: Potentially knocked over. Horizon present but no growth on horizon.

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBC, MRF, CNF
Vessel: Gale Force	Buoy Number: 20		Station ID: ADP-CC-04
Recorder: PBC	Time of Deployment (local): 1219		
Northing: 2707066.558	Easting: 815629.885	Elevation (ft.): 0.877	DGPS Accuracy (ft): H: 0.076 V: 0.156
Water depth (ft): 6.2	Predicted Tidal Height (ft.): 2.6		
PED ID(s): 170628BS005	Sample ID(s): P-17G-ADP-CC-04		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017		Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 20		Station ID: ADP-CC-04
Recorder: PBC	Time of Recovery (local): 0836		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):	(2)	
PED ID(s): 170628BS005	Sample ID(s): P-17G-ADP-CC-04		
Comments / Observations: Exposed Trip Blank For 5 minutes At This Station.			
		(2) NOT RECORDED PBC 14AUG2017	

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, CNF, MRF
Vessel: GALE FORCE	Buoy Number: 21	Station ID: ADP-CC-05
Recorder: PBC	Time of Deployment (local): 1328	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2707064.867	815685.658	0.861	H: 0.048 V: 0.069

Water depth (ft):	Predicted Tidal Height (ft.):
7.2	2.41

PED ID(s):	Sample ID(s):
170628BS006	P-17G-ADP-CC-05

Comments / Observations:

RECOVERY	Date: 14 AUGUST 2017	Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 21	Station ID: ADP-CC-05
Recorder: PBC	Time of Recovery (local): 0828	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
		(2)	H: V:

Water depth (ft):	Predicted Tidal Height (ft.):

PED ID(s):	Sample ID(s):
170628BS006	P-17G-ADP-CC-05

Comments / Observations:

(2) PBC 14AUG2017 NOT RECORDED

DEPLOYMENT	Date: 11 July 2017	Staff initials: CNF, PBC, MRF
Vessel: GALE FORCE	Buoy Number: 22	Station ID: ADP-CC-07
Recorder: PBC	Time of Deployment (local): 1237	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
2707069.023	815791.075	0.609	H: 0.048 V: 0.072

Water depth (ft):	Predicted Tidal Height (ft.):
5.5	2.23

PED ID(s):	Sample ID(s):
170628BS007	P-17G-ADP-CC-07

Comments / Observations:

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC / MRF
Vessel: Gale Force	Buoy Number: 22	Station ID: ADP-CC-07
Recorder: PBC	Time of Recovery (local): ~~08219~~ 0819 ①	

Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft):
			H: V:

Water depth (ft):	Predicted Tidal Height (ft.):	②

PED ID(s):	Sample ID(s):
170628BS007	P-17G-ADP-CC-07

Comments / Observations: ① PBC SB / 14 AUG 2017

② NOT RECORDED PBC 14AUG2017

DEPLOYMENT	Date: 11 July 2017		Staff initials: PBC, MRF, CNF
Vessel: GALE FORCE	Buoy Number: 23		Station ID: ADP-BB-07
Recorder: PBC		Time of Deployment (local): 1247	
Northing: 2707122.340	Easting: 815790.215	Elevation (ft.): 0.428	DGPS Accuracy (ft): H: 0.055 V: 0.070
Water depth (ft): 8.4	Predicted Tidal Height (ft.): 2.04		
PED ID(s): 170628BS009		Sample ID(s): P-17G-ADP-BB-07	
Comments / Observations:			

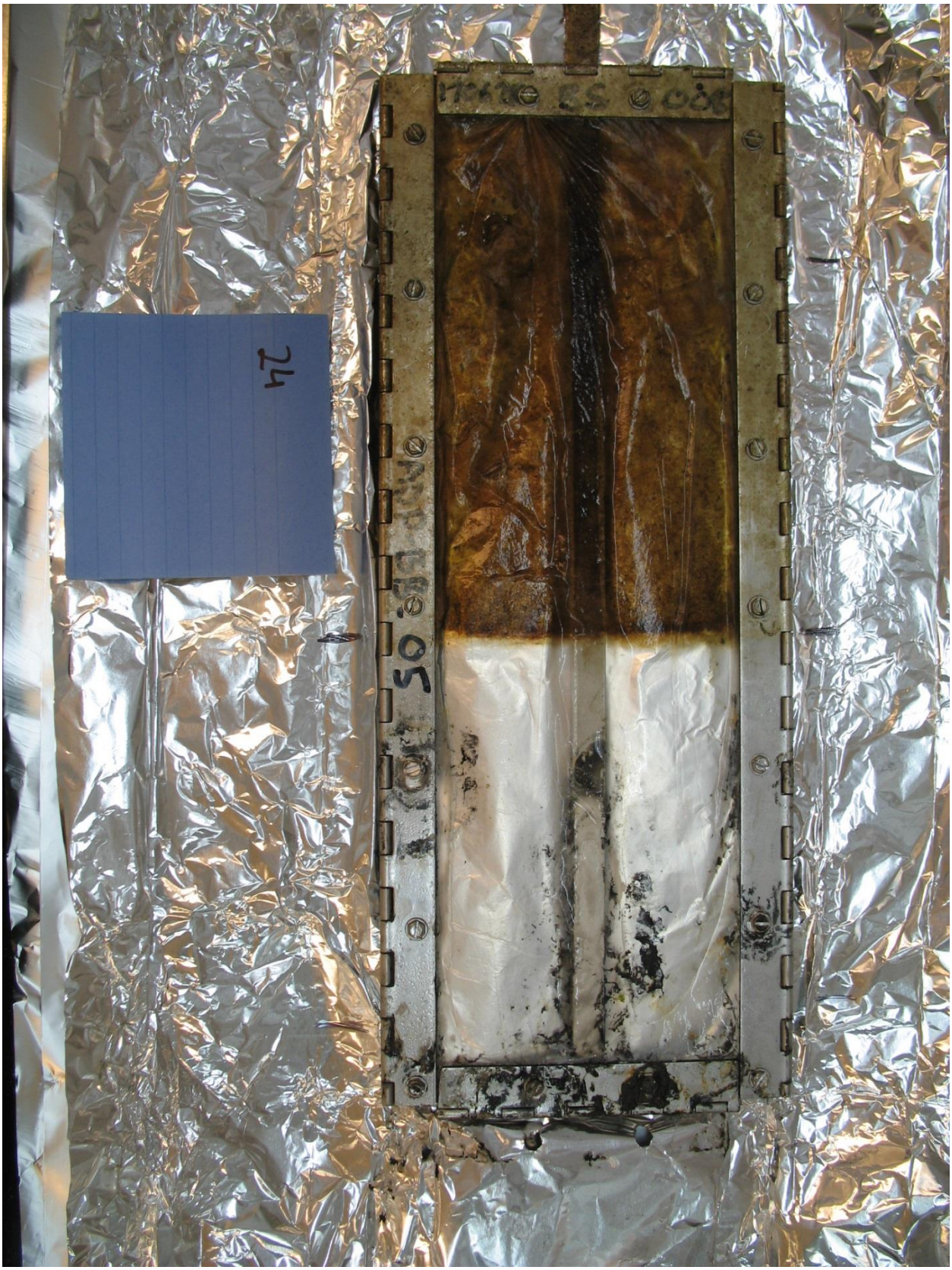
RECOVERY	Date: 14 AUG		Staff initials: PBC/MRF
Vessel: Gale Force	Buoy Number: 23		Station ID: ADP-BB-07
Recorder: PBC		Time of Recovery (local): 0814	
Northing:	Easting:	Elevation (ft.): (1)	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):		
PED ID(s): 170628BS009		Sample ID(s): P-17G-ADP-BB-07	
Comments / Observations:			
(1) NOT RECORDED PBC 14AUG2017			

DEPLOYMENT	Date: 11 July 2017	Staff initials: PBC, MRF, CNF	
Vessel: GALE FORCE	Buoy Number: 24	Station ID: ADP-BB-05	
Recorder: PBC	Time of Deployment (local): 1258		
Northing: 2707120.010	Easting: 815680.164	Elevation (ft.): 0.207	DGPS Accuracy (ft): H: 0.041 V: 0.057
Water depth (ft): 4.1	Predicted Tidal Height (ft.): 1.86		
PED ID(s): 170628B008	Sample ID(s): P-17G-ADP-BB-05		
Comments / Observations:			

RECOVERY	Date: 14 AUG 2017	Staff initials: PBC / MRF	
Vessel: GALE FORCE	Buoy Number:	Station ID: ADP-BB-05	
Recorder: PBC	Time of Recovery (local): 0823		
Northing:	Easting:	Elevation (ft.):	DGPS Accuracy (ft): H: V:
Water depth (ft):	Predicted Tidal Height (ft.):	(1)	
PED ID(s): 170628B008	Sample ID(s): P-17G-ADP-BB-05		
Comments / Observations: (1) NOT RECORDED PBC 14AUG2017			

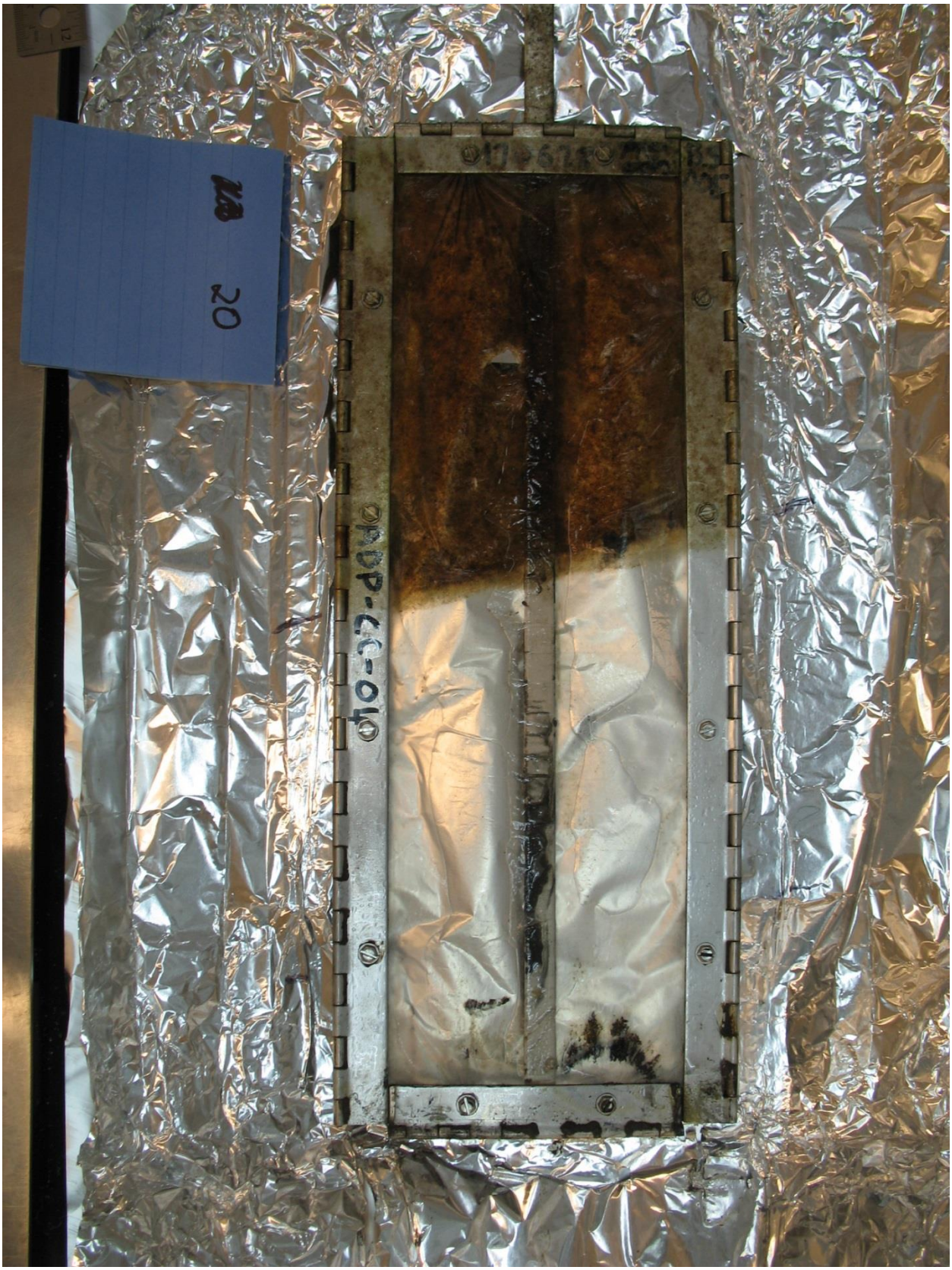
Appendix B:

Laboratory Photos and Data Packages



PED from Station ADP-BB-05, retrieved on 14-Aug-2017

PED from Station ADP-BB-07, retrieved on 14-Aug-2017



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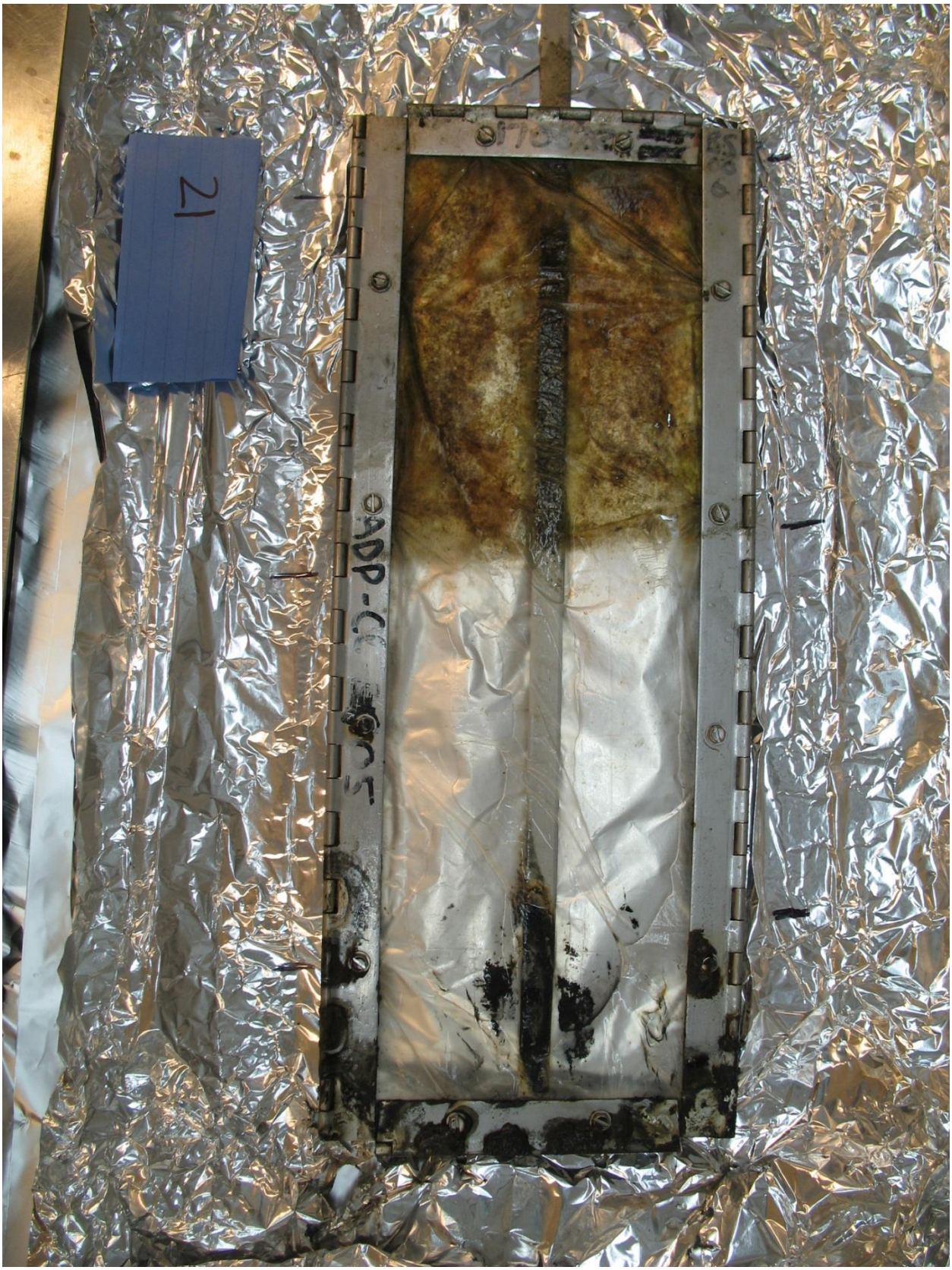
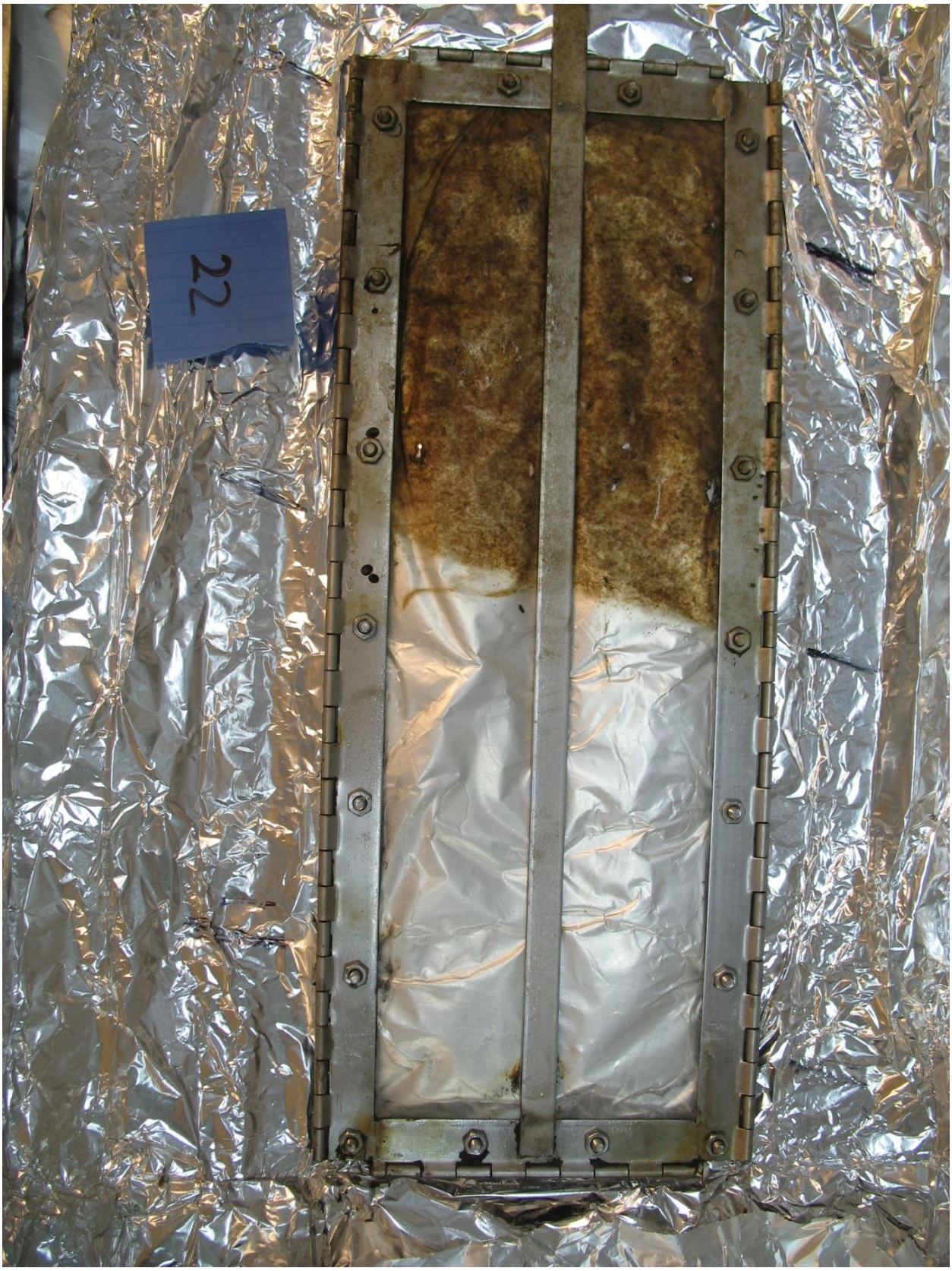
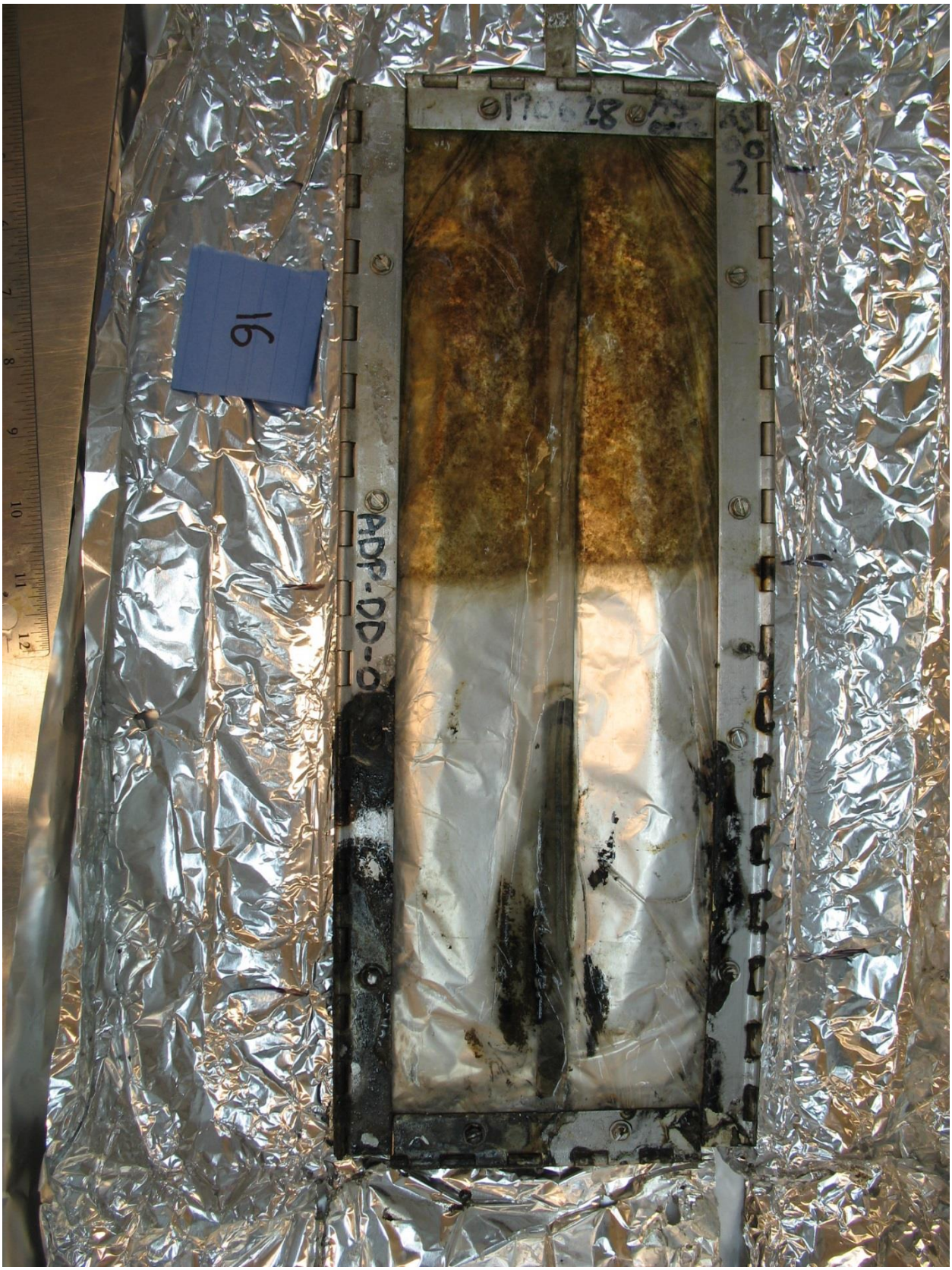


PED from Station ADP-CC-05, retrieved on 14-Aug-2017



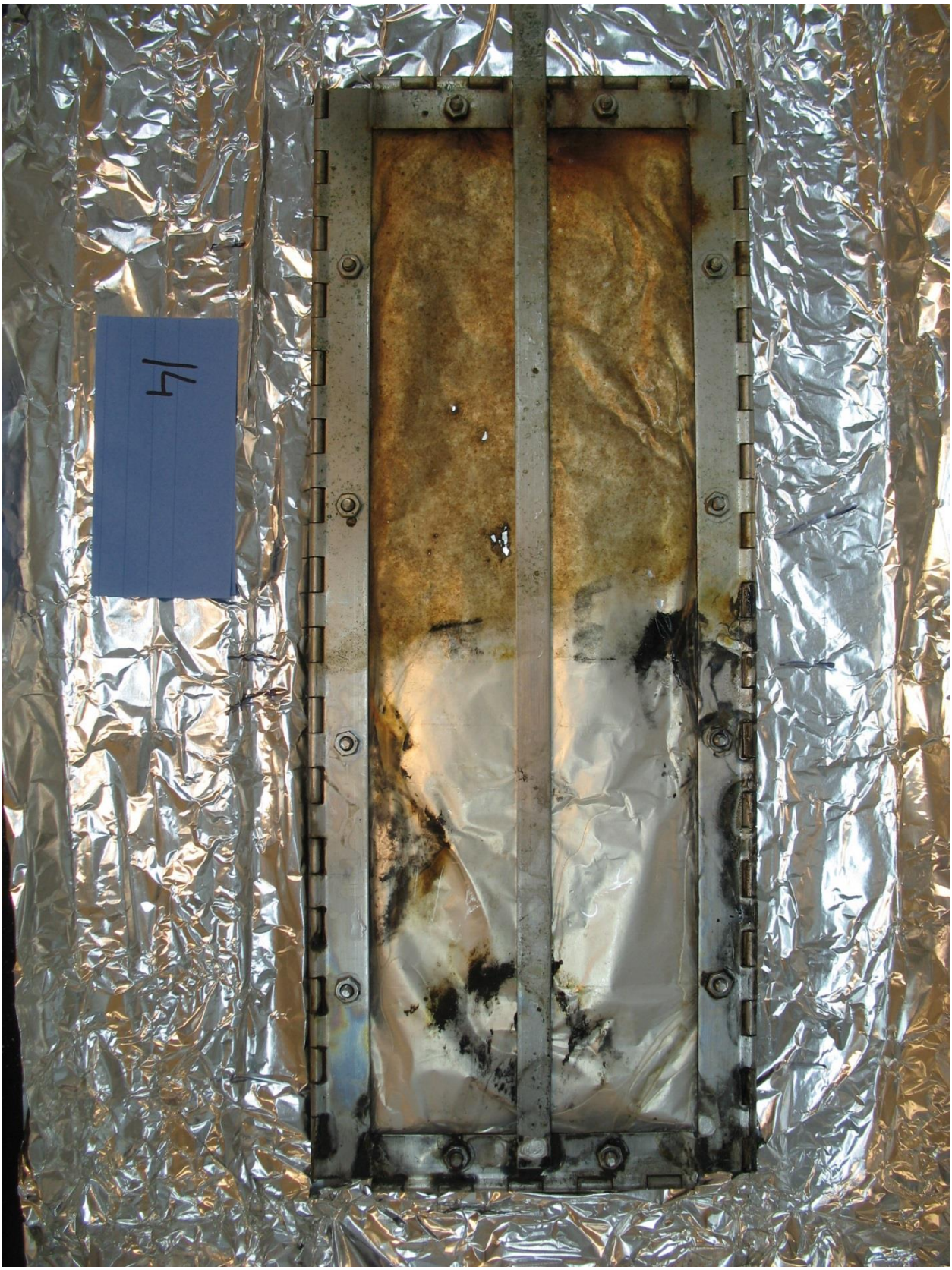
PED from Station ADP-CC-07, retrieved on 14-Aug-2017

PED from Station ADP-DD-04, retrieved on 14-Aug-2017

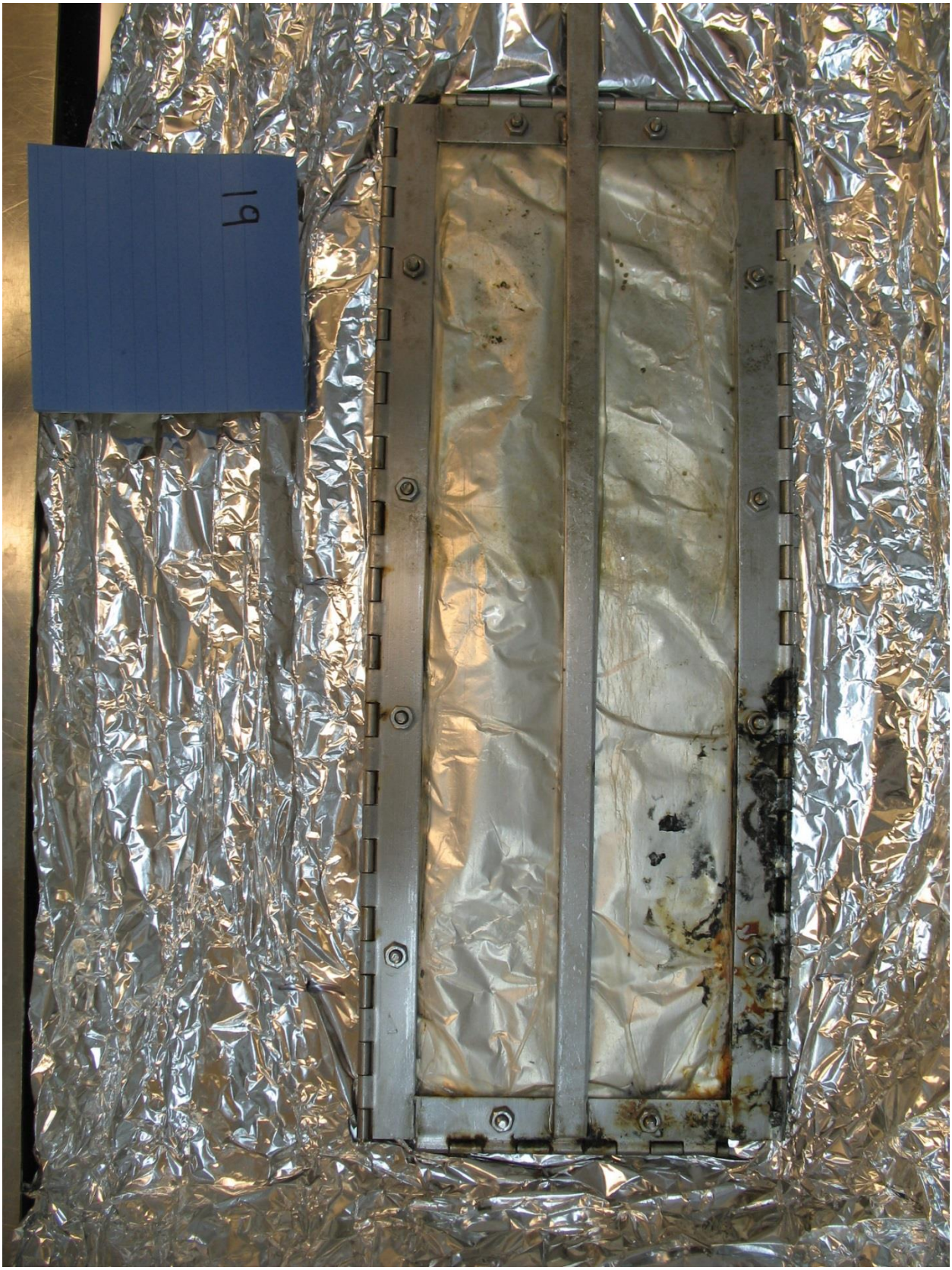


PED from Station ADP-DD-05, retrieved on 14-Aug-2017

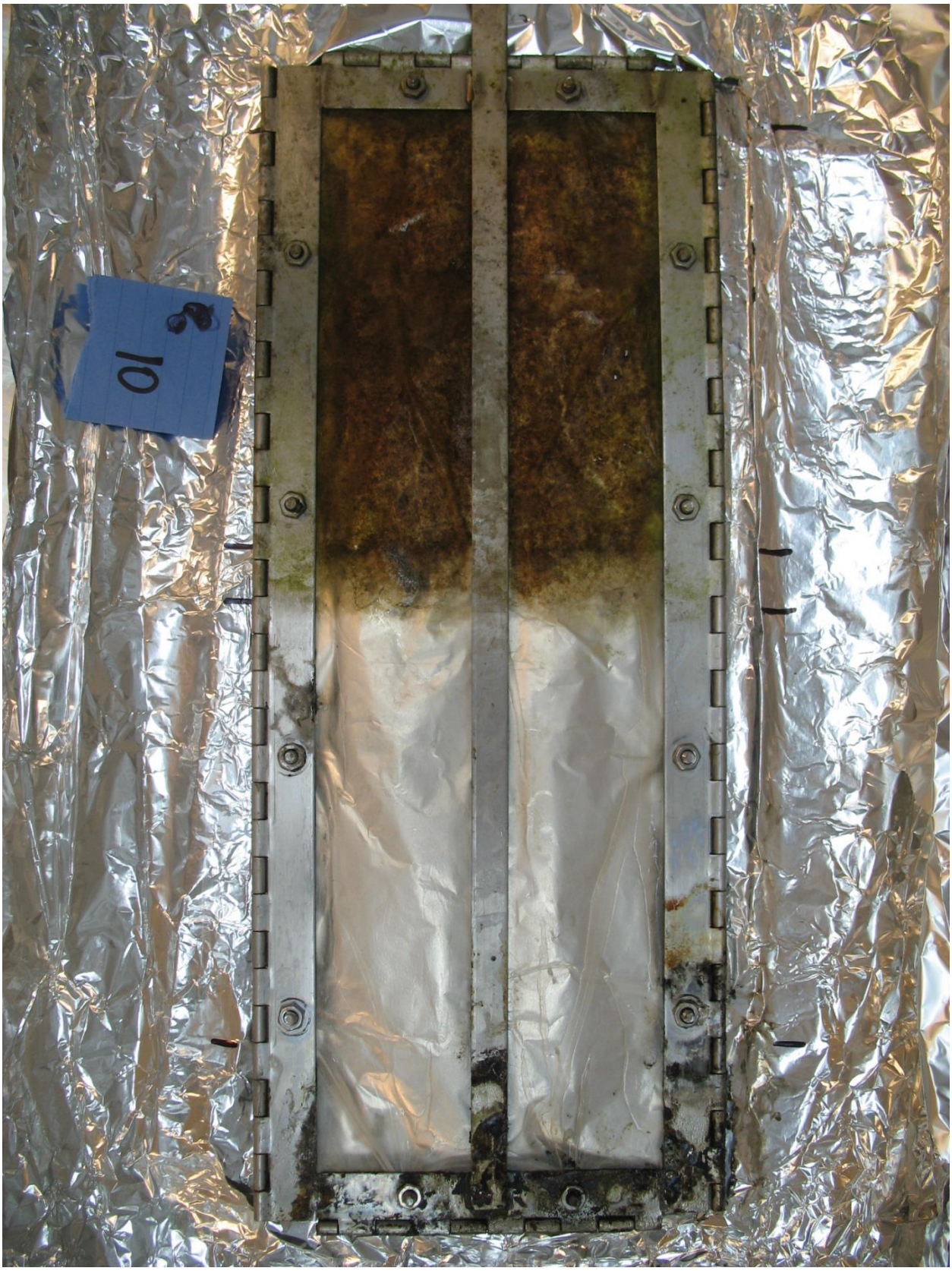
PED from Station ADP-DD-07, retrieved on 14-Aug-2017



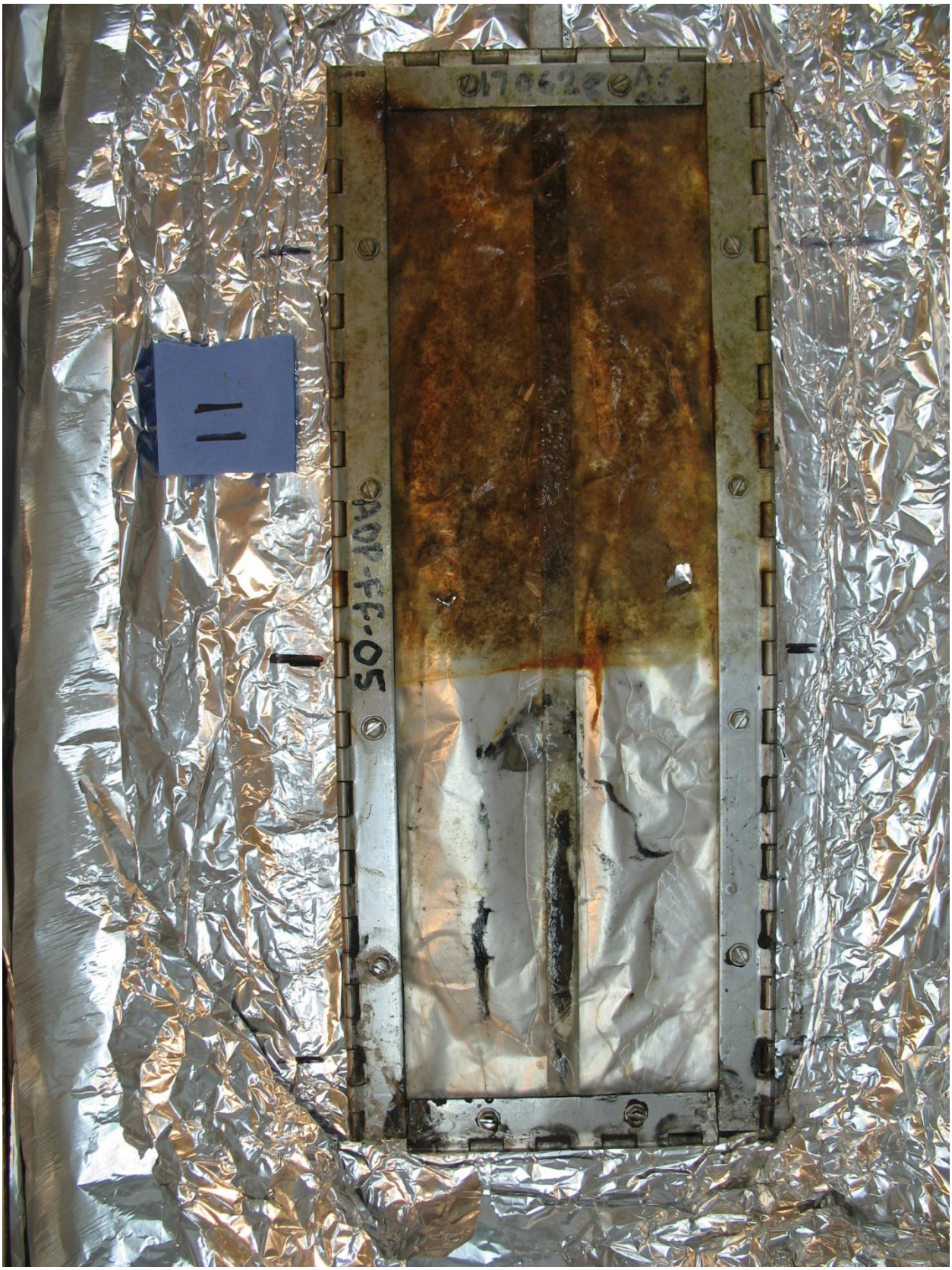
PED from Station ADP-DD-09, retrieved on 14-Aug-2017



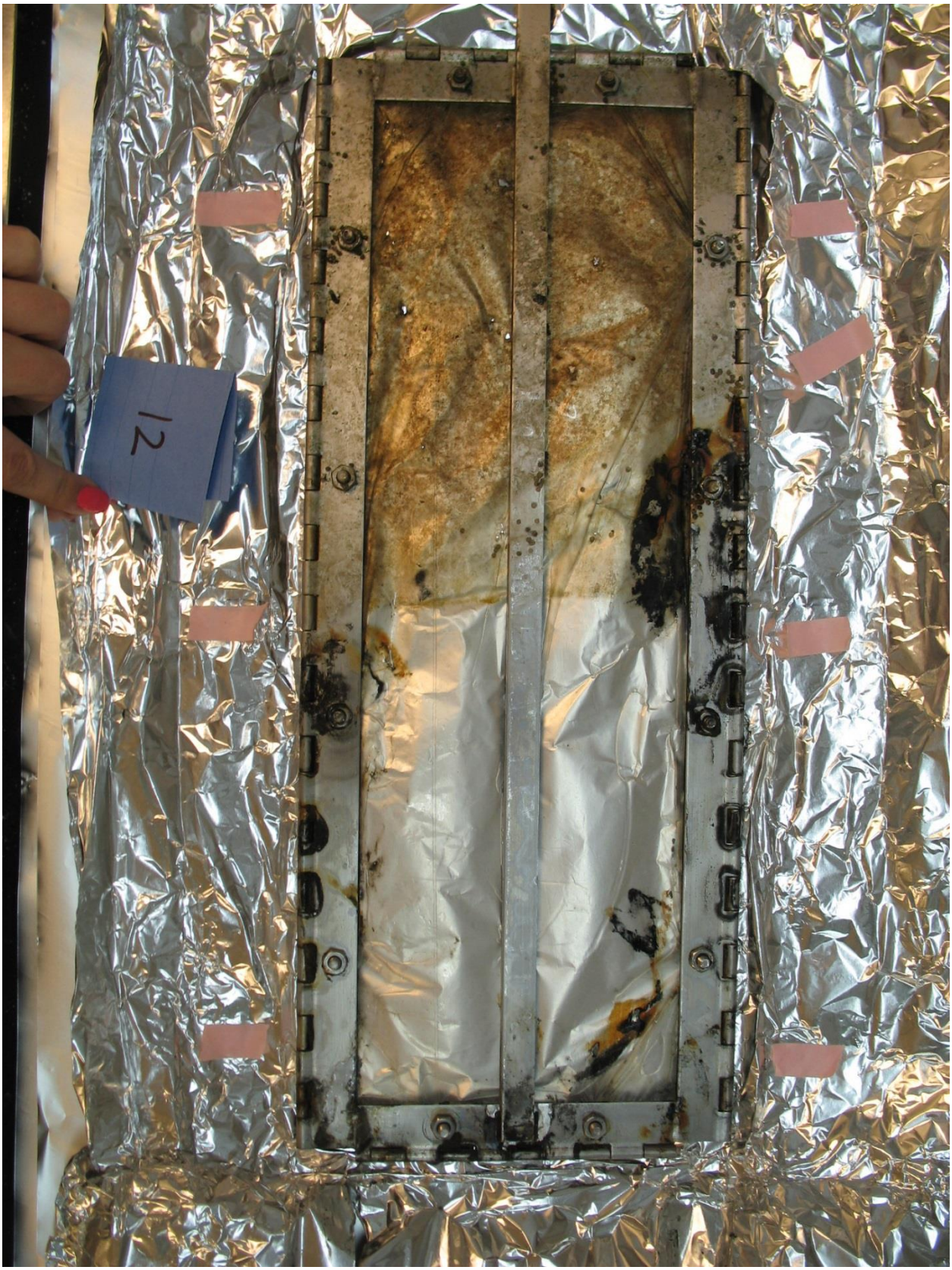
PED from Station ADP-EE-04, retrieved on 14-Aug-2017



PED from Station ADP-FF-04, retrieved on 14-Aug-2017

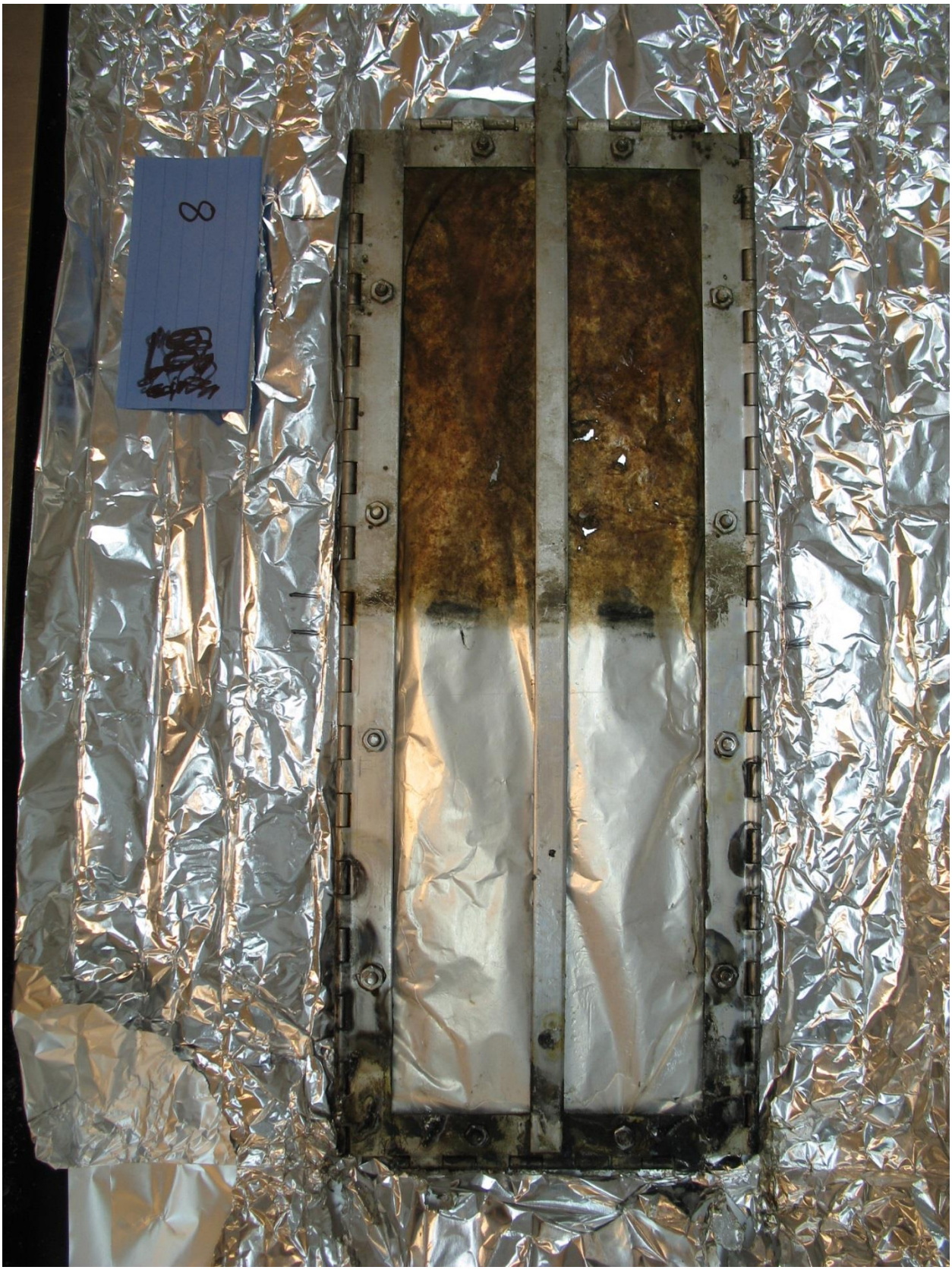


PED from Station ADP-FF-05, retrieved on 14-Aug-2017

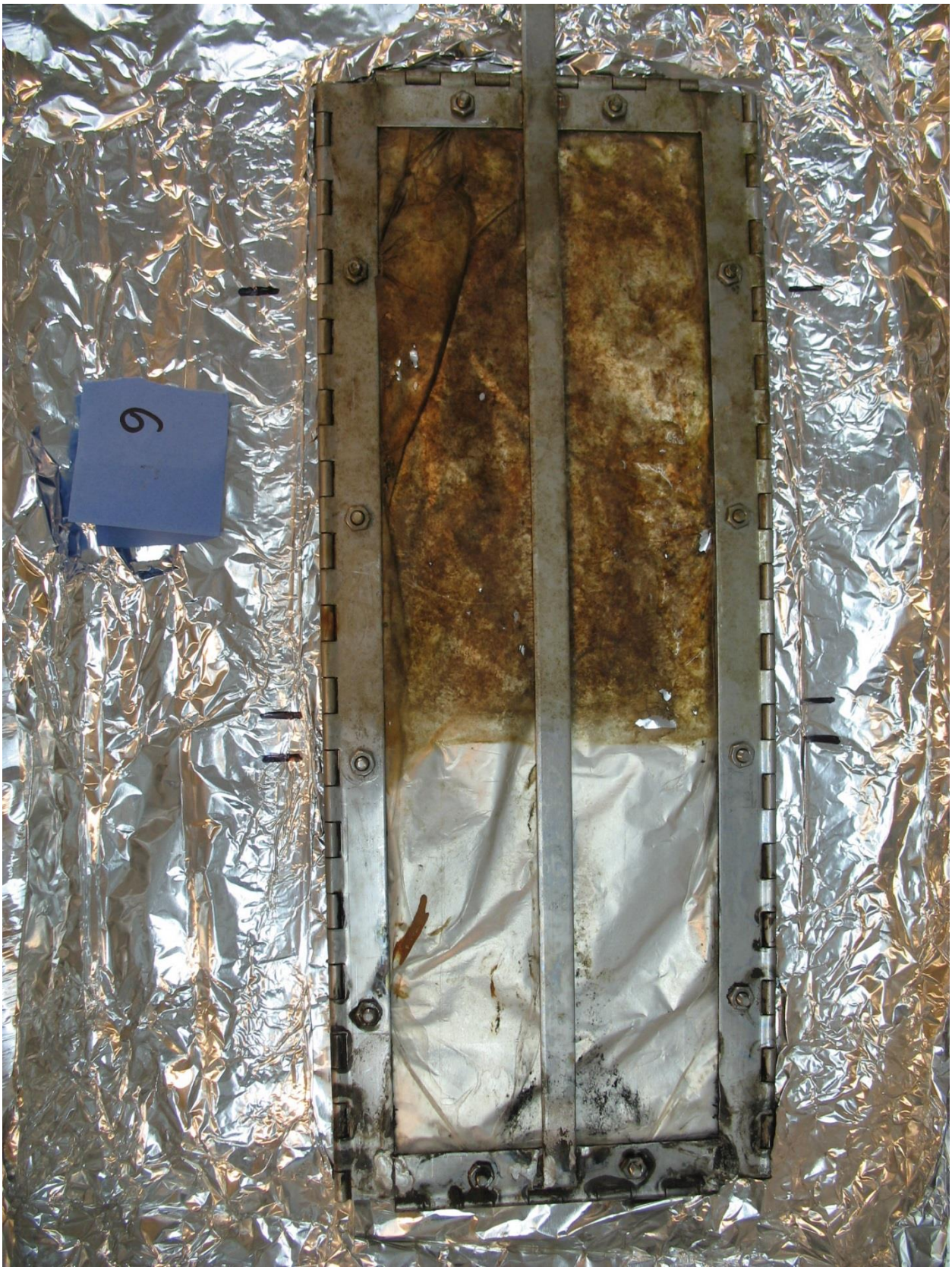


PED from Station ADP-FF-07, retrieved on 14-Aug-2017

PED from Station ADP-GG-04, retrieved on 14-Aug-2017

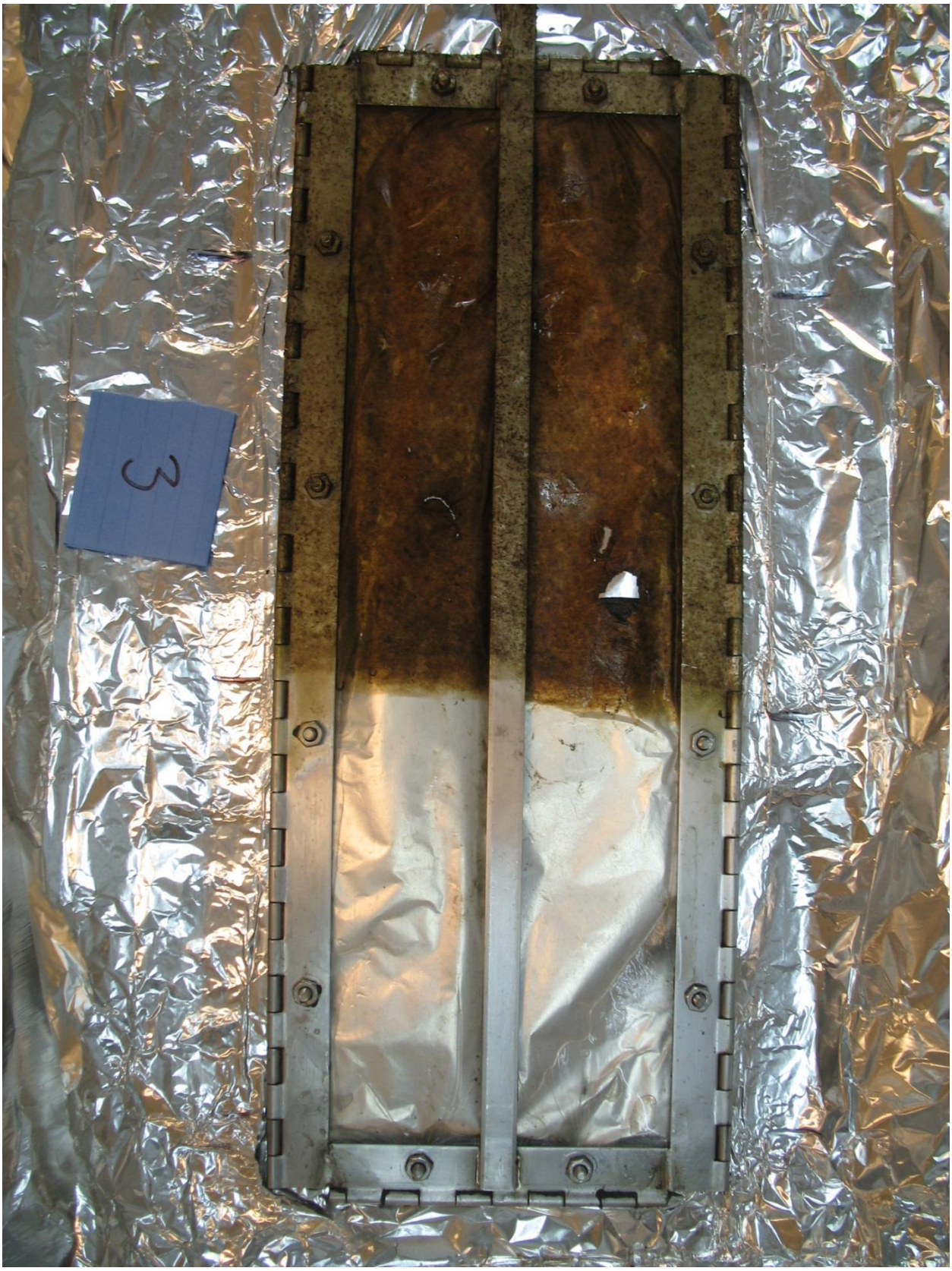


PED from Station ADP-GG-05, retrieved on 14-Aug-2017

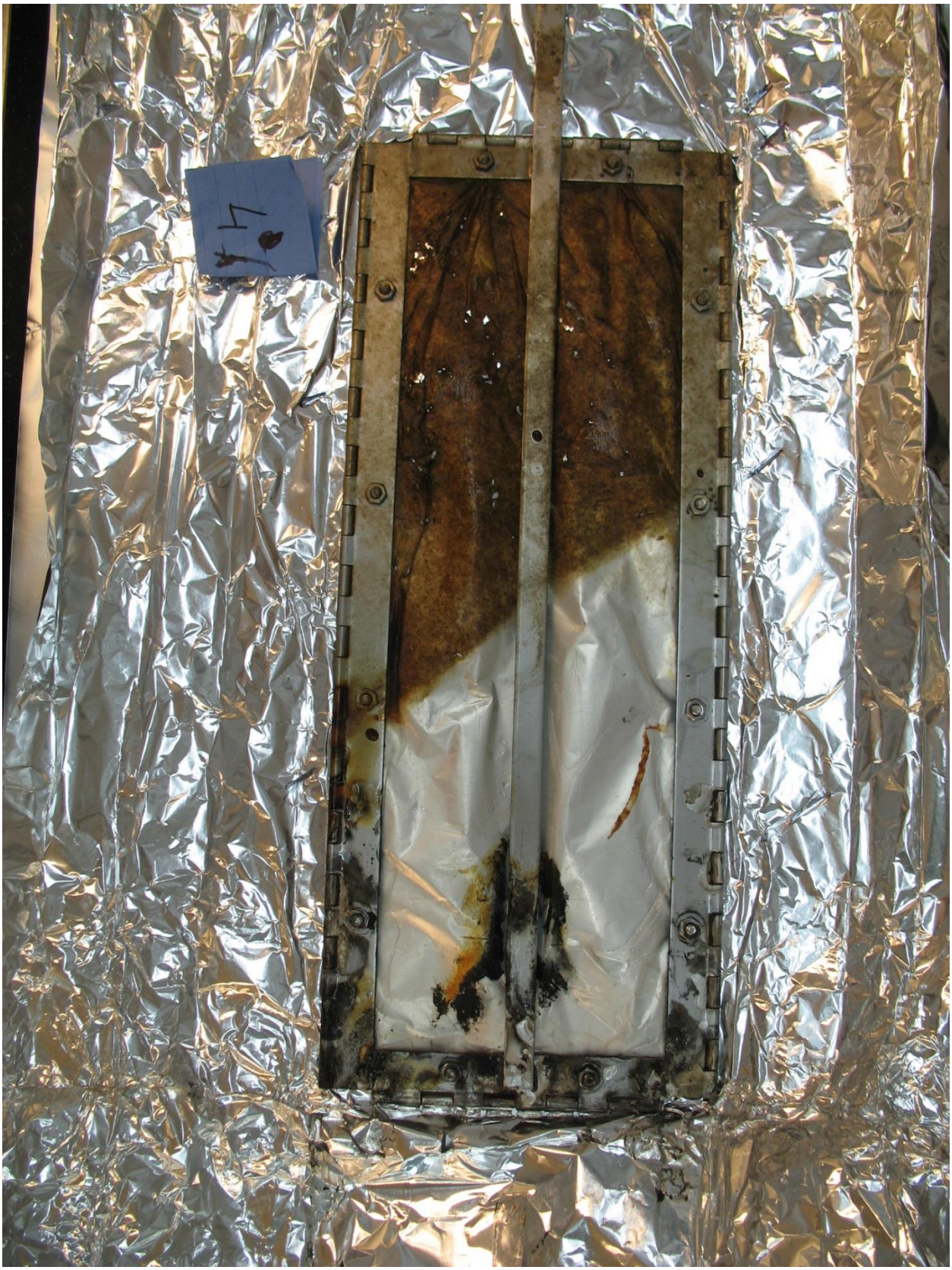


PED from Station ADP-HH-05, retrieved on 14-Aug-2017

PED from Station ADP-HH-07, retrieved on 14-Aug-2017



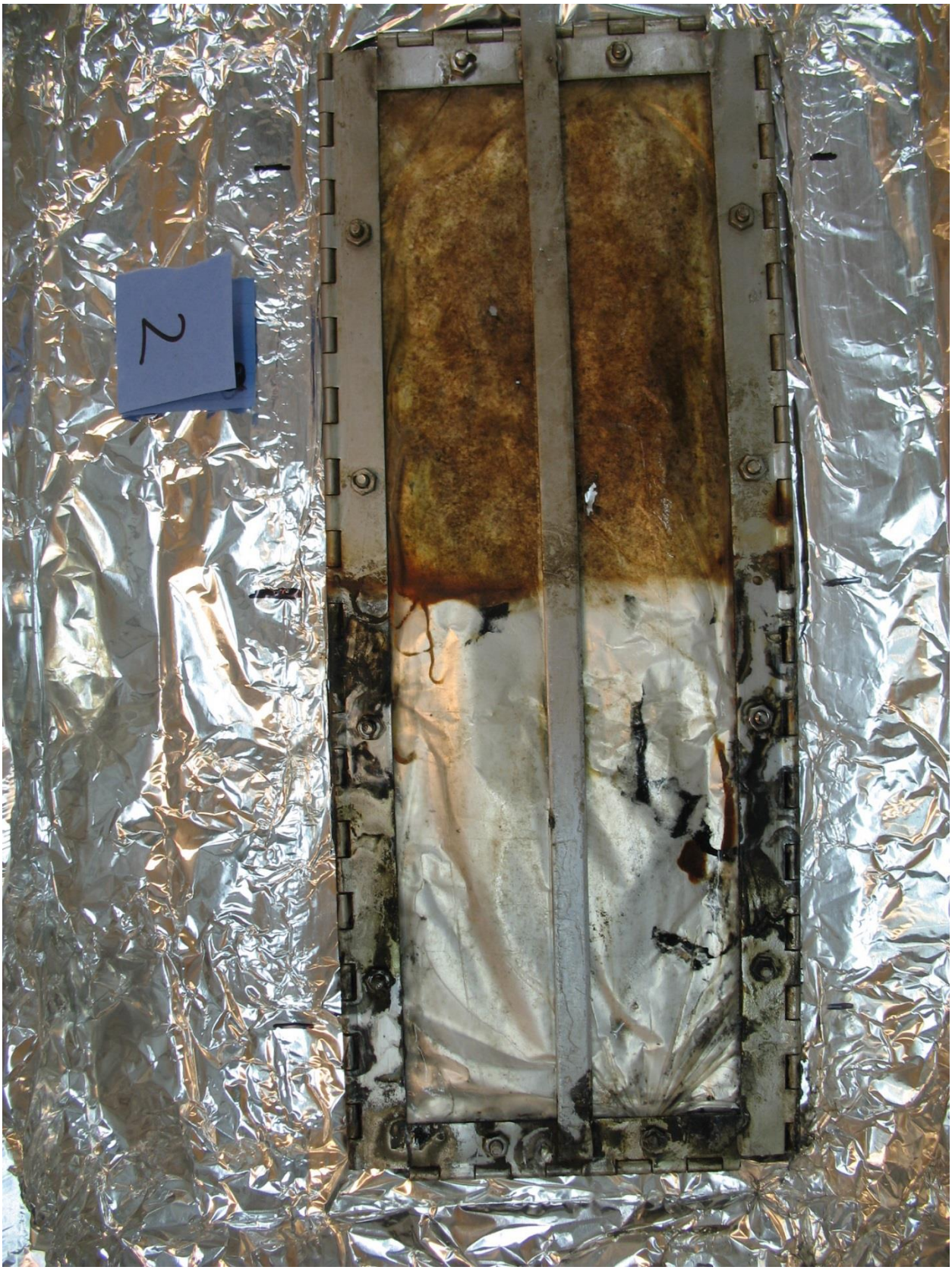
PED from Station ADP-JJ-03, retrieved on 14-Aug-2017



PED from Station ADP-JJ-05, retrieved on 14-Aug-2017

PED from Station ADP-JJ-07, retrieved on 14-Aug-2017

PED from Station ADP-LL-02, retrieved on 14-Aug-2017



PED from Station ADP-LL-03, retrieved on 14-Aug-2017

USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0367

Package DP-17-0183

Submitted to:
USACE - North Atlantic Division
696 Virginia Rd.
Concord, MA 017422751 USA

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Analyst Approval: Rich Restucci 2017.09.18 14:46:50 -04'00'

QC Chemist Approval: Ellyn M Webb 2017.09.21 16:49:12 -04'00'

Project Manager Approval: peven@battelle.org 2017.09.22 08:41:32 -04'00'

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USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0367

Package DP-17-0183

1	***Work Plan*** Laboratory Work Plan, Addendums To Work Plan, Memos From Project Manager, Special Instructions, Chain-of-Custody Reports.	1
2	***Tables*** Analytical Data Tables, Qualifier Definitions.	27
3	***Miscellaneous Documentation*** Case Narrative, Miscellaneous Documentation Form, Quality Control Summary, Example Calculations, Internal Standard Recovery Report, Retention Time Window Report.	58
4	***Sample Preparation Records*** Sample Preparation Records, Dilution Worksheets, Standard Preparation Records, Certificates Of Analysis, GPC Check Report.	N/A
5	***Analytical Calibrations*** Analytical Sequence, Analytical Method, Tune Report, Initial Calibration, Pesticide Degradation Report, RF Summary, Calibration Verifications, Independent Calibration Verification Check.	N/A
6	***Analytical Data*** Raw Data Quantification Reports.	N/A
7	***Chromatograms*** Sample And Standard Chromatograms.	N/A
8	***Unused Data***	N/A

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WORK/QUALITY ASSURANCE PROJECT PLAN

1.0 GENERAL PROJECT INFORMATION

Project Title:	USACE - NBH Aerovox Passive Sampler
Project Number:	100043429
Client:	USACE/NAE 696 Virginia Road Concord, MA 01742 USA
Client Contact Information:	Peter Hugh Engineering Technical Lead (978) 318-8452(V) NA NA
Effective Date of QAPP:	8/21/2017
Version Number:	100043429(S)-12
Project Manager:	Peven-McCarthy, Carole
Laboratory Task Manager:	Peven-McCarthy, Carole
Deliverable Due Date:	9/13/2017

2.0 SCOPE OF WORK

Overview:	Analysis of exposed PEDs to monitor dissolved concentrations of PCB congeners in porewater and surface water. Activity ID: 17T6AVX
Matrix:	Soil/Sediment

2.1 TECHNICAL APPROACH

2.1.1 Sample Receipt, Storage, and Handling

The list of samples for this project plan are presented in Attachment 1.

Storage Directions:	Store refrigerated (up to 14 days from collection) or frozen (up to 1 year) until extraction.
Sub_Sampling:	Yes
Procedures:	PM will lead PED splitting. Each PED will be split into ~4 sections based on PM directives. Each section will receive a unique ID. Photograph each PED during inspection prior to cleaning.
Contact:	NA
Comment:	NA

Archiving: Frozen storage.

Disposal: Standard

2.1.2 Sample Preparation

22 PEDs, 2 samples generated from each - 44 field samples,
4 background PED (2 per each set of 20 PED prepared)
1 PED trip blank

IRAD samples:

Samples Expected:	Samples Per Batch:	Batches Expected:
49	20	3

Batch quality control samples are defined in Table 1.

Target samples are presented in Attachment 1.

Table 1: Quality Control Samples

Type:	*Description:*	*Count:*	*Rgt:*	*Reference:*	*Comment:*
PB	Laboratory control reagent blank.	1 per batch	--	NA	
LCS	Laboratory Control Sample	1 per batch	No	NA	use clean PED for LCS and LCSD
LCSD	Laboratory Control Sample Duplicate	1 per batch	No	NA	use clean PED for LCS and LCSD

2.1.3 Extraction/Preparation

2.1.3.1 Extraction

SOP No.-Rev: **5-192-15**

SOP Title: *Soil/Sediment Extraction for Trace Level Semi-Volatile Organic Contaminant Analysis*

Sample Size: 1 g

SIS and LCS/MS Compounds: Defined in Table 2.

Deviations: 1 g weight is a place holder - an estimate of the weight of the fraction of the PED.

After extraction, dry and weigh the PEDs recording weight to 5 decimal places.

Use undeployed PEDs for LCS and LCSD. They do not necessarily have

to be spiked with PRCs.

Extract in hexane.

Comments: - PM will inspect PEDs and advise prep staff if samples need to be cleaned of biofilm before extraction. Cleaning will be performed by gently wiping PED with Kimwipe and/or rinsing with Milli-Q water.

- Photograph each PED prior to processing.

- PED will be removed from frame by cutting with a clean straight edge knife. Only the exposed portion of the PED will be extracted.

- The PEDs will be cut at the sediment water interface. Consult with PM before cutting PEDs. 6" above and below the interface will be extracted. The remainder will be archived frozen. (Each PED will be split into 4 unique sections; two analyzed, two archived.) New IDs will be assigned to each sample section.

Table 2: SIS and LCS/MS Spiking Level

Standard Type	Standard Contents		Spike Amount (ng)	Volume (uL)	Comment
PCB SIS	JC21	SIS	~ 50 ng	50 uL	NA
PCB LCS Spiking Solution	JG57	LCS/MS	~ 50 ng	100 uL	NA

2.1.3.2 Cleanup

1)	SOP No.-Rev:	**5-329-07**
	SOP Title:	*Alumina Cleanup of Environmental Sample Extracts*
	Deviations:	none
	Comments:	none
2)	SOP No.-Rev:	**5-328-04**
	SOP Title:	*Removal (cleanup) of Sulfur from Environmental Sample Extracts*
	Deviations:	NA
	Comments:	NA

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WORK/QUALITY ASSURANCE PROJECT PLAN

3)	SOP No.-Rev:	**5-191-11**
	SOP Title:	*Size Exclusion HPLC Cleanup of Environmental Sample Extracts*
	Deviations:	Consult with PM after alumina cleanup. If extracts do not appear to be heavily laiden with matrix, GPC will not be performed.
	Comments:	none

RIS spiking levels are presented in Table 3.

Extract PIV (uL): 500

Table 3: RIS Spiking Level

Standard Type	Standard Contents	Spike Amount (ng)	Volume (uL)	Comment
PCB IS	JD51 RIS	~ 50 ng	50 uL	NA

2.1.4 Instrumental Analysis

The list of analytes along with data quality criteria are presented in Attachment 2.

1)	SOP_No-Rev:	**5-315-11**
	SOP_Title:	*Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode*
	Deviations:	Generate separate standards and calibration curve for PRCs. Reporting in ng/kg (NOTE TO LAB REVIEWERS - what conversion in test code?)
	Comments:	Quadratic calibration curve fitting (not forced).

2.2. DELIVERABLES

Deliverables Due:	9/13/2017
LIMS Reports:	*Yes*
Histograms:	*No*
Excel Tables:	*Yes*
EICs:	*No*
Chromatograms:	*No*
EDDs:	*Yes*
Comments:	New Bedford Harbor EDD required.

Full data package (pdf) required for external validation.
Detailed quant reports are not required.

3.0 QUALITY

The Method Quality Objectives are defined in Attachment 3.

4.0 ORGANIZATION AND COMMUNICATION

4.1 ORGANIZATION

The project team is defined in Table 4. Supervisors may make substitutions with Project Manager concurrence.

Table 4: Project Team and Roles

Staff Member	Role	Comment
Lisa F. Lefkovitz	Project Manager	NA
Samuel A. Guimaraes	Sample Preparation	NA
Richard P. Restucci Jr	GC/MS Analysis	NA
Matt D. Schumitz	Sample Custody	NA
Carla R. Devine	Quality Control Officer	NA

4.2 COMMUNICATION

A kick-off meeting will be held to discuss project scope and goals.

5.0 SCHEDULE

The project schedule is presented in Table 5.

Table 5. Schedule of Laboratory Activities

Activity:	Start Date:	End Date:	TAT (days):	Comment:
Sample Receipt	08/11/2017	08/11/2017	0	NA
Sample Preparation	08/11/2017	08/23/2017	12	NA
Instrument Analysis	08/17/2017	09/07/2017	21	NA
Quality Control Review	09/11/2017	09/12/2017	1	NA
Final Data Reporting	09/12/2017	09/12/2017	0	NA

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6.0 BUDGET

The labor budget for the analytical task is presented in Table 6.

Table 6. Labor Budget (Laboratory Analytical Task)

Labor Activity:	Hours/ Batch:	Batches:	Total Hours:	Comment:
Sample Receipt	3	3	9	Note: The third batch will contain 4 field samples. The associated IR&D samples can be included with these samples for efficiency.
Sample Preparation	40	3	120	NA
Extraction	*32*			
glassware	*8*			
Instrument Analysis	40	3	120	NA
Quality Control Review	4	3	12	NA
Final Data Reporting	2	3	6	NA

7.0 STAFF DEVELOPMENT

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Attachment 1: Target Samples

Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9598	P-17G-ADP-GG-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
2	K9599	P-17G-ADP-G5-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
3	K9600	P-17G-ADP-JJ-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
4	K9601	P-17G-ADP-JJ-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
5	K9602	P-17G-ADP-DD-09 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
6	K9603	P-17G-ADP-DD-09 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
7	K9604	P-17G-ADP-FF-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
8	K9605	P-17G-ADP-FF-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
9	K9606	P-17G-ADP-GG-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
10	K9607	P-17G-ADP-GG-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
11	K9608	P-17G-ADP-HH-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
12	K9609	P-17G-ADP-HH-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
13	K9610	P-17G-ADP-EE-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
14	K9611	P-17G-ADP-EE-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
15	K9612	P-17G-ADP-JJ-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
16	K9613	P-17G-ADP-JJ-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
17	K9614	P-17G-ADP-DD-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
18	K9615	P-17G-ADP-DD-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
19	K9616	P-17G-ADP-FF-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
20	K9617	P-17G-ADP-FF-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
21	K9618	P-17G-ADP-CC-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
22	K9619	P-17G-ADP-CC-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
23	K9620	P-17G-ADP-DD-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
24	K9621	P-17G-ADP-DD-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
25	K9622	P-17G-ADP-CC-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
26	K9623	P-17G-ADP-CC-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
27	K9624	P-17G-ADP-LL-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
28	K9625	P-17G-ADP-LL-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
29	K9626	P-17G-ADP-JJ-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
30	K9627	P-17G-ADP-JJ-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
31	K9628	P-17G-ADP-BB-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
32	K9629	P-17G-ADP-BB-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
33	K9630	P-17G-ADP-BB-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
34	K9631	P-17G-ADP-BB-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
35	K9632	P-17G-ADP-LL-02 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
36	K9633	P-17G-ADP-LL-02 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
37	K9634	P-17G-ADP-HH-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
38	K9635	P-17G-ADP-HH-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
39	K9636	P-17G-ADP-DD-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
40	K9637	P-17G-ADP-DD-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
41	K9638	P-17G-ADP-CC-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			

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Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
42	K9639	P-17G-ADP-CC-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
43	K9640	P-17G-ADP-FF-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
44	K9641	P-17G-ADP-FF-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
45	K9642	TB-081417-01	08/14/2017 12:00 am	PED	F0114 (NA)			

Shipment: **SHP-170823-01**

Status: Approved

Description: PED Blanks

Range: K9645-K9650

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9645	170628AS017	06/28/2017 12:00 am	PED	F0117 (NA)			
2	K9646	170628AS018	06/28/2017 12:00 am	PED	F0117 (NA)			
3	K9649	170628BS017	06/28/2017 12:00 am	PED	F0117 (NA)			
4	K9650	170628BS018	06/28/2017 12:00 am	PED	F0117 (NA)			

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name:	Master_315(PRC)
SOP Reference:	5-315 - Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode
Description:	PCB by GC/MS SIM
Matrix:	S - Solid Samples, like soil or sediment, prepared and anlyzed under the same class of detection limits.
Detection Limit Study:	5-315-2015-ssMDL-SF
Instrument:	GCMS
MQO Criteria	USACE/NBH
Standard Report:	Standard Result Report

Method Specific Reporting				Holding Times (days)		Data Flags	
Result Units:	ng/g	***Unit Conversion:***	(none)	***Sample:***	14	***DL_Flag:***	U
Weight Basis:	DRY	***Result Format:***	Significant Figure	***Frozen:***	365	***RL_Flag:***	J
Standard Basis:	RIS	***# of Figures/Digits:***	3	***Extract:***	40	***PB_Flag:***	B
Oil Weight Basis:	No	***Oil Weight Source:***	Oil Weight			***DIL_Flag:***	D
U-Value Substition:	ND=MDL	***Histograms:***	No			***HT_Flag:***	T
ECD_Reporting:	No						

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
1	Cl1(1)	Cl1(1)	T	Cl5(96)	Cl3(34)	Yes	No
2	Cl1(3)	Cl1(3)	T	Cl5(96)	Cl3(34)	Yes	No
3	Cl2(4)	Cl2(4)	T	Cl5(96)	Cl3(34)	Yes	No
4	Cl2(5)	Cl2(5)	T	Cl5(96)	Cl3(34)	Yes	No
5	Cl2(6)	Cl2(6)	T	Cl5(96)	Cl3(34)	Yes	No
6	Cl2(7)	Cl2(7)	T	Cl5(96)	Cl3(34)	Yes	No
7	Cl2(8)	Cl2(8)	T	Cl5(96)	Cl3(34)	Yes	No
8	Cl2(9)	Cl2(9)	T	Cl5(96)	Cl3(34)	Yes	No
9	Cl2(11)	Cl2(11)	T	Cl5(96)	Cl3(34)	Yes	No
10	Cl2(12)	Cl2(12)	T	Cl5(96)	Cl3(34)	Yes	No
11	Cl2(13)	Cl2(13)	T	Cl5(96)	Cl3(34)	Yes	No
12	Cl2(15)	Cl2(15)	T	Cl5(96)	Cl3(34)	Yes	No
13	Cl3(16)	Cl3(16)	T	Cl5(96)	Cl3(34)	Yes	No
14	Cl3(17)	Cl3(17)	T	Cl5(96)	Cl3(34)	Yes	No
15	Cl3(18)	Cl3(18)	T	Cl5(96)	Cl3(34)	Yes	No
16	Cl3(19)	Cl3(19)	T	Cl5(96)	Cl3(34)	Yes	No
17	Cl3(22)	Cl3(22)	T	Cl5(96)	Cl3(34)	Yes	No
18	Cl3(24)	Cl3(24)	T	Cl5(96)	Cl3(34)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
19	Cl3(25)	Cl3(25)	T	Cl5(96)	Cl3(34)	Yes	No
20	Cl3(26)	Cl3(26)	T	Cl5(96)	Cl3(34)	Yes	No
21	Cl3(27)	Cl3(27)	T	Cl5(96)	Cl3(34)	Yes	No
22	Cl3(28)	Cl3(28)	T	Cl5(96)	Cl3(34)	Yes	No
23	Cl3(29)	Cl3(29)	T	Cl5(96)	Cl3(34)	Yes	No
24	Cl3(30)	Cl3(30)	T	Cl5(96)	Cl3(34)	Yes	No
25	Cl3(31)	Cl3(31)	T	Cl5(96)	Cl3(34)	Yes	No
26	Cl3(32)	Cl3(32)	T	Cl5(96)	Cl3(34)	Yes	No
27	Cl3(33)	Cl3(33)	T	Cl5(96)	Cl3(34)	Yes	No
28	Cl3(37)	Cl3(37)	T	Cl5(96)	Cl3(34)	Yes	No
29	Cl4(40)	Cl4(40)	T	Cl5(96)	Cl3(34)	Yes	No
30	Cl4(41)	Cl4(41)	T	Cl5(96)	Cl3(34)	Yes	No
31	Cl4(42)	Cl4(42)	T	Cl5(96)	Cl3(34)	Yes	No
32	Cl4(43)	Cl4(43)	T	Cl5(96)	Cl3(34)	Yes	No
33	Cl4(44)	Cl4(44)	T	Cl5(96)	Cl3(34)	Yes	No
34	Cl4(45)	Cl4(45)	T	Cl5(96)	Cl3(34)	Yes	No
35	Cl4(46)	Cl4(46)	T	Cl5(96)	Cl3(34)	Yes	No
36	Cl4(47)	Cl4(47)	T	Cl5(96)	Cl3(34)	Yes	No
37	Cl4(48)	Cl4(48)	T	Cl5(96)	Cl3(34)	Yes	No
38	Cl4(49)	Cl4(49)	T	Cl5(96)	Cl3(34)	Yes	No
39	Cl4(50)	Cl4(50)	T	Cl5(96)	Cl3(34)	Yes	No
40	Cl4(51)	Cl4(51)	T	Cl5(96)	Cl3(34)	Yes	No
41	Cl4(52)	Cl4(52)	T	Cl5(96)	Cl3(34)	Yes	No
42	Cl4(53)	Cl4(53)	T	Cl5(96)	Cl3(34)	Yes	No
43	Cl4(54)	Cl4(54)	T	Cl5(96)	Cl3(34)	Yes	No
44	Cl4(56)	Cl4(56)	T	Cl5(96)	Cl3(34)	Yes	No
45	Cl4(60)	Cl4(60)	T	Cl6(161)	Cl6(152)	Yes	No
46	Cl4(63)	Cl4(63)	T	Cl5(96)	Cl3(34)	Yes	No
47	Cl4(64)	Cl4(64)	T	Cl5(96)	Cl3(34)	Yes	No
48	Cl4(66)	Cl4(66)	T	Cl5(96)	Cl3(34)	Yes	No
49	Cl4(67)	Cl4(67)	T	Cl5(96)	Cl3(34)	Yes	No
50	Cl4(70)	Cl4(70)	T	Cl5(96)	Cl3(34)	Yes	No
51	Cl4(71)	Cl4(71)	T	Cl5(96)	Cl3(34)	Yes	No
52	Cl4(74)	Cl4(74)	T	Cl5(96)	Cl3(34)	Yes	No
53	Cl4(75)	Cl4(75)	T	Cl5(96)	Cl3(34)	Yes	No
54	Cl4(77)	Cl4(77)	T	Cl6(161)	Cl6(152)	Yes	No
55	Cl4(80)	Cl4(80)	T	Cl5(96)	Cl3(34)	Yes	No
56	Cl4(81)	Cl4(81)	T	Cl6(161)	Cl6(152)	Yes	No
57	Cl5(82)	Cl5(82)	T	Cl6(161)	Cl6(152)	Yes	No
58	Cl5(83)	Cl5(83)	T	Cl6(161)	Cl6(152)	Yes	No
59	Cl5(84)	Cl5(84)	T	Cl5(96)	Cl3(34)	Yes	No
60	Cl5(85)	Cl5(85)	T	Cl6(161)	Cl6(152)	Yes	No
61	Cl5(87)	Cl5(87)	T	Cl6(161)	Cl6(152)	Yes	No
62	Cl5(91)	Cl5(91)	T	Cl5(96)	Cl3(34)	Yes	No
63	Cl5(92)	Cl5(92)	T	Cl5(96)	Cl3(34)	Yes	No
64	Cl5(95)	Cl5(95)	T	Cl5(96)	Cl3(34)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
65	Cl5(97)	Cl5(97)	T	Cl6(161)	Cl6(152)	Yes	No
66	Cl5(99)	Cl5(99)	T	Cl6(161)	Cl6(152)	Yes	No
67	Cl5(100)	Cl5(100)	T	Cl5(96)	Cl3(34)	Yes	No
68	Cl5(101)	Cl5(101)	T	Cl5(96)	Cl3(34)	Yes	No
69	Cl5(104)	Cl5(104)	T	Cl5(96)	Cl3(34)	Yes	No
70	Cl5(105)	Cl5(105)	T	Cl6(161)	Cl6(152)	Yes	No
71	Cl5(110)	Cl5(110)	T	Cl6(161)	Cl6(152)	Yes	No
72	Cl5(114)	Cl5(114)	T	Cl6(161)	Cl6(152)	Yes	No
73	Cl5(115)	Cl5(115)	T	Cl6(161)	Cl6(152)	Yes	No
74	Cl5(118)	Cl5(118)	T	Cl6(161)	Cl6(152)	Yes	No
75	Cl5(123)	Cl5(123)	T	Cl6(161)	Cl6(152)	Yes	No
76	Cl5(124)	Cl5(124)	T	Cl6(161)	Cl6(152)	Yes	No
77	Cl5(125)	Cl5(125)	T	Cl6(161)	Cl6(152)	Yes	No
78	Cl5(126)	Cl5(126)	T	Cl6(161)	Cl6(152)	Yes	No
79	Cl5(127)	Cl5(127)	T	Cl6(161)	Cl6(152)	Yes	No
80	Cl6(128)	Cl6(128)	T	Cl6(161)	Cl6(152)	Yes	No
81	Cl6(130)	Cl6(130)	T	Cl6(161)	Cl6(152)	Yes	No
82	Cl6(131)	Cl6(131)	T	Cl6(161)	Cl6(152)	Yes	No
83	Cl6(134)	Cl6(134)	T	Cl6(161)	Cl6(152)	Yes	No
84	Cl6(135)	Cl6(135)	T	Cl6(161)	Cl6(152)	Yes	No
85	Cl6(136)	Cl6(136)	T	Cl6(161)	Cl6(152)	Yes	No
86	Cl6(137)	Cl6(137)	T	Cl6(161)	Cl6(152)	Yes	No
87	Cl6(138)	Cl6(138)	T	Cl6(161)	Cl6(152)	Yes	No
88	Cl6(139)	Cl6(139)	T	Cl6(161)	Cl6(152)	Yes	No
89	Cl6(140)	Cl6(140)	T	Cl6(161)	Cl6(152)	Yes	No
90	Cl6(141)	Cl6(141)	T	Cl6(161)	Cl6(152)	Yes	No
91	Cl6(144)	Cl6(144)	T	Cl6(161)	Cl6(152)	Yes	No
92	Cl6(146)	Cl6(146)	T	Cl6(161)	Cl6(152)	Yes	No
93	Cl6(149)	Cl6(149)	T	Cl6(161)	Cl6(152)	Yes	No
94	Cl6(151)	Cl6(151)	T	Cl6(161)	Cl6(152)	Yes	No
95	Cl6(153)	Cl6(153)	T	Cl6(161)	Cl6(152)	Yes	No
96	Cl6(154)	Cl6(154)	T	Cl6(161)	Cl6(152)	Yes	No
97	Cl6(155)	Cl6(155)	T	Cl5(96)	Cl3(34)	Yes	No
98	Cl6(156)	Cl6(156)	T	Cl6(161)	Cl6(152)	Yes	No
99	Cl6(157)	Cl6(157)	T	Cl6(161)	Cl6(152)	Yes	No
100	Cl6(158)	Cl6(158)	T	Cl6(161)	Cl6(152)	Yes	No
101	Cl6(163)	Cl6(163)	T	Cl6(161)	Cl6(152)	Yes	No
102	Cl6(164)	Cl6(164)	T	Cl6(161)	Cl6(152)	Yes	No
103	Cl6(166)	Cl6(166)	T	Cl6(161)	Cl6(152)	Yes	No
104	Cl6(167)	Cl6(167)	T	Cl6(161)	Cl6(152)	Yes	No
105	Cl6(169)	Cl6(169)	T	Cl6(161)	Cl6(152)	Yes	No
106	Cl7(170)	Cl7(170)	T	Cl6(161)	Cl6(152)	Yes	No
107	Cl7(171)	Cl7(171)	T	Cl6(161)	Cl6(152)	Yes	No
108	Cl7(172)	Cl7(172)	T	Cl6(161)	Cl6(152)	Yes	No
109	Cl7(173)	Cl7(173)	T	Cl6(161)	Cl6(152)	Yes	No
110	Cl7(174)	Cl7(174)	T	Cl6(161)	Cl6(152)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
111	Cl7(175)	Cl7(175)	T	Cl6(161)	Cl6(152)	Yes	No
112	Cl7(176)	Cl7(176)	T	Cl6(161)	Cl6(152)	Yes	No
113	Cl7(177)	Cl7(177)	T	Cl6(161)	Cl6(152)	Yes	No
114	Cl7(178)	Cl7(178)	T	Cl6(161)	Cl6(152)	Yes	No
115	Cl7(179)	Cl7(179)	T	Cl6(161)	Cl6(152)	Yes	No
116	Cl7(180)	Cl7(180)	T	Cl6(161)	Cl6(152)	Yes	No
117	Cl7(183)	Cl7(183)	T	Cl6(161)	Cl6(152)	Yes	No
118	Cl7(184)	Cl7(184)	T	Cl6(161)	Cl6(152)	Yes	No
119	Cl7(185)	Cl7(185)	T	Cl6(161)	Cl6(152)	Yes	No
120	Cl7(187)	Cl7(187)	T	Cl6(161)	Cl6(152)	Yes	No
121	Cl7(188)	Cl7(188)	T	Cl6(161)	Cl6(152)	Yes	No
122	Cl7(189)	Cl7(189)	T	Cl6(161)	Cl6(152)	Yes	No
123	Cl7(190)	Cl7(190)	T	Cl6(161)	Cl6(152)	Yes	No
124	Cl7(191)	Cl7(191)	T	Cl6(161)	Cl6(152)	Yes	No
125	Cl7(193)	Cl7(193)	T	Cl6(161)	Cl6(152)	Yes	No
126	Cl8(194)	Cl8(194)	T	Cl6(161)	Cl6(152)	Yes	No
127	Cl8(195)	Cl8(195)	T	Cl6(161)	Cl6(152)	Yes	No
128	Cl8(197)	Cl8(197)	T	Cl6(161)	Cl6(152)	Yes	No
129	Cl8(198)	Cl8(198)	T	Cl6(161)	Cl6(152)	Yes	No
130	Cl8(199)	Cl8(199)	T	Cl6(161)	Cl6(152)	Yes	No
131	Cl8(200)	Cl8(200)	T	Cl6(161)	Cl6(152)	Yes	No
132	Cl8(201)	Cl8(201)	T	Cl6(161)	Cl6(152)	Yes	No
133	Cl8(202)	Cl8(202)	T	Cl6(161)	Cl6(152)	Yes	No
134	Cl8(203)	Cl8(203)	T	Cl6(161)	Cl6(152)	Yes	No
135	Cl8(205)	Cl8(205)	T	Cl6(161)	Cl6(152)	Yes	No
136	Cl9(206)	Cl9(206)	T	Cl6(161)	Cl6(152)	Yes	No
137	Cl9(207)	Cl9(207)	T	Cl6(161)	Cl6(152)	Yes	No
138	Cl9(208)	Cl9(208)	T	Cl6(161)	Cl6(152)	Yes	No
139	Cl10(209)	Cl10(209)	T	Cl6(161)	Cl6(152)	Yes	No
140	LOC 1	LOC 1	T	Cl5(96)	Cl3(34)	Yes	No
141	LOC 2	LOC 2	T	Cl5(96)	Cl3(34)	Yes	No
142	LOC 3	LOC 3	T	Cl5(96)	Cl3(34)	Yes	No
143	LOC 4	LOC 4	T	Cl5(96)	Cl3(34)	Yes	No
144	LOC 5	LOC 5	T	Cl5(96)	Cl3(34)	Yes	No
145	LOC 6	LOC 6	T	Cl6(161)	Cl6(152)	Yes	No
146	LOC 7	LOC 7	T	Cl6(161)	Cl6(152)	Yes	No
147	LOC 8	LOC 8	T	Cl6(161)	Cl6(152)	Yes	No
148	LOC 9	LOC 9	T	Cl6(161)	Cl6(152)	Yes	No
149	LOC 10	LOC 10	T			Yes	No
150	Cl3(38)	Cl3(38)	T	Cl5(96)		No	No
151	Cl4(78)	Cl4(78)	T	Cl5(96)		No	No
152	Cl4(79)	Cl4(79)	T	Cl5(96)		No	No
153	Cl7(186)	Cl7(186)	T	Cl6(161)		No	No
1	Cl3(34)	Cl3(34)	SIS	Cl5(96)		No	No
2	Cl6(152)	Cl6(152)	SIS	Cl6(161)		No	No

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It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Total Analytes: 155

Subtract Peaks:

None

Sum Peaks:

Compound:	LOC 1				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl1(1)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl1(3)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 2**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl2(4)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(5)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(6)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(7)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(8)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(9)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(11)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(12)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(13)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(15)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 3**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl3(16)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(17)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(18)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(19)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(22)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(24)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(25)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(26)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(27)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(28)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(29)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl3(30)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(31)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(32)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(33)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(37)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(38)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 4**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl4(40)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 4**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl4(41)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(42)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(43)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(44)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(45)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(46)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(47)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(48)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(49)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(50)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(51)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(52)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(53)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(54)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(56)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(60)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(63)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(64)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(66)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(67)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(70)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(71)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(74)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(75)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(77)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(80)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(81)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(78)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl4(79)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 5**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl5(82)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(83)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(84)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(85)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(87)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(91)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(92)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(95)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(97)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(99)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(100)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(101)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(104)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 5**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl5(105)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(110)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(114)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(115)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(118)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(123)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(124)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(125)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(126)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(127)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 6**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl6(128)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(130)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(131)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(134)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(135)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(136)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(137)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(138)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(139)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(140)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(141)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(144)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(146)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(149)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(151)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(153)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(154)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(155)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(156)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(157)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(158)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(163)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(164)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(166)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(167)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(169)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(170)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(171)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(172)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(173)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(174)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(175)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(176)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(177)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(178)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(179)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(180)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(183)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(184)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(185)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(187)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(188)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(189)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(190)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(191)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(193)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(186)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 8**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl8(194)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(195)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(197)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(198)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(199)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(200)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(201)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(202)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(203)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(205)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 9**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl9(206)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(207)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(208)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 10**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl10(209)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

ICAL Acceptance Criteria:

Curve Fit:	Limit Mean(%):	Mean Qual:	Limit Ind.:	Ind. Qual:	Min Points:	Points Qual:	Comments:
Linear	NA	NA	0.995	N	5	N	y = Bx + C
Average RF	15	N	25	N	5	N	y = Bx
Linear (0,0)	NA	NA	0.995	N	5	N	y = Bx + 0
Quadratic	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + C
Quadratic (0,0)	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + 0

Continuing Calibration Verification Criteria:

CCV Name: 5-315

Frequency Hrs:	Mean PD(%):	Individual PD(%):	RIS/SIS RT Window (min):	Area Limit Low(%):	Area Limit High(%):	Comment:
24 (N)	15 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Independent Calibration Verification:

ICC Name: 5-315

Mean PD Limit(%):	Ind. PD Limit(%):	RIS/SIS Window Limit (Secs):	Area Limit High(%):	Area Limit Low(%):	Comment:
25 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Mass Discrimination Criteria:

None

Degredation Check Criteria:

Degredation Check Name: 5-315

DDT Breakdown Limit (%):	Endrin Breakdown Limit(%):	Total Breakdown Limit(%):	Comment:
20 (N)	20 (N)	20 (N)	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Procedural Blank	Samples must be greater than five times the blank concentration (>5xPB).	B	Review with Project Manager; re-analyze or justify results in project records.
PB Measurement Quality Objective	Organic results in the Procedural Blank are less than the ssRL (<ssRL)	N	
Laboratory Control Sample	Recovery values 40-120%.	N	Review with project manager; re-analyze or justify reporting the results in project records.
Matrix Spike Recovery	Organics 40-120%. Analyte concentration in MS must be greater than five times reported background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Matrix Spike/Spike Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Spike must be >5x background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Standard Reference Material Accuracy	Organics Percent Difference less than 30% from a range of certified values on average. Analyte concentration must be greater than five times the Method Detection Limit (>5xMDL).	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the MDL	n	
Analytical Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	
Analytical Triplicate Precision	Organics results less than 30% Relative Standard Deviation (RSD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Surrogate Compound Recovery	Recovery results between 40% and 120%.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
Control Oil	RPD < 30% for at least 90% of analytes	N n	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Instrument Calibration	5-315-11: R-squared greater than or equal to 0.995 Mean RSD less than or equal to 15%, Individual RSD less than or equal to 25%	N	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Independent Calibration Check Solution	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 25%.	N	Review with Project Manager; re-analyze or justify in project records.
Continuing Calibration Verification	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 15%.	N	

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ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form

Approved: ☐ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Hand Delivered **Tracking Number:** na

COC Forms: ☑ **Shipped with samples** ☐ **No Forms**

Cooler(s)/Box(es)

Cntr	Type	Tracking No.	Seal	Seal	Container	Therm.	Temp C	Smps
1 of 1	Cardboard Box		None	Intact	Intact	Therm_2	-20.0	45

Samples

Sample Labels:
☑ Sample labels agree with COC forms
☐ Discrepancies (see Sample Custody Corrective Action Form)

Container Seals:
☐ Tape ☐ Custody Seals ☐ Other Seals (See sample Log)
☑ Seals intact for each shipping container
☐ Seals broken (See sample log for impacted samples)

Condition of Samples:
☑ Sample containers intact
☐ Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): -20 Temperature Blank used ☐ Yes ☑ No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: ☐ Yes ☐ No ☑ Unknown

Initial pH 5-9?: ☐ Yes ☐ No ☑ NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: ☐ Yes ☐ No ☑ NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: ☐ Yes ☐ No ☑ NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: ☐ Yes ☐ No ☑ Unknown /Lot No.: UnKnown

Storage Location: Custody: Freezer - F0114 (NA) **BDO IDs Assigned:** K9598 - K9642

Samples logged in by: Schumitz, Matt **Date/Time:** 08/21/2017 3:15 PM

Approved By: **Approved On:**

Authorized By: **Authorized On:**

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ShpNo SHP-170822-02

Battelle Project No: 100043429

Sample Receipt Form Details

Approved: ☑ **Authorized** ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9598	P-17G-ADP-GG-05 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9599	P-17G-ADP-GG-05 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9600	P-17G-ADP-JJ-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9601	P-17G-ADP-JJ-07 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9602	P-17G-ADP-DD-09 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9603	P-17G-ADP-DD-09 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9604	P-17G-ADP-FF-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9605	P-17G-ADP-FF-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9606	P-17G-ADP-GG-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9607	P-17G-ADP-GG-04 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9608	P-17G-ADP-HH-07 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9609	P-17G-ADP-HH-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9610	P-17G-ADP-EE-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9611	P-17G-ADP-EE-04 PW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9612	P-17G-ADP-JJ-05 SW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9613	P-17G-ADP-JJ-05 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9614	P-17G-ADP-DD-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9615	P-17G-ADP-DD-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9616	P-17G-ADP-FF-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9617	P-17G-ADP-FF-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9618	P-17G-ADP-CC-07 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9619	P-17G-ADP-CC-07 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9620	P-17G-ADP-DD-05 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9621	P-17G-ADP-DD-05 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9622	P-17G-ADP-CC-04 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9623	P-17G-ADP-CC-04 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9624	P-17G-ADP-LL-03 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9625	P-17G-ADP-LL-03 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			

BATTELLE
It can be done

ShpNo SHP-170822-02

Battelle Project No: 100043429

Sample Receipt Form Details

Approved: ☑ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9626	P-17G-ADP-JJ-03 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9627	P-17G-ADP-JJ-03 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9628	P-17G-ADP-BB-05 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9629	P-17G-ADP-BB-05 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9630	P-17G-ADP-BB-07 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9631	P-17G-ADP-BB-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9632	P-17G-ADP-LL-02 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9633	P-17G-ADP-LL-02 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9634	P-17G-ADP-HH-05 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9635	P-17G-ADP-HH-05 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9636	P-17G-ADP-DD-07 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9637	P-17G-ADP-DD-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9638	P-17G-ADP-CC-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9639	P-17G-ADP-CC-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9640	P-17G-ADP-FF-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9641	P-17G-ADP-FF-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9642	TB-081417-01	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			

Total Samples: 45

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:	Preservative	COC #
		Analysis: PCB Long	Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	PCB Long	COC #
P-17G-ADP-GG05 SW	8/14/17			PED	1	1	K9598
P-17G-ADP-GG05 PW					1	1	K9599
P-17G-ADP-JJ07 SW					1	1	K9600
P-17G-ADP-JJ07 PW					1	1	" "01
P-17G-ADP-DD09 SW					1	1	02
P-17G-ADP-DD09 PW					1	1	03
P-17G-ADP-FF07 SW					1	1	04
P-17G-ADP-FF07 PW					1	1	05
P-17G-ADP-GG04 SW					1	1	06
P-17G-ADP-GG04 PW					1	1	07
P-17G-ADP-HH07 SW					1	1	08
P-17G-ADP-HH07 PW					1	1	09
P-17G-ADP-EE04 SW					1	1	10

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[signature]	Battelle	8/21/2017 3:15pm	[signature]	Battelle	8/27/17 315

Comments:

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BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Arrowd Project No.: 100043929-17TGAVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Preservative	Analysis: PCB Lows
P-17G-ADP-EE04 PW	8/14/17			PW	1		✓
P-17G-ADP-JJ05 SW					1		✓
P-17G-ADP-JJ05 PW					1		✓
P-17G-ADP-DD04 SW					1		✓
P-17G-ADP-DD04 PW					1		✓
P-17G-ADP-FF04 SW					1		✓
P-17G-ADP-FF04 PW					1		✓
P-17G-ADP-CC07 SW					1		✓
P-17G-ADP-CC07 PW					1		✓
P-17G-ADP-DD05 SW					1		✓
P-17G-ADP-DD05 PW					1		✓
P-17G-ADP-CC04 SW					1		✓
P-17G-ADP-CC04 PW					1		✓

Page#
K9611
" "12
13
14
15
16
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18
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22
23

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign)	Company	Date/Time	Received by (Print/Sign)	Company	Date/Time
CSPlumy	Battelle	8/21/2017 3:15pm	Matt Schmitz	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Preservative	Analysis: PCB Congeners	COC #	Page#
P-17G-ADP-LL03 SW	8/14/17			PED	1		✓	K9624	
P-17G-ADP-LL03 PW					1		✓	" "	25
P-17G-ADP-JJ03 SW					1		✓		26
P-17G-ADP-JJ03 PW					1		✓		27
P-17G-ADP-BB05 SW					1		✓		28
P-17G-ADP-BB05 PW					1		✓		29
P-17G-ADP-BB07 SW					1		✓		30
P-17G-ADP-BB07 PW					1		✓		31
P-17G-ADP-LL02 SW					1		✓		32
P-17G-ADP-LL02 PW					1		✓		33
P-17G-ADP-HH05 SW					1		✓		34
P-17G-ADP-HH05 PW					1		✓		35
P-17G-ADP-DD07 SW					1		✓		36

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[illegible]	Battelle	8/21/2017 3:15pm	Matt Schumate	Battelle	8/21/17 315
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dankn Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17Tb AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Preservative	Analysis: PCB Long															COC #
P-17G-ADP-DD07 PW	8/14/17			PEO	1		✓															K9637
P-17G-ADP-UU05 SW	↓			↓	1		✓															" 38
P-17G-ADP-CC-05 PW					1		✓															39
P-17G-ADP-FF-05 SW					1		✓															40
P-17G-ADP-FF-05 PW					1		✓															41
TB-081417-01					1		✓															42

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[illegible]	Battelle	8/21/2017 3:15pm	Matt Schumte [illegible]	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM912PB-P
Sample Type	PB
Collection Date	08/29/2017
Extraction Date	08/29/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.36
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl1(1)	2.26 U
Cl1(3)	3.57 U
Cl2(4)	1.51 U
Cl2(5)	2.33 U
Cl2(6)	0.893 U
Cl2(7)	3.71 U
Cl2(8)	5.50 U
Cl2(9)	4.26 U
Cl2(11)	3.43 U
Cl2(12)	3.71 U
Cl2(13)	1.92 U
Cl2(15)	3.43 U
Cl3(16)	4.47 U
Cl3(17)	2.96 U
Cl3(18)	1.92 U
Cl3(19)	3.22 U
Cl3(22)	3.36 U
Cl3(24)	1.72 U
Cl3(25)	4.67 U
Cl3(26)	1.58 U
Cl3(27)	1.92 U
Cl3(28)	3.64 U
Cl3(29)	1.86 U
Cl3(30)	2.82 U
Cl3(31)	2.00 U
Cl3(32)	2.82 U
Cl3(33)	3.57 U
Cl3(37)	4.47 U
Cl4(40)	5.08 U
Cl4(41)	4.33 U
Cl4(42)	3.36 U
Cl4(43)	3.92 U
Cl4(44)	2.54 U
Cl4(45)	2.19 U
Cl4(46)	3.10 U
Cl4(47)	2.26 U
Cl4(48)	2.96 U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM912PB-P
Sample Type	PB
Collection Date	08/29/2017
Extraction Date	08/29/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.36
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl4(49)	3.71 U
Cl4(50)	1.72 U
Cl4(51)	1.65 U
Cl4(52)	3.43 U
Cl4(53)	1.92 U
Cl4(54)	2.61 U
Cl4(56)	2.19 U
Cl4(60)	2.61 U
Cl4(63)	3.10 U
Cl4(64)	2.61 U
Cl4(66)	3.36 U
Cl4(67)	1.79 U
Cl4(70)	3.57 U
Cl4(71)	1.86 U
Cl4(74)	2.89 U
Cl4(75)	2.96 U
Cl4(77)	3.43 U
Cl4(80)	2.12 U
Cl4(81)	2.12 U
Cl5(82)	2.12 U
Cl5(83)	2.26 U
Cl5(84)	3.50 U
Cl5(85)	5.90 U
Cl5(87)	2.00 U
Cl5(91)	3.10 U
Cl5(92)	2.61 U
Cl5(95)	1.65 U
Cl5(97)	2.82 U
Cl5(99)	1.86 U
Cl5(100)	2.26 U
Cl5(101)	2.26 U
Cl5(104)	1.24 U
Cl5(105)	3.31 U
Cl5(110)	2.47 U
Cl5(114)	2.26 U
Cl5(115)	3.64 U
Cl5(118)	2.89 U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM912PB-P
Sample Type	PB
Collection Date	08/29/2017
Extraction Date	08/29/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.36
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl5(123)	2.82 U
Cl5(124)	1.79 U
Cl5(125)	2.61 U
Cl5(126)	2.89 U
Cl5(127)	5.78 U
Cl6(128)	2.75 U
Cl6(130)	2.54 U
Cl6(131)	1.65 U
Cl6(134)	2.61 U
Cl6(135)	1.72 U
Cl6(136)	1.37 U
Cl6(137)	3.85 U
Cl6(138)	3.43 U
Cl6(139)	3.64 U
Cl6(140)	2.82 U
Cl6(141)	1.92 U
Cl6(144)	2.06 U
Cl6(146)	4.26 U
Cl6(149)	2.06 U
Cl6(151)	2.40 U
Cl6(153)	4.33 U
Cl6(154)	1.92 U
Cl6(155)	2.06 U
Cl6(156)	3.43 U
Cl6(157)	3.43 U
Cl6(158)	1.92 U
Cl6(163)	2.54 U
Cl6(164)	1.51 U
Cl6(166)	1.31 U
Cl6(167)	11.5 U
Cl6(169)	2.40 U
Cl7(170)	2.54 U
Cl7(171)	2.12 U
Cl7(172)	1.72 U
Cl7(173)	2.40 U
Cl7(174)	3.17 U
Cl7(175)	1.72 U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM912PB-P
Sample Type	PB
Collection Date	08/29/2017
Extraction Date	08/29/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.36
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl7(176)	1.51	U
Cl7(177)	2.06	U
Cl7(178)	3.03	U
Cl7(179)	2.06	U
Cl7(180)	3.71	U
Cl7(183)	1.79	U
Cl7(184)	1.44	U
Cl7(185)	2.26	U
Cl7(187)	1.03	U
Cl7(188)	1.65	U
Cl7(189)	2.40	U
Cl7(190)	2.33	U
Cl7(191)	2.96	U
Cl7(193)	1.44	U
Cl8(194)	4.40	U
Cl8(195)	1.86	U
Cl8(197)	1.72	U
Cl8(198)	2.26	U
Cl8(199)	3.36	U
Cl8(200)	2.26	U
Cl8(201)	1.72	U
Cl8(202)	1.51	U
Cl8(203)	2.19	U
Cl8(205)	2.26	U
Cl9(206)	3.57	U
Cl9(207)	1.65	U
Cl9(208)	1.79	U
Cl10(209)	1.65	U
LOC 1		U
LOC 2		U
LOC 3		U
LOC 4		U
LOC 5		U
LOC 6		U
LOC 7		U
LOC 8		U
LOC 9		U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM912PB-P
Sample Type	PB
Collection Date	08/29/2017
Extraction Date	08/29/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.36
Size Unit-Basis	G_DRY
Units	NG/G_DRY

LOC 10	U
Cl3(38)	U
Cl4(78)	U
Cl4(79)	U
Cl7(186)	U

Surrogate Recoveries (%)	
Cl3(34)	96
Cl6(152)	85

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM913LCS-P				CM914LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/29/2017				08/29/2017					
Extraction Date	08/29/2017				08/29/2017					
Analysis Date	09/12/2017				09/12/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.19				1.31					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl1(1)	40.7	42.06	97		35.7	38.21	93		4.2	
Cl1(3)	41.4	42.31	98		37.9	38.44	99		1.0	
Cl2(4)	41.1	42.02	98		36.1	38.17	95		3.1	
Cl2(5)	41.9	42.14	99		38.8	38.28	101		2.0	
Cl2(6)	39.2	41.76	94		35.2	37.94	93		1.1	
Cl2(7)	49.8	42.10	118		42.4	38.24	111		6.1	
Cl2(8)	45.4	41.85	108		40.0	38.02	105		2.8	
Cl2(9)	38.4	41.64	92		36.5	37.82	97		5.3	
Cl2(11)	40.0	41.76	96		36.7	37.94	97		1.0	
Cl2(12)	40.3	42.18	96		38.3	38.32	100		4.1	
Cl2(13)	43.9	42.27	104		42.4	38.40	110		5.6	
Cl2(15)	40.8	42.10	97		37.4	38.24	98		1.0	
Cl3(16)	45.2	41.89	108		40.9	38.05	107		0.9	
Cl3(17)	41.7	42.02	99		37.1	38.17	97		2.0	
Cl3(18)	39.3	42.31	93		35.0	38.44	91		2.2	
Cl3(19)	43.2	42.02	103		38.0	38.17	100		3.0	
Cl3(22)	41.9	42.02	100		38.5	38.17	101		1.0	
Cl3(24)	37.8	41.85	90		34.9	38.02	92		2.2	
Cl3(25)	44.1	42.27	104		41.2	38.40	107		2.8	
Cl3(26)	39.2	41.68	94		35.5	37.86	94		0.0	
Cl3(27)	42.2	41.93	101		38.2	38.09	100		1.0	
Cl3(28)	42.0	42.52	99		39.3	38.63	102		3.0	
Cl3(29)	40.3	42.06	96		37.4	38.21	98		2.1	
Cl3(30)	41.7	42.35	98		37.4	38.47	97		1.0	
Cl3(31)	42.0	42.31	99		39.2	38.44	102		3.0	
Cl3(32)	43.0	41.72	103		39.2	37.90	103		0.0	
Cl3(33)	42.2	41.60	101		40.2	37.79	106		4.8	
Cl3(37)	42.7	42.23	101		40.4	38.36	105		3.9	
Cl4(40)	40.6	41.68	97		34.5	37.86	91		6.4	
Cl4(41)	40.8	41.81	98		37.4	37.98	98		0.0	
Cl4(42)	45.5	42.10	108		40.8	38.24	107		0.9	
Cl4(43)	45.7	42.23	108		42.4	38.36	111		2.7	
Cl4(44)	41.1	42.02	98		38.6	38.17	101		3.0	
Cl4(45)	41.0	42.48	97		37.9	38.59	98		1.0	
Cl4(46)	42.1	41.97	100		39.3	38.13	103		3.0	
Cl4(47)	37.0	42.10	88		35.8	38.24	94		6.6	
Cl4(48)	41.9	42.27	99		35.6	38.40	93		6.3	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM913LCS-P				CM914LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/29/2017				08/29/2017					
Extraction Date	08/29/2017				08/29/2017					
Analysis Date	09/12/2017				09/12/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.19				1.31					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl4(49)	40.6	42.06	97		40.0	38.21	105		7.9	
Cl4(50)	41.5	42.35	98		37.9	38.47	99		1.0	
Cl4(51)	37.5	42.10	89		33.2	38.24	87		2.3	
Cl4(52)	42.2	41.93	101		38.2	38.09	100		1.0	
Cl4(53)	41.3	41.60	99		37.2	37.79	98		1.0	
Cl4(54)	39.2	41.97	93		35.1	38.13	92		1.1	
Cl4(56)	39.9	42.06	95		38.5	38.21	101		6.1	
Cl4(60)	40.6	41.68	97		36.4	37.86	96		1.0	
Cl4(63)	42.7	42.10	101		39.0	38.24	102		1.0	
Cl4(64)	40.8	42.35	96		38.5	38.47	100		4.1	
Cl4(66)	39.9	42.14	95		39.6	38.28	103		8.1	
Cl4(67)	42.8	42.18	101		41.0	38.32	107		5.8	
Cl4(70)	46.0	42.27	109		42.9	38.40	112		2.7	
Cl4(71)	40.5	42.35	96		38.0	38.47	99		3.1	
Cl4(74)	41.2	42.14	98		39.1	38.28	102		4.0	
Cl4(75)	41.8	41.97	100		37.0	38.13	97		3.0	
Cl4(77)	43.3	42.06	103		41.0	38.21	107		3.8	
Cl4(80)	45.1	41.85	108		41.6	38.02	109		0.9	
Cl4(81)	37.7	42.06	90		35.5	38.21	93		3.3	
Cl5(82)	38.3	41.68	92		36.9	37.86	97		5.3	
Cl5(83)	39.9	42.14	95		37.6	38.28	98		3.1	
Cl5(84)	40.1	42.02	95		30.6	38.17	80		17.1	
Cl5(85)	33.6	41.68	81		29.9	37.86	79		2.5	
Cl5(87)	39.9	42.02	95		37.5	38.17	98		3.1	
Cl5(91)	44.2	41.85	106		41.0	38.02	108		1.9	
Cl5(92)	45.1	41.89	108		41.5	38.05	109		0.9	
Cl5(95)	39.8	41.93	95		36.6	38.09	96		1.0	
Cl5(97)	39.7	41.72	95		36.7	37.90	97		2.1	
Cl5(99)	38.7	41.89	92		35.4	38.05	93		1.1	
Cl5(100)	42.2	42.23	100		38.5	38.36	100		0.0	
Cl5(101)	39.8	42.06	95		37.4	38.21	98		3.1	
Cl5(104)	40.0	42.10	95		37.0	38.24	97		2.1	
Cl5(105)	42.5	42.35	100		38.6	38.47	100		0.0	
Cl5(110)	38.9	42.02	93		35.2	38.17	92		1.1	
Cl5(114)	40.6	42.18	96		38.9	38.32	102		6.1	
Cl5(115)	40.4	41.97	96		39.7	38.13	104		8.0	
Cl5(118)	36.6	42.27	87		34.6	38.40	90		3.4	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM913LCS-P				CM914LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/29/2017				08/29/2017					
Extraction Date	08/29/2017				08/29/2017					
Analysis Date	09/12/2017				09/12/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.19				1.31					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl5(123)	42.0	42.06	100		38.4	38.21	100		0.0	
Cl5(124)	41.6	41.72	100		38.7	37.90	102		2.0	
Cl5(125)	42.8	41.97	102		39.7	38.13	104		1.9	
Cl5(126)	44.0	42.27	104		42.5	38.40	111		6.5	
Cl5(127)	46.5	42.02	111		44.5	38.17	117		5.3	
Cl6(128)	41.8	42.06	99		38.8	38.21	102		3.0	
Cl6(130)	37.4	41.93	89		40.8	38.09	107		18.4	
Cl6(131)	37.0	41.76	89		34.4	37.94	91		2.2	
Cl6(134)	39.8	41.93	95		35.8	38.09	94		1.1	
Cl6(135)	37.5	41.51	90		35.3	37.71	94		4.3	
Cl6(136)	41.2	42.06	98		38.3	38.21	100		2.0	
Cl6(137)	54.1	41.60	130	N	51.0	37.79	135	N	3.8	
Cl6(138)	35.9	41.76	86		38.4	37.94	101		16.0	
Cl6(139)	42.7	41.89	102		39.9	38.05	105		2.9	
Cl6(140)	36.8	42.27	87		33.7	38.40	88		1.1	
Cl6(141)	39.6	41.60	95		34.8	37.79	92		3.2	
Cl6(144)	41.5	42.18	98		37.8	38.32	99		1.0	
Cl6(146)	37.7	42.23	89		35.5	38.36	93		4.4	
Cl6(149)	38.6	42.10	92		38.2	38.24	100		8.3	
Cl6(151)	40.0	41.85	96		35.0	38.02	92		4.3	
Cl6(153)	40.4	42.31	95		36.4	38.44	95		0.0	
Cl6(154)	36.7	42.35	87		34.9	38.47	91		4.5	
Cl6(155)	35.9	41.68	86		34.0	37.86	90		4.5	
Cl6(156)	43.7	42.65	102		41.9	38.74	108		5.7	
Cl6(157)	43.4	42.10	103		39.6	38.24	104		1.0	
Cl6(158)	39.6	42.14	94		37.0	38.28	97		3.1	
Cl6(163)	41.9	41.76	100		34.4	37.94	91		9.4	
Cl6(164)	40.8	41.89	97		34.1	38.05	90		7.5	
Cl6(166)	39.7	42.06	94		36.1	38.21	94		0.0	
Cl6(167)	43.1	42.44	102		40.7	38.55	106		3.8	
Cl6(169)	41.6	41.93	99		43.6	38.09	114		14.1	
Cl7(170)	38.8	42.02	92		40.1	38.17	105		13.2	
Cl7(171)	45.5	41.85	109		42.3	38.02	111		1.8	
Cl7(172)	38.8	42.48	91		36.6	38.59	95		4.3	
Cl7(173)	38.9	42.23	92		35.5	38.36	93		1.1	
Cl7(174)	40.3	42.10	96		36.7	38.24	96		0.0	
Cl7(175)	36.9	41.85	88		34.8	38.02	92		4.4	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM913LCS-P				CM914LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/29/2017				08/29/2017					
Extraction Date	08/29/2017				08/29/2017					
Analysis Date	09/12/2017				09/12/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.19				1.31					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl7(176)	39.4	42.10	94		35.0	38.24	92		2.2	
Cl7(177)	40.4	42.27	96		37.2	38.40	97		1.0	
Cl7(178)	38.2	41.81	91		32.9	37.98	87		4.5	
Cl7(179)	40.5	41.89	97		35.8	38.05	94		3.1	
Cl7(180)	39.4	41.85	94		36.0	38.02	95		1.1	
Cl7(183)	38.6	41.60	93		34.9	37.79	92		1.1	
Cl7(184)	39.2	42.02	93		35.9	38.17	94		1.1	
Cl7(185)	46.5	42.02	111		43.1	38.17	113		1.8	
Cl7(187)	37.8	42.02	90		35.5	38.17	93		3.3	
Cl7(188)	38.7	41.93	92		34.9	38.09	92		0.0	
Cl7(189)	45.6	41.89	109		41.4	38.05	109		0.0	
Cl7(190)	40.3	42.10	96		38.6	38.24	101		5.1	
Cl7(191)	39.8	41.72	95		36.4	37.90	96		1.0	
Cl7(193)	44.8	42.06	107		42.4	38.21	111		3.7	
Cl8(194)	46.9	42.06	112		45.4	38.21	119		6.1	
Cl8(195)	45.5	42.02	108		40.8	38.17	107		0.9	
Cl8(197)	41.3	42.61	97		35.8	38.70	93		4.2	
Cl8(198)	43.1	41.72	103		40.0	37.90	106		2.9	
Cl8(199)	31.2	42.02	74		29.7	38.17	78		5.3	
Cl8(200)	37.4	42.35	88		34.6	38.47	90		2.2	
Cl8(201)	39.7	41.89	95		35.3	38.05	93		2.1	
Cl8(202)	37.7	42.14	89		34.4	38.28	90		1.1	
Cl8(203)	40.4	42.18	96		36.8	38.32	96		0.0	
Cl8(205)	41.0	41.68	98		38.9	37.86	103		5.0	
Cl9(206)	41.8	42.02	99		38.2	38.17	100		1.0	
Cl9(207)	38.2	42.23	90		34.8	38.36	91		1.1	
Cl9(208)	37.8	42.02	90		35.6	38.17	93		3.3	
Cl10(209)	39.7	42.06	94		35.3	38.21	92		2.2	
LOC 1	82.1				73.6					
LOC 2	421				384					
LOC 3	628				575					
LOC 4	1160				1070					
LOC 5	937				867					
LOC 6	1050				980					
LOC 7	808				746					
LOC 8	404				372					
LOC 9	118				109					

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM913LCS-P				CM914LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/29/2017				08/29/2017					
Extraction Date	08/29/2017				08/29/2017					
Analysis Date	09/12/2017				09/12/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.19				1.31					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
LOC 10	39.7				35.3					
Cl3(38)	U				U					
Cl4(78)	U				U					
Cl4(79)	U				U					
Cl7(186)	U				U					
Surrogate Recoveries (%)										
Cl3(34)	101				102					
Cl6(152)	93				93					

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-05 SW	P-17G-ADP-GG-05 PW	P-17G-ADP-JJ-07 SW	P-17G-ADP-JJ-07 PW
Battelle ID	K9598-P	K9599-P	K9600-P	K9601-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/12/17	09/12/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.29	0.32	0.29	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	31.000	68.800	33.600	195.000
Cl1(3)	22.100	47.100	26.600	91.500
Cl2(4)	2110.000 D	4330.000 D	2280.000 D	9920.000 D
Cl2(5)	3.220 U	2.920 U	3.220 U	2.390 U
Cl2(6)	7240.000 D	13900.000 D	7730.000 D	19100.000 D
Cl2(7)	117.000	170.000	117.000	493.000 D
Cl2(8)	7020.000 D	16600.000 D	7250.000 D	20100.000 D
Cl2(9)	174.000	721.000 D	204.000	1010.000 D
Cl2(11)	1200.000 D	1920.000 D	1320.000 D	2070.000 D
Cl2(12)	3.090 J	8.430	4.840	5.910
Cl2(13)	3730.000 D	8130.000 D	4130.000 D	8770.000 D
Cl2(15)	3510.000 D	6920.000 D	3880.000 D	7470.000 D
Cl3(16)	288.000	1580.000 D	321.000	1060.000 D
Cl3(17)	13100.000 D	20800.000 D	13500.000 D	21900.000 D
Cl3(18)	25300.000 D	38600.000 D	26200.000 D	45700.000 D
Cl3(19)	1560.000 D	2660.000 D	1660.000 D	3560.000 D
Cl3(22)	2190.000 D	3720.000 D	2480.000 D	2910.000 D
Cl3(24)	20.400	37.700	25.400	27.200
Cl3(25)	29700.000 D	41100.000 D	30400.000 D	39300.000 D
Cl3(26)	40000.000 D	54800.000 D	40200.000 D	52500.000 D
Cl3(27)	3830.000 D	6350.000 D	4160.000 D	8970.000 D
Cl3(28)	50300.000 D	57400.000 D	51000.000 D	58400.000 D
Cl3(29)	10.100	11.500	12.100	6.510
Cl3(30)	11.500	12.700	11.600	11.200
Cl3(31)	48400.000 D	55900.000 D	51000.000 D	59600.000 D
Cl3(32)	9000.000 D	14400.000 D	9360.000 D	15900.000 D
Cl3(33)	1300.000 D	2820.000 D	1470.000 D	1580.000 D
Cl3(37)	1230.000 D	1630.000 D	1260.000 D	1100.000 D
Cl4(40)	2620.000 D	3000.000 D	2500.000 D	2280.000 D
Cl4(41)	5.980 U	5.420 U	5.980 U	15.200
Cl4(42)	7120.000 D	9600.000 D	6930.000 D	8540.000 D
Cl4(43)	786.000 D	723.000 D	743.000 D	545.000 D
Cl4(44)	11600.000 D	16800.000 D	11400.000 D	14400.000 D
Cl4(45)	844.000 D	1330.000 D	949.000 D	1140.000 D
Cl4(46)	1190.000 D	1880.000 D	1230.000 D	1770.000 D
Cl4(47)	18700.000 D	22300.000 D	18300.000 D	19200.000 D
Cl4(48)	1140.000 D	2740.000 D	1650.000 D	3610.000 D
Cl4(49)	57300.000 D	73200.000 D	58800.000 D	70100.000 D
Cl4(50)	84.500	87.800	89.100	81.300
Cl4(51)	3920.000 D	5000.000 D	3940.000 D	4440.000 D
Cl4(52)	61600.000 D	76900.000 D	60700.000 D	72200.000 D
Cl4(53)	9080.000 D	12500.000 D	9020.000 D	12200.000 D
Cl4(54)	63.500	74.400	64.600	74.800
Cl4(56)	818.000 D	1040.000 D	846.000 D	697.000 D
Cl4(60)	467.000 D	451.000 D	482.000 D	155.000
Cl4(63)	259.000	618.000 D	270.000	190.000
Cl4(64)	5080.000 D	8520.000 D	5550.000 D	7010.000 D
Cl4(66)	3370.000 D	3320.000 D	3310.000 D	2400.000 D
Cl4(67)	1970.000 D	1360.000 D	2070.000 D	1430.000 D
Cl4(70)	2840.000 D	2500.000 D	2740.000 D	1840.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-05 SW	P-17G-ADP-GG-05 PW	P-17G-ADP-JJ-07 SW	P-17G-ADP-JJ-07 PW
Battelle ID	K9598-P	K9599-P	K9600-P	K9601-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/12/17	09/12/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.29	0.32	0.29	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(71)	10300.000 D	13600.000 D	9730.000 D	10700.000 D
Cl4(74)	4210.000 D	2880.000 D	4510.000 D	2820.000 D
Cl4(75)	968.000 D	1170.000 D	1050.000 D	888.000 D
Cl4(77)	247.000	261.000	253.000	196.000
Cl4(80)	34.500	23.500	36.800	25.500
Cl4(81)	17.900	14.300	17.700	17.100
Cl5(82)	142.000	205.000 D	121.000	122.000
Cl5(83)	4540.000 D	6160.000 D	4250.000 D	4340.000 D
Cl5(84)	2830.000 D	4620.000 D	2610.000 D	3010.000 D
Cl5(85)	332.000	584.000	348.000	367.000
Cl5(87)	513.000	743.000 D	432.000	424.000
Cl5(91)	6960.000 D	9840.000 D	6170.000 D	7240.000 D
Cl5(92)	3550.000 D	3940.000 D	3600.000 D	3100.000 D
Cl5(95)	13300.000 D	17500.000 D	12500.000 D	13600.000 D
Cl5(97)	2990.000 D	3620.000 D	3000.000 D	2700.000 D
Cl5(99)	9310.000 D	10700.000 D	7740.000 D	7570.000 D
Cl5(100)	911.000 D	1080.000 D	787.000 D	744.000 D
Cl5(101)	12400.000 D	13000.000 D	11300.000 D	10200.000 D
Cl5(104)	22.200	19.000	18.300	15.900
Cl5(105)	466.000	595.000	367.000	365.000
Cl5(110)	13400.000 D	17900.000 D	12500.000 D	13100.000 D
Cl5(114)	106.000	121.000	92.600	90.900
Cl5(115)	94.500	150.000	77.200	105.000
Cl5(118)	4890.000 D	5380.000 D	4550.000 D	4130.000 D
Cl5(123)	655.000 D	778.000 D	581.000	564.000
Cl5(124)	151.000	166.000	135.000	117.000
Cl5(125)	68.000	53.200	49.300	58.500
Cl5(126)	19.600	20.400	19.000	17.800
Cl5(127)	79.200	31.600	143.000	16.500
Cl6(128)	338.000	433.000	282.000	317.000
Cl6(130)	152.000	193.000	139.000	147.000
Cl6(131)	246.000	356.000	213.000	250.000
Cl6(134)	532.000	785.000 D	470.000	501.000
Cl6(135)	1070.000 D	1490.000 D	1020.000 D	1090.000 D
Cl6(136)	1390.000 D	2000.000 D	1340.000 D	1480.000 D
Cl6(137)	146.000	197.000	124.000	136.000
Cl6(138)	929.000 D	1420.000 D	865.000 D	1200.000 D
Cl6(139)	140.000	174.000	116.000	132.000
Cl6(140)	11.000	12.600	6.120	8.360
Cl6(141)	182.000	252.000	153.000	167.000
Cl6(144)	107.000	183.000	89.100	129.000
Cl6(146)	952.000 D	1270.000 D	852.000 D	957.000 D
Cl6(149)	9380.000 D	12000.000 D	7630.000 D	9070.000 D
Cl6(151)	1250.000 D	1700.000 D	1220.000 D	1320.000 D
Cl6(153)	6290.000 D	7400.000 D	5180.000 D	6260.000 D
Cl6(154)	582.000	807.000 D	469.000	552.000
Cl6(155)	4.030 J	3.980 J	3.700 J	3.220 J
Cl6(156)	258.000	344.000	219.000	245.000
Cl6(157)	48.200	67.600	39.400	44.900
Cl6(158)	385.000	477.000	334.000	362.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-05 SW	P-17G-ADP-GG-05 PW	P-17G-ADP-JJ-07 SW	P-17G-ADP-JJ-07 PW
Battelle ID	K9598-P	K9599-P	K9600-P	K9601-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/12/17	09/12/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.29	0.32	0.29	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(163)	2020.000 D	2800.000 D	1830.000 D	2000.000 D
Cl6(164)	296.000	382.000	262.000	286.000
Cl6(166)	37.200	43.500	31.400	34.300
Cl6(167)	234.000	306.000	199.000	232.000
Cl6(169)	3.310 U	3.000 U	3.310 U	2.460 U
Cl7(170)	189.000	283.000	162.000	206.000
Cl7(171)	61.400	95.500	55.900	70.600
Cl7(172)	36.300	57.100	34.300	42.100
Cl7(173)	6.240	7.560	4.250 J	6.560
Cl7(174)	116.000	171.000	103.000	125.000
Cl7(175)	17.300	25.200	13.100	18.600
Cl7(176)	27.100	40.500	24.500	28.100
Cl7(177)	92.400	132.000	79.400	100.000
Cl7(178)	112.000	160.000	89.200	115.000
Cl7(179)	209.000	306.000	184.000	232.000
Cl7(180)	358.000	521.000	312.000	388.000
Cl7(183)	169.000	248.000	145.000	184.000
Cl7(184)	1.990 U	1.800 U	1.990 U	1.340 J
Cl7(185)	19.700	26.800	16.700	20.700
Cl7(187)	587.000	941.000 D	496.000	691.000 D
Cl7(188)	14.100	22.000	12.700	16.000
Cl7(189)	13.000	21.600	9.710	15.100
Cl7(190)	62.700	95.000	54.400	71.500
Cl7(191)	13.800	19.600	10.900	16.100
Cl7(193)	31.300	54.200	26.100	35.600
Cl8(194)	42.300	87.300	33.300	55.800
Cl8(195)	16.600	28.000	14.600	21.200
Cl8(197)	3.980 J	4.730	3.380 J	3.620
Cl8(198)	3.120 U	2.830 U	3.120 U	2.320 U
Cl8(199)	44.900	77.800	41.000	56.200
Cl8(200)	4.740 J	7.400	4.670 J	5.820
Cl8(201)	8.360	11.900	5.680	8.710
Cl8(202)	20.700	33.800	18.800	26.200
Cl8(203)	57.700	106.000	47.700	77.000
Cl8(205)	4.100 J	5.330	2.840 J	4.220
Cl9(206)	18.400	41.800	15.400	29.700
Cl9(207)	3.970 J	6.020	3.150 J	4.410
Cl9(208)	7.940	14.600	6.210	9.400
Cl10(209)	2.590 J	6.740	2.200 J	4.020
LOC 1	53.100	116.000	60.200	286.000
LOC 2	25100.000	52700.000	26900.000	68900.000
LOC 3	226000.000	302000.000	233000.000	312000.000
LOC 4	207000.000	262000.000	207000.000	239000.000
LOC 5	77700.000	97200.000	71400.000	72000.000
LOC 6	27000.000	35100.000	23100.000	26900.000
LOC 7	2140.000	3230.000	1830.000	2380.000
LOC 8	203.000	362.000	172.000	259.000
LOC 9	30.300	62.400	24.800	43.500
LOC 10	2.590	6.740	2.200	4.020
Cl3(38)	31.000	58.500	36.800	52.500

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-05 SW	P-17G-ADP-GG-05 PW	P-17G-ADP-JJ-07 SW	P-17G-ADP-JJ-07 PW
Battelle ID	K9598-P	K9599-P	K9600-P	K9601-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/12/17	09/12/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.29	0.32	0.29	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(78)	47.000	34.400	66.300	21.700
Cl4(79)	65.600	35.800	88.700	21.700
Cl7(186)	167.000	73.100	335.000	26.500

Surrogate Recoveries (%)

Cl3(34)	172 N	198 N	192 N	216 N
Cl6(152)	92	93	85	92

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-09 SW	P-17G-ADP-DD-09 PW	P-17G-ADP-FF-07 SW	P-17G-ADP-FF-07 PW
Battelle ID	K9602-P	K9603-P	K9604-P	K9605-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/13/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.41	0.38	0.32	0.34
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	19.800	769.000 D	25.400	66.200
Cl1(3)	17.100	143.000	21.900	52.700
Cl2(4)	1870.000 D	13600.000 D	1830.000 D	2930.000 D
Cl2(5)	2.280 U	2.460 U	2.920 U	2.740 U
Cl2(6)	7150.000 D	21600.000 D	6020.000 D	7370.000 D
Cl2(7)	96.700	699.000 D	138.000	125.000
Cl2(8)	6790.000 D	24800.000 D	5900.000 D	7930.000 D
Cl2(9)	144.000	1230.000 D	175.000	226.000
Cl2(11)	1210.000 D	2090.000 D	1210.000 D	1180.000 D
Cl2(12)	4.520	3.900 U	2.600 J	2.950 J
Cl2(13)	3770.000 D	8220.000 D	3770.000 D	3670.000 D
Cl2(15)	3600.000 D	7260.000 D	3710.000 D	3510.000 D
Cl3(16)	241.000	647.000 D	293.000	704.000 D
Cl3(17)	13300.000 D	23000.000 D	12800.000 D	12100.000 D
Cl3(18)	25600.000 D	49800.000 D	24300.000 D	24500.000 D
Cl3(19)	1460.000 D	4960.000 D	1470.000 D	1730.000 D
Cl3(22)	2340.000 D	2000.000 D	2090.000 D	2250.000 D
Cl3(24)	22.800	17.000	22.800	24.900
Cl3(25)	30300.000 D	33900.000 D	29100.000 D	24600.000 D
Cl3(26)	39600.000 D	48700.000 D	38800.000 D	33500.000 D
Cl3(27)	3710.000 D	10200.000 D	3680.000 D	3750.000 D
Cl3(28)	50700.000 D	54500.000 D	49000.000 D	41700.000 D
Cl3(29)	1.820 U	6.010	9.660	12.000
Cl3(30)	9.470	11.600	11.000	10.000
Cl3(31)	50000.000 D	57600.000 D	47800.000 D	41000.000 D
Cl3(32)	9020.000 D	17000.000 D	8650.000 D	8320.000 D
Cl3(33)	1560.000 D	1140.000 D	1490.000 D	1360.000 D
Cl3(37)	1140.000 D	949.000 D	1160.000 D	996.000 D
Cl4(40)	2400.000 D	2040.000 D	2270.000 D	1890.000 D
Cl4(41)	4.230 U	4.560 U	5.420 U	5.100 U
Cl4(42)	7180.000 D	4860.000 D	5880.000 D	5170.000 D
Cl4(43)	739.000 D	802.000 D	3310.000 D	1660.000 D
Cl4(44)	11800.000 D	9600.000 D	10700.000 D	9370.000 D
Cl4(45)	908.000 D	697.000 D	884.000 D	842.000 D
Cl4(46)	1160.000 D	1660.000 D	1130.000 D	1140.000 D
Cl4(47)	18100.000 D	16200.000 D	17300.000 D	13400.000 D
Cl4(48)	2950.000 D	1620.000 D	2560.000 D	2370.000 D
Cl4(49)	48400.000 D	53300.000 D	69800.000 D	55800.000 D
Cl4(50)	66.000	90.000	82.800	67.100
Cl4(51)	3540.000 D	5190.000 D	3530.000 D	3180.000 D
Cl4(52)	49900.000 D	59400.000 D	66500.000 D	54200.000 D
Cl4(53)	8800.000 D	13900.000 D	8340.000 D	7540.000 D
Cl4(54)	46.600	126.000	56.100	64.800
Cl4(56)	782.000 D	537.000 D	762.000 D	627.000 D
Cl4(60)	178.000	123.000	216.000	177.000
Cl4(63)	188.000	157.000	253.000	195.000
Cl4(64)	6500.000 D	3790.000 D	5430.000 D	4420.000 D
Cl4(66)	3110.000 D	1990.000 D	3220.000 D	2440.000 D
Cl4(67)	1890.000 D	1140.000 D	1950.000 D	1320.000 D
Cl4(70)	2580.000 D	1550.000 D	2610.000 D	1890.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-09 SW	P-17G-ADP-DD-09 PW	P-17G-ADP-FF-07 SW	P-17G-ADP-FF-07 PW
Battelle ID	K9602-P	K9603-P	K9604-P	K9605-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/13/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.41	0.38	0.32	0.34
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(71)	9390.000 D	9990.000 D	8820.000 D	7520.000 D
Cl4(74)	3970.000 D	2400.000 D	4110.000 D	2890.000 D
Cl4(75)	963.000 D	831.000 D	1010.000 D	749.000 D
Cl4(77)	254.000	187.000	268.000	212.000
Cl4(80)	30.100	27.900	35.300	34.500
Cl4(81)	17.400	13.400	13.200	2.500 U
Cl5(82)	132.000	98.700	140.000	113.000
Cl5(83)	3980.000 D	3370.000 D	4140.000 D	3410.000 D
Cl5(84)	2430.000 D	1930.000 D	2430.000 D	2480.000 D
Cl5(85)	403.000	283.000	367.000	355.000
Cl5(87)	497.000	362.000	467.000	426.000
Cl5(91)	6550.000 D	4390.000 D	5690.000 D	4720.000 D
Cl5(92)	3390.000 D	2630.000 D	3370.000 D	2370.000 D
Cl5(95)	12300.000 D	9670.000 D	11700.000 D	9920.000 D
Cl5(97)	2920.000 D	2060.000 D	2930.000 D	2310.000 D
Cl5(99)	7930.000 D	5430.000 D	7900.000 D	6090.000 D
Cl5(100)	740.000 D	665.000 D	351.000	301.000
Cl5(101)	10700.000 D	7430.000 D	10400.000 D	7910.000 D
Cl5(104)	15.000	18.400	18.100	14.900
Cl5(105)	412.000	302.000	415.000	359.000
Cl5(110)	12400.000 D	9400.000 D	12300.000 D	9880.000 D
Cl5(114)	82.300	67.800	92.400	78.400
Cl5(115)	3.550 U	85.800	4.550 U	4.280 U
Cl5(118)	4430.000 D	3180.000 D	4570.000 D	3760.000 D
Cl5(123)	639.000	452.000	638.000	519.000
Cl5(124)	135.000	93.800	140.000	112.000
Cl5(125)	41.600	46.100	3.260 U	3.070 U
Cl5(126)	19.000	15.300	17.600	18.400
Cl5(127)	95.000	68.500	113.000	75.000
Cl6(128)	300.000	252.000	304.000	281.000
Cl6(130)	132.000	115.000	142.000	128.000
Cl6(131)	239.000	203.000	234.000	219.000
Cl6(134)	518.000	402.000	504.000	451.000
Cl6(135)	1010.000 D	845.000 D	1010.000 D	877.000 D
Cl6(136)	1300.000 D	1170.000 D	1270.000 D	1160.000 D
Cl6(137)	129.000	107.000	133.000	116.000
Cl6(138)	851.000 D	685.000	850.000	800.000
Cl6(139)	122.000	104.000	126.000	118.000
Cl6(140)	13.200	7.030	9.340	8.890
Cl6(141)	159.000	129.000	168.000	150.000
Cl6(144)	83.600	98.300	89.000	77.200
Cl6(146)	825.000 D	660.000	835.000	742.000
Cl6(149)	7720.000 D	6980.000 D	7590.000 D	6850.000 D
Cl6(151)	1110.000 D	924.000 D	1140.000 D	992.000 D
Cl6(153)	4930.000 D	4180.000 D	5090.000 D	4670.000 D
Cl6(154)	534.000	483.000	518.000	472.000
Cl6(155)	3.140 J	2.930 J	3.720 J	3.460 J
Cl6(156)	201.000	187.000	230.000	218.000
Cl6(157)	37.900	39.000	40.900	40.700
Cl6(158)	354.000	295.000	362.000	342.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-09 SW	P-17G-ADP-DD-09 PW	P-17G-ADP-FF-07 SW	P-17G-ADP-FF-07 PW
Battelle ID	K9602-P	K9603-P	K9604-P	K9605-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/13/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.41	0.38	0.32	0.34
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(163)	1780.000 D	1520.000 D	1780.000 D	1650.000 D
Cl6(164)	291.000	225.000	276.000	257.000
Cl6(166)	31.200	27.100	35.300	30.300
Cl6(167)	191.000	181.000	215.000	208.000
Cl6(169)	4.800	2.530 U	3.000 U	2.830 U
Cl7(170)	156.000	159.000	164.000	185.000
Cl7(171)	52.300	54.600	57.100	61.700
Cl7(172)	31.600	32.300	35.400	32.900
Cl7(173)	8.200	5.630	5.080	4.480
Cl7(174)	98.300	97.600	110.000	108.000
Cl7(175)	15.600	12.100	15.500	14.400
Cl7(176)	24.100	23.600	26.500	26.200
Cl7(177)	85.200	77.700	85.300	89.100
Cl7(178)	91.300	91.000	96.500	96.200
Cl7(179)	193.000	182.000	199.000	193.000
Cl7(180)	299.000	290.000	325.000	345.000
Cl7(183)	144.000	142.000	155.000	161.000
Cl7(184)	1.410 U	1.520 U	1.800 U	1.700 U
Cl7(185)	19.700	14.900	19.800	17.600
Cl7(187)	566.000	510.000	528.000	545.000
Cl7(188)	11.700	12.800	12.600	13.000
Cl7(189)	8.420	11.900	11.000	12.600
Cl7(190)	49.700	54.700	59.400	62.900
Cl7(191)	12.000	10.600	11.800	12.800
Cl7(193)	33.800	35.000	26.900	27.400
Cl8(194)	34.000	44.500	36.500	51.100
Cl8(195)	14.500	17.500	14.900	20.300
Cl8(197)	3.020 J	2.950 J	3.460 J	3.410 J
Cl8(198)	2.210 U	2.380 U	2.830 U	2.660 U
Cl8(199)	48.800	44.000	41.700	49.600
Cl8(200)	6.160	5.020	4.120 J	5.400
Cl8(201)	6.930	6.960	8.860	7.190
Cl8(202)	18.600	20.200	20.300	22.600
Cl8(203)	45.600	62.800	52.700	63.500
Cl8(205)	2.210 U	4.370	2.830 U	2.660 U
Cl9(206)	14.500	25.200	16.100	23.300
Cl9(207)	3.860	3.170 J	2.440 J	3.970 J
Cl9(208)	6.810	8.900	6.410	9.520
Cl10(209)	5.830	3.320 J	2.370 J	3.820 J
LOC 1	36.900	912.000	47.300	119.000
LOC 2	24600.000	79500.000	22800.000	26900.000
LOC 3	229000.000	304000.000	221000.000	196000.000
LOC 4	186000.000	192000.000	221000.000	179000.000
LOC 5	70200.000	52000.000	68200.000	55200.000
LOC 6	22900.000	19800.000	23000.000	20900.000
LOC 7	1900.000	1820.000	1940.000	2010.000
LOC 8	178.000	208.000	182.000	223.000
LOC 9	25.200	37.300	25.000	36.800
LOC 10	5.830	3.320	2.370	3.820
Cl3(38)	21.900	71.700	28.200	82.800

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-09 SW	P-17G-ADP-DD-09 PW	P-17G-ADP-FF-07 SW	P-17G-ADP-FF-07 PW
Battelle ID	K9602-P	K9603-P	K9604-P	K9605-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/13/17	09/13/17	09/13/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.41	0.38	0.32	0.34
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(78)	57.700	55.900	54.700	67.900
Cl4(79)	67.200	62.700	57.100	74.300
Cl7(186)	196.000	144.000	252.000	169.000

Surrogate Recoveries (%)

Cl3(34)	182 N	233 N	182 N	181 N
Cl6(152)	100	87	93	89

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-04 SW	P-17G-ADP-GG-04 PW	P-17G-ADP-HH-07 SW	P-17G-ADP-HH-07 PW
Battelle ID	K9606-P	K9607-P	K9608-P	K9609-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/14/17	09/14/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.34	0.35	0.32	0.36
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	32.000	156.000	28.700	92.100
Cl1(3)	23.700	66.800	23.400	73.800
Cl2(4)	2260.000 D	5870.000 D	2200.000 D	5690.000 D
Cl2(5)	2.740 U	2.670 U	2.920 U	2.590 U
Cl2(6)	8550.000 D	10500.000 D	6980.000 D	13900.000 D
Cl2(7)	139.000	143.000	108.000	116.000
Cl2(8)	9320.000 D	15500.000 D	6790.000 D	14700.000 D
Cl2(9)	199.000	289.000	201.000	690.000 D
Cl2(11)	1480.000 D	1460.000 D	1370.000 D	1720.000 D
Cl2(12)	2.820 J	5.880	4.640 U	807.000 D
Cl2(13)	4580.000 D	4810.000 D	4280.000 D	4870.000 D
Cl2(15)	4420.000 D	5360.000 D	4220.000 D	4060.000 D
Cl3(16)	776.000 D	3040.000 D	287.000	245.000
Cl3(17)	15700.000 D	15700.000 D	14100.000 D	18100.000 D
Cl3(18)	31100.000 D	30100.000 D	27800.000 D	39400.000 D
Cl3(19)	1770.000 D	2300.000 D	1640.000 D	3600.000 D
Cl3(22)	2710.000 D	4130.000 D	2470.000 D	2000.000 D
Cl3(24)	23.400	60.600	19.000	21.400
Cl3(25)	35800.000 D	29700.000 D	33000.000 D	32600.000 D
Cl3(26)	49300.000 D	42600.000 D	43900.000 D	46600.000 D
Cl3(27)	4460.000 D	3860.000 D	4160.000 D	6910.000 D
Cl3(28)	59800.000 D	50100.000 D	55900.000 D	51500.000 D
Cl3(29)	12.500	25.100	8.870	2.070 U
Cl3(30)	11.700	10.300	11.300	9.860
Cl3(31)	59100.000 D	51800.000 D	53700.000 D	53900.000 D
Cl3(32)	11300.000 D	10500.000 D	9800.000 D	14700.000 D
Cl3(33)	1970.000 D	4710.000 D	1620.000 D	216.000
Cl3(37)	1440.000 D	2240.000 D	1400.000 D	987.000 D
Cl4(40)	2560.000 D	2380.000 D	2900.000 D	1980.000 D
Cl4(41)	5.100 U	41.600	5.420 U	4.810 U
Cl4(42)	7820.000 D	7970.000 D	6910.000 D	5110.000 D
Cl4(43)	4830.000 D	5400.000 D	2510.000 D	821.000 D
Cl4(44)	13100.000 D	14300.000 D	12600.000 D	8580.000 D
Cl4(45)	1020.000 D	1150.000 D	971.000 D	708.000 D
Cl4(46)	1360.000 D	1430.000 D	1270.000 D	1610.000 D
Cl4(47)	20200.000 D	16900.000 D	20400.000 D	16800.000 D
Cl4(48)	3580.000 D	4470.000 D	3700.000 D	1230.000 D
Cl4(49)	65100.000 D	53200.000 D	54300.000 D	74100.000 D
Cl4(50)	88.100	66.200	86.000	71.200
Cl4(51)	4470.000 D	3600.000 D	4010.000 D	4870.000 D
Cl4(52)	68800.000 D	54000.000 D	57000.000 D	73900.000 D
Cl4(53)	11100.000 D	9020.000 D	9370.000 D	12800.000 D
Cl4(54)	67.100	61.800	57.300	99.500
Cl4(56)	937.000 D	1500.000 D	911.000 D	547.000 D
Cl4(60)	201.000	651.000 D	236.000	328.000 D
Cl4(63)	221.000	252.000	266.000	131.000
Cl4(64)	5670.000 D	5780.000 D	5910.000 D	3750.000 D
Cl4(66)	3710.000 D	5220.000 D	3760.000 D	2030.000 D
Cl4(67)	1900.000 D	1410.000 D	2320.000 D	1120.000 D
Cl4(70)	3110.000 D	5300.000 D	3050.000 D	1540.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-04 SW	P-17G-ADP-GG-04 PW	P-17G-ADP-HH-07 SW	P-17G-ADP-HH-07 PW
Battelle ID	K9606-P	K9607-P	K9608-P	K9609-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/14/17	09/14/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.34	0.35	0.32	0.36
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(71)	11500.000 D	10100.000 D	10600.000 D	9000.000 D
Cl4(74)	4230.000 D	4040.000 D	4930.000 D	2400.000 D
Cl4(75)	1070.000 D	799.000 D	1070.000 D	851.000 D
Cl4(77)	239.000	315.000	286.000	164.000
Cl4(80)	32.600	34.100	36.200	21.800
Cl4(81)	9.770	15.000	2.660 U	17.700
Cl5(82)	151.000	441.000	138.000	94.700
Cl5(83)	4120.000 D	4730.000 D	5250.000 D	3770.000 D
Cl5(84)	2600.000 D	3970.000 D	2670.000 D	2470.000 D
Cl5(85)	504.000	1290.000 D	424.000	265.000
Cl5(87)	556.000	2090.000 D	576.000 D	356.000
Cl5(91)	6040.000 D	7660.000 D	6950.000 D	4740.000 D
Cl5(92)	3010.000 D	4150.000 D	4350.000 D	2460.000 D
Cl5(95)	13900.000 D	16400.000 D	14200.000 D	8690.000 D
Cl5(97)	3010.000 D	4530.000 D	3640.000 D	2150.000 D
Cl5(99)	8720.000 D	11900.000 D	10200.000 D	6110.000 D
Cl5(100)	764.000 D	780.000 D	949.000 D	709.000 D
Cl5(101)	11600.000 D	16700.000 D	13800.000 D	6860.000 D
Cl5(104)	18.900	15.500	20.400	18.200
Cl5(105)	462.000	1640.000 D	477.000	302.000
Cl5(110)	13800.000 D	19200.000 D	15400.000 D	10800.000 D
Cl5(114)	88.400	164.000	112.000	61.400
Cl5(115)	4.280 U	4.160 U	4.550 U	455.000
Cl5(118)	4690.000 D	9560.000 D	5840.000 D	3580.000 D
Cl5(123)	593.000	1060.000 D	738.000	460.000
Cl5(124)	138.000	262.000	173.000	102.000
Cl5(125)	3.070 U	50.700	3.260 U	44.000
Cl5(126)	15.500	17.800	21.600	16.000
Cl5(127)	114.000	87.900	84.500	42.800
Cl6(128)	287.000	871.000 D	354.000	276.000
Cl6(130)	123.000	288.000	181.000	118.000
Cl6(131)	200.000	306.000	287.000	231.000
Cl6(134)	443.000	631.000	586.000	482.000
Cl6(135)	986.000 D	1340.000 D	1280.000 D	964.000 D
Cl6(136)	1280.000 D	1690.000 D	1620.000 D	1270.000 D
Cl6(137)	124.000	312.000	158.000	121.000
Cl6(138)	919.000 D	3070.000 D	1160.000 D	836.000 D
Cl6(139)	107.000	170.000	158.000	117.000
Cl6(140)	3.320 U	19.800	9.270	12.700
Cl6(141)	162.000	501.000	196.000	142.000
Cl6(144)	77.900	176.000	110.000	62.000
Cl6(146)	710.000	1260.000 D	1110.000 D	779.000 D
Cl6(149)	7930.000 D	11000.000 D	10300.000 D	7230.000 D
Cl6(151)	1050.000 D	1560.000 D	1480.000 D	1100.000 D
Cl6(153)	4750.000 D	8810.000 D	6570.000 D	4950.000 D
Cl6(154)	450.000	543.000	613.000	547.000
Cl6(155)	2.940 J	3.450 J	3.990 J	3.390 J
Cl6(156)	211.000	530.000	285.000	198.000
Cl6(157)	38.800	120.000	49.700	36.600
Cl6(158)	317.000	615.000	451.000	293.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-04 SW	P-17G-ADP-GG-04 PW	P-17G-ADP-HH-07 SW	P-17G-ADP-HH-07 PW
Battelle ID	K9606-P	K9607-P	K9608-P	K9609-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/14/17	09/14/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.34	0.35	0.32	0.36
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(163)	1640.000 D	2370.000 D	2340.000 D	1810.000 D
Cl6(164)	241.000	432.000	342.000	259.000
Cl6(166)	27.200	44.200	41.900	30.600
Cl6(167)	185.000	333.000	266.000	208.000
Cl6(169)	2.830 U	2.750 U	3.000 U	2.670 U
Cl7(170)	145.000	365.000	218.000	184.000
Cl7(171)	48.300	116.000	71.000	61.900
Cl7(172)	27.900	63.600	42.600	36.600
Cl7(173)	3.990 J	9.840	7.110	10.400
Cl7(174)	91.400	240.000	135.000	103.000
Cl7(175)	11.700	22.900	17.400	16.500
Cl7(176)	22.000	45.800	30.600	28.500
Cl7(177)	70.800	164.000	101.000	88.200
Cl7(178)	80.900	126.000	122.000	105.000
Cl7(179)	164.000	241.000	240.000	218.000
Cl7(180)	263.000	607.000	400.000	370.000
Cl7(183)	123.000	241.000	187.000	174.000
Cl7(184)	1.700 U	1.650 U	1.800 U	1.600 U
Cl7(185)	14.300	28.400	25.300	18.800
Cl7(187)	437.000	656.000	648.000	681.000
Cl7(188)	12.100	13.200	17.000	14.800
Cl7(189)	9.010	21.800	14.000	14.800
Cl7(190)	46.700	97.400	72.600	61.900
Cl7(191)	10.100	21.200	15.600	15.200
Cl7(193)	27.200	37.200	32.500	30.800
Cl8(194)	31.700	84.300	48.200	54.400
Cl8(195)	12.100	29.800	20.000	20.400
Cl8(197)	2.580 J	4.730	2.150 U	5.080
Cl8(198)	2.660 U	2.590 U	2.830 U	2.520 U
Cl8(199)	33.600	76.000	53.300	66.200
Cl8(200)	3.660 J	7.720	5.910	7.280
Cl8(201)	5.450	10.300	8.980	9.290
Cl8(202)	16.100	25.500	26.000	23.900
Cl8(203)	37.000	96.400	66.800	68.700
Cl8(205)	2.660 U	6.510	4.250 J	4.960
Cl9(206)	13.200	35.700	20.000	27.100
Cl9(207)	2.080 J	5.220	3.530 J	5.820
Cl9(208)	5.250	11.600	8.170	10.500
Cl10(209)	2.090 J	5.510	3.050 J	6.920
LOC 1	55.700	223.000	52.100	166.000
LOC 2	31000.000	43900.000	26200.000	46600.000
LOC 3	275000.000	251000.000	250000.000	271000.000
LOC 4	237000.000	209000.000	210000.000	225000.000
LOC 5	74900.000	107000.000	86000.000	54600.000
LOC 6	22300.000	37000.000	30000.000	22100.000
LOC 7	1610.000	3120.000	2400.000	2230.000
LOC 8	142.000	341.000	233.000	260.000
LOC 9	20.500	52.500	31.700	43.400
LOC 10	2.090	5.510	3.050	6.920
Cl3(38)	55.000	65.300	27.800	76.800

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-GG-04 SW	P-17G-ADP-GG-04 PW	P-17G-ADP-HH-07 SW	P-17G-ADP-HH-07 PW
Battelle ID	K9606-P	K9607-P	K9608-P	K9609-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/13/17	09/14/17	09/14/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.34	0.35	0.32	0.36
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(78)	80.400	81.400	38.900	55.300
Cl4(79)	99.200	80.600	57.300	59.400
Cl7(186)	234.000	167.000	171.000	93.900

Surrogate Recoveries (%)

Cl3(34)	187 N	164 N	179 N	176 N
Cl6(152)	89	78	91	88

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-EE-04 SW	P-17G-ADP-EE-04 PW	P-17G-ADP-JJ-05 SW	P-17G-ADP-JJ-05 PW
Battelle ID	K9610-P	K9611-P	K9612-P	K9613-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.48	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	54.600	66.200	26.200	1790.000 D
Cl1(3)	31.500	34.400	18.700	753.000 D
Cl2(4)	2880.000 D	2940.000 D	2630.000 D	104000.000 D
Cl2(5)	2.520 U	2.670 U	1.940 U	23.300 UD
Cl2(6)	7510.000 D	7380.000 D	8850.000 D	191000.000 D
Cl2(7)	103.000	137.000	80.800	1660.000 D
Cl2(8)	7800.000 D	7550.000 D	8660.000 D	206000.000 D
Cl2(9)	187.000	186.000	140.000	3550.000 D
Cl2(11)	1460.000 D	1460.000 D	1330.000 D	16100.000 D
Cl2(12)	4.210	3.300 J	3.090 U	14.300 D
Cl2(13)	4620.000 D	4690.000 D	4170.000 D	54400.000 D
Cl2(15)	4450.000 D	4310.000 D	3820.000 D	45400.000 D
Cl3(16)	926.000 D	969.000 D	161.000	2720.000 D
Cl3(17)	16200.000 D	15800.000 D	15900.000 D	157000.000 D
Cl3(18)	32100.000 D	32200.000 D	32700.000 D	364000.000 D
Cl3(19)	2140.000 D	2190.000 D	1920.000 D	35300.000 D
Cl3(22)	2760.000 D	2780.000 D	1880.000 D	12900.000 D
Cl3(24)	25.200	30.000	11.200	137.000 D
Cl3(25)	32800.000 D	32300.000 D	35600.000 D	233000.000 D
Cl3(26)	47300.000 D	47700.000 D	49400.000 D	377000.000 D
Cl3(27)	5460.000 D	5550.000 D	4880.000 D	63600.000 D
Cl3(28)	53900.000 D	53800.000 D	56800.000 D	322000.000 D
Cl3(29)	10.700	12.500	4.930	18.600 UD
Cl3(30)	32.600 D	9.500	6.960	78.500 D
Cl3(31)	51500.000 D	51500.000 D	58000.000 D	352000.000 D
Cl3(32)	12600.000 D	12900.000 D	12000.000 D	126000.000 D
Cl3(33)	2000.000 D	2070.000 D	1280.000 D	3520.000 D
Cl3(37)	1510.000 D	1620.000 D	1260.000 D	1720.000 D
Cl4(40)	2440.000 D	2730.000 D	2920.000 D	11600.000 D
Cl4(41)	14.300	14.000	3.610 U	43.300 UD
Cl4(42)	6010.000 D	6190.000 D	5340.000 D	26000.000 D
Cl4(43)	768.000 D	838.000 D	3030.000 D	20900.000 D
Cl4(44)	12600.000 D	13200.000 D	12100.000 D	57600.000 D
Cl4(45)	1020.000 D	1010.000 D	723.000 D	2160.000 D
Cl4(46)	1540.000 D	1600.000 D	1390.000 D	14100.000 D
Cl4(47)	19300.000 D	21300.000 D	22800.000 D	71100.000 D
Cl4(48)	2080.000 D	1820.000 D	3980.000 D	13200.000 D
Cl4(49)	79900.000 D	86000.000 D	79400.000 D	468000.000 D
Cl4(50)	78.900	82.700	71.900	494.000 D
Cl4(51)	5360.000 D	5610.000 D	5120.000 D	37300.000 D
Cl4(52)	83100.000 D	87900.000 D	83200.000 D	543000.000 D
Cl4(53)	13300.000 D	13600.000 D	12800.000 D	99300.000 D
Cl4(54)	99.400	102.000	54.900	753.000 D
Cl4(56)	1000.000 D	1050.000 D	622.000 D	360.000 D
Cl4(60)	191.000	209.000	108.000	144.000 D
Cl4(63)	195.000	200.000	137.000	620.000 D
Cl4(64)	5010.000 D	5140.000 D	4130.000 D	17000.000 D
Cl4(66)	4020.000 D	4300.000 D	2490.000 D	906.000 D
Cl4(67)	1510.000 D	1490.000 D	1500.000 D	586.000 D
Cl4(70)	3210.000 D	3420.000 D	2010.000 D	618.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-EE-04 SW	P-17G-ADP-EE-04 PW	P-17G-ADP-JJ-05 SW	P-17G-ADP-JJ-05 PW
Battelle ID	K9610-P	K9611-P	K9612-P	K9613-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.48	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(71)	10400.000 D	10900.000 D	13200.000 D	63600.000 D
Cl4(74)	3800.000 D	3830.000 D	3090.000 D	658.000 D
Cl4(75)	1020.000 D	1060.000 D	1160.000 D	1830.000 D
Cl4(77)	265.000	297.000	213.000	124.000 D
Cl4(80)	30.800	35.000	16.600	28.800 D
Cl4(81)	13.300	17.300	1.770 U	21.200 UD
Cl5(82)	170.000	222.000	104.000	106.000 D
Cl5(83)	4450.000 D	5060.000 D	5310.000 D	18500.000 D
Cl5(84)	2590.000 D	3400.000 D	2340.000 D	11800.000 D
Cl5(85)	491.000	492.000	438.000	586.000 D
Cl5(87)	712.000	887.000	354.000	378.000 D
Cl5(91)	5660.000 D	6200.000 D	5690.000 D	26200.000 D
Cl5(92)	3670.000 D	3490.000 D	3450.000 D	16100.000 D
Cl5(95)	13400.000 D	14800.000 D	14000.000 D	51400.000 D
Cl5(97)	3160.000 D	3690.000 D	2750.000 D	3500.000 D
Cl5(99)	9190.000 D	10800.000 D	8310.000 D	12000.000 D
Cl5(100)	311.000	361.000	1040.000 D	1710.000 D
Cl5(101)	11800.000 D	14200.000 D	10800.000 D	14300.000 D
Cl5(104)	20.100	22.600	22.600	120.000 D
Cl5(105)	653.000	840.000	318.000	226.000 D
Cl5(110)	12800.000 D	15400.000 D	12700.000 D	36100.000 D
Cl5(114)	106.000	141.000	84.200	69.000 D
Cl5(115)	84.000	137.000	3.030 U	36.400 UD
Cl5(118)	5560.000 D	6840.000 D	4130.000 D	2780.000 D
Cl5(123)	648.000	768.000	526.000	620.000 D
Cl5(124)	155.000	199.000	115.000	88.100 D
Cl5(125)	64.000	66.000	2.180 U	26.100 UD
Cl5(126)	16.400	21.800	17.000	28.900 UD
Cl5(127)	64.700	55.800	81.200	51.300 D
Cl6(128)	380.000	514.000	253.000	300.000 D
Cl6(130)	135.000	210.000	124.000	188.000 D
Cl6(131)	219.000	278.000	262.000	871.000 D
Cl6(134)	475.000	573.000	487.000	1550.000 D
Cl6(135)	906.000	1230.000 D	1210.000 D	3440.000 D
Cl6(136)	1380.000 D	1570.000 D	1720.000 D	5770.000 D
Cl6(137)	153.000	224.000	119.000	134.000 D
Cl6(138)	1280.000 D	2110.000 D	687.000	970.000 D
Cl6(139)	128.000	159.000	130.000	304.000 D
Cl6(140)	10.300	14.500	6.560	28.200 UD
Cl6(141)	215.000	305.000	138.000	157.000 D
Cl6(144)	110.000	114.000	80.000	149.000 D
Cl6(146)	770.000	943.000	978.000 D	2010.000 D
Cl6(149)	7320.000 D	10100.000 D	10200.000 D	33100.000 D
Cl6(151)	1170.000 D	1420.000 D	1290.000 D	3370.000 D
Cl6(153)	5300.000 D	6710.000 D	5290.000 D	7540.000 D
Cl6(154)	504.000	607.000	693.000	2410.000 D
Cl6(155)	2.220 U	3.400 J	2.970	21.900 D
Cl6(156)	277.000	400.000	216.000	319.000 D
Cl6(157)	55.300	83.500	38.100	56.900 D
Cl6(158)	368.000	494.000	322.000	376.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-EE-04 SW	P-17G-ADP-EE-04 PW	P-17G-ADP-JJ-05 SW	P-17G-ADP-JJ-05 PW
Battelle ID	K9610-P	K9611-P	K9612-P	K9613-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.48	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(163)	1850.000 D	2040.000 D	2220.000 D	5450.000 D
Cl6(164)	274.000	351.000	242.000	322.000 D
Cl6(166)	29.400	39.800	31.000	53.600 D
Cl6(167)	214.000	287.000	211.000	323.000 D
Cl6(169)	2.600 U	2.750 U	2.000 U	24.000 UD
Cl7(170)	184.000	255.000	165.000	357.000 D
Cl7(171)	59.300	84.800	58.300	113.000 D
Cl7(172)	33.700	44.300	34.700	78.300 D
Cl7(173)	4.560	7.510	4.350	24.000 UD
Cl7(174)	113.000	156.000	103.000	234.000 D
Cl7(175)	14.200	19.800	15.800	58.300 D
Cl7(176)	24.600	33.500	26.400	85.400 D
Cl7(177)	84.000	120.000	79.400	134.000 D
Cl7(178)	90.600	114.000	116.000	384.000 D
Cl7(179)	178.000	225.000	227.000	778.000 D
Cl7(180)	319.000	445.000	330.000	918.000 D
Cl7(183)	144.000	200.000	169.000	515.000 D
Cl7(184)	1.480 J	1.650 U	1.200 U	14.400 UD
Cl7(185)	17.500	22.200	19.200	41.500 D
Cl7(187)	485.000	614.000	613.000	2380.000 D
Cl7(188)	12.000	16.300	16.800	84.500 D
Cl7(189)	12.800	18.400	13.800	36.400 D
Cl7(190)	54.900	77.900	63.700	168.000 D
Cl7(191)	11.400	16.600	12.200	43.200 D
Cl7(193)	24.000	32.700	30.500	96.100 D
Cl8(194)	36.800	50.400	51.100	254.000 D
Cl8(195)	15.400	19.900	18.600	100.000 D
Cl8(197)	2.480 J	3.510 J	3.000	17.200 UD
Cl8(198)	2.450 U	2.590 U	1.890 U	22.600 UD
Cl8(199)	39.800	51.100	52.300	180.000 D
Cl8(200)	4.720	4.910	5.550	22.600 UD
Cl8(201)	6.280	9.360	8.590	37.300 D
Cl8(202)	17.000	22.600	25.400	103.000 D
Cl8(203)	51.000	66.500	67.800	294.000 D
Cl8(205)	3.140 J	4.860	3.970	22.600 UD
Cl9(206)	14.900	22.400	25.900	206.000 D
Cl9(207)	3.230 J	4.170	3.730	29.100 D
Cl9(208)	6.040	7.850	8.950	74.300 D
Cl10(209)	2.490 J	2.630 J	3.780	49.800 D
LOC 1	86.100	101.000	44.900	2540.000
LOC 2	29000.000	28700.000	29700.000	622000.000
LOC 3	261000.000	261000.000	272000.000	2050000.000
LOC 4	258000.000	274000.000	262000.000	1450000.000
LOC 5	75800.000	88100.000	72600.000	197000.000
LOC 6	23500.000	30800.000	27000.000	69200.000
LOC 7	1870.000	2500.000	2100.000	6500.000
LOC 8	177.000	233.000	236.000	968.000
LOC 9	24.200	34.400	38.600	309.000
LOC 10	2.490	2.630	3.780	49.800
Cl3(38)	50.800	42.000	19.200	19.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-EE-04 SW	P-17G-ADP-EE-04 PW	P-17G-ADP-JJ-05 SW	P-17G-ADP-JJ-05 PW
Battelle ID	K9610-P	K9611-P	K9612-P	K9613-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.48	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(78)	46.600	38.100	26.800	9.220
Cl4(79)	47.200	37.700	35.500	9.260
Cl7(186)	133.000	106.000	176.000	125.000

Surrogate Recoveries (%)

Cl3(34)	190 N	176 N	169 N	1305 ND
Cl6(152)	97	93	89	120 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-04 SW	P-17G-ADP-DD-04 PW	P-17G-ADP-FF-04 SW	P-17G-ADP-FF-04 PW
Battelle ID	K9614-P	K9615-P	K9616-P	K9617-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.33	0.28	0.40	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	197.000	36600.000 D	34.600	151.000
Cl1(3)	55.600	5440.000 D	23.000	34.800
Cl2(4)	2980.000 D	98100.000 D	2160.000 D	5070.000 D
Cl2(5)	2.830 U	1380.000 D	2.330 U	2.390 U
Cl2(6)	7100.000 D	24100.000 D	6360.000 D	11100.000 D
Cl2(7)	151.000	5.300 U	119.000	90.600
Cl2(8)	8210.000 D	64400.000 D	6380.000 D	10100.000 D
Cl2(9)	255.000	6190.000 D	159.000	159.000
Cl2(11)	1270.000 D	2010.000 D	1230.000 D	1700.000 D
Cl2(12)	5.600	103.000	2.460 J	3.800 U
Cl2(13)	4070.000 D	7360.000 D	3910.000 D	7220.000 D
Cl2(15)	4600.000 D	17700.000 D	3850.000 D	4630.000 D
Cl3(16)	905.000 D	10500.000 D	270.000	1210.000 D
Cl3(17)	13300.000 D	29300.000 D	13000.000 D	17400.000 D
Cl3(18)	26200.000 D	45800.000 D	25600.000 D	32600.000 D
Cl3(19)	1700.000 D	11600.000 D	1540.000 D	2940.000 D
Cl3(22)	2580.000 D	6750.000 D	2310.000 D	3460.000 D
Cl3(24)	31.100	233.000	19.600	22.300
Cl3(25)	29000.000 D	26800.000 D	30300.000 D	40200.000 D
Cl3(26)	39000.000 D	36000.000 D	40600.000 D	63100.000 D
Cl3(27)	3970.000 D	7940.000 D	3910.000 D	9660.000 D
Cl3(28)	45400.000 D	51600.000 D	50500.000 D	56200.000 D
Cl3(29)	14.500	73.000	10.200	7.060
Cl3(30)	12.600	21.600	8.460	8.930
Cl3(31)	41400.000 D	49200.000 D	48500.000 D	55600.000 D
Cl3(32)	9280.000 D	14800.000 D	9140.000 D	15600.000 D
Cl3(33)	1810.000 D	5340.000 D	1690.000 D	3390.000 D
Cl3(37)	1370.000 D	2560.000 D	1260.000 D	1570.000 D
Cl4(40)	2180.000 D	2760.000 D	2240.000 D	2910.000 D
Cl4(41)	5.250 U	73.100	4.330 U	4.440 U
Cl4(42)	6020.000 D	6860.000 D	5750.000 D	10200.000 D
Cl4(43)	3550.000 D	411.000	3390.000 D	4050.000 D
Cl4(44)	11200.000 D	12300.000 D	11400.000 D	18000.000 D
Cl4(45)	928.000 D	1580.000 D	338.000	1020.000 D
Cl4(46)	1160.000 D	1580.000 D	1150.000 D	2070.000 D
Cl4(47)	16600.000 D	19100.000 D	17500.000 D	25600.000 D
Cl4(48)	2840.000 D	426.000	2490.000 D	4480.000 D
Cl4(49)	55300.000 D	54500.000 D	74000.000 D	84000.000 D
Cl4(50)	83.800	92.700	73.300	73.300
Cl4(51)	3620.000 D	4320.000 D	3860.000 D	7860.000 D
Cl4(52)	55900.000 D	54600.000 D	73100.000 D	94200.000 D
Cl4(53)	8760.000 D	9290.000 D	9410.000 D	16300.000 D
Cl4(54)	66.200	125.000	57.500	107.000
Cl4(56)	1100.000 D	1420.000 D	880.000 D	1240.000 D
Cl4(60)	212.000	264.000	185.000	577.000 D
Cl4(63)	541.000 D	273.000	188.000	200.000
Cl4(64)	5210.000 D	6620.000 D	4930.000 D	7700.000 D
Cl4(66)	3840.000 D	5270.000 D	3590.000 D	4380.000 D
Cl4(67)	1640.000 D	1480.000 D	1590.000 D	1290.000 D
Cl4(70)	2780.000 D	3980.000 D	2950.000 D	3410.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-04 SW	P-17G-ADP-DD-04 PW	P-17G-ADP-FF-04 SW	P-17G-ADP-FF-04 PW
Battelle ID	K9614-P	K9615-P	K9616-P	K9617-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.33	0.28	0.40	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(71)	8790.000 D	7910.000 D	9980.000 D	14200.000 D
Cl4(74)	3820.000 D	4630.000 D	3720.000 D	3140.000 D
Cl4(75)	914.000 D	380.000	351.000	1040.000 D
Cl4(77)	233.000	370.000	232.000	302.000
Cl4(80)	143.000 D	40.600	27.100	48.700
Cl4(81)	11.100	20.500	11.200	14.800
Cl5(82)	128.000	204.000	158.000	387.000
Cl5(83)	3350.000 D	3750.000 D	3750.000 D	5810.000 D
Cl5(84)	1730.000 D	3470.000 D	2250.000 D	3610.000 D
Cl5(85)	378.000	716.000	512.000	1280.000 D
Cl5(87)	437.000	965.000	606.000	1930.000 D
Cl5(91)	4960.000 D	6030.000 D	5230.000 D	9110.000 D
Cl5(92)	3020.000 D	2850.000 D	3400.000 D	5070.000 D
Cl5(95)	11000.000 D	11400.000 D	12300.000 D	19000.000 D
Cl5(97)	2480.000 D	2990.000 D	2910.000 D	4640.000 D
Cl5(99)	6940.000 D	9660.000 D	7080.000 D	13100.000 D
Cl5(100)	299.000	399.000	285.000	976.000 D
Cl5(101)	9210.000 D	11900.000 D	11100.000 D	16600.000 D
Cl5(104)	16.700	20.400	16.700	19.000
Cl5(105)	363.000	805.000	542.000	1650.000 D
Cl5(110)	11100.000 D	13500.000 D	12200.000 D	20500.000 D
Cl5(114)	77.300	117.000	93.600	166.000
Cl5(115)	4.410 U	717.000	3.640 U	3.730 U
Cl5(118)	3920.000 D	6550.000 D	4760.000 D	10000.000 D
Cl5(123)	495.000	754.000	567.000	1150.000 D
Cl5(124)	112.000	172.000	145.000	258.000
Cl5(125)	3.160 U	55.800	2.610 U	53.400
Cl5(126)	14.000	20.600	16.200	22.200
Cl5(127)	149.000	78.400	85.200	46.500
Cl6(128)	246.000	440.000	308.000	918.000 D
Cl6(130)	110.000	210.000	116.000	286.000
Cl6(131)	167.000	266.000	188.000	335.000
Cl6(134)	372.000	552.000	413.000	701.000
Cl6(135)	700.000	1180.000	809.000	1560.000 D
Cl6(136)	1020.000 D	1260.000 D	1140.000 D	1980.000 D
Cl6(137)	101.000	207.000	132.000	307.000
Cl6(138)	704.000	1490.000 D	1040.000 D	3060.000 D
Cl6(139)	84.800	152.000	98.300	186.000
Cl6(140)	3.420 U	14.400	8.340	21.400
Cl6(141)	133.000	270.000	188.000	476.000
Cl6(144)	68.600	97.000	80.900	180.000
Cl6(146)	598.000	1170.000	653.000	1280.000 D
Cl6(149)	5670.000 D	7730.000 D	6360.000 D	12200.000 D
Cl6(151)	870.000 D	1220.000 D	834.000	1760.000 D
Cl6(153)	3980.000 D	6680.000 D	4540.000 D	9380.000 D
Cl6(154)	362.000	596.000	411.000	651.000
Cl6(155)	3.080 J	4.150 J	2.720 J	3.030 J
Cl6(156)	180.000	310.000	232.000	517.000
Cl6(157)	31.500	65.000	46.800	122.000
Cl6(158)	261.000	408.000	315.000	598.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-04 SW	P-17G-ADP-DD-04 PW	P-17G-ADP-FF-04 SW	P-17G-ADP-FF-04 PW
Battelle ID	K9614-P	K9615-P	K9616-P	K9617-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.33	0.28	0.40	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(163)	1340.000 D	1720.000 D	1590.000 D	2700.000 D
Cl6(164)	197.000	337.000	247.000	452.000
Cl6(166)	25.200	36.800	25.900	46.000
Cl6(167)	158.000	259.000	185.000	336.000
Cl6(169)	2.910 U	3.430 U	2.400 U	2.460 U
Cl7(170)	126.000	219.000	148.000	327.000
Cl7(171)	40.800	80.800	49.400	109.000
Cl7(172)	25.300	48.900	29.100	54.300
Cl7(173)	4.040 J	12.000	4.180	8.500
Cl7(174)	79.400	144.000	92.700	212.000
Cl7(175)	10.100	21.400	13.100	22.500
Cl7(176)	18.600	31.600	21.400	41.600
Cl7(177)	61.400	116.000	72.900	157.000
Cl7(178)	68.400	114.000	72.000	131.000
Cl7(179)	141.000	227.000	154.000	257.000
Cl7(180)	239.000	432.000	262.000	529.000
Cl7(183)	109.000	195.000	120.000	236.000
Cl7(184)	1.750 U	2.060 U	1.440 U	1.480 U
Cl7(185)	13.600	19.900	14.700	29.400
Cl7(187)	379.000	696.000	406.000	686.000
Cl7(188)	9.190	15.900	9.900	15.400
Cl7(189)	6.500	14.200	8.440	22.700
Cl7(190)	40.800	65.800	45.400	88.000
Cl7(191)	8.960	18.400	9.060	19.600
Cl7(193)	17.000	31.700	25.700	39.000
Cl8(194)	25.800	50.000	30.000	61.300
Cl8(195)	10.700	23.600	11.000	22.600
Cl8(197)	2.090 U	2.460 U	2.640 J	4.300
Cl8(198)	2.740 U	3.230 U	2.260 U	2.320 U
Cl8(199)	28.000	64.600	29.600	54.900
Cl8(200)	3.870 J	8.430	3.310 J	6.880
Cl8(201)	4.650	11.800	4.730	10.300
Cl8(202)	13.900	25.500	14.900	24.900
Cl8(203)	34.200	72.800	36.900	76.200
Cl8(205)	2.740 U	6.490	2.260 U	5.490
Cl9(206)	10.800	24.600	10.400	23.900
Cl9(207)	2.000 U	6.600	2.050 J	3.140 J
Cl9(208)	5.450	9.650	4.970	9.320
Cl10(209)	2.000 U	7.550	1.650 U	3.320 J
LOC 1	253.000	42000.000	57.600	186.000
LOC 2	28600.000	221000.000	24200.000	40100.000
LOC 3	216000.000	298000.000	229000.000	303000.000
LOC 4	197000.000	201000.000	233000.000	308000.000
LOC 5	60200.000	77100.000	68000.000	115000.000
LOC 6	17400.000	26700.000	20000.000	40100.000
LOC 7	1400.000	2500.000	1560.000	2980.000
LOC 8	121.000	263.000	133.000	267.000
LOC 9	16.200	40.800	17.400	36.400
LOC 10	U	7.550	U	3.320
Cl3(38)	51.900	89.400	36.100	50.100

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-DD-04 SW	P-17G-ADP-DD-04 PW	P-17G-ADP-FF-04 SW	P-17G-ADP-FF-04 PW
Battelle ID	K9614-P	K9615-P	K9616-P	K9617-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/29/17	08/29/17	08/29/17	08/29/17
Analysis Date	09/14/17	09/15/17	09/15/17	09/14/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.33	0.28	0.40	0.39
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(78)	136.000	88.400	77.000	45.700
Cl4(79)	109.000	83.600	89.700	36.500
Cl7(186)	325.000	178.000	174.000	78.200

Surrogate Recoveries (%)

Cl3(34)	188 N	179 N	189 N	169 N
Cl6(152)	82	95	92	100

Glossary of Data Qualifiers

Flag:	Application:
B	Analyte concentration found in the sample at a concentration <5x the level found in the procedural blank.
D	Dilution Run. Initial run outside linear range of instrument.
E	Estimate, result is greater than the highest concentration level in the calibration.
H	Surrogate diluted out. Used when surrogate recovery is affected by excessive dilution of the sample extract.
J	Analyte detected below the sample-specific Reporting Limit (RL).
m	Confirmation column manually over-ridden by analyst, dual column quantitative analysis only.
ME	Significant Matrix Interference - Estimated value.
MI	Significant Matrix Interference - value could not be determined or estimated.
n	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO), but meets the contingency criteria.
N	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO)
NA	Not applicable
p	Dual column value exceeds RPD criteria, dual column quantitative analysis only.
T	Holding Time (HT) exceeded.
U	Analyte not detected at 3:1 signal:noise ratio.

QA/QC Summary
Batch 17-0367

Project:	USACE/NAE – NBH Aerovox Passive Samplers
Parameters:	PCB Congeners
Laboratory:	Battelle, Norwell, MA
Matrix:	PED Samples
Data Set:	DP-17-0183
Analytical SOP:	5-315
Method Reference:	EPA Method 8270D-modified/1668A-modified

Sample Custody

Collection Date	Receipt Date	Temp (°C)
8/14/2017	8/21/2017	-20.0

Corrective Actions	None.
Sample Storage	The samples were stored frozen until extraction.
Related samples	None.

METHOD SUMMARIES

Sample Preparation	Prior to processing, the PEDs were examined by the PM and cutting instructions were determined. The PEDs were cut from the frames using solvent cleaned knives/scissors. The individual pieces were gently cleaned with Milli-Q water and Kimwipes, as necessary, and stored in solvent-rinsed foil packets, each ID'ed appropriately with information describing the location of the section on the un-cut PED. Each piece was logged in and assigned a unique ID. The PEDs were extracted by shaker table. The PED was placed in an extraction vessel, spiked with surrogates and extracted three times in hexane. The extracts were combined after each extraction. The sample extracts were concentrated using KD and nitrogen blow down techniques. The sample concentrates were further processed by alumina cleanup, followed copper cleanup and spiked with internal standard. Final extracts were submitted for PCB analyses by GC-MS. PEDs were air dried and weighed after extraction.
Prep comments	K9600: Spilled about 1 mL of this sample (out of ~200 mL total).

Analysis	PCB congeners were measured by gas chromatography-mass spectrometry (GC/MS) in the selected ion mode (SIM). An initial calibration consisting of representative target analytes was analyzed prior to analysis to demonstrate the linear range of analysis. Calibration verification was performed at the beginning and end of each 24 hour period, or every 10 injections, whichever was shortest. Target PCB were quantified vs. internal standards using a quadratic regression calculated from the initial calibration.
Analysis Comments	• No ICC exists for PRC compounds. • Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, historical data has reported these as two separate peaks. These peaks are integrated as two separate peaks in all ICAL, ICC, CCV, and field

	samples to comply with the reporting criteria of the historical data. • There are many low failing IS areas in method MW0399. This method is used to quantify PRC compounds and this internal standard is used to quantify one analyte; PCB 186. The samples were also run using MW0396A with similar results. • Many of the undiluted authentic samples fail the IS are for PCB 96 high using methods MF0908 & MF0909. It is likely the high levels of congeners in these samples contribute slightly to the PCB 96 IS area. In addition, most of the analytes reported from PCB 96 are reported from dilution, where PCB 96 passes IS area criterion. It should be noted that the secondary IS passes criteria using these methods. • Sample K9613-P(2) exhibits levels of contamination which render the sample unquantifiable. Data for this sample is reported from dilution only.	
Holding Times	Extraction Date(s)	Analysis Date(s)
	8/29/2017	9/12-15/2017; 9/15-16/2017; 9/15-17/2017

Procedural Blank (PB)	A PB was prepared with this analytical batch to ensure the sample extraction and analysis methods are free of contamination.
Blank value <SSRL Samples >5X PB	No exceedances noted. No comments.

Laboratory Control Spike (LCS)/Laboratory Control Spike Duplicate (LCSD)	A LCS/LCSD pair was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy. The RPDs between replicates were calculated to measure precision
40-120% recovery ≤30%RPD	Two recovery exceedances noted. PCB 137 was recovered high in the LCS and LCSD samples. This congener is one of the lower detected congeners in the authentic samples – never at dilution concentrations in these samples. There is no significant impact to the total PCB.

Surrogate Recovery	Surrogate compounds were added prior to extraction. The surrogate recoveries are calculated to measure extraction efficiency.
40-120% recovery	Twenty exceedances noted. Surrogate PCB 34 was over-recovered in all field samples. The second SIS in each of these samples was acceptable. Likely something (high lower-chlorinated PCB levels) related to the exposed PED impacted the early-eluting surrogate. Not noted in QC samples. All data reviewed. No further corrective actions taken.

Initial Calibration (ICAL)	The GC/MS was calibrated with six-level quadratic non-forced calibration curve for all compounds using a quadratic regression (R^2). A six-level quadratic non-forced calibration curve was used for PRC PCB compounds.
$R^2 \geq 0.995$	No exceedances noted.
	No comments.

Independent Calibration Check (ICC)	The independent check was run after each initial calibration to verify the calibration. This standard is from a different source than the ICAL.
≤ 25% difference individual and mean	No exceedances noted.
	No comments.

Continuing Calibration Verification (CCV)	Continuing calibration standards were run every 24 hours or every 10 injections, whichever is shortest, to ensure that initial calibration is still valid.
≤ 25% difference individual; ≤15% difference mean	No exceedances noted.
	No comments.

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It can be done

Report Project Data Set MQOs

Project Title: USACE/NAE New Bedford Harbor Task

Data Set Number: DP-17-0183

Project Number: 100043429

Prep Batch Number: 17-0367

Test Code (Matrix Type): Master_315(PRC)(S)

QC_PARAMETER:	Exceed:	Contg.:	JUSTIFICATION:
Procedural Blank	0	0	None
PB Measurement Quality Objective	0	0	None
Laboratory Control Sample	2	0	PCB 137 high in the LCS&LSCD. This congener is significantly lower than other congeners detected in the authentic samples. There is no significant impact to the total PCB. RR 09/18/2017
Matrix Spike Recovery	NA	NA	NA
Matrix Spike/Spike Duplicate Precision	0	0	None
Standard Reference Material Accuracy	NA	NA	NA
Analytical Duplicate Precision	NA	NA	NA
Analytical Triplicate Precision	NA	NA	NA
Surrogate Compound Recovery	20	0	High levels of congeners in the authentic samples lead to over recovery of PCB 34. The second SIS compound, PCB 152, is acceptable in all samples, indicating both the extraction and the instrument are in control. RR 09/18/2017
Control Oil	NA	NA	NA
Instrument Calibration	0	0	None
Independent Calibration Check Solution	0	0	None
Continuing Calibration Verification	0	0	None

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BATTELLE - NORWELL OPERATIONS
MISCELLANEOUS DOCUMENTATION FORM

Project Title:	USACE/NAE New Bedford Harbor Task	**Data Set Number:**	DP-17-0183
Project Number:	100043429	**Prep Batch Number:**	17-0367
Entered By:	Richard Restucci Jr	**Entered On:**	09/18/2017
Test Code (Matrix Type):	Master_315(PRC)(S)		

Integrations by Lauren Griffith, Mike Meara, and Rich Restucci.
RR 9/18/17

Method MF0908 is used to quant select samples and dilutions for 315 method congeners.
Method MF0909 is used to quant remaining samples and tertiary dilutions for 315 method congeners.
Method MW0399 is used to quant all samples for PRC compounds.
RR 9/18/17

No ICC exists for PRC compounds.
RR 9/18/17

Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, historical data has reported these as two separate peaks. These peaks are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data.
RR 9/18/17

CCV F4175 will not report properly in LIMS. The Enviroquant percent difference report is provided.
RR 9/18/17

There are many low failing IS areas in method MW0399. This method is used to quantify PRC compounds and this internal standard is used to quantify one analyte; PCB 186. The samples were also run using MW0396A with similar results.
RR 9/18/17

Many of the undiluted authentic samples fail the IS are for PCB 96 high using methods MF0908 & MF0909. It is likely the high levels of congeners in these samples contribute slightly to the PCB 96 IS area. In addition, most of the analytes reported from PCB 96 are reported from dilution, where PCB 96 passes IS area criterion. It should be noted that the secondary IS passes criteria using these methods.
RR 9/18/17

Sample K9613-P(2) exhibits levels of contamination which render the sample unquantifiable for many congeners. Only PRC data are reported from the original, undiluted sample. All other data are reported from dilution.
RR 9/18/17

Samples were weighed using 5 decimal places, but concentrations are calculated using a sample weight value of 2 decimal places.
RR 9/19/17

Task Leader Approval:		Robert Lizotte, Jr. 2017.09.21 16:17:48 -04'00'
SupervisorApproval:		Robert Lizotte, Jr. 2017.09.21 16:18:09 -04'00'
PM Approval:		

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0908.S	F4100.D	JM67	CS	Cl5(96)		18269
SF0908.S	F4101.D	JM68	CS	Cl5(96)		19731
SF0908.S	F4102.D	JM69	CS	Cl5(96)		21181
SF0908.S	F4103.D	JM70	CS	Cl5(96)		22053
SF0908.S	F4104.D	JM71	CS	Cl5(96)		23178
SF0908.S	F4105.D	JM72	CS	Cl5(96)		21675
					L3	21181
					(+)	42362
					(-)	10591

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4106.D	JG69 ICC	ICC	Cl5(96)	21166	
SF0908.S	F4123.D	JM71	CCV	Cl5(96)	28059	
SF0908.S	F4124.D	CM912PB-P(0)	PB	Cl5(96)	18141	
SF0908.S	F4125.D	CM913LCS-P(0)	LCS	Cl5(96)	17491	
SF0908.S	F4126.D	CM914LCSD-P(0)	LCSD	Cl5(96)	18175	
SF0908.S	F4127.D	K9598-P(2)	SA	Cl5(96)	50423	>
SF0908.S	F4128.D	K9598-P-D(4)	SA	Cl5(96)	27501	
SF0908.S	F4129.D	K9598-P-D(5)	SA	Cl5(96)	26097	
SF0908.S	F4130.D	K9599-P(2)	SA	Cl5(96)	63215	>
SF0908.S	F4131.D	K9599-P-D(4)	SA	Cl5(96)	26423	
SF0908.S	F4132.D	K9599-P-D(5)	SA	Cl5(96)	23334	
SF0908.S	F4134.D	JM70	CCV	Cl5(96)	25619	
SF0908.S	F4135.D	K9600-P(2)	SA	Cl5(96)	43235	>
SF0908.S	F4136.D	K9600-P-D(4)	SA	Cl5(96)	23605	
SF0908.S	F4137.D	K9600-P-D(5)	SA	Cl5(96)	22745	
SF0908.S	F4138.D	K9601-P(2)	SA	Cl5(96)	55166	>
SF0908.S	F4139.D	K9601-P-D(4)	SA	Cl5(96)	24861	
SF0908.S	F4140.D	K9601-P-D(5)	SA	Cl5(96)	20735	
SF0908.S	F4142.D	K9602-P-D(4)	SA	Cl5(96)	21778	
SF0908.S	F4143.D	K9602-P-D(5)	SA	Cl5(96)	19736	
SF0908.S	F4145.D	JM70	CCV	Cl5(96)	21869	
SF0908.S	F4146.D	K9603-P(2)	SA	Cl5(96)	46235	>
SF0908.S	F4147.D	K9603-P-D(4)	SA	Cl5(96)	21954	
SF0908.S	F4148.D	K9603-P-D(5)	SA	Cl5(96)	19432	
SF0908.S	F4149.D	K9604-P(2)	SA	Cl5(96)	36293	
SF0908.S	F4150.D	K9604-P-D(4)	SA	Cl5(96)	20194	
SF0908.S	F4151.D	K9604-P-D(5)	SA	Cl5(96)	18927	
SF0908.S	F4152.D	K9605-P(2)	SA	Cl5(96)	35735	
SF0908.S	F4153.D	K9605-P-D(4)	SA	Cl5(96)	20928	
SF0908.S	F4155.D	JM71	CCV	Cl5(96)	22282	
SF0908.S	F4156.D	K9605-P-D(5)	SA	Cl5(96)	18516	
SF0908.S	F4157.D	K9606-P(2)	SA	Cl5(96)	40253	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4158.D	K9606-P-D(4)	SA	Cl5(96)	20236	
SF0908.S	F4159.D	K9606-P-D(5)	SA	Cl5(96)	18554	
SF0908.S	F4160.D	K9607-P(2)	SA	Cl5(96)	42273	
SF0908.S	F4161.D	K9607-P-D(4)	SA	Cl5(96)	20251	
SF0908.S	F4162.D	K9607-P-D(5)	SA	Cl5(96)	18169	
SF0908.S	F4163.D	K9608-P(2)	SA	Cl5(96)	40192	
SF0908.S	F4165.D	JM70	CCV	Cl5(96)	21101	
SF0908.S	F4166.D	K9608-P-D(4)	SA	Cl5(96)	19211	
SF0908.S	F4167.D	K9608-P-D(5)	SA	Cl5(96)	17864	
SF0908.S	F4168.D	K9617-P(2)	SA	Cl5(96)	55614	>
SF0908.S	F4169.D	K9617-P-D(4)	SA	Cl5(96)	21734	
SF0908.S	F4170.D	K9617-P-D(5)	SA	Cl5(96)	17605	
SF0908.S	F4171.D	K9614-P(2)	SA	Cl5(96)	34434	
SF0908.S	F4172.D	K9614-P-D(4)	SA	Cl5(96)	20745	
SF0908.S	F4173.D	K9614-P-D(5)	SA	Cl5(96)	16663	
SF0908.S	F4180.D	K9613-P-D(4)	SA	Cl5(96)	29413	
SF0908.S	F4181.D	K9613-P-D(6)	SA	Cl5(96)	14808	
SF0908.S	F4182.D	K9613-P-D(7)	SA	Cl5(96)	15099	
SF0908.S	F4185.D	JM70	CCV	Cl5(96)	15065	
SF0908.S	F4186.D	K9609-P-D(4)	SA	Cl5(96)	13716	
SF0908.S	F4187.D	K9609-P-D(6)	SA	Cl5(96)	12789	
SF0908.S	F4188.D	K9610-P(2)	SA	Cl5(96)	36259	
SF0908.S	F4189.D	K9610-P-D(4)	SA	Cl5(96)	15324	
SF0908.S	F4190.D	K9610-P-D(6)	SA	Cl5(96)	13247	
SF0908.S	F4191.D	K9611-P(2)	SA	Cl5(96)	34046	
SF0908.S	F4192.D	K9611-P-D(4)	SA	Cl5(96)	14602	
SF0908.S	F4193.D	K9611-P-D(6)	SA	Cl5(96)	13086	
SF0908.S	F4195.D	JM70	CCV	Cl5(96)	14766	
SF0908.S	F4196.D	K9612-P(2)	SA	Cl5(96)	43902	>
SF0908.S	F4197.D	K9612-P-D(4)	SA	Cl5(96)	15893	
SF0908.S	F4198.D	K9612-P-D(6)	SA	Cl5(96)	13303	
SF0908.S	F4199.D	K9616-P(2)	SA	Cl5(96)	29537	
SF0908.S	F4200.D	K9616-P-D(4)	SA	Cl5(96)	14222	
SF0908.S	F4201.D	K9616-P-D(6)	SA	Cl5(96)	13351	
SF0908.S	F4204.D	JM70	CCV	Cl5(96)	15615	
SF0908.S	F4175.D	JM70	CCV	Cl5(96)	18821	

RR 9/18/17

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0908.S	F4100.D	JM67	CS	Cl6(161)		12275
SF0908.S	F4101.D	JM68	CS	Cl6(161)		13517
SF0908.S	F4102.D	JM69	CS	Cl6(161)		14294
SF0908.S	F4103.D	JM70	CS	Cl6(161)		14852
SF0908.S	F4104.D	JM71	CS	Cl6(161)		15219
SF0908.S	F4105.D	JM72	CS	Cl6(161)		13424
					L3	14294
					(+)	28588
					(-)	7147

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4106.D	JG69 ICC	ICC	Cl6(161)	14042	
SF0908.S	F4123.D	JM71	CCV	Cl6(161)	19287	
SF0908.S	F4124.D	CM912PB-P(0)	PB	Cl6(161)	13196	
SF0908.S	F4125.D	CM913LCS-P(0)	LCS	Cl6(161)	12205	
SF0908.S	F4126.D	CM914LCSD-P(0)	LCSD	Cl6(161)	12732	
SF0908.S	F4127.D	K9598-P(2)	SA	Cl6(161)	13884	
SF0908.S	F4128.D	K9598-P-D(4)	SA	Cl6(161)	17829	
SF0908.S	F4129.D	K9598-P-D(5)	SA	Cl6(161)	18258	
SF0908.S	F4130.D	K9599-P(2)	SA	Cl6(161)	12533	
SF0908.S	F4131.D	K9599-P-D(4)	SA	Cl6(161)	14754	
SF0908.S	F4132.D	K9599-P-D(5)	SA	Cl6(161)	16150	
SF0908.S	F4134.D	JM70	CCV	Cl6(161)	17505	
SF0908.S	F4135.D	K9600-P(2)	SA	Cl6(161)	12864	
SF0908.S	F4136.D	K9600-P-D(4)	SA	Cl6(161)	14790	
SF0908.S	F4137.D	K9600-P-D(5)	SA	Cl6(161)	16029	
SF0908.S	F4138.D	K9601-P(2)	SA	Cl6(161)	11325	
SF0908.S	F4139.D	K9601-P-D(4)	SA	Cl6(161)	13852	
SF0908.S	F4140.D	K9601-P-D(5)	SA	Cl6(161)	14524	
SF0908.S	F4142.D	K9602-P-D(4)	SA	Cl6(161)	12688	
SF0908.S	F4143.D	K9602-P-D(5)	SA	Cl6(161)	13542	
SF0908.S	F4145.D	JM70	CCV	Cl6(161)	15237	
SF0908.S	F4146.D	K9603-P(2)	SA	Cl6(161)	9858	
SF0908.S	F4147.D	K9603-P-D(4)	SA	Cl6(161)	12857	
SF0908.S	F4148.D	K9603-P-D(5)	SA	Cl6(161)	13388	
SF0908.S	F4149.D	K9604-P(2)	SA	Cl6(161)	9270	
SF0908.S	F4150.D	K9604-P-D(4)	SA	Cl6(161)	12064	
SF0908.S	F4151.D	K9604-P-D(5)	SA	Cl6(161)	12916	
SF0908.S	F4152.D	K9605-P(2)	SA	Cl6(161)	9419	
SF0908.S	F4153.D	K9605-P-D(4)	SA	Cl6(161)	12517	
SF0908.S	F4155.D	JM71	CCV	Cl6(161)	15214	
SF0908.S	F4156.D	K9605-P-D(5)	SA	Cl6(161)	12640	
SF0908.S	F4157.D	K9606-P(2)	SA	Cl6(161)	9916	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4158.D	K9606-P-D(4)	SA	Cl6(161)	12336	
SF0908.S	F4159.D	K9606-P-D(5)	SA	Cl6(161)	12411	
SF0908.S	F4160.D	K9607-P(2)	SA	Cl6(161)	10224	
SF0908.S	F4161.D	K9607-P-D(4)	SA	Cl6(161)	11737	
SF0908.S	F4162.D	K9607-P-D(5)	SA	Cl6(161)	12078	
SF0908.S	F4163.D	K9608-P(2)	SA	Cl6(161)	10144	
SF0908.S	F4165.D	JM70	CCV	Cl6(161)	14730	
SF0908.S	F4166.D	K9608-P-D(4)	SA	Cl6(161)	11300	
SF0908.S	F4167.D	K9608-P-D(5)	SA	Cl6(161)	12131	
SF0908.S	F4168.D	K9617-P(2)	SA	Cl6(161)	9280	
SF0908.S	F4169.D	K9617-P-D(4)	SA	Cl6(161)	11316	
SF0908.S	F4170.D	K9617-P-D(5)	SA	Cl6(161)	11814	
SF0908.S	F4171.D	K9614-P(2)	SA	Cl6(161)	10304	
SF0908.S	F4172.D	K9614-P-D(4)	SA	Cl6(161)	13153	
SF0908.S	F4173.D	K9614-P-D(5)	SA	Cl6(161)	11081	
SF0908.S	F4180.D	K9613-P-D(4)	SA	Cl6(161)	8093	
SF0908.S	F4181.D	K9613-P-D(6)	SA	Cl6(161)	9187	
SF0908.S	F4182.D	K9613-P-D(7)	SA	Cl6(161)	10301	
SF0908.S	F4185.D	JM70	CCV	Cl6(161)	10394	
SF0908.S	F4186.D	K9609-P-D(4)	SA	Cl6(161)	7871	
SF0908.S	F4187.D	K9609-P-D(6)	SA	Cl6(161)	8648	
SF0908.S	F4188.D	K9610-P(2)	SA	Cl6(161)	7361	
SF0908.S	F4189.D	K9610-P-D(4)	SA	Cl6(161)	8997	
SF0908.S	F4190.D	K9610-P-D(6)	SA	Cl6(161)	9220	
SF0908.S	F4191.D	K9611-P(2)	SA	Cl6(161)	7161	
SF0908.S	F4192.D	K9611-P-D(4)	SA	Cl6(161)	8448	
SF0908.S	F4193.D	K9611-P-D(6)	SA	Cl6(161)	9022	
SF0908.S	F4195.D	JM70	CCV	Cl6(161)	10435	
SF0908.S	F4196.D	K9612-P(2)	SA	Cl6(161)	7422	
SF0908.S	F4197.D	K9612-P-D(4)	SA	Cl6(161)	8462	
SF0908.S	F4198.D	K9612-P-D(6)	SA	Cl6(161)	9400	
SF0908.S	F4199.D	K9616-P(2)	SA	Cl6(161)	7221	
SF0908.S	F4200.D	K9616-P-D(4)	SA	Cl6(161)	8633	
SF0908.S	F4201.D	K9616-P-D(6)	SA	Cl6(161)	9366	
SF0908.S	F4204.D	JM70	CCV	Cl6(161)	11088	
SF0908.S	F4175.D	JM70	CCV	Cl6(161)	13011	

RR 9/18/17

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It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0909.S	F4206.D	JM67	CS	Cl5(96)		11375
SF0909.S	F4207.D	JM68	CS	Cl5(96)		10438
SF0909.S	F4208.D	JM69	CS	Cl5(96)		12911
SF0909.S	F4209.D	JM70	CS	Cl5(96)		13717
SF0909.S	F4210.D	JM71	CS	Cl5(96)		12888
SF0909.S	F4211.D	JM72	CS	Cl5(96)		13836
					L3	12911
					(+)	25822
					(-)	6456

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4212.D	JG69 ICC	ICC	Cl5(96)	13357	
SF0909.S	F4213.D	K9609-P(2)	SA	Cl5(96)	28724	>
SF0909.S	F4214.D	K9602-P(2)	SA	Cl5(96)	24120	
SF0909.S	F4215.D	K9615-P(2)	SA	Cl5(96)	20792	
SF0909.S	F4216.D	K9615-P-D(4)	SA	Cl5(96)	12434	
SF0909.S	F4217.D	K9615-P-D(6)	SA	Cl5(96)	13142	
SF0909.S	F4218.D	K9598-P-D(7)	SA	Cl5(96)	11947	
SF0909.S	F4219.D	K9599-P-D(7)	SA	Cl5(96)	11238	
SF0909.S	F4220.D	K9600-P-D(7)	SA	Cl5(96)	11365	
SF0909.S	F4222.D	JM70	CCV	Cl5(96)	11279	
SF0909.S	F4223.D	K9601-P-D(7)	SA	Cl5(96)	11148	
SF0909.S	F4224.D	K9602-P-D(7)	SA	Cl5(96)	10027	
SF0909.S	F4225.D	K9603-P-D(7)	SA	Cl5(96)	9393	
SF0909.S	F4226.D	K9606-P-D(7)	SA	Cl5(96)	8801	
SF0909.S	F4227.D	K9607-P-D(7)	SA	Cl5(96)	9414	
SF0909.S	F4228.D	K9608-P-D(7)	SA	Cl5(96)	9307	
SF0909.S	F4230.D	K9612-P-D(7)	SA	Cl5(96)	9415	
SF0909.S	F4232.D	JM71	CCV	Cl5(96)	13042	
SF0909.S	F4233.D	K9614-P-D(7)	SA	Cl5(96)	10615	
SF0909.S	F4234.D	K9615-P-D(7)	SA	Cl5(96)	11095	
SF0909.S	F4235.D	K9617-P-D(7)	SA	Cl5(96)	11228	
SF0909.S	F4237.D	JM70	CCV	Cl5(96)	13017	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0909.S	F4206.D	JM67	CS	Cl6(161)		7513
SF0909.S	F4207.D	JM68	CS	Cl6(161)		6792
SF0909.S	F4208.D	JM69	CS	Cl6(161)		9267
SF0909.S	F4209.D	JM70	CS	Cl6(161)		9169
SF0909.S	F4210.D	JM71	CS	Cl6(161)		8736
SF0909.S	F4211.D	JM72	CS	Cl6(161)		9365
					L3	9267
					(+)	18534
					(-)	4634

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4212.D	JG69 ICC	ICC	Cl6(161)	9337	
SF0909.S	F4213.D	K9609-P(2)	SA	Cl6(161)	6681	
SF0909.S	F4214.D	K9602-P(2)	SA	Cl6(161)	5341	
SF0909.S	F4215.D	K9615-P(2)	SA	Cl6(161)	5949	
SF0909.S	F4216.D	K9615-P-D(4)	SA	Cl6(161)	7906	
SF0909.S	F4217.D	K9615-P-D(6)	SA	Cl6(161)	9122	
SF0909.S	F4218.D	K9598-P-D(7)	SA	Cl6(161)	8238	
SF0909.S	F4219.D	K9599-P-D(7)	SA	Cl6(161)	7806	
SF0909.S	F4220.D	K9600-P-D(7)	SA	Cl6(161)	7737	
SF0909.S	F4222.D	JM70	CCV	Cl6(161)	7713	
SF0909.S	F4223.D	K9601-P-D(7)	SA	Cl6(161)	7551	
SF0909.S	F4224.D	K9602-P-D(7)	SA	Cl6(161)	6775	
SF0909.S	F4225.D	K9603-P-D(7)	SA	Cl6(161)	6283	
SF0909.S	F4226.D	K9606-P-D(7)	SA	Cl6(161)	5877	
SF0909.S	F4227.D	K9607-P-D(7)	SA	Cl6(161)	6281	
SF0909.S	F4228.D	K9608-P-D(7)	SA	Cl6(161)	6236	
SF0909.S	F4230.D	K9612-P-D(7)	SA	Cl6(161)	6485	
SF0909.S	F4232.D	JM71	CCV	Cl6(161)	9043	
SF0909.S	F4233.D	K9614-P-D(7)	SA	Cl6(161)	7369	
SF0909.S	F4234.D	K9615-P-D(7)	SA	Cl6(161)	7554	
SF0909.S	F4235.D	K9617-P-D(7)	SA	Cl6(161)	7621	
SF0909.S	F4237.D	JM70	CCV	Cl6(161)	9033	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MW0399.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0399.S	W9161.D	JJ48	CS	Cl5(96)		21033
SW0399.S	W9162.D	JJ49	CS	Cl5(96)		20083
SW0399.S	W9163.D	JJ50	CS	Cl5(96)		19825
SW0399.S	W9164.D	JJ51	CS	Cl5(96)		19072
SW0399.S	W9165.D	JJ52	CS	Cl5(96)		20210
SW0399.S	W9166.D	JJ53	CS	Cl5(96)		18681
					L3	19825
					(+)	39650
					(-)	9913

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:	FLAG:
SW0399.S	W9167.D	CM912PB-P(0)	PB	Cl5(96)		16429	
SW0399.S	W9168.D	CM913LCS-P(0)	LCS	Cl5(96)		9716	<
SW0399.S	W9169.D	CM914LCSD-P(0)	LCSD	Cl5(96)		9301	<
SW0399.S	W9170.D	K9598-P(2)	SA	Cl5(96)		22571	
SW0399.S	W9171.D	K9599-P(2)	SA	Cl5(96)		31635	
SW0399.S	W9172.D	K9600-P(2)	SA	Cl5(96)		25665	
SW0399.S	W9173.D	K9601-P(2)	SA	Cl5(96)		33919	
SW0399.S	W9174.D	K9603-P(2)	SA	Cl5(96)		32695	
SW0399.S	W9175.D	JJ51	CCV	Cl5(96)		19947	
SW0399.S	W9176.D	K9604-P(2)	SA	Cl5(96)		26788	
SW0399.S	W9177.D	K9605-P(2)	SA	Cl5(96)		27063	
SW0399.S	W9178.D	K9606-P(2)	SA	Cl5(96)		23806	
SW0399.S	W9179.D	K9607-P(2)	SA	Cl5(96)		29066	
SW0399.S	W9180.D	K9608-P(2)	SA	Cl5(96)		25207	
SW0399.S	W9181.D	K9617-P(2)	SA	Cl5(96)		35643	
SW0399.S	W9182.D	K9614-P(2)	SA	Cl5(96)		19492	
SW0399.S	W9183.D	JJ52	CCV	Cl5(96)		21789	
SW0399.S	W9209.D	JJ51	CCV	Cl5(96)		15652	
SW0399.S	W9210.D	K9611-P(2)	SA	Cl5(96)		32966	
SW0399.S	W9211.D	K9612-P(2)	SA	Cl5(96)		29058	
SW0399.S	W9212.D	K9616-P(2)	SA	Cl5(96)		19199	
SW0399.S	W9213.D	K9613-P(2)	SA	Cl5(96)		113273	>
SW0399.S	W9214.D	K9610-P(2)	SA	Cl5(96)		30323	
SW0399.S	W9215.D	K9609-P(2)	SA	Cl5(96)		20314	
SW0399.S	W9216.D	K9602-P(2)	SA	Cl5(96)		16368	
SW0399.S	W9217.D	K9615-P(2)	SA	Cl5(96)		17244	
SW0399.S	W9218.D	JJ52	CCV	Cl5(96)		19767	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0367

METHOD: MW0399.M

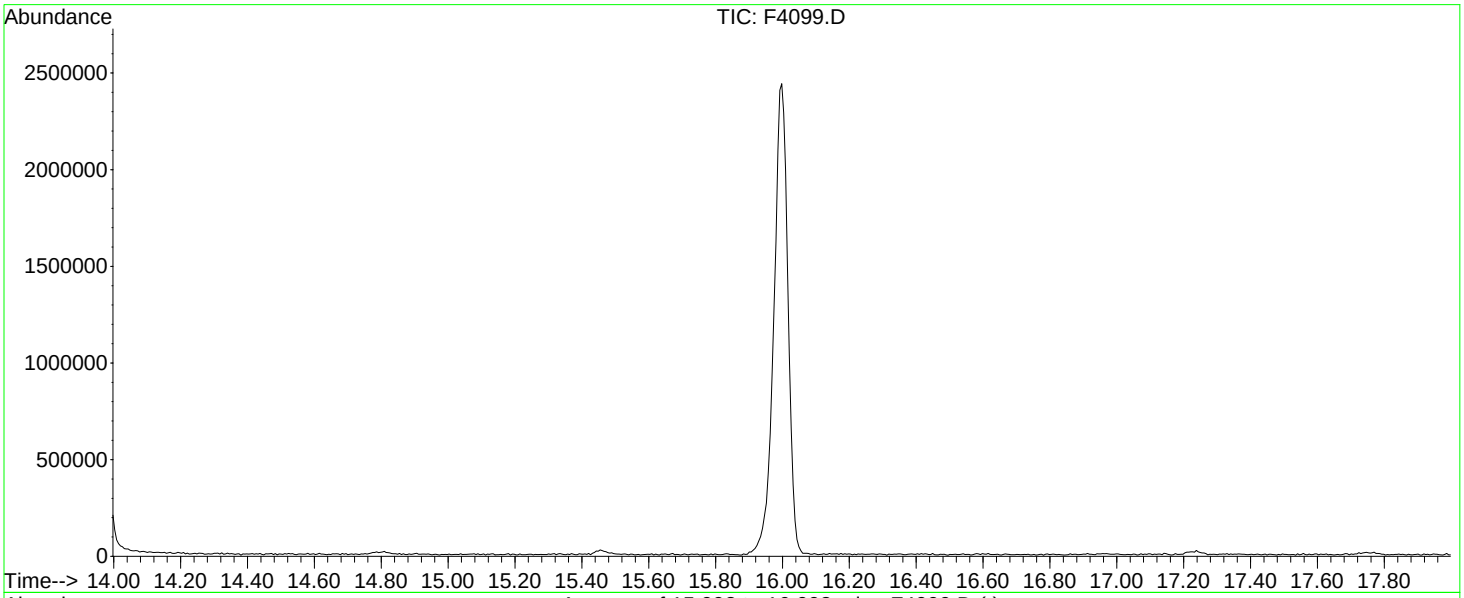
SIGNAL: 1

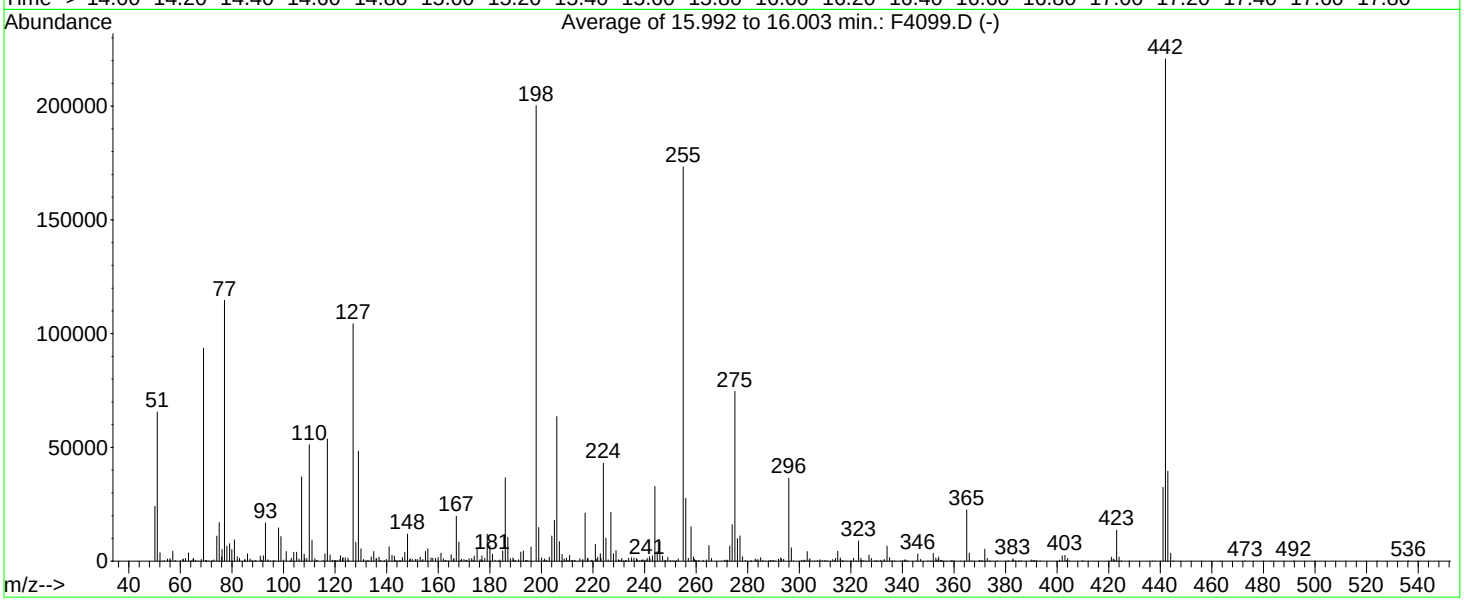
SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0399.S	W9161.D	JJ48	CS	Cl6(161)		14960
SW0399.S	W9162.D	JJ49	CS	Cl6(161)		13783
SW0399.S	W9163.D	JJ50	CS	Cl6(161)		13727
SW0399.S	W9164.D	JJ51	CS	Cl6(161)		12904
SW0399.S	W9165.D	JJ52	CS	Cl6(161)		14006
SW0399.S	W9166.D	JJ53	CS	Cl6(161)		12921
					L3	13727
					(+)	27454
					(-)	6864

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:	
SW0399.S	W9167.D	CM912PB-P(0)	PB	Cl6(161)	11941		
SW0399.S	W9168.D	CM913LCS-P(0)	LCS	Cl6(161)	5895	<	
SW0399.S	W9169.D	CM914LCSD-P(0)	LCSD	Cl6(161)	5529	<	
SW0399.S	W9170.D	K9598-P(2)	SA	Cl6(161)	6388	<	
SW0399.S	W9171.D	K9599-P(2)	SA	Cl6(161)	4923	<	
SW0399.S	W9172.D	K9600-P(2)	SA	Cl6(161)	6311	<	
SW0399.S	W9173.D	K9601-P(2)	SA	Cl6(161)	5450	<	
SW0399.S	W9174.D	K9603-P(2)	SA	Cl6(161)	5237	<	
SW0399.S	W9175.D	JJ51	CCV	Cl6(161)	14956		
SW0399.S	W9176.D	K9604-P(2)	SA	Cl6(161)	6473	<	
SW0399.S	W9177.D	K9605-P(2)	SA	Cl6(161)	5449	<	
SW0399.S	W9178.D	K9606-P(2)	SA	Cl6(161)	5705	<	
SW0399.S	W9179.D	K9607-P(2)	SA	Cl6(161)	6051	<	
SW0399.S	W9180.D	K9608-P(2)	SA	Cl6(161)	5709	<	
SW0399.S	W9181.D	K9617-P(2)	SA	Cl6(161)	5084	<	
SW0399.S	W9182.D	K9614-P(2)	SA	Cl6(161)	5460	<	
SW0399.S	W9183.D	JJ52	CCV	Cl6(161)	15367		
SW0399.S	W9209.D	JJ51	CCV	Cl6(161)	11581		
SW0399.S	W9210.D	K9611-P(2)	SA	Cl6(161)	5337	<	
SW0399.S	W9211.D	K9612-P(2)	SA	Cl6(161)	4593	<	
SW0399.S	W9212.D	K9616-P(2)	SA	Cl6(161)	5003	<	
SW0399.S	W9213.D	K9613-P(2)	SA	Cl6(161)	~~249425~~	~~>~~	3667 < RR 9/21/17
SW0399.S	W9214.D	K9610-P(2)	SA	Cl6(161)	4018	<	
SW0399.S	W9215.D	K9609-P(2)	SA	Cl6(161)	3849	<	
SW0399.S	W9216.D	K9602-P(2)	SA	Cl6(161)	3310	<	
SW0399.S	W9217.D	K9615-P(2)	SA	Cl6(161)	4418	<	
SW0399.S	W9218.D	JJ52	CCV	Cl6(161)	14001		

Data File : G:\F\DATA\SF0908\F4099.D
Acq On : 11 Sep 2017 5:27 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0908.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: NA

Vial: 1
Operator: RR
Inst : Inst. F
Multiplr: 1.00



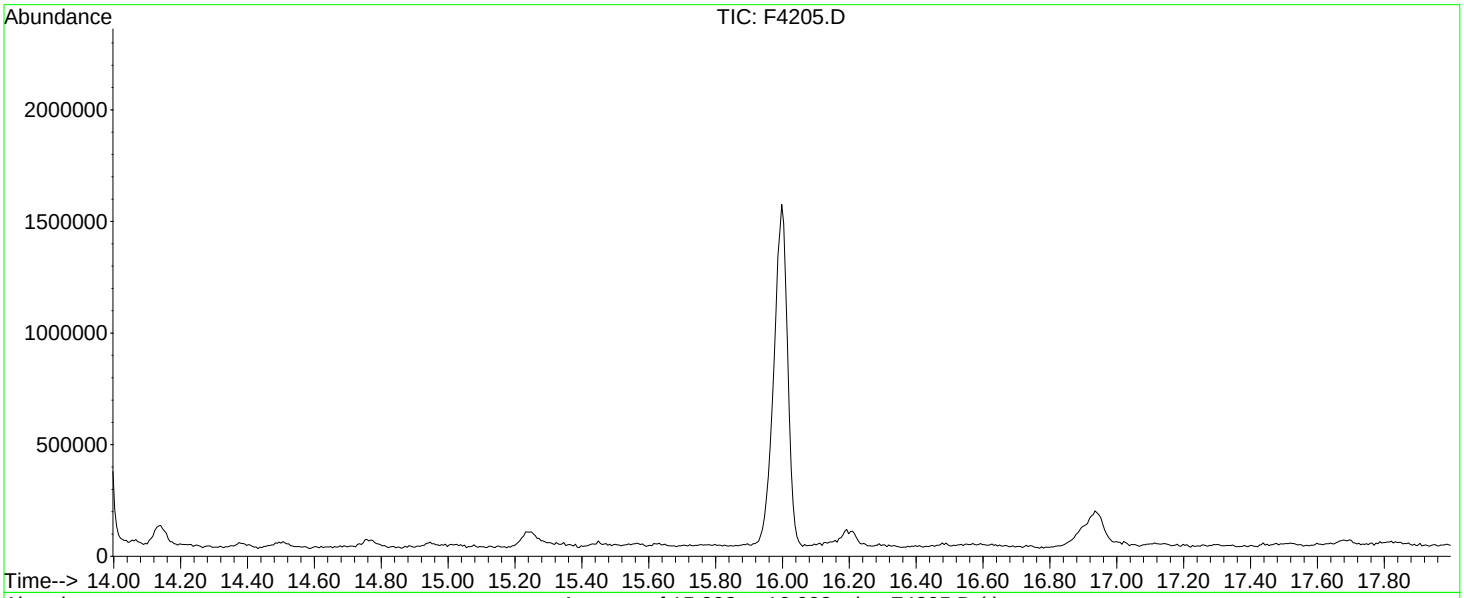


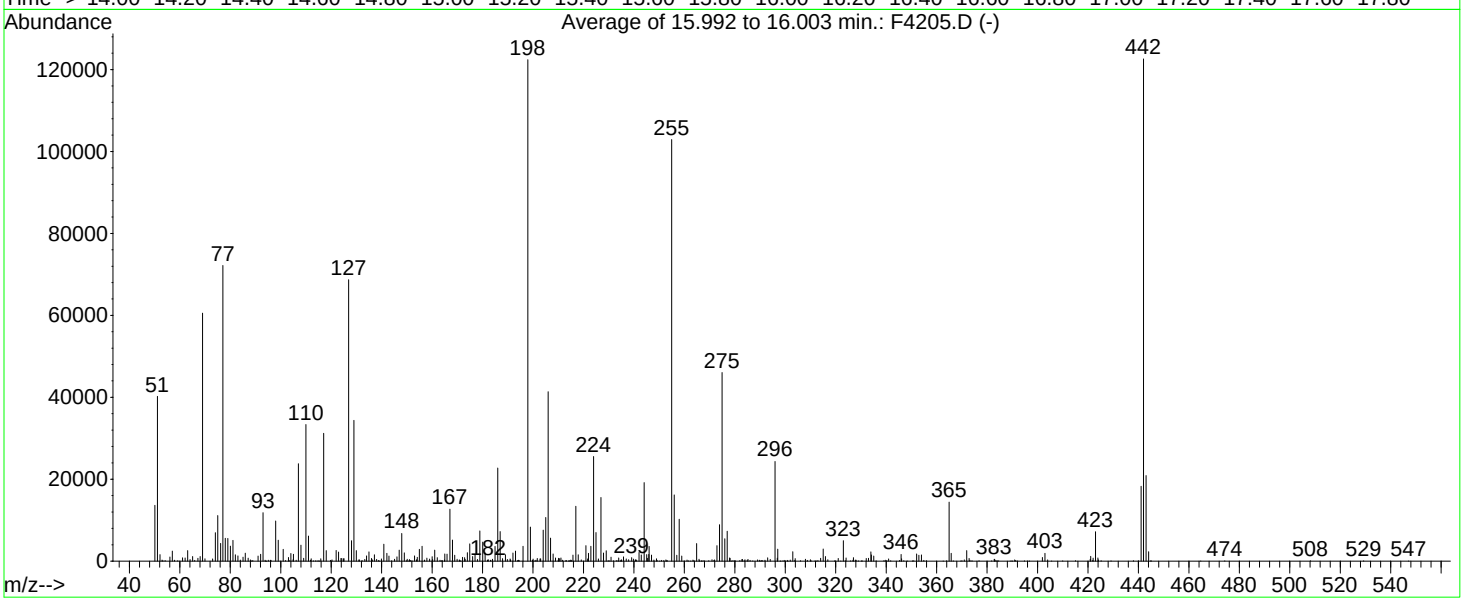
AutoFind: Scans 1909, 1910, 1911; Background Corrected with Scan 1893

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	32.7	65531	PASS
68	69	0.00	2	0.8	771	PASS
70	69	0.00	2	0.4	337	PASS
127	198	10	80	52.1	104288	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	200185	PASS
199	198	5	9	7.4	14862	PASS
275	198	10	60	37.3	74613	PASS
365	198	1	1000	11.3	22552	PASS
441	442	0.01	24	14.7	32437	PASS
442	198	50	1000	110.3	220757	PASS
443	442	15	24	17.9	39535	PASS

Data File : G:\F\DATA\SF0909\F4205.D
Acq On : 15 Sep 2017 1:33 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0909.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: NA

Vial: 1
Operator: LMG
Inst : Inst. F
Multiplr: 1.00



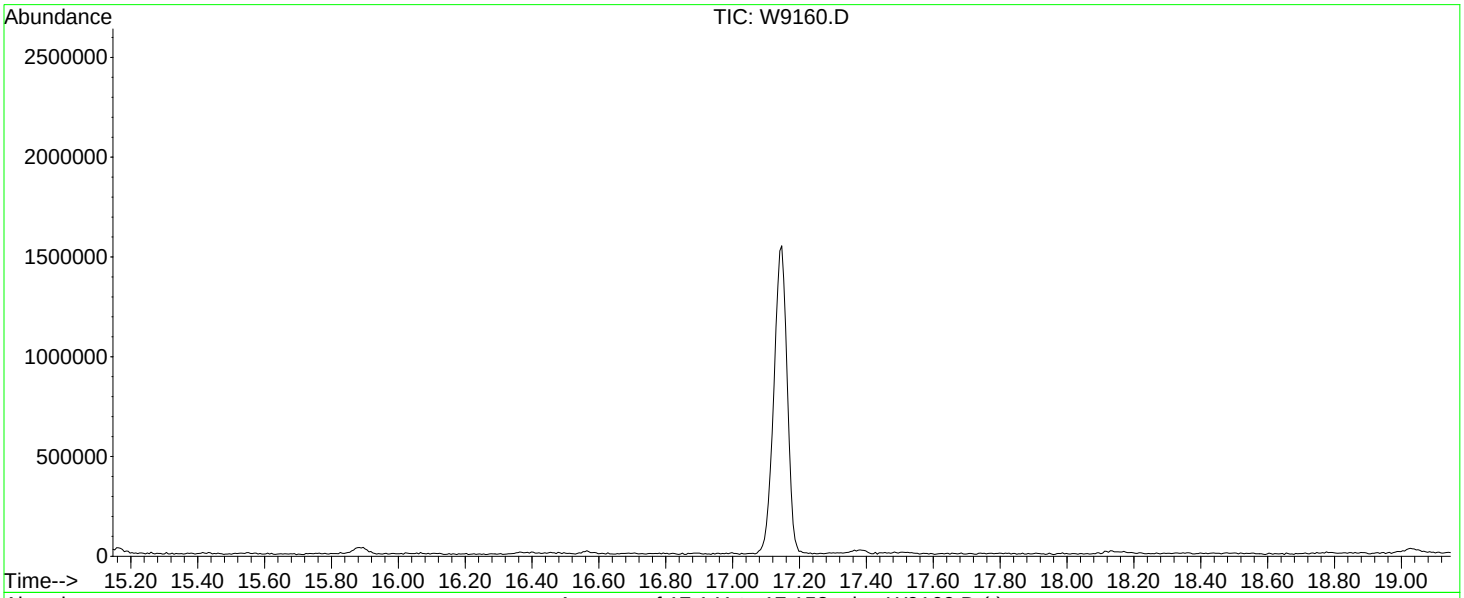


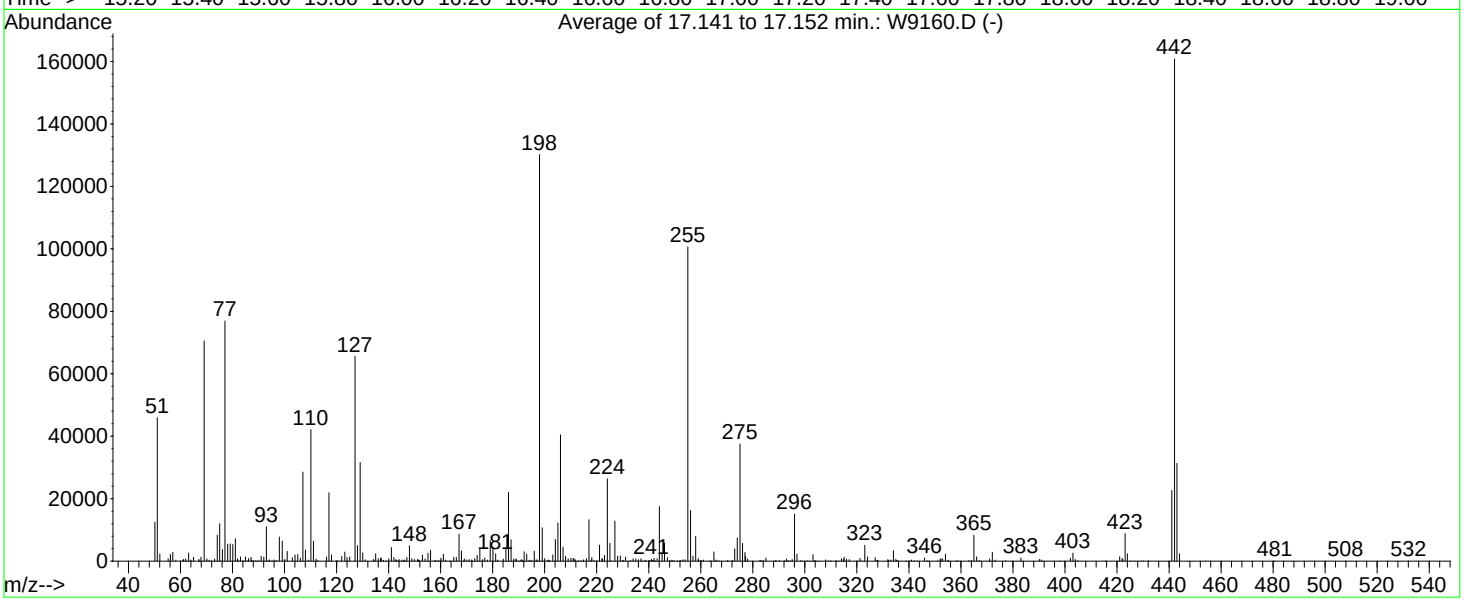
AutoFind: Scans 1909, 1910, 1911; Background Corrected with Scan 1891

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	32.9	40221	PASS
68	69	0.00	2	1.9	1126	PASS
70	69	0.00	2	1.0	604	PASS
127	198	10	80	56.1	68687	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	122400	PASS
199	198	5	9	6.8	8306	PASS
275	198	10	60	37.6	46032	PASS
365	198	1	1000	11.8	14420	PASS
441	442	0.01	24	14.9	18286	PASS
442	198	50	1000	100.2	122605	PASS
443	442	15	24	17.0	20904	PASS

Data File : G:\W\DATA\SW0399\W9160.D
Acq On : 15 Sep 2017 11:19 am
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\W\DATA\MW0399.M (RTE Integrator)
Title : PRC
Standard Mult: NA

Vial: 1
Operator: LMG
Inst : Inst. W
Multiplr: 1.00





AutoFind: Scans 2110, 2111, 2112; Background Corrected with Scan 2094

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	35.3	45952	PASS
68	69	0.00	2	1.8	1269	PASS
70	69	0.00	2	1.0	727	PASS
127	198	10	80	50.3	65538	PASS
197	198	0.00	2	0.4	463	PASS
198	198	100	100	100.0	130218	PASS
199	198	5	9	8.2	10722	PASS
275	198	10	60	28.8	37530	PASS
365	198	1	1000	6.4	8327	PASS
441	442	0.01	24	14.1	22632	PASS
442	198	50	1000	123.5	160832	PASS
443	442	15	24	19.5	31352	PASS

USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0368

Package DP-17-0184

Submitted to:
USACE - North Atlantic Division
696 Virginia Rd.
Concord, MA 017422751 USA

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Analyst Approval: Rich Restucci 2017.09.20 08:58:41 -04'00'

QC Chemist Approval: Carla Devine Digitally signed by devinec@battelle.org DN: cn=devinec@battelle.org Date: 2017.09.21 11:32:50 -04'00'

Project Manager Approval: peven@battelle.org 2017.09.22 08:09:48 -04'00'

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USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0368

Package DP-17-0184

1	***Work Plan*** Laboratory Work Plan, Addendums To Work Plan, Memos From Project Manager, Special Instructions, Chain-of-Custody Reports.	1
2	***Tables*** Analytical Data Tables, Qualifier Definitions.	27
3	***Miscellaneous Documentation*** Case Narrative, Miscellaneous Documentation Form, Quality Control Summary, Example Calculations, Internal Standard Recovery Report, Retention Time Window Report.	58
4	***Sample Preparation Records*** Sample Preparation Records, Dilution Worksheets, Standard Preparation Records, Certificates Of Analysis, GPC Check Report.	N/A
5	***Analytical Calibrations*** Analytical Sequence, Analytical Method, Tune Report, Initial Calibration, Pesticide Degradation Report, RF Summary, Calibration Verifications, Independent Calibration Verification Check.	N/A
6	***Analytical Data*** Raw Data Quantification Reports.	N/A
7	***Chromatograms*** Sample And Standard Chromatograms.	N/A
8	***Unused Data***	N/A

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WORK/QUALITY ASSURANCE PROJECT PLAN

1.0 GENERAL PROJECT INFORMATION

Project Title:	USACE - NBH Aerovox Passive Sampler
Project Number:	100043429
Client:	USACE/NAE 696 Virginia Road Concord, MA 01742 USA
Client Contact Information:	Peter Hugh Engineering Technical Lead (978) 318-8452(V) NA NA
Effective Date of QAPP:	8/21/2017
Version Number:	100043429(S)-12
Project Manager:	Peven-McCarthy, Carole
Laboratory Task Manager:	Peven-McCarthy, Carole
Deliverable Due Date:	9/13/2017

2.0 SCOPE OF WORK

Overview:	Analysis of exposed PEDs to monitor dissolved concentrations of PCB congeners in porewater and surface water. Activity ID: 17T6AVX
Matrix:	Soil/Sediment

2.1 TECHNICAL APPROACH

2.1.1 Sample Receipt, Storage, and Handling

The list of samples for this project plan are presented in Attachment 1.

Storage Directions:	Store refrigerated (up to 14 days from collection) or frozen (up to 1 year) until extraction.
Sub_Sampling:	Yes
Procedures:	PM will lead PED splitting. Each PED will be split into ~4 sections based on PM directives. Each section will receive a unique ID. Photograph each PED during inspection prior to cleaning.
Contact:	NA
Comment:	NA

Archiving: Frozen storage.

Disposal: Standard

2.1.2 Sample Preparation

22 PEDs, 2 samples generated from each - 44 field samples,
4 background PED (2 per each set of 20 PED prepared)
1 PED trip blank

IRAD samples:

Samples Expected:	Samples Per Batch:	Batches Expected:
49	20	3

Batch quality control samples are defined in Table 1.

Target samples are presented in Attachment 1.

Table 1: Quality Control Samples

Type:	*Description:*	*Count:*	*Rgt:*	*Reference:*	*Comment:*
PB	Laboratory control reagent blank.	1 per batch	--	NA	
LCS	Laboratory Control Sample	1 per batch	No	NA	use clean PED for LCS and LCSD
LCSD	Laboratory Control Sample Duplicate	1 per batch	No	NA	use clean PED for LCS and LCSD

2.1.3 Extraction/Preparation

2.1.3.1 Extraction

SOP No.-Rev: **5-192-15**

SOP Title: *Soil/Sediment Extraction for Trace Level Semi-Volatile Organic Contaminant Analysis*

Sample Size: 1 g

SIS and LCS/MS Compounds: Defined in Table 2.

Deviations: 1 g weight is a place holder - an estimate of the weight of the fraction of the PED.

After extraction, dry and weigh the PEDs recording weight to 5 decimal places.

Use undeployed PEDs for LCS and LCSD. They do not necessarily have

to be spiked with PRCs.

Extract in hexane.

Comments: - PM will inspect PEDs and advise prep staff if samples need to be cleaned of biofilm before extraction. Cleaning will be performed by gently wiping PED with Kimwipe and/or rinsing with Milli-Q water.

- Photograph each PED prior to processing.

- PED will be removed from frame by cutting with a clean straight edge knife. Only the exposed portion of the PED will be extracted.

- The PEDs will be cut at the sediment water interface. Consult with PM before cutting PEDs. 6" above and below the interface will be extracted. The remainder will be archived frozen. (Each PED will be split into 4 unique sections; two analyzed, two archived.) New IDs will be assigned to each sample section.

Table 2: SIS and LCS/MS Spiking Level

Standard Type	Standard Contents		Spike Amount (ng)	Volume (uL)	Comment
PCB SIS	JC21	SIS	~ 50 ng	50 uL	NA
PCB LCS Spiking Solution	JG57	LCS/MS	~ 50 ng	100 uL	NA

2.1.3.2 Cleanup

1)	SOP No.-Rev:	**5-329-07**
	SOP Title:	*Alumina Cleanup of Environmental Sample Extracts*
	Deviations:	none
	Comments:	none
2)	SOP No.-Rev:	**5-328-04**
	SOP Title:	*Removal (cleanup) of Sulfur from Environmental Sample Extracts*
	Deviations:	NA
	Comments:	NA

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3)	SOP No.-Rev:	**5-191-11**
	SOP Title:	*Size Exclusion HPLC Cleanup of Environmental Sample Extracts*
	Deviations:	Consult with PM after alumina cleanup. If extracts do not appear to be heavily laiden with matrix, GPC will not be performed.
	Comments:	none

RIS spiking levels are presented in Table 3.

Extract PIV (uL): 500

Table 3: RIS Spiking Level

Standard Type	Standard Contents	Spike Amount (ng)	Volume (uL)	Comment
PCB IS	JD51 RIS	~ 50 ng	50 uL	NA

2.1.4 Instrumental Analysis

The list of analytes along with data quality criteria are presented in Attachment 2.

1)	SOP_No-Rev:	**5-315-11**
	SOP_Title:	*Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode*
	Deviations:	Generate separate standards and calibration curve for PRCs. Reporting in ng/kg (NOTE TO LAB REVIEWERS - what conversion in test code?)
	Comments:	Quadratic calibration curve fitting (not forced).

2.2. DELIVERABLES

Deliverables Due:	9/13/2017
LIMS Reports:	*Yes*
Histograms:	*No*
Excel Tables:	*Yes*
EICs:	*No*
Chromatograms:	*No*
EDDs:	*Yes*
Comments:	New Bedford Harbor EDD required.

Full data package (pdf) required for external validation.
Detailed quant reports are not required.

3.0 QUALITY

The Method Quality Objectives are defined in Attachment 3.

4.0 ORGANIZATION AND COMMUNICATION

4.1 ORGANIZATION

The project team is defined in Table 4. Supervisors may make substitutions with Project Manager concurrence.

Table 4: Project Team and Roles

Staff Member	Role	Comment
Lisa F. Lefkovitz	Project Manager	NA
Samuel A. Guimaraes	Sample Preparation	NA
Richard P. Restucci Jr	GC/MS Analysis	NA
Matt D. Schumitz	Sample Custody	NA
Carla R. Devine	Quality Control Officer	NA

4.2 COMMUNICATION

A kick-off meeting will be held to discuss project scope and goals.

5.0 SCHEDULE

The project schedule is presented in Table 5.

Table 5. Schedule of Laboratory Activities

Activity:	Start Date:	End Date:	TAT (days):	Comment:
Sample Receipt	08/11/2017	08/11/2017	0	NA
Sample Preparation	08/11/2017	08/23/2017	12	NA
Instrument Analysis	08/17/2017	09/07/2017	21	NA
Quality Control Review	09/11/2017	09/12/2017	1	NA
Final Data Reporting	09/12/2017	09/12/2017	0	NA

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6.0 BUDGET

The labor budget for the analytical task is presented in Table 6.

Table 6. Labor Budget (Laboratory Analytical Task)

Labor Activity:	Hours/ Batch:	Batches:	Total Hours:	Comment:
Sample Receipt	3	3	9	Note: The third batch will contain 4 field samples. The associated IR&D samples can be included with these samples for efficiency.
Sample Preparation	40	3	120	NA
Extraction	*32*			
glassware	*8*			
Instrument Analysis	40	3	120	NA
Quality Control Review	4	3	12	NA
Final Data Reporting	2	3	6	NA

7.0 STAFF DEVELOPMENT

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Attachment 1: Target Samples

Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9598	P-17G-ADP-GG-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
2	K9599	P-17G-ADP-G5-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
3	K9600	P-17G-ADP-JJ-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
4	K9601	P-17G-ADP-JJ-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
5	K9602	P-17G-ADP-DD-09 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
6	K9603	P-17G-ADP-DD-09 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
7	K9604	P-17G-ADP-FF-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
8	K9605	P-17G-ADP-FF-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
9	K9606	P-17G-ADP-GG-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
10	K9607	P-17G-ADP-GG-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
11	K9608	P-17G-ADP-HH-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
12	K9609	P-17G-ADP-HH-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
13	K9610	P-17G-ADP-EE-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
14	K9611	P-17G-ADP-EE-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
15	K9612	P-17G-ADP-JJ-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
16	K9613	P-17G-ADP-JJ-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
17	K9614	P-17G-ADP-DD-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
18	K9615	P-17G-ADP-DD-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
19	K9616	P-17G-ADP-FF-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
20	K9617	P-17G-ADP-FF-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
21	K9618	P-17G-ADP-CC-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
22	K9619	P-17G-ADP-CC-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
23	K9620	P-17G-ADP-DD-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
24	K9621	P-17G-ADP-DD-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
25	K9622	P-17G-ADP-CC-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
26	K9623	P-17G-ADP-CC-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
27	K9624	P-17G-ADP-LL-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
28	K9625	P-17G-ADP-LL-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
29	K9626	P-17G-ADP-JJ-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
30	K9627	P-17G-ADP-JJ-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
31	K9628	P-17G-ADP-BB-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
32	K9629	P-17G-ADP-BB-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
33	K9630	P-17G-ADP-BB-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
34	K9631	P-17G-ADP-BB-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
35	K9632	P-17G-ADP-LL-02 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
36	K9633	P-17G-ADP-LL-02 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
37	K9634	P-17G-ADP-HH-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
38	K9635	P-17G-ADP-HH-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
39	K9636	P-17G-ADP-DD-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
40	K9637	P-17G-ADP-DD-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
41	K9638	P-17G-ADP-CC-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			

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Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
42	K9639	P-17G-ADP-CC-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
43	K9640	P-17G-ADP-FF-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
44	K9641	P-17G-ADP-FF-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
45	K9642	TB-081417-01	08/14/2017 12:00 am	PED	F0114 (NA)			

Shipment: **SHP-170823-01**

Status: Approved

Description: PED Blanks

Range: K9645-K9650

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9645	170628AS017	06/28/2017 12:00 am	PED	F0117 (NA)			
2	K9646	170628AS018	06/28/2017 12:00 am	PED	F0117 (NA)			
3	K9649	170628BS017	06/28/2017 12:00 am	PED	F0117 (NA)			
4	K9650	170628BS018	06/28/2017 12:00 am	PED	F0117 (NA)			

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Attachment 2: Test Codes

Project Test Code Name:	Master_315(PRC)
SOP Reference:	5-315 - Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode
Description:	PCB by GC/MS SIM
Matrix:	S - Solid Samples, like soil or sediment, prepared and anlyzed under the same class of detection limits.
Detection Limit Study:	5-315-2015-ssMDL-SF
Instrument:	GCMS
MQO Criteria	USACE/NBH
Standard Report:	Standard Result Report

Method Specific Reporting				Holding Times (days)		Data Flags	
Result Units:	ng/g	***Unit Conversion:***	(none)	***Sample:***	14	***DL_Flag:***	U
Weight Basis:	DRY	***Result Format:***	Significant Figure	***Frozen:***	365	***RL_Flag:***	J
Standard Basis:	RIS	***# of Figures/Digits:***	3	***Extract:***	40	***PB_Flag:***	B
Oil Weight Basis:	No	***Oil Weight Source:***	Oil Weight			***DIL_Flag:***	D
U-Value Substition:	ND=MDL	***Histograms:***	No			***HT_Flag:***	T
ECD_Reporting:	No						

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
1	Cl1(1)	Cl1(1)	T	Cl5(96)	Cl3(34)	Yes	No
2	Cl1(3)	Cl1(3)	T	Cl5(96)	Cl3(34)	Yes	No
3	Cl2(4)	Cl2(4)	T	Cl5(96)	Cl3(34)	Yes	No
4	Cl2(5)	Cl2(5)	T	Cl5(96)	Cl3(34)	Yes	No
5	Cl2(6)	Cl2(6)	T	Cl5(96)	Cl3(34)	Yes	No
6	Cl2(7)	Cl2(7)	T	Cl5(96)	Cl3(34)	Yes	No
7	Cl2(8)	Cl2(8)	T	Cl5(96)	Cl3(34)	Yes	No
8	Cl2(9)	Cl2(9)	T	Cl5(96)	Cl3(34)	Yes	No
9	Cl2(11)	Cl2(11)	T	Cl5(96)	Cl3(34)	Yes	No
10	Cl2(12)	Cl2(12)	T	Cl5(96)	Cl3(34)	Yes	No
11	Cl2(13)	Cl2(13)	T	Cl5(96)	Cl3(34)	Yes	No
12	Cl2(15)	Cl2(15)	T	Cl5(96)	Cl3(34)	Yes	No
13	Cl3(16)	Cl3(16)	T	Cl5(96)	Cl3(34)	Yes	No
14	Cl3(17)	Cl3(17)	T	Cl5(96)	Cl3(34)	Yes	No
15	Cl3(18)	Cl3(18)	T	Cl5(96)	Cl3(34)	Yes	No
16	Cl3(19)	Cl3(19)	T	Cl5(96)	Cl3(34)	Yes	No
17	Cl3(22)	Cl3(22)	T	Cl5(96)	Cl3(34)	Yes	No
18	Cl3(24)	Cl3(24)	T	Cl5(96)	Cl3(34)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
19	Cl3(25)	Cl3(25)	T	Cl5(96)	Cl3(34)	Yes	No
20	Cl3(26)	Cl3(26)	T	Cl5(96)	Cl3(34)	Yes	No
21	Cl3(27)	Cl3(27)	T	Cl5(96)	Cl3(34)	Yes	No
22	Cl3(28)	Cl3(28)	T	Cl5(96)	Cl3(34)	Yes	No
23	Cl3(29)	Cl3(29)	T	Cl5(96)	Cl3(34)	Yes	No
24	Cl3(30)	Cl3(30)	T	Cl5(96)	Cl3(34)	Yes	No
25	Cl3(31)	Cl3(31)	T	Cl5(96)	Cl3(34)	Yes	No
26	Cl3(32)	Cl3(32)	T	Cl5(96)	Cl3(34)	Yes	No
27	Cl3(33)	Cl3(33)	T	Cl5(96)	Cl3(34)	Yes	No
28	Cl3(37)	Cl3(37)	T	Cl5(96)	Cl3(34)	Yes	No
29	Cl4(40)	Cl4(40)	T	Cl5(96)	Cl3(34)	Yes	No
30	Cl4(41)	Cl4(41)	T	Cl5(96)	Cl3(34)	Yes	No
31	Cl4(42)	Cl4(42)	T	Cl5(96)	Cl3(34)	Yes	No
32	Cl4(43)	Cl4(43)	T	Cl5(96)	Cl3(34)	Yes	No
33	Cl4(44)	Cl4(44)	T	Cl5(96)	Cl3(34)	Yes	No
34	Cl4(45)	Cl4(45)	T	Cl5(96)	Cl3(34)	Yes	No
35	Cl4(46)	Cl4(46)	T	Cl5(96)	Cl3(34)	Yes	No
36	Cl4(47)	Cl4(47)	T	Cl5(96)	Cl3(34)	Yes	No
37	Cl4(48)	Cl4(48)	T	Cl5(96)	Cl3(34)	Yes	No
38	Cl4(49)	Cl4(49)	T	Cl5(96)	Cl3(34)	Yes	No
39	Cl4(50)	Cl4(50)	T	Cl5(96)	Cl3(34)	Yes	No
40	Cl4(51)	Cl4(51)	T	Cl5(96)	Cl3(34)	Yes	No
41	Cl4(52)	Cl4(52)	T	Cl5(96)	Cl3(34)	Yes	No
42	Cl4(53)	Cl4(53)	T	Cl5(96)	Cl3(34)	Yes	No
43	Cl4(54)	Cl4(54)	T	Cl5(96)	Cl3(34)	Yes	No
44	Cl4(56)	Cl4(56)	T	Cl5(96)	Cl3(34)	Yes	No
45	Cl4(60)	Cl4(60)	T	Cl6(161)	Cl6(152)	Yes	No
46	Cl4(63)	Cl4(63)	T	Cl5(96)	Cl3(34)	Yes	No
47	Cl4(64)	Cl4(64)	T	Cl5(96)	Cl3(34)	Yes	No
48	Cl4(66)	Cl4(66)	T	Cl5(96)	Cl3(34)	Yes	No
49	Cl4(67)	Cl4(67)	T	Cl5(96)	Cl3(34)	Yes	No
50	Cl4(70)	Cl4(70)	T	Cl5(96)	Cl3(34)	Yes	No
51	Cl4(71)	Cl4(71)	T	Cl5(96)	Cl3(34)	Yes	No
52	Cl4(74)	Cl4(74)	T	Cl5(96)	Cl3(34)	Yes	No
53	Cl4(75)	Cl4(75)	T	Cl5(96)	Cl3(34)	Yes	No
54	Cl4(77)	Cl4(77)	T	Cl6(161)	Cl6(152)	Yes	No
55	Cl4(80)	Cl4(80)	T	Cl5(96)	Cl3(34)	Yes	No
56	Cl4(81)	Cl4(81)	T	Cl6(161)	Cl6(152)	Yes	No
57	Cl5(82)	Cl5(82)	T	Cl6(161)	Cl6(152)	Yes	No
58	Cl5(83)	Cl5(83)	T	Cl6(161)	Cl6(152)	Yes	No
59	Cl5(84)	Cl5(84)	T	Cl5(96)	Cl3(34)	Yes	No
60	Cl5(85)	Cl5(85)	T	Cl6(161)	Cl6(152)	Yes	No
61	Cl5(87)	Cl5(87)	T	Cl6(161)	Cl6(152)	Yes	No
62	Cl5(91)	Cl5(91)	T	Cl5(96)	Cl3(34)	Yes	No
63	Cl5(92)	Cl5(92)	T	Cl5(96)	Cl3(34)	Yes	No
64	Cl5(95)	Cl5(95)	T	Cl5(96)	Cl3(34)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
65	Cl5(97)	Cl5(97)	T	Cl6(161)	Cl6(152)	Yes	No
66	Cl5(99)	Cl5(99)	T	Cl6(161)	Cl6(152)	Yes	No
67	Cl5(100)	Cl5(100)	T	Cl5(96)	Cl3(34)	Yes	No
68	Cl5(101)	Cl5(101)	T	Cl5(96)	Cl3(34)	Yes	No
69	Cl5(104)	Cl5(104)	T	Cl5(96)	Cl3(34)	Yes	No
70	Cl5(105)	Cl5(105)	T	Cl6(161)	Cl6(152)	Yes	No
71	Cl5(110)	Cl5(110)	T	Cl6(161)	Cl6(152)	Yes	No
72	Cl5(114)	Cl5(114)	T	Cl6(161)	Cl6(152)	Yes	No
73	Cl5(115)	Cl5(115)	T	Cl6(161)	Cl6(152)	Yes	No
74	Cl5(118)	Cl5(118)	T	Cl6(161)	Cl6(152)	Yes	No
75	Cl5(123)	Cl5(123)	T	Cl6(161)	Cl6(152)	Yes	No
76	Cl5(124)	Cl5(124)	T	Cl6(161)	Cl6(152)	Yes	No
77	Cl5(125)	Cl5(125)	T	Cl6(161)	Cl6(152)	Yes	No
78	Cl5(126)	Cl5(126)	T	Cl6(161)	Cl6(152)	Yes	No
79	Cl5(127)	Cl5(127)	T	Cl6(161)	Cl6(152)	Yes	No
80	Cl6(128)	Cl6(128)	T	Cl6(161)	Cl6(152)	Yes	No
81	Cl6(130)	Cl6(130)	T	Cl6(161)	Cl6(152)	Yes	No
82	Cl6(131)	Cl6(131)	T	Cl6(161)	Cl6(152)	Yes	No
83	Cl6(134)	Cl6(134)	T	Cl6(161)	Cl6(152)	Yes	No
84	Cl6(135)	Cl6(135)	T	Cl6(161)	Cl6(152)	Yes	No
85	Cl6(136)	Cl6(136)	T	Cl6(161)	Cl6(152)	Yes	No
86	Cl6(137)	Cl6(137)	T	Cl6(161)	Cl6(152)	Yes	No
87	Cl6(138)	Cl6(138)	T	Cl6(161)	Cl6(152)	Yes	No
88	Cl6(139)	Cl6(139)	T	Cl6(161)	Cl6(152)	Yes	No
89	Cl6(140)	Cl6(140)	T	Cl6(161)	Cl6(152)	Yes	No
90	Cl6(141)	Cl6(141)	T	Cl6(161)	Cl6(152)	Yes	No
91	Cl6(144)	Cl6(144)	T	Cl6(161)	Cl6(152)	Yes	No
92	Cl6(146)	Cl6(146)	T	Cl6(161)	Cl6(152)	Yes	No
93	Cl6(149)	Cl6(149)	T	Cl6(161)	Cl6(152)	Yes	No
94	Cl6(151)	Cl6(151)	T	Cl6(161)	Cl6(152)	Yes	No
95	Cl6(153)	Cl6(153)	T	Cl6(161)	Cl6(152)	Yes	No
96	Cl6(154)	Cl6(154)	T	Cl6(161)	Cl6(152)	Yes	No
97	Cl6(155)	Cl6(155)	T	Cl5(96)	Cl3(34)	Yes	No
98	Cl6(156)	Cl6(156)	T	Cl6(161)	Cl6(152)	Yes	No
99	Cl6(157)	Cl6(157)	T	Cl6(161)	Cl6(152)	Yes	No
100	Cl6(158)	Cl6(158)	T	Cl6(161)	Cl6(152)	Yes	No
101	Cl6(163)	Cl6(163)	T	Cl6(161)	Cl6(152)	Yes	No
102	Cl6(164)	Cl6(164)	T	Cl6(161)	Cl6(152)	Yes	No
103	Cl6(166)	Cl6(166)	T	Cl6(161)	Cl6(152)	Yes	No
104	Cl6(167)	Cl6(167)	T	Cl6(161)	Cl6(152)	Yes	No
105	Cl6(169)	Cl6(169)	T	Cl6(161)	Cl6(152)	Yes	No
106	Cl7(170)	Cl7(170)	T	Cl6(161)	Cl6(152)	Yes	No
107	Cl7(171)	Cl7(171)	T	Cl6(161)	Cl6(152)	Yes	No
108	Cl7(172)	Cl7(172)	T	Cl6(161)	Cl6(152)	Yes	No
109	Cl7(173)	Cl7(173)	T	Cl6(161)	Cl6(152)	Yes	No
110	Cl7(174)	Cl7(174)	T	Cl6(161)	Cl6(152)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
111	Cl7(175)	Cl7(175)	T	Cl6(161)	Cl6(152)	Yes	No
112	Cl7(176)	Cl7(176)	T	Cl6(161)	Cl6(152)	Yes	No
113	Cl7(177)	Cl7(177)	T	Cl6(161)	Cl6(152)	Yes	No
114	Cl7(178)	Cl7(178)	T	Cl6(161)	Cl6(152)	Yes	No
115	Cl7(179)	Cl7(179)	T	Cl6(161)	Cl6(152)	Yes	No
116	Cl7(180)	Cl7(180)	T	Cl6(161)	Cl6(152)	Yes	No
117	Cl7(183)	Cl7(183)	T	Cl6(161)	Cl6(152)	Yes	No
118	Cl7(184)	Cl7(184)	T	Cl6(161)	Cl6(152)	Yes	No
119	Cl7(185)	Cl7(185)	T	Cl6(161)	Cl6(152)	Yes	No
120	Cl7(187)	Cl7(187)	T	Cl6(161)	Cl6(152)	Yes	No
121	Cl7(188)	Cl7(188)	T	Cl6(161)	Cl6(152)	Yes	No
122	Cl7(189)	Cl7(189)	T	Cl6(161)	Cl6(152)	Yes	No
123	Cl7(190)	Cl7(190)	T	Cl6(161)	Cl6(152)	Yes	No
124	Cl7(191)	Cl7(191)	T	Cl6(161)	Cl6(152)	Yes	No
125	Cl7(193)	Cl7(193)	T	Cl6(161)	Cl6(152)	Yes	No
126	Cl8(194)	Cl8(194)	T	Cl6(161)	Cl6(152)	Yes	No
127	Cl8(195)	Cl8(195)	T	Cl6(161)	Cl6(152)	Yes	No
128	Cl8(197)	Cl8(197)	T	Cl6(161)	Cl6(152)	Yes	No
129	Cl8(198)	Cl8(198)	T	Cl6(161)	Cl6(152)	Yes	No
130	Cl8(199)	Cl8(199)	T	Cl6(161)	Cl6(152)	Yes	No
131	Cl8(200)	Cl8(200)	T	Cl6(161)	Cl6(152)	Yes	No
132	Cl8(201)	Cl8(201)	T	Cl6(161)	Cl6(152)	Yes	No
133	Cl8(202)	Cl8(202)	T	Cl6(161)	Cl6(152)	Yes	No
134	Cl8(203)	Cl8(203)	T	Cl6(161)	Cl6(152)	Yes	No
135	Cl8(205)	Cl8(205)	T	Cl6(161)	Cl6(152)	Yes	No
136	Cl9(206)	Cl9(206)	T	Cl6(161)	Cl6(152)	Yes	No
137	Cl9(207)	Cl9(207)	T	Cl6(161)	Cl6(152)	Yes	No
138	Cl9(208)	Cl9(208)	T	Cl6(161)	Cl6(152)	Yes	No
139	Cl10(209)	Cl10(209)	T	Cl6(161)	Cl6(152)	Yes	No
140	LOC 1	LOC 1	T	Cl5(96)	Cl3(34)	Yes	No
141	LOC 2	LOC 2	T	Cl5(96)	Cl3(34)	Yes	No
142	LOC 3	LOC 3	T	Cl5(96)	Cl3(34)	Yes	No
143	LOC 4	LOC 4	T	Cl5(96)	Cl3(34)	Yes	No
144	LOC 5	LOC 5	T	Cl5(96)	Cl3(34)	Yes	No
145	LOC 6	LOC 6	T	Cl6(161)	Cl6(152)	Yes	No
146	LOC 7	LOC 7	T	Cl6(161)	Cl6(152)	Yes	No
147	LOC 8	LOC 8	T	Cl6(161)	Cl6(152)	Yes	No
148	LOC 9	LOC 9	T	Cl6(161)	Cl6(152)	Yes	No
149	LOC 10	LOC 10	T			Yes	No
150	Cl3(38)	Cl3(38)	T	Cl5(96)		No	No
151	Cl4(78)	Cl4(78)	T	Cl5(96)		No	No
152	Cl4(79)	Cl4(79)	T	Cl5(96)		No	No
153	Cl7(186)	Cl7(186)	T	Cl6(161)		No	No
1	Cl3(34)	Cl3(34)	SIS	Cl5(96)		No	No
2	Cl6(152)	Cl6(152)	SIS	Cl6(161)		No	No

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Total Analytes: 155

Subtract Peaks:

None

Sum Peaks:

Compound:	LOC 1				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl1(1)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl1(3)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 2**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl2(4)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(5)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(6)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(7)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(8)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(9)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(11)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(12)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(13)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(15)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 3**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl3(16)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(17)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(18)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(19)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(22)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(24)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(25)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(26)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(27)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(28)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(29)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl3(30)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(31)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(32)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(33)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(37)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(38)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 4**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl4(40)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 4**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl4(41)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(42)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(43)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(44)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(45)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(46)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(47)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(48)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(49)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(50)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(51)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(52)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(53)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(54)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(56)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(60)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(63)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(64)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(66)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(67)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(70)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(71)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(74)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(75)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(77)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(80)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(81)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(78)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl4(79)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 5**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl5(82)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(83)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(84)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(85)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(87)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(91)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(92)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(95)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(97)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(99)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(100)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(101)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(104)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 5**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl5(105)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(110)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(114)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(115)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(118)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(123)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(124)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(125)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(126)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(127)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 6**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl6(128)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(130)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(131)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(134)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(135)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(136)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(137)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(138)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(139)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(140)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(141)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(144)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(146)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(149)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(151)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(153)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(154)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(155)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(156)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(157)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(158)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(163)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(164)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(166)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(167)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(169)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(170)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(171)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(172)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(173)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(174)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(175)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(176)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(177)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(178)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(179)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(180)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(183)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(184)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(185)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(187)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(188)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(189)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(190)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(191)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(193)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(186)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 8**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl8(194)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(195)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(197)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(198)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(199)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(200)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(201)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(202)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(203)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(205)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 9**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl9(206)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(207)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(208)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 10**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl10(209)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

ICAL Acceptance Criteria:

Curve Fit:	Limit Mean(%):	Mean Qual:	Limit Ind.:	Ind. Qual:	Min Points:	Points Qual:	Comments:
Linear	NA	NA	0.995	N	5	N	y = Bx + C
Average RF	15	N	25	N	5	N	y = Bx
Linear (0,0)	NA	NA	0.995	N	5	N	y = Bx + 0
Quadratic	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + C
Quadratic (0,0)	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + 0

Continuing Calibration Verification Criteria:

CCV Name: 5-315

Frequency Hrs:	Mean PD(%):	Individual PD(%):	RIS/SIS RT Window (min):	Area Limit Low(%):	Area Limit High(%):	Comment:
24 (N)	15 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Independent Calibration Verification:

ICC Name: 5-315

Mean PD Limit(%):	Ind. PD Limit(%):	RIS/SIS Window Limit (Secs):	Area Limit High(%):	Area Limit Low(%):	Comment:
25 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Mass Discrimination Criteria:

None

Degredation Check Criteria:

Degredation Check Name: 5-315

DDT Breakdown Limit (%):	Endrin Breakdown Limit(%):	Total Breakdown Limit(%):	Comment:
20 (N)	20 (N)	20 (N)	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Procedural Blank	Samples must be greater than five times the blank concentration (>5xPB).	B	Review with Project Manager; re-analyze or justify results in project records.
PB Measurement Quality Objective	Organic results in the Procedural Blank are less than the ssRL (<ssRL)	N	
Laboratory Control Sample	Recovery values 40-120%.	N	Review with project manager; re-analyze or justify reporting the results in project records.
Matrix Spike Recovery	Organics 40-120%. Analyte concentration in MS must be greater than five times reported background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Matrix Spike/Spike Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Spike must be >5x background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Standard Reference Material Accuracy	Organics Percent Difference less than 30% from a range of certified values on average. Analyte concentration must be greater than five times the Method Detection Limit (>5xMDL).	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the MDL	n	
Analytical Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	
Analytical Triplicate Precision	Organics results less than 30% Relative Standard Deviation (RSD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Surrogate Compound Recovery	Recovery results between 40% and 120%.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
Control Oil	RPD < 30% for at least 90% of analytes	N n	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Instrument Calibration	5-315-11: R-squared greater than or equal to 0.995 Mean RSD less than or equal to 15%, Individual RSD less than or equal to 25%	N	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Independent Calibration Check Solution	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 25%.	N	Review with Project Manager; re-analyze or justify in project records.
Continuing Calibration Verification	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 15%.	N	

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ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form

Approved: ☐ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Hand Delivered **Tracking Number:** na

COC Forms: ☑ **Shipped with samples** ☐ **No Forms**

Cooler(s)/Box(es)

Cntr	Type	Tracking No.	Seal	Seal	Container	Therm.	Temp C	Smps
1 of 1	Cardboard Box		None	Intact	Intact	Therm_2	-20.0	45

Samples

Sample Labels:
☑ Sample labels agree with COC forms
☐ Discrepancies (see Sample Custody Corrective Action Form)

Container Seals:
☐ Tape ☐ Custody Seals ☐ Other Seals (See sample Log)
☑ Seals intact for each shipping container
☐ Seals broken (See sample log for impacted samples)

Condition of Samples:
☑ Sample containers intact
☐ Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): -20 Temperature Blank used ☐ Yes ☑ No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: ☐ Yes ☐ No ☑ Unknown

Initial pH 5-9?: ☐ Yes ☐ No ☑ NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: ☐ Yes ☐ No ☑ NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: ☐ Yes ☐ No ☑ NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: ☐ Yes ☐ No ☑ Unknown /Lot No.: UnKnown

Storage Location: Custody: Freezer - F0114 (NA) **BDO IDs Assigned:** K9598 - K9642

Samples logged in by: Schumitz, Matt **Date/Time:** 08/21/2017 3:15 PM

Approved By: **Approved On:**

Authorized By: **Authorized On:**

BATTELLE

It can be done

ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form Details

Approved: ☐ **Authorized** ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9598	P-17G-ADP-GG-05 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9599	P-17G-ADP-G5-05 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9600	P-17G-ADP-JJ-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9601	P-17G-ADP-JJ-07 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9602	P-17G-ADP-DD-09 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9603	P-17G-ADP-DD-09 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9604	P-17G-ADP-FF-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9605	P-17G-ADP-FF-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9606	P-17G-ADP-GG-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9607	P-17G-ADP-GG-04 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9608	P-17G-ADP-HH-07 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9609	P-17G-ADP-HH-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9610	P-17G-ADP-EE-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9611	P-17G-ADP-EE-04 PW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9612	P-17G-ADP-JJ-05 SW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9613	P-17G-ADP-JJ-05 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9614	P-17G-ADP-DD-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9615	P-17G-ADP-DD-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9616	P-17G-ADP-FF-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9617	P-17G-ADP-FF-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9618	P-17G-ADP-CC-07 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9619	P-17G-ADP-CC-07 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9620	P-17G-ADP-DD-05 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9621	P-17G-ADP-DD-05 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9622	P-17G-ADP-CC-04 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9623	P-17G-ADP-CC-04 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9624	P-17G-ADP-LL-03 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9625	P-17G-ADP-LL-03 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			

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ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form Details

Approved: ☐ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9626	P-17G-ACP-JJ-03 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9627	P-17G-ACP-JJ-03 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9628	P-17G-ACP-BB-05 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9629	P-17G-ACP-BB-05 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9630	P-17G-ACP-BB-07 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9631	P-17G-ACP-BB-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9632	P-17G-ACP-LL-02 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9633	P-17G-ACP-LL-02 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9634	P-17G-ACP-HH-05 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9635	P-17G-ACP-HH-05 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9636	P-17G-ACP-DD-07 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9637	P-17G-ACP-DD-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9638	P-17G-ACP-CC-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9639	P-17G-ACP-CC-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9640	P-17G-ACP-FF-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9641	P-17G-ACP-FF-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9642	TB-081417-01	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			

Total Samples: 45

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Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:	Preservative	COC #
		Analysis: PCB Long	Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	PCB Long	COC #
P-17G-ADP-GG05 SW	8/14/17			PED	1	1	K9598
P-17G-ADP-GG05 PW	↓			↓	1	1	K9599
P-17G-ADP-JJ07 SW					1	1	K9600
P-17G-ADP-JJ07 PW					1	1	" "01
P-17G-ADP-DD09 SW					1	1	02
P-17G-ADP-DD09 PW					1	1	03
P-17G-ADP-FF07 SW					1	1	04
P-17G-ADP-FF07 PW					1	1	05
P-17G-ADP-GG04 SW					1	1	06
P-17G-ADP-GG04 PW					1	1	07
P-17G-ADP-HH07 SW					1	1	08
P-17G-ADP-HH07 PW					1	1	09
P-17G-ADP-EE04 SW	↓			↓	1	1	10

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[signature]	Battelle	8/21/2017 3:15pm	[signature]	Battelle	8/27/17 315
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovoy Project No.: 100043429-17TGAVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:	Preservative	COC #
		Analysis: PCB Long	Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	PCB Long	Page#
P-17G-ADP-EE04 PW	8/14/17			PSD	1	✓	K9611
P-17G-ADP-JJ05 SW					1	✓	" "12
P-17G-ADP-JJ05 PW					1	✓	13
P-17G-ADP-DD04 SW					1	✓	14
P-17G-ADP-DD04 PW					1	✓	15
P-17G-ADP-FF04 SW					1	✓	16
P-17G-ADP-FF04 PW					1	✓	17
P-17G-ADP-CC07 SW					1	✓	18
P-17G-ADP-CC07 PW					1	✓	19
P-17G-ADP-DD05 SW					1	✓	20
P-17G-ADP-DD05 PW					1	✓	21
P-17G-ADP-CC04 SW					1	✓	22
P-17G-ADP-CC04 PW					1	✓	23

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign)	Company	Date/Time	Received by (Print/Sign)	Company	Date/Time
CSPMay [signature]	Battelle	8/21/2017 3:15pm	Matt Schmitz [signature]	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Preservative	Analysis: PCB Congeners	COC #	Page#
P-17G-ADP-LL03 SW	8/14/17			PED	1		✓	K9624	
P-17G-ADP-LL03 PW					1		✓	" "	25
P-17G-ADP-JJ03 SW					1		✓		26
P-17G-ADP-JJ03 PW					1		✓		27
P-17G-ADP-BB05 SW					1		✓		28
P-17G-ADP-BB05 PW					1		✓		29
P-17G-ADP-BB07 SW					1		✓		30
P-17G-ADP-BB07 PW					1		✓		31
P-17G-ADP-LL02 SW					1		✓		32
P-17G-ADP-LL02 PW					1		✓		33
P-17G-ADP-HH05 SW					1		✓		34
P-17G-ADP-HH05 PW					1		✓		35
P-17G-ADP-DD07 SW					1		✓		36

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[illegible]	Battelle	8/21/2017 3:15pm	Matt Schumate	Battelle	8/21/17 315
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6 AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Analysis: PCB Long	COC #
P-17G-ADP-DD07 PW	8/14/17			PEO	1	✓	K9637
P-17G-ADP-UU05 SW	↓			↓	1	✓	" 38
P-17G-ADP-CC-05 PW					1	✓	39
P-17G-ADP-FF-05 SW					1	✓	40
P-17G-ADP-FF-05 PW					1	✓	41
TB-081417-01					1	✓	42

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[signature]	Battelle	8/21/2017 3:15pm	Matt Schumte [signature]	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM915PB-P
Sample Type	PB
Collection Date	08/23/2017
Extraction Date	08/23/2017
Analysis Date	09/16/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.38
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl1(1)	2.14 U
Cl1(3)	3.38 U
Cl2(4)	1.43 U
Cl2(5)	2.21 U
Cl2(6)	0.846 U
Cl2(7)	3.51 U
Cl2(8)	5.21 U
Cl2(9)	4.04 U
Cl2(11)	3.25 U
Cl2(12)	3.51 U
Cl2(13)	1.82 U
Cl2(15)	3.25 U
Cl3(16)	4.24 U
Cl3(17)	2.80 U
Cl3(18)	1.82 U
Cl3(19)	3.05 U
Cl3(22)	3.18 U
Cl3(24)	1.63 U
Cl3(25)	4.42 U
Cl3(26)	1.50 U
Cl3(27)	1.82 U
Cl3(28)	3.45 U
Cl3(29)	1.76 U
Cl3(30)	2.67 U
Cl3(31)	1.90 U
Cl3(32)	2.67 U
Cl3(33)	3.38 U
Cl3(37)	4.24 U
Cl4(40)	4.82 U
Cl4(41)	4.10 U
Cl4(42)	3.18 U
Cl4(43)	3.71 U
Cl4(44)	2.41 U
Cl4(45)	2.08 U
Cl4(46)	2.93 U
Cl4(47)	2.14 U
Cl4(48)	2.80 U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM915PB-P
Sample Type	PB
Collection Date	08/23/2017
Extraction Date	08/23/2017
Analysis Date	09/16/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.38
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl4(49)	3.51 U
Cl4(50)	1.63 U
Cl4(51)	1.57 U
Cl4(52)	3.25 U
Cl4(53)	1.82 U
Cl4(54)	2.47 U
Cl4(56)	2.08 U
Cl4(60)	2.47 U
Cl4(63)	2.93 U
Cl4(64)	2.47 U
Cl4(66)	3.18 U
Cl4(67)	1.70 U
Cl4(70)	3.38 U
Cl4(71)	1.76 U
Cl4(74)	2.74 U
Cl4(75)	2.80 U
Cl4(77)	3.25 U
Cl4(80)	2.01 U
Cl4(81)	2.01 U
Cl5(82)	2.01 U
Cl5(83)	2.14 U
Cl5(84)	3.32 U
Cl5(85)	5.59 U
Cl5(87)	1.90 U
Cl5(91)	2.93 U
Cl5(92)	2.47 U
Cl5(95)	1.57 U
Cl5(97)	2.67 U
Cl5(99)	1.76 U
Cl5(100)	2.14 U
Cl5(101)	2.14 U
Cl5(104)	1.17 U
Cl5(105)	3.13 U
Cl5(110)	2.34 U
Cl5(114)	2.14 U
Cl5(115)	3.45 U
Cl5(118)	2.74 U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM915PB-P
Sample Type	PB
Collection Date	08/23/2017
Extraction Date	08/23/2017
Analysis Date	09/16/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.38
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl5(123)	2.67 U
Cl5(124)	1.70 U
Cl5(125)	2.47 U
Cl5(126)	2.74 U
Cl5(127)	5.47 U
Cl6(128)	2.60 U
Cl6(130)	2.41 U
Cl6(131)	1.57 U
Cl6(134)	2.47 U
Cl6(135)	1.63 U
Cl6(136)	1.30 U
Cl6(137)	3.64 U
Cl6(138)	3.25 U
Cl6(139)	3.45 U
Cl6(140)	2.67 U
Cl6(141)	1.82 U
Cl6(144)	1.95 U
Cl6(146)	4.04 U
Cl6(149)	1.95 U
Cl6(151)	2.28 U
Cl6(153)	4.10 U
Cl6(154)	1.82 U
Cl6(155)	1.95 U
Cl6(156)	3.25 U
Cl6(157)	3.25 U
Cl6(158)	1.82 U
Cl6(163)	2.41 U
Cl6(164)	1.43 U
Cl6(166)	1.24 U
Cl6(167)	10.9 U
Cl6(169)	2.28 U
Cl7(170)	2.41 U
Cl7(171)	2.01 U
Cl7(172)	1.63 U
Cl7(173)	2.28 U
Cl7(174)	3.00 U
Cl7(175)	1.63 U

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM915PB-P
Sample Type	PB
Collection Date	08/23/2017
Extraction Date	08/23/2017
Analysis Date	09/16/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.38
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl7(176)	1.43	U
Cl7(177)	1.95	U
Cl7(178)	2.87	U
Cl7(179)	1.95	U
Cl7(180)	3.51	U
Cl7(183)	1.70	U
Cl7(184)	1.37	U
Cl7(185)	2.14	U
Cl7(187)	0.976	U
Cl7(188)	1.57	U
Cl7(189)	2.28	U
Cl7(190)	2.21	U
Cl7(191)	2.80	U
Cl7(193)	1.37	U
Cl8(194)	4.17	U
Cl8(195)	1.76	U
Cl8(197)	1.63	U
Cl8(198)	2.14	U
Cl8(199)	3.18	U
Cl8(200)	2.14	U
Cl8(201)	1.63	U
Cl8(202)	1.43	U
Cl8(203)	2.08	U
Cl8(205)	2.14	U
Cl9(206)	3.38	U
Cl9(207)	1.57	U
Cl9(208)	1.70	U
Cl10(209)	1.57	U
LOC 1		U
LOC 2		U
LOC 3		U
LOC 4		U
LOC 5		U
LOC 6		U
LOC 7		U
LOC 8		U
LOC 9		U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM915PB-P
Sample Type	PB
Collection Date	08/23/2017
Extraction Date	08/23/2017
Analysis Date	09/16/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.38
Size Unit-Basis	G_DRY
Units	NG/G_DRY

LOC 10		U
Cl3(38)	5.25	
Cl4(78)		U
Cl4(79)		U
Cl7(186)		U

Surrogate Recoveries (%)	
Cl3(34)	117
Cl6(152)	116

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM916LCS-P				CM917LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/23/2017				08/23/2017					
Extraction Date	08/23/2017				08/23/2017					
Analysis Date	09/16/2017				09/16/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.12				1.30					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl1(1)	34.6	44.69	77		28.2	38.50	73		5.3	
Cl1(3)	34.3	44.96	76		28.4	38.73	73		4.0	
Cl2(4)	36.3	44.64	81		29.3	38.46	76		6.4	
Cl2(5)	38.2	44.78	85		30.8	38.58	80		6.1	
Cl2(6)	33.4	44.38	75		27.5	38.23	72		4.1	
Cl2(7)	33.3	44.73	74		36.2	38.54	94		23.8	
Cl2(8)	39.0	44.46	88		32.2	38.31	84		4.7	
Cl2(9)	35.9	44.24	81		33.5	38.12	88		8.3	
Cl2(11)	37.0	44.38	83		29.7	38.23	78		6.2	
Cl2(12)	35.9	44.82	80		29.0	38.62	75		6.5	
Cl2(13)	39.3	44.91	88		31.9	38.69	82		7.1	
Cl2(15)	38.3	44.73	86		30.7	38.54	80		7.2	
Cl3(16)	43.1	44.51	97		33.6	38.35	88		9.7	
Cl3(17)	39.3	44.64	88		31.4	38.46	82		7.1	
Cl3(18)	37.3	44.96	83		30.4	38.73	78		6.2	
Cl3(19)	39.1	44.64	88		32.0	38.46	83		5.8	
Cl3(22)	38.9	44.64	87		31.5	38.46	82		5.9	
Cl3(24)	36.6	44.46	82		28.3	38.31	74		10.3	
Cl3(25)	40.7	44.91	91		32.6	38.69	84		8.0	
Cl3(26)	39.8	44.29	90		32.0	38.15	84		6.9	
Cl3(27)	39.3	44.55	88		31.6	38.38	82		7.1	
Cl3(28)	39.2	45.18	87		31.4	38.92	81		7.1	
Cl3(29)	38.9	44.69	87		31.0	38.50	81		7.1	
Cl3(30)	38.7	45.00	86		30.6	38.77	79		8.5	
Cl3(31)	40.5	44.96	90		32.5	38.73	84		6.9	
Cl3(32)	40.2	44.33	91		32.1	38.19	84		8.0	
Cl3(33)	39.0	44.20	88		32.4	38.08	85		3.5	
Cl3(37)	38.2	44.87	85		32.0	38.65	83		2.4	
Cl4(40)	34.9	44.29	79		31.6	38.15	83		4.9	
Cl4(41)	39.3	44.42	88		30.3	38.27	79		10.8	
Cl4(42)	42.8	44.73	96		35.6	38.54	92		4.3	
Cl4(43)	43.5	44.87	97		35.0	38.65	91		6.4	
Cl4(44)	40.4	44.64	91		33.3	38.46	87		4.5	
Cl4(45)	41.2	45.13	91		32.0	38.88	82		10.4	
Cl4(46)	40.0	44.60	90		32.2	38.42	84		6.9	
Cl4(47)	44.8	44.73	100		35.0	38.54	91		9.4	
Cl4(48)	39.8	44.91	89		31.6	38.69	82		8.2	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM916LCS-P				CM917LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/23/2017				08/23/2017					
Extraction Date	08/23/2017				08/23/2017					
Analysis Date	09/16/2017				09/16/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.12				1.30					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl4(49)	39.1	44.69	87		31.8	38.50	83		4.7	
Cl4(50)	39.4	45.00	88		33.1	38.77	85		3.5	
Cl4(51)	36.7	44.73	82		28.6	38.54	74		10.3	
Cl4(52)	40.3	44.55	90		32.0	38.38	83		8.1	
Cl4(53)	40.4	44.20	91		33.2	38.08	87		4.5	
Cl4(54)	38.8	44.60	87		30.7	38.42	80		8.4	
Cl4(56)	39.5	44.69	88		31.6	38.50	82		7.1	
Cl4(60)	37.4	44.29	84		30.2	38.15	79		6.1	
Cl4(63)	40.9	44.73	91		32.8	38.54	85		6.8	
Cl4(64)	42.2	45.00	94		33.6	38.77	87		7.7	
Cl4(66)	38.1	44.78	85		31.6	38.58	82		3.6	
Cl4(67)	41.1	44.82	92		34.1	38.62	88		4.4	
Cl4(70)	42.8	44.91	95		34.2	38.69	88		7.7	
Cl4(71)	41.7	45.00	93		33.8	38.77	87		6.7	
Cl4(74)	41.7	44.78	93		33.6	38.58	87		6.7	
Cl4(75)	36.0	44.60	81		29.0	38.42	75		7.7	
Cl4(77)	36.7	44.69	82		29.7	38.50	77		6.3	
Cl4(80)	44.0	44.46	99		34.8	38.31	91		8.4	
Cl4(81)	32.6	44.69	73		26.9	38.50	70		4.2	
Cl5(82)	35.8	44.29	81		30.3	38.15	79		2.5	
Cl5(83)	40.2	44.78	90		31.3	38.58	81		10.5	
Cl5(84)	43.4	44.64	97		42.5	38.46	111		13.5	
Cl5(85)	40.6	44.29	92		27.3	38.15	72		24.4	
Cl5(87)	37.7	44.64	84		30.7	38.46	80		4.9	
Cl5(91)	44.1	44.46	99		35.7	38.31	93		6.3	
Cl5(92)	43.6	44.51	98		34.9	38.35	91		7.4	
Cl5(95)	41.1	44.55	92		32.8	38.38	85		7.9	
Cl5(97)	36.3	44.33	82		28.4	38.19	74		10.3	
Cl5(99)	36.7	44.51	82		28.7	38.35	75		8.9	
Cl5(100)	43.4	44.87	97		34.5	38.65	89		8.6	
Cl5(101)	40.8	44.69	91		32.5	38.50	84		8.0	
Cl5(104)	41.0	44.73	92		30.9	38.54	80		14.0	
Cl5(105)	35.0	45.00	78		29.9	38.77	77		1.3	
Cl5(110)	36.7	44.64	82		29.4	38.46	76		7.6	
Cl5(114)	34.7	44.82	77		28.3	38.62	73		5.3	
Cl5(115)	36.5	44.60	82		27.9	38.42	73		11.6	
Cl5(118)	36.0	44.91	80		27.9	38.69	72		10.5	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM916LCS-P				CM917LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/23/2017				08/23/2017					
Extraction Date	08/23/2017				08/23/2017					
Analysis Date	09/16/2017				09/16/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.12				1.30					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl5(123)	37.2	44.69	83		30.1	38.50	78		6.2	
Cl5(124)	39.1	44.33	88		31.0	38.19	81		8.3	
Cl5(125)	40.1	44.60	90		31.5	38.42	82		9.3	
Cl5(126)	38.8	44.91	86		30.7	38.69	79		8.5	
Cl5(127)	42.0	44.64	94		34.3	38.46	89		5.5	
Cl6(128)	36.9	44.69	83		29.6	38.50	77		7.5	
Cl6(130)	40.1	44.55	90		31.2	38.38	81		10.5	
Cl6(131)	37.1	44.38	84		30.0	38.23	78		7.4	
Cl6(134)	37.2	44.55	84		30.1	38.38	78		7.4	
Cl6(135)	34.8	44.11	79		28.0	38.00	74		6.5	
Cl6(136)	40.4	44.69	90		31.8	38.50	83		8.1	
Cl6(137)	52.5	44.20	119		42.2	38.08	111		7.0	
Cl6(138)	39.2	44.38	88		30.5	38.23	80		9.5	
Cl6(139)	40.1	44.51	90		31.8	38.35	83		8.1	
Cl6(140)	34.2	44.91	76		26.4	38.69	68		11.1	
Cl6(141)	38.0	44.20	86		30.1	38.08	79		8.5	
Cl6(144)	37.9	44.82	85		30.4	38.62	79		7.3	
Cl6(146)	36.4	44.87	81		29.4	38.65	76		6.4	
Cl6(149)	38.9	44.73	87		30.8	38.54	80		8.4	
Cl6(151)	37.5	44.46	84		28.4	38.31	74		12.7	
Cl6(153)	37.4	44.96	83		29.3	38.73	76		8.8	
Cl6(154)	35.3	45.00	78		27.8	38.77	72		8.0	
Cl6(155)	36.5	44.29	82		29.4	38.15	77		6.3	
Cl6(156)	39.0	45.31	86		30.4	39.04	78		9.8	
Cl6(157)	39.0	44.73	87		29.9	38.54	78		10.9	
Cl6(158)	35.2	44.78	79		27.7	38.58	72		9.3	
Cl6(163)	33.8	44.38	76		26.8	38.23	70		8.2	
Cl6(164)	38.9	44.51	87		30.4	38.35	79		9.6	
Cl6(166)	38.1	44.69	85		28.8	38.50	75		12.5	
Cl6(167)	39.6	45.09	88		30.8	38.85	79		10.8	
Cl6(169)	36.8	44.55	83		29.2	38.38	76		8.8	
Cl7(170)	36.8	44.64	82		27.4	38.46	71		14.4	
Cl7(171)	42.0	44.46	94		32.7	38.31	85		10.1	
Cl7(172)	38.6	45.13	86		31.3	38.88	81		6.0	
Cl7(173)	35.4	44.87	79		27.6	38.65	71		10.7	
Cl7(174)	36.3	44.73	81		28.4	38.54	74		9.0	
Cl7(175)	35.5	44.46	80		27.8	38.31	73		9.2	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM916LCS-P				CM917LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/23/2017				08/23/2017					
Extraction Date	08/23/2017				08/23/2017					
Analysis Date	09/16/2017				09/16/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.12				1.30					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl7(176)	37.6	44.73	84		30.0	38.54	78		7.4	
Cl7(177)	37.3	44.91	83		29.6	38.69	77		7.5	
Cl7(178)	35.8	44.42	81		27.4	38.27	72		11.8	
Cl7(179)	39.8	44.51	89		30.4	38.35	79		11.9	
Cl7(180)	33.4	44.46	75		25.3	38.31	66		12.8	
Cl7(183)	36.9	44.20	83		28.5	38.08	75		10.1	
Cl7(184)	37.9	44.64	85		29.0	38.46	75		12.5	
Cl7(185)	43.1	44.64	97		33.8	38.46	88		9.7	
Cl7(187)	35.1	44.64	79		27.5	38.46	72		9.3	
Cl7(188)	36.1	44.55	81		28.5	38.38	74		9.0	
Cl7(189)	38.8	44.51	87		30.7	38.35	80		8.4	
Cl7(190)	37.1	44.73	83		29.2	38.54	76		8.8	
Cl7(191)	35.6	44.33	80		27.9	38.19	73		9.2	
Cl7(193)	41.5	44.69	93		32.3	38.50	84		10.2	
Cl8(194)	42.6	44.69	95		34.7	38.50	90		5.4	
Cl8(195)	39.4	44.64	88		31.7	38.46	82		7.1	
Cl8(197)	39.0	45.27	86		30.2	39.00	77		11.0	
Cl8(198)	32.6	44.33	74		25.1	38.19	66		11.4	
Cl8(199)	38.7	44.64	87		29.3	38.46	76		13.5	
Cl8(200)	35.4	45.00	79		27.5	38.77	71		10.7	
Cl8(201)	36.9	44.51	83		29.9	38.35	78		6.2	
Cl8(202)	35.4	44.78	79		27.5	38.58	71		10.7	
Cl8(203)	37.3	44.82	83		28.4	38.62	74		11.5	
Cl8(205)	37.5	44.29	85		29.7	38.15	78		8.6	
Cl9(206)	36.6	44.64	82		28.1	38.46	73		11.6	
Cl9(207)	36.1	44.87	80		28.5	38.65	74		7.8	
Cl9(208)	34.6	44.64	78		26.8	38.46	70		10.8	
Cl10(209)	33.5	44.69	75		25.4	38.50	66		12.8	
LOC 1	68.9				56.6					
LOC 2	367				311					
LOC 3	590				474					
LOC 4	1120				902					
LOC 5	901				722					
LOC 6	991				781					
LOC 7	751				585					
LOC 8	375				294					
LOC 9	107				83.4					

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM916LCS-P				CM917LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/23/2017				08/23/2017					
Extraction Date	08/23/2017				08/23/2017					
Analysis Date	09/16/2017				09/16/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.12				1.30					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
LOC 10	33.5				25.4					
Cl3(38)	U				U					
Cl4(78)	U				U					
Cl4(79)	U				U					
Cl7(186)	U				U					
Surrogate Recoveries (%)										
Cl3(34)	98				94					
Cl6(152)	91				84					

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-07 SW	P-17G-ADP-CC-07 PW	P-17G-ADP-DD-05 SW	P-17G-ADP-DD-05 PW
Battelle ID	K9618-P	K9619-P	K9620-P	K9621-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.31	0.41	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	35.000	8800.000 D	25.300	37.200
Cl1(3)	21.600	1800.000 D	18.000	26.500
Cl2(4)	1970.000 D	87000.000 D	1430.000 D	1700.000 D
Cl2(5)	2.210 U	2.710 U	2.050 U	2.100 U
Cl2(6)	6360.000 D	99800.000 D	5160.000 D	5430.000 D
Cl2(7)	77.200	2570.000 D	85.700	91.400
Cl2(8)	6290.000 D	126000.000 D	5090.000 D	5660.000 D
Cl2(9)	405.000 D	7440.000 D	146.000	161.000
Cl2(11)	1000.000 D	8090.000 D	820.000 D	833.000 D
Cl2(12)	5.100	4.310 U	3.260 U	4.070
Cl2(13)	3250.000 D	27800.000 D	2620.000 D	2880.000 D
Cl2(15)	3510.000 D	29400.000 D	2910.000 D	3050.000 D
Cl3(16)	512.000 D	2300.000 D	231.000	674.000 D
Cl3(17)	12300.000 D	77400.000 D	10000.000 D	10100.000 D
Cl3(18)	24800.000 D	178000.000 D	20100.000 D	19100.000 D
Cl3(19)	1430.000 D	17800.000 D	1090.000 D	1160.000 D
Cl3(22)	1790.000 D	6500.000 D	1610.000 D	1980.000 D
Cl3(24)	21.800	76.800	19.200	27.800
Cl3(25)	25800.000 D	100000.000 D	22000.000 D	19900.000 D
Cl3(26)	37100.000 D	128000.000 D	31700.000 D	28800.000 D
Cl3(27)	3500.000 D	23500.000 D	2840.000 D	2870.000 D
Cl3(28)	48300.000 D	151000.000 D	39300.000 D	35600.000 D
Cl3(29)	9.060	6.980	9.340	10.700
Cl3(30)	10.400	25.800	9.220	7.500
Cl3(31)	45100.000 D	157000.000 D	37800.000 D	34900.000 D
Cl3(32)	8630.000 D	44600.000 D	6820.000 D	7020.000 D
Cl3(33)	1120.000 D	3050.000 D	1060.000 D	1280.000 D
Cl3(37)	932.000 D	1110.000 D	740.000 D	840.000 D
Cl4(40)	2040.000 D	2930.000 D	1520.000 D	1610.000 D
Cl4(41)	4.100 U	5.030 U	3.800 U	3.900 U
Cl4(42)	5930.000 D	13300.000 D	5190.000 D	5170.000 D
Cl4(43)	664.000 D	2350.000 D	2470.000 D	2240.000 D
Cl4(44)	9870.000 D	26600.000 D	8450.000 D	8290.000 D
Cl4(45)	743.000 D	2660.000 D	670.000 D	772.000 D
Cl4(46)	986.000 D	3490.000 D	842.000 D	917.000 D
Cl4(47)	18000.000 D	33200.000 D	14000.000 D	12900.000 D
Cl4(48)	1140.000 D	1910.000 D	1890.000 D	1920.000 D
Cl4(49)	56100.000 D	128000.000 D	46400.000 D	45900.000 D
Cl4(50)	74.800	149.000	63.500	53.900
Cl4(51)	3340.000 D	10500.000 D	2670.000 D	2540.000 D
Cl4(52)	63800.000 D	152000.000 D	53000.000 D	46500.000 D
Cl4(53)	8260.000 D	25400.000 D	6840.000 D	6240.000 D
Cl4(54)	49.400	114.000	45.100	47.300
Cl4(56)	654.000 D	614.000 D	541.000 D	610.000 D
Cl4(60)	362.000 D	78.800	143.000	148.000
Cl4(63)	432.000 D	164.000	166.000	160.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-07 SW	P-17G-ADP-CC-07 PW	P-17G-ADP-DD-05 SW	P-17G-ADP-DD-05 PW
Battelle ID	K9618-P	K9619-P	K9620-P	K9621-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.31	0.41	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(64)	5080.000 D	10200.000 D	4660.000 D	4860.000 D
Cl4(66)	2590.000 D	1800.000 D	2090.000 D	2220.000 D
Cl4(67)	1430.000 D	737.000 D	1240.000 D	1080.000 D
Cl4(70)	2060.000 D	1250.000 D	1740.000 D	1700.000 D
Cl4(71)	8870.000 D	19700.000 D	7020.000 D	6630.000 D
Cl4(74)	3300.000 D	1560.000 D	2700.000 D	2540.000 D
Cl4(75)	848.000 D	1060.000 D	601.000 D	576.000 D
Cl4(77)	188.000	168.000	155.000	194.000
Cl4(80)	25.000	13.100	24.900	25.100
Cl4(81)	12.900	2.470 U	1.870 U	11.800
Cl5(82)	103.000	99.200	90.600	107.000
Cl5(83)	3510.000 D	5280.000 D	2600.000 D	2820.000 D
Cl5(84)	2860.000 D	5270.000 D	2760.000 D	2230.000 D
Cl5(85)	403.000	531.000	279.000	350.000
Cl5(87)	403.000	475.000	338.000	461.000
Cl5(91)	5630.000 D	9850.000 D	4010.000 D	4220.000 D
Cl5(92)	2680.000 D	3790.000 D	1860.000 D	2250.000 D
Cl5(95)	10900.000 D	19800.000 D	8810.000 D	8740.000 D
Cl5(97)	2260.000 D	2130.000 D	1810.000 D	1840.000 D
Cl5(99)	6920.000 D	6600.000 D	5560.000 D	5450.000 D
Cl5(100)	654.000 D	933.000 D	509.000 D	503.000 D
Cl5(101)	9190.000 D	8230.000 D	7480.000 D	7240.000 D
Cl5(104)	16.200	19.500	13.100	12.700
Cl5(105)	344.000	332.000	274.000	390.000
Cl5(110)	11000.000 D	16100.000 D	8620.000 D	8950.000 D
Cl5(114)	65.600	70.400	54.300	64.000
Cl5(115)	482.000	4.230 U	3.200 U	3.280 U
Cl5(118)	3700.000 D	3020.000 D	2880.000 D	3260.000 D
Cl5(123)	462.000 D	494.000	406.000	471.000
Cl5(124)	106.000	85.900	86.000	96.900
Cl5(125)	42.200	3.030 U	2.290 U	21.500
Cl5(126)	14.200	14.400	11.100	13.600
Cl5(127)	73.100	48.800	66.400	56.200
Cl6(128)	249.000	300.000	186.000	251.000
Cl6(130)	123.000	164.000	94.100	100.000
Cl6(131)	205.000	347.000	150.000	192.000
Cl6(134)	428.000	711.000	334.000	415.000
Cl6(135)	770.000 D	1220.000 D	589.000 D	688.000 D
Cl6(136)	1070.000 D	1970.000 D	813.000 D	886.000 D
Cl6(137)	112.000	130.000	81.800	110.000
Cl6(138)	749.000 D	974.000 D	570.000 D	750.000 D
Cl6(139)	98.600	141.000	75.300	95.200
Cl6(140)	8.200	11.900	7.830	2.540 U
Cl6(141)	138.000	165.000	106.000	144.000
Cl6(144)	81.000	104.000	54.200	55.000
Cl6(146)	701.000 D	893.000 D	501.000 D	624.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-07 SW	P-17G-ADP-CC-07 PW	P-17G-ADP-DD-05 SW	P-17G-ADP-DD-05 PW
Battelle ID	K9618-P	K9619-P	K9620-P	K9621-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.31	0.41	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(149)	7160.000 D	11800.000 D	5120.000 D	5880.000 D
Cl6(151)	912.000 D	1440.000 D	700.000 D	785.000 D
Cl6(153)	4620.000 D	5240.000 D	3280.000 D	4000.000 D
Cl6(154)	451.000	744.000 D	327.000	421.000
Cl6(155)	3.110 J	3.670 J	2.540 J	2.800 J
Cl6(156)	170.000	227.000	128.000	178.000
Cl6(157)	35.400	43.800	22.400	34.400
Cl6(158)	280.000	311.000	210.000	282.000
Cl6(163)	1330.000 D	2120.000 D	926.000 D	1190.000 D
Cl6(164)	226.000	254.000	178.000	247.000
Cl6(166)	26.300	34.100	20.100	25.800
Cl6(167)	164.000	215.000	124.000	174.000
Cl6(169)	2.280 U	2.790 U	2.110 U	2.160 U
Cl7(170)	132.000	229.000	92.500	144.000
Cl7(171)	47.700	79.800	34.300	48.100
Cl7(172)	30.700	50.600	21.000	30.600
Cl7(173)	6.000	8.360	5.590	5.500
Cl7(174)	87.100	130.000	58.800	87.700
Cl7(175)	14.800	22.800	10.100	12.800
Cl7(176)	22.600	37.400	16.000	21.100
Cl7(177)	70.200	103.000	52.700	72.800
Cl7(178)	79.900	152.000	58.700	78.200
Cl7(179)	167.000	321.000	124.000	170.000
Cl7(180)	264.000	530.000	186.000	287.000
Cl7(183)	134.000	248.000	94.800	136.000
Cl7(184)	1.370 U	1.680 U	1.270 U	1.300 U
Cl7(185)	14.400	22.900	10.700	14.400
Cl7(187)	454.000	885.000 D	347.000	505.000
Cl7(188)	11.200	24.400	8.100	11.200
Cl7(189)	9.760	21.800	6.050	9.120
Cl7(190)	46.100	74.000	31.800	44.800
Cl7(191)	11.200	19.600	8.630	11.300
Cl7(193)	21.800	44.300	14.600	22.800
Cl8(194)	32.100	85.100	23.300	39.000
Cl8(195)	13.000	30.600	9.570	14.000
Cl8(197)	3.010 J	6.020	1.510 U	3.030 J
Cl8(198)	2.140 U	2.630 U	1.990 U	2.040 U
Cl8(199)	42.200	92.600	26.800	43.700
Cl8(200)	5.340	9.810	4.710	5.530
Cl8(201)	7.000	15.000	4.680	6.910
Cl8(202)	16.500	39.000	11.700	18.200
Cl8(203)	43.000	114.000	30.700	49.800
Cl8(205)	3.880	6.540	1.990 U	2.040 U
Cl9(206)	13.600	49.900	9.050	18.100
Cl9(207)	3.330	9.120	1.450 U	4.460
Cl9(208)	6.180	17.500	4.310	7.130

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-07 SW	P-17G-ADP-CC-07 PW	P-17G-ADP-DD-05 SW	P-17G-ADP-DD-05 PW
Battelle ID	K9618-P	K9619-P	K9620-P	K9621-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.31	0.41	0.40
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl10(209)	4.370	11.100	1.450 U	5.050
LOC 1	56.600	10600.000	43.300	63.700
LOC 2	22900.000	388000.000	18300.000	19800.000
LOC 3	211000.000	890000.000	175000.000	164000.000
LOC 4	197000.000	440000.000	165000.000	156000.000
LOC 5	61800.000	83200.000	48500.000	49600.000
LOC 6	20100.000	29600.000	14600.000	17500.000
LOC 7	1620.000	3000.000	1180.000	1710.000
LOC 8	166.000	399.000	112.000	180.000
LOC 9	23.100	76.500	13.400	29.700
LOC 10	4.370	11.100	U	5.050
Cl3(38)	37.400	49.100	43.900	103.000
Cl4(78)	52.300	34.500	62.500	103.000
Cl4(79)	56.600	34.100	70.500	69.400
Cl7(186)	156.000	102.000	148.000	114.000

Surrogate Recoveries (%)

Cl3(34)	172 N	252 N	166 N	158 N
Cl6(152)	78	86	77	92

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-04 SW	P-17G-ADP-CC-04 PW	P-17G-ADP-LL-03 SW	P-17G-ADP-LL-03 PW
Battelle ID	K9622-P	K9623-P	K9624-P	K9625-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/17/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.40	0.33	0.43	0.42
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	54.000	3340.000 D	24.200	156.000
Cl1(3)	27.000	193.000	17.300	68.900
Cl2(4)	1940.000 D	19700.000 D	1850.000 D	10500.000 D
Cl2(5)	2.100 U	2.830 U	2.170 U	2.220 U
Cl2(6)	5610.000 D	23000.000 D	6140.000 D	20500.000 D
Cl2(7)	108.000	240.000	89.200	520.000 D
Cl2(8)	5780.000 D	24800.000 D	6000.000 D	21700.000 D
Cl2(9)	176.000	1490.000 D	140.000	1050.000 D
Cl2(11)	909.000 D	2220.000 D	964.000 D	1910.000 D
Cl2(12)	5.480	5.040	3.450 U	3.530 U
Cl2(13)	2820.000 D	9020.000 D	3150.000 D	7850.000 D
Cl2(15)	3550.000 D	9190.000 D	3370.000 D	7240.000 D
Cl3(16)	684.000 D	2020.000 D	208.000	1130.000 D
Cl3(17)	10800.000 D	26000.000 D	11800.000 D	21800.000 D
Cl3(18)	21000.000 D	51000.000 D	23200.000 D	47700.000 D
Cl3(19)	1280.000 D	5150.000 D	1350.000 D	3630.000 D
Cl3(22)	1990.000 D	3980.000 D	1760.000 D	2580.000 D
Cl3(24)	24.600	37.600	17.500	28.700
Cl3(25)	22500.000 D	38900.000 D	25000.000 D	35100.000 D
Cl3(26)	32600.000 D	60000.000 D	36100.000 D	49300.000 D
Cl3(27)	3120.000 D	12400.000 D	3440.000 D	7990.000 D
Cl3(28)	50600.000 D	64700.000 D	44900.000 D	55600.000 D
Cl3(29)	12.200	11.300	7.760	5.600
Cl3(30)	9.220	14.200	8.610	11.200
Cl3(31)	39400.000 D	68800.000 D	43700.000 D	57900.000 D
Cl3(32)	7420.000 D	17600.000 D	8100.000 D	15100.000 D
Cl3(33)	1430.000 D	2920.000 D	1120.000 D	1570.000 D
Cl3(37)	1010.000 D	1180.000 D	838.000 D	782.000 D
Cl4(40)	1780.000 D	2290.000 D	1900.000 D	1830.000 D
Cl4(41)	3.900 U	5.250 U	4.030 U	4.130 U
Cl4(42)	5450.000 D	10400.000 D	5730.000 D	7380.000 D
Cl4(43)	1410.000 D	3480.000 D	2300.000 D	2510.000 D
Cl4(44)	9250.000 D	15800.000 D	9760.000 D	13100.000 D
Cl4(45)	774.000 D	1310.000 D	730.000 D	1170.000 D
Cl4(46)	917.000 D	1780.000 D	1010.000 D	1650.000 D
Cl4(47)	15000.000 D	20200.000 D	16700.000 D	18000.000 D
Cl4(48)	2300.000 D	2470.000 D	3640.000 D	3350.000 D
Cl4(49)	52700.000 D	72300.000 D	53700.000 D	61300.000 D
Cl4(50)	68.400	82.600	63.000	67.800
Cl4(51)	2940.000 D	5010.000 D	3350.000 D	4050.000 D
Cl4(52)	56100.000 D	85300.000 D	59600.000 D	68600.000 D
Cl4(53)	7110.000 D	13400.000 D	7830.000 D	11000.000 D
Cl4(54)	48.400	92.800	46.000	62.200
Cl4(56)	725.000 D	807.000 D	577.000 D	522.000 D
Cl4(60)	174.000	138.000	138.000	98.300
Cl4(63)	198.000	198.000	160.000	145.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-04 SW	P-17G-ADP-CC-04 PW	P-17G-ADP-LL-03 SW	P-17G-ADP-LL-03 PW
Battelle ID	K9622-P	K9623-P	K9624-P	K9625-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/17/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.40	0.33	0.43	0.42
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(64)	5180.000 D	5910.000 D	5130.000 D	6130.000 D
Cl4(66)	2870.000 D	2500.000 D	2420.000 D	1770.000 D
Cl4(67)	1360.000 D	806.000 D	1480.000 D	962.000 D
Cl4(70)	2280.000 D	1760.000 D	1920.000 D	1280.000 D
Cl4(71)	7400.000 D	9480.000 D	8660.000 D	10000.000 D
Cl4(74)	3250.000 D	2130.000 D	3240.000 D	2020.000 D
Cl4(75)	700.000 D	837.000 D	667.000 D	763.000 D
Cl4(77)	225.000	187.000	194.000	160.000
Cl4(80)	27.100	32.800	21.100	17.000
Cl4(81)	13.000	2.580 U	1.980 U	10.900
Cl5(82)	122.000	173.000	96.400	102.000
Cl5(83)	3140.000 D	4120.000 D	3610.000 D	3540.000 D
Cl5(84)	2570.000 D	5190.000 D	2960.000 D	3320.000 D
Cl5(85)	462.000	546.000	313.000	402.000
Cl5(87)	493.000	794.000	425.000	450.000
Cl5(91)	4870.000 D	7300.000 D	5440.000 D	6210.000 D
Cl5(92)	2570.000 D	3090.000 D	2520.000 D	2600.000 D
Cl5(95)	9480.000 D	13700.000 D	10600.000 D	12100.000 D
Cl5(97)	2150.000 D	2070.000 D	2360.000 D	1960.000 D
Cl5(99)	6280.000 D	6360.000 D	6670.000 D	5990.000 D
Cl5(100)	587.000 D	292.000	617.000 D	608.000 D
Cl5(101)	8460.000 D	7720.000 D	9270.000 D	7710.000 D
Cl5(104)	14.400	16.000	14.700	12.800
Cl5(105)	413.000	487.000	355.000	347.000
Cl5(110)	9820.000 D	13200.000 D	10700.000 D	10900.000 D
Cl5(114)	70.600	66.200	76.300	63.300
Cl5(115)	3.280 U	4.410 U	3.380 U	3.460 U
Cl5(118)	3720.000 D	3730.000 D	3950.000 D	3110.000 D
Cl5(123)	518.000	474.000	545.000	471.000
Cl5(124)	112.000	102.000	113.000	94.600
Cl5(125)	24.500	3.160 U	29.400	2.490 U
Cl5(126)	12.400	11.600	16.100	14.800
Cl5(127)	88.800	50.700	76.000	48.200
Cl6(128)	244.000	365.000	250.000	262.000
Cl6(130)	117.000	173.000	120.000	128.000
Cl6(131)	191.000	260.000	208.000	225.000
Cl6(134)	407.000	538.000	455.000	498.000
Cl6(135)	681.000 D	990.000 D	796.000 D	860.000 D
Cl6(136)	938.000 D	1420.000 D	1110.000 D	1190.000 D
Cl6(137)	117.000	139.000	114.000	117.000
Cl6(138)	767.000 D	1310.000 D	731.000 D	750.000 D
Cl6(139)	92.000	110.000	101.000	113.000
Cl6(140)	9.210	11.200	8.230	2.680 U
Cl6(141)	146.000	200.000	143.000	145.000
Cl6(144)	60.500	80.800	61.400	64.300
Cl6(146)	629.000 D	866.000	712.000 D	684.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-04 SW	P-17G-ADP-CC-04 PW	P-17G-ADP-LL-03 SW	P-17G-ADP-LL-03 PW
Battelle ID	K9622-P	K9623-P	K9624-P	K9625-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/17/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.40	0.33	0.43	0.42
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(149)	5940.000 D	8920.000 D	6820.000 D	7320.000 D
Cl6(151)	830.000 D	1170.000 D	909.000 D	922.000 D
Cl6(153)	4040.000 D	4960.000 D	4580.000 D	4370.000 D
Cl6(154)	397.000	555.000	456.000	516.000
Cl6(155)	2.820 J	3.390 J	2.620 J	2.570 J
Cl6(156)	170.000	227.000	180.000	181.000
Cl6(157)	34.400	50.000	33.600	36.000
Cl6(158)	279.000	335.000	305.000	304.000
Cl6(163)	1200.000 D	1680.000 D	1360.000 D	1400.000 D
Cl6(164)	228.000	234.000	244.000	242.000
Cl6(166)	24.600	31.600	28.400	27.900
Cl6(167)	157.000	192.000	174.000	181.000
Cl6(169)	2.160 U	2.910 U	2.240 U	2.290 U
Cl7(170)	123.000	186.000	137.000	158.000
Cl7(171)	41.900	65.400	48.400	52.000
Cl7(172)	28.600	37.600	32.800	31.900
Cl7(173)	2.160 U	8.280	5.090	6.120
Cl7(174)	82.400	123.000	85.400	101.000
Cl7(175)	12.700	17.400	12.500	15.500
Cl7(176)	20.000	30.700	20.600	23.600
Cl7(177)	65.800	96.800	71.400	78.600
Cl7(178)	74.000	105.000	78.700	89.500
Cl7(179)	152.000	208.000	174.000	191.000
Cl7(180)	240.000	362.000	276.000	331.000
Cl7(183)	121.000	172.000	131.000	150.000
Cl7(184)	1.300 U	1.750 U	1.340 U	1.380 U
Cl7(185)	12.600	19.600	15.600	17.400
Cl7(187)	438.000	649.000	500.000	588.000
Cl7(188)	9.430	14.900	11.600	13.700
Cl7(189)	7.780	13.200	7.740	10.800
Cl7(190)	39.100	56.700	46.100	49.600
Cl7(191)	9.360	14.200	11.000	12.600
Cl7(193)	19.300	28.100	21.600	28.400
Cl8(194)	27.300	49.600	29.600	42.900
Cl8(195)	12.300	20.500	10.900	16.800
Cl8(197)	1.550 U	2.090 U	1.600 U	1.640 U
Cl8(198)	2.040 U	2.740 U	2.110 U	2.160 U
Cl8(199)	33.600	56.800	40.000	50.900
Cl8(200)	4.580	7.140	5.110	5.790
Cl8(201)	6.200	9.070	7.100	7.820
Cl8(202)	15.200	22.500	17.900	21.800
Cl8(203)	35.300	62.100	43.800	57.700
Cl8(205)	2.040 U	2.740 U	2.110 U	2.160 U
Cl9(206)	10.100	23.300	14.500	20.300
Cl9(207)	3.330	5.450	1.540 U	4.480
Cl9(208)	5.060	10.000	6.450	9.060

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-04 SW	P-17G-ADP-CC-04 PW	P-17G-ADP-LL-03 SW	P-17G-ADP-LL-03 PW
Battelle ID	K9622-P	K9623-P	K9624-P	K9625-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/17/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.40	0.33	0.43	0.42
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl10(209)	4.260	6.830	1.540 U	5.760
LOC 1	81.000	3530.000	41.500	225.000
LOC 2	20900.000	89700.000	21700.000	71300.000
LOC 3	194000.000	355000.000	202000.000	300000.000
LOC 4	180000.000	259000.000	191000.000	218000.000
LOC 5	56000.000	69500.000	60800.000	60000.000
LOC 6	17700.000	24800.000	19900.000	20500.000
LOC 7	1500.000	2210.000	1690.000	1950.000
LOC 8	134.000	228.000	154.000	204.000
LOC 9	18.500	38.800	21.000	33.800
LOC 10	4.260	6.830	U	5.760
Cl3(38)	33.600	68.900	28.900	81.400
Cl4(78)	124.000	119.000	123.000	101.000
Cl4(79)	89.400	63.300	77.500	66.500
Cl7(186)	188.000	117.000	161.000	107.000

Surrogate Recoveries (%)

Cl3(34)	171 N	185 N	173 N	191 N
Cl6(152)	90	82	90	94

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-JJ-03 SW	P-17G-ADP-JJ-03 PW	P-17G-ADP-BB-05 SW	P-17G-ADP-BB-05 PW
Battelle ID	K9626-P	K9627-P	K9628-P	K9629-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/19/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.33	0.43	0.38
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	25.800	38.900	44.200	4320.000 D
Cl1(3)	17.600	30.100	24.400	1100.000 D
Cl2(4)	1610.000 D	2220.000 D	2190.000 D	88900.000 D
Cl2(5)	2.460 U	2.830 U	2.170 U	24.600 UD
Cl2(6)	4660.000 D	5410.000 D	6190.000 D	95600.000 D
Cl2(7)	84.100	90.100	100.000	1990.000 D
Cl2(8)	4350.000 D	5350.000 D	6030.000 D	113000.000 D
Cl2(9)	151.000	186.000	182.000	6280.000 D
Cl2(11)	823.000 D	782.000 D	918.000 D	8440.000 D
Cl2(12)	3.900 U	4.320	3.890	31.200 DJ
Cl2(13)	2610.000 D	2320.000 D	2990.000 D	27100.000 D
Cl2(15)	2830.000 D	2280.000 D	3450.000 D	23800.000 D
Cl3(16)	205.000	201.000	252.000	1310.000 D
Cl3(17)	9900.000 D	8980.000 D	10600.000 D	84600.000 D
Cl3(18)	19400.000 D	18900.000 D	21800.000 D	190000.000 D
Cl3(19)	1170.000 D	1550.000 D	1400.000 D	23700.000 D
Cl3(22)	1490.000 D	1030.000 D	1720.000 D	2840.000 D
Cl3(24)	16.200	13.800	19.800	133.000 D
Cl3(25)	20700.000 D	14800.000 D	21400.000 D	99700.000 D
Cl3(26)	30100.000 D	23600.000 D	31800.000 D	150000.000 D
Cl3(27)	2890.000 D	3010.000 D	3250.000 D	27900.000 D
Cl3(28)	37400.000 D	25400.000 D	39000.000 D	151000.000 D
Cl3(29)	8.250	6.390	8.330	19.600 UD
Cl3(30)	8.730	8.720	8.560	75.800 D
Cl3(31)	35500.000 D	25900.000 D	37200.000 D	144000.000 D
Cl3(32)	6820.000 D	6390.000 D	7510.000 D	57400.000 D
Cl3(33)	968.000 D	818.000 D	1030.000 D	1830.000 D
Cl3(37)	764.000 D	317.000	734.000 D	1080.000 D
Cl4(40)	1720.000 D	1130.000 D	1420.000 D	2900.000 D
Cl4(41)	4.560 U	5.250 U	4.030 U	45.600 UD
Cl4(42)	4470.000 D	2640.000 D	4480.000 D	11400.000 D
Cl4(43)	2580.000 D	1140.000 D	3270.000 D	1100.000 D
Cl4(44)	7770.000 D	4870.000 D	8030.000 D	18000.000 D
Cl4(45)	317.000	260.000	623.000 D	1850.000 D
Cl4(46)	828.000 D	444.000	912.000 D	3440.000 D
Cl4(47)	14500.000 D	9240.000 D	13000.000 D	36100.000 D
Cl4(48)	2020.000 D	1600.000 D	2550.000 D	1440.000 D
Cl4(49)	53100.000 D	34600.000 D	49600.000 D	138000.000 D
Cl4(50)	61.600	50.500	61.500	341.000 D
Cl4(51)	2840.000 D	2620.000 D	2780.000 D	15100.000 D
Cl4(52)	52200.000 D	37700.000 D	51000.000 D	184000.000 D
Cl4(53)	6920.000 D	5750.000 D	7020.000 D	34200.000 D
Cl4(54)	48.000	68.100	48.700	540.000 D
Cl4(56)	522.000 D	187.000	516.000 D	441.000 D
Cl4(60)	146.000	85.200	124.000	197.000 D
Cl4(63)	167.000	109.000	147.000	355.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-JJ-03 SW	P-17G-ADP-JJ-03 PW	P-17G-ADP-BB-05 SW	P-17G-ADP-BB-05 PW
Battelle ID	K9626-P	K9627-P	K9628-P	K9629-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/19/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.33	0.43	0.38
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(64)	3840.000 D	2190.000 D	3840.000 D	11400.000 D
Cl4(66)	2200.000 D	1280.000 D	1980.000 D	1320.000 D
Cl4(67)	1270.000 D	294.000	1040.000 D	519.000 D
Cl4(70)	1720.000 D	887.000 D	1520.000 D	915.000 D
Cl4(71)	7270.000 D	5460.000 D	6870.000 D	23100.000 D
Cl4(74)	2810.000 D	1280.000 D	2330.000 D	1190.000 D
Cl4(75)	680.000 D	265.000	267.000	1150.000 D
Cl4(77)	151.000	92.800	144.000	152.000 D
Cl4(80)	24.300	14.400	20.600	34.000 DJ
Cl4(81)	2.240 U	2.580 U	8.030	22.400 UD
Cl5(82)	88.800	65.500	79.700	77.600 D
Cl5(83)	3170.000 D	2150.000 D	2540.000 D	6330.000 D
Cl5(84)	2240.000 D	1410.000 D	1930.000 D	3700.000 D
Cl5(85)	319.000	242.000	264.000	238.000 D
Cl5(87)	382.000	259.000	300.000	333.000 D
Cl5(91)	4330.000 D	2730.000 D	3760.000 D	11900.000 D
Cl5(92)	2440.000 D	1670.000 D	1800.000 D	2970.000 D
Cl5(95)	9070.000 D	5430.000 D	8100.000 D	22500.000 D
Cl5(97)	1990.000 D	1110.000 D	1640.000 D	1710.000 D
Cl5(99)	5870.000 D	3610.000 D	4730.000 D	5540.000 D
Cl5(100)	296.000	244.000	220.000	1040.000 D
Cl5(101)	8120.000 D	4200.000 D	6000.000 D	6940.000 D
Cl5(104)	15.400	14.600	12.500	70.600 D
Cl5(105)	312.000	218.000	234.000	258.000 D
Cl5(110)	8980.000 D	5600.000 D	7470.000 D	14600.000 D
Cl5(114)	61.700	35.400	46.600	64.900 D
Cl5(115)	3.830 U	4.410 U	3.380 U	89.100 D
Cl5(118)	3390.000 D	2100.000 D	2570.000 D	2360.000 D
Cl5(123)	449.000	271.000	330.000	341.000 D
Cl5(124)	94.400	59.900	69.300	74.600 D
Cl5(125)	2.750 U	16.300	14.300	47.200 D
Cl5(126)	11.900	10.000	10.300	30.400 UD
Cl5(127)	45.700	127.000	30.000	85.800 D
Cl6(128)	212.000	160.000	148.000	216.000 D
Cl6(130)	110.000	78.800	76.400	113.000 D
Cl6(131)	176.000	132.000	124.000	277.000 D
Cl6(134)	374.000	252.000	275.000	537.000 D
Cl6(135)	772.000	490.000	575.000	1150.000 D
Cl6(136)	949.000 D	773.000	793.000 D	2200.000 D
Cl6(137)	99.600	83.400	68.000	85.400 D
Cl6(138)	687.000 D	544.000	620.000	714.000 D
Cl6(139)	85.200	63.000	57.200	108.000 D
Cl6(140)	2.970 U	7.080	6.390	29.700 UD
Cl6(141)	124.000	97.100	85.100	116.000 D
Cl6(144)	55.900	38.400	40.200	76.800 D
Cl6(146)	735.000	480.000	487.000	701.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-JJ-03 SW	P-17G-ADP-JJ-03 PW	P-17G-ADP-BB-05 SW	P-17G-ADP-BB-05 PW
Battelle ID	K9626-P	K9627-P	K9628-P	K9629-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/19/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.33	0.43	0.38
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(149)	5770.000 D	4420.000 D	4730.000 D	12000.000 D
Cl6(151)	789.000 D	618.000	684.000	1300.000 D
Cl6(153)	4010.000 D	2880.000 D	2810.000 D	3750.000 D
Cl6(154)	399.000	321.000	285.000	944.000 D
Cl6(155)	2.880 J	3.440 J	2.440 J	22.400 DJ
Cl6(156)	155.000	121.000	103.000	147.000 D
Cl6(157)	30.700	26.500	19.800	48.600 D
Cl6(158)	248.000	172.000	166.000	223.000 D
Cl6(163)	1180.000 D	869.000 D	856.000 D	1930.000 D
Cl6(164)	197.000	133.000	138.000	175.000 D
Cl6(166)	22.800	17.400	16.100	40.700 D
Cl6(167)	151.000	116.000	100.000	145.000 D
Cl6(169)	2.530 U	2.910 U	2.240 U	25.300 UD
Cl7(170)	115.000	92.800	73.800	156.000 D
Cl7(171)	39.600	34.000	28.700	77.400 D
Cl7(172)	28.100	24.200	20.100	47.200 D
Cl7(173)	6.230	2.910 U	5.310	25.300 UD
Cl7(174)	77.200	61.100	49.500	85.000 D
Cl7(175)	10.900	12.300	7.650	18.100 UD
Cl7(176)	19.300	15.700	12.800	27.300 DJ
Cl7(177)	61.200	50.400	41.800	77.200 D
Cl7(178)	70.100	57.100	50.500	139.000 D
Cl7(179)	148.000	121.000	103.000	263.000 D
Cl7(180)	227.000	194.000	144.000	273.000 D
Cl7(183)	115.000	97.400	75.900	156.000 D
Cl7(184)	1.520 U	1.750 U	1.340 U	15.200 UD
Cl7(185)	12.800	11.900	9.690	29.000 DJ
Cl7(187)	431.000	359.000	290.000	798.000 D
Cl7(188)	10.300	8.380	7.830	44.700 D
Cl7(189)	9.180	9.000	5.320	8.540 DJ
Cl7(190)	42.200	34.600	27.100	70.000 D
Cl7(191)	9.500	9.180	7.810	34.000 DJ
Cl7(193)	18.100	17.600	13.200	56.600 D
Cl8(194)	29.700	31.200	20.400	71.000 D
Cl8(195)	12.300	13.700	8.380	36.200 DJ
Cl8(197)	1.810 U	2.090 U	1.600 U	18.100 UD
Cl8(198)	2.380 U	2.740 U	2.110 U	23.800 UD
Cl8(199)	35.100	33.200	21.500	66.300 D
Cl8(200)	2.380 U	2.740 U	2.110 U	23.800 UD
Cl8(201)	6.640	7.110	4.580	18.100 UD
Cl8(202)	14.800	15.500	11.000	40.200 D
Cl8(203)	40.700	41.400	25.200	89.800 D
Cl8(205)	2.380 U	2.740 U	2.110 U	23.800 UD
Cl9(206)	13.300	15.500	9.140	53.800 D
Cl9(207)	3.390 J	2.000 U	1.540 U	17.400 UD
Cl9(208)	6.460	7.010	3.440	30.900 DJ

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-JJ-03 SW	P-17G-ADP-JJ-03 PW	P-17G-ADP-BB-05 SW	P-17G-ADP-BB-05 PW
Battelle ID	K9626-P	K9627-P	K9628-P	K9629-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/19/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.38	0.33	0.43	0.38
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl10(209)	4.470	2.000 U	1.540 U	17.400 UD
LOC 1	43.400	69.000	68.600	5420.000
LOC 2	17100.000	18600.000	22000.000	365000.000
LOC 3	167000.000	131000.000	178000.000	936000.000
LOC 4	170000.000	114000.000	164000.000	489000.000
LOC 5	51700.000	31600.000	42200.000	81300.000
LOC 6	17300.000	12900.000	13300.000	27000.000
LOC 7	1450.000	1210.000	974.000	2340.000
LOC 8	139.000	142.000	91.100	304.000
LOC 9	23.200	22.500	12.600	84.700
LOC 10	4.470	U	U	UD
Cl3(38)	30.300	169.000	41.200	48.900
Cl4(78)	135.000	97.900	53.100	32.500
Cl4(79)	60.300	177.000	58.600	36.000
Cl7(186)	106.000	293.000	71.200	183.000

Surrogate Recoveries (%)

Cl3(34)	163 N	154 N	186 N	998 ND
Cl6(152)	82	90	87	94 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-BB-07 SW	P-17G-ADP-BB-07 PW	P-17G-ADP-LL-02 SW	P-17G-ADP-LL-02 PW
Battelle ID	K9630-P	K9631-P	K9632-P	K9633-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/17/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.39	0.34	0.42	0.37
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	21.800	90.800	23.300	57.600
Cl1(3)	14.400	47.400	17.800	31.000
Cl2(4)	1220.000 D	2340.000 D	1790.000 D	2710.000 D
Cl2(5)	2.390 U	2.740 U	2.220 U	2.520 U
Cl2(6)	3740.000 D	5560.000 D	6190.000 D	6260.000 D
Cl2(7)	73.400	102.000	83.900	80.000
Cl2(8)	3550.000 D	5760.000 D	5160.000 D	6150.000 D
Cl2(9)	130.000	178.000	154.000	223.000
Cl2(11)	678.000 D	975.000 D	967.000 D	980.000 D
Cl2(12)	3.370 J	4.280	3.260 J	3.460 J
Cl2(13)	2100.000 D	3180.000 D	3010.000 D	3130.000 D
Cl2(15)	2180.000 D	3860.000 D	3150.000 D	2920.000 D
Cl3(16)	205.000	324.000	216.000	271.000
Cl3(17)	7820.000 D	11500.000 D	11300.000 D	10400.000 D
Cl3(18)	15400.000 D	21100.000 D	22700.000 D	20500.000 D
Cl3(19)	915.000 D	1290.000 D	1330.000 D	1550.000 D
Cl3(22)	1370.000 D	2110.000 D	1700.000 D	1600.000 D
Cl3(24)	16.500	26.600	16.300	20.800
Cl3(25)	17100.000 D	23300.000 D	24500.000 D	18800.000 D
Cl3(26)	24600.000 D	33900.000 D	34800.000 D	27600.000 D
Cl3(27)	2340.000 D	3230.000 D	3390.000 D	3380.000 D
Cl3(28)	30600.000 D	41000.000 D	43800.000 D	32500.000 D
Cl3(29)	8.010	9.020	8.310	7.260
Cl3(30)	8.020	8.900	8.350	7.980
Cl3(31)	29200.000 D	41000.000 D	42000.000 D	31900.000 D
Cl3(32)	5060.000 D	7810.000 D	7910.000 D	7450.000 D
Cl3(33)	841.000 D	1260.000 D	1010.000 D	944.000 D
Cl3(37)	349.000	898.000 D	830.000 D	776.000 D
Cl4(40)	1210.000 D	1760.000 D	1690.000 D	1480.000 D
Cl4(41)	4.440 U	5.100 U	4.130 U	4.680 U
Cl4(42)	3990.000 D	5320.000 D	5100.000 D	4050.000 D
Cl4(43)	501.000 D	628.000 D	629.000 D	537.000 D
Cl4(44)	6870.000 D	9430.000 D	9300.000 D	7370.000 D
Cl4(45)	317.000	815.000 D	689.000 D	698.000 D
Cl4(46)	412.000	974.000 D	958.000 D	1020.000 D
Cl4(47)	11800.000 D	15400.000 D	15600.000 D	12200.000 D
Cl4(48)	949.000 D	416.000 D	492.000 D	537.000 D
Cl4(49)	40900.000 D	56600.000 D	59100.000 D	44600.000 D
Cl4(50)	54.200	58.700	61.100	55.900
Cl4(51)	2230.000 D	2830.000 D	3130.000 D	3000.000 D
Cl4(52)	41400.000 D	54400.000 D	54800.000 D	46300.000 D
Cl4(53)	4860.000 D	6020.000 D	7840.000 D	6350.000 D
Cl4(54)	40.700	49.900	47.700	56.200
Cl4(56)	261.000	653.000 D	573.000 D	256.000
Cl4(60)	141.000	166.000	135.000	281.000 D
Cl4(63)	163.000	191.000	164.000	139.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-BB-07 SW	P-17G-ADP-BB-07 PW	P-17G-ADP-LL-02 SW	P-17G-ADP-LL-02 PW
Battelle ID	K9630-P	K9631-P	K9632-P	K9633-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/17/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.39	0.34	0.42	0.37
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(64)	3590.000 D	4990.000 D	4280.000 D	3500.000 D
Cl4(66)	1850.000 D	2430.000 D	2280.000 D	2030.000 D
Cl4(67)	1090.000 D	1150.000 D	1370.000 D	1010.000 D
Cl4(70)	1500.000 D	1780.000 D	1840.000 D	1510.000 D
Cl4(71)	5340.000 D	6420.000 D	8180.000 D	6180.000 D
Cl4(74)	2350.000 D	2670.000 D	2950.000 D	2270.000 D
Cl4(75)	291.000	326.000	742.000 D	287.000
Cl4(77)	136.000	182.000	169.000	161.000
Cl4(80)	24.000	31.300	22.300	21.000
Cl4(81)	9.290	2.500 U	10.900	2.300 U
Cl5(82)	70.000	114.000	79.900	148.000
Cl5(83)	2320.000 D	3470.000 D	3090.000 D	3060.000 D
Cl5(84)	1960.000 D	2040.000 D	2560.000 D	2250.000 D
Cl5(85)	302.000	401.000	318.000	473.000
Cl5(87)	296.000	473.000	363.000	646.000
Cl5(91)	3610.000 D	5100.000 D	4520.000 D	4050.000 D
Cl5(92)	1990.000 D	3040.000 D	2360.000 D	2310.000 D
Cl5(95)	7560.000 D	10100.000 D	9650.000 D	8180.000 D
Cl5(97)	2.890 U	2150.000 D	2060.000 D	1950.000 D
Cl5(99)	4620.000 D	6870.000 D	6090.000 D	6040.000 D
Cl5(100)	242.000	310.000	534.000 D	276.000
Cl5(101)	6230.000 D	8490.000 D	8120.000 D	7360.000 D
Cl5(104)	12.700	14.200	13.800	14.700
Cl5(105)	231.000	374.000	290.000	488.000
Cl5(110)	7180.000 D	10900.000 D	9610.000 D	8360.000 D
Cl5(114)	46.800	69.200	56.000	71.200
Cl5(115)	3.730 U	4.280 U	3.460 U	3.930 U
Cl5(118)	2500.000 D	3810.000 D	3310.000 D	3590.000 D
Cl5(123)	348.000	506.000	458.000	474.000
Cl5(124)	72.600	105.000	93.400	107.000
Cl5(125)	2.680 U	3.070 U	17.100	2.820 U
Cl5(126)	9.760	17.400	13.900	14.000
Cl5(127)	75.800	77.900	67.300	37.700
Cl6(128)	157.000	293.000	198.000	279.000
Cl6(130)	80.300	141.000	109.000	130.000
Cl6(131)	130.000	221.000	170.000	193.000
Cl6(134)	284.000	466.000	367.000	400.000
Cl6(135)	579.000	861.000 D	688.000 D	446.000 D
Cl6(136)	888.000	1080.000 D	951.000 D	956.000 D
Cl6(137)	74.300	132.000	95.000	121.000
Cl6(138)	531.000	933.000 D	632.000 D	868.000 D
Cl6(139)	69.600	112.000	86.100	96.700
Cl6(140)	2.890 U	3.320 U	7.380	9.590
Cl6(141)	90.100	162.000	119.000	171.000
Cl6(144)	40.200	66.600	48.600	65.100
Cl6(146)	520.000	776.000 D	601.000 D	818.000

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-BB-07 SW	P-17G-ADP-BB-07 PW	P-17G-ADP-LL-02 SW	P-17G-ADP-LL-02 PW
Battelle ID	K9630-P	K9631-P	K9632-P	K9633-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/17/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.39	0.34	0.42	0.37
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(149)	4430.000 D	7900.000 D	5800.000 D	6210.000 D
Cl6(151)	728.000	982.000 D	782.000 D	824.000 D
Cl6(153)	2900.000 D	5220.000 D	3910.000 D	4480.000 D
Cl6(154)	280.000	483.000	360.000	433.000
Cl6(155)	2.630 J	3.970 J	2.570 J	3.150 J
Cl6(156)	112.000	204.000	150.000	192.000
Cl6(157)	21.600	40.100	24.900	34.400
Cl6(158)	179.000	320.000	240.000	299.000
Cl6(163)	865.000 D	1540.000 D	1160.000 D	1220.000 D
Cl6(164)	154.000	249.000	200.000	225.000
Cl6(166)	17.600	28.600	21.600	25.300
Cl6(167)	107.000	200.000	146.000	173.000
Cl6(169)	2.460 U	2.830 U	2.290 U	2.600 U
Cl7(170)	83.000	183.000	115.000	142.000
Cl7(171)	30.600	63.600	38.600	50.900
Cl7(172)	18.900	39.200	24.000	27.400
Cl7(173)	2.460 U	6.870	5.480	6.470
Cl7(174)	55.900	104.000	74.200	93.900
Cl7(175)	7.500	15.900	11.800	12.400
Cl7(176)	14.400	26.900	17.600	22.000
Cl7(177)	46.400	92.700	59.300	71.500
Cl7(178)	49.900	101.000	67.700	78.900
Cl7(179)	108.000	202.000	139.000	165.000
Cl7(180)	155.000	357.000	228.000	287.000
Cl7(183)	82.600	163.000	109.000	137.000
Cl7(184)	1.480 U	1.700 U	1.380 U	1.560 U
Cl7(185)	11.500	17.400	12.200	15.400
Cl7(187)	299.000	622.000	404.000	491.000
Cl7(188)	8.170	14.500	8.770	12.400
Cl7(189)	5.210	12.800	8.350	8.940
Cl7(190)	28.700	58.200	38.600	47.700
Cl7(191)	7.790	15.000	10.400	12.600
Cl7(193)	17.700	28.300	17.500	22.700
Cl8(194)	19.300	48.300	28.500	38.000
Cl8(195)	9.120	19.100	11.400	15.400
Cl8(197)	1.770 U	2.030 U	1.640 U	1.860 U
Cl8(198)	2.320 U	2.660 U	2.160 U	2.450 U
Cl8(199)	21.800	57.500	33.300	46.000
Cl8(200)	2.320 U	6.320	4.740	6.120
Cl8(201)	4.740	9.680	6.420	7.560
Cl8(202)	10.900	24.500	14.300	19.200
Cl8(203)	26.700	62.600	34.900	50.500
Cl8(205)	2.320 U	2.660 U	2.160 U	2.450 U
Cl9(206)	8.860	22.900	11.600	18.200
Cl9(207)	1.700 U	4.720	1.570 U	1.790 U
Cl9(208)	5.010	9.230	5.900	7.390

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-BB-07 SW	P-17G-ADP-BB-07 PW	P-17G-ADP-LL-02 SW	P-17G-ADP-LL-02 PW
Battelle ID	K9630-P	K9631-P	K9632-P	K9633-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/17/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.39	0.34	0.42	0.37
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl10(209)	1.700 U	6.280	1.570 U	5.900
LOC 1	36.200	138.000	41.100	88.600
LOC 2	13700.000	22000.000	20500.000	22500.000
LOC 3	136000.000	189000.000	196000.000	158000.000
LOC 4	132000.000	176000.000	182000.000	146000.000
LOC 5	39700.000	58400.000	53700.000	49900.000
LOC 6	13200.000	22400.000	16900.000	18700.000
LOC 7	1030.000	2120.000	1390.000	1700.000
LOC 8	92.600	228.000	134.000	183.000
LOC 9	13.900	36.800	17.500	25.600
LOC 10	U	6.280	U	5.900
Cl3(38)	24.100 B	85.800	38.600	90.500
Cl4(78)	54.100	130.000	119.000	108.000
Cl4(79)	61.000	95.300	90.800	63.500
Cl7(186)	183.000	169.000	142.000	81.900

Surrogate Recoveries (%)

Cl3(34)	157 N	166 N	176 N	161 N
Cl6(152)	85	93	93	87

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-HH-05 SW	P-17G-ADP-HH-05 PW	P-17G-ADP-DD-07 SW	P-17G-ADP-DD-07 PW
Battelle ID	K9634-P	K9635-P	K9636-P	K9637-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.37	0.31
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl1(1)	22.300	1160.000 D	76.600	2260.000 D
Cl1(3)	16.500	102.000	35.900	885.000 D
Cl2(4)	1970.000 D	57100.000 D	3790.000 D	43200.000 D
Cl2(5)	2.520 U	2.670 U	2.520 U	3.010 U
Cl2(6)	7200.000 D	91200.000 D	8450.000 D	68800.000 D
Cl2(7)	54.000	1070.000 D	144.000	2170.000 D
Cl2(8)	6910.000 D	100000.000 D	8800.000 D	90300.000 D
Cl2(9)	167.000	2740.000 D	265.000	4290.000 D
Cl2(11)	1080.000 D	7830.000 D	1210.000 D	7480.000 D
Cl2(12)	4.610	4.240 U	5.060	8.880
Cl2(13)	3490.000 D	26500.000 D	3690.000 D	24900.000 D
Cl2(15)	3590.000 D	21000.000 D	3960.000 D	26600.000 D
Cl3(16)	219.000	3120.000 D	277.000	4050.000 D
Cl3(17)	14000.000 D	80900.000 D	15300.000 D	79500.000 D
Cl3(18)	27200.000 D	174000.000 D	32100.000 D	158000.000 D
Cl3(19)	1480.000 D	18300.000 D	2060.000 D	14200.000 D
Cl3(22)	2090.000 D	8400.000 D	1910.000 D	10200.000 D
Cl3(24)	19.100	23.400	24.800	88.000
Cl3(25)	30400.000 D	121000.000 D	27400.000 D	110000.000 D
Cl3(26)	44400.000 D	184000.000 D	40000.000 D	135000.000 D
Cl3(27)	3840.000 D	27000.000 D	2.070 U	19000.000 D
Cl3(28)	54600.000 D	156000.000 D	50800.000 D	193000.000 D
Cl3(29)	7.820	2.130 U	10.700	15.400
Cl3(30)	8.360	12.600	10.800	23.200
Cl3(31)	53100.000 D	152000.000 D	50200.000 D	167000.000 D
Cl3(32)	9690.000 D	54200.000 D	10200.000 D	44100.000 D
Cl3(33)	1250.000 D	2520.000 D	1460.000 D	7930.000 D
Cl3(37)	1050.000 D	1180.000 D	990.000 D	2310.000 D
Cl4(40)	2490.000 D	3770.000 D	1910.000 D	3980.000 D
Cl4(41)	4.680 U	4.950 U	4.680 U	16.200
Cl4(42)	7050.000 D	17900.000 D	5640.000 D	18700.000 D
Cl4(43)	273.000	1170.000 D	707.000 D	1240.000 D
Cl4(44)	11900.000 D	43800.000 D	10800.000 D	37800.000 D
Cl4(45)	328.000	2120.000 D	989.000 D	4090.000 D
Cl4(46)	1160.000 D	8400.000 D	1150.000 D	3840.000 D
Cl4(47)	22200.000 D	45300.000 D	18500.000 D	43800.000 D
Cl4(48)	2140.000 D	3790.000 D	940.000 D	2470.000 D
Cl4(49)	66400.000 D	209000.000 D	64400.000 D	155000.000 D
Cl4(50)	69.700	102.000	73.500	146.000
Cl4(51)	4140.000 D	16600.000 D	3680.000 D	11500.000 D
Cl4(52)	74000.000 D	264000.000 D	66900.000 D	187000.000 D
Cl4(53)	10000.000 D	40700.000 D	9340.000 D	26800.000 D
Cl4(54)	50.500	87.900	55.500	91.700
Cl4(56)	749.000 D	421.000 D	705.000 D	1460.000 D
Cl4(60)	165.000	42.900	147.000	142.000
Cl4(63)	196.000	612.000 D	174.000	884.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-HH-05 SW	P-17G-ADP-HH-05 PW	P-17G-ADP-DD-07 SW	P-17G-ADP-DD-07 PW
Battelle ID	K9634-P	K9635-P	K9636-P	K9637-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.37	0.31
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl4(64)	5290.000 D	12100.000 D	5370.000 D	17700.000 D
Cl4(66)	3090.000 D	1340.000 D	2610.000 D	4080.000 D
Cl4(67)	1780.000 D	878.000 D	1360.000 D	1180.000 D
Cl4(70)	2460.000 D	957.000 D	2130.000 D	3190.000 D
Cl4(71)	11400.000 D	38000.000 D	9640.000 D	26400.000 D
Cl4(74)	3920.000 D	1370.000 D	2990.000 D	3060.000 D
Cl4(75)	326.000	1220.000 D	810.000 D	1480.000 D
Cl4(77)	204.000	126.000	172.000	312.000
Cl4(80)	25.700	9.440	21.700	15.200
Cl4(81)	11.100	2.430 U	10.500	17.600
Cl5(82)	124.000	105.000	95.800	201.000
Cl5(83)	4780.000 D	9930.000 D	3450.000 D	8310.000 D
Cl5(84)	3460.000 D	9930.000 D	2860.000 D	9840.000 D
Cl5(85)	304.000	567.000	377.000	902.000
Cl5(87)	469.000	533.000	399.000	1010.000
Cl5(91)	7330.000 D	17600.000 D	5280.000 D	15000.000 D
Cl5(92)	2990.000 D	10000.000 D	2790.000 D	5400.000 D
Cl5(95)	14000.000 D	35000.000 D	11800.000 D	30800.000 D
Cl5(97)	2990.000 D	2970.000 D	2310.000 D	4510.000 D
Cl5(99)	9340.000 D	9540.000 D	7020.000 D	12000.000 D
Cl5(100)	336.000	1300.000 D	271.000	1180.000 D
Cl5(101)	12300.000 D	11100.000 D	9360.000 D	15000.000 D
Cl5(104)	18.000	17.000	15.300	18.100
Cl5(105)	411.000	380.000	321.000	845.000
Cl5(110)	14200.000 D	26300.000 D	11400.000 D	3.190 U
Cl5(114)	82.700	75.300	63.400	115.000
Cl5(115)	54.300	4.160 U	3.930 U	4.700 U
Cl5(118)	5070.000 D	3970.000 D	3540.000 D	5960.000 D
Cl5(123)	631.000	574.000	461.000	868.000
Cl5(124)	125.000	101.000	96.800	163.000
Cl5(125)	55.000	2.980 U	20.700	3.370 U
Cl5(126)	16.800	16.700	12.900	18.800
Cl5(127)	38.600	80.600	91.000	35.300
Cl6(128)	288.000	328.000	210.000	522.000
Cl6(130)	151.000	166.000	107.000	239.000
Cl6(131)	242.000	482.000	179.000	490.000
Cl6(134)	527.000	1040.000 D	399.000	1110.000 D
Cl6(135)	1080.000 D	2100.000 D	861.000	2070.000 D
Cl6(136)	1480.000 D	3540.000 D	1140.000 D	3040.000 D
Cl6(137)	130.000	150.000	104.000	250.000
Cl6(138)	1030.000	1260.000 D	736.000 D	2030.000 D
Cl6(139)	121.000	173.000	89.800	197.000
Cl6(140)	8.220	3.220 U	9.850	17.000
Cl6(141)	164.000	179.000	131.000	351.000
Cl6(144)	92.900	86.800	56.000	156.000
Cl6(146)	1080.000	1310.000 D	739.000	1570.000 D

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-HH-05 SW	P-17G-ADP-HH-05 PW	P-17G-ADP-DD-07 SW	P-17G-ADP-DD-07 PW
Battelle ID	K9634-P	K9635-P	K9636-P	K9637-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.37	0.31
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl6(149)	9550.000 D	19300.000 D	7210.000 D	17700.000 D
Cl6(151)	1200.000 D	2340.000 D	915.000 D	2440.000 D
Cl6(153)	5960.000 D	7010.000 D	4240.000 D	8840.000 D
Cl6(154)	570.000	1200.000 D	394.000	1030.000
Cl6(155)	3.700 J	3.160 J	3.120 J	3.590 J
Cl6(156)	207.000	246.000	154.000	439.000
Cl6(157)	36.500	48.500	28.000	86.400
Cl6(158)	332.000	361.000	243.000	531.000
Cl6(163)	1740.000 D	3460.000 D	1280.000 D	3900.000 D
Cl6(164)	272.000	298.000	201.000	400.000
Cl6(166)	30.800	35.100	23.300	47.200
Cl6(167)	198.000	240.000	145.000	325.000
Cl6(169)	2.600 U	2.750 U	3.700 J	3.100 U
Cl7(170)	153.000	242.000	116.000	429.000
Cl7(171)	53.600	78.900	41.600	125.000
Cl7(172)	37.600	56.400	30.100	83.500
Cl7(173)	8.280	8.330	4.990	14.300
Cl7(174)	100.000	147.000	79.200	243.000
Cl7(175)	13.900	25.200	10.800	33.600
Cl7(176)	25.100	37.500	18.000	54.200
Cl7(177)	83.800	102.000	60.600	166.000
Cl7(178)	98.200	198.000	72.100	213.000
Cl7(179)	204.000	419.000	150.000	449.000
Cl7(180)	316.000	604.000	233.000	4.780 U
Cl7(183)	155.000	275.000	113.000	373.000
Cl7(184)	1.560 U	1.650 U	1.560 U	1.860 U
Cl7(185)	17.300	23.000	14.000	34.200
Cl7(187)	594.000	1220.000 D	423.000	1360.000 D
Cl7(188)	13.500	31.700	9.930	29.700
Cl7(189)	10.600	24.500	8.370	32.100
Cl7(190)	52.300	81.900	38.400	115.000
Cl7(191)	13.400	19.500	10.600	27.400
Cl7(193)	25.200	55.900	19.200	71.500
Cl8(194)	33.900	101.000	28.100	154.000
Cl8(195)	15.200	31.200	11.600	52.400
Cl8(197)	3.030 J	6.260	1.860 U	8.950
Cl8(198)	2.450 U	2.590 U	2.450 U	2.920 U
Cl8(199)	47.500	102.000	36.600	165.000
Cl8(200)	4.890	9.820	5.140	17.100
Cl8(201)	7.650	14.800	7.110	22.100
Cl8(202)	18.200	42.300	16.000	55.900
Cl8(203)	53.900	121.000	37.400	198.000
Cl8(205)	3.870	7.820	2.450 U	9.000
Cl9(206)	16.800	56.200	13.700	101.000
Cl9(207)	4.040	8.880	3.870	13.900
Cl9(208)	7.560	19.000	6.070	32.300

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-HH-05 SW	P-17G-ADP-HH-05 PW	P-17G-ADP-DD-07 SW	P-17G-ADP-DD-07 PW
Battelle ID	K9634-P	K9635-P	K9636-P	K9637-P
Sample Type	SA	SA	SA	SA
Collection Date	08/14/17	08/14/17	08/14/17	08/14/17
Extraction Date	08/23/17	08/23/17	08/23/17	08/23/17
Analysis Date	09/16/17	09/16/17	09/16/17	09/16/17
Analytical Instrument	MS	MS	MS	MS
% Moisture	NA	NA	NA	NA
% Lipid	NA	NA	NA	NA
Matrix	PED	PED	PED	PED
Sample Size	0.37	0.35	0.37	0.31
Size Unit-Basis	G_DRY	G_DRY	G_DRY	G_DRY
Units	NG/G_DRY	NG/G_DRY	NG/G_DRY	NG/G_DRY
Cl10(209)	4.640	13.200	1.790 U	19.800
LOC 1	38.800	1260.000	112.000	3140.000
LOC 2	24500.000	307000.000	30300.000	268000.000
LOC 3	243000.000	983000.000	233000.000	944000.000
LOC 4	232000.000	714000.000	211000.000	556000.000
LOC 5	79100.000	140000.000	62000.000	112000.000
LOC 6	26500.000	45400.000	19600.000	47800.000
LOC 7	1980.000	3650.000	1450.000	3850.000
LOC 8	188.000	436.000	142.000	682.000
LOC 9	28.400	84.100	23.600	147.000
LOC 10	4.640	13.200	U	19.800
Cl3(38)	26.400	35.800	25.800 B	37.900
Cl4(78)	37.000	28.400	43.700	21.300
Cl4(79)	42.100	30.800	53.300	16.900
Cl7(186)	80.300	186.000	218.000	81.600

Surrogate Recoveries (%)

Cl3(34)	164 N	180 N	175 N	248 N
Cl6(152)	91	100	85	91

Glossary of Data Qualifiers

Flag:	Application:
B	Analyte concentration found in the sample at a concentration <5x the level found in the procedural blank.
D	Dilution Run. Initial run outside linear range of instrument.
E	Estimate, result is greater than the highest concentration level in the calibration.
H	Surrogate diluted out. Used when surrogate recovery is affected by excessive dilution of the sample extract.
J	Analyte detected below the sample-specific Reporting Limit (RL).
m	Confirmation column manually over-ridden by analyst, dual column quantitative analysis only.
ME	Significant Matrix Interference - Estimated value.
MI	Significant Matrix Interference - value could not be determined or estimated.
n	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO), but meets the contingency criteria.
N	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO)
NA	Not applicable
p	Dual column value exceeds RPD criteria, dual column quantitative analysis only.
T	Holding Time (HT) exceeded.
U	Analyte not detected at 3:1 signal:noise ratio.

QA/QC Summary
Batch 17-0368

Project:	USACE/NAE – NBH Aerovox Passive Samplers
Parameters:	PCB Congeners
Laboratory:	Battelle, Norwell, MA
Matrix:	PED Samples
Data Set:	DP-17-0184
Analytical SOP:	5-315
Method Reference:	EPA Method 8270D-modified/1668A-modified

Sample Custody

Collection Date	Receipt Date	Temp (°C)
8/14/2017	8/21/2017	-20.0

Corrective Actions	None.
Sample Storage	The samples were stored frozen until extraction.
Related samples	None.

METHOD SUMMARIES

Sample Preparation	Prior to processing, the PEDs were examined by the PM and cutting instructions were determined. The PEDs were cut from the frames using solvent cleaned knives/scissors. The individual pieces were gently cleaned with Milli-Q water and Kimwipes, as necessary, and stored in solvent-rinsed foil packets, each ID'ed appropriately with information describing the location of the section on the un-cut PED. Each piece was logged in and assigned a unique ID. The PEDs were extracted by shaker table. The PED was placed in an extraction vessel, spiked with surrogates and extracted three times in hexane. The extracts were combined after each extraction. The sample extracts were concentrated using KD and nitrogen blow down techniques. The sample concentrates were further processed by alumina cleanup, followed copper cleanup and spiked with internal standard. Final extracts were submitted for PCB analyses by GC-MS.
Prep comments	CM917LCSD: Spilled about 2 mL (out of ~200 mL total) of this sample K9622, K9631, K9635: Had to reactivate copper a second time and add more to samples. K9635, K9636: spilled ~3 mL of sample extract (out of ~200 mL total)

Analysis	PCB congeners were measured by gas chromatography-mass spectrometry (GC/MS) in the selected ion mode (SIM). An initial calibration consisting of representative target analytes was analyzed prior to analysis to demonstrate the linear range of analysis. Calibration verification was performed at the beginning and end of each 24 hour period, or every 10 injections, whichever was shortest. Target PCB were quantified vs. internal standards using a quadratic regression calculated from the initial calibration.
Analysis Comments	• No ICC exists for PRC compounds. • Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however,

	historical data has reported these as two separate peaks. These peaks are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data. • Samples were weighed using 5 decimal places, but concentrations are calculated using a sample weight value of 2 decimal places. • There are many low failing IS areas in method MW0399. This method is used to quantify PRC compounds and this internal standard is used to quantify one analyte; PCB 186. The samples were also run using MW0396A with similar results. • Many of the undiluted authentic samples fail the IS are for PCB 96 high using method MF0909. It is likely the high levels of congeners in these samples contribute slightly to the PCB 96 IS area. In addition, most of the analytes reported from PCB 96 are reported from dilution, where PCB 96 passes IS area criterion. It should be noted that the secondary IS passes criteria using this method. • Sample K9629-P(2) exhibits levels of contamination which render the sample unquantifiable. Data for this sample is reported from dilution only.	
Holding Times	Extraction Date(s)	Analysis Date(s)
	8/23-24/2017	9/16-19/2017

Procedural Blank (PB)	A PB was prepared with this analytical batch to ensure the sample extraction and analysis methods are free of contamination.
Blank value <SSRL Samples >5X PB	Two exceedances noted. The PRC compound PCB 38 is detected in two samples < 5x what was detected in the PB. Integrations and data reviewed. No further corrective actions taken.

Laboratory Control Spike (LCS)/Laboratory Control Spike Duplicate (LCSD)	A LCS/LCSD pair was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy. The RPDs between replicates were calculated to measure precision
40-120% recovery ≤30%RPD	No exceedances noted. No comments.

Surrogate Recovery	Surrogate compounds were added prior to extraction. The surrogate recoveries are calculated to measure extraction efficiency.
40-120% recovery	Twenty exceedances noted. Surrogate PCB 34 was over-recovered in all field samples. The second SIS in each of these samples, PCB 152, was acceptable. Likely something (high lower-chlorinated PCB levels) related to the exposed PED impacted the early-eluting surrogate. Not noted in QC samples. All data reviewed. No further corrective actions taken.

Initial Calibration (ICAL)	The GC/MS was calibrated with six-level quadratic non-forced calibration curve for all compounds using a quadratic regression (R^2). A six-level quadratic non-forced calibration curve was used for PRC PCB compounds.
$R^2 \geq 0.995$	No exceedances noted.
	No comments.

Independent Calibration Check (ICC)	The independent check was run after each initial calibration to verify the calibration. This standard is from a different source than the ICAL.
≤ 25% difference individual and mean	No exceedances noted.
	No comments.

Continuing Calibration Verification (CCV)	Continuing calibration standards were run every 24 hours or every 10 injections, whichever is shortest, to ensure that initial calibration is still valid.
≤ 25% difference individual; ≤15% difference mean	No exceedances noted.
	No comments.

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Report Project Data Set MQOs

Project Title: USACE/NAE New Bedford Harbor Task

Data Set Number: DP-17-0184

Project Number: 100043429

Prep Batch Number: 17-0368

Test Code (Matrix Type): Master_315(PRC)(S)

QC_PARAMETER:	Exceed:	Contg.:	JUSTIFICATION:
Procedural Blank	2	0	The PRC compound PCB 38 is detected in two samples < 5x what was detected in the PB. Integrations and data reviewed. RR 09/19/2017
PB Measurement Quality Objective	0	0	None
Laboratory Control Sample	0	0	None
Matrix Spike Recovery	NA	NA	NA
Matrix Spike/Spike Duplicate Precision	0	0	None
Standard Reference Material Accuracy	NA	NA	NA
Analytical Duplicate Precision	NA	NA	NA
Analytical Triplicate Precision	NA	NA	NA
Surrogate Compound Recovery	20	0	High levels of congeners in the authentic samples lead to over recovery of PCB 34. The second SIS compound, PCB 152, is acceptable in all samples, indicating both the extraction and the instrument are in control RR 09/19/2017
Control Oil	NA	NA	NA
Instrument Calibration	0	0	None
Independent Calibration Check Solution	0	0	None
Continuing Calibration Verification	0	0	None

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BATTELLE - NORWELL OPERATIONS
MISCELLANEOUS DOCUMENTATION FORM

Project Title:	USACE/NAE New Bedford Harbor Task	**Data Set Number:**	DP-17-0184
Project Number:	100043429	**Prep Batch Number:**	17-0368
Entered By:	Richard Restucci Jr	**Entered On:**	09/19/2017
Test Code (Matrix Type):	Master_315(PRC)(S)		

Integrations by Lauren Griffith, Mike Meara, and Rich Restucci.
RR 9/19/17

Method MF0909 is used to quant remaining samples and tertiary dilutions for 315 method congeners.
Method MK1084 is used to quant extract (7) dilutions.
Method MW0399 is used to quant all samples for PRC compounds.
RR 9/19/17

No ICC exists for PRC compounds.
RR 9/19/17

Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, historical data has reported these as two separate peaks. These peaks are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data.
RR 9/19/177

There are many low failing IS areas in method MW0399. This method is used to quantify PRC compounds and this internal standard is used to quantify one analyte; PCB 186. The samples were also run using MW0396A with similar results.
RR 9/19/17

Many of the undiluted authentic samples fail the IS are for PCB 96 high using method MF0909. It is likely the high levels of congeners in these samples contribute slightly to the PCB 96 IS area. In addition, most of the analytes reported from PCB 96 are reported from dilution, where PCB 96 passes IS area criterion. It should be noted that the secondary IS passes criteria using this method.
RR 9/19/17

Sample K9629-P(2) exhibits levels of contamination which render the sample unquantifiable for many congeners. Only PRC data are reported from the original, undiluted sample. All other data are reported from dilution.
RR 9/19/17

Samples were weighed using 5 decimal places, but concentrations are calculated using a sample weight value of 2 decimal places.
RR 9/19/17

Task Leader Approval:		Kevin McInerney cn=Kevin McInerney, o=Battelle, ou=Analytical Chemistry Services, email=mcinerneyk@battelle.org, c=US 2017.09.21 11:51:02 -04'00'
SupervisorApproval:		
PM Approval:		Kevin McInerney cn=Kevin McInerney, o=Battelle, ou=Analytical Chemistry Services, email=mcinerneyk@battelle.org, c=US 2017.09.21 11:51:14 -04'00'

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0909.S	F4206.D	JM67	CS	Cl5(96)		11375
SF0909.S	F4207.D	JM68	CS	Cl5(96)		10438
SF0909.S	F4208.D	JM69	CS	Cl5(96)		12911
SF0909.S	F4209.D	JM70	CS	Cl5(96)		13717
SF0909.S	F4210.D	JM71	CS	Cl5(96)		12888
SF0909.S	F4211.D	JM72	CS	Cl5(96)		13836
					L3	12911
					(+)	25822
					(-)	6456

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4212.D	JG69 ICC	ICC	Cl5(96)	13357	
SF0909.S	F4237.D	JM70	CCV	Cl5(96)	13017	
SF0909.S	F4238.D	CM915PB-P(0)	PB	Cl5(96)	11763	
SF0909.S	F4239.D	CM916LCS-P(0)	LCS	Cl5(96)	12721	
SF0909.S	F4240.D	CM917LCSD-P(0)	LCSD	Cl5(96)	11778	
SF0909.S	F4241.D	K9618-P(0)	SA	Cl5(96)	36620	>
SF0909.S	F4242.D	K9618-P-D(4)	SA	Cl5(96)	18909	
SF0909.S	F4243.D	K9618-P-D(5)	SA	Cl5(96)	17989	
SF0909.S	F4244.D	K9619-P(0)	SA	Cl5(96)	49609	>
SF0909.S	F4245.D	K9619-P-D(4)	SA	Cl5(96)	19513	
SF0909.S	F4246.D	K9619-P-D(5)	SA	Cl5(96)	14960	
SF0909.S	F4248.D	JM71	CCV	Cl5(96)	18061	
SF0909.S	F4249.D	K9620-P(0)	SA	Cl5(96)	27143	>
SF0909.S	F4250.D	K9620-P-D(4)	SA	Cl5(96)	15989	
SF0909.S	F4251.D	K9620-P-D(5)	SA	Cl5(96)	15667	
SF0909.S	F4252.D	K9621-P(0)	SA	Cl5(96)	29015	>
SF0909.S	F4253.D	K9621-P-D(4)	SA	Cl5(96)	15761	
SF0909.S	F4254.D	K9621-P-D(5)	SA	Cl5(96)	15798	
SF0909.S	F4255.D	K9622-P(0)	SA	Cl5(96)	27468	>
SF0909.S	F4256.D	K9622-P-D(4)	SA	Cl5(96)	16135	
SF0909.S	F4257.D	K9622-P-D(5)	SA	Cl5(96)	16480	
SF0909.S	F4259.D	JM70	CCV	Cl5(96)	15979	
SF0909.S	F4260.D	K9623-P(2)	SA	Cl5(96)	27444	>
SF0909.S	F4261.D	K9624-P(2)	SA	Cl5(96)	26769	>
SF0909.S	F4262.D	K9625-P(2)	SA	Cl5(96)	31574	>
SF0909.S	F4263.D	K9626-P(2)	SA	Cl5(96)	20795	
SF0909.S	F4264.D	K9627-P(2)	SA	Cl5(96)	17487	
SF0909.S	F4265.D	K9631-P(2)	SA	Cl5(96)	21879	
SF0909.S	F4266.D	K9632-P(2)	SA	Cl5(96)	22740	
SF0909.S	F4267.D	K9633-P(2)	SA	Cl5(96)	22342	
SF0909.S	F4269.D	JM71	CCV	Cl5(96)	15886	
SF0909.S	F4271.D	K9635-P(2)	SA	Cl5(96)	64568	>

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4272.D	K9636-P(2)	SA	Cl5(96)	23212	
SF0909.S	F4273.D	K9637-P(2)	SA	Cl5(96)	43323	>
SF0909.S	F4274.D	K9628-P(2)	SA	Cl5(96)	20612	
SF0909.S	F4276.D	K9630-P(2)	SA	Cl5(96)	14759	
SF0909.S	F4278.D	JM70	CCV	Cl5(96)	13474	
SF0909.S	F4279.D	K9623-P-D(4)	SA	Cl5(96)	13397	
SF0909.S	F4280.D	K9623-P-D(5)	SA	Cl5(96)	12226	
SF0909.S	F4281.D	K9624-P-D(4)	SA	Cl5(96)	12996	
SF0909.S	F4282.D	K9624-P-D(5)	SA	Cl5(96)	12145	
SF0909.S	F4283.D	K9625-P-D(4)	SA	Cl5(96)	13712	
SF0909.S	F4284.D	K9625-P-D(6)	SA	Cl5(96)	12821	
SF0909.S	F4285.D	K9626-P-D(4)	SA	Cl5(96)	13320	
SF0909.S	F4288.D	JM71	CCV	Cl5(96)	13339	
SF0909.S	F4289.D	K9627-P-D(4)	SA	Cl5(96)	12530	
SF0909.S	F4290.D	K9627-P-D(6)	SA	Cl5(96)	13216	
SF0909.S	F4291.D	K9628-P-D(4)	SA	Cl5(96)	13492	
SF0909.S	F4292.D	K9628-P-D(6)	SA	Cl5(96)	12724	
SF0909.S	F4294.D	K9629-P-D(4)	SA	Cl5(96)	16450	
SF0909.S	F4295.D	K9629-P-D(6)	SA	Cl5(96)	12396	
SF0909.S	F4296.D	K9630-P-D(4)	SA	Cl5(96)	12772	
SF0909.S	F4297.D	K9630-P-D(6)	SA	Cl5(96)	12548	
SF0909.S	F4299.D	JM70	CCV	Cl5(96)	13785	
SF0909.S	F4300.D	K9631-P-D(4)	SA	Cl5(96)	11822	
SF0909.S	F4301.D	K9631-P-D(6)	SA	Cl5(96)	11557	
SF0909.S	F4302.D	K9632-P-D(4)	SA	Cl5(96)	12137	
SF0909.S	F4303.D	K9632-P-D(6)	SA	Cl5(96)	11424	
SF0909.S	F4304.D	K9633-P-D(4)	SA	Cl5(96)	11760	
SF0909.S	F4305.D	K9633-P-D(6)	SA	Cl5(96)	11631	
SF0909.S	F4306.D	K9634-P(2)	SA	Cl5(96)	21524	
SF0909.S	F4307.D	K9634-P-D(4)	SA	Cl5(96)	13824	
SF0909.S	F4308.D	K9634-P-D(6)	SA	Cl5(96)	13476	
SF0909.S	F4309.D	JM71	CCV	Cl5(96)	18706	
SF0909.S	F4310.D	K9635-P-D(4)	SA	Cl5(96)	19186	
SF0909.S	F4311.D	K9635-P-D(6)	SA	Cl5(96)	13098	
SF0909.S	F4312.D	K9636-P-D(4)	SA	Cl5(96)	13069	
SF0909.S	F4313.D	K9636-P-D(6)	SA	Cl5(96)	12574	
SF0909.S	F4314.D	K9637-P-D(4)	SA	Cl5(96)	16392	
SF0909.S	F4315.D	K9637-P-D(6)	SA	Cl5(96)	13152	
SF0909.S	F4316.D	K9626-P-D(6)	SA	Cl5(96)	12534	
SF0909.S	F4317.D	JM71	CCV	Cl5(96)	14192	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0909.S	F4206.D	JM67	CS	Cl6(161)		7513
SF0909.S	F4207.D	JM68	CS	Cl6(161)		6792
SF0909.S	F4208.D	JM69	CS	Cl6(161)		9267
SF0909.S	F4209.D	JM70	CS	Cl6(161)		9169
SF0909.S	F4210.D	JM71	CS	Cl6(161)		8736
SF0909.S	F4211.D	JM72	CS	Cl6(161)		9365
					L3	9267
					(+)	18534
					(-)	4634

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4212.D	JG69 ICC	ICC	Cl6(161)	9337	
SF0909.S	F4237.D	JM70	CCV	Cl6(161)	9033	
SF0909.S	F4238.D	CM915PB-P(0)	PB	Cl6(161)	9102	
SF0909.S	F4239.D	CM916LCS-P(0)	LCS	Cl6(161)	9546	
SF0909.S	F4240.D	CM917LCSD-P(0)	LCSD	Cl6(161)	8921	
SF0909.S	F4241.D	K9618-P(0)	SA	Cl6(161)	9755	
SF0909.S	F4242.D	K9618-P-D(4)	SA	Cl6(161)	11838	
SF0909.S	F4243.D	K9618-P-D(5)	SA	Cl6(161)	12547	
SF0909.S	F4244.D	K9619-P(0)	SA	Cl6(161)	7449	
SF0909.S	F4245.D	K9619-P-D(4)	SA	Cl6(161)	10062	
SF0909.S	F4246.D	K9619-P-D(5)	SA	Cl6(161)	10403	
SF0909.S	F4248.D	JM71	CCV	Cl6(161)	12596	
SF0909.S	F4249.D	K9620-P(0)	SA	Cl6(161)	7592	
SF0909.S	F4250.D	K9620-P-D(4)	SA	Cl6(161)	10042	
SF0909.S	F4251.D	K9620-P-D(5)	SA	Cl6(161)	10889	
SF0909.S	F4252.D	K9621-P(0)	SA	Cl6(161)	7555	
SF0909.S	F4253.D	K9621-P-D(4)	SA	Cl6(161)	9840	
SF0909.S	F4254.D	K9621-P-D(5)	SA	Cl6(161)	11261	
SF0909.S	F4255.D	K9622-P(0)	SA	Cl6(161)	7357	
SF0909.S	F4256.D	K9622-P-D(4)	SA	Cl6(161)	10241	
SF0909.S	F4257.D	K9622-P-D(5)	SA	Cl6(161)	11505	
SF0909.S	F4259.D	JM70	CCV	Cl6(161)	11087	
SF0909.S	F4260.D	K9623-P(2)	SA	Cl6(161)	6198	
SF0909.S	F4261.D	K9624-P(2)	SA	Cl6(161)	6156	
SF0909.S	F4262.D	K9625-P(2)	SA	Cl6(161)	6130	
SF0909.S	F4263.D	K9626-P(2)	SA	Cl6(161)	6226	
SF0909.S	F4264.D	K9627-P(2)	SA	Cl6(161)	6093	
SF0909.S	F4265.D	K9631-P(2)	SA	Cl6(161)	6382	
SF0909.S	F4266.D	K9632-P(2)	SA	Cl6(161)	5899	
SF0909.S	F4267.D	K9633-P(2)	SA	Cl6(161)	6247	
SF0909.S	F4269.D	JM71	CCV	Cl6(161)	11160	
SF0909.S	F4271.D	K9635-P(2)	SA	Cl6(161)	5709	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0909.S	F4272.D	K9636-P(2)	SA	Cl6(161)	6223	
SF0909.S	F4273.D	K9637-P(2)	SA	Cl6(161)	5839	
SF0909.S	F4274.D	K9628-P(2)	SA	Cl6(161)	5846	
SF0909.S	F4276.D	K9630-P(2)	SA	Cl6(161)	4819	
SF0909.S	F4278.D	JM70	CCV	Cl6(161)	9325	
SF0909.S	F4279.D	K9623-P-D(4)	SA	Cl6(161)	7678	
SF0909.S	F4280.D	K9623-P-D(5)	SA	Cl6(161)	8333	
SF0909.S	F4281.D	K9624-P-D(4)	SA	Cl6(161)	7705	
SF0909.S	F4282.D	K9624-P-D(5)	SA	Cl6(161)	8356	
SF0909.S	F4283.D	K9625-P-D(4)	SA	Cl6(161)	7934	
SF0909.S	F4284.D	K9625-P-D(6)	SA	Cl6(161)	9219	
SF0909.S	F4285.D	K9626-P-D(4)	SA	Cl6(161)	8525	
SF0909.S	F4288.D	JM71	CCV	Cl6(161)	9278	
SF0909.S	F4289.D	K9627-P-D(4)	SA	Cl6(161)	8179	
SF0909.S	F4290.D	K9627-P-D(6)	SA	Cl6(161)	9375	
SF0909.S	F4291.D	K9628-P-D(4)	SA	Cl6(161)	8162	
SF0909.S	F4292.D	K9628-P-D(6)	SA	Cl6(161)	8755	
SF0909.S	F4294.D	K9629-P-D(4)	SA	Cl6(161)	7498	
SF0909.S	F4295.D	K9629-P-D(6)	SA	Cl6(161)	8565	
SF0909.S	F4296.D	K9630-P-D(4)	SA	Cl6(161)	8434	
SF0909.S	F4297.D	K9630-P-D(6)	SA	Cl6(161)	8978	
SF0909.S	F4299.D	JM70	CCV	Cl6(161)	9460	
SF0909.S	F4300.D	K9631-P-D(4)	SA	Cl6(161)	7613	
SF0909.S	F4301.D	K9631-P-D(6)	SA	Cl6(161)	8154	
SF0909.S	F4302.D	K9632-P-D(4)	SA	Cl6(161)	7585	
SF0909.S	F4303.D	K9632-P-D(6)	SA	Cl6(161)	7906	
SF0909.S	F4304.D	K9633-P-D(4)	SA	Cl6(161)	7401	
SF0909.S	F4305.D	K9633-P-D(6)	SA	Cl6(161)	8219	
SF0909.S	F4306.D	K9634-P(2)	SA	Cl6(161)	5262	
SF0909.S	F4307.D	K9634-P-D(4)	SA	Cl6(161)	8470	
SF0909.S	F4308.D	K9634-P-D(6)	SA	Cl6(161)	9391	
SF0909.S	F4309.D	JM71	CCV	Cl6(161)	12984	
SF0909.S	F4310.D	K9635-P-D(4)	SA	Cl6(161)	7940	
SF0909.S	F4311.D	K9635-P-D(6)	SA	Cl6(161)	8602	
SF0909.S	F4312.D	K9636-P-D(4)	SA	Cl6(161)	8058	
SF0909.S	F4313.D	K9636-P-D(6)	SA	Cl6(161)	8620	
SF0909.S	F4314.D	K9637-P-D(4)	SA	Cl6(161)	8019	
SF0909.S	F4315.D	K9637-P-D(6)	SA	Cl6(161)	9033	
SF0909.S	F4316.D	K9626-P-D(6)	SA	Cl6(161)	8913	
SF0909.S	F4317.D	JM71	CCV	Cl6(161)	9829	

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MF0909.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MK1084.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SK1084.S	K7007.D	JM67	CS	Cl5(96)		16810
SK1084.S	K7008.D	JM68	CS	Cl5(96)		18117
SK1084.S	K7009.D	JM69	CS	Cl5(96)		21228
SK1084.S	K7010.D	JM70	CS	Cl5(96)		22818
SK1084.S	K7011.D	JM71	CS	Cl5(96)		22640
SK1084.S	K7012.D	JM72	CS	Cl5(96)		25001
					L3	21228
					(+)	42456
					(-)	10614

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SK1084.S	K7013.D	JG69 ICC	ICC	Cl5(96)	22272	
SK1085.S	K7042.D	JM70	CCV	Cl5(96)	18058	
SK1085.S	K7043.D	K9618-P-D(7)	SA	Cl5(96)	17897	
SK1085.S	K7044.D	K9619-P-D(7)	SA	Cl5(96)	17204	
SK1085.S	K7045.D	K9620-P-D(7)	SA	Cl5(96)	18182	
SK1085.S	K7046.D	K9621-P-D(7)	SA	Cl5(96)	18423	
SK1085.S	K7047.D	K9622-P-D(7)	SA	Cl5(96)	17889	
SK1085.S	K7048.D	K9623-P-D(7)	SA	Cl5(96)	17934	
SK1085.S	K7049.D	K9624-P-D(7)	SA	Cl5(96)	17859	
SK1085.S	K7050.D	K9625-P-D(7)	SA	Cl5(96)	17637	
SK1085.S	K7053.D	JM70	CCV	Cl5(96)	18615	
SK1085.S	K7054.D	K9628-P-D(7)	SA	Cl5(96)	16761	
SK1085.S	K7055.D	K9629-P-D(7)	SA	Cl5(96)	17353	
SK1085.S	K7058.D	K9632-P-D(7)	SA	Cl5(96)	17327	
SK1085.S	K7060.D	K9634-P-D(7)	SA	Cl5(96)	17929	
SK1085.S	K7061.D	K9635-P-D(7)	SA	Cl5(96)	17433	
SK1085.S	K7062.D	K9636-P-D(7)	SA	Cl5(96)	17428	
SK1085.S	K7063.D	K9637-P-D(7)	SA	Cl5(96)	18051	
SK1085.S	K7064.D	JM71	CCV	Cl5(96)	19950	

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MK1084.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SK1084.S	K7007.D	JM67	CS	Cl6(161)		12533
SK1084.S	K7008.D	JM68	CS	Cl6(161)		12766
SK1084.S	K7009.D	JM69	CS	Cl6(161)		14809
SK1084.S	K7010.D	JM70	CS	Cl6(161)		16431
SK1084.S	K7011.D	JM71	CS	Cl6(161)		16328
SK1084.S	K7012.D	JM72	CS	Cl6(161)		17340
					L3	14809
					(+)	29618
					(-)	7405

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SK1084.S	K7013.D	JG69 ICC	ICC	Cl6(161)	16965	
SK1085.S	K7042.D	JM70	CCV	Cl6(161)	11811	
SK1085.S	K7043.D	K9618-P-D(7)	SA	Cl6(161)	12965	
SK1085.S	K7044.D	K9619-P-D(7)	SA	Cl6(161)	12033	
SK1085.S	K7045.D	K9620-P-D(7)	SA	Cl6(161)	12780	
SK1085.S	K7046.D	K9621-P-D(7)	SA	Cl6(161)	12911	
SK1085.S	K7047.D	K9622-P-D(7)	SA	Cl6(161)	12684	
SK1085.S	K7048.D	K9623-P-D(7)	SA	Cl6(161)	12571	
SK1085.S	K7049.D	K9624-P-D(7)	SA	Cl6(161)	12503	
SK1085.S	K7050.D	K9625-P-D(7)	SA	Cl6(161)	12390	
SK1085.S	K7053.D	JM70	CCV	Cl6(161)	13100	
SK1085.S	K7054.D	K9628-P-D(7)	SA	Cl6(161)	11549	
SK1085.S	K7055.D	K9629-P-D(7)	SA	Cl6(161)	11922	
SK1085.S	K7058.D	K9632-P-D(7)	SA	Cl6(161)	11838	
SK1085.S	K7060.D	K9634-P-D(7)	SA	Cl6(161)	12031	
SK1085.S	K7061.D	K9635-P-D(7)	SA	Cl6(161)	11957	
SK1085.S	K7062.D	K9636-P-D(7)	SA	Cl6(161)	12106	
SK1085.S	K7063.D	K9637-P-D(7)	SA	Cl6(161)	12333	
SK1085.S	K7064.D	JM71	CCV	Cl6(161)	13759	

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MW0399.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0399.S	W9161.D	JJ48	CS	Cl5(96)		21033
SW0399.S	W9162.D	JJ49	CS	Cl5(96)		20083
SW0399.S	W9163.D	JJ50	CS	Cl5(96)		19825
SW0399.S	W9164.D	JJ51	CS	Cl5(96)		19072
SW0399.S	W9165.D	JJ52	CS	Cl5(96)		20210
SW0399.S	W9166.D	JJ53	CS	Cl5(96)		18681
					L3	19825
					(+)	39650
					(-)	9913

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SW0399.S	W9183.D	JJ52	CCV	Cl5(96)	21789	
SW0399.S	W9184.D	CM915PB-P(0)	PB	Cl5(96)	17394	
SW0399.S	W9185.D	CM916LCS-P(0)	LCS	Cl5(96)	10492	
SW0399.S	W9186.D	CM917LCSD-P(0)	LCSD	Cl5(96)	8714	<
SW0399.S	W9187.D	K9618-P(2)	SA	Cl5(96)	23747	
SW0399.S	W9188.D	K9619-P(2)	SA	Cl5(96)	40222	>
SW0399.S	W9189.D	K9620-P(2)	SA	Cl5(96)	20950	
SW0399.S	W9190.D	K9621-P(2)	SA	Cl5(96)	21608	
SW0399.S	W9191.D	K9622-P(2)	SA	Cl5(96)	20217	
SW0399.S	W9192.D	JJ51	CCV	Cl5(96)	20469	
SW0399.S	W9193.D	K9623-P(2)	SA	Cl5(96)	29474	
SW0399.S	W9194.D	K9624-P(2)	SA	Cl5(96)	22018	
SW0399.S	W9195.D	K9625-P(2)	SA	Cl5(96)	27313	
SW0399.S	W9196.D	K9626-P(2)	SA	Cl5(96)	18264	
SW0399.S	W9197.D	K9627-P(2)	SA	Cl5(96)	18922	
SW0399.S	W9198.D	K9631-P(2)	SA	Cl5(96)	21521	
SW0399.S	W9199.D	K9632-P(2)	SA	Cl5(96)	19927	
SW0399.S	W9200.D	JJ52	CCV	Cl5(96)	38902	
SW0399.S	W9201.D	K9633-P(2)	SA	Cl5(96)	20917	
SW0399.S	W9202.D	K9634-P(2)	SA	Cl5(96)	26028	
SW0399.S	W9203.D	K9635-P(2)	SA	Cl5(96)	63332	>
SW0399.S	W9204.D	K9636-P(2)	SA	Cl5(96)	21421	
SW0399.S	W9205.D	K9637-P(2)	SA	Cl5(96)	39261	
SW0399.S	W9206.D	K9628-P(2)	SA	Cl5(96)	16634	
SW0399.S	W9207.D	K9629-P(2)	SA	Cl5(96)	44131	>
SW0399.S	W9208.D	K9630-P(2)	SA	Cl5(96)	16936	
SW0399.S	W9209.D	JJ51	CCV	Cl5(96)	15652	

BATTELLE

It can be done

Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0368

METHOD: MW0399.M

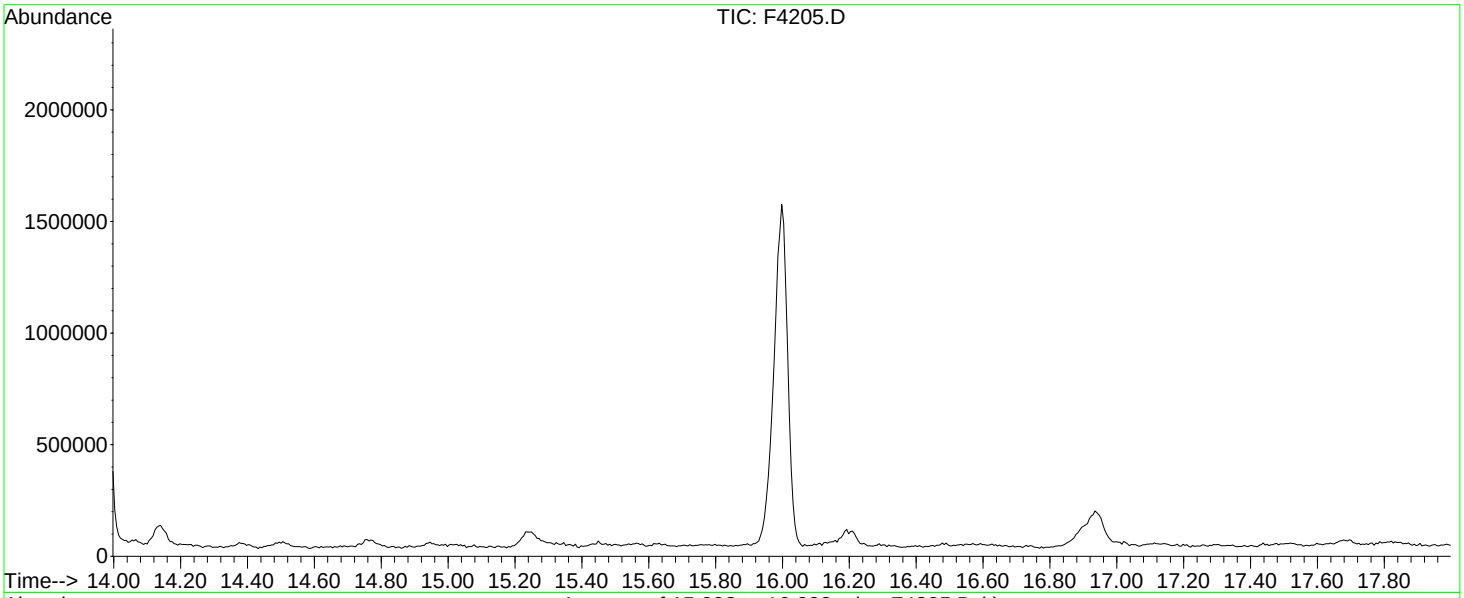
SIGNAL: 1

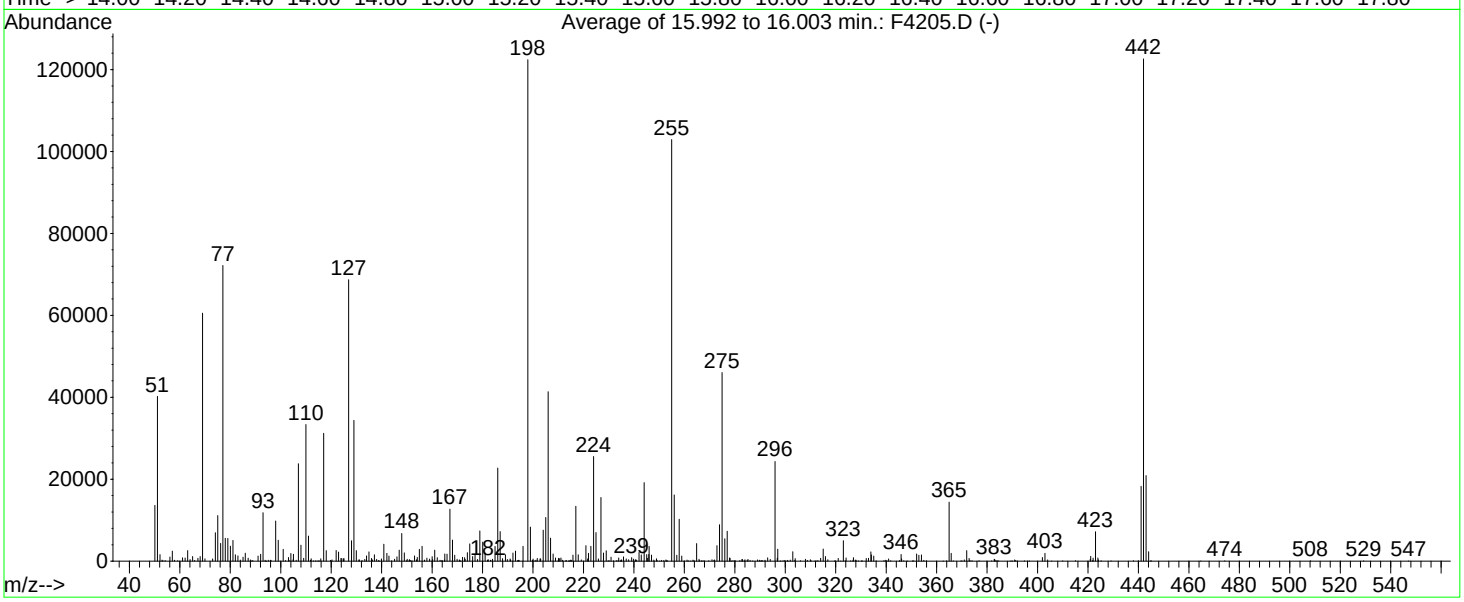
SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0399.S	W9161.D	JJ48	CS	Cl6(161)		14960
SW0399.S	W9162.D	JJ49	CS	Cl6(161)		13783
SW0399.S	W9163.D	JJ50	CS	Cl6(161)		13727
SW0399.S	W9164.D	JJ51	CS	Cl6(161)		12904
SW0399.S	W9165.D	JJ52	CS	Cl6(161)		14006
SW0399.S	W9166.D	JJ53	CS	Cl6(161)		12921
					L3	13727
					(+)	27454
					(-)	6864

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:		
SW0399.S	W9183.D	JJ52	CCV	Cl6(161)	15367			
SW0399.S	W9184.D	CM915PB-P(0)	PB	Cl6(161)	13481			
SW0399.S	W9185.D	CM916LCS-P(0)	LCS	Cl6(161)	7267			
SW0399.S	W9186.D	CM917LCSD-P(0)	LCSD	Cl6(161)	6061	<		
SW0399.S	W9187.D	K9618-P(2)	SA	Cl6(161)	7090			
SW0399.S	W9188.D	K9619-P(2)	SA	Cl6(161)	5694	<		
SW0399.S	W9189.D	K9620-P(2)	SA	Cl6(161)	5864	<		
SW0399.S	W9190.D	K9621-P(2)	SA	Cl6(161)	5455	<		
SW0399.S	W9191.D	K9622-P(2)	SA	Cl6(161)	6005	<		
SW0399.S	W9192.D	JJ51	CCV	Cl6(161)	14965			
SW0399.S	W9193.D	K9623-P(2)	SA	Cl6(161)	6030	<		
SW0399.S	W9194.D	K9624-P(2)	SA	Cl6(161)	5623	<		
SW0399.S	W9195.D	K9625-P(2)	SA	Cl6(161)	4808	<		
SW0399.S	W9196.D	K9626-P(2)	SA	Cl6(161)	5891	<		
SW0399.S	W9197.D	K9627-P(2)	SA	Cl6(161)	~~107687~~	~~>~~	5985	RR 9/21/17
SW0399.S	W9198.D	K9631-P(2)	SA	Cl6(161)	6029	<		
SW0399.S	W9199.D	K9632-P(2)	SA	Cl6(161)	~~191190~~	~~>~~	6152	
SW0399.S	W9200.D	JJ52	CCV	Cl6(161)	28746	>		
SW0399.S	W9201.D	K9633-P(2)	SA	Cl6(161)	5573	<		
SW0399.S	W9202.D	K9634-P(2)	SA	Cl6(161)	6510	<		
SW0399.S	W9203.D	K9635-P(2)	SA	Cl6(161)	4979	<		
SW0399.S	W9204.D	K9636-P(2)	SA	Cl6(161)	5379	<		
SW0399.S	W9205.D	K9637-P(2)	SA	Cl6(161)	4464	<		
SW0399.S	W9206.D	K9628-P(2)	SA	Cl6(161)	4698	<		
SW0399.S	W9207.D	K9629-P(2)	SA	Cl6(161)	3716	<		
SW0399.S	W9208.D	K9630-P(2)	SA	Cl6(161)	4896	<		
SW0399.S	W9209.D	JJ51	CCV	Cl6(161)	11581			

Data File : G:\F\DATA\SF0909\F4205.D
Acq On : 15 Sep 2017 1:33 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0909.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: NA

Vial: 1
Operator: LMG
Inst : Inst. F
Multiplr: 1.00



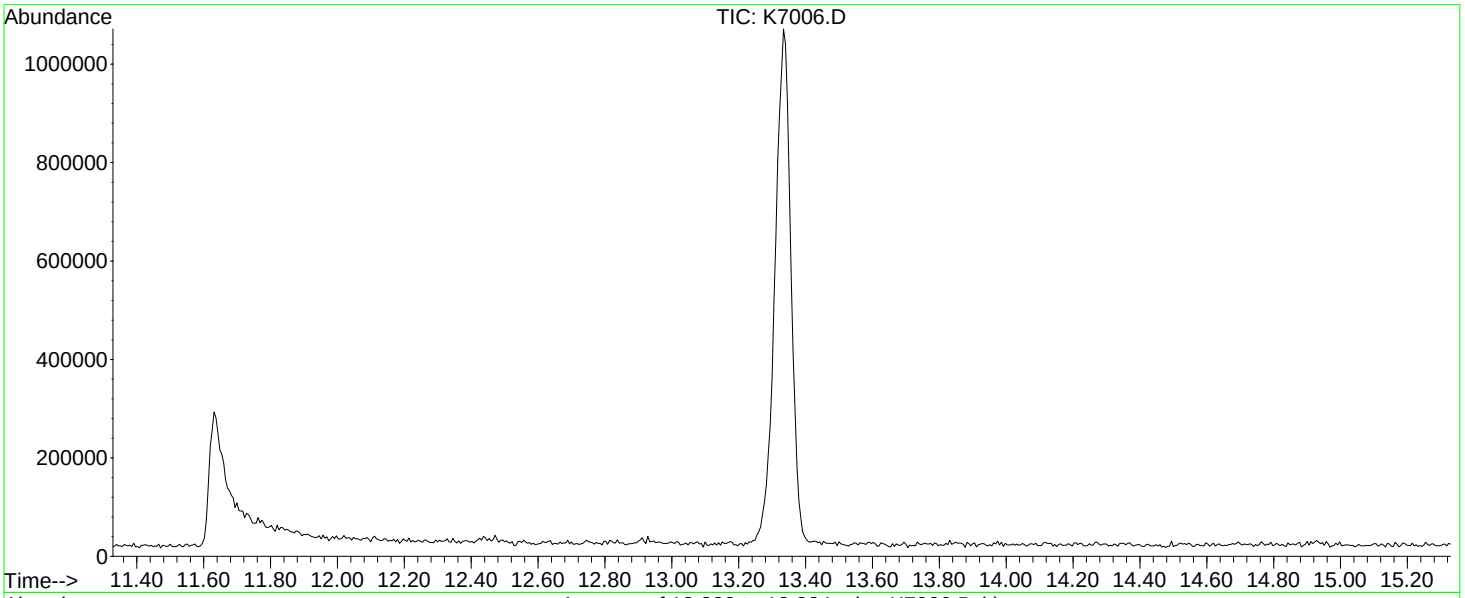


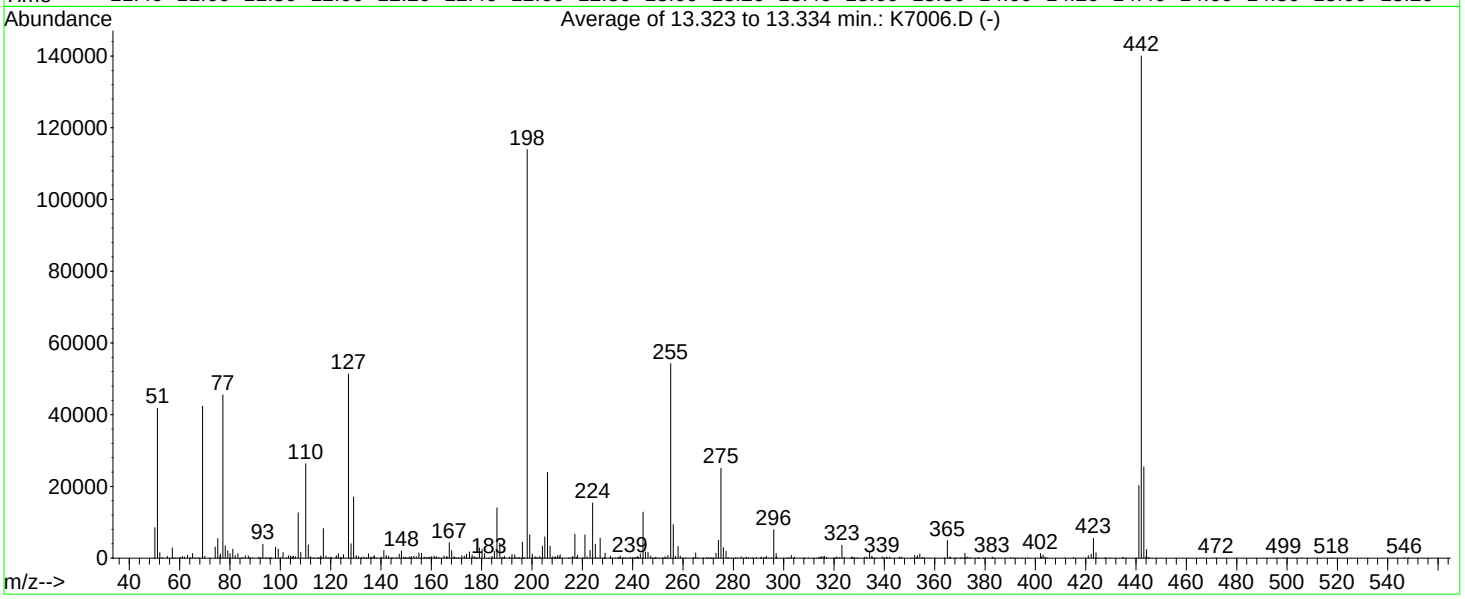
AutoFind: Scans 1909, 1910, 1911; Background Corrected with Scan 1891

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	32.9	40221	PASS
68	69	0.00	2	1.9	1126	PASS
70	69	0.00	2	1.0	604	PASS
127	198	10	80	56.1	68687	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	122400	PASS
199	198	5	9	6.8	8306	PASS
275	198	10	60	37.6	46032	PASS
365	198	1	1000	11.8	14420	PASS
441	442	0.01	24	14.9	18286	PASS
442	198	50	1000	100.2	122605	PASS
443	442	15	24	17.0	20904	PASS

Data File : G:\K\DATA\SK1084\K7006.D
Acq On : 14 Sep 2017 3:31 pm
Sample : JJ95
Misc : 5-315 TUNE
MS Integration Params: rteint.p
Method : G:\K\DATA\MK1084.M (RTE Integrator)
Title : PCB
Standard Mult: 1.000 ( )

Vial: 1
Operator: MM
Inst : Inst K
Multiplr: 1.00



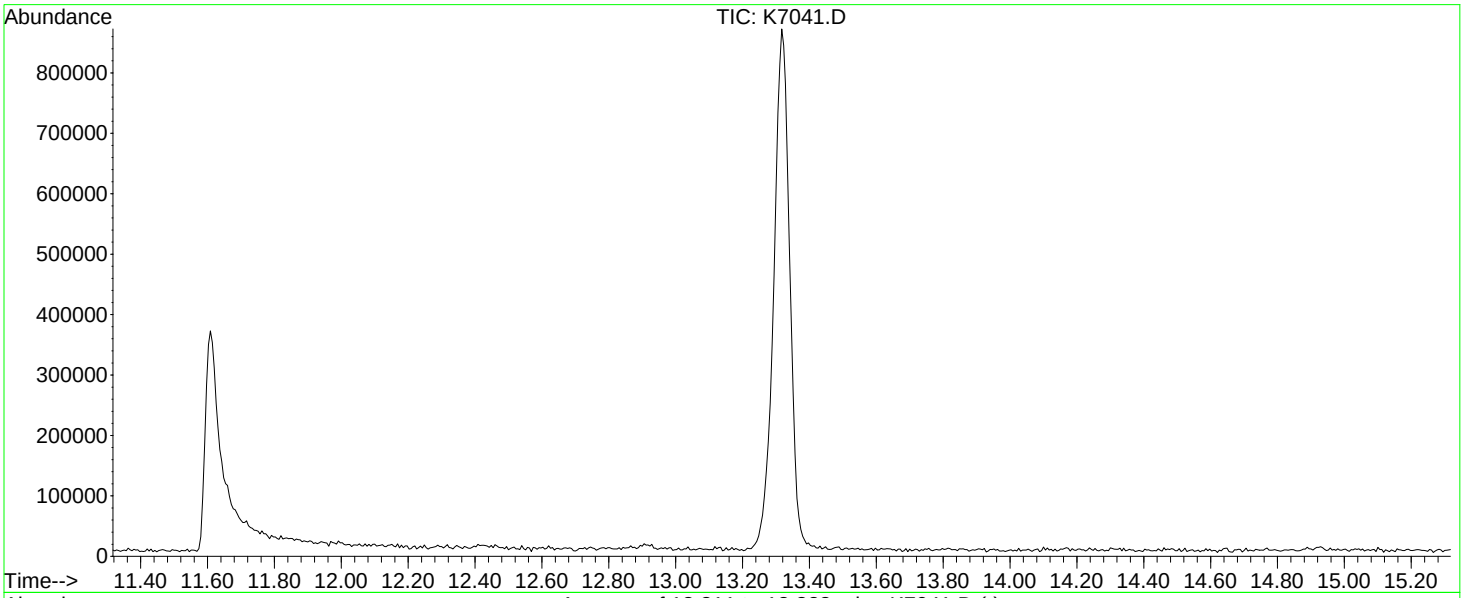


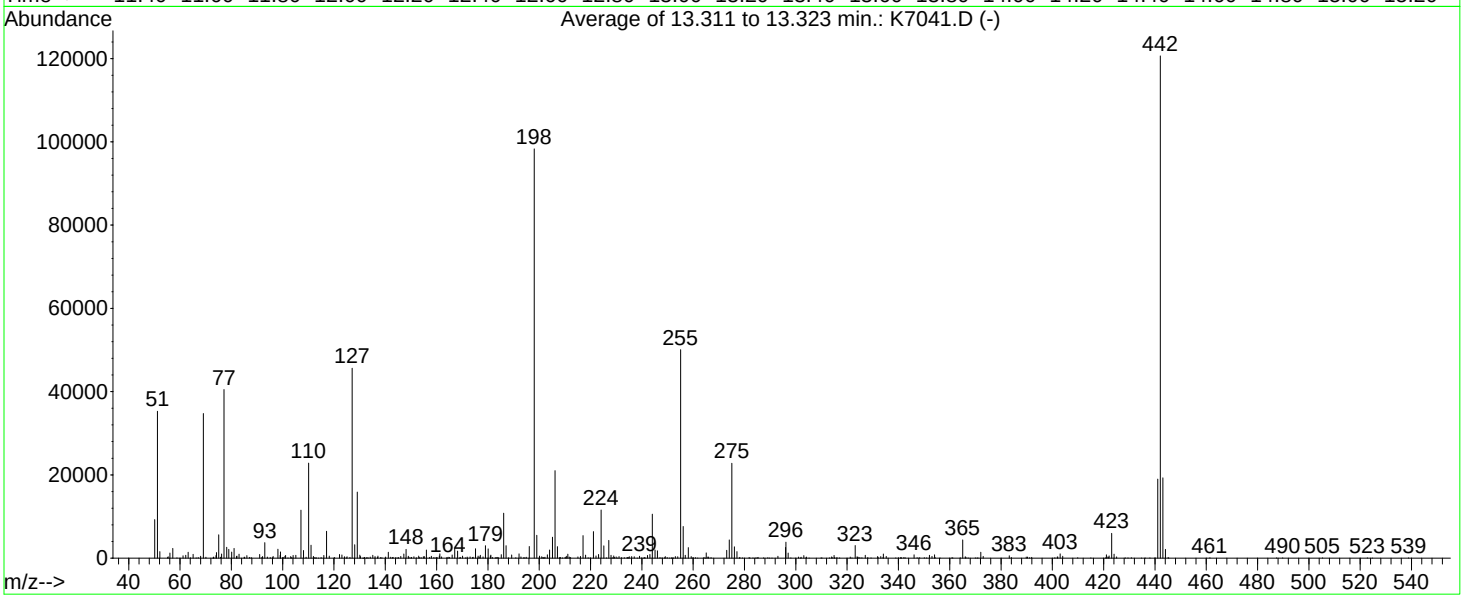
AutoFind: Scans 1442, 1443, 1444; Background Corrected with Scan 1426

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	36.7	41792	PASS
68	69	0.00	2	0.0	0	PASS
70	69	0.00	2	1.3	555	PASS
127	198	10	80	45.1	51349	PASS
197	198	0.00	2	0.1	168	PASS
198	198	100	100	100.0	113925	PASS
199	198	5	9	5.7	6509	PASS
275	198	10	60	22.0	25093	PASS
365	198	1	1000	4.3	4936	PASS
441	442	0.01	24	14.5	20256	PASS
442	198	50	1000	122.9	140042	PASS
443	442	15	24	18.2	25481	PASS

Data File : G:\K\DATA\SK1085\K7041.D
Acq On : 18 Sep 2017 1:53 pm
Sample : JJ95
Misc : 5-315 TUNE
MS Integration Params: rteint.p
Method : G:\K\DATA\MK1084.M (RTE Integrator)
Title : PCB
Standard Mult: 1.000 ( )

Vial: 2
Operator: LMG
Inst : Inst K
Multiplr: 1.00



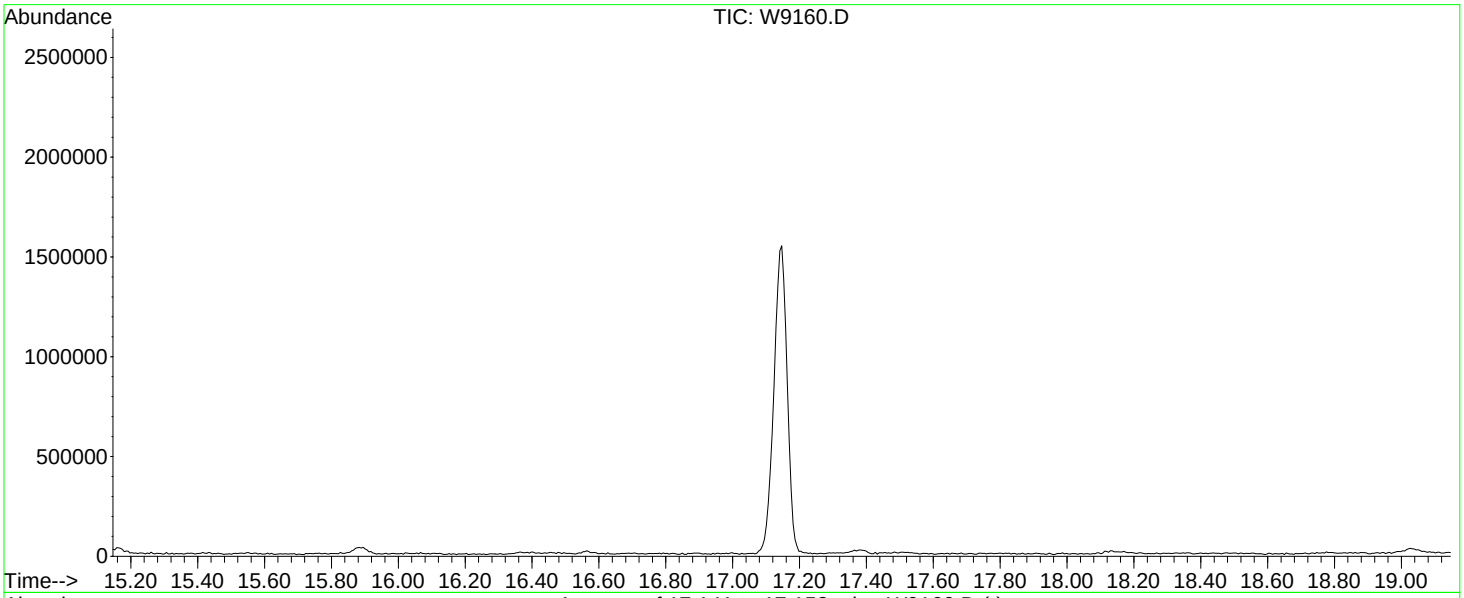


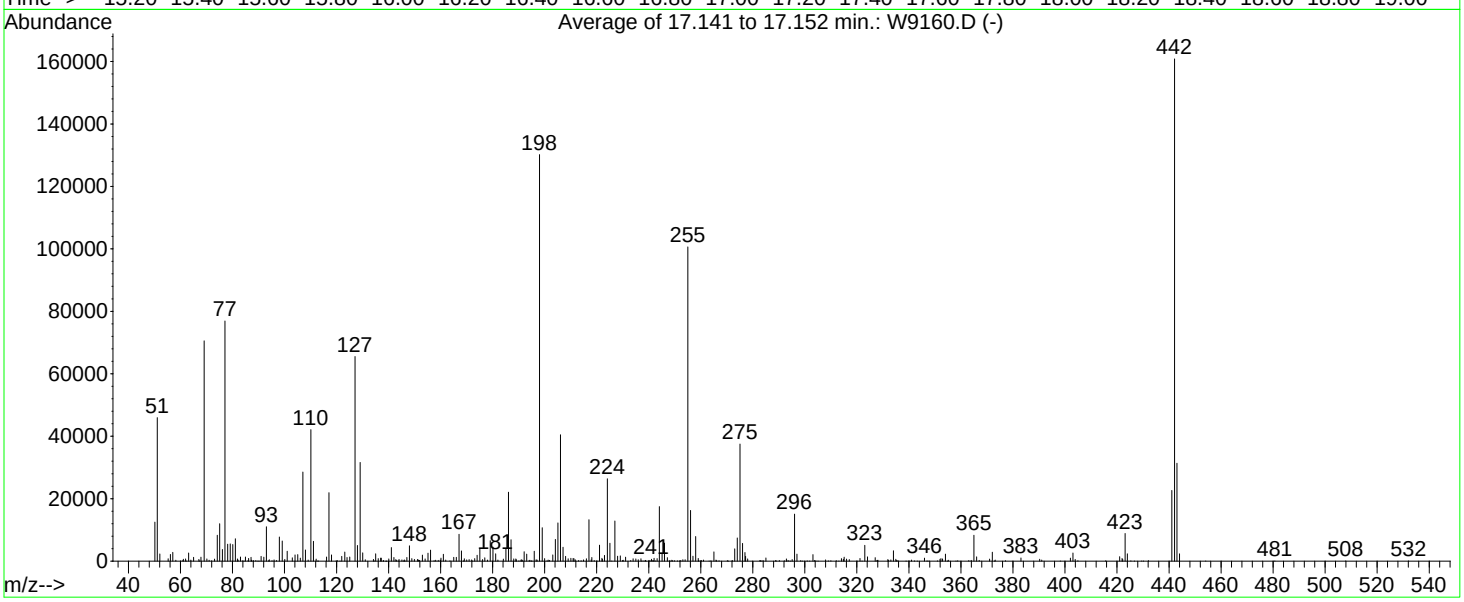
AutoFind: Scans 1440, 1441, 1442; Background Corrected with Scan 1422

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	35.9	35301	PASS
68	69	0.00	2	1.4	483	PASS
70	69	0.00	2	0.7	241	PASS
127	198	10	80	46.4	45613	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	98314	PASS
199	198	5	9	5.6	5490	PASS
275	198	10	60	23.2	22792	PASS
365	198	1	1000	4.4	4369	PASS
441	442	0.01	24	15.7	18984	PASS
442	198	50	1000	122.7	120642	PASS
443	442	15	24	16.0	19288	PASS

Data File : G:\W\DATA\SW0399\W9160.D
Acq On : 15 Sep 2017 11:19 am
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\W\DATA\MW0399A.M (RTE Integrator)
Title : PRC
Standard Mult: NA

Vial: 1
Operator: LMG
Inst : Inst. W
Multiplr: 1.00





AutoFind: Scans 2110, 2111, 2112; Background Corrected with Scan 2094

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	35.3	45952	PASS
68	69	0.00	2	1.8	1269	PASS
70	69	0.00	2	1.0	727	PASS
127	198	10	80	50.3	65538	PASS
197	198	0.00	2	0.4	463	PASS
198	198	100	100	100.0	130218	PASS
199	198	5	9	8.2	10722	PASS
275	198	10	60	28.8	37530	PASS
365	198	1	1000	6.4	8327	PASS
441	442	0.01	24	14.1	22632	PASS
442	198	50	1000	123.5	160832	PASS
443	442	15	24	19.5	31352	PASS

USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0369

Package DP-17-0185

Submitted to:
USACE - North Atlantic Division
696 Virginia Rd.
Concord, MA 017422751 USA

NELAP Accreditation Number: E87856 (Florida Department of Health)
DoD-ELAP Accreditation Number: 91667

Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Analyst Approval: Rich Restucci 2017.09.15 10:57:29 -04'00'

QC Chemist Approval: Ellyn M Webb 2017.09.20 11:48:19 -04'00'

Project Manager Approval: peven@battelle.org 2017.09.20 13:56:06 -04'00'

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USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM

PED

Batch 17-0369

Package DP-17-0185

1	***Work Plan*** Laboratory Work Plan, Addendums To Work Plan, Memos From Project Manager, Special Instructions, Chain-of-Custody Reports.	1
2	***Tables*** Analytical Data Tables, Qualifier Definitions.	30
3	***Miscellaneous Documentation*** Case Narrative, Miscellaneous Documentation Form, Quality Control Summary, Example Calculations, Internal Standard Recovery Report, Retention Time Window Report.	56
4	***Sample Preparation Records*** Sample Preparation Records, Dilution Worksheets, Standard Preparation Records, Certificates Of Analysis, GPC Check Report.	N/A
5	***Analytical Calibrations*** Analytical Sequence, Analytical Method, Tune Report, Initial Calibration, Pesticide Degradation Report, RF Summary, Calibration Verifications, Independent Calibration Verification Check.	N/A
6	***Analytical Data*** Raw Data Quantification Reports.	N/A
7	***Chromatograms*** Sample And Standard Chromatograms.	N/A
8	***Unused Data***	N/A

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WORK/QUALITY ASSURANCE PROJECT PLAN

1.0 GENERAL PROJECT INFORMATION

Project Title:	USACE - NBH Aerovox Passive Sampler
Project Number:	100043429
Client:	USACE/NAE 696 Virginia Road Concord, MA 01742 USA
Client Contact Information:	Peter Hugh Engineering Technical Lead (978) 318-8452(V) NA NA
Effective Date of QAPP:	8/21/2017
Version Number:	100043429(S)-12
Project Manager:	Peven-McCarthy, Carole
Laboratory Task Manager:	Peven-McCarthy, Carole
Deliverable Due Date:	9/13/2017

2.0 SCOPE OF WORK

Overview:	Analysis of exposed PEDs to monitor dissolved concentrations of PCB congeners in porewater and surface water. Activity ID: 17T6AVX
Matrix:	Soil/Sediment

2.1 TECHNICAL APPROACH

2.1.1 Sample Receipt, Storage, and Handling

The list of samples for this project plan are presented in Attachment 1.

Storage Directions:	Store refrigerated (up to 14 days from collection) or frozen (up to 1 year) until extraction.
Sub_Sampling:	Yes
Procedures:	PM will lead PED splitting. Each PED will be split into ~4 sections based on PM directives. Each section will receive a unique ID. Photograph each PED during inspection prior to cleaning.
Contact:	NA
Comment:	NA

Archiving: Frozen storage.

Disposal: Standard

2.1.2 Sample Preparation

22 PEDs, 2 samples generated from each - 44 field samples,
4 background PED (2 per each set of 20 PED prepared)
1 PED trip blank

IRAD samples:

Samples Expected:	Samples Per Batch:	Batches Expected:
49	20	3

Batch quality control samples are defined in Table 1.

Target samples are presented in Attachment 1.

Table 1: Quality Control Samples

Type:	*Description:*	*Count:*	*Rgt:*	*Reference:*	*Comment:*
PB	Laboratory control reagent blank.	1 per batch	--	NA	
LCS	Laboratory Control Sample	1 per batch	No	NA	use clean PED for LCS and LCSD
LCSD	Laboratory Control Sample Duplicate	1 per batch	No	NA	use clean PED for LCS and LCSD

2.1.3 Extraction/Preparation

2.1.3.1 Extraction

SOP No.-Rev: **5-192-15**

SOP Title: *Soil/Sediment Extraction for Trace Level Semi-Volatile Organic Contaminant Analysis*

Sample Size: 1 g

SIS and LCS/MS Compounds: Defined in Table 2.

Deviations: 1 g weight is a place holder - an estimate of the weight of the fraction of the PED.

After extraction, dry and weigh the PEDs recording weight to 5 decimal places.

Use undeployed PEDs for LCS and LCSD. They do not necessarily have

to be spiked with PRCs.

Extract in hexane.

Comments: - PM will inspect PEDs and advise prep staff if samples need to be cleaned of biofilm before extraction. Cleaning will be performed by gently wiping PED with Kimwipe and/or rinsing with Milli-Q water.

- Photograph each PED prior to processing.

- PED will be removed from frame by cutting with a clean straight edge knife. Only the exposed portion of the PED will be extracted.

- The PEDs will be cut at the sediment water interface. Consult with PM before cutting PEDs. 6" above and below the interface will be extracted. The remainder will be archived frozen. (Each PED will be split into 4 unique sections; two analyzed, two archived.) New IDs will be assigned to each sample section.

Table 2: SIS and LCS/MS Spiking Level

Standard Type	Standard Contents		Spike Amount (ng)	Volume (uL)	Comment
PCB SIS	JC21	SIS	~ 50 ng	50 uL	NA
PCB LCS Spiking Solution	JG57	LCS/MS	~ 50 ng	100 uL	NA

2.1.3.2 Cleanup

1)	SOP No.-Rev:	**5-329-07**
	SOP Title:	*Alumina Cleanup of Environmental Sample Extracts*
	Deviations:	none
	Comments:	none
2)	SOP No.-Rev:	**5-328-04**
	SOP Title:	*Removal (cleanup) of Sulfur from Environmental Sample Extracts*
	Deviations:	NA
	Comments:	NA

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3)	SOP No.-Rev:	**5-191-11**
	SOP Title:	*Size Exclusion HPLC Cleanup of Environmental Sample Extracts*
	Deviations:	Consult with PM after alumina cleanup. If extracts do not appear to be heavily laiden with matrix, GPC will not be performed.
	Comments:	none

RIS spiking levels are presented in Table 3.

Extract PIV (uL): 500

Table 3: RIS Spiking Level

Standard Type	Standard Contents	Spike Amount (ng)	Volume (uL)	Comment
PCB IS	JD51 RIS	~ 50 ng	50 uL	NA

2.1.4 Instrumental Analysis

The list of analytes along with data quality criteria are presented in Attachment 2.

1)	SOP_No-Rev:	**5-315-11**
	SOP_Title:	*Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode*
	Deviations:	Generate separate standards and calibration curve for PRCs. Reporting in ng/kg (NOTE TO LAB REVIEWERS - what conversion in test code?)
	Comments:	Quadratic calibration curve fitting (not forced).

2.2. DELIVERABLES

Deliverables Due:	9/13/2017
LIMS Reports:	*Yes*
Histograms:	*No*
Excel Tables:	*Yes*
EICs:	*No*
Chromatograms:	*No*
EDDs:	*Yes*
Comments:	New Bedford Harbor EDD required.

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WORK/QUALITY ASSURANCE PROJECT PLAN

Full data package (pdf) required for external validation.
Detailed quant reports are not required.

3.0 QUALITY

The Method Quality Objectives are defined in Attachment 3.

4.0 ORGANIZATION AND COMMUNICATION

4.1 ORGANIZATION

The project team is defined in Table 4. Supervisors may make substitutions with Project Manager concurrence.

Table 4: Project Team and Roles

Staff Member	Role	Comment
Lisa F. Lefkovitz	Project Manager	NA
Samuel A. Guimaraes	Sample Preparation	NA
Richard P. Restucci Jr	GC/MS Analysis	NA
Matt D. Schumitz	Sample Custody	NA
Carla R. Devine	Quality Control Officer	NA

4.2 COMMUNICATION

A kick-off meeting will be held to discuss project scope and goals.

5.0 SCHEDULE

The project schedule is presented in Table 5.

Table 5. Schedule of Laboratory Activities

Activity:	Start Date:	End Date:	TAT (days):	Comment:
Sample Receipt	08/11/2017	08/11/2017	0	NA
Sample Preparation	08/11/2017	08/23/2017	12	NA
Instrument Analysis	08/17/2017	09/07/2017	21	NA
Quality Control Review	09/11/2017	09/12/2017	1	NA
Final Data Reporting	09/12/2017	09/12/2017	0	NA

6.0 BUDGET

The labor budget for the analytical task is presented in Table 6.

Table 6. Labor Budget (Laboratory Analytical Task)

Labor Activity:	Hours/ Batch:	Batches:	Total Hours:	Comment:
Sample Receipt	3	3	9	Note: The third batch will contain 4 field samples. The associated IR&D samples can be included with these samples for efficiency.
Sample Preparation	40	3	120	NA
Extraction	*32*			
glassware	*8*			
Instrument Analysis	40	3	120	NA
Quality Control Review	4	3	12	NA
Final Data Reporting	2	3	6	NA

7.0 STAFF DEVELOPMENT

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 1: Target Samples

Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9598	P-17G-ADP-GG-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
2	K9599	P-17G-ADP-G5-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
3	K9600	P-17G-ADP-JJ-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
4	K9601	P-17G-ADP-JJ-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
5	K9602	P-17G-ADP-DD-09 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
6	K9603	P-17G-ADP-DD-09 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
7	K9604	P-17G-ADP-FF-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
8	K9605	P-17G-ADP-FF-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
9	K9606	P-17G-ADP-GG-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
10	K9607	P-17G-ADP-GG-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
11	K9608	P-17G-ADP-HH-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
12	K9609	P-17G-ADP-HH-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
13	K9610	P-17G-ADP-EE-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
14	K9611	P-17G-ADP-EE-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
15	K9612	P-17G-ADP-JJ-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
16	K9613	P-17G-ADP-JJ-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
17	K9614	P-17G-ADP-DD-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
18	K9615	P-17G-ADP-DD-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
19	K9616	P-17G-ADP-FF-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
20	K9617	P-17G-ADP-FF-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
21	K9618	P-17G-ADP-CC-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
22	K9619	P-17G-ADP-CC-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
23	K9620	P-17G-ADP-DD-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
24	K9621	P-17G-ADP-DD-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
25	K9622	P-17G-ADP-CC-04 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
26	K9623	P-17G-ADP-CC-04 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
27	K9624	P-17G-ADP-LL-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
28	K9625	P-17G-ADP-LL-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
29	K9626	P-17G-ADP-JJ-03 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
30	K9627	P-17G-ADP-JJ-03 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
31	K9628	P-17G-ADP-BB-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
32	K9629	P-17G-ADP-BB-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
33	K9630	P-17G-ADP-BB-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
34	K9631	P-17G-ADP-BB-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
35	K9632	P-17G-ADP-LL-02 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
36	K9633	P-17G-ADP-LL-02 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
37	K9634	P-17G-ADP-HH-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
38	K9635	P-17G-ADP-HH-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
39	K9636	P-17G-ADP-DD-07 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
40	K9637	P-17G-ADP-DD-07 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
41	K9638	P-17G-ADP-CC-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			

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Shipment: **SHP-170822-02**

Status: Approved

Description: NBH Aerovox

Range: K9598-K9642

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
42	K9639	P-17G-ADP-CC-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
43	K9640	P-17G-ADP-FF-05 SW	08/14/2017 12:00 am	PED	F0114 (NA)			
44	K9641	P-17G-ADP-FF-05 PW	08/14/2017 12:00 am	PED	F0114 (NA)			
45	K9642	TB-081417-01	08/14/2017 12:00 am	PED	F0114 (NA)			

Shipment: **SHP-170823-01**

Status: Approved

Description: PED Blanks

Range: K9645-K9650

Comment: NA

No:	BDO Id:	Client Sample ID:	Collection Date:	Matrix:	Storage Facility:	Location:	No:	Comments:
1	K9645	170628AS017	06/28/2017 12:00 am	PED	F0117 (NA)			
2	K9646	170628AS018	06/28/2017 12:00 am	PED	F0117 (NA)			
3	K9649	170628BS017	06/28/2017 12:00 am	PED	F0117 (NA)			
4	K9650	170628BS018	06/28/2017 12:00 am	PED	F0117 (NA)			

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name:	Master_315(PRC)
SOP Reference:	5-315 - Identification and Quantification of Polychlorinated Biphenyl Congeners (PCBs),PCB Homologues, and Chlorinated Pesticides by Gas Chromatography / Mass Specroscopy in the Selected Ion Monitoring (SIM) Mode
Description:	PCB by GC/MS SIM
Matrix:	S - Solid Samples, like soil or sediment, prepared and anlyzed under the same class of detection limits.
Detection Limit Study:	5-315-2015-ssMDL-SF
Instrument:	GCMS
MQO Criteria	USACE/NBH
Standard Report:	Standard Result Report

Method Specific Reporting				Holding Times (days)		Data Flags	
Result Units:	ng/g	***Unit Conversion:***	(none)	***Sample:***	14	***DL_Flag:***	U
Weight Basis:	DRY	***Result Format:***	Significant Figure	***Frozen:***	365	***RL_Flag:***	J
Standard Basis:	RIS	***# of Figures/Digits:***	3	***Extract:***	40	***PB_Flag:***	B
Oil Weight Basis:	No	***Oil Weight Source:***	Oil Weight			***DIL_Flag:***	D
U-Value Substition:	ND=MDL	***Histograms:***	No			***HT_Flag:***	T
ECD_Reporting:	No						

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
1	Cl1(1)	Cl1(1)	T	Cl5(96)	Cl3(34)	Yes	No
2	Cl1(3)	Cl1(3)	T	Cl5(96)	Cl3(34)	Yes	No
3	Cl2(4)	Cl2(4)	T	Cl5(96)	Cl3(34)	Yes	No
4	Cl2(5)	Cl2(5)	T	Cl5(96)	Cl3(34)	Yes	No
5	Cl2(6)	Cl2(6)	T	Cl5(96)	Cl3(34)	Yes	No
6	Cl2(7)	Cl2(7)	T	Cl5(96)	Cl3(34)	Yes	No
7	Cl2(8)	Cl2(8)	T	Cl5(96)	Cl3(34)	Yes	No
8	Cl2(9)	Cl2(9)	T	Cl5(96)	Cl3(34)	Yes	No
9	Cl2(11)	Cl2(11)	T	Cl5(96)	Cl3(34)	Yes	No
10	Cl2(12)	Cl2(12)	T	Cl5(96)	Cl3(34)	Yes	No
11	Cl2(13)	Cl2(13)	T	Cl5(96)	Cl3(34)	Yes	No
12	Cl2(15)	Cl2(15)	T	Cl5(96)	Cl3(34)	Yes	No
13	Cl3(16)	Cl3(16)	T	Cl5(96)	Cl3(34)	Yes	No
14	Cl3(17)	Cl3(17)	T	Cl5(96)	Cl3(34)	Yes	No
15	Cl3(18)	Cl3(18)	T	Cl5(96)	Cl3(34)	Yes	No
16	Cl3(19)	Cl3(19)	T	Cl5(96)	Cl3(34)	Yes	No
17	Cl3(22)	Cl3(22)	T	Cl5(96)	Cl3(34)	Yes	No
18	Cl3(24)	Cl3(24)	T	Cl5(96)	Cl3(34)	Yes	No

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Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
19	Cl3(25)	Cl3(25)	T	Cl5(96)	Cl3(34)	Yes	No
20	Cl3(26)	Cl3(26)	T	Cl5(96)	Cl3(34)	Yes	No
21	Cl3(27)	Cl3(27)	T	Cl5(96)	Cl3(34)	Yes	No
22	Cl3(28)	Cl3(28)	T	Cl5(96)	Cl3(34)	Yes	No
23	Cl3(30)	Cl3(30)	T	Cl5(96)	Cl3(34)	Yes	No
24	Cl3(31)	Cl3(31)	T	Cl5(96)	Cl3(34)	Yes	No
25	Cl3(32)	Cl3(32)	T	Cl5(96)	Cl3(34)	Yes	No
26	Cl3(33)	Cl3(33)	T	Cl5(96)	Cl3(34)	Yes	No
27	Cl3(37)	Cl3(37)	T	Cl5(96)	Cl3(34)	Yes	No
28	Cl4(40)	Cl4(40)	T	Cl5(96)	Cl3(34)	Yes	No
29	Cl4(41)	Cl4(41)	T	Cl5(96)	Cl3(34)	Yes	No
30	Cl4(42)	Cl4(42)	T	Cl5(96)	Cl3(34)	Yes	No
31	Cl4(43)	Cl4(43)	T	Cl5(96)	Cl3(34)	Yes	No
32	Cl4(44)	Cl4(44)	T	Cl5(96)	Cl3(34)	Yes	No
33	Cl4(45)	Cl4(45)	T	Cl5(96)	Cl3(34)	Yes	No
34	Cl4(46)	Cl4(46)	T	Cl5(96)	Cl3(34)	Yes	No
35	Cl4(47)	Cl4(47)	T	Cl5(96)	Cl3(34)	Yes	No
36	Cl4(48)	Cl4(48)	T	Cl5(96)	Cl3(34)	Yes	No
37	Cl4(49)	Cl4(49)	T	Cl5(96)	Cl3(34)	Yes	No
38	Cl4(50)	Cl4(50)	T	Cl5(96)	Cl3(34)	Yes	No
39	Cl4(51)	Cl4(51)	T	Cl5(96)	Cl3(34)	Yes	No
40	Cl4(52)	Cl4(52)	T	Cl5(96)	Cl3(34)	Yes	No
41	Cl4(53)	Cl4(53)	T	Cl5(96)	Cl3(34)	Yes	No
42	Cl4(54)	Cl4(54)	T	Cl5(96)	Cl3(34)	Yes	No
43	Cl4(56)	Cl4(56)	T	Cl5(96)	Cl3(34)	Yes	No
44	Cl4(60)	Cl4(60)	T	Cl6(161)	Cl6(152)	Yes	No
45	Cl4(63)	Cl4(63)	T	Cl5(96)	Cl3(34)	Yes	No
46	Cl4(64)	Cl4(64)	T	Cl5(96)	Cl3(34)	Yes	No
47	Cl4(66)	Cl4(66)	T	Cl5(96)	Cl3(34)	Yes	No
48	Cl4(67)	Cl4(67)	T	Cl5(96)	Cl3(34)	Yes	No
49	Cl4(70)	Cl4(70)	T	Cl5(96)	Cl3(34)	Yes	No
50	Cl4(71)	Cl4(71)	T	Cl5(96)	Cl3(34)	Yes	No
51	Cl4(74)	Cl4(74)	T	Cl5(96)	Cl3(34)	Yes	No
52	Cl4(75)	Cl4(75)	T	Cl5(96)	Cl3(34)	Yes	No
53	Cl4(77)	Cl4(77)	T	Cl6(161)	Cl6(152)	Yes	No
54	Cl4(80)	Cl4(80)	T	Cl5(96)	Cl3(34)	Yes	No
55	Cl4(81)	Cl4(81)	T	Cl6(161)	Cl6(152)	Yes	No
56	Cl5(82)	Cl5(82)	T	Cl6(161)	Cl6(152)	Yes	No
57	Cl5(83)	Cl5(83)	T	Cl6(161)	Cl6(152)	Yes	No
58	Cl5(84)	Cl5(84)	T	Cl5(96)	Cl3(34)	Yes	No
59	Cl5(85)	Cl5(85)	T	Cl6(161)	Cl6(152)	Yes	No
60	Cl5(87)	Cl5(87)	T	Cl6(161)	Cl6(152)	Yes	No
61	Cl5(91)	Cl5(91)	T	Cl5(96)	Cl3(34)	Yes	No
62	Cl5(92)	Cl5(92)	T	Cl5(96)	Cl3(34)	Yes	No
63	Cl5(95)	Cl5(95)	T	Cl5(96)	Cl3(34)	Yes	No
64	Cl5(97)	Cl5(97)	T	Cl6(161)	Cl6(152)	Yes	No

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
65	Cl5(99)	Cl5(99)	T	Cl6(161)	Cl6(152)	Yes	No
66	Cl5(100)	Cl5(100)	T	Cl5(96)	Cl3(34)	Yes	No
67	Cl5(101)	Cl5(101)	T	Cl5(96)	Cl3(34)	Yes	No
68	Cl5(104)	Cl5(104)	T	Cl5(96)	Cl3(34)	Yes	No
69	Cl5(105)	Cl5(105)	T	Cl6(161)	Cl6(152)	Yes	No
70	Cl5(110)	Cl5(110)	T	Cl6(161)	Cl6(152)	Yes	No
71	Cl5(114)	Cl5(114)	T	Cl6(161)	Cl6(152)	Yes	No
72	Cl5(115)	Cl5(115)	T	Cl6(161)	Cl6(152)	Yes	No
73	Cl5(118)	Cl5(118)	T	Cl6(161)	Cl6(152)	Yes	No
74	Cl5(123)	Cl5(123)	T	Cl6(161)	Cl6(152)	Yes	No
75	Cl5(124)	Cl5(124)	T	Cl6(161)	Cl6(152)	Yes	No
76	Cl5(125)	Cl5(125)	T	Cl6(161)	Cl6(152)	Yes	No
77	Cl5(126)	Cl5(126)	T	Cl6(161)	Cl6(152)	Yes	No
78	Cl5(127)	Cl5(127)	T	Cl6(161)	Cl6(152)	Yes	No
79	Cl6(128)	Cl6(128)	T	Cl6(161)	Cl6(152)	Yes	No
80	Cl6(130)	Cl6(130)	T	Cl6(161)	Cl6(152)	Yes	No
81	Cl6(131)	Cl6(131)	T	Cl6(161)	Cl6(152)	Yes	No
82	Cl6(134)	Cl6(134)	T	Cl6(161)	Cl6(152)	Yes	No
83	Cl6(135)	Cl6(135)	T	Cl6(161)	Cl6(152)	Yes	No
84	Cl6(136)	Cl6(136)	T	Cl6(161)	Cl6(152)	Yes	No
85	Cl6(137)	Cl6(137)	T	Cl6(161)	Cl6(152)	Yes	No
86	Cl6(138)	Cl6(138)	T	Cl6(161)	Cl6(152)	Yes	No
87	Cl6(139)	Cl6(139)	T	Cl6(161)	Cl6(152)	Yes	No
88	Cl6(140)	Cl6(140)	T	Cl6(161)	Cl6(152)	Yes	No
89	Cl6(141)	Cl6(141)	T	Cl6(161)	Cl6(152)	Yes	No
90	Cl6(144)	Cl6(144)	T	Cl6(161)	Cl6(152)	Yes	No
91	Cl6(146)	Cl6(146)	T	Cl6(161)	Cl6(152)	Yes	No
92	Cl6(149)	Cl6(149)	T	Cl6(161)	Cl6(152)	Yes	No
93	Cl6(151)	Cl6(151)	T	Cl6(161)	Cl6(152)	Yes	No
94	Cl6(153)	Cl6(153)	T	Cl6(161)	Cl6(152)	Yes	No
95	Cl6(154)	Cl6(154)	T	Cl6(161)	Cl6(152)	Yes	No
96	Cl6(155)	Cl6(155)	T	Cl5(96)	Cl3(34)	Yes	No
97	Cl6(156)	Cl6(156)	T	Cl6(161)	Cl6(152)	Yes	No
98	Cl6(157)	Cl6(157)	T	Cl6(161)	Cl6(152)	Yes	No
99	Cl6(158)	Cl6(158)	T	Cl6(161)	Cl6(152)	Yes	No
100	Cl6(163)	Cl6(163)	T	Cl6(161)	Cl6(152)	Yes	No
101	Cl6(164)	Cl6(164)	T	Cl6(161)	Cl6(152)	Yes	No
102	Cl6(166)	Cl6(166)	T	Cl6(161)	Cl6(152)	Yes	No
103	Cl6(167)	Cl6(167)	T	Cl6(161)	Cl6(152)	Yes	No
104	Cl6(169)	Cl6(169)	T	Cl6(161)	Cl6(152)	Yes	No
105	Cl7(170)	Cl7(170)	T	Cl6(161)	Cl6(152)	Yes	No
106	Cl7(171)	Cl7(171)	T	Cl6(161)	Cl6(152)	Yes	No
107	Cl7(172)	Cl7(172)	T	Cl6(161)	Cl6(152)	Yes	No
108	Cl7(173)	Cl7(173)	T	Cl6(161)	Cl6(152)	Yes	No
109	Cl7(174)	Cl7(174)	T	Cl6(161)	Cl6(152)	Yes	No
110	Cl7(175)	Cl7(175)	T	Cl6(161)	Cl6(152)	Yes	No

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

No:	Analyte:	Report Name:	Type	RIS	SIS	Hidden:	Graph:
111	Cl7(176)	Cl7(176)	T	Cl6(161)	Cl6(152)	Yes	No
112	Cl7(177)	Cl7(177)	T	Cl6(161)	Cl6(152)	Yes	No
113	Cl7(178)	Cl7(178)	T	Cl6(161)	Cl6(152)	Yes	No
114	Cl7(179)	Cl7(179)	T	Cl6(161)	Cl6(152)	Yes	No
115	Cl7(180)	Cl7(180)	T	Cl6(161)	Cl6(152)	Yes	No
116	Cl7(183)	Cl7(183)	T	Cl6(161)	Cl6(152)	Yes	No
117	Cl7(184)	Cl7(184)	T	Cl6(161)	Cl6(152)	Yes	No
118	Cl7(185)	Cl7(185)	T	Cl6(161)	Cl6(152)	Yes	No
119	Cl7(187)	Cl7(187)	T	Cl6(161)	Cl6(152)	Yes	No
120	Cl7(188)	Cl7(188)	T	Cl6(161)	Cl6(152)	Yes	No
121	Cl7(189)	Cl7(189)	T	Cl6(161)	Cl6(152)	Yes	No
122	Cl7(190)	Cl7(190)	T	Cl6(161)	Cl6(152)	Yes	No
123	Cl7(191)	Cl7(191)	T	Cl6(161)	Cl6(152)	Yes	No
124	Cl7(193)	Cl7(193)	T	Cl6(161)	Cl6(152)	Yes	No
125	Cl8(194)	Cl8(194)	T	Cl6(161)	Cl6(152)	Yes	No
126	Cl8(195)	Cl8(195)	T	Cl6(161)	Cl6(152)	Yes	No
127	Cl8(197)	Cl8(197)	T	Cl6(161)	Cl6(152)	Yes	No
128	Cl8(198)	Cl8(198)	T	Cl6(161)	Cl6(152)	Yes	No
129	Cl8(199)	Cl8(199)	T	Cl6(161)	Cl6(152)	Yes	No
130	Cl8(200)	Cl8(200)	T	Cl6(161)	Cl6(152)	Yes	No
131	Cl8(201)	Cl8(201)	T	Cl6(161)	Cl6(152)	Yes	No
132	Cl8(202)	Cl8(202)	T	Cl6(161)	Cl6(152)	Yes	No
133	Cl8(203)	Cl8(203)	T	Cl6(161)	Cl6(152)	Yes	No
134	Cl8(205)	Cl8(205)	T	Cl6(161)	Cl6(152)	Yes	No
135	Cl9(206)	Cl9(206)	T	Cl6(161)	Cl6(152)	Yes	No
136	Cl9(207)	Cl9(207)	T	Cl6(161)	Cl6(152)	Yes	No
137	Cl9(208)	Cl9(208)	T	Cl6(161)	Cl6(152)	Yes	No
138	Cl10(209)	Cl10(209)	T	Cl6(161)	Cl6(152)	Yes	No
139	LOC 1	LOC 1	T	Cl5(96)	Cl3(34)	Yes	No
140	LOC 2	LOC 2	T	Cl5(96)	Cl3(34)	Yes	No
141	LOC 3	LOC 3	T	Cl5(96)	Cl3(34)	Yes	No
142	LOC 4	LOC 4	T	Cl5(96)	Cl3(34)	Yes	No
143	LOC 5	LOC 5	T	Cl5(96)	Cl3(34)	Yes	No
144	LOC 6	LOC 6	T	Cl6(161)	Cl6(152)	Yes	No
145	LOC 7	LOC 7	T	Cl6(161)	Cl6(152)	Yes	No
146	LOC 8	LOC 8	T	Cl6(161)	Cl6(152)	Yes	No
147	LOC 9	LOC 9	T	Cl6(161)	Cl6(152)	Yes	No
148	LOC 10	LOC 10	T			Yes	No
149	Cl3(38)	Cl3(38)	T	Cl5(96)		No	No
150	Cl4(78)	Cl4(78)	T	Cl5(96)		No	No
151	Cl4(79)	Cl4(79)	T	Cl5(96)		No	No
152	Cl7(186)	Cl7(186)	T	Cl6(161)		No	No
1	Cl3(34)	Cl3(34)	SIS	Cl5(96)		No	No
2	Cl6(152)	Cl6(152)	SIS	Cl6(161)		No	No

Total Analytes: 154

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Subtract Peaks:

None

Sum Peaks:

Compound:	LOC 1				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl1(1)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl1(3)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 2**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl2(4)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(5)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(6)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(7)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(8)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(9)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(11)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(12)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(13)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl2(15)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 3**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl3(16)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(17)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(18)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(19)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(22)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(24)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(25)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(26)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(27)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(28)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(29)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl3(30)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(31)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(32)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(33)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(37)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl3(38)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 4**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl4(40)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(41)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(42)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound: **LOC 4**

Sum_Peak:	Multiplier:	Include:	ND-Rule:	ND-Description:	Comment:
Cl4(43)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(44)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(45)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(46)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(47)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(48)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(49)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(50)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(51)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(52)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(53)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(54)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(56)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(60)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(63)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(64)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(66)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(67)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(70)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(71)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(74)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(75)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(77)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(80)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(81)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl4(78)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Cl4(79)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	

Compound: **LOC 5**

Sum_Peak:	Multiplier:	Include:	ND-Rule:	ND-Description:	Comment:
Cl5(82)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(83)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(84)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(85)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(87)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(91)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(92)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(95)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(97)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(99)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(100)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(101)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(104)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(105)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(110)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 5**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl5(114)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(115)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(118)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(123)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(124)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(125)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(126)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl5(127)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 6**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl6(128)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(130)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(131)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(134)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(135)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(136)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(137)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(138)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(139)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(140)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(141)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(144)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(146)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(149)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(151)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(153)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(154)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(155)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(156)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(157)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(158)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(163)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(164)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(166)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(167)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl6(169)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(170)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(171)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(172)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(173)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(174)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

Compound:	**LOC 7**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl7(175)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(176)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(177)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(178)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(179)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(180)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(183)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(184)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(185)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(187)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(188)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(189)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(190)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(191)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(193)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl7(186)	1.000	No	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 8**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl8(194)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(195)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(197)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(198)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(199)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(200)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(201)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(202)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(203)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl8(205)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 9**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl9(206)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(207)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Cl9(208)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	
Compound:	**LOC 10**				
Sum_Peak:	**Multiplier:**	**Include:**	**ND-Rule:**	**ND-Description:**	**Comment:**
Cl10(209)	1.000	Yes	FIXED-ZERO	Replace a non-detect with 0	

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WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 2: Test Codes

Project Test Code Name: Master_315(PRC)

ICAL Acceptance Criteria:

Curve Fit:	Limit Mean(%):	Mean Qual:	Limit Ind.:	Ind. Qual:	Min Points:	Points Qual:	Comments:
Linear	NA	NA	0.995	N	5	N	y = Bx + C
Average RF	15	N	25	N	5	N	y = Bx
Linear (0,0)	NA	NA	0.995	N	5	N	y = Bx + 0
Quadratic	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + C
Quadratic (0,0)	NA	NA	0.995	N	6	N	y = Ax^2 + Bx + 0

Continuing Calibration Verification Criteria:

CCV Name: 5-315

Frequency Hrs:	Mean PD(%):	Individual PD(%):	RIS/SIS RT Window (min):	Area Limit Low(%):	Area Limit High(%):	Comment:
24 (N)	15 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Independent Calibration Verification:

ICC Name: 5-315

Mean PD Limit(%):	Ind. PD Limit(%):	RIS/SIS Window Limit (Secs):	Area Limit High(%):	Area Limit Low(%):	Comment:
25 (N)	25 (N)	0.25 (N)	-50	100 (N)	NA

Mass Discrimination Criteria:

None

Degredation Check Criteria:

Degredation Check Name: 5-315

DDT Breakdown Limit (%):	Endrin Breakdown Limit(%):	Total Breakdown Limit(%):	Comment:
20 (N)	20 (N)	20 (N)	

BATTELLE
It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Procedural Blank	Samples must be greater than five times the blank concentration (>5xPB).	B	Review with Project Manager; re-analyze or justify results in project records.
PB Measurement Quality Objective	Organic results in the Procedural Blank are less than the ssRL (<ssRL)	N	
Laboratory Control Sample	Recovery values 40-120%.	N	Review with project manager; re-analyze or justify reporting the results in project records.
Matrix Spike Recovery	Organics 40-120%. Analyte concentration in MS must be greater than five times reported background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Matrix Spike/Spike Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Spike must be >5x background concentration.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the Original	n	
Standard Reference Material Accuracy	Organics Percent Difference less than 30% from a range of certified values on average. Analyte concentration must be greater than five times the Method Detection Limit (>5xMDL).	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Target is less than 5 times the MDL	n	
Analytical Duplicate Precision	Organics results less than 30% Relative Percent Difference (RPD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	
Analytical Triplicate Precision	Organics results less than 30% Relative Standard Deviation (RSD). Concentration must be >10X the MDL.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
	Organics Results in the Original is less than 10 times the MDL	n	

BATTELLE
It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

Attachment 3: Method Quality Objectives

MQO Application	***USACE/NBH***		
MQO:	**Acceptance Criteria**	**Qual:**	**Corrective Action:**
Surrogate Compound Recovery	Recovery results between 40% and 120%.	N	Review with Project Manager; re-analyze or justify reporting results in the project records.
Control Oil	RPD < 30% for at least 90% of analytes	N n	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Instrument Calibration	5-315-11: R-squared greater than or equal to 0.995 Mean RSD less than or equal to 15%, Individual RSD less than or equal to 25%	N	Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented.
Independent Calibration Check Solution	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 25%.	N	Review with Project Manager; re-analyze or justify in project records.
Continuing Calibration Verification	5-315-11: Individual PD less than or equal to 25%. Mean Percent Difference less than or equal to 15%.	N	

BATTELLE

It can be done

ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form

Approved: ☐ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Hand Delivered **Tracking Number:** na

COC Forms: ☑ **Shipped with samples** ☐ **No Forms**

Cooler(s)/Box(es)

Cntr	Type	Tracking No.	Seal	Seal	Container	Therm.	Temp C	Smps
1 of 1	Cardboard Box		None	Intact	Intact	Therm_2	-20.0	45

Samples

Sample Labels:
☑ Sample labels agree with COC forms
☐ Discrepancies (see Sample Custody Corrective Action Form)

Container Seals:
☐ Tape ☐ Custody Seals ☐ Other Seals (See sample Log)
☑ Seals intact for each shipping container
☐ Seals broken (See sample log for impacted samples)

Condition of Samples:
☑ Sample containers intact
☐ Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): -20 Temperature Blank used ☐ Yes ☑ No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: ☐ Yes ☐ No ☑ Unknown

Initial pH 5-9?: ☐ Yes ☐ No ☑ NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: ☐ Yes ☐ No ☑ NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: ☐ Yes ☐ No ☑ NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: ☐ Yes ☐ No ☑ Unknown /Lot No.: UnKnown

Storage Location: Custody: Freezer - F0114 (NA) **BDO IDs Assigned:** K9598 - K9642

Samples logged in by: Schumitz, Matt **Date/Time:** 08/21/2017 3:15 PM

Approved By: **Approved On:**

Authorized By: **Authorized On:**

BATTELLE

It can be done

ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form Details

Approved: ☐ **Authorized** ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9598	P-17G-ADP-GG-05 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9599	P-17G-ADP-G5-05 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9600	P-17G-ADP-JJ-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9601	P-17G-ADP-JJ-07 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9602	P-17G-ADP-DD-09 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9603	P-17G-ADP-DD-09 PW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9604	P-17G-ADP-FF-07 SW	08/14/17 0:00	08/22/17 9:17	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9605	P-17G-ADP-FF-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9606	P-17G-ADP-GG-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9607	P-17G-ADP-GG-04 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9608	P-17G-ADP-HH-07 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9609	P-17G-ADP-HH-07 PW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9610	P-17G-ADP-EE-04 SW	08/14/17 0:00	08/22/17 9:18	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9611	P-17G-ADP-EE-04 PW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9612	P-17G-ADP-JJ-05 SW	08/14/17 0:00	08/22/17 9:19	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9613	P-17G-ADP-JJ-05 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9614	P-17G-ADP-DD-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9615	P-17G-ADP-DD-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9616	P-17G-ADP-FF-04 SW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9617	P-17G-ADP-FF-04 PW	08/14/17 0:00	08/22/17 9:20	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9618	P-17G-ADP-CC-07 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9619	P-17G-ADP-CC-07 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9620	P-17G-ADP-DD-05 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9621	P-17G-ADP-DD-05 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9622	P-17G-ADP-CC-04 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9623	P-17G-ADP-CC-04 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9624	P-17G-ADP-LL-03 SW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9625	P-17G-ADP-LL-03 PW	08/14/17 0:00	08/22/17 9:21	1	PED	-20	NA	NA	NA	F0114 (NA)			

BATTELLE

It can be done

ShpNo SHP-170822-02

Battelle Project No:

Sample Receipt Form Details

Approved: ☐ Authorized ☐

Project Number: 100043429-17T6AVX **Client:** USACE

Received by: Schumitz, Matt **Date/Time Received:** Monday, August 21, 2017 3:15 PM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9626	P-17G-ACP-JJ-03 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9627	P-17G-ACP-JJ-03 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9628	P-17G-ACP-BB-05 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9629	P-17G-ACP-BB-05 PW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9630	P-17G-ACP-BB-07 SW	08/14/17 0:00	08/22/17 9:22	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9631	P-17G-ACP-BB-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9632	P-17G-ACP-LL-02 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9633	P-17G-ACP-LL-02 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9634	P-17G-ACP-HH-05 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9635	P-17G-ACP-HH-05 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9636	P-17G-ACP-DD-07 SW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9637	P-17G-ACP-DD-07 PW	08/14/17 0:00	08/22/17 9:23	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9638	P-17G-ACP-CC-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9639	P-17G-ACP-CC-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9640	P-17G-ACP-FF-05 SW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9641	P-17G-ACP-FF-05 PW	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			
K9642	TB-081417-01	08/14/17 0:00	08/22/17 9:24	1	PED	-20	NA	NA	NA	F0114 (NA)			

Total Samples: 45

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:	Preservative	COC #
		Analysis	Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	PCB Long	
P-17G-ADP-GG05 SW	8/14/17			PED	1	1	K9598
P-17G-ADP-GG05 PW					1	1	K9599
P-17G-ADP-JJ07 SW					1	1	K9600
P-17G-ADP-JJ07 PW					1	1	" "01
P-17G-ADP-DD09 SW					1	1	02
P-17G-ADP-DD09 PW					1	1	03
P-17G-ADP-FF07 SW					1	1	04
P-17G-ADP-FF07 PW					1	1	05
P-17G-ADP-GG04 SW					1	1	06
P-17G-ADP-GG04 PW					1	1	07
P-17G-ADP-HH07 SW					1	1	08
P-17G-ADP-HH07 PW					1	1	09
P-17G-ADP-EE04 SW					1	1	10

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[signature]	Battelle	8/21/2017 3:15pm	[signature]	Battelle	8/27/17 315

Comments:

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BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen	Sampling Site:	Site Information:
	Sampler Information (print name):		
	Phone:		COC #
	Email:		
	Turnaround Time (TAT) Requested:		
Project Name: NBH Aerovoy	Normal ☐ Priority ☐ RUSH ☐		Page#
Project No.: 100043429-17TGAVX	Time Zone:		

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Preservative	Analysis: PCB Long	COC #
P-17G-ADP-EE04 PW	8/14/17			PSD	1		✓	K9611
P-17G-ADP-JJ05 SW					1		✓	" "12
P-17G-ADP-JJ05 PW					1		✓	13
P-17G-ADP-DD04 SW					1		✓	14
P-17G-ADP-DD04 PW					1		✓	15
P-17G-ADP-FF04 SW					1		✓	16
P-17G-ADP-FF04 PW					1		✓	17
P-17G-ADP-CC07 SW					1		✓	18
P-17G-ADP-CC07 PW					1		✓	19
P-17G-ADP-DD05 SW					1		✓	20
P-17G-ADP-DD05 PW					1		✓	21
P-17G-ADP-CC04 SW					1		✓	22
P-17G-ADP-CC04 PW					1		✓	23

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
CSPMay [signature]	Battelle	8/21/2017 3:15pm	Matt Schmitz [signature]	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:
Project Name: NBH Aerovox Project No.: 100043429-17T6AVX	Normal ☐ Priority ☐ RUSH ☐ Time Zone:		COC # Page#

Preservative

Analysis: PCB Congeners

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	PCB Congeners	COC #
P-17G-ADP-LL03 SW	8/14/17			PED	1	✓	K9624
P-17G-ADP-LL03 PW					1	✓	" " 25
P-17G-ADP-JJ03 SW					1	✓	26
P-17G-ADP-JJ03 PW					1	✓	27
P-17G-ADP-BB05 SW					1	✓	28
P-17G-ADP-BB05 PW					1	✓	29
P-17G-ADP-BB07 SW					1	✓	30
P-17G-ADP-BB07 PW					1	✓	31
P-17G-ADP-LL02 SW					1	✓	32
P-17G-ADP-LL02 PW					1	✓	33
P-17G-ADP-HH05 SW					1	✓	34
P-17G-ADP-HH05 PW					1	✓	35
P-17G-ADP-DD07 SW					1	✓	36

Receipt Temperature:(°C)	Samples Intact: Yes - No	Samples on Ice: Yes - No	Receipt Comments:

Relinquished by (Print/Sign)	Company	Date/Time	Received by (Print/Sign)	Company	Date/Time
[illegible]	Battelle	8/21/2017 3:15pm	Matt Schumate	Battelle	8/21/17 315
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information	Project Manager: Dahlen Sampler Information (print name): Phone: Email: Turnaround Time (TAT) Requested:	Sampling Site:	Site Information:

Project Name: NBH Aerovox
Project No.: 100043429-17T6 AVX

Normal ☐
Priority ☐
RUSH ☐
Time Zone:

COC #

Page#

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Analysis: PCB Long	Page#
P-17G-ADP-DD07 PW	8/14/17			PEO	1	✓	K9637
P-17G-ADP-UU05 SW	↓			↓	1	✓	" 38
P-17G-ADP-CC-05 PW					1	✓	39
P-17G-ADP-FF-05 SW					1	✓	40
P-17G-ADP-FF-05 PW					1	✓	41
TB-081417-01					1	✓	42

Receipt Temperature:(°C) | *Samples Intact: Yes - No* | *Samples on Ice: Yes - No* | *Receipt Comments:*

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[illegible]	Battelle	8/21/2017 3:15pm	Matt Schumte [illegible]	Battelle	8/21/17 3:15
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:

Comments:

BATTELLE

It can be done

ShpNo SHP-170823-01

Battelle Project No: 100043429

Sample Receipt Form

Approved: ☐ **Authorized** ☐

Project Number:

Client: PED Blanks(Aerovox)

Received by: Schumitz, Matt

Date/Time Received: Wednesday, August 23, 2017 9:45 AM

No. of Shipping Containers: 1

SHIPMENT

Method of Delivery: Hand Delivered

Tracking Number: NA

COC Forms: ☑ **Shipped with samples** ☐ **No Forms**

Cooler(s)/Box(es)

Cntr	Type	Tracking No.	Seal	Seal	Container	Therm.	Temp C	Smps
1 of 1	No Container				Not Applicable	Therm_2	-20.0	8

Samples

Sample Labels:
☑ Sample labels agree with COC forms
☐ Discrepancies (see Sample Custody Corrective Action Form)

Container Seals:
☐ Tape ☐ Custody Seals ☑ Other Seals (See sample Log)
☑ Seals intact for each shipping container
☐ Seals broken (See sample log for impacted samples)

Condition of Samples:
☑ Sample containers intact
☐ Sample containers broken/leaking (See Custody Corrective Action Form)

Temperature upon receipt (°C): -20 Temperature Blank used ☐ Yes ☑ No
(Note: If temperature upon receipt differs from required conditions, see sample log comment field)

Samples Acidified: ☐ Yes ☐ No ☑ Unknown

Initial pH 5-9?: ☐ Yes ☐ No ☑ NA
If no, individual sample adjustments on the Auxiliary Sample Receipt Form

Total Residual Chlorine Present?: ☐ Yes ☐ No ☑ NA
If yes, individual sample adjustments on the Auxiliary Sample Receipt Form

Head Space <1% in samples for water VOC analysis: ☐ Yes ☐ No ☑ NA
Individual sample deviations noted on sample log

Samples Containers:
Samples returned in PC-grade jars: ☐ Yes ☐ No ☑ Unknown /Lot No.: Unknown

Storage Location: Custody: Freezer - F0117 (NA)

BDO IDs Assigned: K9645 - K9652

Samples logged in by: Schumitz, Matt

Date/Time: 08/23/2017 9:45 AM

Approved By:

Approved On:

Authorized By:

Authorized On:

BATTELLE

It can be done

ShpNo SHP-170823-01

Battelle Project No: 100043429

Sample Receipt Form Details

Approved: ☐ Authorized ☐

Project Number:

Client: PED Blanks(Aerovox)

Received by: Schumitz, Matt

Date/Time Received: Wednesday, August 23, 2017 9:45 AM

No. of Shipping Containers: 1

BDO Id:	Client Sample ID:	Collection Date:	Login Date:	Ctrs:	Matrix:	Temp:	pH:	TRC:	VOC:	Stored In:	Loc:	No:	Comments:
K9645	170628AS017	06/28/17 0:00	08/23/17 9:47	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9646	170628AS018	06/28/17 0:00	08/23/17 9:47	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9647	170628AS019	06/28/17 0:00	08/23/17 9:47	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9648	170628AS020	06/28/17 0:00	08/23/17 9:47	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9649	170628BS017	06/28/17 0:00	08/23/17 9:47	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9650	170628BS018	06/28/17 0:00	08/23/17 9:48	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9651	170628BS019	06/28/17 0:00	08/23/17 9:48	1	PED	-20	NA	NA	NA	F0117 (NA)			
K9652	170628BS020	06/28/17 0:00	08/23/17 9:48	1	PED	-20	NA	NA	NA	F0117 (NA)			

Total Samples: 8

BATTELLE
It can be done

Chain-of-Custody

Client Contact Information

Project Manager: Dahlen
Sampler Information (print name):
Phone:
Email:
Turnaround Time (TAT) Requested:
Normal ☐
Priority ☐
RUSH ☐
Time Zone:

Sampling Site:

Site Information:

COC #

Page#

Project Name: NRH-Aurora
Project No.: 100043429-1776AUX

Preservative

Analysis: PUS Cons

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	Total # of Cont.	Analysis	COC #
170628AS017	6/28/17	NA	NA	PED	1	X	K9645
170628AS018						X	K9646
170628AS019							K9647
170628AS020							K9648
170628BS017						X	K9649
170628BS018						X	K9650
170628BS019							K9651
170628BS020							K9652

Receipt Temperature:(°C) -20

Samples Intact: Yes - No

Samples on Ice: Yes - No
Freezer

Receipt Comments:

Relinquished by (Print/Sign):	Company:	Date/Time:	Received by (Print/Sign):	Company:	Date/Time:
[signature]	Battelle	8/23/17 945	[signature]	Battelle	8/23/17 945

Comments:

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM918PB-P
Sample Type	PB
Collection Date	08/30/2017
Extraction Date	08/30/2017
Analysis Date	09/08/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.82
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl1(1)	0.994	U
Cl1(3)	1.57	U
Cl2(4)	0.665	U
Cl2(5)	1.02	U
Cl2(6)	0.392	U
Cl2(7)	1.63	U
Cl2(8)	2.42	U
Cl2(9)	1.87	U
Cl2(11)	1.51	U
Cl2(12)	1.63	U
Cl2(13)	0.842	U
Cl2(15)	1.51	U
Cl3(16)	1.96	U
Cl3(17)	1.30	U
Cl3(18)	0.842	U
Cl3(19)	1.42	U
Cl3(22)	1.48	U
Cl3(24)	0.756	U
Cl3(25)	2.05	U
Cl3(26)	0.695	U
Cl3(27)	0.842	U
Cl3(28)	1.60	U
Cl3(29)	0.817	U
Cl3(30)	1.24	U
Cl3(31)	0.878	U
Cl3(32)	1.24	U
Cl3(33)	1.57	U
Cl3(37)	1.96	U
Cl4(40)	2.23	U
Cl4(41)	1.90	U
Cl4(42)	1.48	U
Cl4(43)	1.72	U
Cl4(44)	1.12	U
Cl4(45)	0.963	U
Cl4(46)	1.36	U
Cl4(47)	0.994	U
Cl4(48)	1.30	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM918PB-P
Sample Type	PB
Collection Date	08/30/2017
Extraction Date	08/30/2017
Analysis Date	09/08/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.82
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl4(49)	1.63	U
Cl4(50)	0.756	U
Cl4(51)	0.726	U
Cl4(52)	1.51	U
Cl4(53)	0.842	U
Cl4(54)	1.15	U
Cl4(56)	0.963	U
Cl4(60)	1.15	U
Cl4(63)	1.36	U
Cl4(64)	1.15	U
Cl4(66)	1.48	U
Cl4(67)	0.787	U
Cl4(70)	1.57	U
Cl4(71)	0.817	U
Cl4(74)	1.27	U
Cl4(75)	1.30	U
Cl4(77)	1.51	U
Cl4(80)	0.933	U
Cl4(81)	0.933	U
Cl5(82)	0.933	U
Cl5(83)	0.994	U
Cl5(84)	1.54	U
Cl5(85)	2.59	U
Cl5(87)	0.878	U
Cl5(91)	1.36	U
Cl5(92)	1.15	U
Cl5(95)	0.726	U
Cl5(97)	1.24	U
Cl5(99)	0.817	U
Cl5(100)	0.994	U
Cl5(101)	0.994	U
Cl5(104)	0.543	U
Cl5(105)	1.45	U
Cl5(110)	1.08	U
Cl5(114)	0.994	U
Cl5(115)	1.60	U
Cl5(118)	1.27	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM918PB-P
Sample Type	PB
Collection Date	08/30/2017
Extraction Date	08/30/2017
Analysis Date	09/08/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.82
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl5(123)	1.24	U
Cl5(124)	0.787	U
Cl5(125)	1.15	U
Cl5(126)	1.27	U
Cl5(127)	2.54	U
Cl6(128)	1.21	U
Cl6(130)	1.12	U
Cl6(131)	0.726	U
Cl6(134)	1.15	U
Cl6(135)	0.756	U
Cl6(136)	0.603	U
Cl6(137)	1.69	U
Cl6(138)	1.51	U
Cl6(139)	1.60	U
Cl6(140)	1.24	U
Cl6(141)	0.842	U
Cl6(144)	0.902	U
Cl6(146)	1.87	U
Cl6(149)	0.902	U
Cl6(151)	1.06	U
Cl6(153)	1.90	U
Cl6(154)	0.842	U
Cl6(155)	0.902	U
Cl6(156)	1.51	U
Cl6(157)	1.51	U
Cl6(158)	0.842	U
Cl6(163)	1.12	U
Cl6(164)	0.665	U
Cl6(166)	0.573	U
Cl6(167)	5.04	U
Cl6(169)	1.06	U
Cl7(170)	1.12	U
Cl7(171)	0.933	U
Cl7(172)	0.756	U
Cl7(173)	1.06	U
Cl7(174)	1.39	U
Cl7(175)	0.756	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM918PB-P
Sample Type	PB
Collection Date	08/30/2017
Extraction Date	08/30/2017
Analysis Date	09/08/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.82
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl7(176)	0.665	U
Cl7(177)	0.902	U
Cl7(178)	1.33	U
Cl7(179)	0.902	U
Cl7(180)	1.63	U
Cl7(183)	0.787	U
Cl7(184)	0.634	U
Cl7(185)	0.994	U
Cl7(187)	0.452	U
Cl7(188)	0.726	U
Cl7(189)	1.06	U
Cl7(190)	1.02	U
Cl7(191)	1.30	U
Cl7(193)	0.634	U
Cl8(194)	1.93	U
Cl8(195)	0.817	U
Cl8(197)	0.756	U
Cl8(198)	0.994	U
Cl8(199)	1.48	U
Cl8(200)	0.994	U
Cl8(201)	0.756	U
Cl8(202)	0.665	U
Cl8(203)	0.963	U
Cl8(205)	0.994	U
Cl9(206)	1.57	U
Cl9(207)	0.726	U
Cl9(208)	0.787	U
Cl10(209)	0.726	U
LOC 1		U
LOC 2		U
LOC 3		U
LOC 4		U
LOC 5		U
LOC 6		U
LOC 7		U
LOC 8		U
LOC 9		U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Procedural Blank
Battelle ID	CM918PB-P
Sample Type	PB
Collection Date	08/30/2017
Extraction Date	08/30/2017
Analysis Date	09/08/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	SEDIMENT
Sample Size	0.82
Size Unit-Basis	G_DRY
Units	NG/G_DRY

LOC 10	U
Cl3(38)	U
Cl4(78)	U
Cl4(79)	U
Cl7(186)	U

Surrogate Recoveries (%)	
Cl3(34)	89
Cl6(152)	81

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM919LCS-P				CM920LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/30/2017				08/30/2017					
Extraction Date	08/30/2017				08/30/2017					
Analysis Date	09/08/2017				09/08/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.31				1.10					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl1(1)	32.3	38.21	85		24.7	45.50	54		44.6	N
Cl1(3)	33.2	38.44	86		27.1	45.77	59		37.2	N
Cl2(4)	34.6	38.17	91		28.0	45.45	62		37.9	N
Cl2(5)	33.8	38.28	88		25.8	45.59	57		42.8	N
Cl2(6)	33.6	37.94	89		25.7	45.18	57		43.8	N
Cl2(7)	40.9	38.24	107		38.8	45.55	85		22.9	
Cl2(8)	45.4	38.02	119		36.6	45.27	81		38.0	N
Cl2(9)	37.0	37.82	98		24.7	45.05	55		56.2	N
Cl2(11)	37.8	37.94	100		29.9	45.18	66		41.0	N
Cl2(12)	35.8	38.32	93		29.0	45.64	64		36.9	N
Cl2(13)	41.8	38.40	109		32.9	45.73	72		40.9	N
Cl2(15)	45.0	38.24	118		34.6	45.55	76		43.3	N
Cl3(16)	42.0	38.05	110		32.2	45.32	71		43.1	N
Cl3(17)	38.8	38.17	102		30.6	45.45	67		41.4	N
Cl3(18)	35.3	38.44	92		27.3	45.77	60		42.1	N
Cl3(19)	38.4	38.17	101		29.2	45.45	64		44.8	N
Cl3(22)	39.0	38.17	102		30.0	45.45	66		42.9	N
Cl3(24)	35.6	38.02	94		27.9	45.27	62		41.0	N
Cl3(25)	39.3	38.40	102		32.5	45.73	71		35.8	N
Cl3(26)	34.2	37.86	90		26.7	45.09	59		41.6	N
Cl3(27)	36.2	38.09	95		28.0	45.36	62		42.0	N
Cl3(28)	34.5	38.63	89		28.2	46.00	61		37.3	N
Cl3(29)	37.3	38.21	98		28.9	45.50	64		42.0	N
Cl3(30)	37.4	38.47	97		28.7	45.82	63		42.5	N
Cl3(31)	35.2	38.44	92		28.6	45.77	62		39.0	N
Cl3(32)	39.9	37.90	105		31.2	45.14	69		41.4	N
Cl3(33)	43.2	37.79	114		33.1	45.00	74		42.6	N
Cl3(37)	41.4	38.36	108		34.7	45.68	76		34.8	N
Cl4(40)	36.6	37.86	97		31.6	45.09	70		32.3	N
Cl4(41)	40.8	37.98	107		33.0	45.23	73		37.8	N
Cl4(42)	39.0	38.24	102		31.3	45.55	69		38.6	N
Cl4(43)	41.1	38.36	107		31.8	45.68	70		41.8	N
Cl4(44)	36.8	38.17	96		29.9	45.45	66		37.0	N
Cl4(45)	36.0	38.59	93		27.9	45.95	61		41.6	N
Cl4(46)	37.4	38.13	98		28.8	45.41	63		43.5	N
Cl4(47)	35.7	38.24	93		27.8	45.55	61		41.6	N
Cl4(48)	34.2	38.40	89		22.9	45.73	50		56.1	N

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM919LCS-P				CM920LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/30/2017				08/30/2017					
Extraction Date	08/30/2017				08/30/2017					
Analysis Date	09/08/2017				09/08/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.31				1.10					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl4(49)	44.1	38.21	115		39.7	45.50	87		27.7	
Cl4(50)	36.0	38.47	94		28.8	45.82	63		39.5	N
Cl4(51)	31.8	38.24	83		25.0	45.55	55		40.6	N
Cl4(52)	42.5	38.09	112		33.8	45.36	75		39.6	N
Cl4(53)	35.9	37.79	95		28.6	45.00	64		39.0	N
Cl4(54)	33.7	38.13	88		26.8	45.41	59		39.5	N
Cl4(56)	36.6	38.21	96		29.6	45.50	65		38.5	N
Cl4(60)	37.8	37.86	100		30.7	45.09	68		38.1	N
Cl4(63)	38.0	38.24	99		30.0	45.55	66		40.0	N
Cl4(64)	35.3	38.47	92		27.7	45.82	60		42.1	N
Cl4(66)	39.8	38.28	104		30.9	45.59	68		41.9	N
Cl4(67)	39.4	38.32	103		30.8	45.64	67		42.4	N
Cl4(70)	56.1	38.40	146	N	46.3	45.73	101		36.4	N
Cl4(71)	38.5	38.47	100		31.1	45.82	68		38.1	N
Cl4(74)	37.6	38.28	98		30.2	45.59	66		39.0	N
Cl4(75)	39.5	38.13	104		32.1	45.41	71		37.7	N
Cl4(77)	44.8	38.21	117		37.4	45.50	82		35.2	N
Cl4(80)	40.8	38.02	107		33.3	45.27	74		36.5	N
Cl4(81)	37.1	38.21	97		31.0	45.50	68		35.2	N
Cl5(82)	35.6	37.86	94		26.7	45.09	59		45.8	N
Cl5(83)	32.6	38.28	85		25.1	45.59	55		42.9	N
Cl5(84)	44.4	38.17	116		30.9	45.45	68		52.2	N
Cl5(85)	34.6	37.86	91		24.8	45.09	55		49.3	N
Cl5(87)	36.0	38.17	94		27.6	45.45	61		42.6	N
Cl5(91)	40.6	38.02	107		31.9	45.27	70		41.8	N
Cl5(92)	38.4	38.05	101		30.9	45.32	68		39.1	N
Cl5(95)	35.6	38.09	93		28.1	45.36	62		40.0	N
Cl5(97)	38.3	37.90	101		30.4	45.14	67		40.5	N
Cl5(99)	33.4	38.05	88		26.5	45.32	58		41.1	N
Cl5(100)	37.5	38.36	98		30.7	45.68	67		37.6	N
Cl5(101)	35.3	38.21	92		28.2	45.50	62		39.0	N
Cl5(104)	32.8	38.24	86		25.9	45.55	57		40.6	N
Cl5(105)	39.7	38.47	103		32.0	45.82	70		38.2	N
Cl5(110)	34.5	38.17	90		27.3	45.45	60		40.0	N
Cl5(114)	36.3	38.32	95		28.7	45.64	63		40.5	N
Cl5(115)	38.6	38.13	101		34.9	45.41	77		27.0	
Cl5(118)	35.4	38.40	92		28.8	45.73	63		37.4	N

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM919LCS-P				CM920LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/30/2017				08/30/2017					
Extraction Date	08/30/2017				08/30/2017					
Analysis Date	09/08/2017				09/08/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.31				1.10					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl5(123)	37.1	38.21	97		30.0	45.50	66		38.0	N
Cl5(124)	35.8	37.90	94		27.8	45.14	62		41.0	N
Cl5(125)	37.8	38.13	99		28.8	45.41	63		44.4	N
Cl5(126)	41.2	38.40	107		33.7	45.73	74		36.5	N
Cl5(127)	42.1	38.17	110		33.0	45.45	73		40.4	N
Cl6(128)	36.0	38.21	94		27.7	45.50	61		42.6	N
Cl6(130)	26.7	38.09	70		20.4	45.36	45		43.5	N
Cl6(131)	33.0	37.94	87		26.3	45.18	58		40.0	N
Cl6(134)	34.6	38.09	91		27.2	45.36	60		41.1	N
Cl6(135)	35.3	37.71	94		28.7	44.91	64		38.0	N
Cl6(136)	35.0	38.21	92		27.6	45.50	61		40.5	N
Cl6(137)	46.4	37.79	123	N	36.7	45.00	82		40.0	N
Cl6(138)	31.5	37.94	83		24.8	45.18	55		40.6	N
Cl6(139)	36.0	38.05	95		27.7	45.32	61		43.6	N
Cl6(140)	32.0	38.40	83		25.8	45.73	56		38.8	N
Cl6(141)	33.7	37.79	89		27.3	45.00	61		37.3	N
Cl6(144)	38.5	38.32	100		29.4	45.64	64		43.9	N
Cl6(146)	31.1	38.36	81		24.9	45.68	55		38.2	N
Cl6(149)	38.2	38.24	100		27.8	45.55	61		48.4	N
Cl6(151)	29.5	38.02	78		23.4	45.27	52		40.0	N
Cl6(153)	33.5	38.44	87		26.8	45.77	59		38.4	N
Cl6(154)	33.4	38.47	87		26.1	45.82	57		41.7	N
Cl6(155)	32.2	37.86	85		25.3	45.09	56		41.1	N
Cl6(156)	38.1	38.74	98		29.2	46.14	63		43.5	N
Cl6(157)	39.2	38.24	103		31.8	45.55	70		38.2	N
Cl6(158)	35.9	38.28	94		27.8	45.59	61		42.6	N
Cl6(163)	35.8	37.94	94		28.5	45.18	63		39.5	N
Cl6(164)	43.1	38.05	113		29.8	45.32	66		52.5	N
Cl6(166)	33.3	38.21	87		26.8	45.50	59		38.4	N
Cl6(167)	37.3	38.55	97		30.4	45.91	66		38.0	N
Cl6(169)	38.3	38.09	101		32.9	45.36	73		32.2	N
Cl7(170)	35.1	38.17	92		26.9	45.45	59		43.7	N
Cl7(171)	37.7	38.02	99		28.5	45.27	63		44.4	N
Cl7(172)	34.1	38.59	88		26.2	45.95	57		42.8	N
Cl7(173)	33.7	38.36	88		25.9	45.68	57		42.8	N
Cl7(174)	33.6	38.24	88		26.2	45.55	58		41.1	N
Cl7(175)	29.1	38.02	77		23.1	45.27	51		40.6	N

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM919LCS-P				CM920LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/30/2017				08/30/2017					
Extraction Date	08/30/2017				08/30/2017					
Analysis Date	09/08/2017				09/08/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.31				1.10					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
Cl7(176)	33.3	38.24	87		25.4	45.55	56		43.4	N
Cl7(177)	37.0	38.40	96		27.4	45.73	60		46.2	N
Cl7(178)	30.4	37.98	80		23.3	45.23	52		42.4	N
Cl7(179)	33.3	38.05	88		25.7	45.32	57		42.8	N
Cl7(180)	27.9	38.02	73		21.6	45.27	48		41.3	N
Cl7(183)	31.4	37.79	83		24.9	45.00	55		40.6	N
Cl7(184)	32.7	38.17	86		25.7	45.45	57		40.6	N
Cl7(185)	37.9	38.17	99		28.6	45.45	63		44.4	N
Cl7(187)	33.8	38.17	89		26.8	45.45	59		40.5	N
Cl7(188)	32.7	38.09	86		24.6	45.36	54		45.7	N
Cl7(189)	35.1	38.05	92		28.2	45.32	62		39.0	N
Cl7(190)	35.0	38.24	92		27.1	45.55	59		43.7	N
Cl7(191)	31.7	37.90	84		24.4	45.14	54		43.5	N
Cl7(193)	41.0	38.21	107		31.2	45.50	69		43.2	N
Cl8(194)	36.7	38.21	96		28.5	45.50	63		41.5	N
Cl8(195)	33.2	38.17	87		26.7	45.45	59		38.4	N
Cl8(197)	32.4	38.70	84		25.1	46.09	54		43.5	N
Cl8(198)	27.3	37.90	72		21.6	45.14	48		40.0	N
Cl8(199)	44.2	38.17	116		36.0	45.45	79		37.9	N
Cl8(200)	29.3	38.47	76		22.6	45.82	49		43.2	N
Cl8(201)	30.6	38.05	80		24.4	45.32	54		38.8	N
Cl8(202)	28.3	38.28	74		23.1	45.59	51		36.8	N
Cl8(203)	30.1	38.32	79		24.2	45.64	53		39.4	N
Cl8(205)	31.8	37.86	84		25.5	45.09	57		38.3	N
Cl9(206)	30.5	38.17	80		24.7	45.45	54		38.8	N
Cl9(207)	28.8	38.36	75		22.1	45.68	48		43.9	N
Cl9(208)	27.2	38.17	71		21.5	45.45	47		40.7	N
Cl10(209)	28.9	38.21	76		22.2	45.50	49		43.2	N
LOC 1	65.5				51.8					
LOC 2	386				306					
LOC 3	570				449					
LOC 4	1080				869					
LOC 5	854				673					
LOC 6	918				721					
LOC 7	676				522					
LOC 8	324				258					
LOC 9	86.5				68.3					

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	Laboratory Control Sample				Laboratory Control Sample Duplicate					
Battelle ID	CM919LCS-P				CM920LCSD-P					
Sample Type	LCS				LCSD					
Collection Date	08/30/2017				08/30/2017					
Extraction Date	08/30/2017				08/30/2017					
Analysis Date	09/08/2017				09/08/2017					
Analytical Instrument	MS				MS					
% Moisture	0.00				0.00					
% Lipid	NA				NA					
Matrix	SEDIMENT				SEDIMENT					
Sample Size	1.31				1.10					
Size Unit-Basis	G_DRY				G_DRY					
Units	NG/G_DRY	**Target**	**% REC**	**Qual**	NG/G_DRY	**Target**	**% REC**	**Qual**	**RPD**	**Qual**
LOC 10	28.9				22.2					
Cl3(38)	U				U					
Cl4(78)	U				U					
Cl4(79)	U				U					
Cl7(186)	U				U					
Surrogate Recoveries (%)										
Cl3(34)	106				71					
Cl6(152)	91				58					

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-05 SW		P-17G-ADP-CC-05 PW		P-17G-ADP-FF-05 SW		P-17G-ADP-FF-05 PW	
Battelle ID	K9638-P		K9639-P		K9640-P		K9641-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		08/14/2017		08/14/2017		08/14/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/08/2017		09/08/2017		09/08/2017		09/08/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	0.37		0.36		0.44		0.36	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl1(1)	31.2		80.8		23.6		140	
Cl1(3)	21.2		52.4		19.6		65.3	
Cl2(4)	2080	D	2820	D	1880	D	14400	D
Cl2(5)	2.27	U	2.33	U	1.91	U	2.33	U
Cl2(6)	7150	D	7450	D	6140	D	25800	D
Cl2(7)	116		144		94.4		195	
Cl2(8)	7060	D	8170	D	6080	D	25500	D
Cl2(9)	159		229		144		323	
Cl2(11)	1190	D	1200	D	1040	D	2340	D
Cl2(12)	6.08		4.95		3.81		3.71	U
Cl2(13)	3660	D	3970	D	3180	D	10600	D
Cl2(15)	3690	D	3830	D	2960	D	8590	D
Cl3(16)	313		483		239		1340	D
Cl3(17)	13500	D	12400	D	11100	D	28800	D
Cl3(18)	26300	D	23400	D	22300	D	58400	D
Cl3(19)	1480	D	1540	D	1380	D	6500	D
Cl3(22)	2240	D	2460	D	1920	D	3420	D
Cl3(24)	24.8		33.6		18.9		23.9	
Cl3(25)	29800	D	23500	D	24900	D	48600	D
Cl3(26)	40600	D	32700	D	33800	D	48700	D
Cl3(27)	3750	D	3640	D	3410	D	11100	D
Cl3(28)	50100	D	38400	D	41400	D	65900	D
Cl3(29)	10.9		12.3		8.80		5.36	
Cl3(30)	10.9		10.8		9.00		12.0	
Cl3(31)	51500	D	41100	D	41300	D	58900	D
Cl3(32)	9160	D	8420	D	7770	D	20600	D
Cl3(33)	1450	D	1600	D	1200	D	2500	D
Cl3(37)	1400	D	1080	D	1000	D	1320	D
Cl4(40)	2320	D	1840	D	2090	D	3010	D
Cl4(41)	4.22	U	13.8		3.54	U	4.33	U
Cl4(42)	7020	D	5320	D	5840	D	10700	D
Cl4(43)	5200	D	4910	D	666	D	12400	D
Cl4(44)	11600	D	9700	D	9690	D	20000	D
Cl4(45)	392		461		314		1260	D
Cl4(46)	1140	D	1090	D	1020	D	2290	D
Cl4(47)	18300	D	13100	D	15400	D	25300	D

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-05 SW		P-17G-ADP-CC-05 PW		P-17G-ADP-FF-05 SW		P-17G-ADP-FF-05 PW	
Battelle ID	K9638-P		K9639-P		K9640-P		K9641-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		08/14/2017		08/14/2017		08/14/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/08/2017		09/08/2017		09/08/2017		09/08/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	0.37		0.36		0.44		0.36	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl4(48)	3980	D	4080	D	2910	D	8500	D
Cl4(49)	71400	D	56000	D	97200	D	83600	D
Cl4(50)	79.0		64.6		66.4		95.6	
Cl4(51)	3590	D	2970	D	3400	D	8390	D
Cl4(52)	75000	D	53400	D	108000	D	84000	D
Cl4(53)	8950	D	7180	D	8020	D	18400	D
Cl4(54)	52.5		55.9		46.8		92.8	
Cl4(56)	827	D	353		286		216	
Cl4(60)	204		179		157		106	
Cl4(63)	234		206		184		206	
Cl4(64)	5260	D	4670	D	4380	D	7850	D
Cl4(66)	3200	D	2470	D	2630	D	2260	D
Cl4(67)	1840	D	1090	D	1470	D	355	
Cl4(70)	2520	D	1820	D	2140	D	1690	D
Cl4(71)	9520	D	7210	D	8280	D	16700	D
Cl4(74)	4280	D	2820	D	3210	D	2290	D
Cl4(75)	913	D	376		868	D	349	
Cl4(77)	259		200		206		125	
Cl4(80)	32.0		31.4		25.7		19.6	
Cl4(81)	16.6		11.2		8.94		10.6	
Cl5(82)	120		105		101		98.0	
Cl5(83)	4170	D	3310	D	3850	D	6650	D
Cl5(84)	2260	D	2350	D	2200	D	3680	D
Cl5(85)	249		373		4.83	U	5.90	U
Cl5(87)	444		408		381		488	
Cl5(91)	6630	D	4830	D	5640	D	10100	D
Cl5(92)	3660	D	2540	D	2540	D	6350	D
Cl5(95)	12700	D	9760	D	10700	D	19600	D
Cl5(97)	2880	D	2210	D	2630	D	3220	D
Cl5(99)	8570	D	6210	D	6900	D	9290	D
Cl5(100)	317		283		275		315	
Cl5(101)	11000	D	7530	D	8800	D	10900	D
Cl5(104)	16.5		14.1		14.7		18.2	
Cl5(105)	389		356		350		371	
Cl5(110)	13300	D	9950	D	10800	D	18800	D
Cl5(114)	69.6		49.6		54.4		51.5	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-05 SW		P-17G-ADP-CC-05 PW		P-17G-ADP-FF-05 SW		P-17G-ADP-FF-05 PW	
Battelle ID	K9638-P		K9639-P		K9640-P		K9641-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		08/14/2017		08/14/2017		08/14/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/08/2017		09/08/2017		09/08/2017		09/08/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	0.37		0.36		0.44		0.36	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl5(115)	121		3.64	U	2.98	U	3.64	U
Cl5(118)	4380	D	3500	D	3960	D	4550	D
Cl5(123)	549		415		477		492	
Cl5(124)	118		90.0		98.4		95.6	
Cl5(125)	37.2		13.7		2.14	U	2.61	U
Cl5(126)	16.8		15.4		15.3		13.9	
Cl5(127)	125		78.4		74.2		46.1	
Cl6(128)	272		252		238		301	
Cl6(130)	88.3		82.7		95.5		120	
Cl6(131)	205		169		178		260	
Cl6(134)	431		340		372		507	
Cl6(135)	634		533		552		716	
Cl6(136)	1310	D	855		1250	D	2250	D
Cl6(137)	114		99.5		102		124	
Cl6(138)	948		807		885		935	
Cl6(139)	103		84.2		86.4		108	
Cl6(140)	10.8		8.81		9.18		13.2	
Cl6(141)	138		125		129		153	
Cl6(144)	109		73.9		80.2		116	
Cl6(146)	691		572		608		757	
Cl6(149)	8510	D	6920	D	7200	D	13500	D
Cl6(151)	935		723		825		1880	D
Cl6(153)	5070	D	4380	D	4640	D	7260	D
Cl6(154)	448		385		408		584	
Cl6(155)	3.55		4.19		3.37		4.29	
Cl6(156)	192		168		171		212	
Cl6(157)	37.1		34.2		33.9		42.2	
Cl6(158)	276		267		276		316	
Cl6(163)	1760	D	1540	D	1700	D	2920	D
Cl6(164)	290		248		237		281	
Cl6(166)	27.3		23.9		24.4		27.6	
Cl6(167)	178		156		156		182	
Cl6(169)	6.84		2.40	U	1.97	U	8.10	
Cl7(170)	141		132		127		177	
Cl7(171)	45.0		42.4		38.8		58.3	
Cl7(172)	29.3		27.1		25.9		34.8	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-05 SW		P-17G-ADP-CC-05 PW		P-17G-ADP-FF-05 SW		P-17G-ADP-FF-05 PW	
Battelle ID	K9638-P		K9639-P		K9640-P		K9641-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		08/14/2017		08/14/2017		08/14/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/08/2017		09/08/2017		09/08/2017		09/08/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	0.37		0.36		0.44		0.36	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl7(173)	4.25		4.08		4.09		5.43	
Cl7(174)	87.1		81.8		77.9		110	
Cl7(175)	13.4		12.9		10.8		17.3	
Cl7(176)	21.2		21.7		19.7		26.0	
Cl7(177)	73.0		69.4		63.5		89.7	
Cl7(178)	73.7		69.9		70.1		106	
Cl7(179)	153		138		139		205	
Cl7(180)	228		216		196		304	
Cl7(183)	126		113		111		162	
Cl7(184)	1.40	U	2.97	J	1.18	U	1.44	U
Cl7(185)	15.7		13.6		12.8		16.3	
Cl7(187)	483		452		435		659	
Cl7(188)	11.5		11.3		9.79		15.7	
Cl7(189)	11.5		11.0		9.33		15.4	
Cl7(190)	46.1		41.7		41.7		57.4	
Cl7(191)	10.7		10.8		9.91		13.8	
Cl7(193)	19.5		20.2		26.0		34.3	
Cl8(194)	31.9		34.4		28.0		54.0	
Cl8(195)	12.8		13.5		10.2		18.5	
Cl8(197)	3.56		3.43	J	3.08		4.26	
Cl8(198)	2.20	U	2.26	U	1.85	U	2.26	U
Cl8(199)	50.4		49.3		45.0		83.3	
Cl8(200)	6.84		7.67		5.75		9.24	
Cl8(201)	7.97		8.11		6.68		9.07	
Cl8(202)	15.8		16.2		13.7		24.0	
Cl8(203)	38.6		42.0		34.9		62.3	
Cl8(205)	4.13		4.46		3.93		5.40	
Cl9(206)	13.1		15.8		11.1		27.6	
Cl9(207)	3.33	J	2.66	J	2.42	J	4.16	
Cl9(208)	5.68		7.34		5.16		9.40	
Cl10(209)	4.62		5.74		4.10		6.48	
LOC 1	52.4		133		43.2		205	
LOC 2	25100		27800		21500		87800	
LOC 3	232000		191000		192000		356000	
LOC 4	238000		182000		278000		310000	
LOC 5	72100		54400		59900		95100	

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	P-17G-ADP-CC-05 SW		P-17G-ADP-CC-05 PW		P-17G-ADP-FF-05 SW		P-17G-ADP-FF-05 PW	
Battelle ID	K9638-P		K9639-P		K9640-P		K9641-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		08/14/2017		08/14/2017		08/14/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/08/2017		09/08/2017		09/08/2017		09/08/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	0.37		0.36		0.44		0.36	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
LOC 6	22800		18800		20300		33600	
LOC 7	1590		1490		1430		2110	
LOC 8	172		179		151		270	
LOC 9	22.1		25.8		18.7		41.2	
LOC 10	4.62		5.74		4.10		6.48	
Cl3(38)	30.8		107		29.4		58.3	
Cl4(78)	66.2		93.6		55.7		46.4	
Cl4(79)	78.2		124		91.4		67.8	
Cl7(186)	270		197		173		132	
Surrogate Recoveries (%)								
Cl3(34)	198	N	188	N	187	N	185	N
Cl6(152)	80		70		73		65	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	TB-081417-01		170628AS017		170628AS018		170628BS017	
Battelle ID	K9642-P		K9645-P		K9646-P		K9649-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		06/28/2017		06/28/2017		06/28/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/12/2017		09/12/2017		09/12/2017		09/12/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	1.23		1.14		1.22		1.16	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl1(1)	0.663	U	0.715	U	0.668	U	0.703	U
Cl1(3)	1.04	U	1.13	U	1.05	U	1.11	U
Cl2(4)	2.98		0.478	U	0.447	U	0.470	U
Cl2(5)	0.683	U	0.737	U	0.688	U	0.724	U
Cl2(6)	1.86		0.282	U	0.264	U	0.277	U
Cl2(7)	1.30		1.17	U	1.09	U	1.15	U
Cl2(8)	1.61	U	1.74	U	1.62	U	1.71	U
Cl2(9)	1.25	U	1.35	U	1.26	U	1.32	U
Cl2(11)	1.00	U	1.08	U	1.01	U	1.06	U
Cl2(12)	1.08	U	1.17	U	1.09	U	1.15	U
Cl2(13)	0.561	U	0.605	U	0.566	U	0.595	U
Cl2(15)	1.00	U	1.08	U	1.01	U	1.06	U
Cl3(16)	1.31	U	1.41	U	1.32	U	1.39	U
Cl3(17)	0.866	U	0.934	U	0.873	U	0.918	U
Cl3(18)	0.561	U	0.605	U	0.566	U	0.595	U
Cl3(19)	0.943	U	1.02	U	0.951	U	1.00	U
Cl3(22)	0.984	U	1.06	U	0.992	U	1.04	U
Cl3(24)	0.504	U	0.544	U	0.508	U	0.534	U
Cl3(25)	1.37	U	1.47	U	1.38	U	1.45	U
Cl3(26)	0.463	U	0.500	U	0.467	U	0.491	U
Cl3(27)	0.561	U	0.605	U	0.566	U	0.595	U
Cl3(28)	1.06	U	1.15	U	1.07	U	1.13	U
Cl3(29)	0.545	U	0.588	U	0.549	U	0.578	U
Cl3(30)	0.825	U	0.890	U	0.832	U	0.875	U
Cl3(31)	0.585	U	0.632	U	0.590	U	0.621	U
Cl3(32)	0.825	U	0.890	U	0.832	U	0.875	U
Cl3(33)	1.04	U	1.13	U	1.05	U	1.11	U
Cl3(37)	1.31	U	1.41	U	1.32	U	1.39	U
Cl4(40)	1.49	U	1.60	U	1.50	U	1.58	U
Cl4(41)	1.27	U	1.37	U	1.28	U	1.34	U
Cl4(42)	0.984	U	1.06	U	0.992	U	1.04	U
Cl4(43)	1.15	U	1.24	U	1.16	U	1.22	U
Cl4(44)	4.80		0.803	U	0.750	U	0.789	U
Cl4(45)	0.642	U	0.693	U	0.648	U	0.681	U
Cl4(46)	0.906	U	0.978	U	0.914	U	0.961	U
Cl4(47)	0.663	U	0.715	U	0.668	U	0.703	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	TB-081417-01		170628AS017		170628AS018		170628BS017	
Battelle ID	K9642-P		K9645-P		K9646-P		K9649-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		06/28/2017		06/28/2017		06/28/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/12/2017		09/12/2017		09/12/2017		09/12/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	1.23		1.14		1.22		1.16	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl4(48)	0.866	U	0.934	U	0.873	U	0.918	U
Cl4(49)	1.87		1.17	U	1.09	U	1.15	U
Cl4(50)	0.504	U	0.544	U	0.508	U	0.534	U
Cl4(51)	0.484	U	0.522	U	0.488	U	0.513	U
Cl4(52)	3.13		1.08	U	1.01	U	1.06	U
Cl4(53)	0.561	U	0.605	U	0.566	U	0.595	U
Cl4(54)	0.764	U	0.734	J	0.562	J	0.810	U
Cl4(56)	0.642	U	0.693	U	0.648	U	0.681	U
Cl4(60)	0.764	U	0.825	U	0.770	U	0.810	U
Cl4(63)	0.906	U	0.978	U	0.914	U	0.961	U
Cl4(64)	0.764	U	0.825	U	0.770	U	0.810	U
Cl4(66)	0.984	U	1.06	U	0.992	U	1.04	U
Cl4(67)	0.524	U	1.31		1.68		1.15	
Cl4(70)	1.04	U	1.13	U	1.05	U	1.11	U
Cl4(71)	0.545	U	0.588	U	0.549	U	0.578	U
Cl4(74)	0.846	U	0.912	U	0.852	U	0.897	U
Cl4(75)	0.866	U	0.934	U	0.873	U	0.918	U
Cl4(77)	1.00	U	1.08	U	1.01	U	1.06	U
Cl4(80)	0.622	U	0.671	U	0.627	U	0.660	U
Cl4(81)	0.622	U	0.671	U	0.627	U	0.660	U
Cl5(82)	0.622	U	0.671	U	0.627	U	0.660	U
Cl5(83)	0.663	U	0.715	U	0.668	U	0.703	U
Cl5(84)	1.02	U	1.10	U	1.03	U	1.09	U
Cl5(85)	1.73	U	1.86	U	1.74	U	1.83	U
Cl5(87)	0.585	U	0.632	U	0.590	U	0.621	U
Cl5(91)	0.821	J	0.478	J	0.914	U	0.368	J
Cl5(92)	0.764	U	0.825	U	0.770	U	0.810	U
Cl5(95)	0.484	U	0.522	U	0.488	U	0.513	U
Cl5(97)	0.825	U	0.890	U	0.832	U	0.875	U
Cl5(99)	0.545	U	0.588	U	0.549	U	0.578	U
Cl5(100)	0.663	U	0.715	U	0.668	U	0.703	U
Cl5(101)	0.663	U	0.715	U	0.668	U	0.703	U
Cl5(104)	0.362	U	0.390	U	0.365	U	0.384	U
Cl5(105)	0.968	U	1.04	U	0.975	U	1.03	U
Cl5(110)	0.724	U	0.781	U	0.730	U	0.767	U
Cl5(114)	0.663	U	0.715	U	0.668	U	0.703	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	TB-081417-01		170628AS017		170628AS018		170628BS017	
Battelle ID	K9642-P		K9645-P		K9646-P		K9649-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		06/28/2017		06/28/2017		06/28/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/12/2017		09/12/2017		09/12/2017		09/12/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	1.23		1.14		1.22		1.16	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl5(115)	1.06	U	1.15	U	1.07	U	1.13	U
Cl5(118)	0.846	U	0.912	U	0.852	U	0.897	U
Cl5(123)	0.825	U	0.890	U	0.832	U	0.875	U
Cl5(124)	0.524	U	0.566	U	0.529	U	0.556	U
Cl5(125)	0.764	U	0.825	U	0.770	U	0.810	U
Cl5(126)	0.846	U	0.912	U	0.852	U	0.897	U
Cl5(127)	1.69	U	1.82	U	1.70	U	1.79	U
Cl6(128)	0.805	U	0.868	U	0.812	U	0.853	U
Cl6(130)	0.744	U	0.803	U	0.750	U	0.789	U
Cl6(131)	0.484	U	0.522	U	0.488	U	0.513	U
Cl6(134)	0.764	U	0.825	U	0.770	U	0.810	U
Cl6(135)	0.504	U	0.544	U	0.508	U	0.534	U
Cl6(136)	0.402	U	0.434	U	0.405	U	0.426	U
Cl6(137)	1.13	U	1.22	U	1.14	U	1.19	U
Cl6(138)	1.00	U	1.08	U	1.01	U	1.06	U
Cl6(139)	1.06	U	1.15	U	1.07	U	1.13	U
Cl6(140)	0.825	U	0.890	U	0.832	U	0.875	U
Cl6(141)	0.561	U	0.605	U	0.566	U	0.595	U
Cl6(144)	0.602	U	0.649	U	0.607	U	0.638	U
Cl6(146)	1.25	U	1.35	U	1.26	U	1.32	U
Cl6(149)	0.602	U	0.649	U	0.607	U	0.638	U
Cl6(151)	0.703	U	0.759	U	0.709	U	0.746	U
Cl6(153)	1.27	U	1.37	U	1.28	U	1.34	U
Cl6(154)	0.561	U	0.605	U	0.566	U	0.595	U
Cl6(155)	0.602	U	0.649	U	0.607	U	0.638	U
Cl6(156)	1.00	U	1.08	U	1.01	U	1.06	U
Cl6(157)	1.00	U	1.08	U	1.01	U	1.06	U
Cl6(158)	0.561	U	0.605	U	0.566	U	0.595	U
Cl6(163)	0.744	U	0.803	U	0.750	U	0.789	U
Cl6(164)	0.443	U	0.478	U	0.447	U	0.470	U
Cl6(166)	0.382	U	0.412	U	0.385	U	0.405	U
Cl6(167)	3.36	U	3.62	U	3.38	U	3.56	U
Cl6(169)	0.703	U	0.759	U	0.709	U	0.746	U
Cl7(170)	0.744	U	0.803	U	0.750	U	0.789	U
Cl7(171)	0.622	U	0.671	U	0.627	U	0.660	U
Cl7(172)	0.504	U	0.544	U	0.508	U	0.534	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	TB-081417-01		170628AS017		170628AS018		170628BS017	
Battelle ID	K9642-P		K9645-P		K9646-P		K9649-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		06/28/2017		06/28/2017		06/28/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/12/2017		09/12/2017		09/12/2017		09/12/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	1.23		1.14		1.22		1.16	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
Cl7(173)	0.703	U	0.759	U	0.709	U	0.746	U
Cl7(174)	0.927	U	1.00	U	0.934	U	0.983	U
Cl7(175)	0.504	U	0.544	U	0.508	U	0.534	U
Cl7(176)	0.443	U	0.478	U	0.447	U	0.470	U
Cl7(177)	0.602	U	0.649	U	0.607	U	0.638	U
Cl7(178)	0.886	U	0.956	U	0.893	U	0.940	U
Cl7(179)	0.602	U	0.649	U	0.607	U	0.638	U
Cl7(180)	1.08	U	1.17	U	1.09	U	1.15	U
Cl7(183)	0.524	U	0.566	U	0.529	U	0.556	U
Cl7(184)	0.423	U	0.456	U	0.426	U	0.448	U
Cl7(185)	0.663	U	0.715	U	0.668	U	0.703	U
Cl7(187)	0.302	U	0.325	U	0.304	U	0.320	U
Cl7(188)	0.484	U	0.522	U	0.488	U	0.513	U
Cl7(189)	0.703	U	0.759	U	0.709	U	0.746	U
Cl7(190)	0.683	U	0.737	U	0.688	U	0.724	U
Cl7(191)	0.866	U	0.934	U	0.873	U	0.918	U
Cl7(193)	0.423	U	0.456	U	0.426	U	0.448	U
Cl8(194)	1.29	U	1.39	U	1.30	U	1.37	U
Cl8(195)	0.545	U	0.588	U	0.549	U	0.578	U
Cl8(197)	0.504	U	0.544	U	0.508	U	0.534	U
Cl8(198)	0.663	U	0.715	U	0.668	U	0.703	U
Cl8(199)	0.984	U	1.06	U	0.992	U	1.04	U
Cl8(200)	0.663	U	0.715	U	0.668	U	0.703	U
Cl8(201)	0.504	U	0.544	U	0.508	U	0.534	U
Cl8(202)	0.443	U	0.478	U	0.447	U	0.470	U
Cl8(203)	0.642	U	0.693	U	0.648	U	0.681	U
Cl8(205)	0.663	U	0.715	U	0.668	U	0.703	U
Cl9(206)	1.04	U	1.13	U	1.05	U	1.11	U
Cl9(207)	0.484	U	0.522	U	0.488	U	0.513	U
Cl9(208)	0.524	U	0.566	U	0.529	U	0.556	U
Cl10(209)	0.484	U	0.522	U	0.488	U	0.513	U
LOC 1		U		U		U		U
LOC 2	6.14			U		U		U
LOC 3		U		U		U		U
LOC 4	9.80		2.04		2.24		1.15	
LOC 5	0.821		0.478			U	0.368	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	TB-081417-01		170628AS017		170628AS018		170628BS017	
Battelle ID	K9642-P		K9645-P		K9646-P		K9649-P	
Sample Type	SA		SA		SA		SA	
Collection Date	08/14/2017		06/28/2017		06/28/2017		06/28/2017	
Extraction Date	08/30/2017		08/30/2017		08/30/2017		08/30/2017	
Analysis Date	09/12/2017		09/12/2017		09/12/2017		09/12/2017	
Analytical Instrument	MS		MS		MS		MS	
% Moisture	0.00		0.00		0.00		0.00	
% Lipid	NA		NA		NA		NA	
Matrix	PED		PED		PED		PED	
Sample Size	1.23		1.14		1.22		1.16	
Size Unit-Basis	G_DRY		G_DRY		G_DRY		G_DRY	
Units	NG/G_DRY		NG/G_DRY		NG/G_DRY		NG/G_DRY	
LOC 6		U		U		U		U
LOC 7		U		U		U		U
LOC 8		U		U		U		U
LOC 9		U		U		U		U
LOC 10		U		U		U		U
Cl3(38)	938	D	868	D	842	D	785	D
Cl4(78)	518	D	520	D	552	D	402	D
Cl4(79)	538	D	502	D	545	D	382	D
Cl7(186)	270	D	324	D	444	D	236	D
Surrogate Recoveries (%)								
Cl3(34)	101		93		95		103	
Cl6(152)	92		91		86		93	

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	170628BS018
Battelle ID	K9650-P
Sample Type	SA
Collection Date	06/28/2017
Extraction Date	08/30/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	PED
Sample Size	1.08
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl1(1)	0.755	U
Cl1(3)	1.19	U
Cl2(4)	0.505	U
Cl2(5)	0.778	U
Cl2(6)	0.298	U
Cl2(7)	1.24	U
Cl2(8)	1.83	U
Cl2(9)	1.42	U
Cl2(11)	1.14	U
Cl2(12)	1.24	U
Cl2(13)	0.639	U
Cl2(15)	1.14	U
Cl3(16)	1.49	U
Cl3(17)	0.986	U
Cl3(18)	0.639	U
Cl3(19)	1.07	U
Cl3(22)	1.12	U
Cl3(24)	0.574	U
Cl3(25)	1.56	U
Cl3(26)	0.528	U
Cl3(27)	0.639	U
Cl3(28)	1.21	U
Cl3(29)	0.620	U
Cl3(30)	0.940	U
Cl3(31)	0.667	U
Cl3(32)	0.940	U
Cl3(33)	1.19	U
Cl3(37)	1.49	U
Cl4(40)	1.69	U
Cl4(41)	1.44	U
Cl4(42)	1.12	U
Cl4(43)	1.31	U
Cl4(44)	0.847	U
Cl4(45)	0.732	U
Cl4(46)	1.03	U
Cl4(47)	0.755	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	170628BS018
Battelle ID	K9650-P
Sample Type	SA
Collection Date	06/28/2017
Extraction Date	08/30/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	PED
Sample Size	1.08
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl4(48)	0.986	U
Cl4(49)	1.24	U
Cl4(50)	0.574	U
Cl4(51)	0.551	U
Cl4(52)	1.14	U
Cl4(53)	0.639	U
Cl4(54)	0.870	U
Cl4(56)	0.732	U
Cl4(60)	0.870	U
Cl4(63)	1.03	U
Cl4(64)	0.870	U
Cl4(66)	1.12	U
Cl4(67)	1.29	
Cl4(70)	1.19	U
Cl4(71)	0.620	U
Cl4(74)	0.963	U
Cl4(75)	0.986	U
Cl4(77)	1.14	U
Cl4(80)	0.708	U
Cl4(81)	0.708	U
Cl5(82)	0.708	U
Cl5(83)	0.755	U
Cl5(84)	1.17	U
Cl5(85)	1.97	U
Cl5(87)	0.667	U
Cl5(91)	1.03	U
Cl5(92)	0.870	U
Cl5(95)	0.551	U
Cl5(97)	0.940	U
Cl5(99)	0.620	U
Cl5(100)	0.755	U
Cl5(101)	0.755	U
Cl5(104)	0.412	U
Cl5(105)	1.10	U
Cl5(110)	0.824	U
Cl5(114)	0.755	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	170628BS018
Battelle ID	K9650-P
Sample Type	SA
Collection Date	06/28/2017
Extraction Date	08/30/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	PED
Sample Size	1.08
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl5(115)	1.21	U
Cl5(118)	0.963	U
Cl5(123)	0.940	U
Cl5(124)	0.597	U
Cl5(125)	0.870	U
Cl5(126)	0.963	U
Cl5(127)	1.93	U
Cl6(128)	0.917	U
Cl6(130)	0.847	U
Cl6(131)	0.551	U
Cl6(134)	0.870	U
Cl6(135)	0.574	U
Cl6(136)	0.458	U
Cl6(137)	1.28	U
Cl6(138)	1.14	U
Cl6(139)	1.21	U
Cl6(140)	0.940	U
Cl6(141)	0.639	U
Cl6(144)	0.685	U
Cl6(146)	1.42	U
Cl6(149)	0.685	U
Cl6(151)	0.801	U
Cl6(153)	1.44	U
Cl6(154)	0.639	U
Cl6(155)	0.685	U
Cl6(156)	1.14	U
Cl6(157)	1.14	U
Cl6(158)	0.639	U
Cl6(163)	0.847	U
Cl6(164)	0.505	U
Cl6(166)	0.435	U
Cl6(167)	3.82	U
Cl6(169)	0.801	U
Cl7(170)	0.847	U
Cl7(171)	0.708	U
Cl7(172)	0.574	U

BATTELLE
It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	170628BS018
Battelle ID	K9650-P
Sample Type	SA
Collection Date	06/28/2017
Extraction Date	08/30/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	PED
Sample Size	1.08
Size Unit-Basis	G_DRY
Units	NG/G_DRY

Cl7(173)	0.801	U
Cl7(174)	1.06	U
Cl7(175)	0.574	U
Cl7(176)	0.505	U
Cl7(177)	0.685	U
Cl7(178)	1.01	U
Cl7(179)	0.685	U
Cl7(180)	1.24	U
Cl7(183)	0.597	U
Cl7(184)	0.482	U
Cl7(185)	0.755	U
Cl7(187)	0.344	U
Cl7(188)	0.551	U
Cl7(189)	0.801	U
Cl7(190)	0.778	U
Cl7(191)	0.986	U
Cl7(193)	0.482	U
Cl8(194)	1.47	U
Cl8(195)	0.620	U
Cl8(197)	0.574	U
Cl8(198)	0.755	U
Cl8(199)	1.12	U
Cl8(200)	0.755	U
Cl8(201)	0.574	U
Cl8(202)	0.505	U
Cl8(203)	0.732	U
Cl8(205)	0.755	U
Cl9(206)	1.19	U
Cl9(207)	0.551	U
Cl9(208)	0.597	U
Cl10(209)	0.551	U
LOC 1		U
LOC 2		U
LOC 3		U
LOC 4	1.29	
LOC 5		U

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It can be done

Project Client: USACE - North Atlantic Division
Project Name: USACE - NBH Aerovox Passive Sampler
Project Number: 100043429

Client ID	170628BS018
Battelle ID	K9650-P
Sample Type	SA
Collection Date	06/28/2017
Extraction Date	08/30/2017
Analysis Date	09/12/2017
Analytical Instrument	MS
% Moisture	0.00
% Lipid	NA
Matrix	PED
Sample Size	1.08
Size Unit-Basis	G_DRY
Units	NG/G_DRY

LOC 6		U
LOC 7		U
LOC 8		U
LOC 9		U
LOC 10		U
Cl3(38)	777	D
Cl4(78)	417	D
Cl4(79)	391	D
Cl7(186)	236	D

Surrogate Recoveries (%)	
Cl3(34)	95
Cl6(152)	89

Glossary of Data Qualifiers

Flag:	Application:
B	Analyte concentration found in the sample at a concentration <5x the level found in the procedural blank.
D	Dilution Run. Initial run outside linear range of instrument.
E	Estimate, result is greater than the highest concentration level in the calibration.
H	Surrogate diluted out. Used when surrogate recovery is affected by excessive dilution of the sample extract.
J	Analyte detected below the sample-specific Reporting Limit (RL).
m	Confirmation column manually over-ridden by analyst, dual column quantitative analysis only.
ME	Significant Matrix Interference - Estimated value.
MI	Significant Matrix Interference - value could not be determined or estimated.
n	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO), but meets the contingency criteria.
N	Quality Control (QC) value is outside the accuracy or precision Data Quality Objective (DQO)
NA	Not applicable
p	Dual column value exceeds RPD criteria, dual column quantitative analysis only.
T	Holding Time (HT) exceeded.
U	Analyte not detected at 3:1 signal:noise ratio.

QA/QC Summary
Batch 17-0369

Project:	USACE/NAE – NBH Aerovox Passive Samplers
Parameters:	PCB Congeners
Laboratory:	Battelle, Norwell, MA
Matrix:	PED Samples
Data Set:	DP-17-0185
Analytical SOP:	5-315
Method Reference:	EPA Method 8270D-modified/1668A-modified

Sample Custody

Collection Date	Receipt Date	Temp (°C)
8/14/2017	8/21/2017	-20.0
6/28/2017	8/23/2017	-20.0

Corrective Actions	None.
Sample Storage	The samples were stored frozen until extraction.
Related samples	None.

METHOD SUMMARIES

Sample Preparation	Prior to processing, the PEDs were examined by the PM and cutting instructions were determined. The PEDs were cut from the frames using solvent cleaned knives/scissors. The individual pieces were gently cleaned with Milli-Q water and Kimwipes, as necessary, and stored in solvent-rinsed foil packets, each ID'ed appropriately with information describing the location of the section on the un-cut PED. Each piece was logged in and assigned a unique ID. The PEDs were extracted by shaker table. The PED was placed in an extraction vessel, spiked with surrogates and extracted three times in hexane. The extracts were combined after each extraction. The sample extracts were concentrated using KD and nitrogen blow down techniques. The sample concentrates were further processed by alumina cleanup, followed copper cleanup and spiked with internal standard. Final extracts were submitted for PCB analyses by GC-MS.
Prep comments	K9638: Spilled about 2 mL (out of ~200 mL total) of this sample post concentration.

Analysis	PCB congeners were measured by gas chromatography-mass spectrometry (GC/MS) in the selected ion mode (SIM). An initial calibration consisting of representative target analytes was analyzed prior to analysis to demonstrate the linear range of analysis. Calibration verification was performed at the beginning and end of each 24 hour period, or every 10 injections, whichever was shortest. Target PCB were quantified vs. internal standards using a quadratic regression calculated from the initial calibration.
Analysis Comments	• No ICC exists for PRC compounds. • Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, historical data has reported these as two separate peaks. These peaks

	are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data. • Sample K9641 exhibits a high IS area for PCB 96 using PRC method MW0396A. It is likely the high levels of congeners in this sample contribute slightly to the IS area. It should be noted that the secondary IS passes criteria and both IS are acceptable in this sample using the full congener method. • Samples were weighed using 5 decimal places, but concentrations are calculated using a sample weight value of 2 decimal places.

Holding Times	Extraction Date(s)	Analysis Date(s)
	8/30-31/2017	9/8/2017 & 9/11-14/2017

Procedural Blank (PB)	A PB was prepared with this analytical batch to ensure the sample extraction and analysis methods are free of contamination.
Blank value <SSRL Samples >5X PB	No exceedances noted. No comments.

Laboratory Control Spike (LCS)/Laboratory Control Spike Duplicate (LCSD)	A LCS/LCSD pair was prepared with this analytical batch. The percent recoveries of target analytes were calculated to measure accuracy. The RPDs between replicates were calculated to measure precision
40-120% recovery ≤30%RPD	Two recovery exceedances noted. 136 RPD exceedances. Recovery: PCB 70 fails high in the LCS. This analyte also fails high in the CCVs, indicating a calibration issue with this analyte. All authentic samples report PCB 70 from dilution where PCB 70 passes. There is no impact on the data for the authentic samples. PCB 137 fails high in the LCS (123%). This analyte passes in all other QC and system checks. All data are qualified appropriately. No further corrective actions taken. RPD: The recoveries of target PCB are lower in the LCSD than in the LCS. All recoveries are within QC criteria in the LCSD, however the differences between the two samples are >30%. All preparation records and integrations were reviewed. Data are appropriately qualified. No further corrective actions taken.

Surrogate Recovery	Surrogate compounds were added prior to extraction. The surrogate recoveries are calculated to measure extraction efficiency.
40-120% recovery	Four exceedances noted. Surrogate PCB 34 was over-recovered in four field samples. The second SIS in each of these samples was acceptable. Likely something (high lower-chlorinated PCB levels) in the background for exposed PEDs impacted the early-eluting surrogate. Not noted in QC samples or unexposed PEDs. All data reviewed. No further corrective actions taken.

Initial Calibration (ICAL)	The GC/MS was calibrated with six-level quadratic non-forced calibration curve for all compounds using a quadratic regression (R^2). A six-level quadratic non-forced calibration curve was used for PRC PCB compounds.
$R^2 \geq 0.995$	No exceedances noted.
	No comments.

Independent Calibration Check (ICC)	The independent check was run after each initial calibration to verify the calibration. This standard is from a different source than the ICAL.
≤ 25% difference individual and mean	No exceedances noted.
	No comments.

Continuing Calibration Verification (CCV)	Continuing calibration standards were run every 24 hours or every 10 injections, whichever is shortest, to ensure that initial calibration is still valid.
≤ 25% difference individual; ≤15% difference mean	Two exceedances noted.
	PCB 70 elevated in two CCVs. All authentic samples in bracket report PCB 70 from dilution, where PCB 70 passes. No additional corrective actions necessary.

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Report Project Data Set MQOs

Project Title: USACE/NAE New Bedford Harbor Task

Data Set Number: DP-17-0185

Project Number: 100043429

Prep Batch Number: 17-0369

Test Code (Matrix Type): Master_315(PRC)(S)

QC_PARAMETER:	Exceed:	Contg.:	JUSTIFICATION:
Procedural Blank	0	0	None
PB Measurement Quality Objective	0	0	None
Laboratory Control Sample	2	0	PCB 70 fails high in the LCS. This analyte also fails high in the CCVs, indicating a calibration issue with this analyte. All authentic samples report PCB 70 from dilution where PCB 70 passes. There is no impact on the data for the authentic samples. PCB 137 fails high in the LCS. This analyte passes in all other QC and system checks. RR 09/14/2017
Matrix Spike Recovery	NA	NA	NA
Matrix Spike/Spike Duplicate Precision	136	0	LCSD significanly lower in recovery than LCS. All analytes pass in LCSD, two high in LCS. Preparation records and integrations reviewed. RR 09/14/2017
Standard Reference Material Accuracy	NA	NA	NA
Analytical Duplicate Precision	NA	NA	NA
Analytical Triplicate Precision	NA	NA	NA
Surrogate Compound Recovery	4	0	High levels of congeners in four authentic samples lead to over recovery of PCB 34. The second SIS compound, PCB 152, is acceptable in all samples, indicating the instrument is in control. RR 09/14/2017
Control Oil	NA	NA	NA
Instrument Calibration	0	0	None
Independent Calibration Check Solution	0	0	None
Continuing Calibration Verification	2	0	PCB 70 high in two CCVs. All authentic samples in bracket report PCB 70 from dilution, where PCB 70 passes. RR 09/14/2017

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BATTELLE - NORWELL OPERATIONS
MISCELLANEOUS DOCUMENTATION FORM

Project Title:	USACE/NAE New Bedford Harbor Task	**Data Set Number:**	DP-17-0185
Project Number:	100043429	**Prep Batch Number:**	17-0369
Entered By:	Richard Restucci Jr	**Entered On:**	09/14/2017
Test Code (Matrix Type):	Master_315(PRC)(S)		

Integrations by Lauren Griffith, Mike Meara, and Rich Restucci.
RR 9/14/17

Method MF0901A is used to quant QC and samples K9638 - K9641 for 315 method congeners.
Method MF0908 is used to quant remaining samples and dilutions for 315 method congeners.
Method MW0396A is used to quant all samples and dilutions for PRC compounds.

No ICC exists for PRC compounds.
RR 9/14/17

Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, historical data has reported these as two separate peaks. These peaks are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data.
RR 9/14/17

Sample K9641 exhibits a high IS area for PCB 96 using PRC method MW0396A. It is likely the high levels of congeners in this sample contribute slightly to the IS area. It should be noted that the secondary IS passes criteria and both IS are acceptable in this sample using the full congener method.
RR 9/14/17

CCV F4175 will not report properly in LIMS. The Enviroquant percent difference report is provided.
RR 9/15/17

Samples were weighed using 5 decimal places, but concentrations are calculated using a sample weight value of 2 decimal places.
RR 9/19/17

Task Leader Approval: Kevin McInerney
cn=Kevin McInerney, o=Battelle, ou=Analytical Chemistry Services, email=mcinerneyk@battelle.org, c=US
2017.09.20 08:20:36 -04'00'

SupervisorApproval:

PM Approval: peven@battelle.org
2017.09.20 08:03:45 -04'00'

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MF0901A.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0901.S	F3823.D	JM67	CS	Cl5(96)		37206
SF0901.S	F3824.D	JM68	CS	Cl5(96)		42176
SF0901.S	F3825.D	JM69	CS	Cl5(96)		40968
SF0901.S	F3826.D	JM70	CS	Cl5(96)		44632
SF0901.S	F3827.D	JM71	CS	Cl5(96)		49667
SF0901.S	F3828.D	JM72	CS	Cl5(96)		52742
					L3	40968
					(+)	81936
					(-)	20484

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0901.S	F3829.D	JG69 ICC	ICC	Cl5(96)	47351	
SF0907.S	F4020.D	JM70	CCV	Cl5(96)	31999	
SF0907.S	F4021.D	CM918PB-P(0)	PB	Cl5(96)	27824	
SF0907.S	F4022.D	CM919LCS-P(0)	LCS	Cl5(96)	22746	
SF0907.S	F4023.D	CM920LCSD-P(0)	LCSD	Cl5(96)	35229	
SF0907.S	F4024.D	K9638-P(0)	SA	Cl5(96)	64654	
SF0907.S	F4025.D	K9639-P(0)	SA	Cl5(96)	57225	
SF0907.S	F4026.D	K9640-P(0)	SA	Cl5(96)	60027	
SF0907.S	F4027.D	K9641-P(0)	SA	Cl5(96)	78004	
SF0907.S	F4029.D	JM71	CCV	Cl5(96)	22602	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MF0901A.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0901.S	F3823.D	JM67	CS	Cl6(161)		27081
SF0901.S	F3824.D	JM68	CS	Cl6(161)		29700
SF0901.S	F3825.D	JM69	CS	Cl6(161)		29977
SF0901.S	F3826.D	JM70	CS	Cl6(161)		32317
SF0901.S	F3827.D	JM71	CS	Cl6(161)		35087
SF0901.S	F3828.D	JM72	CS	Cl6(161)		34770
					L3	29977
					(+)	59954
					(-)	14989

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0901.S	F3829.D	JG69 ICC	ICC	Cl6(161)	32599	
SF0907.S	F4020.D	JM70	CCV	Cl6(161)	24325	
SF0907.S	F4021.D	CM918PB-P(0)	PB	Cl6(161)	22711	
SF0907.S	F4022.D	CM919LCS-P(0)	LCS	Cl6(161)	17289	
SF0907.S	F4023.D	CM920LCSD-P(0)	LCSD	Cl6(161)	27075	
SF0907.S	F4024.D	K9638-P(0)	SA	Cl6(161)	19269	
SF0907.S	F4025.D	K9639-P(0)	SA	Cl6(161)	19894	
SF0907.S	F4026.D	K9640-P(0)	SA	Cl6(161)	17373	
SF0907.S	F4027.D	K9641-P(0)	SA	Cl6(161)	19036	
SF0907.S	F4029.D	JM71	CCV	Cl6(161)	17718	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0908.S	F4100.D	JM67	CS	Cl5(96)		18269
SF0908.S	F4101.D	JM68	CS	Cl5(96)		19731
SF0908.S	F4102.D	JM69	CS	Cl5(96)		21181
SF0908.S	F4103.D	JM70	CS	Cl5(96)		22053
SF0908.S	F4104.D	JM71	CS	Cl5(96)		23178
SF0908.S	F4105.D	JM72	CS	Cl5(96)		21675
					L3	21181
					(+)	42362
					(-)	10591

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4106.D	JG69 ICC	ICC	Cl5(96)	21166	
SF0908.S	F4107.D	K9638-P-D(4)	SA	Cl5(96)	22373	
SF0908.S	F4108.D	K9638-P-D(5)	SA	Cl5(96)	19931	
SF0908.S	F4109.D	K9639-P-D(4)	SA	Cl5(96)	22419	
SF0908.S	F4110.D	K9639-P-D(5)	SA	Cl5(96)	20888	
SF0908.S	F4111.D	K9640-P-D(4)	SA	Cl5(96)	22096	
SF0908.S	F4112.D	K9640-P-D(5)	SA	Cl5(96)	20230	
SF0908.S	F4113.D	K9641-P-D(5)	SA	Cl5(96)	20354	
SF0908.S	F4115.D	JM70	CCV	Cl5(96)	21118	
SF0908.S	F4116.D	K9642-P(0)	SA	Cl5(96)	14954	
SF0908.S	F4117.D	K9645-P(0)	SA	Cl5(96)	18326	
SF0908.S	F4118.D	K9646-P(0)	SA	Cl5(96)	17679	
SF0908.S	F4119.D	K9649-P(0)	SA	Cl5(96)	18901	
SF0908.S	F4120.D	K9650-P(0)	SA	Cl5(96)	19091	
SF0908.S	F4121.D	K9641-P-D(4)	SA	Cl5(96)	30459	
SF0908.S	F4123.D	JM71	CCV	Cl5(96)	28059	
SF0908.S	F4176.D	K9638-P-D(7)	SA	Cl5(96)	15657	
SF0908.S	F4177.D	K9640-P-D(7)	SA	Cl5(96)	14621	
SF0908.S	F4178.D	K9641-P-D(7)	SA	Cl5(96)	14891	
SF0908.S	F4185.D	JM70	CCV	Cl5(96)	15065	
SF0908.S	F4175.D	JM70 mid	CCV	Cl5(96)	18821	

RR 9/15/17

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MF0908.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SF0908.S	F4100.D	JM67	CS	Cl6(161)		12275
SF0908.S	F4101.D	JM68	CS	Cl6(161)		13517
SF0908.S	F4102.D	JM69	CS	Cl6(161)		14294
SF0908.S	F4103.D	JM70	CS	Cl6(161)		14852
SF0908.S	F4104.D	JM71	CS	Cl6(161)		15219
SF0908.S	F4105.D	JM72	CS	Cl6(161)		13424
					L3	14294
					(+)	28588
					(-)	7147

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SF0908.S	F4106.D	JG69 ICC	ICC	Cl6(161)	14042	
SF0908.S	F4107.D	K9638-P-D(4)	SA	Cl6(161)	13476	
SF0908.S	F4108.D	K9638-P-D(5)	SA	Cl6(161)	13551	
SF0908.S	F4109.D	K9639-P-D(4)	SA	Cl6(161)	13487	
SF0908.S	F4110.D	K9639-P-D(5)	SA	Cl6(161)	14278	
SF0908.S	F4111.D	K9640-P-D(4)	SA	Cl6(161)	12672	
SF0908.S	F4112.D	K9640-P-D(5)	SA	Cl6(161)	13596	
SF0908.S	F4113.D	K9641-P-D(5)	SA	Cl6(161)	13494	
SF0908.S	F4115.D	JM70	CCV	Cl6(161)	14095	
SF0908.S	F4116.D	K9642-P(0)	SA	Cl6(161)	11395	
SF0908.S	F4117.D	K9645-P(0)	SA	Cl6(161)	12700	
SF0908.S	F4118.D	K9646-P(0)	SA	Cl6(161)	12184	
SF0908.S	F4119.D	K9649-P(0)	SA	Cl6(161)	13344	
SF0908.S	F4120.D	K9650-P(0)	SA	Cl6(161)	13218	
SF0908.S	F4121.D	K9641-P-D(4)	SA	Cl6(161)	15077	
SF0908.S	F4123.D	JM71	CCV	Cl6(161)	19287	
SF0908.S	F4176.D	K9638-P-D(7)	SA	Cl6(161)	10960	
SF0908.S	F4177.D	K9640-P-D(7)	SA	Cl6(161)	9898	
SF0908.S	F4178.D	K9641-P-D(7)	SA	Cl6(161)	10212	
SF0908.S	F4185.D	JM70	CCV	Cl6(161)	10394	
SF0908.S	F4175.D	JM70	CCV	Cl6(161)	13011	

RR 9/15/17

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MW0396A.M

SIGNAL: 1

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0396.S	W9087.D	JJ48	CS	Cl5(96)		39819
SW0396.S	W9088.D	JJ49	CS	Cl5(96)		37926
SW0396.S	W9089.D	JJ50	CS	Cl5(96)		31881
SW0396.S	W9090.D	JJ51	CS	Cl5(96)		29609
SW0396.S	W9091.D	JJ52	CS	Cl5(96)		28342
SW0396.S	W9092.D	JJ53	CS	Cl5(96)		27390
					L3	31881
					(+)	63762
					(-)	15941

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SW0397.S	W9094.D	JJ51	CCV	Cl5(96)	31313	
SW0397.S	W9095.D	CM918PB-P(0)	PB	Cl5(96)	24961	
SW0397.S	W9096.D	CM919LCS-P(0)	LCS	Cl5(96)	21474	
SW0397.S	W9097.D	CM920LCSD-P(0)	LCSD	Cl5(96)	36635	
SW0397.S	W9098.D	K9638-P(2)	SA	Cl5(96)	59910	
SW0397.S	W9099.D	K9639-P(2)	SA	Cl5(96)	49140	
SW0397.S	W9100.D	K9640-P(2)	SA	Cl5(96)	49803	
SW0397.S	W9101.D	K9641-P(2)	SA	Cl5(96)	72756	>
SW0397.S	W9103.D	JJ52	CCV	Cl5(96)	37560	
SW0397.S	W9108.D	JJ51	CCV	Cl5(96)	42543	
SW0397.S	W9116.D	K9642-P-D(3)	SA	Cl5(96)	22165	
SW0397.S	W9117.D	JJ52	CCV	Cl5(96)	40755	
SW0397.S	W9118.D	K9645-P-D(3)	SA	Cl5(96)	32943	
SW0397.S	W9119.D	K9646-P-D(3)	SA	Cl5(96)	32979	
SW0397.S	W9120.D	K9649-P-D(3)	SA	Cl5(96)	33223	
SW0397.S	W9121.D	K9650-P-D(3)	SA	Cl5(96)	32728	
SW0397.S	W9122.D	JJ51	CCV	Cl5(96)	40123	

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Internal Standard Area Report

PROJECT NAME: USACE/NAE New Bedford Harbor Task Order 10

PROJECT NO: 100043429

BATCH: 17-0369

METHOD: MW0396A.M

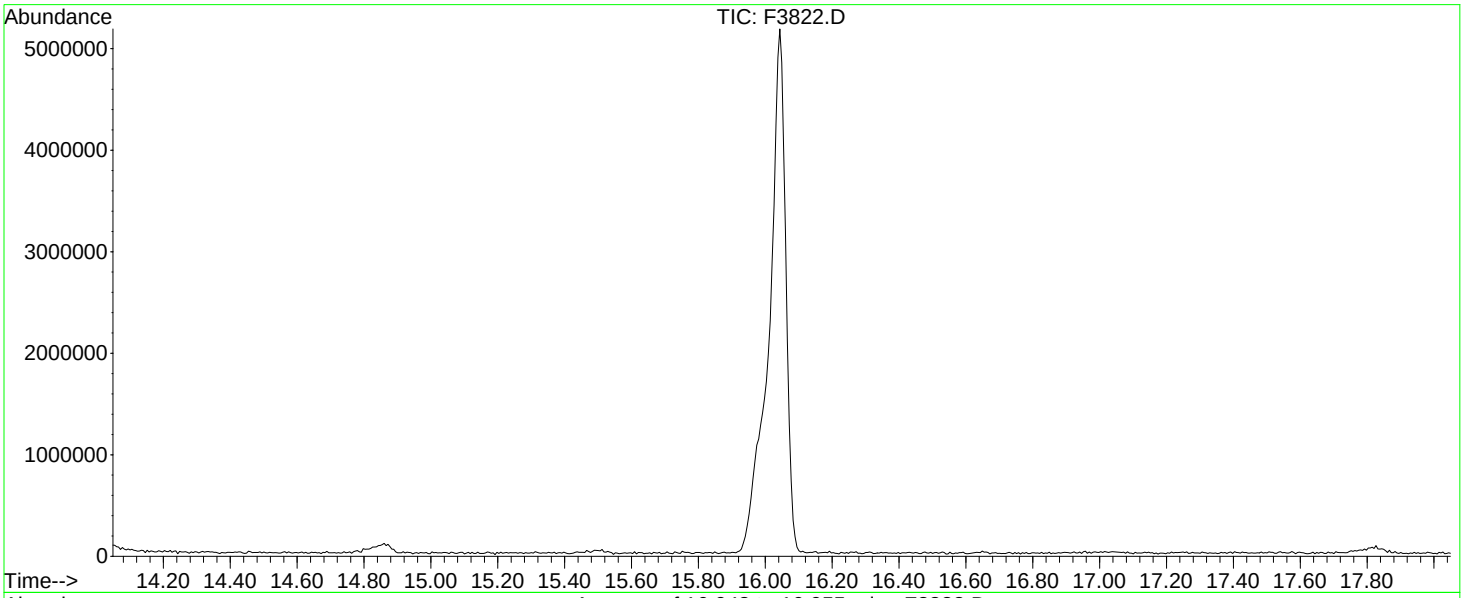
SIGNAL: 1

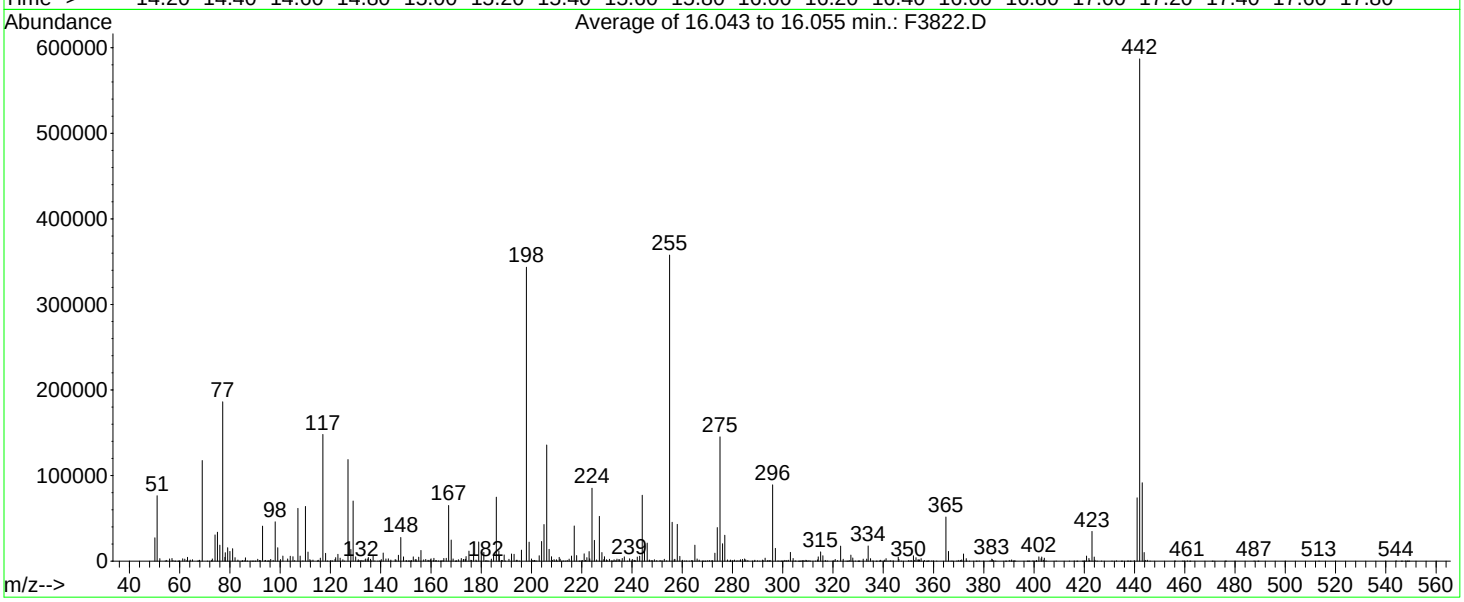
SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:		AREA:
SW0396.S	W9087.D	JJ48	CS	Cl6(161)		24936
SW0396.S	W9088.D	JJ49	CS	Cl6(161)		23661
SW0396.S	W9089.D	JJ50	CS	Cl6(161)		19656
SW0396.S	W9090.D	JJ51	CS	Cl6(161)		18609
SW0396.S	W9091.D	JJ52	CS	Cl6(161)		17757
SW0396.S	W9092.D	JJ53	CS	Cl6(161)		16445
					L3	19656
					(+)	39312
					(-)	9828

SEQUENCE:	FILE:	LEVEL:	TYPE:	PEAK:	AREA:	FLAG:
SW0397.S	W9094.D	JJ51	CCV	Cl6(161)	19451	
SW0397.S	W9095.D	CM918PB-P(0)	PB	Cl6(161)	17252	
SW0397.S	W9096.D	CM919LCS-P(0)	LCS	Cl6(161)	12063	
SW0397.S	W9097.D	CM920LCSD-P(0)	LCSD	Cl6(161)	20763	
SW0397.S	W9098.D	K9638-P(2)	SA	Cl6(161)	15358	
SW0397.S	W9099.D	K9639-P(2)	SA	Cl6(161)	11440	
SW0397.S	W9100.D	K9640-P(2)	SA	Cl6(161)	11847	
SW0397.S	W9101.D	K9641-P(2)	SA	Cl6(161)	9963	
SW0397.S	W9103.D	JJ52	CCV	Cl6(161)	24863	
SW0397.S	W9108.D	JJ51	CCV	Cl6(161)	31704	
SW0397.S	W9116.D	K9642-P-D(3)	SA	Cl6(161)	12489	
SW0397.S	W9117.D	JJ52	CCV	Cl6(161)	27043	
SW0397.S	W9118.D	K9645-P-D(3)	SA	Cl6(161)	22463	
SW0397.S	W9119.D	K9646-P-D(3)	SA	Cl6(161)	22947	
SW0397.S	W9120.D	K9649-P-D(3)	SA	Cl6(161)	22655	
SW0397.S	W9121.D	K9650-P-D(3)	SA	Cl6(161)	22836	
SW0397.S	W9122.D	JJ51	CCV	Cl6(161)	27489	

Data File : G:\F\DATA\SF0901\F3822.D
Acq On : 15 Aug 2017 4:53 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0901A.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: 1.000 ( )

Vial: 1
Operator: RR
Inst : Inst. F
Multiplr: 1.00



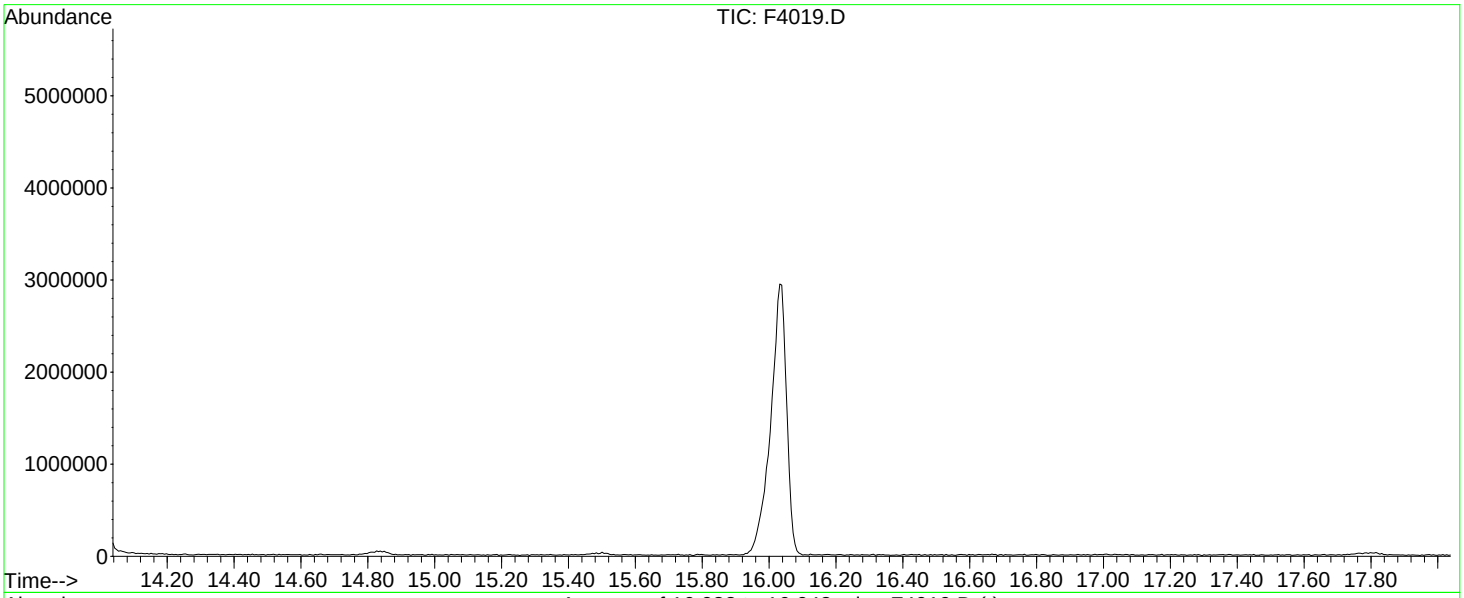


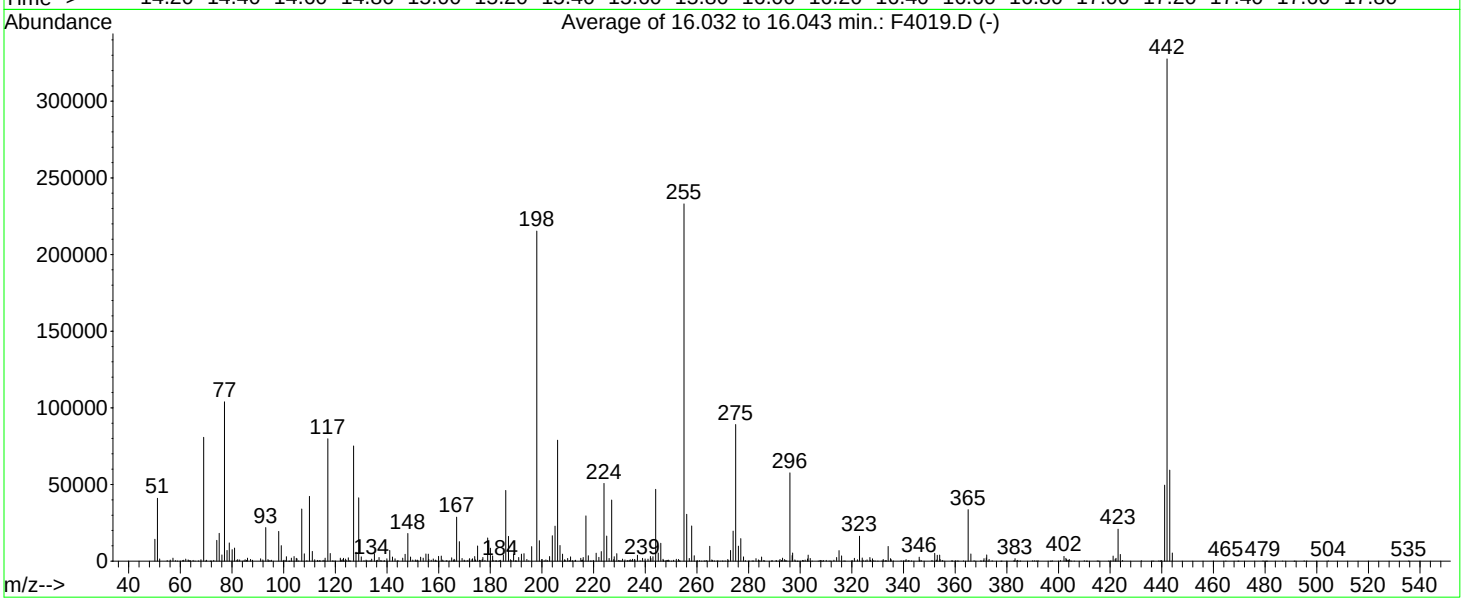
Spectrum Information: Average of 16.043 to 16.055 min.

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	22.3	76538	PASS
68	69	0.00	2	1.0	1198	PASS
70	69	0.00	2	0.0	0	PASS
127	198	10	80	34.6	118698	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	343402	PASS
199	198	5	9	6.5	22245	PASS
275	198	10	60	42.3	145258	PASS
365	198	1	1000	15.0	51653	PASS
441	442	0.01	24	12.6	74117	PASS
442	198	50	1000	170.9	586922	PASS
443	442	15	24	15.6	91741	PASS

Data File : G:\F\DATA\SF0907\F4019.D
Acq On : 8 Sep 2017 12:08 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0901A.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: 1.000 ( )

Vial: 2
Operator: RR
Inst : Inst. F
Multiplr: 1.00





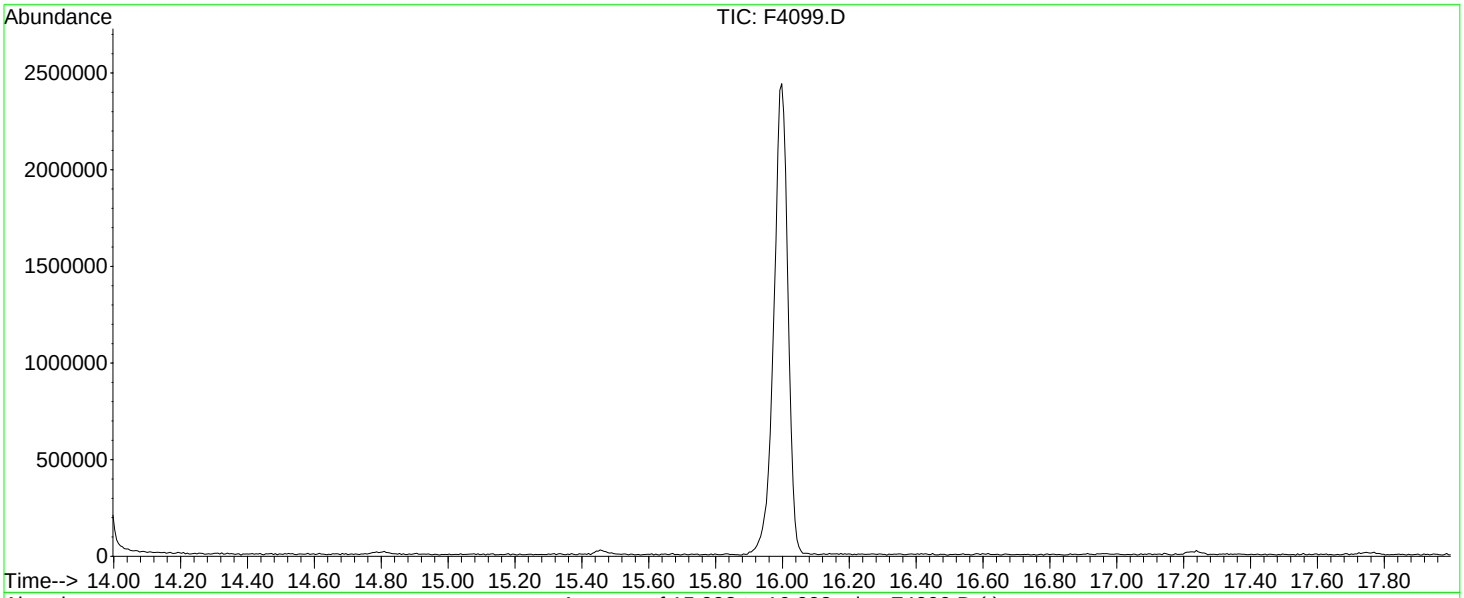
AutoFind: Scans 1916, 1917, 1918; Background Corrected with Scan 1896

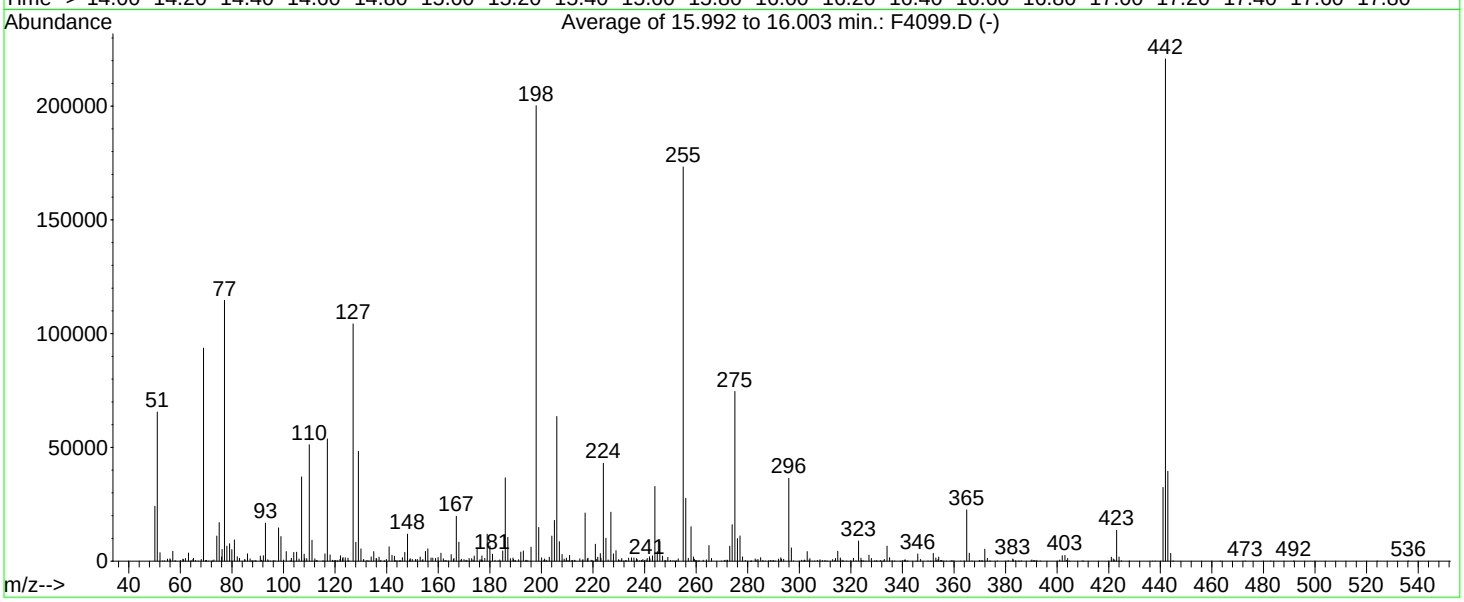
Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	19.1	41066	PASS
68	69	0.00	2	1.1	910	PASS
70	69	0.00	2	0.8	664	PASS
127	198	10	80	34.9	75165	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	215338	PASS
199	198	5	9	6.2	13359	PASS
275	198	10	60	41.4	89170	PASS
365	198	1	1000	15.6	33589	PASS
441	442	0.01	24	15.1	49536	PASS
442	198	50	1000	152.1	327616	PASS
443	442	15	24	18.1	59432	PASS

F4019.D MF0901A.M Thu Sep 14 14:32:42 2017 040221CFS

Data File : G:\F\DATA\SF0908\F4099.D
Acq On : 11 Sep 2017 5:27 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\F\DATA\MF0908.M (RTE Integrator)
Title : PCB-QNF NBH
Standard Mult: NA

Vial: 1
Operator: RR
Inst : Inst. F
Multiplr: 1.00



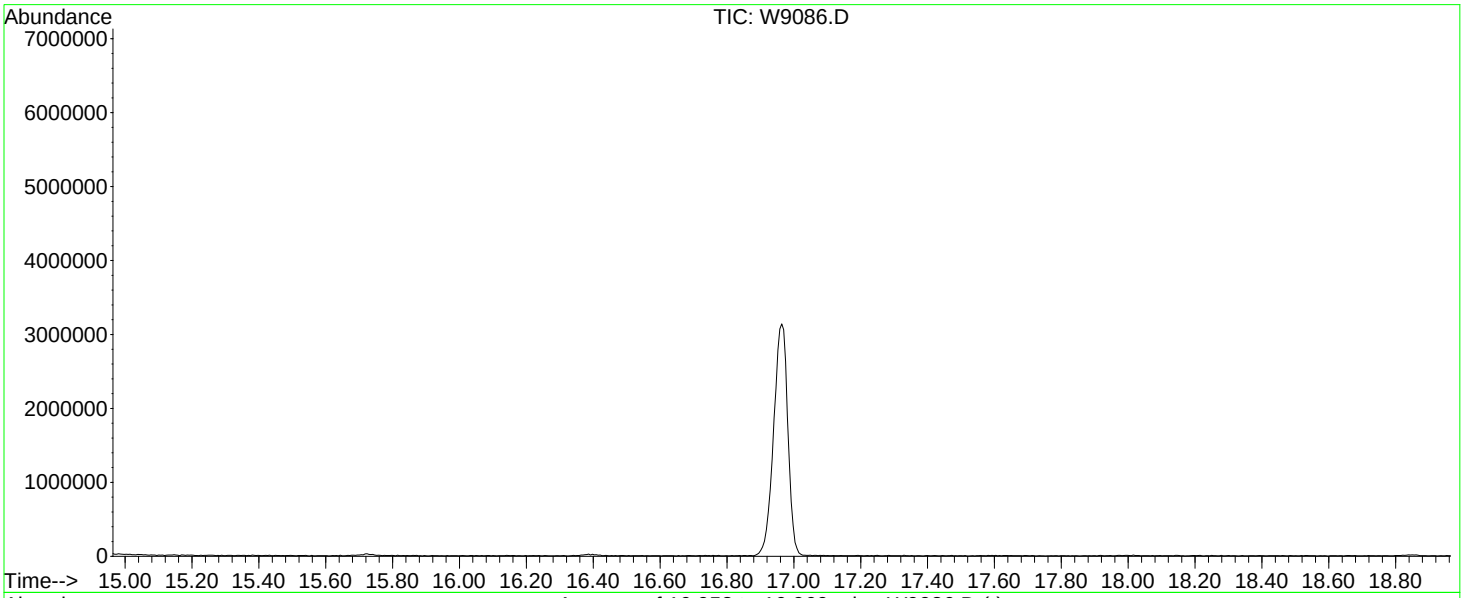


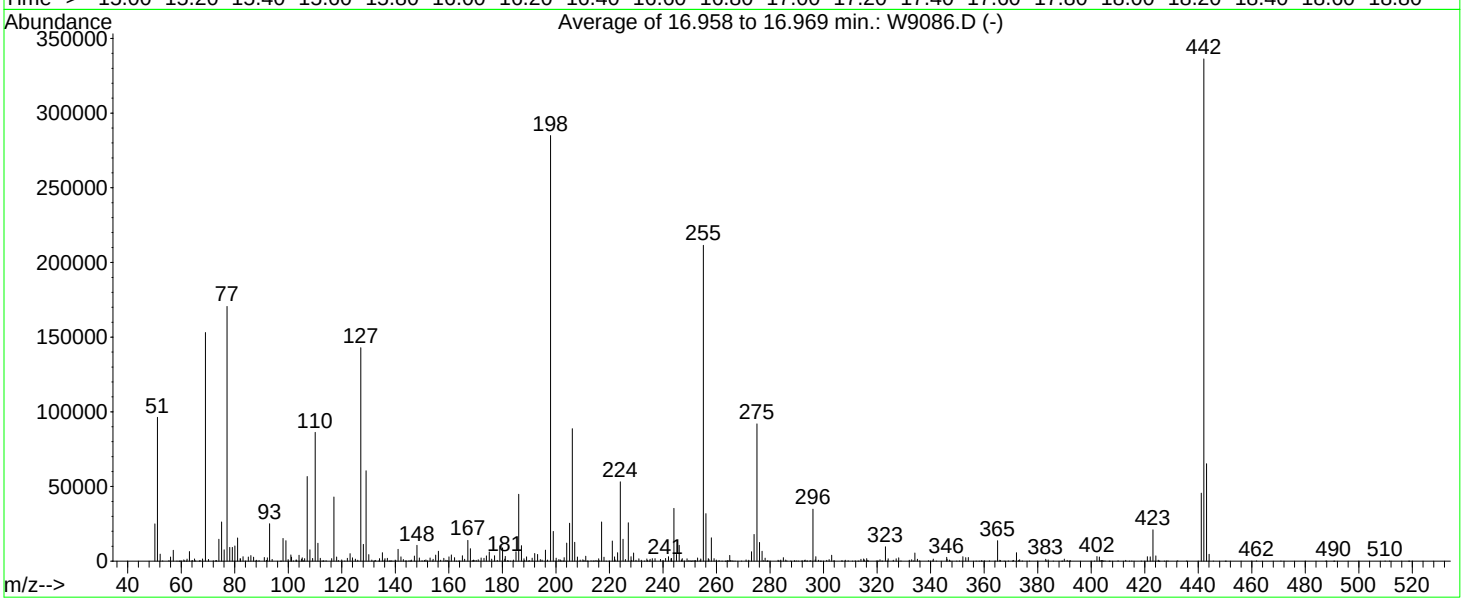
AutoFind: Scans 1909, 1910, 1911; Background Corrected with Scan 1893

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	32.7	65531	PASS
68	69	0.00	2	0.8	771	PASS
70	69	0.00	2	0.4	337	PASS
127	198	10	80	52.1	104288	PASS
197	198	0.00	2	0.0	0	PASS
198	198	100	100	100.0	200185	PASS
199	198	5	9	7.4	14862	PASS
275	198	10	60	37.3	74613	PASS
365	198	1	1000	11.3	22552	PASS
441	442	0.01	24	14.7	32437	PASS
442	198	50	1000	110.3	220757	PASS
443	442	15	24	17.9	39535	PASS

Data File : G:\W\DATA\SW0396\W9086.D
Acq On : 8 Sep 2017 2:16 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\W\DATA\MW0396A.M (RTE Integrator)
Title : PRC
Standard Mult: 1.000 ( )

Vial: 2
Operator: RR
Inst : Inst. W
Multiplr: 1.00



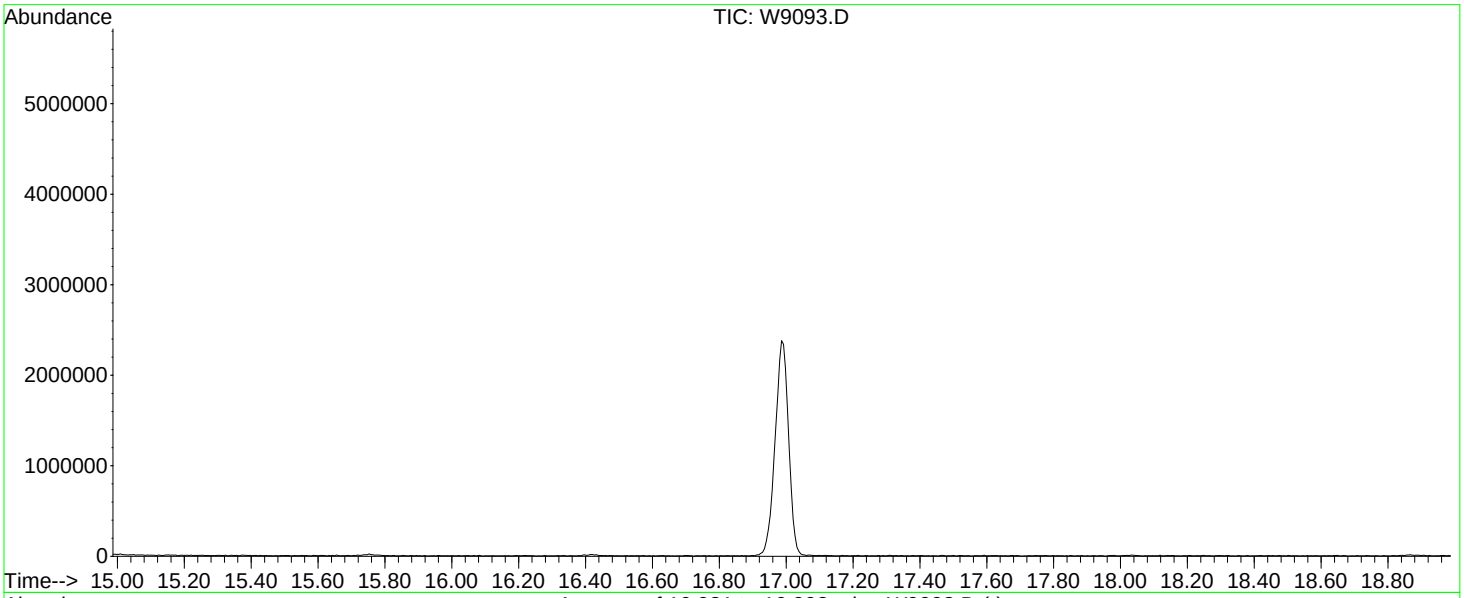


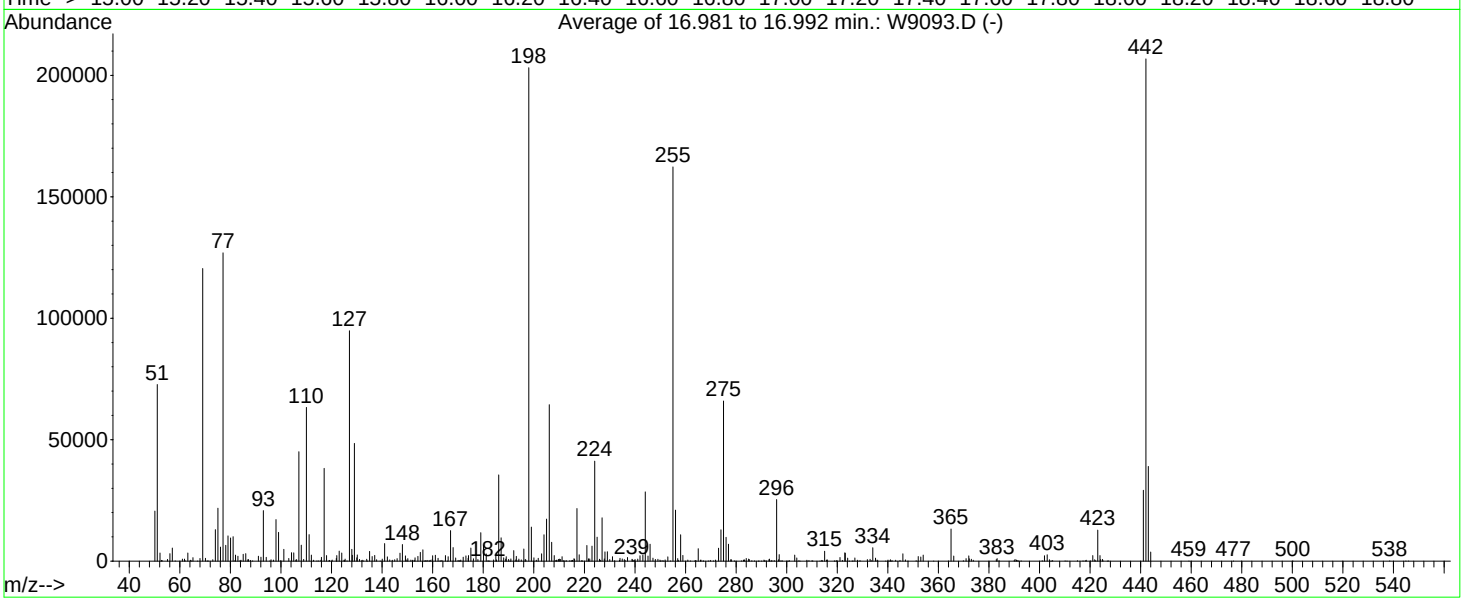
AutoFind: Scans 2078, 2079, 2080; Background Corrected with Scan 2060

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	33.8	96272	PASS
68	69	0.00	2	1.0	1508	PASS
70	69	0.00	2	0.8	1164	PASS
127	198	10	80	50.1	142869	PASS
197	198	0.00	2	0.3	764	PASS
198	198	100	100	100.0	285034	PASS
199	198	5	9	7.0	19970	PASS
275	198	10	60	32.3	91941	PASS
365	198	1	1000	4.8	13738	PASS
441	442	0.01	24	13.5	45549	PASS
442	198	50	1000	118.0	336298	PASS
443	442	15	24	19.4	65216	PASS

Data File : G:\W\DATA\SW0397\W9093.D
Acq On : 12 Sep 2017 3:50 pm
Sample : JJ95
Misc : 5-315 DFTPP
MS Integration Params: rteint.p
Method : G:\W\DATA\MW0396A.M (RTE Integrator)
Title : PRC
Standard Mult: 1.000 ( )

Vial: 1
Operator: LMG
Inst : Inst. W
Multiplr: 1.00





AutoFind: Scans 2082, 2083, 2084; Background Corrected with Scan 2069

Target Mass	Rel. to Mass	Lower Limit%	Upper Limit%	Rel. Abn%	Raw Abn	Result Pass/Fail
51	198	10	80	35.8	72717	PASS
68	69	0.00	2	0.9	1117	PASS
70	69	0.00	2	1.0	1203	PASS
127	198	10	80	46.7	94858	PASS
197	198	0.00	2	0.2	441	PASS
198	198	100	100	100.0	203136	PASS
199	198	5	9	6.9	14054	PASS
275	198	10	60	32.5	65957	PASS
365	198	1	1000	6.5	13224	PASS
441	442	0.01	24	14.1	29176	PASS
442	198	50	1000	101.8	206762	PASS
443	442	15	24	18.9	38976	PASS

Appendix C:

Porewater and Surface Water Calculation Data

This Appendix contains abbreviated congener data, including PED concentration, water concentration, and congener octanol-water partition coefficients (K_{ow}s) and K_{PED}s.

- Tables C-1 to C-3 include analytical results of PED concentration data for the three analytical batches analyzed in this survey (Batch S17-0367, S17-0368, S17-0369). Samples with IDs ending in "SW" correspond to the surface water part of the PED, and samples with IDs ending in "PW" correspond to porewater part of the PEDs. At the bottom of each table, initial and final PRC concentrations and calculated fractional equilibrations are provided as well. The data are presented in the simplified form that was used in data processing: qualifiers were removed and any non-detect values were set to zero. In addition, Table 3 (Batch S17-0369) includes the results of the trip blank and pre-exposed PED analysis.
- Tables C-4 to C-6 contain the porewater and surface water concentrations calculated from the PED data for the three analytical batches, as described above. Water concentrations were not calculated for the trip blank and pre-exposed PEDs because these samples were not deployed.
- Table C-7 provides a list of K_{ow} and K_{PED} data used during conversion of the PED concentration results to theoretical water concentrations.

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
Congener																				
PCB-1	31	68.8	33.6	195	19.8	769	25.4	66.2	32	156	28.7	92.1	54.6	66.2	26.2	1790	197	36600	34.6	151
PCB-3	22.1	47.1	26.6	91.5	17.1	143	21.9	52.7	23.7	66.8	23.4	73.8	31.5	34.4	18.7	753	55.6	5440	23	34.8
PCB-4	2110	4330	2280	9920	1870	13600	1830	2930	2260	5870	2200	5690	2880	2940	2630	104000	2980	98100	2160	5070
PCB-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1380	0	0
PCB-6	7240	13900	7730	19100	7150	21600	6020	7370	8550	10500	6980	13900	7510	7380	8850	191000	7100	24100	6360	11100
PCB-7	117	170	117	493	96.7	699	138	125	139	143	108	116	103	137	80.8	1660	151	0	119	90.6
PCB-8	7020	16600	7250	20100	6790	24800	5900	7930	9320	15500	6790	14700	7800	7550	8660	206000	8210	64400	6380	10100
PCB-9	174	721	204	1010	144	1230	175	226	199	289	201	690	187	186	140	3550	255	6190	159	159
PCB-11	1200	1920	1320	2070	1210	2090	1210	1180	1480	1460	1370	1720	1460	1460	1330	16100	1270	2010	1230	1700
PCB-12	3.09	8.43	4.84	5.91	4.52	0	2.6	2.95	2.82	5.88	0	807	4.21	3.3	0	14.3	5.6	103	2.46	0
PCB-13	3730	8130	4130	8770	3770	8220	3770	3670	4580	4810	4280	4870	4620	4690	4170	54400	4070	7360	3910	7220
PCB-15	3510	6920	3880	7470	3600	7260	3710	3510	4420	5360	4220	4060	4450	4310	3820	45400	4600	17700	3850	4630
PCB-16	288	1580	321	1060	241	647	293	704	776	3040	287	245	926	969	161	2720	905	10500	270	1210
PCB-17	13100	20800	13500	21900	13300	23000	12800	12100	15700	15700	14100	18100	16200	15800	15900	157000	13300	29300	13000	17400
PCB-18	25300	38600	26200	45700	25600	49800	24300	24500	31100	30100	27800	39400	32100	32200	32700	364000	26200	45800	25600	32600
PCB-19	1560	2660	1660	3560	1460	4960	1470	1730	1770	2300	1640	3600	2140	2190	1920	35300	1700	11600	1540	2940
PCB-22	2190	3720	2480	2910	2340	2000	2090	2250	2710	4130	2470	2000	2760	2780	1880	12900	2580	6750	2310	3460
PCB-24	20.4	37.7	25.4	27.2	22.8	17	22.8	24.9	23.4	60.6	19	21.4	25.2	30	11.2	137	31.1	233	19.6	22.3
PCB-25	29700	41100	30400	39300	30300	33900	29100	24600	35800	29700	33000	32600	32800	32300	35600	233000	29000	26800	30300	40200
PCB-26	40000	54800	40200	52500	39600	48700	38800	33500	49300	42600	43900	46600	47300	47700	49400	377000	39000	36000	40600	63100
PCB-27	3830	6350	4160	8970	3710	10200	3680	3750	4460	3860	4160	6910	5460	5550	4880	63600	3970	7940	3910	9660
PCB-28	50300	57400	51000	58400	50700	54500	49000	41700	59800	50100	55900	51500	53900	53800	56800	322000	45400	51600	50500	56200
PCB-29	10.1	11.5	12.1	6.51	0	6.01	9.66	12	12.5	25.1	8.87	0	10.7	12.5	4.93	0	14.5	73	10.2	7.06
PCB-30	11.5	12.7	11.6	11.2	9.47	11.6	11	10	11.7	10.3	11.3	9.86	32.6	9.5	6.96	78.5	12.6	21.6	8.46	8.93
PCB-31	48400	55900	51000	59600	50000	57600	47800	41000	59100	51800	53700	53900	51500	51500	58000	352000	41400	49200	48500	55600
PCB-32	9000	14400	9360	15900	9020	17000	8650	8320	11300	10500	9800	14700	12600	12900	12000	126000	9280	14800	9140	15600
PCB-33	1300	2820	1470	1580	1560	1140	1490	1360	1970	4710	1620	216	2000	2070	1280	3520	1810	5340	1690	3390
PCB-37	1230	1630	1260	1100	1140	949	1160	996	1440	2240	1400	987	1510	1620	1260	1720	1370	2560	1260	1570

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-40	2620	3000	2500	2280	2400	2040	2270	1890	2560	2380	2900	1980	2440	2730	2920	11600	2180	2760	2240	2910
PCB-41	0	0	0	15.2	0	0	0	0	0	41.6	0	0	14.3	14	0	0	0	73.1	0	0
PCB-42	7120	9600	6930	8540	7180	4860	5880	5170	7820	7970	6910	5110	6010	6190	5340	26000	6020	6860	5750	10200
PCB-43	786	723	743	545	739	802	3310	1660	4830	5400	2510	821	768	838	3030	20900	3550	411	3390	4050
PCB-44	11600	16800	11400	14400	11800	9600	10700	9370	13100	14300	12600	8580	12600	13200	12100	57600	11200	12300	11400	18000
PCB-45	844	1330	949	1140	908	697	884	842	1020	1150	971	708	1020	1010	723	2160	928	1580	338	1020
PCB-46	1190	1880	1230	1770	1160	1660	1130	1140	1360	1430	1270	1610	1540	1600	1390	14100	1160	1580	1150	2070
PCB-47	18700	22300	18300	19200	18100	16200	17300	13400	20200	16900	20400	16800	19300	21300	22800	71100	16600	19100	17500	25600
PCB-48	1140	2740	1650	3610	2950	1620	2560	2370	3580	4470	3700	1230	2080	1820	3980	13200	2840	426	2490	4480
PCB-49	57300	73200	58800	70100	48400	53300	69800	55800	65100	53200	54300	74100	79900	86000	79400	468000	55300	54500	74000	84000
PCB-50	84.5	87.8	89.1	81.3	66	90	82.8	67.1	88.1	66.2	86	71.2	78.9	82.7	71.9	494	83.8	92.7	73.3	73.3
PCB-51	3920	5000	3940	4440	3540	5190	3530	3180	4470	3600	4010	4870	5360	5610	5120	37300	3620	4320	3860	7860
PCB-52	61600	76900	60700	72200	49900	59400	66500	54200	68800	54000	57000	73900	83100	87900	83200	543000	55900	54600	73100	94200
PCB-53	9080	12500	9020	12200	8800	13900	8340	7540	11100	9020	9370	12800	13300	13600	12800	99300	8760	9290	9410	16300
PCB-54	63.5	74.4	64.6	74.8	46.6	126	56.1	64.8	67.1	61.8	57.3	99.5	99.4	102	54.9	753	66.2	125	57.5	107
PCB-56	818	1040	846	697	782	537	762	627	937	1500	911	547	1000	1050	622	360	1100	1420	880	1240
PCB-60	467	451	482	155	178	123	216	177	201	651	236	328	191	209	108	144	212	264	185	577
PCB-63	259	618	270	190	188	157	253	195	221	252	266	131	195	200	137	620	541	273	188	200
PCB-64	5080	8520	5550	7010	6500	3790	5430	4420	5670	5780	5910	3750	5010	5140	4130	17000	5210	6620	4930	7700
PCB-66	3370	3320	3310	2400	3110	1990	3220	2440	3710	5220	3760	2030	4020	4300	2490	906	3840	5270	3590	4380
PCB-67	1970	1360	2070	1430	1890	1140	1950	1320	1900	1410	2320	1120	1510	1490	1500	586	1640	1480	1590	1290
PCB-70	2840	2500	2740	1840	2580	1550	2610	1890	3110	5300	3050	1540	3210	3420	2010	618	2780	3980	2950	3410
PCB-71	10300	13600	9730	10700	9390	9990	8820	7520	11500	10100	10600	9000	10400	10900	13200	63600	8790	7910	9980	14200
PCB-74	4210	2880	4510	2820	3970	2400	4110	2890	4230	4040	4930	2400	3800	3830	3090	658	3820	4630	3720	3140
PCB-75	968	1170	1050	888	963	831	1010	749	1070	799	1070	851	1020	1060	1160	1830	914	380	351	1040
PCB-77	247	261	253	196	254	187	268	212	239	315	286	164	265	297	213	124	233	370	232	302
PCB-80	34.5	23.5	36.8	25.5	30.1	27.9	35.3	34.5	32.6	34.1	36.2	21.8	30.8	35	16.6	28.8	143	40.6	27.1	48.7
PCB-81	17.9	14.3	17.7	17.1	17.4	13.4	13.2	0	9.77	15	0	17.7	13.3	17.3	0	0	11.1	20.5	11.2	14.8
PCB-82	142	205	121	122	132	98.7	140	113	151	441	138	94.7	170	222	104	106	128	204	158	387

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-83	4540	6160	4250	4340	3980	3370	4140	3410	4120	4730	5250	3770	4450	5060	5310	18500	3350	3750	3750	5810
PCB-84	2830	4620	2610	3010	2430	1930	2430	2480	2600	3970	2670	2470	2590	3400	2340	11800	1730	3470	2250	3610
PCB-85	332	584	348	367	403	283	367	355	504	1290	424	265	491	492	438	586	378	716	512	1280
PCB-87	513	743	432	424	497	362	467	426	556	2090	576	356	712	887	354	378	437	965	606	1930
PCB-91	6960	9840	6170	7240	6550	4390	5690	4720	6040	7660	6950	4740	5660	6200	5690	26200	4960	6030	5230	9110
PCB-92	3550	3940	3600	3100	3390	2630	3370	2370	3010	4150	4350	2460	3670	3490	3450	16100	3020	2850	3400	5070
PCB-95	13300	17500	12500	13600	12300	9670	11700	9920	13900	16400	14200	8690	13400	14800	14000	51400	11000	11400	12300	19000
PCB-97	2990	3620	3000	2700	2920	2060	2930	2310	3010	4530	3640	2150	3160	3690	2750	3500	2480	2990	2910	4640
PCB-99	9310	10700	7740	7570	7930	5430	7900	6090	8720	11900	10200	6110	9190	10800	8310	12000	6940	9660	7080	13100
PCB-100	911	1080	787	744	740	665	351	301	764	780	949	709	311	361	1040	1710	299	399	285	976
PCB-101	12400	13000	11300	10200	10700	7430	10400	7910	11600	16700	13800	6860	11800	14200	10800	14300	9210	11900	11100	16600
PCB-104	22.2	19	18.3	15.9	15	18.4	18.1	14.9	18.9	15.5	20.4	18.2	20.1	22.6	22.6	120	16.7	20.4	16.7	19
PCB-105	466	595	367	365	412	302	415	359	462	1640	477	302	653	840	318	226	363	805	542	1650
PCB-110	13400	17900	12500	13100	12400	9400	12300	9880	13800	19200	15400	10800	12800	15400	12700	36100	11100	13500	12200	20500
PCB-114	106	121	92.6	90.9	82.3	67.8	92.4	78.4	88.4	164	112	61.4	106	141	84.2	69	77.3	117	93.6	166
PCB-115	94.5	150	77.2	105	0	85.8	0	0	0	0	0	455	84	137	0	0	0	717	0	0
PCB-118	4890	5380	4550	4130	4430	3180	4570	3760	4690	9560	5840	3580	5560	6840	4130	2780	3920	6550	4760	10000
PCB-123	655	778	581	564	639	452	638	519	593	1060	738	460	648	768	526	620	495	754	567	1150
PCB-124	151	166	135	117	135	93.8	140	112	138	262	173	102	155	199	115	88.1	112	172	145	258
PCB-125	68	53.2	49.3	58.5	41.6	46.1	0	0	0	50.7	0	44	64	66	0	0	0	55.8	0	53.4
PCB-126	19.6	20.4	19	17.8	19	15.3	17.6	18.4	15.5	17.8	21.6	16	16.4	21.8	17	0	14	20.6	16.2	22.2
PCB-127	79.2	31.6	143	16.5	95	68.5	113	75	114	87.9	84.5	42.8	64.7	55.8	81.2	51.3	149	78.4	85.2	46.5
PCB-128	338	433	282	317	300	252	304	281	287	871	354	276	380	514	253	300	246	440	308	918
PCB-130	152	193	139	147	132	115	142	128	123	288	181	118	135	210	124	188	110	210	116	286
PCB-131	246	356	213	250	239	203	234	219	200	306	287	231	219	278	262	871	167	266	188	335
PCB-134	532	785	470	501	518	402	504	451	443	631	586	482	475	573	487	1550	372	552	413	701
PCB-135	1070	1490	1020	1090	1010	845	1010	877	986	1340	1280	964	906	1230	1210	3440	700	1180	809	1560
PCB-136	1390	2000	1340	1480	1300	1170	1270	1160	1280	1690	1620	1270	1380	1570	1720	5770	1020	1260	1140	1980
PCB-137	146	197	124	136	129	107	133	116	124	312	158	121	153	224	119	134	101	207	132	307

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-138	929	1420	865	1200	851	685	850	800	919	3070	1160	836	1280	2110	687	970	704	1490	1040	3060
PCB-139	140	174	116	132	122	104	126	118	107	170	158	117	128	159	130	304	84.8	152	98.3	186
PCB-140	11	12.6	6.12	8.36	13.2	7.03	9.34	8.89	0	19.8	9.27	12.7	10.3	14.5	6.56	0	0	14.4	8.34	21.4
PCB-141	182	252	153	167	159	129	168	150	162	501	196	142	215	305	138	157	133	270	188	476
PCB-144	107	183	89.1	129	83.6	98.3	89	77.2	77.9	176	110	62	110	114	80	149	68.6	97	80.9	180
PCB-146	952	1270	852	957	825	660	835	742	710	1260	1110	779	770	943	978	2010	598	1170	653	1280
PCB-149	9380	12000	7630	9070	7720	6980	7590	6850	7930	11000	10300	7230	7320	10100	10200	33100	5670	7730	6360	12200
PCB-151	1250	1700	1220	1320	1110	924	1140	992	1050	1560	1480	1100	1170	1420	1290	3370	870	1220	834	1760
PCB-153	6290	7400	5180	6260	4930	4180	5090	4670	4750	8810	6570	4950	5300	6710	5290	7540	3980	6680	4540	9380
PCB-154	582	807	469	552	534	483	518	472	450	543	613	547	504	607	693	2410	362	596	411	651
PCB-155	4.03	3.98	3.7	3.22	3.14	2.93	3.72	3.46	2.94	3.45	3.99	3.39	0	3.4	2.97	21.9	3.08	4.15	2.72	3.03
PCB-156	258	344	219	245	201	187	230	218	211	530	285	198	277	400	216	319	180	310	232	517
PCB-157	48.2	67.6	39.4	44.9	37.9	39	40.9	40.7	38.8	120	49.7	36.6	55.3	83.5	38.1	56.9	31.5	65	46.8	122
PCB-158	385	477	334	362	354	295	362	342	317	615	451	293	368	494	322	376	261	408	315	598
PCB-163	2020	2800	1830	2000	1780	1520	1780	1650	1640	2370	2340	1810	1850	2040	2220	5450	1340	1720	1590	2700
PCB-164	296	382	262	286	291	225	276	257	241	432	342	259	274	351	242	322	197	337	247	452
PCB-166	37.2	43.5	31.4	34.3	31.2	27.1	35.3	30.3	27.2	44.2	41.9	30.6	29.4	39.8	31	53.6	25.2	36.8	25.9	46
PCB-167	234	306	199	232	191	181	215	208	185	333	266	208	214	287	211	323	158	259	185	336
PCB-169	0	0	0	0	4.8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-170	189	283	162	206	156	159	164	185	145	365	218	184	184	255	165	357	126	219	148	327
PCB-171	61.4	95.5	55.9	70.6	52.3	54.6	57.1	61.7	48.3	116	71	61.9	59.3	84.8	58.3	113	40.8	80.8	49.4	109
PCB-172	36.3	57.1	34.3	42.1	31.6	32.3	35.4	32.9	27.9	63.6	42.6	36.6	33.7	44.3	34.7	78.3	25.3	48.9	29.1	54.3
PCB-173	6.24	7.56	4.25	6.56	8.2	5.63	5.08	4.48	3.99	9.84	7.11	10.4	4.56	7.51	4.35	0	4.04	12	4.18	8.5
PCB-174	116	171	103	125	98.3	97.6	110	108	91.4	240	135	103	113	156	103	234	79.4	144	92.7	212
PCB-175	17.3	25.2	13.1	18.6	15.6	12.1	15.5	14.4	11.7	22.9	17.4	16.5	14.2	19.8	15.8	58.3	10.1	21.4	13.1	22.5
PCB-176	27.1	40.5	24.5	28.1	24.1	23.6	26.5	26.2	22	45.8	30.6	28.5	24.6	33.5	26.4	85.4	18.6	31.6	21.4	41.6
PCB-177	92.4	132	79.4	100	85.2	77.7	85.3	89.1	70.8	164	101	88.2	84	120	79.4	134	61.4	116	72.9	157
PCB-178	112	160	89.2	115	91.3	91	96.5	96.2	80.9	126	122	105	90.6	114	116	384	68.4	114	72	131
PCB-179	209	306	184	232	193	182	199	193	164	241	240	218	178	225	227	778	141	227	154	257

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-180	358	521	312	388	299	290	325	345	263	607	400	370	319	445	330	918	239	432	262	529
PCB-183	169	248	145	184	144	142	155	161	123	241	187	174	144	200	169	515	109	195	120	236
PCB-184	0	0	0	1.34	0	0	0	0	0	0	0	0	1.48	0	0	0	0	0	0	0
PCB-185	19.7	26.8	16.7	20.7	19.7	14.9	19.8	17.6	14.3	28.4	25.3	18.8	17.5	22.2	19.2	41.5	13.6	19.9	14.7	29.4
PCB-187	587	941	496	691	566	510	528	545	437	656	648	681	485	614	613	2380	379	696	406	686
PCB-188	14.1	22	12.7	16	11.7	12.8	12.6	13	12.1	13.2	17	14.8	12	16.3	16.8	84.5	9.19	15.9	9.9	15.4
PCB-189	13	21.6	9.71	15.1	8.42	11.9	11	12.6	9.01	21.8	14	14.8	12.8	18.4	13.8	36.4	6.5	14.2	8.44	22.7
PCB-190	62.7	95	54.4	71.5	49.7	54.7	59.4	62.9	46.7	97.4	72.6	61.9	54.9	77.9	63.7	168	40.8	65.8	45.4	88
PCB-191	13.8	19.6	10.9	16.1	12	10.6	11.8	12.8	10.1	21.2	15.6	15.2	11.4	16.6	12.2	43.2	8.96	18.4	9.06	19.6
PCB-193	31.3	54.2	26.1	35.6	33.8	35	26.9	27.4	27.2	37.2	32.5	30.8	24	32.7	30.5	96.1	17	31.7	25.7	39
PCB-194	42.3	87.3	33.3	55.8	34	44.5	36.5	51.1	31.7	84.3	48.2	54.4	36.8	50.4	51.1	254	25.8	50	30	61.3
PCB-195	16.6	28	14.6	21.2	14.5	17.5	14.9	20.3	12.1	29.8	20	20.4	15.4	19.9	18.6	100	10.7	23.6	11	22.6
PCB-197	3.98	4.73	3.38	3.62	3.02	2.95	3.46	3.41	2.58	4.73	0	5.08	2.48	3.51	3	0	0	0	2.64	4.3
PCB-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-199	44.9	77.8	41	56.2	48.8	44	41.7	49.6	33.6	76	53.3	66.2	39.8	51.1	52.3	180	28	64.6	29.6	54.9
PCB-200	4.74	7.4	4.67	5.82	6.16	5.02	4.12	5.4	3.66	7.72	5.91	7.28	4.72	4.91	5.55	0	3.87	8.43	3.31	6.88
PCB-201	8.36	11.9	5.68	8.71	6.93	6.96	8.86	7.19	5.45	10.3	8.98	9.29	6.28	9.36	8.59	37.3	4.65	11.8	4.73	10.3
PCB-202	20.7	33.8	18.8	26.2	18.6	20.2	20.3	22.6	16.1	25.5	26	23.9	17	22.6	25.4	103	13.9	25.5	14.9	24.9
PCB-203	57.7	106	47.7	77	45.6	62.8	52.7	63.5	37	96.4	66.8	68.7	51	66.5	67.8	294	34.2	72.8	36.9	76.2
PCB-205	4.1	5.33	2.84	4.22	0	4.37	0	0	0	6.51	4.25	4.96	3.14	4.86	3.97	0	0	6.49	0	5.49
PCB-206	18.4	41.8	15.4	29.7	14.5	25.2	16.1	23.3	13.2	35.7	20	27.1	14.9	22.4	25.9	206	10.8	24.6	10.4	23.9
PCB-207	3.97	6.02	3.15	4.41	3.86	3.17	2.44	3.97	2.08	5.22	3.53	5.82	3.23	4.17	3.73	29.1	0	6.6	2.05	3.14
PCB-208	7.94	14.6	6.21	9.4	6.81	8.9	6.41	9.52	5.25	11.6	8.17	10.5	6.04	7.85	8.95	74.3	5.45	9.65	4.97	9.32
PCB-209	2.59	6.74	2.2	4.02	5.83	3.32	2.37	3.82	2.09	5.51	3.05	6.92	2.49	2.63	3.78	49.8	0	7.55	0	3.32
Total PCB	**565107**	**752492**	**563727**	**722326**	**534737**	**650999**	**557818**	**481143**	**642136**	**651653**	**604107**	**621265**	**650010**	**685780**	**665044**	**4401277**	**521406**	**869190**	**575959**	**810362**
Initial PRC concentration (ng/g dry PED)																				
Cl3(38)	855	855	855	855	781	781	855	855	855	855	855	855	855	855	855	855	781	781	855	855
Cl4(78)	536	536	536	536	410	410	536	536	536	536	536	536	536	536	536	536	410	410	536	536
Cl4(79)	524	524	524	524	387	387	524	524	524	524	524	524	524	524	524	524	387	387	524	524

Table C-1. PED Congener Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	concentration in PED																			
Units	ng/g dry																			
Cl7(186)	384	384	384	384	236	236	384	384	384	384	384	384	384	384	384	384	236	236	384	384
Final PRC concentration (ng/g dry PED)																				
Cl3(38)	31	59	37	53	22	72	28	83	55	65	28	77	51	42	19	19	52	89	36	50
Cl4(78)	47	34	66	22	58	56	55	68	80	81	39	55	47	38	27	9	136	88	77	46
Cl4(79)	66	36	89	22	67	63	57	74	99	81	57	59	47	38	36	9	109	84	90	37
Cl7(186)	167	73	335	27	196	144	252	169	234	167	171	94	133	106	176	125	325	178	174	78
Fractional equilibration *																				
Cl3(38)	0.96	0.93	0.96	0.94	0.97	0.91	0.97	0.90	0.94	0.92	0.97	0.91	0.94	0.95	0.98	0.98	0.93	0.89	0.96	0.94
Cl4(78)	0.91	0.94	0.88	0.96	0.86	0.86	0.90	0.87	0.85	0.85	0.93	0.90	0.91	0.93	0.95	0.98	0.67	0.78	0.86	0.91
Cl4(79)	0.87	0.93	0.83	0.96	0.83	0.84	0.89	0.86	0.81	0.85	0.89	0.89	0.91	0.93	0.93	0.98	0.72	0.78	0.83	0.93
Cl7(186)	0.57	0.81	0.13	0.93	0.17	0.39	0.34	0.56	0.39	0.57	0.55	0.76	0.65	0.72	0.54	0.67	0.00	0.25	0.55	0.80

* If fractional equilibration is < 0 or > 1, the value is set to 0 or 1, respectively

Table C-2. PED Congener Concentration Data for Batch S17-0368

Analytical batch	Batch S17-0368																			
Calculation batch	0368 part 1										0368 part 2									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	concentration in PED																			
Units	ng/g dry																			
Congener																				
PCB-1	35	8800	25.3	37.2	54	3340	24.2	156	25.8	38.9	44.2	4320	21.8	90.8	23.3	57.6	22.3	1160	76.6	2260
PCB-3	21.6	1800	18	26.5	27	193	17.3	68.9	17.6	30.1	24.4	1100	14.4	47.4	17.8	31	16.5	102	35.9	885
PCB-4	1970	87000	1430	1700	1940	19700	1850	10500	1610	2220	2190	88900	1220	2340	1790	2710	1970	57100	3790	43200
PCB-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-6	6360	99800	5160	5430	5610	23000	6140	20500	4660	5410	6190	95600	3740	5560	6190	6260	7200	91200	8450	68800
PCB-7	77.2	2570	85.7	91.4	108	240	89.2	520	84.1	90.1	100	1990	73.4	102	83.9	80	54	1070	144	2170
PCB-8	6290	126000	5090	5660	5780	24800	6000	21700	4350	5350	6030	113000	3550	5760	5160	6150	6910	100000	8800	90300
PCB-9	405	7440	146	161	176	1490	140	1050	151	186	182	6280	130	178	154	223	167	2740	265	4290
PCB-11	1000	8090	820	833	909	2220	964	1910	823	782	918	8440	678	975	967	980	1080	7830	1210	7480
PCB-12	5.1	0	0	4.07	5.48	5.04	0	0	0	4.32	3.89	31.2	3.37	4.28	3.26	3.46	4.61	0	5.06	8.88
PCB-13	3250	27800	2620	2880	2820	9020	3150	7850	2610	2320	2990	27100	2100	3180	3010	3130	3490	26500	3690	24900
PCB-15	3510	29400	2910	3050	3550	9190	3370	7240	2830	2280	3450	23800	2180	3860	3150	2920	3590	21000	3960	26600
PCB-16	512	2300	231	674	684	2020	208	1130	205	201	252	1310	205	324	216	271	219	3120	277	4050
PCB-17	12300	77400	10000	10100	10800	26000	11800	21800	9900	8980	10600	84600	7820	11500	11300	10400	14000	80900	15300	79500
PCB-18	24800	178000	20100	19100	21000	51000	23200	47700	19400	18900	21800	190000	15400	21100	22700	20500	27200	174000	32100	158000
PCB-19	1430	17800	1090	1160	1280	5150	1350	3630	1170	1550	1400	23700	915	1290	1330	1550	1480	18300	2060	14200
PCB-22	1790	6500	1610	1980	1990	3980	1760	2580	1490	1030	1720	2840	1370	2110	1700	1600	2090	8400	1910	10200
PCB-24	21.8	76.8	19.2	27.8	24.6	37.6	17.5	28.7	16.2	13.8	19.8	133	16.5	26.6	16.3	20.8	19.1	23.4	24.8	88
PCB-25	25800	100000	22000	19900	22500	38900	25000	35100	20700	14800	21400	99700	17100	23300	24500	18800	30400	121000	27400	110000
PCB-26	37100	128000	31700	28800	32600	60000	36100	49300	30100	23600	31800	150000	24600	33900	34800	27600	44400	184000	40000	135000
PCB-27	3500	23500	2840	2870	3120	12400	3440	7990	2890	3010	3250	27900	2340	3230	3390	3380	3840	27000	0	19000
PCB-28	48300	151000	39300	35600	50600	64700	44900	55600	37400	25400	39000	151000	30600	41000	43800	32500	54600	156000	50800	193000
PCB-29	9.06	6.98	9.34	10.7	12.2	11.3	7.76	5.6	8.25	6.39	8.33	0	8.01	9.02	8.31	7.26	7.82	0	10.7	15.4
PCB-30	10.4	25.8	9.22	7.5	9.22	14.2	8.61	11.2	8.73	8.72	8.56	75.8	8.02	8.9	8.35	7.98	8.36	12.6	10.8	23.2
PCB-31	45100	157000	37800	34900	39400	68800	43700	57900	35500	25900	37200	144000	29200	41000	42000	31900	53100	152000	50200	167000
PCB-32	8630	44600	6820	7020	7420	17600	8100	15100	6820	6390	7510	57400	5060	7810	7910	7450	9690	54200	10200	44100
PCB-33	1120	3050	1060	1280	1430	2920	1120	1570	968	818	1030	1830	841	1260	1010	944	1250	2520	1460	7930
PCB-37	932	1110	740	840	1010	1180	838	782	764	317	734	1080	349	898	830	776	1050	1180	990	2310
PCB-40	2040	2930	1520	1610	1780	2290	1900	1830	1720	1130	1420	2900	1210	1760	1690	1480	2490	3770	1910	3980
PCB-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16.2
PCB-42	5930	13300	5190	5170	5450	10400	5730	7380	4470	2640	4480	11400	3990	5320	5100	4050	7050	17900	5640	18700

Table C-2. PED Congener Concentration Data for Batch S17-0368

Analytical batch	Batch S17-0368																			
Calculation batch	0368 part 1										0368 part 2									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-43	664	2350	2470	2240	1410	3480	2300	2510	2580	1140	3270	1100	501	628	629	537	273	1170	707	1240
PCB-44	9870	26600	8450	8290	9250	15800	9760	13100	7770	4870	8030	18000	6870	9430	9300	7370	11900	43800	10800	37800
PCB-45	743	2660	670	772	774	1310	730	1170	317	260	623	1850	317	815	689	698	328	2120	989	4090
PCB-46	986	3490	842	917	917	1780	1010	1650	828	444	912	3440	412	974	958	1020	1160	8400	1150	3840
PCB-47	18000	33200	14000	12900	15000	20200	16700	18000	14500	9240	13000	36100	11800	15400	15600	12200	22200	45300	18500	43800
PCB-48	1140	1910	1890	1920	2300	2470	3640	3350	2020	1600	2550	1440	949	416	492	537	2140	3790	940	2470
PCB-49	56100	128000	46400	45900	52700	72300	53700	61300	53100	34600	49600	138000	40900	56600	59100	44600	66400	209000	64400	155000
PCB-50	74.8	149	63.5	53.9	68.4	82.6	63	67.8	61.6	50.5	61.5	341	54.2	58.7	61.1	55.9	69.7	102	73.5	146
PCB-51	3340	10500	2670	2540	2940	5010	3350	4050	2840	2620	2780	15100	2230	2830	3130	3000	4140	16600	3680	11500
PCB-52	63800	152000	53000	46500	56100	85300	59600	68600	52200	37700	51000	184000	41400	54400	54800	46300	74000	264000	66900	187000
PCB-53	8260	25400	6840	6240	7110	13400	7830	11000	6920	5750	7020	34200	4860	6020	7840	6350	10000	40700	9340	26800
PCB-54	49.4	114	45.1	47.3	48.4	92.8	46	62.2	48	68.1	48.7	540	40.7	49.9	47.7	56.2	50.5	87.9	55.5	91.7
PCB-56	654	614	541	610	725	807	577	522	522	187	516	441	261	653	573	256	749	421	705	1460
PCB-60	362	78.8	143	148	174	138	138	98.3	146	85.2	124	197	141	166	135	281	165	42.9	147	142
PCB-63	432	164	166	160	198	198	160	145	167	109	147	355	163	191	164	139	196	612	174	884
PCB-64	5080	10200	4660	4860	5180	5910	5130	6130	3840	2190	3840	11400	3590	4990	4280	3500	5290	12100	5370	17700
PCB-66	2590	1800	2090	2220	2870	2500	2420	1770	2200	1280	1980	1320	1850	2430	2280	2030	3090	1340	2610	4080
PCB-67	1430	737	1240	1080	1360	806	1480	962	1270	294	1040	519	1090	1150	1370	1010	1780	878	1360	1180
PCB-70	2060	1250	1740	1700	2280	1760	1920	1280	1720	887	1520	915	1500	1780	1840	1510	2460	957	2130	3190
PCB-71	8870	19700	7020	6630	7400	9480	8660	10000	7270	5460	6870	23100	5340	6420	8180	6180	11400	38000	9640	26400
PCB-74	3300	1560	2700	2540	3250	2130	3240	2020	2810	1280	2330	1190	2350	2670	2950	2270	3920	1370	2990	3060
PCB-75	848	1060	601	576	700	837	667	763	680	265	267	1150	291	326	742	287	326	1220	810	1480
PCB-77	188	168	155	194	225	187	194	160	151	92.8	144	152	136	182	169	161	204	126	172	312
PCB-80	25	13.1	24.9	25.1	27.1	32.8	21.1	17	24.3	14.4	20.6	34	24	31.3	22.3	21	25.7	9.44	21.7	15.2
PCB-81	12.9	0	0	11.8	13	0	0	10.9	0	0	8.03	0	9.29	0	10.9	0	11.1	0	10.5	17.6
PCB-82	103	99.2	90.6	107	122	173	96.4	102	88.8	65.5	79.7	77.6	70	114	79.9	148	124	105	95.8	201
PCB-83	3510	5280	2600	2820	3140	4120	3610	3540	3170	2150	2540	6330	2320	3470	3090	3060	4780	9930	3450	8310
PCB-84	2860	5270	2760	2230	2570	5190	2960	3320	2240	1410	1930	3700	1960	2040	2560	2250	3460	9930	2860	9840
PCB-85	403	531	279	350	462	546	313	402	319	242	264	238	302	401	318	473	304	567	377	902
PCB-87	403	475	338	461	493	794	425	450	382	259	300	333	296	473	363	646	469	533	399	1010
PCB-91	5630	9850	4010	4220	4870	7300	5440	6210	4330	2730	3760	11900	3610	5100	4520	4050	7330	17600	5280	15000
PCB-92	2680	3790	1860	2250	2570	3090	2520	2600	2440	1670	1800	2970	1990	3040	2360	2310	2990	10000	2790	5400

Table C-2. PED Congener Concentration Data for Batch S17-0368

Analytical batch	Batch S17-0368																			
Calculation batch	0368 part 1										0368 part 2									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-95	10900	19800	8810	8740	9480	13700	10600	12100	9070	5430	8100	22500	7560	10100	9650	8180	14000	35000	11800	30800
PCB-97	2260	2130	1810	1840	2150	2070	2360	1960	1990	1110	1640	1710	0	2150	2060	1950	2990	2970	2310	4510
PCB-99	6920	6600	5560	5450	6280	6360	6670	5990	5870	3610	4730	5540	4620	6870	6090	6040	9340	9540	7020	12000
PCB-100	654	933	509	503	587	292	617	608	296	244	220	1040	242	310	534	276	336	1300	271	1180
PCB-101	9190	8230	7480	7240	8460	7720	9270	7710	8120	4200	6000	6940	6230	8490	8120	7360	12300	11100	9360	15000
PCB-104	16.2	19.5	13.1	12.7	14.4	16	14.7	12.8	15.4	14.6	12.5	70.6	12.7	14.2	13.8	14.7	18	17	15.3	18.1
PCB-105	344	332	274	390	413	487	355	347	312	218	234	258	231	374	290	488	411	380	321	845
PCB-110	11000	16100	8620	8950	9820	13200	10700	10900	8980	5600	7470	14600	7180	10900	9610	8360	14200	26300	11400	0
PCB-114	65.6	70.4	54.3	64	70.6	66.2	76.3	63.3	61.7	35.4	46.6	64.9	46.8	69.2	56	71.2	82.7	75.3	63.4	115
PCB-115	482	0	0	0	0	0	0	0	0	0	0	89.1	0	0	0	0	54.3	0	0	0
PCB-118	3700	3020	2880	3260	3720	3730	3950	3110	3390	2100	2570	2360	2500	3810	3310	3590	5070	3970	3540	5960
PCB-123	462	494	406	471	518	474	545	471	449	271	330	341	348	506	458	474	631	574	461	868
PCB-124	106	85.9	86	96.9	112	102	113	94.6	94.4	59.9	69.3	74.6	72.6	105	93.4	107	125	101	96.8	163
PCB-125	42.2	0	0	21.5	24.5	0	29.4	0	0	16.3	14.3	47.2	0	0	17.1	0	55	0	20.7	0
PCB-126	14.2	14.4	11.1	13.6	12.4	11.6	16.1	14.8	11.9	10	10.3	0	9.76	17.4	13.9	14	16.8	16.7	12.9	18.8
PCB-127	73.1	48.8	66.4	56.2	88.8	50.7	76	48.2	45.7	127	30	85.8	75.8	77.9	67.3	37.7	38.6	80.6	91	35.3
PCB-128	249	300	186	251	244	365	250	262	212	160	148	216	157	293	198	279	288	328	210	522
PCB-130	123	164	94.1	100	117	173	120	128	110	78.8	76.4	113	80.3	141	109	130	151	166	107	239
PCB-131	205	347	150	192	191	260	208	225	176	132	124	277	130	221	170	193	242	482	179	490
PCB-134	428	711	334	415	407	538	455	498	374	252	275	537	284	466	367	400	527	1040	399	1110
PCB-135	770	1220	589	688	681	990	796	860	772	490	575	1150	579	861	688	446	1080	2100	861	2070
PCB-136	1070	1970	813	886	938	1420	1110	1190	949	773	793	2200	888	1080	951	956	1480	3540	1140	3040
PCB-137	112	130	81.8	110	117	139	114	117	99.6	83.4	68	85.4	74.3	132	95	121	130	150	104	250
PCB-138	749	974	570	750	767	1310	731	750	687	544	620	714	531	933	632	868	1030	1260	736	2030
PCB-139	98.6	141	75.3	95.2	92	110	101	113	85.2	63	57.2	108	69.6	112	86.1	96.7	121	173	89.8	197
PCB-140	8.2	11.9	7.83	0	9.21	11.2	8.23	0	0	7.08	6.39	0	0	0	7.38	9.59	8.22	0	9.85	17
PCB-141	138	165	106	144	146	200	143	145	124	97.1	85.1	116	90.1	162	119	171	164	179	131	351
PCB-144	81	104	54.2	55	60.5	80.8	61.4	64.3	55.9	38.4	40.2	76.8	40.2	66.6	48.6	65.1	92.9	86.8	56	156
PCB-146	701	893	501	624	629	866	712	684	735	480	487	701	520	776	601	818	1080	1310	739	1570
PCB-149	7160	11800	5120	5880	5940	8920	6820	7320	5770	4420	4730	12000	4430	7900	5800	6210	9550	19300	7210	17700
PCB-151	912	1440	700	785	830	1170	909	922	789	618	684	1300	728	982	782	824	1200	2340	915	2440
PCB-153	4620	5240	3280	4000	4040	4960	4580	4370	4010	2880	2810	3750	2900	5220	3910	4480	5960	7010	4240	8840

Table C-2. PED Congener Concentration Data for Batch S17-0368

Analytical batch	Batch S17-0368																			
Calculation batch	0368 part 1										0368 part 2									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-154	451	744	327	421	397	555	456	516	399	321	285	944	280	483	360	433	570	1200	394	1030
PCB-155	3.11	3.67	2.54	2.8	2.82	3.39	2.62	2.57	2.88	3.44	2.44	22.4	2.63	3.97	2.57	3.15	3.7	3.16	3.12	3.59
PCB-156	170	227	128	178	170	227	180	181	155	121	103	147	112	204	150	192	207	246	154	439
PCB-157	35.4	43.8	22.4	34.4	34.4	50	33.6	36	30.7	26.5	19.8	48.6	21.6	40.1	24.9	34.4	36.5	48.5	28	86.4
PCB-158	280	311	210	282	279	335	305	304	248	172	166	223	179	320	240	299	332	361	243	531
PCB-163	1330	2120	926	1190	1200	1680	1360	1400	1180	869	856	1930	865	1540	1160	1220	1740	3460	1280	3900
PCB-164	226	254	178	247	228	234	244	242	197	133	138	175	154	249	200	225	272	298	201	400
PCB-166	26.3	34.1	20.1	25.8	24.6	31.6	28.4	27.9	22.8	17.4	16.1	40.7	17.6	28.6	21.6	25.3	30.8	35.1	23.3	47.2
PCB-167	164	215	124	174	157	192	174	181	151	116	100	145	107	200	146	173	198	240	145	325
PCB-169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.7	0
PCB-170	132	229	92.5	144	123	186	137	158	115	92.8	73.8	156	83	183	115	142	153	242	116	429
PCB-171	47.7	79.8	34.3	48.1	41.9	65.4	48.4	52	39.6	34	28.7	77.4	30.6	63.6	38.6	50.9	53.6	78.9	41.6	125
PCB-172	30.7	50.6	21	30.6	28.6	37.6	32.8	31.9	28.1	24.2	20.1	47.2	18.9	39.2	24	27.4	37.6	56.4	30.1	83.5
PCB-173	6	8.36	5.59	5.5	0	8.28	5.09	6.12	6.23	0	5.31	0	0	6.87	5.48	6.47	8.28	8.33	4.99	14.3
PCB-174	87.1	130	58.8	87.7	82.4	123	85.4	101	77.2	61.1	49.5	85	55.9	104	74.2	93.9	100	147	79.2	243
PCB-175	14.8	22.8	10.1	12.8	12.7	17.4	12.5	15.5	10.9	12.3	7.65	0	7.5	15.9	11.8	12.4	13.9	25.2	10.8	33.6
PCB-176	22.6	37.4	16	21.1	20	30.7	20.6	23.6	19.3	15.7	12.8	27.3	14.4	26.9	17.6	22	25.1	37.5	18	54.2
PCB-177	70.2	103	52.7	72.8	65.8	96.8	71.4	78.6	61.2	50.4	41.8	77.2	46.4	92.7	59.3	71.5	83.8	102	60.6	166
PCB-178	79.9	152	58.7	78.2	74	105	78.7	89.5	70.1	57.1	50.5	139	49.9	101	67.7	78.9	98.2	198	72.1	213
PCB-179	167	321	124	170	152	208	174	191	148	121	103	263	108	202	139	165	204	419	150	449
PCB-180	264	530	186	287	240	362	276	331	227	194	144	273	155	357	228	287	316	604	233	0
PCB-183	134	248	94.8	136	121	172	131	150	115	97.4	75.9	156	82.6	163	109	137	155	275	113	373
PCB-184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-185	14.4	22.9	10.7	14.4	12.6	19.6	15.6	17.4	12.8	11.9	9.69	29	11.5	17.4	12.2	15.4	17.3	23	14	34.2
PCB-187	454	885	347	505	438	649	500	588	431	359	290	798	299	622	404	491	594	1220	423	1360
PCB-188	11.2	24.4	8.1	11.2	9.43	14.9	11.6	13.7	10.3	8.38	7.83	44.7	8.17	14.5	8.77	12.4	13.5	31.7	9.93	29.7
PCB-189	9.76	21.8	6.05	9.12	7.78	13.2	7.74	10.8	9.18	9	5.32	8.54	5.21	12.8	8.35	8.94	10.6	24.5	8.37	32.1
PCB-190	46.1	74	31.8	44.8	39.1	56.7	46.1	49.6	42.2	34.6	27.1	70	28.7	58.2	38.6	47.7	52.3	81.9	38.4	115
PCB-191	11.2	19.6	8.63	11.3	9.36	14.2	11	12.6	9.5	9.18	7.81	34	7.79	15	10.4	12.6	13.4	19.5	10.6	27.4
PCB-193	21.8	44.3	14.6	22.8	19.3	28.1	21.6	28.4	18.1	17.6	13.2	56.6	17.7	28.3	17.5	22.7	25.2	55.9	19.2	71.5
PCB-194	32.1	85.1	23.3	39	27.3	49.6	29.6	42.9	29.7	31.2	20.4	71	19.3	48.3	28.5	38	33.9	101	28.1	154
PCB-195	13	30.6	9.57	14	12.3	20.5	10.9	16.8	12.3	13.7	8.38	36.2	9.12	19.1	11.4	15.4	15.2	31.2	11.6	52.4

Table C-2. PED Congener Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	concentration in PED																			
Units	ng/g dry																			
PCB-197	3.01	6.02	0	3.03	0	0	0	0	0	0	0	0	0	0	0	0	3.03	6.26	0	8.95
PCB-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-199	42.2	92.6	26.8	43.7	33.6	56.8	40	50.9	35.1	33.2	21.5	66.3	21.8	57.5	33.3	46	47.5	102	36.6	165
PCB-200	5.34	9.81	4.71	5.53	4.58	7.14	5.11	5.79	0	0	0	0	0	6.32	4.74	6.12	4.89	9.82	5.14	17.1
PCB-201	7	15	4.68	6.91	6.2	9.07	7.1	7.82	6.64	7.11	4.58	0	4.74	9.68	6.42	7.56	7.65	14.8	7.11	22.1
PCB-202	16.5	39	11.7	18.2	15.2	22.5	17.9	21.8	14.8	15.5	11	40.2	10.9	24.5	14.3	19.2	18.2	42.3	16	55.9
PCB-203	43	114	30.7	49.8	35.3	62.1	43.8	57.7	40.7	41.4	25.2	89.8	26.7	62.6	34.9	50.5	53.9	121	37.4	198
PCB-205	3.88	6.54	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3.87	7.82	0	9
PCB-206	13.6	49.9	9.05	18.1	10.1	23.3	14.5	20.3	13.3	15.5	9.14	53.8	8.86	22.9	11.6	18.2	16.8	56.2	13.7	101
PCB-207	3.33	9.12	0	4.46	3.33	5.45	0	4.48	3.39	0	0	0	0	4.72	0	0	4.04	8.88	3.87	13.9
PCB-208	6.18	17.5	4.31	7.13	5.06	10	6.45	9.06	6.46	7.01	3.44	30.9	5.01	9.23	5.9	7.39	7.56	19	6.07	32.3
PCB-209	4.37	11.1	0	5.05	4.26	6.83	0	5.76	4.47	0	0	0	0	6.28	0	5.9	4.64	13.2	0	19.8
Total PCB	**514875**	**1845244**	**423189**	**409003**	**470443**	**803407**	**496782**	**672455**	**425305**	**309736**	**419951**	**1906334**	**335876**	**469795**	**470305**	**396643**	**607492**	**2194804**	**557650**	**1936369**
Initial PRC concentration (ng/g dry PED)																				
Cl3(38)	781	781	781	781	781	781	855	855	855	855	781	781	781	781	855	855	855	855	781	781
Cl4(78)	410	410	410	410	410	410	536	536	536	536	410	410	410	410	536	536	536	536	410	410
Cl4(79)	387	387	387	387	387	387	524	524	524	524	387	387	387	387	524	524	524	524	387	387
Cl7(186)	236	236	236	236	236	236	384	384	384	384	236	236	236	236	384	384	384	384	236	236
Final PRC concentration (ng/g dry PED)																				
Cl3(38)	37	49	44	103	34	69	29	81	30	169	41	49	24	86	39	91	26	36	26	38
Cl4(78)	52	35	63	103	124	119	123	101	135	98	53	33	54	130	119	108	37	28	44	21
Cl4(79)	57	34	71	69	89	63	78	67	60	177	59	36	61	95	91	64	42	31	53	17
Cl7(186)	156	102	148	114	188	117	161	107	106	293	71	183	183	169	142	82	80	186	218	82
Fractional equilibration *																				
Cl3(38)	0.95	0.94	0.94	0.87	0.96	0.91	0.97	0.90	0.96	0.80	0.95	0.94	0.97	0.89	0.95	0.89	0.97	0.96	0.97	0.95
Cl4(78)	0.87	0.92	0.85	0.75	0.70	0.71	0.77	0.81	0.75	0.82	0.87	0.92	0.87	0.68	0.78	0.80	0.93	0.95	0.89	0.95
Cl4(79)	0.85	0.91	0.82	0.82	0.77	0.84	0.85	0.87	0.88	0.66	0.85	0.91	0.84	0.75	0.83	0.88	0.92	0.94	0.86	0.96
Cl7(186)	0.34	0.57	0.37	0.52	0.20	0.50	0.58	0.72	0.72	0.24	0.70	0.22	0.22	0.28	0.63	0.79	0.79	0.52	0.08	0.65

* If fractional equilibration is < 0 or > 1, the value is set to 0 or 1, respectively

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**								
Calculation batch	**0369**								
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]	170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]
Values	concentration in PED								
Units	ng/g dry								
Congener									
PCB-1	31.2	80.8	23.6	140	0	0	0	0	0
PCB-3	21.2	52.4	19.6	65.3	0	0	0	0	0
PCB-4	2080	2820	1880	14400	2.98	0	0	0	0
PCB-5	0	0	0	0	0	0	0	0	0
PCB-6	7150	7450	6140	25800	1.86	0	0	0	0
PCB-7	116	144	94.4	195	1.3	0	0	0	0
PCB-8	7060	8170	6080	25500	0	0	0	0	0
PCB-9	159	229	144	323	0	0	0	0	0
PCB-11	1190	1200	1040	2340	0	0	0	0	0
PCB-12	6.08	4.95	3.81	0	0	0	0	0	0
PCB-13	3660	3970	3180	10600	0	0	0	0	0
PCB-15	3690	3830	2960	8590	0	0	0	0	0
PCB-16	313	483	239	1340	0	0	0	0	0
PCB-17	13500	12400	11100	28800	0	0	0	0	0
PCB-18	26300	23400	22300	58400	0	0	0	0	0
PCB-19	1480	1540	1380	6500	0	0	0	0	0
PCB-22	2240	2460	1920	3420	0	0	0	0	0
PCB-24	24.8	33.6	18.9	23.9	0	0	0	0	0
PCB-25	29800	23500	24900	48600	0	0	0	0	0
PCB-26	40600	32700	33800	48700	0	0	0	0	0
PCB-27	3750	3640	3410	11100	0	0	0	0	0
PCB-28	50100	38400	41400	65900	0	0	0	0	0
PCB-29	10.9	12.3	8.8	5.36	0	0	0	0	0
PCB-30	10.9	10.8	9	12	0	0	0	0	0
PCB-31	51500	41100	41300	58900	0	0	0	0	0
PCB-32	9160	8420	7770	20600	0	0	0	0	0
PCB-33	1450	1600	1200	2500	0	0	0	0	0
PCB-37	1400	1080	1000	1320	0	0	0	0	0

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**								
Calculation batch	**0369**								
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]	170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]
Values	concentration in PED								
Units	ng/g dry								
PCB-40	2320	1840	2090	3010	0	0	0	0	0
PCB-41	0	13.8	0	0	0	0	0	0	0
PCB-42	7020	5320	5840	10700	0	0	0	0	0
PCB-43	5200	4910	666	12400	0	0	0	0	0
PCB-44	11600	9700	9690	20000	4.8	0	0	0	0
PCB-45	392	461	314	1260	0	0	0	0	0
PCB-46	1140	1090	1020	2290	0	0	0	0	0
PCB-47	18300	13100	15400	25300	0	0	0	0	0
PCB-48	3980	4080	2910	8500	0	0	0	0	0
PCB-49	71400	56000	97200	83600	1.87	0	0	0	0
PCB-50	79	64.6	66.4	95.6	0	0	0	0	0
PCB-51	3590	2970	3400	8390	0	0	0	0	0
PCB-52	75000	53400	108000	84000	3.13	0	0	0	0
PCB-53	8950	7180	8020	18400	0	0	0	0	0
PCB-54	52.5	55.9	46.8	92.8	0	0.734	0.562	0	0
PCB-56	827	353	286	216	0	0	0	0	0
PCB-60	204	179	157	106	0	0	0	0	0
PCB-63	234	206	184	206	0	0	0	0	0
PCB-64	5260	4670	4380	7850	0	0	0	0	0
PCB-66	3200	2470	2630	2260	0	0	0	0	0
PCB-67	1840	1090	1470	355	0	1.31	1.68	1.15	1.29
PCB-70	2520	1820	2140	1690	0	0	0	0	0
PCB-71	9520	7210	8280	16700	0	0	0	0	0
PCB-74	4280	2820	3210	2290	0	0	0	0	0
PCB-75	913	376	868	349	0	0	0	0	0
PCB-77	259	200	206	125	0	0	0	0	0
PCB-80	32	31.4	25.7	19.6	0	0	0	0	0
PCB-81	16.6	11.2	8.94	10.6	0	0	0	0	0
PCB-82	120	105	101	98	0	0	0	0	0

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**								
Calculation batch	**0369**								
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]	170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]
Values	concentration in PED								
Units	ng/g dry								
PCB-83	4170	3310	3850	6650	0	0	0	0	0
PCB-84	2260	2350	2200	3680	0	0	0	0	0
PCB-85	249	373	0	0	0	0	0	0	0
PCB-87	444	408	381	488	0	0	0	0	0
PCB-91	6630	4830	5640	10100	0.821	0.478	0	0.368	0
PCB-92	3660	2540	2540	6350	0	0	0	0	0
PCB-95	12700	9760	10700	19600	0	0	0	0	0
PCB-97	2880	2210	2630	3220	0	0	0	0	0
PCB-99	8570	6210	6900	9290	0	0	0	0	0
PCB-100	317	283	275	315	0	0	0	0	0
PCB-101	11000	7530	8800	10900	0	0	0	0	0
PCB-104	16.5	14.1	14.7	18.2	0	0	0	0	0
PCB-105	389	356	350	371	0	0	0	0	0
PCB-110	13300	9950	10800	18800	0	0	0	0	0
PCB-114	69.6	49.6	54.4	51.5	0	0	0	0	0
PCB-115	121	0	0	0	0	0	0	0	0
PCB-118	4380	3500	3960	4550	0	0	0	0	0
PCB-123	549	415	477	492	0	0	0	0	0
PCB-124	118	90	98.4	95.6	0	0	0	0	0
PCB-125	37.2	13.7	0	0	0	0	0	0	0
PCB-126	16.8	15.4	15.3	13.9	0	0	0	0	0
PCB-127	125	78.4	74.2	46.1	0	0	0	0	0
PCB-128	272	252	238	301	0	0	0	0	0
PCB-130	88.3	82.7	95.5	120	0	0	0	0	0
PCB-131	205	169	178	260	0	0	0	0	0
PCB-134	431	340	372	507	0	0	0	0	0
PCB-135	634	533	552	716	0	0	0	0	0
PCB-136	1310	855	1250	2250	0	0	0	0	0
PCB-137	114	99.5	102	124	0	0	0	0	0

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**								
Calculation batch	**0369**								
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]	170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]
Values	concentration in PED								
Units	ng/g dry								
PCB-138	948	807	885	935	0	0	0	0	0
PCB-139	103	84.2	86.4	108	0	0	0	0	0
PCB-140	10.8	8.81	9.18	13.2	0	0	0	0	0
PCB-141	138	125	129	153	0	0	0	0	0
PCB-144	109	73.9	80.2	116	0	0	0	0	0
PCB-146	691	572	608	757	0	0	0	0	0
PCB-149	8510	6920	7200	13500	0	0	0	0	0
PCB-151	935	723	825	1880	0	0	0	0	0
PCB-153	5070	4380	4640	7260	0	0	0	0	0
PCB-154	448	385	408	584	0	0	0	0	0
PCB-155	3.55	4.19	3.37	4.29	0	0	0	0	0
PCB-156	192	168	171	212	0	0	0	0	0
PCB-157	37.1	34.2	33.9	42.2	0	0	0	0	0
PCB-158	276	267	276	316	0	0	0	0	0
PCB-163	1760	1540	1700	2920	0	0	0	0	0
PCB-164	290	248	237	281	0	0	0	0	0
PCB-166	27.3	23.9	24.4	27.6	0	0	0	0	0
PCB-167	178	156	156	182	0	0	0	0	0
PCB-169	6.84	0	0	8.1	0	0	0	0	0
PCB-170	141	132	127	177	0	0	0	0	0
PCB-171	45	42.4	38.8	58.3	0	0	0	0	0
PCB-172	29.3	27.1	25.9	34.8	0	0	0	0	0
PCB-173	4.25	4.08	4.09	5.43	0	0	0	0	0
PCB-174	87.1	81.8	77.9	110	0	0	0	0	0
PCB-175	13.4	12.9	10.8	17.3	0	0	0	0	0
PCB-176	21.2	21.7	19.7	26	0	0	0	0	0
PCB-177	73	69.4	63.5	89.7	0	0	0	0	0
PCB-178	73.7	69.9	70.1	106	0	0	0	0	0
PCB-179	153	138	139	205	0	0	0	0	0

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**									
Calculation batch	**0369**									
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]	170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]	
Values	concentration in PED									
Units	ng/g dry									
PCB-180	228	216	196	304	0	0	0	0	0	
PCB-183	126	113	111	162	0	0	0	0	0	
PCB-184	0	2.97	0	0	0	0	0	0	0	
PCB-185	15.7	13.6	12.8	16.3	0	0	0	0	0	
PCB-187	483	452	435	659	0	0	0	0	0	
PCB-188	11.5	11.3	9.79	15.7	0	0	0	0	0	
PCB-189	11.5	11	9.33	15.4	0	0	0	0	0	
PCB-190	46.1	41.7	41.7	57.4	0	0	0	0	0	
PCB-191	10.7	10.8	9.91	13.8	0	0	0	0	0	
PCB-193	19.5	20.2	26	34.3	0	0	0	0	0	
PCB-194	31.9	34.4	28	54	0	0	0	0	0	
PCB-195	12.8	13.5	10.2	18.5	0	0	0	0	0	
PCB-197	3.56	3.43	3.08	4.26	0	0	0	0	0	
PCB-198	0	0	0	0	0	0	0	0	0	
PCB-199	50.4	49.3	45	83.3	0	0	0	0	0	
PCB-200	6.84	7.67	5.75	9.24	0	0	0	0	0	
PCB-201	7.97	8.11	6.68	9.07	0	0	0	0	0	
PCB-202	15.8	16.2	13.7	24	0	0	0	0	0	
PCB-203	38.6	42	34.9	62.3	0	0	0	0	0	
PCB-205	4.13	4.46	3.93	5.4	0	0	0	0	0	
PCB-206	13.1	15.8	11.1	27.6	0	0	0	0	0	
PCB-207	3.33	2.66	2.42	4.16	0	0	0	0	0	
PCB-208	5.68	7.34	5.16	9.4	0	0	0	0	0	
PCB-209	4.62	5.74	4.1	6.48	0	0	0	0	0	
Total PCB	**591634**	**475298**	**573553**	**885422**	**17**	**3**	**2**	**2**	**1**	
Initial PRC concentration (ng/g dry PED)					**A** [d]	**B** [d]				
Cl3(38)	781	781	855	855	855	781	868	842	785	777
Cl4(78)	410	410	536	536	536	410	520	552	402	417
Cl4(79)	387	387	524	524	524	387	502	545	382	391

Table C-3. PED Congener Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**									
Calculation batch	**0369**									
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW	TB-081417-01 [a]		170628AS017 [b]	170628AS018 [b]	170628BS017 [c]	170628BS018 [c]
Values	concentration in PED									
Units	ng/g dry									
Cl7(186)	236	236	384	384	384	236	324	444	236	236
Final PRC concentration (ng/g dry PED)										
Cl3(38)	31	107	29	58	938		N/A	N/A	N/A	N/A
Cl4(78)	66	94	56	46	518		N/A	N/A	N/A	N/A
Cl4(79)	78	124	91	68	538		N/A	N/A	N/A	N/A
Cl7(186)	270	197	173	132	270		N/A	N/A	N/A	N/A
Fractional equilibration *										
Cl3(38)	0.96	0.86	0.97	0.93	-0.10	-0.20	N/A	N/A	N/A	N/A
Cl4(78)	0.84	0.77	0.90	0.91	0.03	-0.26	N/A	N/A	N/A	N/A
Cl4(79)	0.80	0.68	0.83	0.87	-0.03	-0.39	N/A	N/A	N/A	N/A
Cl7(186)	0.00	0.17	0.55	0.66	0.30	-0.14	N/A	N/A	N/A	N/A

* If fractional equilibration for a deployed PED is < 0 or > 1, the value is set to 0 or 1, respectively. For the trip blank, actual values are presented to demonstrate the expected error resulting from uneven PRC spike within a batch and sampling and analytical errors

[a] Trip blank

[b] Unexposed PED used to determine initial PRC concentration in spiking Batch A

[c] Unexposed PED used to determine initial PRC concentration in spiking Batch B

[d] The records on the spiking batch for the trip blank are missing, therefore fractional equlibration was calculated both by assuming the PED came from the spiking batch A and by assuming it came from the spiking batch B

Table C-4. Equilibrium Congener Water Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
Congener																				
PCB-1	3.11	6.9	3.37	19.6	1.99	77.2	2.55	6.64	3.21	15.7	2.88	9.24	5.48	6.64	2.63	180	19.8	3670	3.47	15.2
PCB-3	1.24	2.65	1.49	5.14	0.96	8.03	1.23	2.96	1.33	3.75	1.31	4.15	1.77	1.93	1.05	42.3	3.12	306	1.29	1.95
PCB-4	100	205	108	470	88.7	645	86.8	139	107	278	104	270	137	139	125	4930	141	4650	102	240
PCB-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	32.5	0	0
PCB-6	140	269	150	370	139	419	117	143	166	204	135	269	146	143	172	3700	138	467	123	215
PCB-7	2.32	3.38	2.32	9.79	1.92	13.9	2.74	2.48	2.76	2.84	2.14	2.3	2.05	2.72	1.6	33	3	0	2.36	1.8
PCB-8	157	372	162	451	152	556	132	178	209	347	152	329	175	169	194	4620	184	1440	143	226
PCB-9	3.21	13.3	3.77	18.7	2.66	22.7	3.23	4.17	3.68	5.34	3.71	12.7	3.45	3.44	2.59	65.6	4.71	114	2.94	2.94
PCB-11	10.2	16.4	11.2	17.6	10.3	17.8	10.3	10.1	12.6	12.4	11.7	14.7	12.4	12.4	11.3	137	10.8	17.1	10.5	14.5
PCB-12	0.0388	0.106	0.0607	0.0741	0.0567	0	0.0326	0.037	0.0354	0.0738	0	10.1	0.0528	0.0414	0	0.179	0.0703	1.29	0.0309	0
PCB-13	37.6	82.1	41.7	88.5	38	83	38	37	46.2	48.5	43.2	49.2	46.6	47.3	42.1	549	41.1	74.3	39.5	72.9
PCB-15	41	80.7	45.3	87.2	42	84.7	43.3	41	51.6	62.5	49.2	47.4	51.9	50.3	44.6	530	53.7	207	44.9	54
PCB-16	4.49	24.6	5.01	16.5	3.76	10.1	4.57	11	12.1	47.4	4.48	3.82	14.4	15.1	2.51	42.4	14.1	164	4.21	18.9
PCB-17	129	205	133	216	131	227	126	119	155	155	139	178	160	156	157	1550	131	289	128	171
PCB-18	350	533	362	632	354	688	336	339	430	416	384	544	444	445	452	5030	362	633	354	451
PCB-19	39.5	67.3	42	90	36.9	125	37.2	43.8	44.8	58.2	41.5	91.1	54.1	55.4	48.6	893	43	293	39	74.4
PCB-22	12.7	21.5	14.4	16.8	13.5	11.6	12.1	13	15.7	23.9	14.3	11.6	16	16.1	10.9	74.7	14.9	39.1	13.4	20
PCB-24	0.232	0.429	0.289	0.31	0.26	0.194	0.26	0.284	0.267	0.69	0.216	0.244	0.287	0.342	0.128	1.56	0.354	2.65	0.223	0.254
PCB-25	126	174	128	166	128	143	123	104	151	126	139	138	139	137	150	985	123	113	128	170
PCB-26	157	215	158	206	156	191	153	132	194	167	173	183	186	188	194	1480	153	142	160	248
PCB-27	51.7	85.7	56.1	121	50	138	49.6	50.6	60.2	52.1	56.1	93.2	73.7	74.9	65.8	858	53.6	107	52.7	130
PCB-28	240	274	243	279	242	260	234	199	285	239	267	246	257	257	271	1540	217	246	241	268
PCB-29	0.0494	0.0562	0.0591	0.0318	0	0.0294	0.0472	0.0586	0.0611	0.123	0.0433	0	0.0523	0.0611	0.0241	0	0.0709	0.357	0.0498	0.0345
PCB-30	0.0911	0.101	0.0919	0.0888	0.075	0.0919	0.0872	0.0793	0.0927	0.0816	0.0896	0.0781	0.258	0.0753	0.0552	0.622	0.0999	0.171	0.067	0.0708
PCB-31	215	248	226	264	222	256	212	182	262	230	238	239	228	228	257	1560	184	218	215	247
PCB-32	155	247	161	273	155	292	149	143	194	180	168	253	216	222	206	2160	159	254	157	268
PCB-33	7.34	15.9	8.3	8.93	8.81	6.44	8.42	7.68	11.1	26.6	9.15	1.22	11.3	11.7	7.23	19.9	10.2	30.2	9.55	19.2
PCB-37	3.45	4.57	3.53	3.08	3.2	2.66	3.25	2.79	4.04	6.28	3.92	2.77	4.23	4.54	3.53	4.82	3.86	7.18	3.53	4.4

Table C-4. Equilibrium Congener Water Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-40	16.7	19.1	15.9	14.5	15.3	13	14.5	12	16.3	15.2	18.5	12.6	15.6	17.4	18.6	74	13.9	17.6	14.3	18.6
PCB-41	0	0	0	0.0627	0	0	0	0	0	0.172	0	0	0.059	0.0578	0	0	0	0.302	0	0
PCB-42	23.6	31.9	23	28.3	23.8	16.1	19.5	17.2	26	26.5	22.9	17	19.9	20.5	17.7	86.3	20.1	22.8	19.1	33.9
PCB-43	3.09	2.84	2.92	2.14	2.91	3.15	13	6.53	19	21.2	9.87	3.23	3.02	3.29	11.9	82.2	14	1.62	13.3	15.9
PCB-44	56.7	82.1	55.7	70.4	57.7	46.9	52.3	45.8	64	69.9	61.6	41.9	61.6	64.5	59.1	281	54.7	60.1	55.7	88
PCB-45	4.65	7.33	5.23	6.29	5.01	3.84	4.87	4.64	5.62	6.34	5.35	3.9	5.62	5.57	3.99	11.9	5.12	8.71	1.86	5.62
PCB-46	10.4	16.4	10.7	15.5	10.1	14.5	9.86	9.95	11.9	12.5	11.1	14.1	13.4	14	12.1	123	10.1	13.8	10	18.1
PCB-47	45.3	54.1	44.5	46.5	44	39.3	41.9	32.5	49	41	49.4	40.7	46.8	51.6	55.3	172	40.9	46.4	42.4	62
PCB-48	3.35	8.06	4.86	10.6	8.68	4.76	7.53	6.97	10.5	13.1	10.9	3.62	6.12	5.35	11.7	38.8	8.41	1.25	7.32	13.2
PCB-49	153	195	157	187	129	142	186	149	174	142	145	198	213	230	212	1250	149	146	198	224
PCB-50	0.384	0.399	0.405	0.369	0.3	0.409	0.376	0.305	0.4	0.301	0.391	0.324	0.359	0.376	0.327	2.25	0.381	0.421	0.333	0.333
PCB-51	26.2	33.5	26.4	29.7	23.7	34.7	23.6	21.3	29.9	24.1	26.8	32.6	35.9	37.5	34.3	250	24.2	28.9	25.8	52.6
PCB-52	225	281	222	264	182	217	243	198	252	197	208	270	304	321	304	1990	205	200	267	344
PCB-53	79.3	109	78.7	107	76.8	121	72.8	65.8	96.9	78.7	81.8	112	116	119	112	867	76.5	81.1	82.1	142
PCB-54	0.689	0.807	0.701	0.812	0.506	1.37	0.609	0.703	0.728	0.671	0.622	1.08	1.08	1.11	0.596	8.17	0.718	1.36	0.624	1.16
PCB-56	1.28	1.63	1.35	1.09	1.25	0.848	1.2	0.985	1.48	2.36	1.43	0.858	1.57	1.65	0.976	0.565	1.86	2.28	1.38	1.95
PCB-60	0.769	0.742	0.806	0.255	0.297	0.204	0.357	0.292	0.333	1.07	0.389	0.54	0.314	0.344	0.178	0.237	0.372	0.443	0.305	0.95
PCB-63	0.306	0.725	0.334	0.223	0.232	0.189	0.303	0.231	0.267	0.298	0.314	0.154	0.229	0.235	0.161	0.728	0.736	0.34	0.223	0.235
PCB-64	19	31.9	20.8	26.3	24.3	14.2	20.3	16.6	21.2	21.6	22.1	14	18.8	19.3	15.5	63.7	19.5	24.8	18.5	28.8
PCB-66	4.37	4.29	4.45	3.1	4.17	2.61	4.22	3.17	4.89	6.78	4.87	2.62	5.2	5.56	3.23	1.17	5.59	7.12	4.67	5.66
PCB-67	2.17	1.48	2.41	1.56	2.2	1.28	2.19	1.46	2.15	1.56	2.55	1.22	1.65	1.63	1.65	0.64	2.13	1.74	1.76	1.41
PCB-70	3.43	3.01	3.46	2.21	3.25	1.9	3.2	2.29	3.84	6.42	3.68	1.85	3.86	4.11	2.42	0.743	3.85	5.06	3.58	4.1
PCB-71	48	63.3	45.3	49.8	43.7	46.5	41.1	35	53.5	47	49.4	41.9	48.4	50.7	61.5	296	40.9	36.8	46.5	66.1
PCB-74	5.08	3.46	5.69	3.39	5	2.95	5.03	3.5	5.22	4.89	5.95	2.89	4.57	4.61	3.73	0.791	5.29	5.88	4.51	3.78
PCB-75	2.52	3.05	2.74	2.31	2.51	2.17	2.63	1.95	2.79	2.08	2.79	2.22	2.66	2.76	3.02	4.77	2.41	0.992	0.915	2.71
PCB-77	0.19	0.194	0.221	0.145	0.221	0.153	0.217	0.164	0.198	0.246	0.22	0.122	0.199	0.221	0.163	0.0926	0.242	0.329	0.182	0.224
PCB-80	0.0144	0.00786	0.0212	0.00817	0.0172	0.0139	0.0172	0.0149	0.0167	0.0149	0.015	0.00762	0.0117	0.0124	0.00678	0.0104	0.109	0.024	0.0122	0.0164
PCB-81	0.0132	0.0101	0.015	0.0121	0.0147	0.0106	0.0103	0	0.0078	0.0112	0	0.0126	0.00956	0.0123	0	0	0.0113	0.0177	0.00846	0.0105
PCB-82	0.234	0.337	0.203	0.201	0.221	0.164	0.232	0.186	0.251	0.727	0.227	0.156	0.28	0.365	0.171	0.175	0.227	0.344	0.261	0.637

Table C-4. Equilibrium Congener Water Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-83	6.8	9.21	6.53	6.49	6.11	5.09	6.24	5.11	6.24	7.09	7.86	5.63	6.65	7.56	7.95	27.7	5.51	5.79	5.63	8.68
PCB-84	5.79	9.45	5.38	6.16	5.01	3.96	4.98	5.08	5.33	8.13	5.46	5.05	5.3	6.96	4.79	24.1	3.68	7.17	4.61	7.39
PCB-85	0.421	0.737	0.461	0.463	0.533	0.365	0.472	0.451	0.653	1.64	0.537	0.334	0.62	0.621	0.555	0.74	0.55	0.956	0.652	1.62
PCB-87	0.75	1.08	0.65	0.619	0.746	0.535	0.688	0.623	0.823	3.06	0.842	0.519	1.04	1.29	0.517	0.551	0.706	1.46	0.888	2.82
PCB-91	11.2	15.8	10.1	11.6	10.7	7.11	9.2	7.6	9.8	12.3	11.2	7.62	9.1	9.96	9.15	42.1	8.63	9.93	8.43	14.6
PCB-92	4.61	5.09	4.87	4.01	4.58	3.47	4.43	3.08	3.98	5.4	5.64	3.18	4.75	4.51	4.47	20.8	4.47	3.88	4.43	6.55
PCB-95	26.6	35	25.2	27.2	24.8	19.4	23.4	19.8	27.9	32.8	28.4	17.4	26.8	29.6	28	103	22.9	23	24.6	38
PCB-97	3.29	3.95	3.53	2.95	3.43	2.33	3.3	2.55	3.43	5.02	4.01	2.35	3.46	4.03	3.02	3.82	3.28	3.55	3.23	5.06
PCB-99	7.21	7.94	6.9	5.61	7.04	4.5	6.48	4.76	7.31	9.36	7.88	4.55	6.94	8.06	6.39	8.98	7.4	8.74	5.61	9.73
PCB-100	1.13	1.33	1.02	0.916	0.959	0.839	0.441	0.373	0.968	0.969	1.17	0.873	0.384	0.445	1.29	2.11	0.428	0.522	0.355	1.2
PCB-101	13	13.5	12.8	10.6	12.1	8.07	11.2	8.36	12.7	17.7	14.5	7.14	12.3	14.8	11.3	14.9	11.8	13.6	11.8	17.3
PCB-104	0.0433	0.037	0.036	0.031	0.0295	0.036	0.0354	0.0291	0.037	0.0302	0.0398	0.0355	0.0392	0.0441	0.0441	0.234	0.0341	0.0402	0.0326	0.037
PCB-105	0.19	0.186	0.212	0.107	0.236	0.15	0.201	0.152	0.235	0.705	0.193	0.0998	0.238	0.282	0.126	0.0778	0.283	0.478	0.239	0.521
PCB-110	15.5	20.5	15.3	15	15.1	11.1	14.5	11.4	16.4	22.3	17.8	12.4	14.7	17.6	14.6	41.4	15.1	16.7	14.2	23.5
PCB-114	0.0538	0.0526	0.0615	0.0387	0.0543	0.0398	0.0532	0.0408	0.053	0.0865	0.0566	0.0274	0.0501	0.0635	0.042	0.0315	0.0665	0.0796	0.0503	0.0725
PCB-115	0.085	0.132	0.0771	0.0922	0	0.081	0	0	0	0	0	0.4	0.0744	0.121	0	0	0	0.725	0	0
PCB-118	2.18	1.93	2.78	1.42	2.68	1.69	2.37	1.73	2.55	4.46	2.59	1.34	2.25	2.59	1.8	1.07	3.18	4.11	2.27	3.62
PCB-123	0.292	0.279	0.355	0.194	0.387	0.24	0.331	0.238	0.322	0.495	0.327	0.172	0.263	0.291	0.229	0.24	0.401	0.473	0.271	0.416
PCB-124	0.0673	0.0595	0.0824	0.0403	0.0817	0.0497	0.0726	0.0515	0.075	0.122	0.0766	0.0382	0.0628	0.0755	0.0501	0.034	0.0908	0.108	0.0692	0.0933
PCB-125	0.107	0.0834	0.0792	0.0918	0.0667	0.0729	0	0	0	0.0797	0	0.069	0.1	0.104	0	0	0	0.0899	0	0.0838
PCB-126	0.00672	0.00476	0.00987	0.00362	0.00977	0.00665	0.00744	0.0066	0.00696	0.00652	0.00735	0.0041	0.00486	0.00574	0.00564	0	0.0101	0.0111	0.00613	0.00528
PCB-127	0.0243	0.00604	0.0696	0.00255	0.0457	0.0275	0.0439	0.0242	0.0473	0.0291	0.0257	0.00926	0.0168	0.0125	0.024	0.012	0.103	0.0395	0.0293	0.00912
PCB-128	0.172	0.185	0.191	0.132	0.201	0.15	0.177	0.147	0.174	0.462	0.179	0.122	0.179	0.229	0.126	0.136	0.217	0.305	0.167	0.394
PCB-130	0.0441	0.0316	0.0667	0.0178	0.0626	0.0448	0.0535	0.0393	0.0498	0.0909	0.052	0.0227	0.0322	0.0421	0.0344	0.0397	0.0767	0.105	0.0381	0.0485
PCB-131	0.138	0.174	0.153	0.12	0.171	0.13	0.147	0.125	0.13	0.177	0.16	0.115	0.115	0.14	0.144	0.442	0.154	0.196	0.111	0.164
PCB-134	0.302	0.392	0.342	0.246	0.374	0.26	0.321	0.262	0.293	0.371	0.332	0.245	0.253	0.294	0.272	0.803	0.346	0.411	0.247	0.351
PCB-135	0.77	1.01	0.873	0.734	0.86	0.663	0.783	0.64	0.785	0.984	0.919	0.655	0.629	0.839	0.862	2.36	0.733	1.03	0.601	1.05
PCB-136	1.47	2.08	1.54	1.54	1.48	1.28	1.38	1.23	1.41	1.8	1.71	1.32	1.44	1.63	1.81	6.01	1.33	1.46	1.22	2.06
PCB-137	0.0624	0.0645	0.0751	0.0418	0.0774	0.0556	0.0674	0.0514	0.0662	0.141	0.0671	0.0419	0.0586	0.079	0.0496	0.0484	0.0825	0.129	0.0611	0.102

Table C-4. Equilibrium Congener Water Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-138	0.446	0.557	0.564	0.454	0.55	0.389	0.473	0.396	0.534	1.54	0.554	0.341	0.562	0.871	0.323	0.407	0.606	0.996	0.534	1.21
PCB-139	0.0663	0.0669	0.0749	0.0488	0.0781	0.0584	0.0693	0.0576	0.0616	0.0843	0.0744	0.0468	0.0553	0.0644	0.0602	0.125	0.0725	0.101	0.0498	0.072
PCB-140	0.00615	0.00615	0.0044	0.00402	0.00943	0.0045	0.00587	0.00508	0	0.0115	0.00516	0.00633	0.00539	0.00728	0.00361	0	0	0.0106	0.00491	0.0105
PCB-141	0.0851	0.0948	0.0979	0.0603	0.101	0.0717	0.0914	0.0723	0.0923	0.245	0.0911	0.0557	0.0914	0.121	0.063	0.0636	0.113	0.178	0.0942	0.181
PCB-144	0.0608	0.0913	0.0648	0.0635	0.0604	0.0637	0.0567	0.0449	0.0515	0.103	0.0623	0.0316	0.0587	0.0585	0.0447	0.0772	0.0638	0.0722	0.0484	0.0901
PCB-146	0.422	0.441	0.528	0.315	0.507	0.352	0.436	0.34	0.389	0.587	0.489	0.284	0.308	0.35	0.423	0.761	0.497	0.745	0.312	0.449
PCB-149	6.49	7.73	6.35	5.82	6.39	5.31	5.7	4.81	6.12	7.79	7.11	4.69	4.87	6.58	6.99	21.7	5.82	6.56	4.56	7.87
PCB-151	0.71	0.848	0.887	0.649	0.802	0.599	0.726	0.576	0.694	0.917	0.838	0.56	0.624	0.728	0.722	1.75	0.809	0.908	0.499	0.881
PCB-153	2.72	2.47	3.16	1.97	2.98	2.19	2.61	2.09	2.56	4.01	2.83	1.75	2.06	2.41	2.23	2.76	3.27	4.19	2.12	3.17
PCB-154	0.348	0.431	0.353	0.292	0.399	0.326	0.344	0.288	0.309	0.335	0.365	0.297	0.285	0.332	0.409	1.33	0.345	0.458	0.257	0.349
PCB-155	0.00211	0.00178	0.00255	0.00141	0.00215	0.00178	0.00222	0.00186	0.00183	0.00188	0.00208	0.00156	0	0.00157	0.00153	0.0103	0.00276	0.00293	0.00151	0.00136
PCB-156	0.0816	0.0666	0.11	0.0378	0.1	0.0776	0.0925	0.0726	0.0907	0.181	0.0893	0.0437	0.0735	0.0914	0.0657	0.0762	0.13	0.162	0.0823	0.103
PCB-157	0.0152	0.0131	0.0199	0.00694	0.0189	0.0162	0.0164	0.0136	0.0167	0.041	0.0156	0.00807	0.0147	0.0191	0.0116	0.0136	0.0227	0.034	0.0166	0.0243
PCB-158	0.171	0.166	0.207	0.119	0.217	0.158	0.189	0.157	0.174	0.287	0.199	0.107	0.147	0.183	0.139	0.142	0.217	0.26	0.151	0.21
PCB-163	0.885	0.953	1.12	0.643	1.08	0.804	0.92	0.748	0.891	1.09	1.02	0.649	0.729	0.744	0.948	2.03	1.11	1.09	0.752	0.929
PCB-164	0.158	0.174	0.183	0.128	0.201	0.139	0.167	0.14	0.152	0.239	0.181	0.121	0.136	0.166	0.127	0.154	0.178	0.241	0.139	0.207
PCB-166	0.0154	0.0135	0.0186	0.00985	0.0183	0.0137	0.0174	0.013	0.0141	0.0193	0.0172	0.0101	0.0108	0.0134	0.0125	0.0185	0.0203	0.0225	0.0116	0.0144
PCB-167	0.0699	0.0532	0.0971	0.0306	0.0922	0.072	0.0828	0.0657	0.0764	0.108	0.0787	0.0419	0.0529	0.0602	0.0604	0.0712	0.111	0.131	0.0624	0.0603
PCB-169	0	0	0	0	0.0022	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-170	0.0636	0.0594	0.0863	0.035	0.0822	0.0698	0.0699	0.0655	0.066	0.133	0.0727	0.0437	0.0522	0.0626	0.0535	0.0916	0.0956	0.121	0.0557	0.0704
PCB-171	0.0208	0.0203	0.0299	0.0122	0.0277	0.0241	0.0244	0.022	0.0221	0.0424	0.0238	0.0148	0.017	0.021	0.019	0.0292	0.031	0.0447	0.0187	0.0237
PCB-172	0.0121	0.0118	0.0182	0.00704	0.0166	0.0141	0.015	0.0116	0.0126	0.023	0.0141	0.00861	0.00949	0.0108	0.0112	0.0199	0.0191	0.0269	0.0109	0.0116
PCB-173	0.00211	0.0016	0.00227	0.00113	0.00434	0.00248	0.00217	0.0016	0.00182	0.00359	0.00239	0.00249	0.0013	0.00186	0.00142	0	0.00307	0.00664	0.00158	0.00185
PCB-174	0.0452	0.0467	0.0599	0.0303	0.0566	0.0478	0.0524	0.0439	0.0461	0.0996	0.0522	0.0306	0.0384	0.0475	0.0389	0.0735	0.0639	0.0864	0.0397	0.0589
PCB-175	0.00606	0.00569	0.00715	0.00351	0.00842	0.00547	0.00681	0.0053	0.00548	0.00862	0.00604	0.00417	0.00424	0.00516	0.00534	0.0158	0.00779	0.0121	0.00511	0.0052
PCB-176	0.011	0.0118	0.0146	0.00742	0.0142	0.0119	0.013	0.0111	0.0114	0.0197	0.0123	0.00897	0.00876	0.0108	0.0104	0.0283	0.0152	0.0194	0.00948	0.0123
PCB-177	0.0326	0.0302	0.0435	0.0192	0.0462	0.0353	0.0377	0.033	0.0333	0.0622	0.0353	0.0225	0.0253	0.0316	0.027	0.0367	0.0475	0.0657	0.0286	0.0368
PCB-178	0.0393	0.0361	0.0487	0.0217	0.0493	0.0412	0.0424	0.0354	0.0379	0.0475	0.0424	0.0265	0.027	0.0297	0.0392	0.104	0.0527	0.0644	0.0281	0.0303
PCB-179	0.0847	0.0893	0.11	0.0613	0.114	0.0917	0.0977	0.0814	0.0851	0.104	0.0966	0.0686	0.0634	0.0724	0.0893	0.258	0.115	0.139	0.0682	0.0761

Table C-4. Equilibrium Congener Water Concentration Data for Batch S17-0367

Analytical batch	**Batch S17-0367**																			
Calculation batch	**0367 part 1**										**0367 part 2**									
Sample ID	ADP-GG-05 SW	ADP-GG-05 PW	ADP-JJ-07 SW	ADP-JJ-07 PW	ADP-DD-09 SW	ADP-DD-09 PW	ADP-FF-07 SW	ADP-FF-07 PW	ADP-GG-04 SW	ADP-GG-04 PW	ADP-HH-07 SW	ADP-HH-07 PW	ADP-EE-04 SW	ADP-EE-04 PW	ADP-JJ-05 SW	ADP-JJ-05 PW	ADP-DD-04 SW	ADP-DD-04 PW	ADP-FF-04 SW	ADP-FF-04 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-180	0.113	0.0973	0.16	0.0557	0.152	0.122	0.132	0.115	0.115	0.208	0.125	0.0797	0.0839	0.0997	0.1	0.216	0.177	0.23	0.0935	0.102
PCB-183	0.058	0.0539	0.0781	0.0329	0.0768	0.0633	0.067	0.0581	0.0567	0.0891	0.0636	0.0426	0.0419	0.0506	0.0559	0.136	0.0833	0.109	0.0459	0.0526
PCB-184	0	0	0	0.00027	0	0	0	0	0	0	0	0	0.00045	0	0	0	0	0	0	0
PCB-185	0.00676	0.00583	0.009	0.0037	0.0105	0.00664	0.00856	0.00635	0.00659	0.0105	0.00861	0.0046	0.00509	0.00561	0.00635	0.0109	0.0104	0.0111	0.00563	0.00655
PCB-187	0.202	0.205	0.267	0.124	0.302	0.227	0.228	0.197	0.202	0.242	0.22	0.167	0.141	0.155	0.203	0.627	0.29	0.388	0.155	0.153
PCB-188	0.0053	0.00564	0.00723	0.00358	0.00659	0.0061	0.00584	0.00511	0.00595	0.0053	0.00634	0.00417	0.0039	0.00471	0.00611	0.0253	0.00729	0.00935	0.00411	0.00403
PCB-189	0.00359	0.00308	0.00461	0.00143	0.00395	0.00453	0.00404	0.00371	0.00357	0.00661	0.00382	0.00256	0.00284	0.00334	0.00363	0.00702	0.00456	0.00702	0.00267	0.00337
PCB-190	0.0196	0.0173	0.0277	0.00986	0.025	0.0227	0.0239	0.0208	0.0202	0.033	0.0224	0.013	0.0142	0.0171	0.0191	0.0387	0.03	0.0348	0.016	0.0165
PCB-191	0.00425	0.00347	0.00551	0.00214	0.006	0.00436	0.0047	0.00417	0.00432	0.0071	0.00476	0.00313	0.0029	0.00357	0.0036	0.00976	0.00656	0.00966	0.00316	0.00359
PCB-193	0.00991	0.0101	0.0134	0.00511	0.0172	0.0147	0.0109	0.00916	0.0119	0.0128	0.0102	0.00664	0.00632	0.00733	0.00927	0.0226	0.0126	0.0169	0.00917	0.00751
PCB-194	0.0123	0.0133	0.0166	0.00572	0.0167	0.0178	0.0141	0.0158	0.0132	0.0269	0.0139	0.00997	0.00862	0.0097	0.0142	0.0519	0.0189	0.0259	0.00999	0.00971
PCB-195	0.00485	0.00429	0.00728	0.0022	0.00715	0.00701	0.00576	0.00631	0.00505	0.00954	0.00578	0.00377	0.00363	0.00385	0.00518	0.0206	0.00786	0.0122	0.00368	0.00361
PCB-197	0.00123	0.00081	0.00174	0.00045	0.00154	0.00123	0.00139	0.00112	0.00112	0.00159	0	0.00103	0.00063	0.00074	0.00089	0	0	0	0.00093	0.00076
PCB-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-199	0.0136	0.0127	0.0208	0.00648	0.0245	0.0181	0.0165	0.0159	0.0143	0.0251	0.0159	0.0129	0.00977	0.0104	0.0151	0.0388	0.0208	0.0341	0.0102	0.00934
PCB-200	0.00147	0.00128	0.00241	0.00073	0.00314	0.0021	0.00166	0.00177	0.00159	0.00261	0.00181	0.00148	0.0012	0.00104	0.00164	0	0.00291	0.00452	0.00116	0.00123
PCB-201	0.00263	0.00211	0.00296	0.00114	0.00356	0.00294	0.00362	0.00239	0.00239	0.00353	0.00279	0.00193	0.00162	0.00203	0.00258	0.00853	0.00352	0.00637	0.00169	0.00189
PCB-202	0.00659	0.00614	0.00985	0.00354	0.00963	0.00861	0.00837	0.00761	0.00712	0.00882	0.00819	0.00507	0.00446	0.005	0.00774	0.024	0.0106	0.0139	0.00537	0.00468
PCB-203	0.0169	0.0164	0.0239	0.00812	0.0225	0.0252	0.0204	0.0198	0.0155	0.031	0.0194	0.0128	0.0121	0.013	0.019	0.0608	0.0252	0.0379	0.0124	0.0123
PCB-205	0.00116	0.00077	0.00139	0.0004	0	0.00171	0	0	0	0.00203	0.00119	0.00087	0.00071	0.0009	0.00107	0	0	0.00331	0	0.00083
PCB-206	0.00529	0.00597	0.00773	0.0027	0.00719	0.0101	0.00621	0.00715	0.00551	0.0113	0.00568	0.00476	0.00341	0.00415	0.00708	0.0407	0.00807	0.0129	0.00345	0.00357
PCB-207	0.00115	0.00088	0.00159	0.00041	0.00192	0.00128	0.00095	0.00123	0.00087	0.00167	0.00101	0.00104	0.00075	0.00078	0.00103	0.00583	0	0.00347	0.00069	0.00048
PCB-208	0.00232	0.00216	0.00315	0.0009	0.00341	0.00361	0.0025	0.00297	0.00222	0.00373	0.00236	0.0019	0.00141	0.00149	0.00249	0.015	0.0041	0.00509	0.00167	0.00144
PCB-209	0.00076	0.00096	0.00113	0.00036	0.00296	0.00136	0.00093	0.00119	0.00089	0.00178	0.00088	0.00122	0.00058	0.00049	0.00105	0.00991	0	0.00404	0	0.0005
Total PCB	**2839**	**4269**	**2920**	**4812**	**2762**	**5093**	**2761**	**2633**	**3390**	**3607**	**3016**	**3904**	**3425**	**3496**	**3480**	**36929**	**2881**	**14357**	**2900**	**4233**

Table C-5. Equilibrium Congner Water Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
Congener																				
PCB-1	3.51	883	2.54	3.73	5.42	335	2.43	15.7	2.59	3.9	4.44	433	2.19	9.11	2.34	5.78	2.24	116	7.69	227
PCB-3	1.21	101	1.01	1.49	1.52	10.8	0.972	3.87	0.989	1.69	1.37	61.8	0.809	2.66	1	1.74	0.927	5.73	2.02	49.7
PCB-4	93.4	4130	67.8	80.6	92	934	87.7	498	76.4	105	104	4220	57.9	111	84.9	129	93.4	2710	180	2050
PCB-5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-6	123	1930	100	105	109	446	119	397	90.3	105	120	1850	72.5	108	120	121	140	1770	164	1330
PCB-7	1.53	51	1.7	1.82	2.14	4.77	1.77	10.3	1.67	1.79	1.99	39.5	1.46	2.03	1.67	1.59	1.07	21.3	2.86	43.1
PCB-8	141	2820	114	127	130	556	134	486	97.5	120	135	2530	79.6	129	116	138	155	2240	197	2020
PCB-9	7.48	137	2.7	2.97	3.25	27.5	2.59	19.4	2.79	3.44	3.36	116	2.4	3.29	2.84	4.12	3.08	50.6	4.89	79.2
PCB-11	8.52	68.9	6.99	7.1	7.75	18.9	8.21	16.3	7.01	6.66	7.82	71.9	5.78	8.31	8.24	8.35	9.2	66.7	10.3	63.7
PCB-12	0.064	0	0	0.0511	0.0688	0.0632	0	0	0	0.0542	0.0488	0.391	0.0423	0.0537	0.0409	0.0434	0.0578	0	0.0635	0.111
PCB-13	32.8	281	26.4	29.1	28.5	91	31.8	79.2	26.3	23.4	30.2	274	21.2	32.1	30.4	31.6	35.2	267	37.2	251
PCB-15	41	343	34	35.6	41.4	107	39.3	84.5	33	26.6	40.3	278	25.4	45	36.8	34.1	41.9	245	46.2	310
PCB-16	7.98	35.9	3.6	10.5	10.7	31.5	3.24	17.6	3.2	3.13	3.93	20.4	3.2	5.05	3.37	4.23	3.42	48.7	4.32	63.2
PCB-17	121	763	98.5	99.5	106	256	116	215	97.5	88.5	104	833	77	113	111	102	138	797	151	783
PCB-18	343	2460	278	264	290	705	321	659	268	261	301	2630	213	292	314	283	376	2400	444	2180
PCB-19	36.2	450	27.6	29.3	32.4	130	34.1	91.8	29.6	39.2	35.4	599	23.1	32.6	33.6	39.2	37.4	463	52.1	359
PCB-22	10.4	37.6	9.32	11.5	11.5	23	10.2	14.9	8.62	5.96	9.95	16.4	7.93	12.2	9.84	9.26	12.1	48.6	11.1	59
PCB-24	0.248	0.875	0.219	0.317	0.28	0.428	0.199	0.327	0.185	0.157	0.226	1.51	0.188	0.303	0.186	0.237	0.218	0.267	0.282	1
PCB-25	109	423	93	84.1	95.1	164	106	148	87.5	62.6	90.5	421	72.3	98.5	104	79.5	128	511	116	465
PCB-26	146	503	125	113	128	236	142	194	118	92.8	125	590	96.7	133	137	108	175	723	157	531
PCB-27	47.2	317	38.3	38.7	42.1	167	46.4	108	39	40.6	43.8	376	31.6	43.6	45.7	45.6	51.8	364	0	256
PCB-28	230	720	187	170	241	309	214	265	178	121	186	720	146	196	209	155	260	744	242	921
PCB-29	0.0443	0.0341	0.0456	0.0523	0.0596	0.0552	0.0379	0.0274	0.0403	0.0312	0.0407	0	0.0391	0.0441	0.0406	0.0355	0.0382	0	0.0523	0.0753
PCB-30	0.0824	0.204	0.0731	0.0594	0.0731	0.113	0.0682	0.0888	0.0692	0.0691	0.0678	0.601	0.0636	0.0705	0.0662	0.0632	0.0663	0.0999	0.0856	0.184
PCB-31	200	696	168	155	175	305	194	257	157	115	165	639	130	182	186	142	236	674	223	741
PCB-32	148	766	117	121	127	302	139	259	117	110	129	986	86.9	134	136	128	166	931	175	758
PCB-33	6.33	17.2	5.99	7.23	8.08	16.5	6.33	8.87	5.47	4.62	5.82	10.3	4.75	7.12	5.71	5.33	7.06	14.2	8.25	44.8
PCB-37	2.61	3.11	2.07	2.35	2.84	3.31	2.35	2.19	2.14	0.89	2.06	3.03	0.978	2.52	2.33	2.17	2.94	3.31	2.78	6.47

Table C-5. Equilibrium Congner Water Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-40	13	18.7	9.69	10.3	11.3	14.6	12.1	11.7	11	7.2	9.05	18.5	7.71	11.2	10.8	9.44	15.9	24	12.2	25.4
PCB-41	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.0668
PCB-42	19.7	44.1	17.2	17.2	18.1	34.5	19	24.5	14.8	8.77	14.9	37.8	13.2	17.7	16.9	13.4	23.4	59.4	18.7	62.1
PCB-43	2.61	9.24	9.71	8.81	5.54	13.7	9.04	9.87	10.1	4.48	12.9	4.32	1.97	2.47	2.47	2.11	1.07	4.6	2.78	4.87
PCB-44	48.2	130	41.3	40.5	45.2	77.2	47.7	64	38	23.8	39.2	88	33.6	46.1	45.4	36	58.1	214	52.8	185
PCB-45	4.1	14.7	3.69	4.26	4.27	7.22	4.03	6.45	1.75	1.43	3.44	10.2	1.75	4.49	3.8	3.85	1.81	11.7	5.45	22.6
PCB-46	8.61	30.5	7.35	8.01	8.01	15.5	8.82	14.4	7.23	3.88	7.96	30	3.6	8.5	8.36	8.9	10.1	73.3	10	33.5
PCB-47	43.7	80.5	34	31.3	36.6	49	40.5	43.6	35.1	22.5	31.5	87.6	28.6	37.5	37.8	29.6	53.8	110	44.9	106
PCB-48	3.35	5.62	5.56	5.65	6.78	7.27	10.7	9.85	5.94	4.71	7.5	4.24	2.79	1.23	1.45	1.58	6.29	11.1	2.77	7.26
PCB-49	150	342	124	123	141	193	143	164	142	92.7	132	369	109	152	158	119	177	558	172	414
PCB-50	0.34	0.677	0.289	0.245	0.311	0.375	0.286	0.308	0.28	0.23	0.279	1.55	0.246	0.267	0.278	0.254	0.317	0.464	0.334	0.664
PCB-51	22.3	70.3	17.9	17	19.7	33.5	22.4	27.1	19	17.5	18.6	101	14.9	18.9	20.9	20.1	27.7	111	24.6	76.9
PCB-52	233	556	194	170	205	312	218	251	191	138	186	673	151	199	200	169	271	965	245	684
PCB-53	72.1	222	59.7	54.5	62.1	117	68.4	96	60.4	50.2	61.3	299	42.4	52.6	68.4	55.4	87.3	355	81.5	234
PCB-54	0.536	1.24	0.489	0.513	0.525	1.01	0.499	0.675	0.521	0.739	0.528	5.86	0.442	0.542	0.518	0.61	0.548	0.954	0.602	0.995
PCB-56	1.03	0.964	0.856	0.963	1.18	1.28	0.907	0.819	0.819	0.303	0.809	0.697	0.415	1.06	0.9	0.402	1.17	0.661	1.13	2.29
PCB-60	0.6	0.13	0.237	0.245	0.296	0.229	0.228	0.162	0.24	0.144	0.204	0.326	0.235	0.281	0.222	0.463	0.272	0.0707	0.246	0.234
PCB-63	0.521	0.193	0.201	0.192	0.254	0.239	0.19	0.17	0.196	0.139	0.173	0.428	0.199	0.243	0.194	0.163	0.23	0.722	0.215	1.04
PCB-64	19	38.2	17.5	18.2	19.4	22.1	19.2	23	14.4	8.2	14.4	42.7	13.4	18.7	16	13.1	19.8	45.3	20.1	66.3
PCB-66	3.41	2.33	2.76	2.91	3.97	3.29	3.15	2.29	2.85	1.76	2.56	1.74	2.46	3.34	2.96	2.62	3.99	1.74	3.5	5.28
PCB-67	1.62	0.809	1.41	1.21	1.65	0.91	1.64	1.05	1.39	0.353	1.14	0.587	1.25	1.38	1.51	1.1	1.94	0.965	1.58	1.29
PCB-70	2.54	1.51	2.15	2.09	2.97	2.17	2.33	1.54	2.07	1.15	1.83	1.13	1.87	2.31	2.23	1.82	2.96	1.16	2.69	3.84
PCB-71	41.3	91.7	32.7	30.9	34.5	44.1	40.3	46.6	33.8	25.4	32	108	24.9	29.9	38.1	28.8	53.1	177	44.9	123
PCB-74	4.06	1.88	3.33	3.12	4.24	2.62	3.93	2.43	3.38	1.66	2.8	1.47	2.93	3.46	3.57	2.73	4.71	1.65	3.77	3.68
PCB-75	2.21	2.76	1.57	1.5	1.83	2.18	1.74	1.99	1.77	0.693	0.696	3	0.759	0.853	1.93	0.748	0.85	3.18	2.11	3.86
PCB-77	0.155	0.128	0.129	0.158	0.211	0.154	0.152	0.12	0.113	0.0858	0.108	0.126	0.116	0.168	0.131	0.12	0.151	0.0967	0.15	0.234
PCB-80	0.0127	0.00535	0.0128	0.0124	0.0176	0.0166	0.00948	0.00626	0.00903	0.00915	0.00776	0.0174	0.0131	0.0199	0.00966	0.00722	0.0087	0.00392	0.0124	0.00564
PCB-81	0.0103	0	0	0.00927	0.0118	0	0	0.00779	0	0	0.00576	0	0.00766	0	0.00813	0	0.00786	0	0.00889	0.0126
PCB-82	0.171	0.163	0.15	0.177	0.208	0.287	0.159	0.168	0.146	0.112	0.131	0.129	0.117	0.194	0.132	0.244	0.204	0.173	0.161	0.331

Table C-5. Equilibrium Congner Water Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-83	5.31	7.9	3.94	4.26	4.94	6.23	5.42	5.29	4.74	3.37	3.8	9.59	3.54	5.43	4.63	4.57	7.14	14.9	5.3	12.4
PCB-84	5.87	10.8	5.66	4.57	5.35	10.6	6.06	6.79	4.58	2.93	3.95	7.59	4.03	4.24	5.24	4.6	7.08	20.3	5.89	20.1
PCB-85	0.521	0.672	0.362	0.451	0.633	0.706	0.399	0.508	0.403	0.329	0.333	0.308	0.396	0.546	0.404	0.597	0.384	0.718	0.499	1.14
PCB-87	0.596	0.694	0.501	0.68	0.76	1.17	0.623	0.657	0.557	0.397	0.438	0.493	0.442	0.726	0.531	0.942	0.684	0.779	0.6	1.47
PCB-91	9.13	15.8	6.51	6.83	8.15	11.8	8.77	9.98	6.96	4.55	6.04	19.3	5.89	8.5	7.28	6.51	11.8	28.3	8.66	24.1
PCB-92	3.54	4.91	2.47	2.96	3.59	4.08	3.29	3.36	3.16	2.32	2.33	3.93	2.66	4.22	3.07	2.99	3.87	13	3.77	6.98
PCB-95	21.8	39.6	17.7	17.5	19.3	27.4	21.2	24.2	18.1	11	16.2	45.1	15.2	20.5	19.3	16.3	28	69.9	23.8	61.5
PCB-97	2.57	2.34	2.07	2.08	2.64	2.35	2.62	2.14	2.18	1.35	1.79	1.95	0	2.62	2.28	2.13	3.26	3.27	2.72	4.93
PCB-99	5.78	5.07	4.68	4.5	6.01	5.31	5.29	4.5	4.41	3.41	3.56	4.65	4	6.5	4.77	4.49	6.94	7.37	6.24	9.02
PCB-100	0.828	1.15	0.646	0.634	0.79	0.369	0.768	0.749	0.365	0.326	0.271	1.32	0.311	0.414	0.663	0.34	0.414	1.61	0.352	1.45
PCB-101	10	8.64	8.2	7.85	10	8.42	9.86	8.03	8.47	4.94	6.26	7.59	6.94	9.99	8.58	7.66	12.8	11.7	10.6	15.6
PCB-104	0.0317	0.038	0.0256	0.0248	0.0286	0.0313	0.0287	0.025	0.03	0.029	0.0244	0.138	0.0249	0.0282	0.0269	0.0287	0.0351	0.0332	0.0301	0.0353
PCB-105	0.173	0.132	0.141	0.191	0.271	0.245	0.157	0.122	0.111	0.14	0.0846	0.131	0.126	0.24	0.123	0.158	0.13	0.154	0.184	0.3
PCB-110	13	18.6	10.3	10.6	12.5	15.7	12.4	12.5	10.3	7.07	8.57	17.3	8.66	13.8	11.1	9.58	16.3	30.3	13.9	0
PCB-114	0.0391	0.0351	0.0328	0.0373	0.0523	0.0394	0.0411	0.0293	0.0287	0.0257	0.0219	0.0389	0.0297	0.0503	0.0293	0.0314	0.0362	0.038	0.042	0.0534
PCB-115	0.458	0	0	0	0	0	0	0	0	0	0	0.0849	0	0	0	0	0.0477	0	0	0
PCB-118	1.99	1.32	1.58	1.71	2.56	2.01	1.89	1.22	1.35	1.41	1.03	1.28	1.45	2.57	1.53	1.32	1.84	1.76	2.15	2.36
PCB-123	0.249	0.215	0.222	0.247	0.357	0.255	0.261	0.185	0.178	0.183	0.133	0.185	0.202	0.342	0.211	0.174	0.229	0.254	0.28	0.344
PCB-124	0.0571	0.0374	0.0471	0.0509	0.0771	0.0549	0.054	0.0372	0.0375	0.0403	0.0279	0.0405	0.0421	0.0709	0.0431	0.0394	0.0453	0.0447	0.0589	0.0646
PCB-125	0.0669	0	0	0.034	0.0401	0	0.0463	0	0	0.0266	0.0224	0.0748	0	0	0.0269	0	0.0863	0	0.0332	0
PCB-126	0.00631	0.00478	0.00503	0.00585	0.00744	0.00514	0.0061	0.00417	0.00341	0.00585	0.00301	0	0.00476	0.0102	0.00501	0.00347	0.00403	0.00567	0.00667	0.00536
PCB-127	0.03	0.0144	0.0279	0.0223	0.0504	0.0208	0.0262	0.0117	0.0113	0.0701	0.00764	0.0356	0.0344	0.0431	0.0219	0.00781	0.00766	0.0245	0.044	0.00873
PCB-128	0.15	0.15	0.114	0.148	0.185	0.22	0.135	0.12	0.0979	0.119	0.0691	0.131	0.101	0.218	0.104	0.121	0.124	0.166	0.141	0.241
PCB-130	0.0492	0.0456	0.0385	0.0384	0.0661	0.069	0.0395	0.0284	0.025	0.0433	0.0179	0.0457	0.0358	0.0776	0.0337	0.0237	0.026	0.0475	0.0511	0.054
PCB-131	0.133	0.191	0.0985	0.122	0.152	0.168	0.123	0.116	0.0909	0.103	0.0646	0.181	0.0895	0.173	0.0975	0.0954	0.119	0.268	0.128	0.253
PCB-134	0.281	0.398	0.222	0.267	0.328	0.353	0.272	0.261	0.197	0.199	0.146	0.355	0.198	0.369	0.214	0.202	0.264	0.588	0.289	0.584
PCB-135	0.61	0.87	0.471	0.538	0.632	0.784	0.592	0.592	0.533	0.448	0.398	0.916	0.48	0.789	0.503	0.302	0.73	1.51	0.735	1.43
PCB-136	1.18	2.07	0.898	0.967	1.13	1.56	1.19	1.24	0.99	0.922	0.828	2.42	0.999	1.29	1.01	0.995	1.54	3.73	1.3	3.17
PCB-137	0.0592	0.0542	0.044	0.0566	0.0805	0.0734	0.0528	0.0432	0.0372	0.0561	0.0258	0.0456	0.0425	0.0889	0.0423	0.0411	0.0433	0.0636	0.0627	0.0931

Table C-5. Equilibrium Congner Water Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-138	0.432	0.458	0.334	0.422	0.562	0.755	0.376	0.32	0.296	0.39	0.27	0.415	0.329	0.671	0.314	0.349	0.408	0.601	0.478	0.873
PCB-139	0.0563	0.0654	0.0437	0.053	0.0669	0.0627	0.0513	0.0475	0.0361	0.0448	0.0245	0.0622	0.0427	0.0799	0.0422	0.0381	0.047	0.0814	0.0578	0.0833
PCB-140	0.00531	0.00655	0.00514	0	0.00735	0.00725	0.00485	0	0	0.00554	0.00333	0	0	0	0.00423	0.00474	0.00403	0	0.00706	0.00877
PCB-141	0.078	0.0754	0.0609	0.0793	0.105	0.113	0.0717	0.0599	0.0517	0.0686	0.0359	0.0661	0.0548	0.115	0.0576	0.0661	0.0624	0.0831	0.0835	0.146
PCB-144	0.0532	0.0582	0.036	0.0354	0.0487	0.053	0.0367	0.0337	0.0294	0.0304	0.0213	0.0508	0.028	0.0528	0.0283	0.0329	0.0466	0.0491	0.0406	0.0821
PCB-146	0.381	0.387	0.277	0.33	0.441	0.47	0.341	0.265	0.287	0.329	0.193	0.384	0.305	0.534	0.277	0.293	0.38	0.577	0.456	0.612
PCB-149	5.5	8.08	3.97	4.45	5.38	6.84	4.89	4.82	3.81	3.94	3.14	9.26	3.56	7.06	4.08	4.02	6.16	13.3	5.99	11.7
PCB-151	0.599	0.806	0.466	0.505	0.669	0.767	0.544	0.483	0.416	0.489	0.363	0.859	0.507	0.778	0.456	0.416	0.602	1.32	0.663	1.28
PCB-153	2.46	2.21	1.78	2.08	2.8	2.64	2.14	1.64	1.52	1.95	1.08	2.02	1.67	3.54	1.76	1.55	2.02	3.01	2.57	3.34
PCB-154	0.308	0.439	0.226	0.282	0.329	0.379	0.286	0.287	0.223	0.262	0.16	0.649	0.202	0.394	0.22	0.234	0.306	0.715	0.296	0.575
PCB-155	0.00192	0.00189	0.00159	0.00169	0.00217	0.00209	0.00146	0.00122	0.00138	0.0026	0.00118	0.0139	0.00173	0.003	0.00139	0.00143	0.00166	0.00165	0.00214	0.00172
PCB-156	0.0722	0.0691	0.0556	0.0729	0.1	0.0963	0.064	0.0451	0.0394	0.0694	0.0269	0.0632	0.0527	0.117	0.0503	0.0405	0.0417	0.0769	0.0773	0.111
PCB-157	0.015	0.0133	0.00974	0.0141	0.0203	0.0212	0.0119	0.00898	0.00781	0.0152	0.00517	0.0209	0.0102	0.0231	0.00835	0.00725	0.00735	0.0152	0.0141	0.0219
PCB-158	0.152	0.135	0.116	0.149	0.196	0.182	0.146	0.118	0.0969	0.118	0.0658	0.122	0.105	0.22	0.111	0.107	0.117	0.159	0.15	0.207
PCB-163	0.716	0.906	0.507	0.624	0.836	0.903	0.644	0.533	0.454	0.592	0.334	1.05	0.503	1.05	0.528	0.429	0.601	1.5	0.783	1.5
PCB-164	0.141	0.133	0.113	0.151	0.177	0.146	0.138	0.117	0.0961	0.101	0.068	0.11	0.103	0.19	0.11	0.104	0.125	0.158	0.14	0.195
PCB-166	0.0136	0.0137	0.0105	0.0129	0.0166	0.0163	0.0128	0.00986	0.00815	0.0115	0.00585	0.0212	0.00985	0.0189	0.0093	0.00815	0.00971	0.0144	0.0137	0.0168
PCB-167	0.0669	0.0616	0.0518	0.0684	0.09	0.0782	0.0588	0.0418	0.0356	0.0646	0.0243	0.0599	0.0486	0.112	0.0464	0.0331	0.036	0.0708	0.0704	0.0763
PCB-169	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00171	0
PCB-170	0.0594	0.0742	0.0425	0.0625	0.0764	0.0835	0.0517	0.0422	0.0313	0.0561	0.0206	0.071	0.0413	0.111	0.041	0.0323	0.0333	0.0806	0.0615	0.116
PCB-171	0.0215	0.026	0.0158	0.021	0.0261	0.0295	0.0184	0.014	0.0109	0.0206	0.00808	0.0354	0.0153	0.0387	0.0138	0.0117	0.0118	0.0264	0.0221	0.0342
PCB-172	0.0137	0.0163	0.00962	0.0132	0.0177	0.0168	0.0123	0.00845	0.00759	0.0146	0.00557	0.0214	0.00936	0.0237	0.00851	0.00616	0.0081	0.0187	0.0159	0.0225
PCB-173	0.00271	0.00273	0.00258	0.0024	0	0.00373	0.00193	0.00165	0.00171	0	0.0015	0	0	0.00418	0.00197	0.00149	0.00182	0.00279	0.00265	0.00391
PCB-174	0.0435	0.0491	0.03	0.0425	0.0551	0.0614	0.0366	0.0327	0.0254	0.0399	0.0166	0.0429	0.0306	0.068	0.0303	0.027	0.028	0.0568	0.0458	0.0797
PCB-175	0.00685	0.00771	0.00478	0.00572	0.00805	0.00804	0.00488	0.00437	0.00313	0.00759	0.00225	0	0.00383	0.00984	0.00437	0.00301	0.00325	0.00874	0.00586	0.0096
PCB-176	0.0116	0.0147	0.00838	0.0105	0.0137	0.0158	0.00915	0.00804	0.00667	0.0105	0.0045	0.0142	0.00807	0.018	0.00746	0.00673	0.00748	0.0151	0.0107	0.0187
PCB-177	0.0327	0.0351	0.0251	0.0327	0.0419	0.045	0.0281	0.0224	0.0177	0.0312	0.0124	0.0363	0.0238	0.0576	0.0221	0.0176	0.0198	0.0356	0.033	0.0479
PCB-178	0.037	0.0514	0.0278	0.035	0.0469	0.0485	0.0308	0.0252	0.0201	0.0352	0.0148	0.0651	0.0255	0.0625	0.0251	0.0192	0.0229	0.0686	0.0391	0.0609
PCB-179	0.0858	0.126	0.065	0.0848	0.104	0.107	0.0772	0.0651	0.0511	0.0806	0.0362	0.137	0.0605	0.135	0.059	0.0505	0.0608	0.168	0.0889	0.155

Table C-5. Equilibrium Congner Water Concentration Data for Batch S17-0368

Analytical batch	**Batch S17-0368**																			
Calculation batch	**0368 part 1**										**0368 part 2**									
Sample ID	ADP-CC-07 SW	ADP-CC-07 PW	ADP-DD-05 SW	ADP-DD-05 PW	ADP-CC-04 SW	ADP-CC-04 PW	ADP-LL-03 SW	ADP-LL-03 PW	ADP-JJ-03 SW	ADP-JJ-03 PW	ADP-BB-05 SW	ADP-BB-05 PW	ADP-BB-07 SW	ADP-BB-07 PW	ADP-LL-02 SW	ADP-LL-02 PW	ADP-HH-05 SW	ADP-HH-05 PW	ADP-DD-07 SW	ADP-DD-07 PW
Values	equlibrium concentrations in water																			
Units	ng/L																			
PCB-180	0.114	0.161	0.082	0.119	0.145	0.156	0.0987	0.0815	0.0571	0.114	0.0372	0.119	0.0742	0.21	0.0768	0.0589	0.0616	0.189	0.119	0
PCB-183	0.0611	0.082	0.0442	0.0599	0.0759	0.0783	0.0503	0.0411	0.0321	0.0595	0.0217	0.072	0.0416	0.0998	0.0396	0.0322	0.0349	0.0934	0.0606	0.104
PCB-184	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-185	0.00657	0.00758	0.00499	0.00634	0.00791	0.00892	0.00599	0.00477	0.00358	0.00727	0.00277	0.0134	0.00579	0.0107	0.00443	0.00362	0.0039	0.00781	0.00751	0.00951
PCB-187	0.207	0.293	0.162	0.222	0.275	0.295	0.192	0.161	0.12	0.219	0.083	0.368	0.151	0.381	0.147	0.115	0.134	0.414	0.227	0.378
PCB-188	0.00545	0.00888	0.00403	0.00528	0.00619	0.00724	0.00482	0.00424	0.00324	0.00537	0.00251	0.022	0.00436	0.00931	0.00347	0.00338	0.00356	0.0118	0.00562	0.0093
PCB-189	0.00382	0.00574	0.00243	0.00342	0.00439	0.00515	0.00246	0.00221	0.00192	0.00493	0.00115	0.00339	0.00229	0.00703	0.00248	0.00145	0.0016	0.00667	0.00395	0.00669
PCB-190	0.0196	0.0222	0.0139	0.0184	0.0234	0.0241	0.0163	0.012	0.0104	0.0201	0.00688	0.0302	0.0136	0.034	0.0128	0.00955	0.00994	0.0253	0.0195	0.0282
PCB-191	0.00473	0.00579	0.00373	0.00459	0.00557	0.00598	0.00384	0.00299	0.0023	0.00531	0.00195	0.0145	0.00366	0.00869	0.00341	0.00247	0.00249	0.00593	0.00533	0.00661
PCB-193	0.00939	0.0135	0.00644	0.00946	0.0116	0.0121	0.00773	0.00699	0.00455	0.0103	0.00341	0.0247	0.00847	0.0166	0.00589	0.00466	0.00492	0.0175	0.00982	0.0179
PCB-194	0.0132	0.0236	0.00981	0.0154	0.0161	0.0203	0.00989	0.00927	0.00658	0.0179	0.00468	0.0295	0.00889	0.0278	0.00889	0.00653	0.00546	0.029	0.0139	0.0339
PCB-195	0.00535	0.00853	0.00404	0.00553	0.00728	0.00842	0.00365	0.00365	0.00274	0.00787	0.00193	0.0151	0.00421	0.011	0.00357	0.00267	0.00247	0.00899	0.00575	0.0116
PCB-197	0.00129	0.00178	0	0.00125	0	0	0	0	0	0	0	0	0	0	0	0	0.00055	0.00191	0	0.00214
PCB-198	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PCB-199	0.0178	0.0267	0.0116	0.0177	0.0202	0.0239	0.0138	0.0116	0.00818	0.0194	0.00517	0.0283	0.0103	0.0337	0.0108	0.00845	0.00821	0.0304	0.0185	0.0382
PCB-200	0.00229	0.00291	0.00207	0.00228	0.00279	0.00306	0.0018	0.00136	0	0	0	0	0	0.00375	0.00157	0.00118	0.00089	0.003	0.00264	0.0041
PCB-201	0.00303	0.00452	0.00208	0.00288	0.0038	0.00392	0.00254	0.00188	0.00163	0.00423	0.00116	0	0.00229	0.00578	0.00215	0.00149	0.00143	0.00459	0.00368	0.00541
PCB-202	0.00721	0.0119	0.00524	0.00765	0.00937	0.00982	0.00646	0.00533	0.0037	0.00929	0.00283	0.0178	0.00531	0.0147	0.00485	0.00386	0.00347	0.0133	0.00834	0.0139
PCB-203	0.0178	0.0319	0.013	0.0197	0.0209	0.0256	0.0147	0.0126	0.00913	0.0238	0.00584	0.0376	0.0124	0.0361	0.011	0.00882	0.00882	0.035	0.0186	0.0442
PCB-205	0.00157	0.00177	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.00059	0.00219	0	0.00192
PCB-206	0.0056	0.0137	0.00383	0.00714	0.00604	0.00957	0.00482	0.00426	0.00287	0.00899	0.00204	0.0225	0.00411	0.0133	0.00359	0.00298	0.00256	0.0159	0.00684	0.0216
PCB-207	0.00138	0.00252	0	0.00177	0.002	0.00225	0	0.00095	0.00074	0	0	0	0	0.00276	0	0	0.00063	0.00254	0.00194	0.00302
PCB-208	0.00257	0.00487	0.00184	0.00285	0.00305	0.00416	0.00217	0.00194	0.00142	0.0041	0.00079	0.013	0.00235	0.00542	0.00185	0.00125	0.00119	0.00548	0.00306	0.00708
PCB-209	0.00184	0.00308	0	0.00203	0.00261	0.00287	0	0.00122	0.00097	0	0	0	0	0.00375	0	0.00097	0.00071	0.0038	0	0.00428
Total PCB	**2656**	**19741**	**2174**	**2132**	**2420**	**6250**	**2533**	**4747**	**2124**	**1814**	**2295**	**19753**	**1687**	**2417**	**2426**	**2173**	**3015**	**18180**	**3094**	**15851**

Table C-6. Equilibrium Congner Water Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**			
Calculation batch	**369**			
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW
Values	equlibrium concentrations in water			
Units	ng/L			
Congener				
PCB-1	3.13	8.11	2.37	14
PCB-3	1.19	2.94	1.1	3.67
PCB-4	98.6	134	89.2	683
PCB-5	0	0	0	0
PCB-6	139	144	119	500
PCB-7	2.3	2.86	1.87	3.87
PCB-8	158	183	136	572
PCB-9	2.94	4.23	2.66	5.97
PCB-11	10.1	10.2	8.86	19.9
PCB-12	0.0763	0.0621	0.0478	0
PCB-13	36.9	40.1	32.1	107
PCB-15	43.1	44.7	34.5	100
PCB-16	4.88	7.53	3.73	20.9
PCB-17	133	122	109	284
PCB-18	363	323	308	807
PCB-19	37.4	39	34.9	164
PCB-22	13	14.2	11.1	19.8
PCB-24	0.282	0.383	0.215	0.272
PCB-25	126	99.3	105	205
PCB-26	160	129	133	191
PCB-27	50.6	49.1	46	150
PCB-28	239	183	197	314
PCB-29	0.0533	0.0601	0.043	0.0262
PCB-30	0.0864	0.0856	0.0713	0.0951
PCB-31	228	182	183	261
PCB-32	157	145	133	354
PCB-33	8.19	9.04	6.78	14.1
PCB-37	3.93	3.03	2.8	3.7

Table C-6. Equilibrium Congner Water Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**			
Calculation batch	**369**			
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW
Values	equlibrium concentrations in water			
Units	ng/L			
PCB-40	14.8	11.7	13.3	19.2
PCB-41	0	0.0569	0	0
PCB-42	23.3	17.7	19.4	35.5
PCB-43	20.4	19.3	2.62	48.7
PCB-44	56.7	47.4	47.4	97.7
PCB-45	2.16	2.54	1.73	6.95
PCB-46	9.95	9.52	8.9	20
PCB-47	44.6	32	37.3	61.3
PCB-48	11.7	12	8.56	25
PCB-49	191	150	260	223
PCB-50	0.359	0.294	0.302	0.434
PCB-51	24	19.9	22.7	56.1
PCB-52	274	195	395	307
PCB-53	78.1	62.7	70	161
PCB-54	0.57	0.607	0.508	1.01
PCB-56	1.34	0.578	0.449	0.339
PCB-60	0.346	0.306	0.259	0.175
PCB-63	0.298	0.267	0.218	0.242
PCB-64	19.7	17.5	16.4	29.4
PCB-66	4.4	3.45	3.42	2.92
PCB-67	2.22	1.34	1.62	0.388
PCB-70	3.27	2.4	2.59	2.03
PCB-71	44.3	33.6	38.6	77.8
PCB-74	5.56	3.72	3.89	2.76
PCB-75	2.39	0.985	2.26	0.91
PCB-77	0.24	0.191	0.161	0.0943
PCB-80	0.0204	0.0211	0.0113	0.00754
PCB-81	0.015	0.0104	0.0067	0.00764
PCB-82	0.204	0.181	0.167	0.161

Table C-6. Equilibrium Congner Water Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**			
Calculation batch	**369**			
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW
Values	equlibrium concentrations in water			
Units	ng/L			
PCB-83	6.53	5.25	5.77	9.94
PCB-84	4.69	4.91	4.5	7.53
PCB-85	0.34	0.517	0	0
PCB-87	0.682	0.634	0.558	0.712
PCB-91	11.1	8.14	9.08	16.2
PCB-92	5.09	3.59	3.31	8.22
PCB-95	25.8	19.9	21.4	39.2
PCB-97	3.52	2.75	2.91	3.53
PCB-99	8.12	6.08	5.43	7.03
PCB-100	0.424	0.385	0.342	0.389
PCB-101	13	9.07	9.32	11.4
PCB-104	0.0328	0.0282	0.0287	0.0355
PCB-105	0.251	0.242	0.151	0.138
PCB-110	16.8	12.8	12.5	21.6
PCB-114	0.0507	0.0379	0.0287	0.0246
PCB-115	0.127	0	0	0
PCB-118	2.96	2.49	1.85	1.87
PCB-123	0.372	0.296	0.223	0.202
PCB-124	0.0799	0.0641	0.046	0.0393
PCB-125	0.0608	0.0226	0	0
PCB-126	0.00988	0.00962	0.00563	0.00421
PCB-127	0.0695	0.0465	0.0247	0.0123
PCB-128	0.203	0.197	0.126	0.143
PCB-130	0.0488	0.0489	0.0303	0.0295
PCB-131	0.161	0.139	0.103	0.137
PCB-134	0.342	0.282	0.219	0.273
PCB-135	0.582	0.507	0.406	0.499
PCB-136	1.57	1.05	1.33	2.35
PCB-137	0.0771	0.071	0.0461	0.0482

Table C-6. Equilibrium Congner Water Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**			
Calculation batch	**369**			
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW
Values	equlibrium concentrations in water			
Units	ng/L			
PCB-138	0.683	0.612	0.446	0.416
PCB-139	0.0737	0.0634	0.0429	0.0473
PCB-140	0.00849	0.00725	0.00532	0.00697
PCB-141	0.098	0.0934	0.0633	0.066
PCB-144	0.0866	0.0614	0.0472	0.0624
PCB-146	0.477	0.416	0.284	0.307
PCB-149	7.62	6.44	5.1	9.03
PCB-151	0.742	0.6	0.486	1.01
PCB-153	3.45	3.15	2.12	2.86
PCB-154	0.367	0.329	0.252	0.333
PCB-155	0.00269	0.00333	0.00184	0.00211
PCB-156	0.111	0.103	0.0587	0.0578
PCB-157	0.0214	0.0211	0.0116	0.0115
PCB-158	0.19	0.194	0.129	0.128
PCB-163	1.21	1.11	0.786	1.17
PCB-164	0.222	0.199	0.131	0.141
PCB-166	0.0181	0.0168	0.0107	0.0103
PCB-167	0.0998	0.0936	0.0508	0.0464
PCB-169	0.00367	0	0	0.00185
PCB-170	0.0858	0.0857	0.0463	0.0516
PCB-171	0.0275	0.0276	0.0142	0.0171
PCB-172	0.0178	0.0175	0.00939	0.0101
PCB-173	0.00259	0.00266	0.0015	0.00159
PCB-174	0.0572	0.057	0.0325	0.0381
PCB-175	0.00832	0.00853	0.00408	0.00529
PCB-176	0.0142	0.0154	0.00851	0.00944
PCB-177	0.0455	0.0461	0.0242	0.0277
PCB-178	0.0458	0.0462	0.0265	0.0324
PCB-179	0.102	0.098	0.06	0.0744

Table C-6. Equilibrium Congner Water Concentration Data for Batch S17-0369

Analytical batch	**Batch S17-0369**			
Calculation batch	**369**			
Sample ID	ADP-CC-05 SW	ADP-CC-05 PW	ADP-FF-05 SW	ADP-FF-05 PW
Values	equlibrium concentrations in water			
Units	ng/L			
PCB-180	0.135	0.136	0.0676	0.0823
PCB-183	0.0774	0.074	0.0412	0.0483
PCB-184	0	0.00199	0	0
PCB-185	0.00965	0.00891	0.00475	0.00486
PCB-187	0.297	0.296	0.161	0.197
PCB-188	0.00741	0.00773	0.00395	0.00522
PCB-189	0.00634	0.00651	0.00284	0.00354
PCB-190	0.027	0.0261	0.0142	0.0153
PCB-191	0.00623	0.00672	0.00333	0.00361
PCB-193	0.0115	0.0127	0.00897	0.00929
PCB-194	0.0184	0.0213	0.00898	0.0131
PCB-195	0.0074	0.00838	0.00328	0.00451
PCB-197	0.00212	0.00218	0.00104	0.00111
PCB-198	0	0	0	0
PCB-199	0.0296	0.0311	0.0149	0.0211
PCB-200	0.00407	0.00489	0.00195	0.00242
PCB-201	0.00478	0.0052	0.0023	0.00242
PCB-202	0.00953	0.0105	0.00476	0.00648
PCB-203	0.0224	0.0261	0.0113	0.0153
PCB-205	0.00235	0.00273	0.00123	0.00127
PCB-206	0.00766	0.00993	0.00353	0.00654
PCB-207	0.00195	0.00168	0.00078	0.001
PCB-208	0.00335	0.00465	0.00167	0.00227
PCB-209	0.00277	0.0037	0.00133	0.00156
Total PCB	**2975**	**2619**	**2749**	**6126**

Table C-7. Congener log K_{OW} and log K_{PED} Values Used in Water Concentration Calculations

Congener	log K_{OW}	log K_{PED}	Congener	log K_{OW}	log K_{PED}	Congener	log K_{OW}	log K_{PED}	Congener	log K_{OW}	log K_{PED}
Cl1(1)	4.37	4.00	Cl4(48)	5.83	5.53	Cl5(115)	6.33	6.06	Cl7(173)	7.06	6.82
Cl1(3)	4.61	4.25	Cl4(49)	5.87	5.57	Cl5(118)	6.72	6.47	Cl7(174)	6.88	6.63
Cl2(4)	4.68	4.32	Cl4(50)	5.65	5.34	Cl5(123)	6.72	6.47	Cl7(175)	7.01	6.77
Cl2(5)	4.97	4.63	Cl4(51)	5.49	5.17	Cl5(124)	6.72	6.47	Cl7(176)	6.84	6.59
Cl2(6)	5.05	4.71	Cl4(52)	5.74	5.44	Cl5(125)	6.09	5.80	Cl7(177)	7.00	6.76
Cl2(7)	5.04	4.70	Cl4(53)	5.38	5.06	Cl5(126)	6.96	6.72	Cl7(178)	7.01	6.77
Cl2(8)	4.99	4.65	Cl4(54)	5.29	4.96	Cl5(127)	7.11	6.88	Cl7(179)	6.84	6.59
Cl2(9)	5.07	4.73	Cl4(56)	6.09	5.80	Cl6(128)	6.64	6.38	Cl7(180)	7.18	6.95
Cl2(11)	5.39	5.07	Cl4(60)	6.07	5.78	Cl6(130)	7.30	7.08	Cl7(183)	7.04	6.80
Cl2(12)	5.23	4.90	Cl4(63)	6.21	5.93	Cl6(131)	6.58	6.32	Cl7(184)	6.98	6.74
Cl2(13)	5.32	5.00	Cl4(64)	5.73	5.43	Cl6(134)	6.57	6.31	Cl7(185)	7.04	6.80
Cl2(15)	5.26	4.93	Cl4(66)	6.17	5.89	Cl6(135)	6.44	6.17	Cl7(187)	7.04	6.80
Cl3(16)	5.14	4.81	Cl4(67)	6.24	5.96	Cl6(136)	6.26	5.98	Cl7(188)	6.92	6.68
Cl3(17)	5.33	5.01	Cl4(70)	6.20	5.92	Cl6(137)	6.77	6.52	Cl7(189)	7.62	7.41
Cl3(18)	5.19	4.86	Cl4(71)	5.64	5.33	Cl6(138)	6.68	6.42	Cl7(190)	7.21	6.98
Cl3(19)	4.94	4.60	Cl4(74)	6.20	5.92	Cl6(139)	6.69	6.43	Cl7(191)	7.24	7.01
Cl3(22)	5.55	5.24	Cl4(75)	5.88	5.58	Cl6(140)	6.58	6.32	Cl7(193)	7.18	6.95
Cl3(24)	5.27	4.94	Cl4(77)	6.40	6.13	Cl6(141)	6.70	6.45	Cl8(194)	7.54	7.33
Cl3(25)	5.68	5.37	Cl4(80)	6.75	6.50	Cl6(144)	6.57	6.31	Cl8(195)	7.52	7.31
Cl3(26)	5.71	5.41	Cl4(81)	6.42	6.15	Cl6(146)	6.74	6.49	Cl8(197)	7.32	7.10
Cl3(27)	5.20	4.87	Cl5(82)	6.07	5.78	Cl6(149)	6.46	6.19	Cl8(198)	7.54	7.33
Cl3(28)	5.63	5.32	Cl5(83)	6.11	5.83	Cl6(151)	6.57	6.31	Cl8(199)	7.39	7.17
Cl3(29)	5.62	5.31	Cl5(84)	5.98	5.69	Cl6(153)	6.76	6.51	Cl8(200)	7.31	7.09
Cl3(30)	5.42	5.10	Cl5(85)	6.18	5.90	Cl6(154)	6.54	6.28	Cl8(201)	7.27	7.04
Cl3(31)	5.66	5.35	Cl5(87)	6.12	5.84	Cl6(155)	6.62	6.36	Cl8(202)	7.24	7.01
Cl3(32)	5.10	4.77	Cl5(91)	6.08	5.79	Cl6(156)	7.12	6.89	Cl8(203)	7.50	7.29
Cl3(33)	5.56	5.25	Cl5(92)	6.17	5.89	Cl6(157)	7.12	6.89	Cl8(205)	7.68	7.47
Cl3(37)	5.85	5.55	Cl5(95)	5.99	5.70	Cl6(158)	6.74	6.49	Cl9(206)	7.86	7.66
Cl4(40)	5.51	5.20	Cl5(97)	6.24	5.96	Cl6(163)	6.75	6.50	Cl9(207)	7.77	7.57
Cl4(41)	5.69	5.38	Cl5(99)	6.40	6.13	Cl6(164)	6.61	6.35	Cl9(208)	7.71	7.51
Cl4(42)	5.78	5.48	Cl5(100)	6.19	5.91	Cl6(166)	6.80	6.55	Cl10(209)	8.09	7.90
Cl4(43)	5.71	5.41	Cl5(101)	6.26	5.98	Cl6(167)	7.23	7.00	**PRCs**		
Cl4(44)	5.62	5.31	Cl5(104)	6.00	5.71	Cl6(169)	7.49	7.27	Cl3(38)	5.82	5.52
Cl4(45)	5.57	5.26	Cl5(105)	6.79	6.54	Cl7(170)	7.07	6.83	Cl4(78)	6.47	6.20
Cl4(46)	5.38	5.06	Cl5(110)	6.22	5.94	Cl7(171)	7.06	6.82	Cl4(79)	6.55	6.29
Cl4(47)	5.91	5.62	Cl5(114)	6.63	6.37	Cl7(172)	7.08	6.84	Cl7(186)	6.95	6.71

Appendix B

Jacobs Boring Logs

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-AA-05
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MWF
Time: 0854
Collection Mechanism: Piston Core

Northing: 2707168.667
Easting: 815681.215
GPS Accuracy (ft.): H: 0.041 V: 0.059
Water Depth (ft.): 2.5
Water Surface Surveyed Elevation (ft NAVD 88): -0.598

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.3
Processed Date/Initials: 9/13/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-AA05-0.0-0.5 OIL-M-SOIL NEGATIVE (GREEN)	0.0-0.5		ML/OL	SILT LOAM	2.5Y 3/1 - 2.5Y 2.5/1	SOFT	FINE SAND	PETROL	SLIGHT SHEEN
	0.5-1.8		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	H_2S	LITTLE CLAM SHELL
AS-AA05-0.5-1.0 OIL-M-SOIL NEGATIVE (GREEN)	1.8-3.3		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	SILT	NONE	
AS-AA-05-2.8-3.3 NEGATIVE (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-AA-06
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 09:07
Collection Mechanism: Piston Core

Northing: 2707168.586
Easting: 815736.833
GPS Accuracy (ft.): H: 0.041 V: 0.060
Water Depth (ft.): 7.2
Water Surface Surveyed Elevation (ft NAVD 88): -0.482

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.3
Processed Date/Initials: 9/11/17 MVM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-AA06-0.0-0.5 RA-C004501 O-H-S NEGATIVE (GREEN)	0.0-0.4		OL	ORGANIC SILT	2.5Y 2.5/1	SOFT	SILT	PETROL	SLIGHT SHEEN
	0.4-0.6		OL/ML	SILT LOAM	2.5Y 3/1	SOFT	SILT	PETROL/ H_2S	SLIGHT SHEEN
RA-C004502 OR-H-SOIL NEGATIVE (GREEN) AS-AA-06-0.6-1.1	0.6-1.2		ML	SILT LOAM	2.5Y 3/1	SOFT	F SAND	H_2S	FEW SHELL FRAGMENTS
AS-AA-06-2.8-3.3 RA-C004503 OR-H-SOIL NEGATIVE (GREEN)	1.2-3.3		ML	SILTY CLAY LOAM	2.5Y/3/1	FIRM	F. SAND	H_2S	

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring | **Project #:** 100043429

Location: New Bedford Harbor | **Vessel:** *Gale Force*

Client: USACE | **Chief Scientist:** M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-36 | Northing: 2707085.670 | All measurements are ±0.1 feet

Core Sample ID: | Easting: 815830.120 | Penetration (ft.): 3.5

Date Collected/Initials: 11 Sept 2017/NRF | GPS Accuracy (ft.): H: 0.034 V: 0.059 | Recovery (ft.): 3.5

Time: 09.30 | Water Depth (ft.): 6.4 | Processed Date/Initials:

Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): -0.314

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
ASB-36 0.0-0.5 CONS-DRAINED TRIAXIAL SHEAR	0.0-0.5		OL	ORGANIC SILT	2.5Y 3/1	SOFT	SILT	PRESENT	
ASB-36 0.5-1.2 ONE-DIMENSIONAL CONSOLIDATION	0.5-1.2		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	SILT		
ASB-36 1.2-1.7 CONS. DRAINED TRIAXIAL SHEAR	1.2-1.7		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND		
ASB-36 1.7-2.4 UNCONF. COMPRESSIVE STRENGTH	1.7-2.4		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND		

Comments: Rep 1. Variable bottom

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-36
Core Sample ID:
Date Collected/Initials: 11Sept2017/MRF
Time: ~~0936~~ 0939
Collection Mechanism: Piston Core

Northing: 2707085.791
Easting: 815829.
GPS Accuracy (ft.): H: 0.039 V: 0.070
Water Depth (ft.): 6.3
Water Surface Surveyed Elevation (ft NAVD 88): -0.018

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.5
Processed Date/Initials:

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments

Comments: Rep 2. Variable bottom ① S/B PBL 11Sept17

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

Attachment 8 Sediment Core Log

2707087.814 N
815828.387 E

Sediment Core Log

Core Location ID	ASB-36	A	Water Depth (feet)	6.3 ft
Geologist/Scientist	Hickman / Morris	B	Water Surface Elevation (feet NGVD 29)	-0.341 ft
Collection Method	4" Lexan Liner	C	Length of Coring Assembly (feet)	
Date	4 October 2017	D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	20 ft

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	-26.6 ft
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	-6.64 ft

0.5 ft

	Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
ASB-36-0-1.0	0-0.5		OL	Organic Silt	2.5Y 2.5/1	Very Soft	Petrol	Trace fine sand
	0.5-3.7		ML	Silty Clay Loam	2.5Y 3/1	Soft	-	
ASB-36-1.0-2.0	3.7-5.0		SW	Gravelly Med Sand Loam	2.5Y 4/1	Loose	-	Little fine organic, trace fine sand

5.0 ft Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-36	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	

5-10 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
5-6.8		SW	Gravelly Med Sand	2.5Y 4/1	Loose	-	Little Rounded Gravel Trace Fine Sand
6.8-10.		NO	Recovery				

1.8 ft Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	KSB-36	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F Elevation of Bottom of Core (NGVD 29): B-(C-D) _____

G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E _____

H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A _____

10-15 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
10-13.8		SW	Gray Medium Sand	2.5Y 4/1	Loose	—	Little Rounded Gravel Trace Fine Sand
13.8-15		No Recovery					

3.8 ft Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID ASB-36
Geologist/Scientist _____
Collection Method _____
Date _____
Time

A Water Depth (feet) _____
B Water Surface Elevation (feet NGVD 29) _____
C Length of Coring Assembly (feet) _____
D Water Surface to Top of Coring Assembly (feet) _____
E Length of Sediment Core (feet) _____

F Elevation of Bottom of Core (NGVD 29): B-(C-D) _____
G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E _____
H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A _____

15-20 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
15-17.5 ft		SW	GRAVELLY MED SAND	2.5Y 4/1	LOOSE	–	LITTLE ROUNDED GRAVEL TRACE FINE SAND
17.5-20		NO RECOVERY					
20+		BEDROCK					NO TILL PRESSURE THIS LOCATION

2.5 ft of Recovery

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-37
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 1023
Collection Mechanism: Piston Core

Northing: 2706937.431
Easting: 815728.443
GPS Accuracy (ft.): H: 0.049 V: 0.072
Water Depth (ft.): 9.0
Water Surface Surveyed Elevation (ft NAVD 88): 0.812

All measurements are ±0.1 feet
Penetration (ft.): 3.4
Recovery (ft.): 3.3
Processed Date/Initials: MWM 9/18/17

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
ASB-37-0.0-0.5 UNGRS. DRAIN TRIAX	0.0-0.5		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	SILT	PETROL	
ASB-37-0.5-1.2 ONE DIM. CONS.	0.5-1.2		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	SILT	NONE	
↓ OPEN CRE #2	1.2+		SP	SANDY LOAM	2.5Y 3/1 - 7.5YR 4/4	FIRM	MED SAND	NONE	

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-37
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MAF
Time: 1033
Collection Mechanism: Piston Core

Northing: 2706936.887
Easting: 815726.481
GPS Accuracy (ft.): H: 0.051 V: 0.071
Water Depth (ft.): 9.1
Water Surface Surveyed Elevation (ft NAVD 88): 1.329

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.5
Processed Date/Initials: 9/18/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
ASB-37 1.2-1.7 UNCONF. DRAINED TRIAXIAL SHEAR	1.2-1.7		SM	SANDY LOAM	2.5Y 3/1	FIRM	MED SAND	NONE	
ASB-37 1.7-2.4 UNCONFINED COMPRESSION STRENGTH	1.7-2.4								

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

Attachment 8 Sediment Core Log

2706937.483N
815727.658E

Sediment Core Log

Core Location ID	ASB-37	A	Water Depth (feet)	7.8 ft
Geologist/Scientist	Hickman/Morris	B	Water Surface Elevation (feet NGVD 29)	-0.620 ft
Collection Method	4" Lexan Liner	C	Length of Coring Assembly (feet)	
Date	4 October 2017	D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	20 ft

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	-28.42 ft
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	-8.42 ft

0.0-5.0 ft

	Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
ASB-37-0.0-1.0	0.0-0.3		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	PETRIC	TRACE FINE SAND
ASB-37-1.0-2.0	0.3-1.0		OL/ML	SILT LOAM	2.5Y 3/1	SOFT	–	TRACE FINE SAND
	1.0-4.7		SP	LOAMY MED SAND	7.5YR 4/4	LOOSE	–	TRACE ROUNDED GRAVEL NO THICK MARINE DEPOSITS HERE

4.7 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-37	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	

5.10 ft

ASB-37 7.4-8.4

ASB-37 8.4-9.4

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
5.9.4		SP	LOAMY FINE SAND	2.5Y 5/3	LOOSE	–	WELL SORTED, LITTLE VERY FINE SAND, TRACE MED SAND
9.4-10		FLO	Recovery				

4.4 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-37	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F Elevation of Bottom of Core (NGVD 29): B-(C-D)

G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E

H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A

10-15 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
10-12.4		SW	Loamy Med Sand	10YR 6/4	Loose	–	Little Rounded Gravel, Little Fine Sand
12.4-15		No Recovery					

2.4 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID ASB-37
Geologist/Scientist _____
Collection Method _____
Date _____
Time

A Water Depth (feet) _____
B Water Surface Elevation (feet NGVD 29) _____
C Length of Coring Assembly (feet) _____
D Water Surface to Top of Coring Assembly (feet) _____
E Length of Sediment Core (feet) _____

F Elevation of Bottom of Core (NGVD 29): B-(C-D) _____
G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E _____
H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A _____

15-20 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
15-16.9		SW	Loamy med sand	10YR Gray	Loose	–	Little coarse sand Little fine sand Poorly sorted
16.9-17.5		GW	Very gravelly sand/gravel	10YR Gray	Loose	–	Rounded gravel Little med sand Trace fine sand
17.5-20		No	No recovery	–	No till present		

2.5 ft of Recovery

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-38
Northing: 2706774.901
All measurements are ±0.1 feet
Core Sample ID:
Easting: 815627.108
Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017/MRF
GPS Accuracy (ft.): H: 0.046 V: 0.076
Recovery (ft.): 3.4
Time: 1309
Water Depth (ft.): 8.5
Processed Date/Initials: 9/18/17 MLK
Collection Mechanism: Piston Core
Water Surface Surveyed Elevation (ft NAVD 88): 2.122

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
ASB-38-0.0-0.5 TRAP.	0.0-0.5	+	OL	ORGANIC SILT	2.5Y 2.5/1	Very Soft	SILT	PETRO	
ASB-38-0.5-1.2 ID CAS.	0.5-1.2		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	SILT	NONE	
ASB-38 2.2-2.7 TRAP	2.2-2.7		ML	SILT LOAM	2.5Y 3/1	FIRM	FINE SAND	NONE	
ASB-38-2.7-3.4 UNCH. CAR. STRUCT	2.7-3.4		ML	SILT LOAM	2.5Y 3/1	FIRM	FINE SAND	NONE	

Comments: Rep 2.

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring | Project #: 100043429

Location: New Bedford Harbor | Vessel: *Gale Force*

Client: USACE | Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-38 | Northing: 2706774.977 | All measurements are ±0.1 feet

Core Sample ID: | Easting: 815627.001 | Penetration (ft.): 3.5

Date Collected/Initials: 11 Sept 2017 / MRF | GPS Accuracy (ft.): H: 0.047 V: 0.073 | Recovery (ft.): 3.4

Time: 1302 | Water Depth (ft.): 8.5 | Processed Date/Initials:

Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): 1.860

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
				NOT USED					

Comments: Rep 1.

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

Attachment 8 Sediment Core Log

2706778.242 N
815628.615 E

Sediment Core Log

Core Location ID	ASB-38	A	Water Depth (feet)	6.0 ft
Geologist/Scientist	Hickman/Morris	B	Water Surface Elevation (feet NGVD 29)	-0.402 ft
Collection Method	4" Lexan Liner	C	Length of Coring Assembly (feet)	
Date	13 October 2007	D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	24 ft

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	-30.40 ft
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	-6.40 ft

0-5 ft

ASB-38-0.0-1.0

ASB-38 1.0-2.0

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
0-0.5		OL	Organic silt	2.5Y 2.5/1	Very soft	-	As seen through tube
0.5-1.0		MC/OL	Silty clay	2.5Y 2/1	Soft	-	Little peat
1.0-2.5		MC	Silty clay loam	2.5Y 2/1	Firm	H_2S	Little clam shell
2.5-4.1		SM	Med sandy loam	7.5YR 3/3	Loose	H_2S	Little medium sand
4.1-5.0		SW	Loamy med sand	5Y/3/1	Loose	H_2S	Little med, coarse trace fine sand

5.0 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	MD-38,	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	

5-10 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
5.0-7.0		SW	LOAM MED SAND	5Y 3/1	LOOSE	-	LITTLE MED, COARSE SAND TRACE FINE SAND
7.0-9.1		"	"	"	"	"	"
9.1-10.0		NO RECOVERY					

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-38	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F Elevation of Bottom of Core (NGVD 29): B-(C-D) _____

G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E _____

H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A _____

10-15 ft

ASB-38-
12.4-13.4

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
10-13.4		SW	GRAVELLY MED SAND	5Y 4/1	LOOSE	–	LITTLE ROUNDED GRAVEL LITTLE MEDI COARSE SAND
13.4-15.0		NO	RECOVERY				VOC OPOR

Recovery 3.4 ft of 5.0

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-38	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F Elevation of Bottom of Core (NGVD 29): B-(C-D)

G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E

H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A

15-20 ft

ASB-38
15.0-16.0 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
15-17.0		SW	Gravelly Med Sand	5Y 4/1	Loose	VOC	Little Rounded Gravels Little Med Sand Little Coarse Sand
17.0-18.2		SP	Med Sand	7.5YR 4/4	Loose	–	Little Fine Sand -Trace Coarse Sand
18.2-20		No	Recovery				

Recovery 3.2 ft

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-38	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F Elevation of Bottom of Core (NGVD 29): B-(C-D)

G Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E

H Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A

20-23 ft

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
20-22.3		SP	LOAM MOD SAND	7.5YR 4/4	LOOSE	—	LITTLE MOD, COARSE SAND - TRACE FINE SAND

2.3 ft Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID	ASB-38	A	Water Depth (feet)	
Geologist/Scientist		B	Water Surface Elevation (feet NGVD 29)	
Collection Method		C	Length of Coring Assembly (feet)	
Date		D	Water Surface to Top of Coring Assembly (feet)	
Time		E	Length of Sediment Core (feet)	

F	Elevation of Bottom of Core (NGVD 29): B-(C-D)	
G	Elevation of Sediment Water Interface Relative to Core Bottom (NGVD 29): F+E	
H	Elevation of Sediment Water Interface Relative to Water Depth (NGVD 29): B-A	

23-24 ft

ASB-38.

23.0-24.0

Elevation (NGVD)	Core Diagram	Lithology - USCS code	Type	Color	Consistency	Odor	Comments
23.0-24.0		GC	Very Gravelly Clayey	5Y 6/3	Very Stiff	None	Some angular gravels. Mix contains organic fines

2.0 ft Recovery

BATTELLE

Project Name: NBH Sediment Monitoring | Project #: 100043429
Location: New Bedford Harbor | Vessel: *Gale Force*
Client: USACE | Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-BB-09 | Northing: 2707123.245 | All measurements are ±0.1 feet
Core Sample ID: | Easting: 815842.026 | Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017/MAF | GPS Accuracy (ft.): H: 0.039 V: 0.068 | Recovery (ft.): 3.3
Time: 0918 | Water Depth (ft.): 7.6 | Processed Date/Initials: 9/14/17 MWM
Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): -0.396

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-BB-09-0.0-0.5 OIL-M-SOIL MELATING (GREEN)	0.0-0.3		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	FINE SAND	PETRO	SLIGHT SHEEN
	0.3-0.8		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	H_2S	
AS-BB-09 0.8-1.3 OIL-M-SOIL MELATING (GREEN)	0.8-1.4		ML	SILT LOAM	2.5Y 3/1	FIRM	SILT	MOLD	
	1.4-3.3		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	MED SAND	MOLD	TRACE MEDIUM SAND
AS-BB-09 2.8-3.3 OIL-M-SOIL MELATING (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-CC-09
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 0951
Collection Mechanism: Piston Core

Northing: 2707067.920
Easting: 815896.112
GPS Accuracy (ft.): H: 0.038 V: 0.066
Water Depth (ft.): 7.4
Water Surface Surveyed Elevation (ft NAVD 88): 0.242

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.4
Processed Date/Initials: 9/12/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-CC09-0.0-0.5 OIL-N-SOIL NEGATIVE (GREEN)	0-0.1		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	FINE SAND	PETROL	SLIGHT SHEEN, TRACE GASTROPOD SHELL
	0.1-1.0		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	PETROL	TRACE CLAM SHELL
AS-CC09-1.0-1.5 OIL-N-SOIL NEGATIVE (GREEN)	1.0-3.4		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	NONE	TRACE CLAM SHELL
AS-CC09-2.9-3.4 OIL-N-SOIL NEGATIVE (GREEN)									

Comments:
1ST ATTEMPT: No good
2ND ATTEMPT: No good

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-DD-09
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 1014
Collection Mechanism: Piston Core

Northing: 2707012.296
Easting: 815894.503
GPS Accuracy (ft.): H: 0.046 V: 0.070
Water Depth (ft.): 8.0
Water Surface Surveyed Elevation (ft NAVD 88): 0.705

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.4
Processed Date/Initials: 9/13/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-DD-09-0.0-0.5 OIL-N-SOIL NEGATIVE (GREEN)	0.0-3		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	FINE SAND	PETROL	
	0.3-1.0		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	NONE	
AS-DD-09-1.0-1.5 OIL-N-SOIL NEGATIVE (GREEN)	1.0-3.4		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	SILT	H_2S	LITTLE CLAM SHELL
AS-DD09-2.9-3.4 OIL-N-SOIL NEGATIVE (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring | Project #: 100043429
Location: New Bedford Harbor | Vessel: *Gale Force*
Client: USACE | Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-FF-08 | Northing: 2706915.104 | All measurements are ±0.1 feet
Core Sample ID: | Easting: 815841.236 | Penetration (ft.): 3.3
Date Collected/Initials: 11 Sept 2017/MAF | GPS Accuracy (ft.): H: 0.051 V: 0.075 | Recovery (ft.): 3.3
Time: 1048 | Water Depth (ft.): @ ~~8.9~~ 9.1 | Processed Date/Initials: 9/15/17 MWM
Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): 1.360

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-FF08-0.0-0.5 OIL-M-SOIL NEGATIVE (GREEN)	@ 0.3		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	FINE SAND	PETROL	SLIGHT SHEEN
	0.3-1.2		ML	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	H_2S	
	1.2-3.3		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	SILT	H_2S	
AS-FF08 1.2-1.7 OIL-M-SOIL NEGATIVE (GREEN)									
AS-FF08 2.8-3.3 OIL-M-SOIL NEGATIVE (GREEN)									

Comments: ① S/B PBC 11 Sept 2017

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-GG-08
Northing: 2706861.102
All measurements are ±0.1 feet
Core Sample ID:
Easting: 815844.297
Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017 / MWF
GPS Accuracy (ft.): H: 0.056 V: 0.075
Recovery (ft.): 3.4
Time: 1059
Water Depth (ft.): 9.2
Processed Date/Initials: 8/14/17 MWM
Collection Mechanism: Piston Core
Water Surface Surveyed Elevation (ft NAVD 88): 1.323

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-GG08-0.0-0.5 OIL-M-SOIL NEGATIVE (GREEN)	0.0-0.3		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	SILT	PETROL	SLIGHT SHEEN
	0.3-1.4		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	PETROL	SLIGHT SHEEN
AS-GG08-1.4-1.9 OIL-M-SOIL NEGATIVE (GREEN)	1.4-3.4		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	SILT	H_2S	TRACE CLAM SHELL
AS-GG08-2.9-3.4 OIL-M-SOIL NEGATIVE (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-II-07
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MAF
Time: 1108
Collection Mechanism: Piston Core

Northing: 2706752.479
Easting: 815787.279
GPS Accuracy (ft.): H: 0.054 V: 0.065
Water Depth (ft.): 8.8
Water Surface Surveyed Elevation (ft NAVD 88): 1.411

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.3
Processed Date/Initials: 9/13/17 - MLM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-II07-0.0-0.5 OIL-N-SOIL NEGATIVE (GREEN)	0-1.2		ML	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	H_2S	TRACE CLAM SHELL
	1.2-1.6		ML	SILT LOAM	2.5Y 3/1	VERY SOFT	FINE SAND	SLIGHT PETROL	VERY WET W/ FREE WATER IN MACROPORES
AS-II07-1.2-1.7 OIL-N-SOIL NEGATIVE (GREEN)	1.6-3.0		ML	SILT LOAM	2.5Y 3/1	FIRM	SILT	NONE	
	3.0-3.3		Pt	FIBROUS PEAT	7.5YR 3/3	SOFT/FIRM	DECO PLANT FIBRES	SKUNK	FIBROUS PEAT, TRACE MINERAL FRACTION
AS-II07-2.5-3.0 OIL-N-SOIL NEGATIVE (GREEN)									

Comments: 1ST ATTEMPT: NO GOOD

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-JJ-07
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 1320
Collection Mechanism: Piston Core

Northing: 2706702.590
Easting: 815793.865
GPS Accuracy (ft.): H: 0.041 V: 0.075
Water Depth (ft.): 10.6
Water Surface Surveyed Elevation (ft NAVD 88): 2.077

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.4
Processed Date/Initials: 9/12/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-JJ07-0.0-0.5 OIL-M-SOIL MELATTIC (GREEN)	0.0-0.6		OL	ORGANIC SILT	2.5Y 2.5/1	SOFT	SILT	PETROL	
	0.6-1.5		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	H_2S	
AS-JJ07-1.7-2.2 OIL-M-SOIL MELATTIC (GREEN)	1.5-1.7		SW SM	MEDIUM SANDY LOAM	2.5Y 3/1	SOFT	MED SAND	MOIST	TRANSITION TO NATIVE
	1.7-3.4		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	MOIST	
AS-JJ07-2.9-3.4 OIL-M-SOIL MELATTIC (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-KK-07
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 1333
Collection Mechanism: Piston Core

Northing: 2706648.100
Easting: 815788.174
GPS Accuracy (ft.): H: 0.040 V: 0.080
Water Depth (ft.): 10.0
Water Surface Surveyed Elevation (ft NAVD 88): 1.797

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.5
Processed Date/Initials: 9/12/17 MWM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-KK07-0.0-0.5 OIL-IN-SOIL NEGATIVE (GREEN)	0-0.4		OL	ORGANIC SILT	2.5Y 2.5/1	SOFT	FINE SAND	PETROL	SLIGHT SHEEN
	0.4-1.9		ML/OL	SILT LOAM	2.5Y 3/1	SOFT	FINE SAND	PETROL	
AS-KK07-1.9-2.4 OIL-N-SOIL NEGATIVE (GREEN)	1.9-3.5		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	H_2S	TRACE CLAM SHELL TO 2.8 ft
AS-KK07 3.0-3.5 OIL-N-SOIL NEGATIVE (GREEN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring | Project #: 100043429
Location: New Bedford Harbor | Vessel: *Gale Force*
Client: USACE | Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-LL-02 | Northing: 2706596.474 | All measurements are ±0.1 feet
Core Sample ID: | Easting: 815535.524 | Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017/MRF | GPS Accuracy (ft.): H: 0.041 V: 0.075 | Recovery (ft.): 3.5
Time: 1415 | Water Depth (ft.): 6.1 | Processed Date/Initials: 9/13/17 MWM
Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): 1.216

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-LL02-0.0-0.5 OIL-M-SOIL NEGATIVE (GREEN)	0-0.4		OL	ORGANIC SILT	2.5Y 2.5/1	VERY SOFT	FINE SAND	PETROL	LITTLE PLANT FIBERS IN MATRIX LITTLE SHEEN
	0.4-0.8		OL/ML	SILT LOAM	2.5Y 2.5/1 - 2.5Y 3/1	SOFT	FINE SAND	PETROL	MIXED LAYER LITTLE SHEEN
AS-LL02-1.7-2.2 OIL-M-SOIL NEGATIVE (GREEN)	0.8-1.7		ML/OL	SILT LOAM	2.5Y 3/1 - 2.5Y 2.5/1	SOFT	FINE SAND	PETROL	ABRUPT LAYER BOUNDARY
	1.7-2.8		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	H_2S	
AS-LL02-2.3-2.8 OIL-M-SOIL NEGATIVE (GREEN)	2.8-3.5		Pt	DECOMPOSED PLANT FIBERS	7.5YR 3/3	SOFT	—	CARBON	

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring | Project #: 100043429
Location: New Bedford Harbor | Vessel: *Gale Force*
Client: USACE | Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-LL-04 | Northing: 2706593.597 | All measurements are ±0.1 feet
Core Sample ID: | Easting: 815631.777 | Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017 / MLF | GPS Accuracy (ft.): H: 0.043 V: 0.070 | Recovery (ft.): 3.5
Time: 1406 | Water Depth (ft.): 7.5 | Processed Date/Initials: 9/11/17 MVM
Collection Mechanism: Piston Core | Water Surface Surveyed Elevation (ft NAVD 88): 1.278

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-LL-04 0.0-0.5 RA-C005S01 OIL-M-SOIL MELATING	0.0-0.3		OL	ORGANIC SILT	2.5Y 2.5/1	SOFT	SILT	NONE	SLIGHT SHEEN
	0.3-1.0		OL/ML	SILT LOAM	2.5Y 2.5/1 (3)	SOFT	FINE SAND	NONE	SLIGHT SHEEN
AS-LL-04 1.0-1.5 RA-C005S02 OIL-M-SOIL MELATING (CLEAN)	1.0-3.5		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	H_2S	TRACE SHELL HASH
AS-LL-04 3.0-3.5 RA-C005S03 OIL-M-SOIL MELATING (CLEAN)									

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

BATTELLE

Project Name: NBH Sediment Monitoring
Location: New Bedford Harbor
Client: USACE

Project #: 100043429
Vessel: *Gale Force*
Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-LL-06
Core Sample ID:
Date Collected/Initials: 11 Sept 2017/MRF
Time: 1343
Collection Mechanism: Piston Core

Northing: 2706592.607
Easting: 815736.771
GPS Accuracy (ft.): H: 0.039 V: 0.077
Water Depth (ft.): 8.2
Water Surface Surveyed Elevation (ft NAVD 88): 1.616

All measurements are ±0.1 feet
Penetration (ft.): 3.5
Recovery (ft.): 3.5
Processed Date/Initials: 9/12/17 MRM

Sample ID	Core Depth (Feet)	Visibly Contaminated Layer (thickness)	Lithology - Include USCS code	Sediment Type	Color (Descriptive & Munsell code)	Consistency	Maximum particle size	Odor	Comments
AS-LL06-0.0-0.5	0-0.7		OL	ORGANIC SILT	2.5Y 2.5/1	SOFT	SILT	PETROL	SLIGHT SHEEN
OIL-H-SOIL NEGATIVE (GREEN)	0.7-1.5		OL/ML	SILT LOAM	2.5Y 3/1	SOFT	MED SAND	PETROL	SLIGHT SHEEN LITTLE OYSTER SHELL
AS-LL06-1.5-2.0									
OIL-H-SOIL NEGATIVE (GREEN)	1.5-3.5		ML	SILTY CLAY LOAM	2.5Y 3/1	FIRM	FINE SAND	H_2S	LITTLE TO TRACE CLAM SHELL FRAGMENTS
AS-LL06-3.0-3.5									
OIL-H-SOIL NEGATIVE (GREEN)									

Comments:
1ST ATTEMPT: NG
2ND ATTEMPT: NG

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\ - Mixed Zone

Appendix C

Groundwater Sampling Field Records

Location: New Boston Harbor Date: 10/23/17

Project Chief: 3 Bl Zoo Mike Morris

Arrow Microwell Sampling

0800 Arrive at Site Attempt Tailgate @ Area C.

Weather: Foggy in morning, clearing, calm

60s, Mostly in 70s. Light SE

Wind: Mostly Tide @ 1119, NW

Tide @ 1626

Personnel: Mike Morris, Mary Beth Wolinski, Patrick Walsh

Task: Water Sampling @ Arrow

Equip: Boat, YSI, Peristaltic Pump.

0840 Leave Area C Dock

0900 Arrive @ Location LL-03.

LL35

WD: 2.18 ft

TD: 12.60 ft

LL30

WD: 2.08 ft

TD: 19.91 ft

Total Depth Water Column: 5.45 ft

0930 Tries to sample LL-03S. Peristaltic Pump was failing

0947 Head back to Area C Dock

1015 Re-Board w/ new Peristaltic Pump

Head to Arrow Investigation Area

Meet

Location: New Boston Harbor Date: 10/23/17

Project Chief: 3 Bl Zoo Mike Morris

Arrow Microwell Sampling

1030 Start up at LL-03D

Flow: 100 ml/min - Pump 2.8 gal

Time LL-03D	Temp °C	pH	SpC µS/cm	DAP mV	Turb NTU	DO mg/L
1030	19.20	7.00	39,100	⇐	1034	6.05
1035	19.22	7.12	40,346	91.1	–	5.91
1040	19.33	7.23	41,749	44.4	–	5.79
1045	19.30	7.26	41,935	56.5	–	5.66
1050	19.19	7.30	42,946	46.4	–	5.78
1115	19.19	7.31	42,459	39.4	–	5.88
1120	19.12	7.29	42,453	35.2	–	5.78
1125	19.4	7.27	42,946	30.1	–	5.92
1130	19.22	7.26	42,600	27.9	–	5.93
1135	19.23	7.25	42,739	25.3	–	5.87

New Bedford Harbor 10/23/17
35BG2000 Mike Morris
Aerovox Microwave Sampling

1145 ~~1100~~ Collect sample for ADP LL03 D - 102317.
~~[illegible] 1130~~ MWM
RA - ~~[illegible]~~ CO 11102; WG, Metals, SW6010C;
Filters, 1 500 ml plastic, 4°C HNO3
~~RA - [illegible]~~ WG Methane; RSK-175;
3 40 ml vials, HCl, 4°C
RA - ~~[illegible]~~ CO 11002, VOC, SW8200B, 3 40 ml
DO vials, 4°C/HCl
POC, E415.1; 3 40 ml vials
Unpreserved
Sulfur, SW9034, 1-250 ml
Plastic; Zn Acetate, NaOH preserved.
Anions, E300, 1 250 ml plastic
Unpreserved E310.1 Alkalinity
Same bottle
RA - CO18601, WG, PCB Congeners;
2 1L Amber, 4°C
1210 Set up of ADP LL03 S; use new
Rigid tubing. Begin to log YSI
readings (see page 61)
1245 Collect sample ADP LL03 S 102317
RA - CO11101; WG; Metals, SW6010C;
1 500 ml plastic, HNO3/4°C
Methane, RSK-175, 3 40 ml vials, HCl/4°C
MWM

New Bedford Harbor 10/23/17
35BG2000 Mike Morris
Aerovox Microwave Sampling

Time LL03 S	Temp °C	pH	DO mg/L	SpC µS/cm	ORP mV	Flow ml
1200	18.37	6.62	2.71	39,422	-35.6	-
1215	17.94	6.78	6.02	43,476	-39.9	1,000
1220	17.91	6.98	6.48	44,027	-48.2	1,900
1225	17.99	7.13	6.54	44,388	-53.0	2,000
1230	18.05	7.17	6.46	44,444	-55.6	1,700
1235	18.11	7.14	6.37	44,428	-57.2	1,160

NEW BEDFORD HARBOR Date 10/23/17
3TBC2000 MIKE MORRIS
AGLOWOX MILLWELL SAMPLING

RA-C016601; WG, VOCs; SW-8260B,
3 ml VIALS HCl/4°C
DOC, E415.1, 3 40ml VIALS UNPRESERVED
SULFIDE, SW9034, 1 250ml PLASTIC,
ZnACETATE/NaOH/4°C
ANIONS, E300; 1 250ml PLASTIC
UNPRESERVED
ALKALINITY; E310.1; 1 250ml PLASTIC
(SAME CONTAINER AS ABOVE)
RA-C018602; WG; PCB CONGENERS,
2 1L AMBER, 4°C.
1250 TOTAL PURGE OF WELL = 3.5 gal.
WL = 1.89 ft
1315 ARRIVE @ AREA C DOCK
1400 PACK SHIPPING SAMPLES TO TA. BURLINGTON
SAMPLING
1630 LEAVE TO SITE

NEW BEDFORD HARBOR Date 10/24/17
3TBC2000 MIKE MORRIS
AGLOWOX MILLWELL SAMPLING

0600 ATTEND AREA C TAILGATE
WEATHER: CLOUDY, CHANCE OF THUNDERSHOWERS,
RAIN LIKELY, STRONG SE WINDS
HIGH TIDE @ 1138, LOW TIDE @
1706
PERSONNEL: MIKE MORRIS, MARY BETH WRIGHT,
PATRICK LAWLER
TASK: WATER SAMPLING @ AGLOWOX SHOREWALL
EQUIPMENT: YSI, PERISTALTIC PUMP, PHOTON
BOAT, TUBING, GLASSWARE, BLOCKERS
0715 LEAVE AREA C DOCK
0740 ARRIVE @ AGLOWOX SHOREWALL SET UP
01 ADP JJ 03
JJ 03 ~~S~~ D
WD = 2.09 ft
TD = 11.10 ft
JJ 03 ~~D~~ S
WD = 2.19 ft
TD = ~~7.64~~ ft 9.04 ft
DEPTH OF WATER COLUMN
WELL WAS SWITCHED ON 10/11/17.
SWITCHED WELLS PACK TO WIPE
CHAIN HAND OUTGOING MARKS.
0800 ATTEMPTED TO CLEAN SEA MOUNT
MOUNT

NEW BEDFORD HARBOR 10/24/17

35BL2000 MIKE MORRIS

AEROBIC MICROWELL SAMPLING

OUT OF BOTTOM OF JJ-03S.
FEELS LIKE ABOUT 1 ft OF SEDIMENT
ON BOTTOM MEASURED BOTTOM OF
WELL W/ TUBING.

0810 ATTEMPTED TO PUMP W/ TUBING POSITION
1 ft, 2 ft, 3 ft OFF OF BOTTOM
WELL. WELL DRAINED PLENTY
UP MOTHING BUT SEDIMENT. TOOK
WELL IS DRY. CLOSE TO ATTEMPT
TO COLLECT ANY WATER

0825 SET UP ON JJ 03 D. DEEP
WELL IS TALLER THAN SHALLOW WELL
YSI IS READING 9999.99 IN
BOTH SpC (µS/cm) & DO (mg/L)
NOT RECORDING SpC. ONLY RECORDING
DO (%) ON PAGE 65.

0915 COLLECT SAMPLE FOR ADP JJ 03D
CA-C015402, WG, VOCs, SW 8260B,
3 40ml VIALS, HCl / 4°C
DOC, E415.1, 3 40ml VIALS.
UNPRESERVED
SULFIDES SW9034, 1 250ml
PLASTIC, ZnAcetate / NaOH / 4°C
ANIONS, E300, & ALKALINITY E310.1
MWM

NEW BEDFORD HARBOR 10/24/17

35BL2000 MIKE MORRIS

AEROBIC MICROWELL SAMPLING

Time	Temp °C	pH	DO % mg/L	SpC µS/cm	ORP mV	Vol ml
JJ-03D						
0830	18.90	6.56	31.3	—	-91.2	500
0835	18.87	6.45	36.2	—	-99.6	1,400
0840	18.83	6.43	50.2	—	-119.5	1,300
0845	18.87	6.43	48.8	—	-132.5	1,100
0850	18.96	6.44	54.9	—	-143.0	1,000
0855	19.04	6.43	66.2	—	-151.5	1,000
0900	19.08	6.44	69.2	—	-158.5	850
0905	19.14	6.43	70.2	—	-164.0	850

NEW BEDFORD HARBOR 10/20/17

35BU 2000 MIKE MORRIS

ACCOUNT MICROWAVE SAMPLING

1 250 ml PLASTIC, UNPRESERVED

RA-C009902, WG, METALS, SW 6010C, FILTERED, 1 500 ml PLASTIC, HNO3/4°C

METHANE, RSK-175, 3 40 ml VIALS, HCL/4°C

RA-C018701, WG, PCB, CONGENERS, 2 1L AMBER, 4°C

0925 ADP JS-03D, WATER DEPTH: 1.2 ft

PROBABLY WATER ON SIDE OF CASING

0935 PACK UP AND HEAD IN TO ALVA C DOCK. WIND IS PICKING UP, LIGHT RAIN + WHITE CAPS MADE RETURN TRIP INTERESTING

1015 ARRIVE @ ALVA C DOCK. MOVE EQUIPMENT INTO LAB TRAILER

1700 LEAVE THE SITE

NEW BEDFORD HARBOR 10/24/17

35BU 2000 MIKE MORRIS

ACCOUNT MICROWAVE SAMPLING

0600 ARRIVE ON SITE. ATTEND TAILGATE @ ALVA C

WEATHER: RAIN, THUNDERSHOWERS, HIGHS IN THE 60S, LOW IN THE 50S; WIND GUSTING OUT OF THE SOUTH; HIGH TIDE @ 1221, LOW TIDE @ 1750

PERSONNEL MIKE MORRIS, MAY WRIGHT, PATRICK LAWLER

TASK: SAMPLING OF MICROWAVE @ ACCOUNT

EQUIPMENT PORTABLE BOAT, YSI, PERISTALTIC PUMP, TUBING, SAMPLE CONTAINERS, COOLERS

0920 LEAVE ALVA C DOCK

0950 ARRIVE @ LOCATION ADP BB-05

BB05S

WL: 2.27 ft

TD: 15.25 ft

BB05D

WL: 3.34 ft

TD: 20.20 ft

WATER COLUMN: 9.00 ft

1000 BEGIN TO PURGE ADP BB05S

1045 COLLECT SAMPLE FROM ADP BB05S

ADP BB05S 102517; 62-82 ft

MWM

NEW BEDFORD HARBOR 10/25/17

35B6200 MIKE MORRIS

AERONAX MICROWELL SAMPLING

RA-C005701; WG; METALS; SW6010C; 1500ml PLASTIC; HNO3/4°C

METHANE; RSK 175; 3 40ml VIALS; HCL/4°C

RA-C0011201; WG; VOCs; SW8260B; 3 40ml VIALS; HCL/4°C

DOC; E415.1; 3 40ml VIALS; LAPRESERVED; 4°C

SULFIDE; SW9034; 1 250ml PLASTIC; ZNACETATE; NaOH/4°C

ALKALINITY; E310.1; 1 250ml PLASTIC LAPRESERVED + AMBER

E300; 1 250ml PLASTIC LAPRESERVED

RA-C020001; WG; PCB CONGENERS; 2 1L AMBER; 4°C

NEW BEDFORD HARBOR 10/25/17

35B6200 MIKE MORRIS

AERONAX MICROWELL SAMPLING

TIME BB-OSS	TEMP °C	pH	DO mg/L	SpC µS/cm	ORP mV	TURB ntu	FLOW ml
1010	18.71	6.56	0.53	24,414	-80.6	~~40~~ 31.8	
1015	18.61	6.45	1.43	25,824	-112.0	10.7	1,000
1020	18.57	6.45	1.83	28,886	-118.7	~~27.8~~ 9.77	1,200
1025	18.58	6.47	1.95	27,879	—	0.94	1,000
1030	18.69	6.54	2.78	36,206	-130.8	2.47	1,000
1035	18.73	6.60	2.40	37,810	-128.4	0.71	1,200
1040	18.72	6.54	2.32	33,442	-132.2	0.42	1,000

Final WL: 1.89 ft Purge: 3.0 gal

NEW BEDFORD HARBOR 10/25/17

35BC2000 MIKE MORRIS

AERONOX MICROWELL SAMPLING

1100 SETUP AT ADP BB-05D

1145 [illegible] SAMPLE FOR BB-05D

ADP BB-05D 102517; 11.1-13.1 ft

RA-C005702; WG; METALS; SW6010C; 1 500ml PLASTIC, HNO3/4°C

METALLIC; RSK 175, 3 40ml VIALS; HCl/4°C

RA C011202; WG; VOCs; SW8260B; 3 40ml VIALS; HCl/4°C

DOC; E415.1; 3 40ml VIALS UNPRESERVED

SULFIDE, ~~125~~ SW9034; 1 250ml PLASTIC; ZnAcetate, MgOH/4°C

ANIONS; E300; 1 250ml PLASTIC UNPRESERVED

ALKALINITY; E310.1; 1 250ml PLASTIC, UNPRESERVED

RA-C020002; WG; PCBs; CONGENERS; 2 1L AMBERS; 4°C

1200 BACK UP BOTT. HEAD FOR ARA C. VERY WINDY & RAINY

1215 ARRIVE @ ARA C DOC. MOVE EQUIPMENT TO LAB TRAILER

700 LEAVE THE SITE

MWM

NEW BEDFORD HARBOR 10/25/17

35BC2000 MIKE MORRIS

AERONOX MICROWELL SAMPLING

TIME BB-05D	TEMP °C	pH	DO mg/L	SPC mS/cm	ORP mV	TURB NTU	FLOW ml
1105	14.71	6.64	2.19	19.316	-110.5	92.5	-
1100	18.03	6.28	0.23	5.608	-65.5	31.9	1,000
1115	17.94	6.01	0.14	4.702	-41.7	12.9	1,000
1120	17.55	6.06	0.09	4.584	-27.7	0.22	1,000
1125	17.53	6.04	0.06	4.472	-18.7	0.47	1,100
1130	17.80	6.03	0.04	4.416	-11.1	0.42	1,000

WL 2.67 ft Purge 3.0 gal

New Bedford Harbor 10/26/17
35B6200 Mike Morris
Aerovox Microwave Sampling

0600 Arrive on Site. Attend Tailgate & Area C
Weather: Cloudy, possible showers. Lows in 40s; Highs in 60s; winds variable out of South West, High Tide @ 1307, Low Tide @ 1843
Personnel: Mike Morris, May Beth Wright, Patrick Lawler;
Task: Sampling Microwells @ Aerovox Shoreline
Equipment: Pontoon Boat, YSI, Turbidity Meter, Peristaltic Pump, Tubing, Water Level Meter, Coolers, Glassware.
0715 Leave Area C Dock.
0800 Arrive @ Aerovox Shoreline. Set up on ADP DD 05 Cluster
DD 05 S
WL: 2.72 ft
TD 13.64 ft
DD 05 D
WL: 2.15 ft
TD 16.45 ft
Water Column: 8.90 ft
0810 Set up Peristaltic Pump on ADP DD 05 S
MWM

New Bedford Harbor 10/26/17
35D6200 Mike Morris
Aerovox Microwave Sampling

Time	Temp	pH	DO	SpC	ORP	Turb	Flow
DD 05 S	°C		mg/L	mS/cm	mV	ntu	mL
0815	17.46	6.58	0.05	26,689	-281.3	32.5	1,400
0820	17.36	6.53	-0.05	27,403	-310.9	12.2	1,000
0825	17.37	6.52	-0.08	27,917	-326.9	5.93	1,000
0830	17.19	6.51	-0.11	28,427	-334.0	3.48	1,000
0835	17.23	6.51	-0.11	28,498	-335.9	1.81	1,000
0840	17.16	6.51	-0.10	27,909	-337.6	1.47	900

0960 WD - 4.29 ft Purge 2.5 gal

New Bedford Harbor 10/26/17

3586 2000 Mike Mauri

Acloy Microwave Sampling

0820 Notice sheen on water in bucket

0845 Begin collecting GW sample for

ADP. DD 05 S - strong sulfur odor

RA-CO18801; ALPHA; PCBs; Congeners;

2 1L amber, 4°C

RA-CO12301; WG; TA ~~Burlington~~ Savannah;

VOCs: SW8260B, 3 40ml vials,

HCl/4°C

DOC; E415.1, 3 40ml vials,

unpreserved

Sulfide, SW9034 1 250ml plastic,

Zn acetate / NaOH/4°C

Anions: E300 + alkalinity, E310.1;

1 250ml plastic unpreserved

RA-CO06801; WG; TA Burlington;

Metals: SW6010C, 1-500ml plastic,

HNO3/4°C / filtered

Methane; RSK 175, 3 40ml

vials HCl/4°C

Sample: ADP DD 05-S-102617

New Bedford Harbor 10/26/17

3586 2000 Mike Mauri

Acloy Microwave Sampling

Time DD05D	Temp °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb NTU	Flow mL
0915	16.80	6.02	0.16	4,973	-257.4	36.5	900
0920	16.89	5.95	0.04	5,012	-257.9	21.9	1,000
0925	16.89	5.91	0.10	5,032	-257.7	9.12	1,000
0930	16.84	5.88	0.06	5,095	-258.0	5.81	1,000
0935	16.68	5.86	0.04	5,106	-258.9	2.96	900
0940	16.79	5.84	0.04	5,135	-259.0	0.64	1,000

1005 WL: 2.00 ft, 30 gal purge

NEW BEDFORD HARBOR 10/26/17

35BC2000 MIKE MORRIS

ACUNOX MILLWORK SAMPLING

0910 SETUP ON WELL ADP-DD-05D

0945 BEGIN COLLECTING SAMPLES TO

ADP-DD-05D - SLIGHT SHEEN OCCUR

SAMPLE ADP DD 05 D 102617

RA-C018802; WG; ALPHA LABS;

PCBs, CONGENERS, 2 1L AMBERS;

4°C

RA C012302; WG; TA SAVANNAH;

VOCs; SW8260B; 3 40ml VIALS

HCl/4°C

DOC; E415.1; 3 40ml VIALS;

UNPRESERVED

SULFIDE; SW9034; 1 250ml PLASTIC;

ZNACETATE & NaOH/4°C

AMMONIA, E300 + ALKALINITY, E310.1;

1 250ml PLASTIC, UNPRESERVED

RA-C006802; WG; TA BURLINGTON;

METALS; SW6010C, 1 500ml PLASTIC,

HNO3/4°C / FILTERED

METHANE, RSK 175; 3 40ml VIALS,

HCl/4°C

NEW BEDFORD HARBOR 10/26/17

35BC2000 MIKE MORRIS

ACUNOX MILLWORK SAMPLING

TIME FF-085	TEMP	pH	DO	SpC	ORP	TUB	FLOW
~~1015~~ 1020	16.91	6.18	0.11	8,088	-252.2	9.4	1,000
1025	17.4	6.18	0.09	7,951	-271.6	12.2	1,000
1030	17.22	6.16	0.04	8,633	-285.7	67.3	1,000
1035	17.19	6.18	0.00	8,534	-293.8	53.1	1,000
1040	17.19	6.20	0.05	7,210	-304.4	41.6	1,000
1045	17.16	6.21	-0.03	6,108	-309.9	34.7	1,000
1050	17.06	6.21	0.04	5,424	-313.6	40.2	900
1055	16.89	6.19	-0.02	4,961	-317.4	66.7	1,000
1100	16.86	6.21	0.01	4,546	-309.0	59.9	900
1120	WATER DEPTH = 4.80 ft						

New Bedford Harbor 10/20/17
35BU200 Mike Morris
Acmex Microwave Sampling

1001 [illegible] C [illegible] FF-05
FF-05 S
WD 2.74 ft
TD 12.01 ft
FF-05 D
WD 5.02 ft
TD 11.84 ft
Water Level 7.54 ft
1115 Water Turbid, Silver Lake,
Pull 3 gal; Turbidity [illegible]
High. Collect Sample on
ADF FF-05 ~~D~~ S - 102617
RA- CO18803; WG; Alpha Labs.
PCBs; Coolers; 2 1L Ambers;
~~40°C~~ 4°C
RA- CO13501; WG; TA Savannah,
VOCs; SW8260B; 3 40 ml Vials;
HCl/4°C
DOC; E415.1; 3 40 ml Vials,
Unpreserved
Sulfide, SW9034, 1 250 ml Plastic,
Zn Acetate - NaOH/4°C
Alkalinity, E300 + Alkalinity, E310.1;
1 250 ml Plastic, Unpreserved
MWH

New Bedford Harbor 10/20/17
35BU200 Mike Morris
Acmex Microwave Sampling

Time FF-05 D	Temp	pH	DO	SpC	ORP	Turb	Flow
1130	17.04	5.96	0.24	8.531	-104.4	96.4	-
1135	17.27	5.96	0.51	9.509	-91.4	10.3	1,000
1140	17.36	5.95	0.19	8.900	-112.8	7.59	900
1145	17.49	5.95	0.17	8.793	-117.3	5.09	800
1150	17.43	5.95	0.14	8.674	-118.0	2.20	800
1155	17.40	5.95	0.21	8.573	-117.7	1.62	800

1215 Water Depth: 2.61 ft Pump rate: 2.0 gal

NEW BEDFORD HARBOR 10/26/17
3TB62000 MIKE MORRIS
ACROWEX MICROWELL SAMPLING

RA- C008001, WG; TA BURLINGTON
METALS; SW6010C; 1 500ml PLASTIC;
HNO3/4°C/FILTERED
METHANE; RSK 175; 3 40ml VIALS;
HCl/4°C

1130 SET UP ON ADP ~~DP~~ MWR FF-05-D
& BEGIN PURGING WELL, 1 LOAD
BLOBS IN PURGE WATER, CLEANED
UP AFTER 10 MINUTES
1200 COLLECT SAMPLE FROM ADP-FF-05-D
SAMPLE NAME ADP-FF-05-D-102617
RA-C015804; WG; ALPHA LABS; PCBs; CONDENSED
2 1L AMBER, 4°C
RA-C013502, WG, TA-SAVANNAH,
VOCs, SW8260B, 3 40ml VIALS;
HCl/4°C
DOC; E415.1, 3 40ml VIALS;
UNPRESERVED

MWR

NEW BEDFORD HARBOR 10/26/17
3TB62000 MIKE MORRIS
ACROWEX MICROWELL SAMPLING

SULFIDE; SW9034; 1 250ml PLASTIC,
ZnACETATE + NaOH/4°C
ALKALINITY, E300 + ~~Z~~ ACIDITY, E310.1;
1 250ml PLASTIC, UNPRESERVED
RA-C008002, WG, TA BURLINGTON;
METALS, SW6010C, FILTERED; 1 500ml
PLASTIC, HNO3/4°C/FILTERED
METHANE; RSK 175, 3 40ml VIALS,
HCl/4°C
1220 PACK UP GEAR AND HEAD TO AREA C DOCK
1250 ARRIVE @ AREA C DOCK, UNLOAD EQUIPMENT
& STORED IN LAB TRAILER
1800 1 EXIT THIS SITE

New Bedford Harbor 10/27/17
35BG2000 Mike Morris
Alcoa Millwell Sampling

0600 Arrive on site. Attend tailgate @ AEM C
Weather: Sunny, lows in 40s, highs in 60s, light west winds. Low tide @ 0643, high tide @ 1354.
Personnel: Mike Morris, May Beth Wright, Patrick Lawler
Task: Millwell Sampling @ Alcoa Shipping
Equipment: YSI, 2 Peristaltic Pumps, Portion Bolt, Turbine Sampling Unit
0700 Leave AEM C Dock
0710 Arrive @ JJ 07S; Found JJ 07D
Placed 3.5 ft Riser on top;
Refound JJ 07D
0735 Arrive @ ADP JJ-05
JJ-05S
WL: 4.35 ft
TD: 16.73 ft
JJ-05D
WL: 4.90 ft
TD: 21.54 ft
Water Column: 394 ft
0745 Set up on well ADP ~~05~~ JJ 05S
This is an MS/MSD well
MWM

New Bedford Harbor 10/27/17
35BG2000 Mike Morris
Alcoa Millwell Sampling

Time JJ-05S	Temp °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb ntu	Flow mL
0750	14.78	6.66	0.47	10,566	-88.4	—	4,000
0755	14.76	6.62	0.25	10,366	-105.4	27.6	1,300
0800	14.54	6.60	0.09	9,807	-123.2	21.1	1,200
0805	14.36	6.56	0.98	8,440	-125.7	13.0	1,200
0810	14.16	6.50	1.38	7,671	-119.0	7.16	900
0815	14.27	6.47	1.24	7,147	-121.3	5.59	800
0820	14.27	6.46	1.15	6,353	-119.9	5.72	800
0825	14.07	6.45	1.07	6,707	-121.2	3.47	800

0950 Water Depth 9.71 ft Total Purge: 2.0 gal

MGW Bioreactor Harvest 10/27/17

35BL2000 Mike Morris

Acuray Microbial Services

0900 Water is reacting clear but there is a strong, sweet, sharp smell. Upon sparge some gas bubbles in line

0900 Current sample for NOP JJ-055 This is the MS/MSD, NOP JJ-055 10/27/17

RA CO2 10/01, WG, Alpha Class, Pibs, Coliform & IL Algae, 40C

RA Co 15/01, WG, TA Salmonella, VOCs, Semivolatile, 9 40ml vials, HCl/40C

DOC, F. 415.1, 9 40ml vials, Ultrasonics

Sulfide, ~~L250~~ Sw9034, 3 250ml Plastic, ZnAcetate, NaOH/4°C

Nitrate, F.300 + Nitrite F.310.1, 3 250ml Plastic, Ultrasonics

RA CO 10/01, WG, TA Perchlorate, Metals Sweep, 3 250ml Plastic, HNO3, NaOH, Filtered

Mercury, RSK 175, 2 40ml Vials, HCl/4°C

Mum

MGW Bioreactor Harvest 10/27/17

35BL2000 Mike Morris

Acuray Microbial

Time JJ055D	Temperature °C	pH	DO mg/L	Specific Conductivity µS/cm	ORP mV	Turbidity NTU	Flow ml
0900	14.19	6.32	0.03	3,260	-95.4	30.7	1
0905	14.45	6.00	0.03	3,049	-99.9	22.7	1,000
0910	14.49	6.06	0.07	2,984	-93.7	18.5	1,300
0915	14.35	6.05	0.07	3,027	-77.4	18.9	1,100
0920	14.28	6.04	0.06	3,002	-75.6	14.3	900
0925	14.22	6.03	0.07	2,994	-73.6	13.3	800
0930	14.17	6.03	0.04	2,983	-71.9	11.2	900
0935	14.33	6.03	0.07	2,975	-70.5	9.69	900
0940	14.44	6.01	0.05	2,969	-69.9	7.56	800

Total Draw 4.56 L Total Pulse 3.0 Gal

Site Bishop Marina — Date 10/27/17

35 Dr Zone — Mike Morris

Acuaox Microbiotic Sampling

0950 Set up 2nd Peristaltic Pump

Purge MW-JJ 05D

0955 Collect water sample for MW-JJ-05D

Sample ID MW-JJ-05D-102717

RA-CO20102, WC; Alpha Glass;

PCBs, Conforms, 2 1L Ambers;

4°C

RA CO15602, WC; TA Southland;

VOCs, SW8260B; 3 40ml Vials

HCl/4°C

DEC, F.Mist, 3 40ml Vials,

Unpreserved

Silica, SW9034; 1 250ml Poly

2M NaOH/NaOH/4°C

Anions; F 300 & Alkalinity, F310.1;

1 250ml Poly, Unpreserved

RA-CO10102, WC; TA Southburlington;

Metals, SW6020; 1 500ml Poly,

HNO3/4°C - Filtered

Mercury, RSK 175; 3 40ml Vials;

HCl/4°C

1030 Arrive & HH-05 Clean

HH-05S

WD 375µ TD 1265µ

MWH

Site Bishop Marina — Date 10/27/17

35 Dr Zone — Mike Morris

Acuaox Microbiotic Sampling

Time	Transmitter °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb NTU	Flow
HH-05S							
1045	15.40	6.02	-0.81	24,722	-334.2	96.1	—
1050	16.34	6.06	-4.08	26,672	-345.2	113	1,300
1055	14.99	6.91	-1.46	24,918	-340.3	290	600
1100	14.64	6.94	-1.53	29,052	-345.5	7.99	300
1105	14.90	7.07	-1.43	24,955	-349.0	3.07	600
1110	14.49	7.23	-1.24	26,713	-352.3	3.70	400
1115	14.32	7.29	-1.01	29,570	-352.5	1.73	400
1120	14.12	7.27	-0.94	29,112	-351.9	2.46	300
1125	14.04	7.34	-0.82	29,130	-351.1	3.00	400

1305 Water Level: 11.95 ft

Turn Pump Off

NEW BEDFORD HARBOR 10/27/17
35B62000 MIKE MORRIS
ACRONX MICHAEL SAUNDERS

HH-05D
WD 347 ft
TD 18.96 ft
WATER COLUMN = 6.01 ft
1031 SET UP PUMP ON ADP HH-05S
THERE WILL BE A FIELD DUPLICATE AT
THIS LOCATION, WATER STARTING OFF
TURBID W/ A SULFUR ODOR LOTS OF BUBBLES
1130 BEGIN TO COLLECT SAMPLE ADP HH05D 102717
THERE IS A DUPLICATE SAMPLE
RA-C020103 WG; ALPHA LABS;
PCBs; CONGENERS; 2 1L AMBER, 4°C
~~RA C020104; WG, FD; ALPHA LABS~~
~~PCBs, CONGENERS 2 1L AMBERS, 4°C~~
RA C014501; WG; TA SAVANNAH
VOCs; SW8260B, 3 40ml VIALS;
HCl/4°C
DOC, E415.1; 3 40ml VIALS,
UNPRESERVED
SULFIDE, SW9034; 1 250 ml PLASTIC,
ZnAcetate/NaOH/4°C
ANIONS, E300 + ALKALINITY, E310.1,
1 250 ml PLASTIC, UNPRESERVED
MWM

NEW BEDFORD HARBOR 10/27/17
35B62000 MIKE MORRIS
ACRONX

~~RA C014502; FD, WG, TA SAVANNAH~~
~~VOCs, SW8260B; 3 40ml VIALS~~
~~HCl/4°C~~
~~DOC, E415.1, 3 40ml VIALS~~
~~UNPRESERVED~~
~~SULFIDE, SW9034; 1 250ml PLASTIC~~
~~ZnAcetate/NaOH/4°C~~
~~ANIONS, E300 + ALKALINITY, E310.1,~~
~~1 250 ml PLASTIC, UNPRESERVED~~
RA C009001; WG; TA-BURLINGTON
METALS; SW6010C, 1 500 ml PLASTIC,
HNO3/4°C/FILTERED
METHANE, RSK 175 3 40ml VIALS
HCl/4°C
~~RA C009002; WG, FD; TA BURLINGTON~~
~~METALS SW6010C 500 ml PLASTIC~~
~~HNO3/4°C/FILTERED~~
~~METHANE; RSK 175, 3 40ml VIALS~~
~~HCl/4°C~~
1140 BEGIN PURGE OF HH-05D
1215 COLLECT SAMPLE ADP HH-05D 102717
RA-C020104; WG; ALPHA LABS
PCBs; CONGENERS; 2 1L AMBERS
4°C
MWM

NEW BEDFORD HARBOR 10/27/17
35BC2000 MIKE MORRIS
ACCOUNT MICROWELL SAMPLING

RA-C014503, WG, TA SAVANNAH
VOCs, SW8260B, 3 40ml VIALS
HCL/4°C
DOC, E4151, 3 40ml VIALS
UNPRESERVED
SULFIDE, SW9034, 1 250ml PLASTIC,
ZN ACETATE + NAOH/4°C
PHENOLS, E300 + ALKALINITY, E310.6,
1 250 ml PLASTIC, UNPRESERVED
RA-C009003, WG, TA BURLINGTON
METALS, SW6010C, 1 500 ml PLASTIC,
HNO3/4°C/FILTERED
METHANES, RSK-175, 3 40ml VIALS,
HCL/4°C
1300 DUE TO LOW WATER VOLUME WE DECIDED
TO BAG THE DUPLICATE OF ADP-HH-05S
I CROSSED OUT ALL REFERENCES TO:
FIELD DUPLICATES FOR HH-05S FROM THE
LOG BOOK
1315 HEAD BACK TO ARCA C DOCK
1345 ARRIVE @ ARCA C DOCK TAKE EQUIPMENT
TO LAB TRAILER
1630 I EXIT THE SITE

MWM

NEW BEDFORD HARBOR 10/27/17
35BC2000 MIKE MORRIS
AGENCY MICROWELL SAMPLING

TIME HH-05D	TEMPERATURE °C	pH	DO mg/L	SpC mS/cm	ORP mV	Turb ntu	Flow ml
1145	15.56	6.43	-0.04	3.79	-320.6	4.84	—
1150	15.51	6.31	0.00	3.660	-313.0	3.36	1,400
1155	15.36	6.22	0.03	3.601	-307.7	1.70	800
1200	15.47	6.18	-0.10	3.531	-301.2	1.18	1,400
1205	15.41	6.14	-0.13	3.483	-299.0	1.46	1,000
1210	15.33	6.13	-0.12	3.468	-297.6	0.02	800

1235 WATER LEVEL = 2.82 ft TOTAL PURGE = 2.5 gal

[signature]

New Bedford Harbor 10/31/17
35 DO 2000 Mike Morris
Aerovox Microwave Sampling

0800 Arrive on site attend tailgate @ Area C
Weather: Sunny, cool, highs in the 50s, lows in the 30s, moderate winds out of the west. Low tide @ 1126, High tide @ 1731
Personnel - Mike Morris, May Beth Wright, Beth Anderson
Task: Microwave sampling and army shoreline
Equipment: Peristaltic pumps YSI, turbidity meter, turbine glassware, coolers 0°C 2104/NB
0900 Leave Area C dock. Hold to Aerovox
0930 Arrive @ cluster DD 07
DD 07S
WD 5.87 ft
TD 10.0 ft
DD 07D
WD ~~5.97 ft~~ 6.00 ft
TD 22 ft
Water column 6.72 ft
0940 Set up pump on ADF DD 07S. Water is relatively high & high spring
1015 Collect sample ADF DD 07S 10/31/17

MWM

New Bedford Harbor 10/31/17
35 DO 2000 Mike Morris
Aerovox Microwave Sampling

Time DD 07S	Temperature °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb NTU	Flow
0945	15.84	6.47	0.55	5.022	-57.2	11.9	—
0950	15.48	6.34	0.04	5.003	-99.0	2.57	—
0955	15.43	6.29	0.02	4.926	-115.0	1.38	—
1000	15.62	6.24	-0.01	4.312	-116.9	1.61	—
1005	15.47	6.15	0.00	3.879	-110.7	1.73	—
1010	15.33	6.08	0.00	3.740	-104.4	2.40	—

WD. 6.23 ft

1140 Bedford Harbor 10/3/17
35B6200 Mike Mowe
Acuvex Microwave Sampling

RA CO20201, WG, Alpha Labs,
PCBs, 4 Cannons, 2 1L Ambers,
4°C

RA CO07001, WG, TA Burlington
PCBs, SW8082, 2 1L Ambers
4°C

Metals, SW6010C, 1 500ml Plastic,
HNO_3/4°C/Filtered

Methane RSK-175, 3 40ml Vials
HCl/4°C

RA CO12501, WG, TA Savannah
Vol, SW8260B, 3 40ml Vials,
HCl/4°C

DOC, E415.1, 3 40ml Vials,
4°C

Sulfide, SW9034, 1 250ml Plastic
ZnA/NaOH/4°C

Anions, E300 + Alkalinity, E310.1,
1 250ml Plastic, 4°C

1030 Collect Sample ADP DD07-D 10/3/17
YSI Readings Recorded in Beth Andersen
Lot Book. This Sample is an
MS/MSD

MWM

1140 Bedford Harbor 10/3/17
35B6200 Mike Mowe
Acuvex Microwave Sampling

RA CO20202
RA ~~CO12502~~, WG, Alpha Labs
PCBs, 4 Cannons, 4 1L Ambers,
4°C

RA CO~~[illegible]~~07002, WG, TA Burlington,
PCBs, Mollusks, SW8082,
4 2 1L Ambers, 4°C

Metals, SW6010C, 3 500ml Plastic,
HNO_3/4°C/Filtered

Methane RSK-175, 9 40ml Vials,
HCl/4°C

RA CO12502, WG, TA Savannah
Vol, SW8260B, 9 40ml Vials,
HCl/4°C

DOC, E415.1, 9 40ml Vials
4°C

Sulfide, SW9034, 3 250ml Plastic,
ZnA/NaOH/4°C

Anions, E300 + Alkalinity, E310.1,
3 250ml Plastic, 4°C

1145 Final Depth of Deep Well DD07D
WD 6.47 ft

1200 Go to HH07D Put 5 ft Rope
on it

1205 Arrive @ FF 07

MWM

New Bedford Harbor 10/31/17
35DG2000 Mike Morris
Arlene Micklewell Sampling

FF-07S
WD 5.08 ft
TD 1.5 ft
FF-07D
WD 3.98 ft
TD 17.4 ft
1220 Set up at well ADP-FF-07S
Lots of Bubbles, water is really
Dirty
1230 Well goes dry Decide to let recharge
Let vols, PCBs if possible
1245 Collect sample ADP-FF-07S 10/31/17
RA-C020203, WG, Alpha lads
PCB; Low Grams; 2 1L Ambers;
4°C (insufficient volume for 2 Ambers)
RA-C008201, WG, TA Burlington
PCB, Aroclors, SW8082 3 40ml
Vials HCl/4°C
Metals SW6010C, 1 250 500ml
Plastic, HNO3/4°C/Filtered
Metals, RSK-175 3 40ml Vials
HCl/4°C
RA C013701, WG TA Savannah
Vols, SW8260B, 3 40ml Vials
MWH

New Bedford Harbor 10/31/17
35DG2000 Mike Morris
Arlene Micklewell Sampling

Time	Temperature	pH	DO	ORP	SpC	Turb	Flow
FF-07S							
1225	15.26	7.05	-2.54	-26.87	20,043	207	
1230	Well goes dry, will let recharge sample vols, PCBs						

New Bedford Harbor 10/31/17
35B62000 Mike Morris
Acoustic Microwave Sampling

HCl/4°C
DOC; E415.1, 3 40ml Vials,
4°C

~~Sulfide, SW9034; 1 250ml Plastic,~~
~~ZnA/NaOH/4°C~~
~~Anions, E300 + Alkalinity E310.1,~~
~~1 250ml Plastic, 4°C~~

Well loaded by Met Grough Volume to
Collect Sulfide, Anions & Alkalinity
1300 Collect Sample @ ADP-FF-07-D 103117
Flow is slow and some bubble are
present
RA-C020204; WG, Alpha Vass
PCBs, Coalgenics, 1 1L Amber (Met
Grough Volume for 2 Ambers),
4°C

RA-~~C007002~~ C008202; TA Burlington
PCBs, Aroclors; SW8082, 2 1L Ambers,
4°C

Metals, SW6010C; 1 500ml Plastic,
HNO_3/4°C/Filtered
Methane, RSK 175, 3 40ml Vials,
HCl/4°C

MWM

New Bedford Harbor 10/31/17
35B62000 Mike Morris
Acoustic Microwave Sampling

RA C013702; WG, TA Sanitary
VOCs, SW8260B, 3 40ml Vials,
HCl/4°C
DOC, E415.1, 3 40ml Vials,
4°C

Sulfide, SW9034 1 250ml Plastic,
ZnA & NaOH/4°C
Anions, E300 + Alkalinity, E310.1,
1 250ml Plastic, 4°C
1400 Winds Gets very strong out of Southwest
We pick up spuds. Had to Alca C
Dock.
1430 Arrive @ Alca C Dock, unload equipment
& transport it to lab trailer.
1700 I exit the site

Location Aerotex Date 10/31/19 7

Project / Client USACE Pg 1 of 3

Equip Cal. by others –

DD-07. Deep 100ml/min

Time	mg/l DO	pH	ORP	µS/cm² Cond.	Turb.	°C Temp
10⁰⁰	0.29	5.91	52.2	4437	3.80	15.19
10⁰⁵	0.07	5.90	43.5	4463	2.23	15.29
10¹⁰	0.08	5.90	40.2	4483	2.59	15.25
10¹⁵	0.12	5.90	35.2	4289	3.01	15.30
10²⁰	0.04	5.90	35.4	4190	1.62	15.44
10²⁵	0.09	5.89	31.4	4145	1.80	15.55
10³⁰	.08	5.88	30.4	4095	1.75	15.45

Sample @ 10³⁰ – 12⁰⁰

pump lite MS / MSD + well

Sample @ 100ml/min –

* Tubing –
Gloves
1 Item / location
Site of
In Mains
OM, WM, Ht.
Per loop by Hand for
remove location –

Rite in the Rain

Location Aerovox - NBH Date 10/31/17

Project / Client USACE

FF-07 - Deep - pump - 100ml/min

Time	Temp	pH	ORP	mg/L DO	uS/cm³ Cond.	Turb.
12:23	16.15	6.60	44.5	0.63	10397	39.3
12:30	16.07	6.64	19.2	0.60	12118	16.2
12:35	16.15	6.56	-16.5	0.80	14224	7.64
12:40	16.20	6.49	-22.1	0.66	14738	5.20
12:45	16.18	6.42	-26.6	.63	15246	3.31
12:50	16.10	6.30	-26.8	.67	15223	2.75
12:55	16.18	6.25	-35.8	.45	15054	5.74 *
1:00	16.23	6.21	-32.7	.65	14586	4.61
1:05	16.18	6.20	-30.1	0.70	14378	3.23
1:10	16.23	6.15	-27.4	.65	14140	3.85
1:15	16.24	6.13	-25.9	.61	13981	
1:20	16.21	6.10	-24.3	.57	13659	
1:25	16.24	6.07	-23.6	.42	13367	
	16.22	6.04	-25.1	.28	13122	
	16.28	6.02	-27.5	.17	12462	
	16.24	6.00	-28.7	0.10	12304	

* moved boat - was pushed away - moved tubing out of screen

Location Aerovox NBH Date pg 3 of 3

Project / Client USACE

16.16 5.99 -27.5 0.15 11764

collected sample @ 145.

- Samples split Alpha. TA Bal. TA Sava.
- Package/ship by others.
- COC by others

[signature] 10/31/17

[illegible] completed

NEW BEDFORD HARBOR 11/1/17

35BC2000 MIKE MORRIS

ACROSS MICROWELL SAMPLING

Clear Arrive on site. Attach [illegible] @ [illegible]

Weather: Mostly cloudy, cool. Highs in 50s

Lows in the 30s. Winds picking up in

Afternoon from the [illegible].

High Tide @ 0[illegible]; Low Tide @ 1159

Personnel: Mike Morris, Mary Beth Wright

Task: Microwell Sampling @ Across Shoreline.

Equipment: YSI, Peristaltic Pump, Water level

Meter, Turbine Glassware, Coolers,

Pontoon Boat.

0715 Leave [illegible] Dock

0740 Arrive @ HH-07

HH-07S

WD 3.02 ft

TD: 16.58 ft

HH 07D

WD: 4.18 ft

TD: 21.58 ft

Water Column: 8.75 ft

0745 Set up all ADP DD 07S - A bit of

[illegible] Sludge at [illegible]. Get bubbles

in MDD [illegible] data collection. Well

Dries up, let well sit for a few

minutes

→ [illegible]

NEW BEDFORD HARBOR 11/1/17

35BC2000 MIKE MORRIS

ACROSS MICROWELL SAMPLING

TIME HH-07S	TEMPERATURE °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb ntu	Flow ml/min
0755	14.67	6.01	0.34	13,164	77.3	-	-
0800	14.76	6.03	0.24	13,658	61.4	115	300
0805	15.07	6.05	-0.14	12,851	-1.5	64.4	200
0810	14.42	6.05	-0.08	13,118	-2.8	36.7	
0815	~~14.42~~ 12.12	~~6.05~~ 6.31	~~-0.08~~ -12.2	~~[illegible]~~ 13,145	~~-2.8~~ -12.2	10.4	50

0820 Well Going Dry. Will Let it set; Fill Bottles After Recharge

Total Purge: 2.0 gal

WL: 16.18 ft

New Bedford Harbor 11/1/17
35B62000 Mike Morris
Acrony Microwave Sampling

0830 Collect water sample for
ADP HH-07-S 110117
RA W20501, WG, ALPHA LABS
PCBs; Congeners, 2 1L Amber
4°C
RA C009201, WG, TA-Burlington
PCBs; Aroclors SW8082;
2 1L Ambers; 4°C
Metals, SW6010C; 1500 ml Plastic,
HNO3/4°C/Filtered
Methane, RSK-175; 3 40 ml Vials,
HCl/4°C
RA-C014701, WG, TA Savannah
VOC, SW8260B; 3 40 ml Vials
HCl/4°C
DOC: E415.1; 3 40 ml Vials,
4°C
Sulfide, SW9030; 1250 ml Plastic
ZnA/NaOH/4°C
Anions E300 + Alkalinity - E310.1,
1250 ml Plastic, 4°C
0835 Set up on ADP HH-07D 110117
Water is Fairly Clear, but Start of
Breakthrough

Mon

New Bedford Harbor 11/1/17
35B62000 Mike Morris
Acrony Microwave Sampling

Time HH-07D	Temperature °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb NTU	Flow ml/min
0840	11.48	6.38	0.80	12,683	-77	124	450
0845	14.09	5.92	-0.28	3,256	-602	371	220
0850	14.00	5.90	-0.01	3,280	-626	4.33	240
0855	14.44	5.89	0.00	3,291	-650	3.12	250
0900	14.55	5.89	-0.02	2,596	-672	1.31	240
0905	14.35	5.88	-0.04	3,269	-678	5.84	250
0910	14.46	5.87	-0.03	3,335	-691	4.02	

WL: 5.82 ft

Purge 3.0 gal

New Bedford Harbor 11/1/17
35BC200 Mike Morris
Agwax Microwave Sampler

0915 Collect water sample ADP HH-07D 110-17
WQC collect a field duplicate at
this location

RA-C020502, WG; Alpha Labs
PCBs/Dioxins, 2 1L Amber
4°C

RA C009202, WG, TA Burlington
PCBs, Aroclors, SW8082, 2 1L Amber
4°C

Metals SW6010C, 1 500ml Plastic
HNO_3/4°C/Filtered

Methane, RSK-175, 3 40ml Vials
HCl/4°C

RA C014702, WG TA Savannah
VOCs, SW8260B 3 40ml Vials
HCl/4°C

DOC, E415.1, 3 40ml Vials
4°C

Sulfide, SW9034, 1 250ml Plastic
ZnA/NaOH/4°C

Anions E300 + Alkalinity E310.1
1 250ml Plastic, 4°C

RA-C020503, WG Alpha Labs
PCBs, Dioxins 2 1L Amber, 4°C

MWM

New Bedford Harbor 11/1/17
35BC200 Mike Morris
Agwax Microwave Sampler

RA C009203, WG, TA Burlington
PCBs, Aroclors, SW8082, 2 1L Amber
4°C

Metals, SW6010C, 1 500ml Plastic
HNO_3/4°C/Filtered

Methane, RSK-175 3 40ml Vials
HCl/4°C

RA C014703, WG, TA Savannah
VOCs, SW8260B, 3 40ml Vials
HCl/4°C

DOC, E415.1, 3 40ml Vials
4°C

Sulfide, SW9034, 1 250ml Plastic
ZnA/NaOH/4°C

Anions E300 + Alkalinity E310.1
1 250ml Plastic, 4°C

1020 Set up on JJ-07
JJ07-5
WD 6.51 ft
TD 16.81 ft
JJ07D
WD 3.87 ft
TD 13.50 ft
Water Column = 7.19 ft

MWM

NEW BEDFORD HARBOR 11/1/17
35BE2000 MIKE MORRIS
ACCURACY MICROWELL SAMPLING

1030 SET UP ON WELL JJ-075 WATER [illegible]
DISTRICT SULFUR ODOR BUBBLE SIM
AFTER A FEW MINUTES
1100 COLLECT SAMPLE ADP JJ 075 110117
RA-C020504, WG; ALPHA [illegible]
PCBs, CONGENERS, 2 1L AMBERS,
4°C
RA-C010301, WG, TA BURLINGTON
PCBs, PROCLORS SW8082,
2 1L AMBERS, 4°C
METALS SW6010C, 1 500 ml PLASTIC
HNO3/4°C
METALS; REX-175, 3 40ml VIALS,
HCl/4°C
RA-C015301, WG; TA SAVANNAH
VOCs, SW8260B; 3 40ml VIALS,
HCl/4°C
DOC E415.1; 3 40ml VIALS;
4°C
SULFIDE SW9034, 1 250 ml PLASTIC,
ZnA/NaOH/4°C
ALKALINITY E 300 + ALKALINITY E 310.1,
1 250 ml PLASTIC, 4°C

MWM

NEW BEDFORD HARBOR 11/1/17
35BE2000 MIKE MORRIS
ACCURACY MICROWELL SAMPLING

TIME JJ 075	TEMPERATURE °C	pH	DO mg/L	SpC µS/cm	ORP mV	TURB ntu	FLOW ml/min
1035	1580	6.53	0.89	19,488	-43.3	93.9	300
1040	1607	6.41	0.46	26,167	-81.3	35.4	150
1045	1563	6.56	2.46	26,074	-74.4	8.07	150

WELL DRIED UP START DUMP TO ACCURACY COLLECT SAMPLE

WD 11.67 M

PLACE 1.5 gal

NEW BEDFORD NAVAL 11/1/17
35B62000 MIKE MORRIS
ASHWOOD MICROWELL SAMPLING

1130 ATTACHED TO DUMMY JJ 07D, STOW UP ON BOTTOM. REMOVED 1 ft OF SEDIMENT LOOKED NOT CLEAR SCREEN
1225 ARRIVED @ CLUSTER BB 07
BB 07S
WD 3.97 ft
TD 17.71 ft
BB 07D
WD 4.58 ft
TD 23.8 ft
WATER COLUMN: 6.65 ft
1230 SET UP OF BB-07S. WATER FAIRLY LIGHT, NO SMELL, NO BUBBLES
1315 COLLECT WATER FOR ADP BB07S 110117
RA CO20505, WG, ALPHA LABS
PCBs, LINGTHOLS 2 1L AMBER, 4°C
RA CO05901, WG, TA BURLINGTON
PCBs, AROCLORS SW8082, 2 1L AMBER, 4°C
METALS SW6010C, 1 500 mL PLASTIC, HNO3 / 4°C / FILTERED
METHANE RSK 175, 3 40 mL VIALS, HCl / 4°C

MWM

NEW BEDFORD NAVAL 11/1/17
35B62000 MIKE MORRIS
ASHWOOD MICROWELL SAMPLING

TIME BB07S	TEMPERATURE °C	pH	DO mg/L	SpC µS/cm	ORP mV	TURB NTU	FLOW ml/min
1240	16.02	6.33	0.55	20,036	-41.6	9.93	250
1245	16.05	6.44	0.49	21,560	-39.6	7.26	250
1250	16.00	6.43	0.43	22,536	-46.3	7.10	250
1255	16.05	6.42	0.41	22,463	-58.7	4.80	250
1300	16.06	6.40	0.40	23,571	-65.2	4.41	250
1305	16.07	6.37	0.35	23,122	-73.2	3.31	250
1310	16.00	6.35	0.22	23,274	-79.9	4.09	250

1355 WD 4.61 ft TOTAL PURGE: 3.5 gal

New Bedford Harbor 11/1/17
35BG2000 Mike Mims
Aqua Microbial Sampling

RA C011401; WG, TA Savannah
VOCs SW8260B, 3 40ml Vials,
HCl/4°C
DOC, E415, 3 40ml Vials;
4°C
Sulfide, SW9034, 1 250ml Plastic;
ZnA/NaOH/4°C
Anions E300 + Alkalinity E310.1;
1 250ml Plastic, 4°C
This is a Field Duplicate
RA-C020506, WG, Alpha Labs,
PCBs, Congeners, 2 1L Ambers,
4°C
RA-C005902; WG, TA Burlington;
PCBs, Aroclors; SW8082; 2 1L Ambers,
4°C
Metals, SW6010C; 1 500ml Plastic,
HNO3/4°C/Filtered
Methane, RSK-175, 3 40ml Vials;
HCl/4°C
RA C011402; WG, TA Savannah
VOCs, SW8260B; 3 40ml Vials;
HCl/4°C
DOC, E415, 3 40ml Vials, 4°C
None

New Bedford Harbor 11/1/17
35BG2000 Mike Mims
Aqua Microbial Sampling

Sulfide, SW9034; 1 250ml Plastic;
ZnA/NaOH/4°C
Anions E300 + Alkalinity E310.1;
1 250ml Plastic, 4°C
1340 Set up on BB07D, Water Clear;
Not Smelly, Good Production
1415 Collect Water Sample. ADP BB07D-110117
RA-C020507; WG, Alpha Labs,
PCBs, Congeners, 2 1L Ambers,
4°C
RA-C005903; WG, TA Burlington,
PCBs, Aroclors, SW8082; 2 1L Ambers,
4°C
Metals SW6010C; 1 500ml Plastic,
HNO3/4°C/Filtered
Methane, RSK-175, 3 40ml Vials
HCl/4°C
RA-C011403; WG, TA Savannah
VOCs; SW8260B; 3 40ml Vials
HCl/4°C
DOC; E415.1, 3 40ml Vials
4°C
Sulfide, SW9034, 1 250ml Plastic
ZnA/NaOH/4°C

NEW BEDFORD HARBOR 11/1/17
35BG2000 MIKE MORRIS
NEWBOY MICROWELL SAMPLING

ASTONS E 300 + ALKALINITY E 310.1
1 250 ml PUBLIC, 4°C
1525 ARRIVE @ GG-06S
WD = 5.23 ft
TD = 17.14 ft
WATER COLUMN: 7.76 ft
1530 SET UP ON ADP-GG-06S 50 ml IRON
GLOBULES IN WATER THAT CLOUD
UP AFTER A WHILE; GOOD FLOW.
GOOD PRODUCING WELL
1615 COLLECT WATER SAMPLE FOR ADP-GG-06S 11017
RA-CO20508; WG, ALPHA LABS;
PCBs, CONGENERS 2 1L AMBERS;
4°C
RA CO08601; WG; ~~ALPHA LABS, TA~~ TA BURLINGTON
PCBs, AROCLOR SW8082;
2 1L AMBERS 4°C
METALS SW6010C, 1 500 ml PLASTIC;
HNO3/4°C/FILTERED
METHANE; RSK 175, 3 40 ml VIALS.
HCl/4°C
RA-CO14101; WG, TA; SAVANNAH
VOCs, SW8260B, 3 40 ml VIALS.
HCl/4°C
MWM

NEW BEDFORD HARBOR 11/1/17
35BG2000 MIKE MORRIS
NEWBOY MICROWELL SAMPLING

TIME BB07D	TEMPERATURE °C	pH	DO mg/L	Sp C µS/cm	ORP mV	TURB ntu	FLOW ml/min
1345	15.21	6.31	-0.95	6,159	-70.7	4.0	500
1350	15.19	6.10	0.04	5,430	-54.1	4.20	400
1355	15.17	6.06	0.04	5,367	-44.9	4.74	250
1400	15.16	6.05	0.05	5,328	-39.8	3.13	250
1405	15.13	6.03	0.09	5,296	-34.7	8.57	250
1410	15.13	6.02	0.05	5,264	-30.7	1.03	250

1435 WATER DEPTH: 4.12 ft TOTAL PURGE: 2.5 gal

NEW BEDFORD HARBOR 11/1/17

35B62000 MIKE MORRIS

ACROWN MICHELLE SAMPLE

DOC; E415.1; 3 40ml ~~[illegible]~~ VIALS, 4°C

SULFIDE; SW9034, 1 250 ml PLASTIC, ZnA/NaOH 4°C

AMMONIA E 300.1 ALKALINITY E 310.1 1 250 ml PLASTIC, 4°C

1630 EXIT THE ACROWN AREA

1700 ARRIVE @ AREA C DOCK. TRANSPORT ALL COOLERS EQUIPMENT TO LAB TRAILER.

1900 I EXIT THE SITE

NEW BEDFORD HARBOR 11/1/17

35B62000 MIKE MORRIS

ACROWN MICHELLE SAMPLE

Time	Temperature	pH	DO	SpC	ORP	Turbs	Flow
00:00	°C		mg/L	µS/cm	mV	ntu	ml/min
1535	16.56	5.64	-0.24	4,945	29.1	4.31	250
1540	16.52	5.59	0.07	4,730	33.5	10.1	250
1545	16.63	5.58	0.06	4,654	35.4	25.0	250
1550	16.64	5.57	0.05	4,597	36.7	24.2	250
1555	16.55	5.56	0.05	4,536	34.1	21.6	250
1600	16.54	5.55	0.04	4,503	39.1	17.7	250
1605	16.63	5.55	0.04	4,496	40.0	3.88	250
1610	16.62	5.56	0.04	4,498	40.5	4.43	250
1615	16.60	5.54	0.04	4,503	41.0	3.84	250

WATER DEPTH 416 µ TOTAL PUMP 3 cycle

New Bedford Harbor 11/2/17

3SB6200 Mike Morris

Aeronex Microcline Sampling

0600 Arrive on site. Attend Tailgate @ Area C

Weather: Partly Cloudy, warmer than yesterday

Lows in the 50s, Highs in the 60s.

Moderate winds out of the South

High Tide @ 0648, Low Tide @ 1244

Personnel: Mike Morris, May Beth Wright

Task: Sampling of Microcline @ Aeronex Shoreline

Equipment: YSIs, Turbidity Meter, Pontoon Boat,

Water Level Meter, Glassware, Turbine YSI 0100706

0705 Leave Area C Dock

0731 Arrive @ FF-09 Cluster

FF-09S

WD: 2.58 ft

TD 16.84 ft

FF-09D

WD = 2.23 ft

TD. 22.29 ft

Water Column = 10.19 ft

0740 Set up all with App FF-09S

Water is fairly clear; odorless

Seems to be struggling to get much

flow, flow meter passed the

entire purge

MWM

New Bedford Harbor 11/2/17

3SB6200 Mike Morris

Aeronex Microcline Sampling

Time ~~Compliance~~ FF-09S	Temperature	pH	DO	SpC	ORP	Turb	Flow
0755	16.24	6.48	-2.53	5,488	-141.0	86.2	100
0800	16.19	6.64	-3.71	7,066	-236.7	22.1	100
0805	16.29	6.65	-3.49	7,855	-293.3	10.2	150
0810	16.47	6.65	-3.98	10,232	-341.2	3.04	150
0815	16.56	6.64	-4.51	10,884	-357.7	1.21	150
0820	16.72	6.64	-5.32	12,002	-363.7	1.59	150
0825	16.73	6.63	-5.91	12,977	-370.2	1.04	150
0830	16.74	6.63	-6.36	13,015	-374.1	0.29	150
0835	16.80	6.64	-6.75	12,991	-378.4	0.02	150

1010 Water Depth 4.88 ft Total Purge 1.5 gal

[signature]

New Bedford Harbor 11/2/17

35BC2000 Mike Morris

Aquatic Microwave Sampling

0830 Collect water sample for ADP FF-09S 110217

RA-C020601, WG, ALPHA LABS

PCBs; Congeners; 2 1L Amber

4°C

RA-C003301, WG; TA Burlington

PCBs; Aroclor, SW8082, 2 1L Amber,

4°C

Metals; SW6010C, 1 500 ml Plastic,

HNO3/4°C/Filtered

Methane; RSC-175, 3 40 ml Vials,

HCl/4°C

RA-C013801; WG; TA Savannah

VOCs; SW8260B, 3 40 ml Vials,

HCl/4°C

DOC; E415.1, 3 40 ml Vials,

4°C

Sulfide; SW9034, 1 250 ml Plastic,

ZnA/NaOH/4°C

Anions - E300 + Alkalinity - E310.1,

1 250 ml Plastic; 4°C

0855 Set up on FF-09D Begin Purge.

Water is v. in clear; odorless;

Good flow, no bubbles

MWM

New Bedford Harbor 11/2/17

35BC2000 Mike Morris

Aquatic Microwave Sampling

Time FF-09D	Temperature °C	pH	DO mg/L	SpC µS/cm	ORP mV	Turb ntu	Flow ml/min
0900	15.52	6.18	-0.27	2,138	-323.4	5.90	450
0905	15.55	6.04	-0.14	2,130	-322.0	1.57	250
0910	15.59	6.02	-0.17	2,129	-320.4	0.06	250
0915	15.59	5.98	-0.13	2,130	-322.0	0.06	250
0920	15.63	5.97	-0.12	2,131	-319.6	0.02	250
0925	15.66	5.95	-0.10	2,129	-319.7	0.02	

Water Purge 4.12 µ Total Purge: 30 gal

[signature]

NEW BEDFORD HARBOR 11/2/17
35 BG 2000 MIKE MORRIS
ALLOY MICROWELL SAMPLING

0930 COLLECT WATER SAMPLE NDP-FF-09D 110217
RA-CO20602, WG, ALPHA LABS
PCBs, CONGENERS, 2 1L AMBERS
4°C
RA-CO08302, WG, TA BURLINGTON
PCBs, AROCLORS, SW8082, 2 1L AMBERS
4°C
METALS/SW6010C, 1 500 ml PLASTIC
HNO_3/4°C/FILTERED
METHANE, RSK-175, 3 40 ml VIALS
4°C
RA-CO13802, WG, TA SAVANNAH
VOCs, SW8260B, 3 40 ml VIALS
HCl/4°C
DOC, E415.1, 3 40 ml VIALS
4°C
SULFIDE, SW9034, 1 250 ml PLASTIC
ZnA/NaOH/4°C
ANIONS E300 + ALKALINITY E310.1
1 250 ml PLASTIC, 4°C
WILL COLLECT A FIELD DUPLICATE ON THIS WELL
RA-CO20603, WG, ALPHA LABS
PCBs, CONGENERS, 2 1L AMBERS
4°C
MWM

NEW BEDFORD HARBOR 11/2/17
35 BG 2000 MIKE MORRIS
ALLOY MICROWELL SAMPLING

RA-CO08303, WG, TA BURLINGTON
PCBs, AROCLORS, SW8082, 2 1L AMBERS
4°C
METALS, SW6010C, 1 500 ml PLASTIC
HNO_3/4°C/FILTERED
METHANE, RSK-175, 3 40 ml VIALS
4°C
RA-CO13803, WG, TA SAVANNAH
VOCs, SW8260B, 3 40 ml VIALS
HCl/4°C
DOC, E415.1, 3 40 ml VIALS
4°C
SULFIDE, SW9034, 1 250 ml PLASTIC
ZnA/NaOH/4°C
ANIONS E300 + ALKALINITY E310.1
1 250 ml PLASTIC, 4°C
1020 MOVE BOX, SET UP ON DD-09
DD-09S
WD 3.03 ft
TD 16.43 ft
DD-09D
WD 4.01 ft
TD 22.40 ft
WATER LEVEL 7.21 ft
MWM

NEW BEDFORD HARBOR 11/2/17
35BC2000 MIKE MORRIS
AEROVOX MICROWELL SAMPLING

1115 COLLECT WATER SAMPLE ADP DD 095 11 OCT
RA CW 20004, WG: ALPHA LABS
PCBs, COLCENERS; 2 1L AMBER
4°C

RA - CW 7201, TA BURLINGTON,
PCBs, AROCLORS, SW8082;
2 1L AMBERS 4°C

METALS, SW6010C; 1 500 ml PLASTIC
HNO3/4°C/FILTERED

METHANE; RSK 175; 3 40ml VIALS;
HCl/4°C

RA CW 12701; WG. TA SAVANNAH
VOCs; SW8260B; 3 40ml VIALS;
HCl/4°C

DOC; E415.1; 3 40ml VIALS;
4°C

SULFIDE, SW9034; 1 250 ml PLASTIC;
ZnA/NaOH/4°C

ANIONS E300 + ALKALINITY E 3 0 1
1 250 ml PLASTIC; 4°C

1120 SET UP OF FF-09D; BEGIN PURGING
WATER IS LIGHT; NO ODOR; GOOD
FLOW

MWM

NEW BEDFORD HARBOR 11/2/17
35BC2000 MIKE MORRIS
AEROVOX MICROWELL SAMPLING

TIME DD OKS	TEMPERATURE °C	pH	DO mg/L	SpC µS/cm	ORP mV	TURB ntu	FLOW ml/min
1030	16.92	6.93	-2.88	7,619	-288.3	14.2	200
1035	17.02	6.87	-1.78	7,852	-333.4	10.2	200
1040	16.91	6.79	-2.20	8,465	-355.4	8.71	200
1045	16.92	6.77	-2.30	8,776	-362.0	6.80	200
1050	17.17	6.74	-2.99	8,876	-368.3	4.47	200
1055	17.23	6.73	-3.36	9,071	-376.6	1.35	

1100 WELL GOES DRY WAIT A FEW MINUTES FOR RECHARGE THEN
SAMPLE
WATER DEPTH 9.91 ft TOTAL PURGED 1.5 gal

[signature]

NEW BEDFORD HARBOR 11/2/17

35 BC 200 MIKE MORRIS

ACCOVAX MICROWAVE SAMPLE

1200 COLLECT WATER SAMPLE FOR ADP-DD 090 110117

RA CO20603, WC, ALPHA LABS —

4°C, PLB, CONTAINS, 2 1L AMBER —

RA CO12702, WC, TN BRUNSWICK —

PCBs, ARCLORS, SW8082; —

2 1L AMBER; 4°C —

METALS, SW6010C; 1 250 ml PLASTIC; —

HNO3/4°C/FILTERED —

MATRIX, RSK-175; 3 40 ml VIALS —

4°C

RA CO12702, WC, TN SAVANNAH —

VOCs, SW8260B; 3 40 ml VIALS —

HCl/4°C

DOC, SM5310; 3 40 ml VIALS —

4°C

SULFIDE, SM4500; 1 250 ml PLASTIC —

ZnAc/NaOH/4°C

AMMONIA - EPA + ALKALINITY - E 310.1, —

1 250 ml PLASTIC; 4°C

1230 LEAVE ACCOVAX STAGING CO INTO MIC DOCK

1315 ARRIVE @ MIC DOCK UNLOAD EQUIPMENT; —

TAKE TO LAB TRAILER

1330 START THE SYSTEM

NEW BEDFORD HARBOR 11/2/17

35 BC 200 MIKE MORRIS

ACCOVAX MICROWAVE SAMPLE

TIME DD-090	TEMPERATURE °C	pH	DO mg/L	SPC mS/cm	ORP mV	TURB NTU	FLOW ml/min
1125	16.41	7.30	1.55	41,114	-264.4	0.39	300
1130	16.42	7.25	1.74	40,274	-260.0	1.19	300
1135	16.47	7.21	1.68	39,994	-255.6	0.45	200
1140	16.50	7.13	1.66	39,469	-252.6	0.51	200
1145	16.63	7.05	1.59	37,743	-249.4	0.34	250
1150	16.74	7.03	1.57	39,052	-240.0	0.27	250
1155	16.79	6.97	1.54	37,566	-232.0	0.15	250

1225 WATER DISCH = 4.37 µg/L — TOTAL DURATION = 4.0 hrs

Appendix D

Ice Scour Report

DRAFT

New Bedford Harbor Superfund Site Ice Investigation

Andrew M. Tuthill, P.E.
5Algonquin Trail
Etna, NH 03750

April 12, 2017

1. Introduction

Andrew Tuthill, PE was contracted by Jacobs Field Services to assist USACE and USEPA in analyzing ice conditions on the Upper Harbor of New Bedford Harbor as part of remedial design efforts for cleanup of the site. The specific goal of the ice study was to determine the potential effect of ice on engineered sediment covers and caps.

The study began with collection of information on local ice processes and past events. Important parameters included dates of observed ice formation on the harbor, maximum ice thickness, as well as ice type, extent and duration. General information on ice processes on estuaries and tidal wetlands was reviewed and relevance to the New Bedford site assessed. Shoreline features in Upper New Bedford Harbor were inspected for any evidence of past ice action.

The study included three field visits to meet with team members, gather project information and observe conditions in the field. In addition, newspaper archives at the New Bedford Library were researched for any ice information. A final trip to New Bedford is planned to present findings to team members at a Cleanup Strategy Meeting.

Long term hydro-meteorological data for New Bedford were collected and analyzed including daily air temperatures, winds, and tides in an effort to identify relationships to ice processes in the harbor. The historical and hydro-met data were also used to estimate the frequency and severity of past ice events and the probability of significant ice forming during any given winter. For the purposes of this study, “significant ice” is defined as an event where most of the upper harbor is ice-covered and the potential exists for the ice to interact with bed material and shorelines.

From the above data collection and analysis, potential types and ice action on project features were identified. These include ice scour from direct impact of ice floes and displacement of sediments and peat clumps due to ice adhesion and lifting during tide cycles. The possibility of anchor ice and ice formed from snow slush were also assessed. From this investigation of ice processes, conclusions were drafted on the potential role ice on the remediation measures underway and planned for the Upper New Bedford Harbor.

2. New Bedford Upper Harbor Characteristics and the Superfund Project

New Bedford, a once-famous whaling port and manufacturing center, remains an important commercial fishing port. New Bedford Harbor, which lies on the western side of a small estuary connecting the Acushnet River with Buzzards Bay, consists of upper, lower and outer harbors (Figures 1&2). The focus of this investigation is the upper harbor with an area of 187 acres and mean low water depths generally less than 16 ft and, in most areas, less than 3 ft. (Figures 3 &4).

The 62-ft wide Coggeshall Bridge and causeway separates the upper and lower harbors. The lower harbor, with an area or 750 acres, serves as New Bedford's commercial port and home for its fishing fleet. A 3.5-mile long hurricane barrier with a 150-ft-wide closable entrance protects the lower harbor from wave action and storm surges. Beyond that, the outer harbor extends another 10 miles or so into Buzzards Bay.

Wind, waves, tides and currents are important factors in the formation and breakup ice covers in New Bedford Harbor and estuaries in general. In the spring, fall, and summer, prevailing south to southwesterly winds can produce waves as high as 6.5 ft in the outer harbor (ERDC, 2014). Due to the damping effect of the hurricane barrier, causeways and bridges, maximum wave height in the lower and upper harbors decreases to 2 - 3 ft. Figures 5 and 6 show fastest daily 2-minute winds for New Bedford from 1998 to present. The strongest winds are fairly well distributed in terms of direction for both the open water and winter seasons. Each dot in the figures represents a fastest daily 2-minute wind for the 26-year-long period of record. Distance from the origin represents magnitude and the positive y-axis true north. In winter, the strongest winds are commonly from the west to northwest in addition to extreme northeast winds from "northeaster" storms (Figure 5). Wind-driven waves are thought to be the main causes of bed sediment movement in shallow portions of the estuary (ERDC, 2014).

The average tide range in the outer harbor is 4.65' increasing to 5.05' during spring tides. Inside the hurricane barrier, the tide range decreases to 3.7' and 4.6' for average and spring tides respectively (ERDC, 2014). The tide range is slightly less in the upper harbor due to the damping effect of the Coggeshall Bridge constriction.

Current velocities in the harbor are generally low. In the lower harbor water velocities are usually less than about 0.66 ft/s. In the upper harbor, average currents are about 0.5 ft/s, and typically less than about of about 1 ft/s with stronger currents during the flood tide than the ebb. Higher velocities occur as result of jet flow through the hurricane barrier opening where velocities can reach 3.9 ft/s and the Coggeshall Bridge where currents as high as 5.9 ft/s are possible. These faster flows through the openings produce eddies that dominate flow patterns in the upper and lower harbors (ERDC, 2014).

In addition to tides and winds, freshwater inflows, salinity and degree of mixing are important factors in ice formation on estuaries. While freshwater freezes at 32°F, average seawater with a

salinity of ~36 ppt freezes at about 28 °F, with the freezing point decreasing inversely with salinity and density increasing with salinity. In estuaries with a large proportion of freshwater inflow and low degree of tidal mixing, the less saline surface water will freeze at a higher water temperature than would occur in a better mixed more tidally influenced estuary. Under normal winter conditions, the Acushnet River with a drainage area of 16.5 mi^2 and an average flow of 30 cfs plays a relatively minor role in the hydraulic regime of the upper harbor. Under normal conditions, inflow from the Acushnet accounts for about 1% of the average tidal prism of New Bedford Harbor[1] (ERDC, 2014) and about 2.8% of the upper harbor tidal prism[2].

These percentages increase during high inflow periods caused by heavy rainfall. Water salinity in the upper harbor ranges from 26 to 30 ppt and can decrease to 12 ppt near the surface during periods of heavy rain (Teeter, 1988) but ice would not likely be present in the harbor during times of heavy rain. As a result of the diurnal tide cycles, relatively shallow depths and low freshwater inflow, the estuary is vertically well-mixed in terms or salinity and water temperature. The combination of these factors would tend to inhibit ice formation on the New Bedford Upper Harbor.

Salt marshes line the eastern shore of the upper harbor while industrial development covers western side. Several of these industries produced electrical capacitors and during the 1940's to 1970's and discharged waste directly into the upper harbor containing polychlorinated biphenyls (PCB's).

As a result, Bedford Harbor was placed on the US Environmental Protection Agency (USEPA) priorities list in 1982 and is currently a Superfund site. The original plan was for the removal and treatment of 450,000 CY of contaminated sediment over a 170 acre area with goal of reducing PCB concentrations to ≤ 10 ppm in the bottom sediments of the upper harbor and ≤ 50 ppm the lower harbor and salt marshes. Since the start of dredging in 2004 about 200,000 CY of contaminated sediment had been removed by 2014 (ERDC 2014). The concentration of contaminants in the sediments decreases with depth and the strategy is to dredge deep enough to reach an allowable PCB concentration and place clean cover material on top. In deeper areas, the maximum allowable contaminant concentration will determine dredging depth. In all cases the final depth with the cover in place will be at least 2 ft to avoid disturbance from wave action and possibly ice. Sediments in some of the intertidal and shorelines areas will also be dredged, covered and re-vegetated. Figure 6 compares existing and predicted bathymetries of the upper harbor. Note the mud flats now exposed at low tide will be dredged to depths of at least 2 ft in the predicted post-project bathymetry. A key question in the ice investigation is whether ice formation and ice action might affect the proposed remediation plans and what those effects might be.

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[1] The tidal prism is the total volume of water that flows in and out of the harbor during a tide cycle.

[2] Tidal prism, assuming a tide range of 3 ft: 2 × 3 ft × 187 acres= 48.8 ft^3. 30 cfs × 12.5 hours = 1.35 million ft^3
1.35/48.8 = 2.8%

2.1. Field Observations of the New Bedford, Winter of 2017

With Jacobs Field Services, the author visited shoreline sites along the New Bedford Upper Harbor on February 16 and March 20, 2017. In addition, a series of aerial photographs were taken of the harbor on March. 21, 2017 and Jacobs Field Services provided photographs of shoreline conditions on March 16, 2017. Figure 7 shows daily air temperature data for the winter of 2017 which was too mild to cause a significant ice cover on New Bedford Harbor. Some shore ice did form however providing clues to the nature of ice formation during more severe winters.

The western side of the upper harbor is primarily industrial development, with its shorelines armored in many places with small to medium-size rip-rap. At the some sites such as the former Aerovox Plant, the shorelines are stabilized with steel sheet piling (Figure 8). Shorelines of this type would be quite resistant to ice action either by tide cycles or wind-driven floes. On the eastern side of the upper harbor, the shorelines are in a more natural condition consisting mainly of salt marshes and some wooded areas. The marshes are drained by a series of ditches running perpendicular to the shorelines (Figures 9 & 10). Figure 11 shows residual shore ice floated up by the tide in the cove near Sycamore St. in Fairhaven on 2/17/2017. Figure 12 shows peat clumps detached from the shores in the marshland near Lawson Ave. on 3/20/2017. The process of detached vegetation and sediment has been attributed to ice action at other sites, as discussed later in this report, but it is not clear what the cause is in the New Bedford case. Residual shore ice and detached peat clumps were also photographed by Jacobs Field Services on 3/16/17 near Sycamore St. (Figure 13), also thin sheet ice over near-shore shallow areas (Figure 14).

From this limited inspection, the upper harbor shorelines, either armored or in a more natural condition, appear to be relatively stable with no evidence of significant erosion from either wave or ice action. The winter of 2017 was extremely mild with no significant ice observed on New Bedford Harbor. The most recent severe winter occurred two year ago in 2015. This limited inspection found no evidence of past shoreline damage from the 2015 or earlier severe ice years.

3. General Ice Processes on Estuaries and Tidal Wetlands

Winter ice, either floating freely or attached to the shoreline can disturb soils, plants and sediments in coastal estuaries (Bertness, 1999). Free-floating ice floes may impact shorelines and shallow areas, scouring sediments and dislodging plants and grasses. The rising tide can lift and move shore-fast ice inland, dislodging plants and peat clumps and depositing them higher on the banks. The falling tide ice can transport ice, attached soil, sediment and vegetation in the channel-ward direction as well. Dionne (1989) describes this process of ice uprooting the marsh substrate followed by melting and deposition as an important source of sediment for marsh building in northern estuaries. Dionne's conclusions were based on observations and measurements made on the Gulf St. Lawrence in Canada, a much colder environment than New Bedford however.

For winters with consistently cold air temperatures, two extremes are possible in terms of ice formation on an estuary. A heavy snow cover that remains in place may insulate the ground minimizing ice growth and ice impacts to the marsh and tidal channels. At the other end of the spectrum, a cold winter with little snow may produce a relatively thick sheet ice cover on the central portion of the estuary and adjacent marsh areas. Where the tide range is small, this sheet ice cover may remain attached to the shoreline and move up and down with tidal cycles. A hinge crack system running parallel to the shore typically develops as a result of this vertical movement.

On freshwater lakes and rivers where surface water velocities are low (less than about 1 ft/s) sheet ice forms in place by thermal heat loss to the atmosphere. This is in contrast to dynamic ice cover formation typical of faster flowing rivers with super cooling, frazil ice growth, transport and deposition of frazil ice floes. In the low water currents typical of the New Bedford upper harbor, one would expect sheet ice as the main ice type. In addition to floating sheet ice which grows from the surface downward, during rare periods of extreme cold, additional shoreline ice could form as a result of tidal wetting or spray in an upward layering process known as “aufeis”. Another possible ice origin would sea slush, formed in open water central sections of the estuary and blown against shorelines. This is not expected to be an important factor due to the relatively short fetches and limited wave action in the upper harbor. Finally, a major snowfall can result in large quantities snow slush in the open water, rapid cooling and speeding up ice formation on the estuary.

In the more central portions of the estuary, a sheet ice cover may be grounded at low tide and floating at high tide, but sufficiently locked in to avoid much lateral movement and breakup during a normal tide cycle. In many coastal estuaries, central channels and constrictions may remain open due faster currents and repeated flushing with warmer sea water. Along the marsh sides, the ice cover may remain anchored to the shoreline, floating up at normal high tide without releasing and resting on the banks at lower tide levels.

A worst case scenario would be an extended cold spell resulting with ice cover formation on the upper harbor coinciding with a northeaster and a spring tide. This combination of events might be enough to lift and displace ice and underlying substrate from the northeastern shorelines leaving behind scarred soil. Upon melting, these displaced floes might deposit peat clumps and vegetation channel-ward. The limited field observations of the 2017 winter season revealed no past evidence of this process however.

4. Historic Ice Events in New Bedford Harbor

Evidence of historic severe ice events in New Bedford Harbor is sparse, likely due to the maritime climate and relatively mild winter temperatures. The internet and newspaper archives were searched for any mention of ice going back as far as 1900. Fortunately, the recent winter of 2015 saw extreme cold resulting in a significant ice cover on New Bedford Harbor with an average ice thickness of about 6 inches. This attracted attention since the ice threatened to trap the scallop fishing fleet in port on the March 1st opening day. As a result there was much

internet and newspaper coverage and the 175-ft US Coast Guard Ice cutter Ida Lewis was called frozen-over harbor:

https://video.search.yahoo.com/search/video?fr=mcafee&p=new+bedford+harbor+ice#action=view&id=1&vid=70aa3426cb8e076df5faafebd92b33c9.

A search of the archives of the New Bedford Standard Times back to 1920 and the New Bedford Mercury back to 1900 found only four mentions of significant ice on New Bedford Harbor which occurred during the winters of 2015, 1978, 1936 and 1934 (Table 1).

The severe northeaster of February 5-7, 1978 shut down much of the Atlantic coast of New England with heavy snowfall, drifting and winds over 80 mph. Figure 15 shows the ice-covered upper harbor on Feb. 7, 1978. The heavy dump of snow into the harbor the likely accelerated the formation of this ice cover, as the winter had not been extremely cold leading up to the storm event.

An article in the Feb. 25, 1936 New Bedford Standard Times mentions a coin throwing contest across the "300-ft-wide" ice covered Acushnet River. This suggests that the upper end of the upper harbor, due to the fresh water inflow, may form an ice cover when the rest of the harbor remains mostly open.

The winter of 1934 was exceptionally severe with mention of ice at many locations along the southern New England coast including New Bedford. Figure 16 shows a rare photo of the ice covered Lower Harbor on Feb. 4,1934.

Going farther back in the newspaper archives, the mentions of ice and number of photographs became more and more sparse. It is surprising that no mention of ice was found in the New Bedford Mercury for the record cold winters of 1904-1905.

5. Analysis of Hydro-Meteorological Data

In an effort to identify other winters where significant ice covers might have formed on New Bedford Harbor, daily air temperature were collected back to 1893 and accumulated freezing degree days (AFDD) calculated for each year of record.

AFDD, the daily summation of degree days of frost[3.] are a good indicator of the coldness of a winter and the potential for ice formation on lakes, rivers and estuaries (US Army 2005). Figure 17 shows daily average air temperature and AFDD for New Bedford for the cold winter of 2015. The maximum AFDD for the winter can be used to estimate the maximum ice thickness *t* on lakes and rivers using the equation:

[3] Degrees of frost are defined as the difference between the daily average air temperature and the freezing point of freshwater (32 °).

$$t = C\sqrt{AFDDmax}.$$

where *C* is a coefficient typically between 0.2 and 0.6. In the case of an estuary or tidal wetland, the influx of warmer seawater and mixing would result in less ice growth than for freshwater conditions. In the New Bedford case, only one observed ice thickness on 6 inches was found in a February 28, 2015 video clip:

https://video.search.yahoo.com/search/video?fr=mcafee&p=new+bedford+harbor+ice#id=3&vid=be5b9697ece645b53a82f2ae8f7c7f3c&action=view

From an *AFDD max* of 593 for the 2015 winter, a coefficient C of 0.259 was calculated and ice thicknesses calculated from *AFDD max* for the other years of record (Figure 18). For the 1893-2017 period of record, the average *AFDD max* is 177 with a large standard deviation of 173. The coldest winter of record in New Bedford occurred in 1905 with an *AFDD max* of 860.5 and a calculated ice thickness of 7.6 in. As an indication of the relative mildness winters in New Bedford, the average *AFDD max* for Portland, ME, not that far away, is 750, more than 4 times as great.

Figure 19 shows the probability distribution of maximum annual ice thickness based on the calculated ice thicknesses for the 1893-2017 winters. The four winters with documented ice covers 2015, 1978, 1936 and 1934, the calculated maximum ice thickness was at least 5 in. From Fig. 19 the chance of the ice thickness exceeding 5 inches is 0.13 and the chance of the ice thickness exceeding the 2015 6-inch value is 0.04.

Typical Ice Formation and Deterioration Scenario

It is likely that ice covers on the upper harbor of less than about 5 inches are of short duration and not significant in terms of potential disruption of bed materials or shorelines. A typical ice formation and deterioration scenario during an unusually cold winter period might be as follows:

- Ice forms initially along the more natural salt marshes of the eastern side of the upper harbor, particularly in sheltered areas and coves. The ice on the industrialized western shore would form later as a result of less shelter, greater depths, and less exposure to the west-northwesterly winds associated with cold periods.

- Sheet ice would from grow out from the shorelines initially in the shallow areas and over submerged mudflats.

- Tide action and waves would tend to intermittently break up the forming ice cover and west-northwesterly winds would transport and deposit ice pieces along marshy shorelines to the east.

- In the case of a cold spell that lasted for several weeks as in 2015 or 1934, a complete ice cover could form across the upper harbor reaching a thickness of 6 inches or so. At this point, tide and wave induced breakup would diminish. The high current velocity area north of the Coggeshall Bridge would likely remain open throughout.

- Once milder air temperatures returned, the central portion of the ice cover would open up, gradually at first, and the cover would thin and recede back towards the shorelines, more or less opposite of how it formed.

- Wind and waves and tides would speed up the ice deterioration process, especially in the case of strong south to southwesterly winds, not uncommon during the winter months (Figure 5).

- The early-formed ice along the marshy eastern shorelines would remain the longest. Wind-driven ice floes from central portion of the harbor would likely accumulate along this remaining shore ice as a result of the southerly winds associated with the thaw.

- If mild air temperatures continued, the shoreline ice and transported floes would melt in pace fairly rapidly. If cold temperatures returned, the shoreline ice and floes would freeze in place and above-described ice formation-deterioration cycle might repeat itself.

7. Summary and Conclusions

The ice regime of New Bedford Upper Harbor was investigated and potential ice effects on contaminated sediment remediation measures identified. The ice study included field observations during the winter of 2017, discussions project personnel, review of newspaper archives and analysis of hydro-meteorological data.

In spite of its northerly location, climatic conditions along the southern coast of Massachusetts and New Bedford in particular are quite mild due to the maritime influence on its weather. As a result, historic ice covers on the harbor were found to be extremely rare with a calculated annual probability of 13% of the ice thickness exceeding 6 inches. In addition to the typically mild winter air temperatures, factors inhibiting ice formation on the upper harbor are the brackishness and top-to-bottom mixing of the water as a result of tide cycles the low freshwater input of the Acushnet River.

In remediated project, the area most vulnerable to potential ice damage will likely be the shorelines and intertidal zones. It is expected that for the offshore areas, the proposed 2 ft minimum depth of the completed project will be sufficient to avoid ice damage. This is because the predominant ice type in the offshore areas will be single-layer sheet ice less than 6 inches in thickness.

A limited inspection of shoreline sites in the New Bedford Upper Harbor revealed no evidence of past ice action and, in general, the shorelines under existing conditions, appeared to be quite stable in terms of resisting disturbances due to waves and an ice action . The shorelines on the deeper, industrialized western side of the upper harbor are largely armored with riprap while the

eastern shorelines remain in a more natural marshland condition and would probably experience more ice growth and retention.

The study included background a review of ice processes in more northerly estuaries and salt marshes including ice scouring and transport of sediments and plants by rafted ice. Possible signs of these processes such as detached peat clumps were observed at New Bedford Upper Harbor but only to a minor degree and difficult to attribute to ice action.

Provided the post-project remediated shorelines are similar in nature and their ability to resist natural disturbances to the existing shorelines, ice not expected to be significant factor at the New Bedford Upper Harbor.

Based on this review and analysis, it is not expected that ice action will have a significant effect on the proposed contaminated sediment remediation measures at the New Bedford Upper Harbor Superfund Project.

8.Acknowledgements

The author would like to thank Steve Fox, Josh Cummings, and Mike Morris of Jacobs Field Services for their assistance and support in this study.

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http://140.194.76.129/publications/eng-manuals/EM_1110-2-1612_pflsec/toc.htm

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Table 1. Historic and Likely Ice Covers in New Bedford Harbor				
Year	**Date**	**Description**	**AFDD max**	**Date of AFDD max**
2015	28-Feb	Upper and Lower Harbors Ice-covered, reported ice thickness 6", Much pre	537	9-Mar
1994		No menting of ice in Standard Times	593	3-Mar
1978	7-Feb	Great Blizzard of '78, much press about snow . Photo showing upper harbor ice-covered	442	8-Mar
1977		No menting of ice in Standard Times	479	22-Feb
1940		No menting of ice in Standard Times	447	23-Mar
1936	25-Feb	Northern end of Upper Harbor frozen 300' across	422	27-Feb
1934	4-Feb	Extreme Winter, Photo of Lower Harbor ice-covered	422	27-Feb
1920		No menting of ice in Standard Times	569	7-Mar
1912		No mention of ice in New Bedford Mercury	501	5-Mar
1905		Extreme winter, Photos of ice-bound ships and harbors around Cape. No mention of ice in New Bedford Mercury	818	13-Mar
1904		Extreme winter, Photos of ice-bound ships and harbors around Cape	859	14-Mar

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Fig. 1. New Bedford Upper Harbor from the North, March 20, 2017

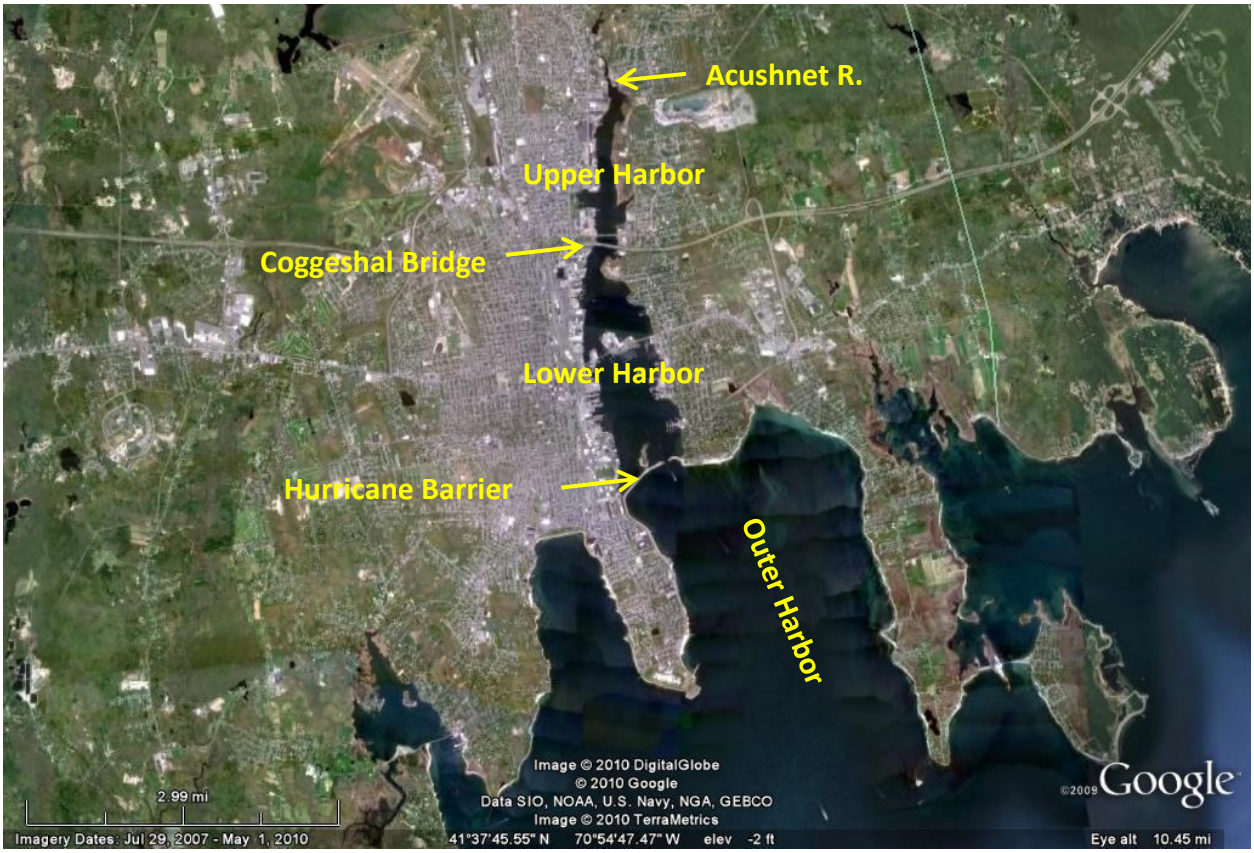

Figure 2. Satellite photo of New Bedford Harbor

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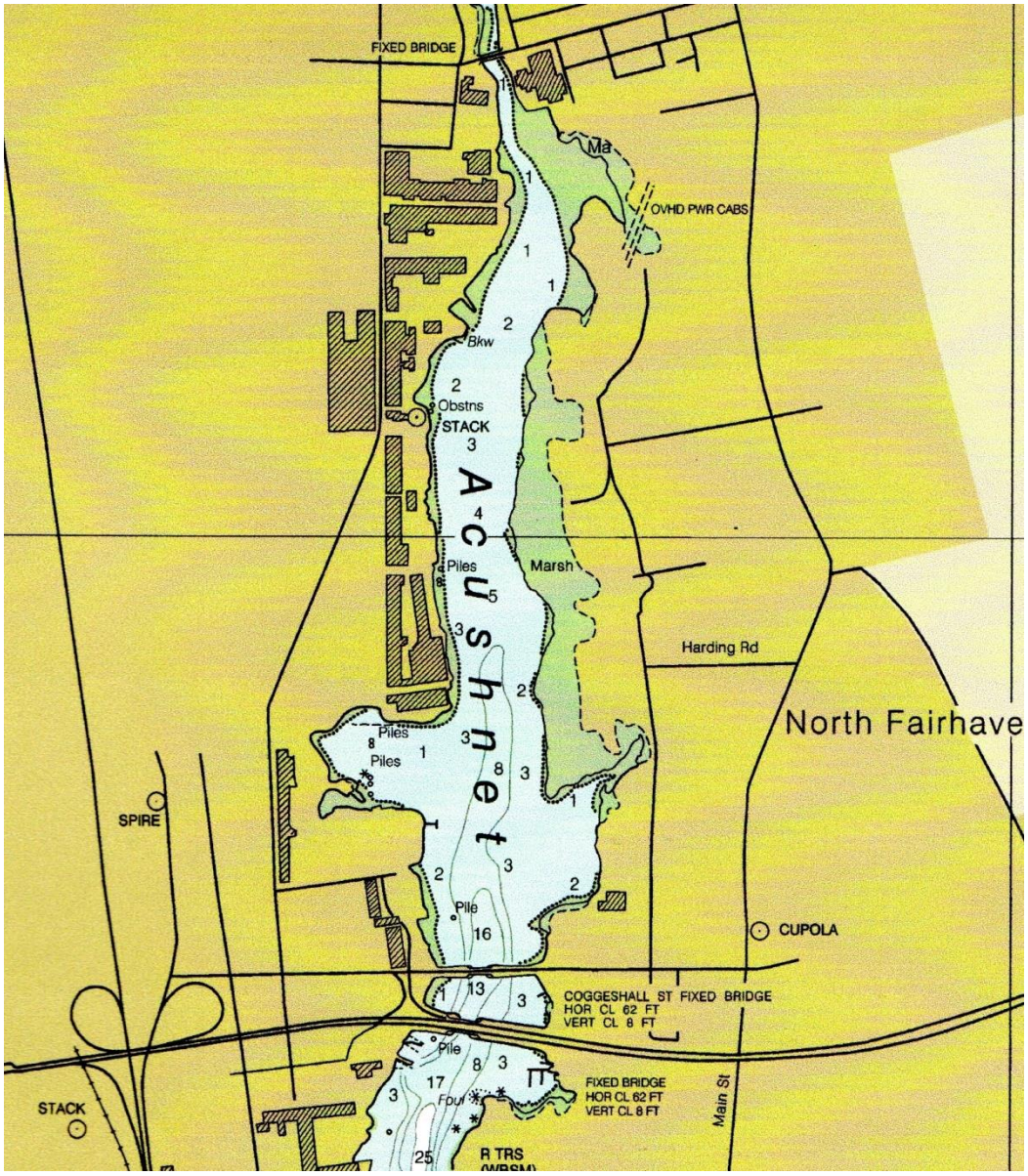

Fig. 3. NOAA Chart of New Bedford Upper Harbor. Soudings in ft at mean low tide (0.1 ft NAD 1983).

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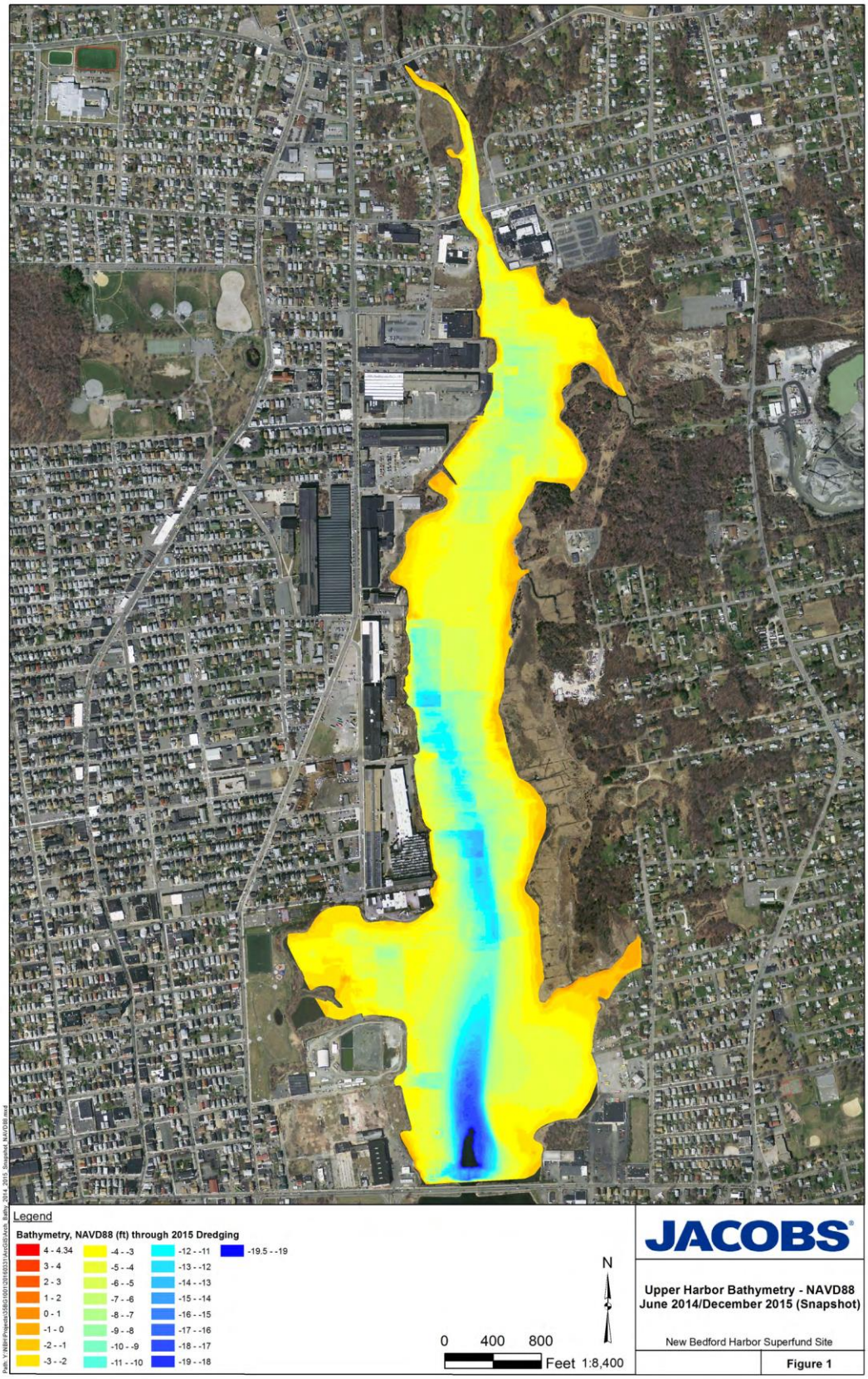
Legend
Bathymetry, NAVD88 (ft) through 2015 Dredging
4 - 4.34
3 - 4
2 - 3
1 - 2
0 - 1
-1 - 0
-2 - -1
-3 - -2
-4 - -3
-5 - -4
-6 - -5
-7 - -6
-8 - -7
-9 - -8
-10 - -9
-11 - -10
-12 - -11
-13 - -12
-14 - -13
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-19 - -18
-19.5 - -19
N
0 400 800
Feet 1:8,400
JACOBS
Upper Harbor Bathymetry - NAVD88
June 2014/December 2015 (Snapshot)
New Bedford Harbor Superfund Site
Figure 1

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FFig. 4 New Bedford Upper Harbor bathymetry 2014-2015. Bed elevations in ft NAVD 1988.

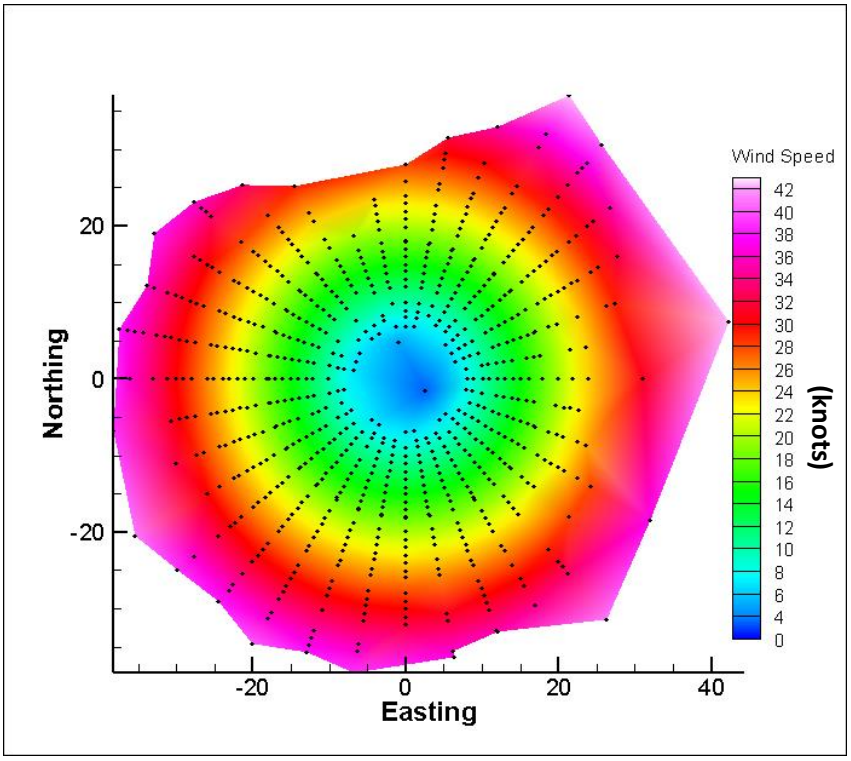

Figure 5. Fasted 2-minute winds, New Bedford Airport, 1998-2017
Open water season: mid-March -mid-December. Each dot represents one day.

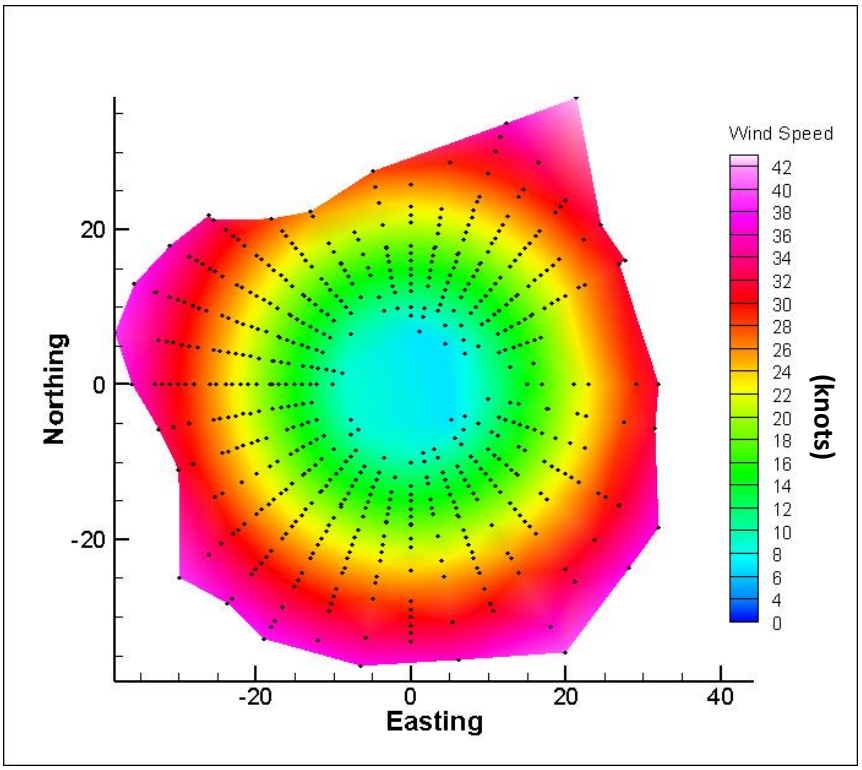

Figure 6. Fasted 2-minute winds, New Bedford Airport, 1998-2017
Winter season: mid-December -mid-March. Each dot represents one day.

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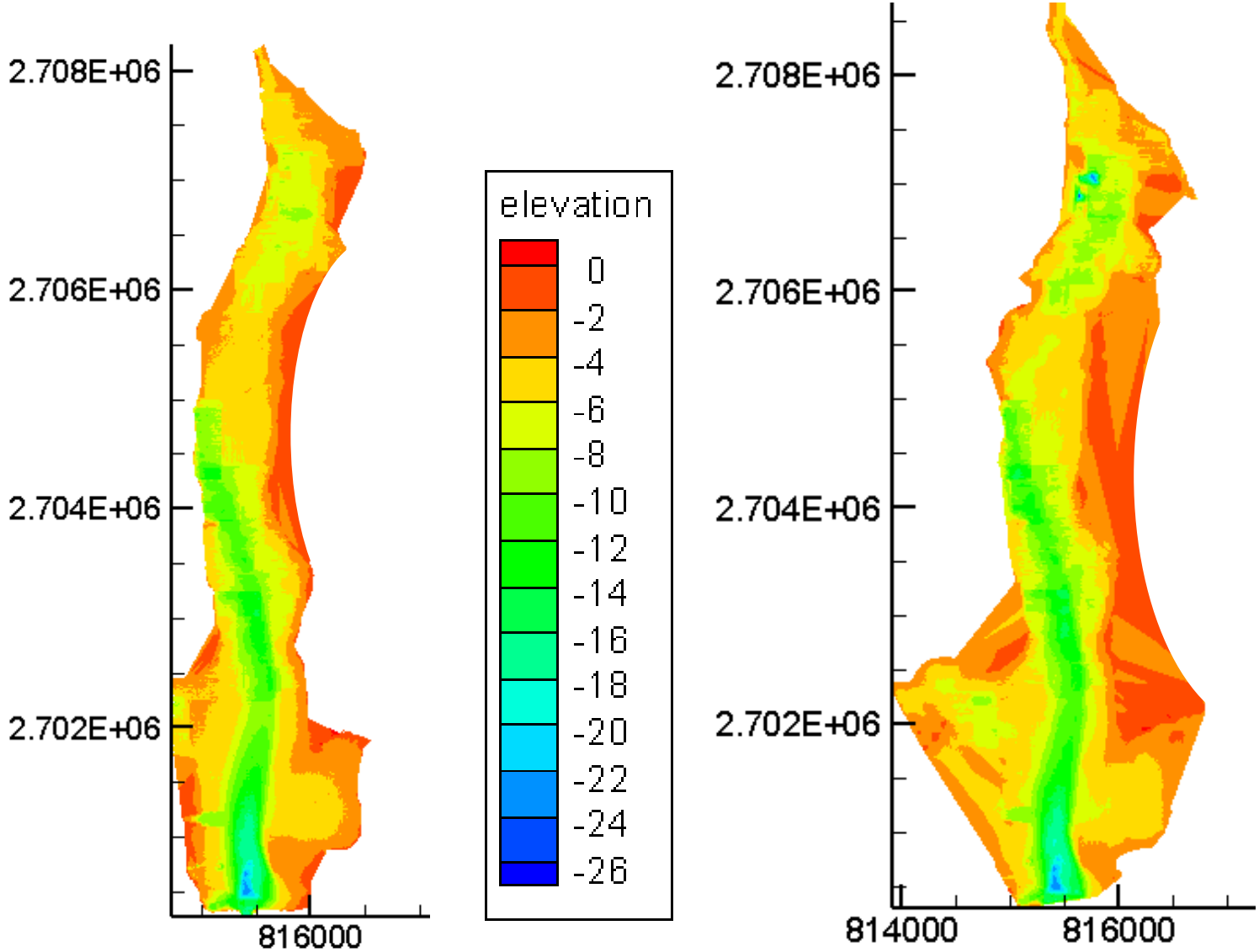
2.708E+06
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2.704E+06
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elevation
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-22
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-26
2.708E+06
2.706E+06
2.704E+06
2.702E+06
814000
816000

Figure 6. Bathymetrytry of New Bedford Upper Harbor, existing conditions (left) and predicted after remediation (right).
Data source: Jacobs Field Services

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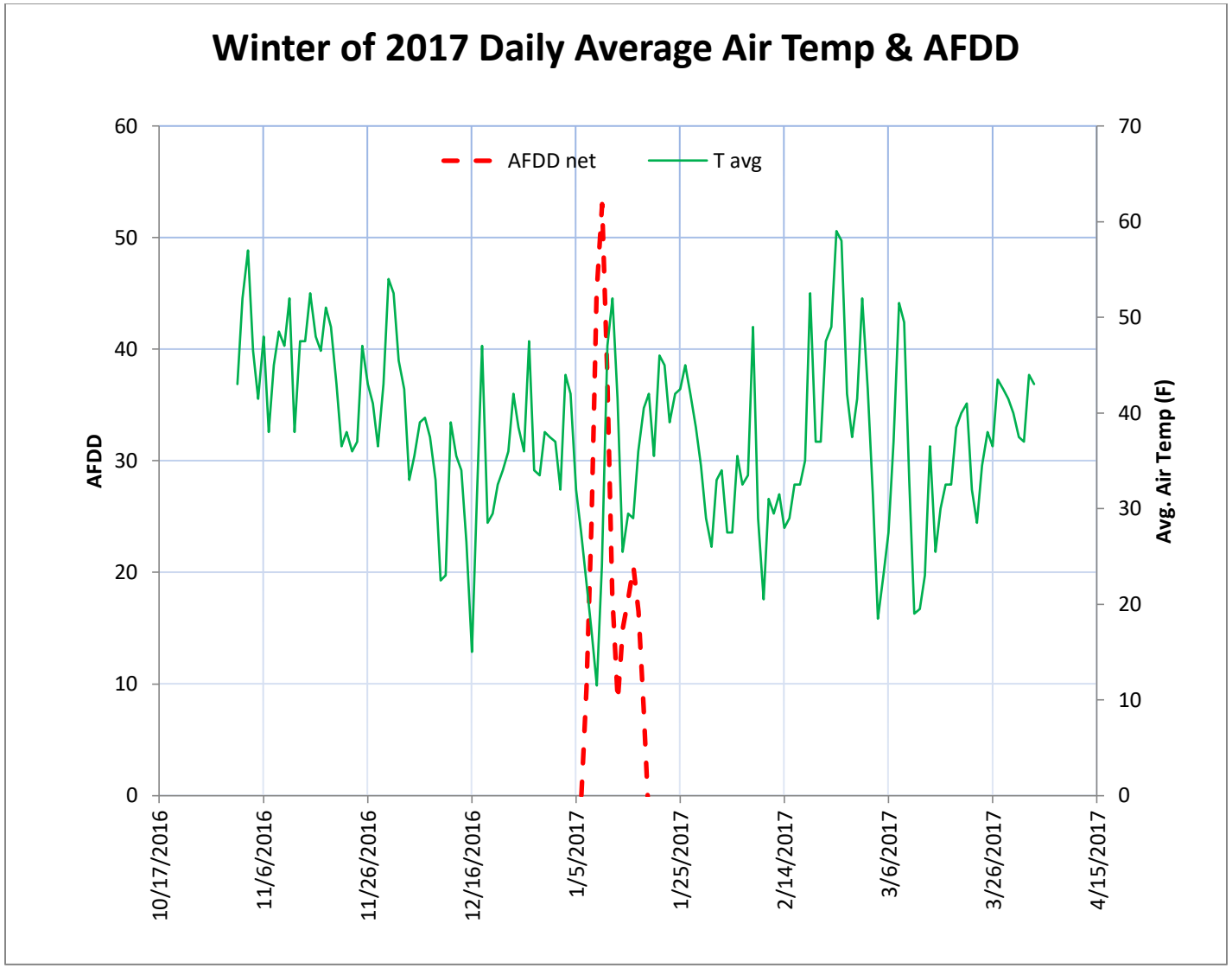
Winter of 2017 Daily Average Air Temp & AFDD
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T avg
AFDD
Avg. Air Temp (F)
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30
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10/17/2016
11/6/2016
11/26/2016
12/16/2016
1/5/2017
1/25/2017
2/14/2017
3/6/2017
3/26/2017
4/15/2017

Figure 8. Winter of 2017 daily average air temperature and accumulated freezing degree days, New Bedford, MA Airport.

Figure 8. Armor stone along shoreline of New Bedford Upper Harbor, looking south from Aerovox site, 3/20/2017.

Fig. 9 New Bedford Upper Harbor showing industrial development on the West and ditched salt marshes on the east (Fairhaven) side, 3/21/2017.

Fig. 10. Northern part of Upper Harbor showing industrial Aerovox Site on West side and eastern shoreline near Lawson Ave., Fairhaven, 3/20/2017.

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Fig. 12 Shoreline marsh near Lawson Ave. ,Fairhaven, showing detached peat clumps 3/20/2017.

Fig. 13. Cove near Sycamore St. Fairhaven showing residual shore ice and detached peat clumps 3/16/2017. Photo by Jacobs Field Services

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Fig. 14. Looking southwest towards New Bedford with thin sheet ice visible over shallow areas on 3/16/2017. Photo by Jacobs Field Services

Figure 15.Ice cover on New Bedford Upper Harbor Feb. 7, 1978
(New Bedford Standard Times).

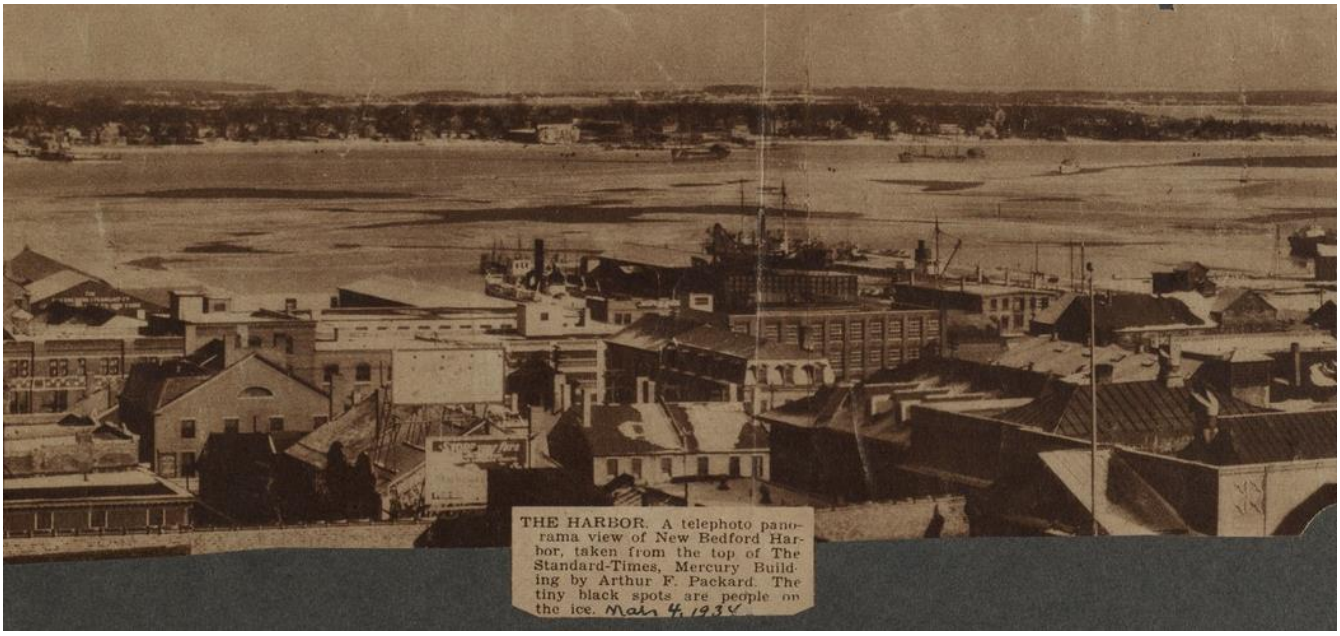

Figure 16 Lower Harbor ice-covered March 4, 1936. (New Bedford Standard Times).

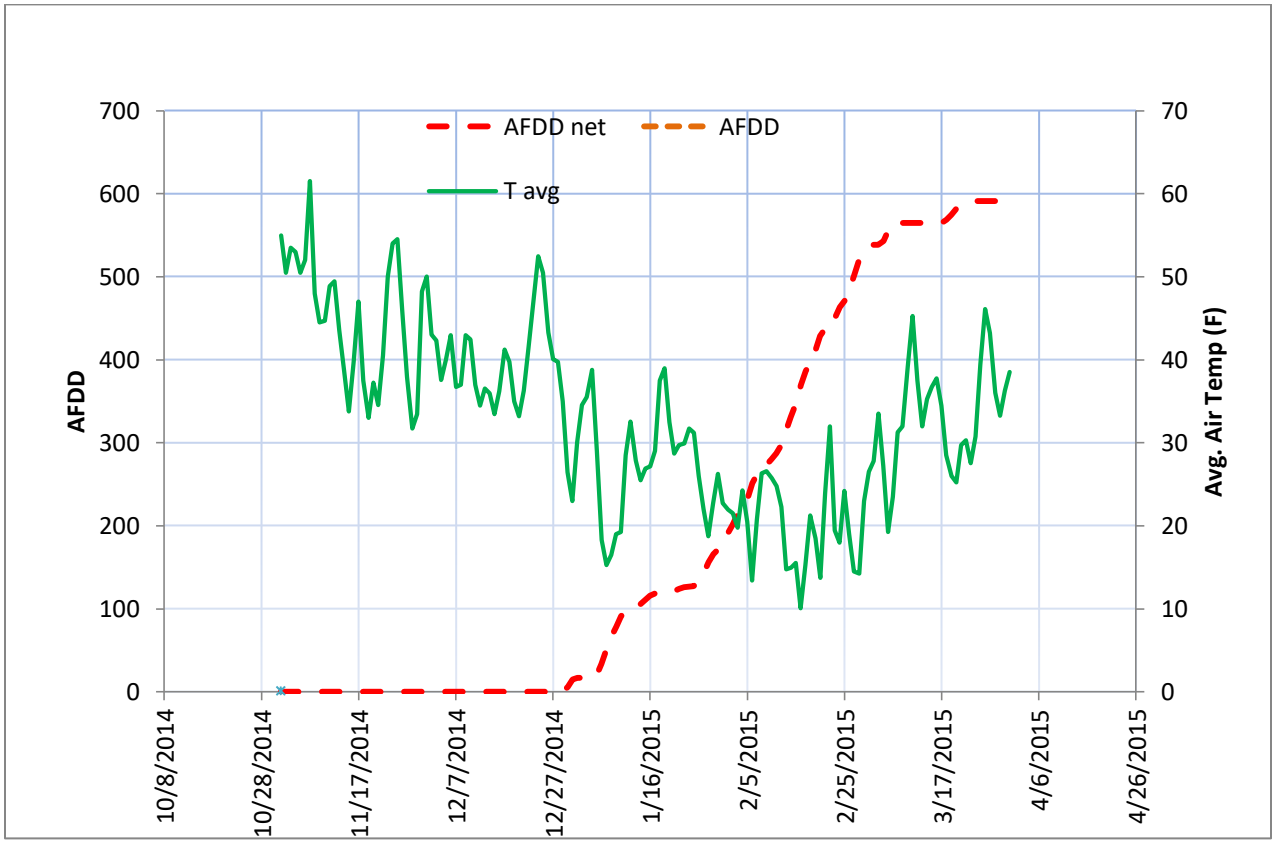

Fig. 17. Daily average air temperature and accumulated freezing degree days for the cold winter of 2015. New Bedford, MA Airport .

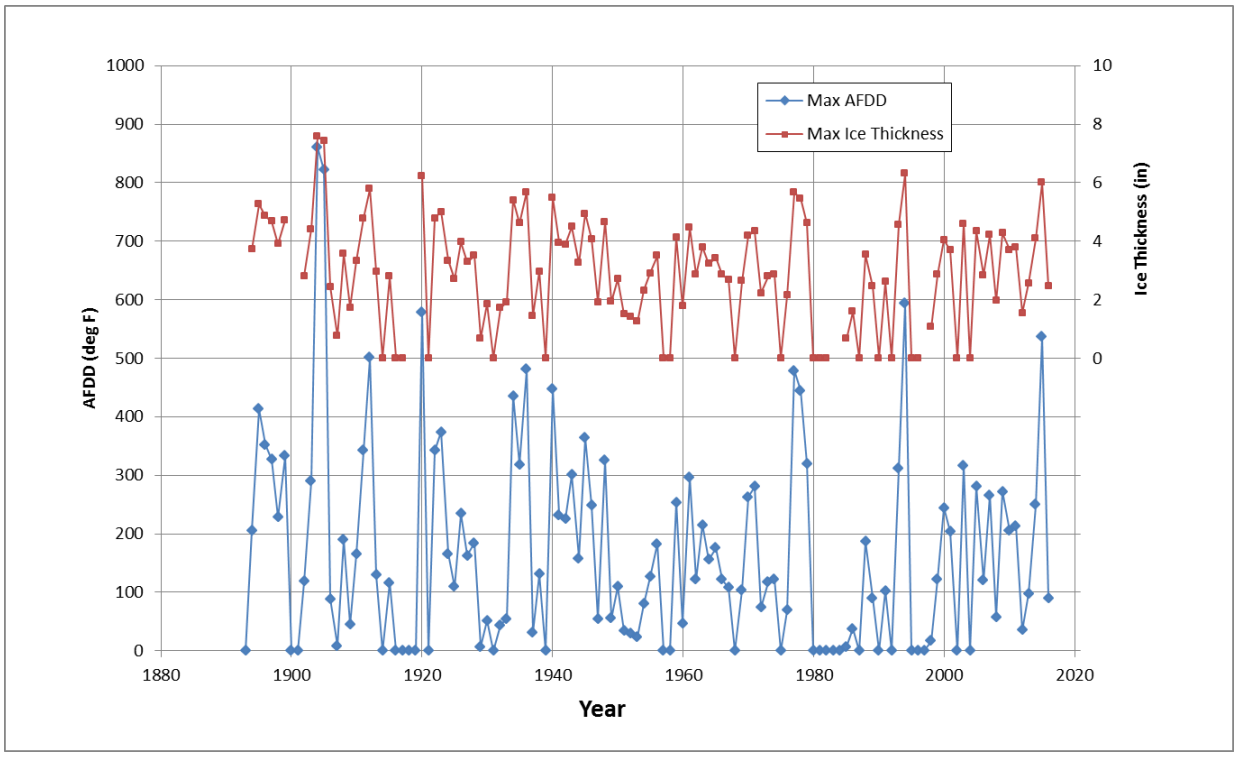

Fig. 18. Maximum accumulated freezing degree days and calcuated ice thickness , New Bedford, MA 1893-2017

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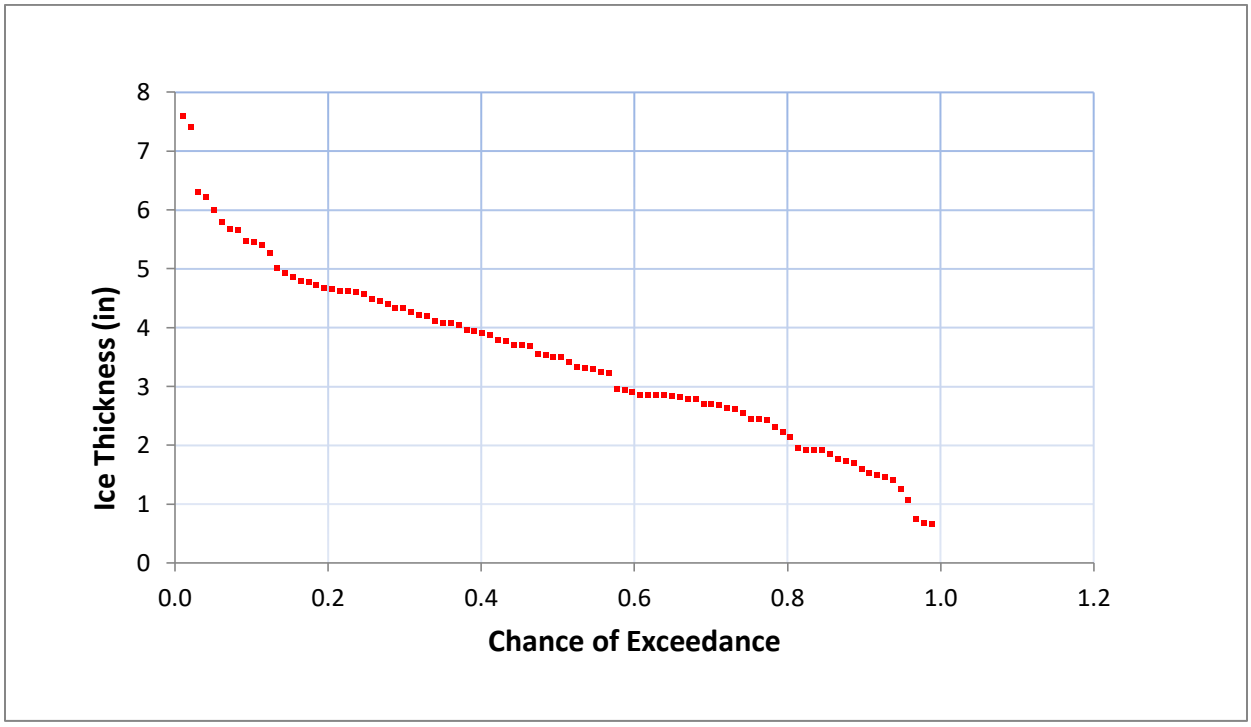

Fig. 19. Probability distributions ice thickness calculated from maximum accumulated freezing degree days winters of 1893-2017. New Bedford, MA

Appendix E

Groundwater Model Report, Jacobs, 2018

New Bedford Harbor Superfund Site

U.S. Army Corps of Engineers New England District

Final Groundwater Flow and Transport Modeling Analysis to Support Interim Cap Action in the Harbor Near Aerovox Site

ACE-J23-35BG2000-M1-0024 | 0

June 2018

Appendix E

New Bedford Harbor Superfund Site

Project no:	35BG2000
Document title:	Final Groundwater Flow and Transport Modeling Analysis to Support Interim Cap Action in the Harbor Near Aerovox Site
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Revision:	0
Date:	June 2018
Client name:	U.S. Army Corps of Engineers New England District
Project manager:	Steve Fox
Authors:	Changsheng Lu

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Document history and status

Revision	Date	Description	By	Review	Approved

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Acronyms and Abbreviations

3-D	three-dimensional
AFCEE	Air Force Center for Engineering and the Environment
Aerovox Inc.	Aerovox Incoroporated
ASTM	American Society for Testing and Materials
AVX	AVX Corporation
bgs	below ground surface
CDF	confined disposal facility
cm/s	centimeters per second
CSA	Comprehensive Site Assessment
cy	cubic yards
DNAPL	dense non-aqueous phase liquid
EPA	U.S. Environmental Protection Agency
°F	degrees Fahrenheit
FEMA	Federal Emergency Management Agency
foc	organic carbon fraction
ft.	feet
ft^3/day	cubic feet per day
FW	Foster Wheeler Environmental Corporation
g/cm^3	grams per cubic centimeter
g/ml	grams per milliliter
IA	immunoassay
in.	inch
Jacobs	Jacobs Engineering Group, Inc.
Kd	soil/water partition coefficient
kg/yr	kilograms per year
Koc	organic carbon-water partition coefficient
LIDAR	Light Detection and Ranging

MCP	Massachusetts Contingency Plan
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
msl	mean sea level
NBH	New Bedford Harbor
NBHSS	New Bedford Harbor Superfund Site
NTCRA	Non-Time Critical Removal Action
PCB	polychlorinated biphenyl
Rf	retardation factor
ROD	Record of Decision
Site	New Bedford Harbor Superfund Site
USGS	U.S. Geological Survey
VOC	volatile organic compound

1.0 Introduction

This report describes the groundwater modeling efforts by Jacobs to support an interim remedy consisting of a temporary cap to be placed over areas of polychlorinated biphenyl (PCB)-contaminated harbor sediment adjacent to the former Aerovox facility at the New Bedford Harbor (NBH) Superfund Site (Site), New Bedford, Massachusetts.

The former Aerovox facility consists of a rectangular 10-acre plot on the west shore of the Upper New Bedford Harbor (Figure 1-1). Aerovox Incorporated (Aerovox Inc.) operated the facility from 1938 through 2001, and used PCBs in the manufacture of electrical capacitors from 1947 to 1978. During this period, PCBs used in manufacturing processes were released within the building, on the site, and into the adjacent harbor, resulting in extensive contamination of the building, the onsite soil, and the harbor sediments.

The purpose of this study was to model the discharge of PCBs to the harbor from the Aerovox site via the harbor sediment's groundwater pathway and support the design of the interim isolation cap. The site-specific three-dimensional (3-D) groundwater flow and transport model was constructed to represent both the on-shore Aerovox site and the harbor area. The development and application of the model used the latest site-specific information, including information collected during cap design field investigation activities.

Detailed groundwater flow and fate-transport analyses were conducted to determine the PCB discharge to the harbor from the Aerovox site and harbor sediments via the groundwater pathway and to support the cap design. This groundwater flow model was first used to develop the groundwater flow regime in the Aerovox area and adjacent harbor. Afterwards, fate-transport modeling and flux budget analysis were conducted to determine the long-term movement of the PCB in groundwater at the Aerovox site and its potential impact to the harbor. The proposed design of the cap was also simulated within the flow and transport models.

2.0 Aerovox and Nearby Harbor Conditions

2.1 Site Location and History

The NBH Site is located in Bristol County, Massachusetts approximately 55 miles south of Boston, and is bordered by the towns of Acushnet and Fairhaven on the east side of NBH, and by the City of New Bedford on the west. From north to south, the NBH Site extends from the upper reaches of the Acushnet River estuary, through New Bedford's commercial port and into Buzzards Bay.

Industrial and urban development surrounding the NBH Site has resulted in sediments becoming contaminated with PCBs and heavy metals, with concentration gradients generally decreasing from north to south. Identification of PCB-contaminated sediments and seafood in and around NBH was first made in the mid 1970's as a result of the U.S. Environmental Protection Agency's (EPA's) region-wide sampling programs. Based on these sampling programs, it was determined that the principle sources of PCB contamination were from two electric capacitor manufacturing facilities located adjacent to the Acushnet River/NBH water way. The NBH Site was added to the Superfund National Priorities List in September 1983.

The primary source of PCB contamination originated from the Aerovox facility, located near the northern boundary of the NBH Site. The former Aerovox facility consists of a rectangular 10-acre plot on the western shore of the Upper New Bedford Harbor (Figure 2-1). Aerovox Inc. operated the facility from 1938 through

2001, and used PCBs in the manufacture of electrical components from 1947 to 1978. During this period, PCBs used in manufacturing processes were released on the site and to the harbor. PCB wastes were discharged from Aerovox operations directly into the Upper Harbor through open trenches and discharge pipes, or indirectly throughout the NBH Site via the City of New Bedford's sewage system.

PCBs are the primary contaminant of concern in New Bedford Harbor. Soil contamination on the Aerovox site ranges in depth from ground surface to greater than 28 feet (ft.) below ground surface (bgs) (AECOM 2015). Groundwater contaminants were found in the shallow overburden (3 to 15 ft. bgs), deep overburden (greater than 15 ft. bgs), and in bedrock (greater than 25 ft. bgs). Dense non-aqueous phase liquid (DNAPL) was also identified in two monitoring wells located in the northeast corner of the site.

Earlier remedial actions performed at the former Aerovox facility on shore included installation of a sheet-pile cutoff wall and capping of unpaved surfaces adjacent to the harbor, removal of fuel oil storage tanks and contaminated soils, and removal of stored chemicals and wastes from the buildings. The building was demolished during a Non Time Critical Removal Action (NTCRA) in 2011 and the entire site was covered with a 3-inch (in.) asphalt cap as an interim measure.

The sheet pile wall that was installed in the 1980s administratively separates the former Aerovox facility from the New Bedford Harbor Superfund Site (NBHSS). Ongoing work at the former Aerovox facility is being conducted under Massachusetts General Law Chapter 21E and the Massachusetts Contingency Plan (MCP) by AVX Corporation (AVX).

Remedial actions were also performed in the harbor near the Aerovox site. In 2008, approximately 6,900 cubic yards (cy) of highly contaminated sediment near the Aerovox shoreline were removed using land-based mechanical excavation (Jacobs Engineering Group, Inc. [Jacobs] 2009). This work was done as part of the remediation conducted pursuant to a 1998 Record of Decision (ROD). The area of the harbor east of the Aerovox shoreline was hydraulically dredged in 2009 and 2010. A total of 26,000 cy was removed during this effort (Jacobs 2010, 2011).

Aerovox site investigations for the Phase II Comprehensive Site Assessment (CSA) were conducted between October 2013 and August 2015. The Phase II investigations identified subsurface areas within the former Aerovox property and in nearby NBH sediment that had contamination related to the former site activities. Analysis of soil concentrations found that PCBs comprised the largest component of the DNAPL found on the Aerovox facility and in the harbor. Two areas of DNAPL were investigated and are aligned with the points of discharge from historic Aerovox drainage ditches (Figure 2-2).

To provide protection to the ecological receptors in the harbor, an interim 10-year remedy addressing the PCB impacts to NBH from the former Aerovox facility is planned. The interim remedy consists of a temporary cap to be placed over the areas of potential PCB contaminated sediment and groundwater or potential PCB DNAPL, excavation of areas of shallow DNAPL accumulation, and removal of DNAPL from one monitoring well.

2.2 Activities Associated with Interim Cap Action

To facilitate the design of the cap, field investigations were conducted in the harbor area near the Aerovox site by Battelle and Jacobs during 2017 to evaluate the current NBH conditions adjacent to the former Aerovox facility. The field activities included the following analyses:

- passive sampling of water in sediment;
- sediment sampling and analysis;
- pore/ground water sampling;
- gas ebullition sampling; and
- ice/scour investigation.

The passive water sampler study was developed to evaluate diffusive transport of PCBs in sediment porewater into surface water. The results were used to evaluate concentration gradients and diffusive flux between the sediment and water column. Harbor sediment sampling analysis was conducted to determine physical and chemical characteristics of sediments in the harbor adjacent to the former Aerovox facility. Sediment samples were analyzed for PCBs by a combination of immunoassay (IA) screening analysis, total Aroclors, and sum of total congeners. The sediment samples were also analyzed for a suite of volatile organic compounds (VOCs) (Figure 2-3).

Sediments were evaluated for their physiochemical characteristics to support this groundwater model construction and to evaluate the potential discharge to the harbor. A series of three sonic borings were advanced to collect these data (Figure 2-4). Previous investigations identified five major stratigraphic layers that may be used as layers in the groundwater model. These include: OL, marine deposits, glacial outwash, glaciolacustrine deposits, and glacial till. These stratigraphic units (if present) were sampled from the three borehole locations.

The whole stratigraphic section representing OL, marine deposits, glacial outwash or glacial till were collected in liners, cut into 8- to 10-in. pieces, and submitted to the laboratory intact to preserve the undisturbed features of the sediment. The laboratory sub-sectioned or sub-sampled the section as necessary to perform the analytical assessment. Each sediment strata was characterized with respect to the following parameters:

- Bulk Density. American Society for Testing and Materials (ASTM) Method D2937.
- Particle Size. Sieve and hydrometer methods ASTM Method D422.
- Atterburg Limits. ASTM Method D4318.
- Soil Classification. ASTM D2487.
- Soil Moisture. ASTM D2216.
- Total Carbon. ASTM D2974.
- Particle Density (also known as Specific Gravity). ASTM D854.
- Sulfide/Sulfate. ASTM D516.
- pH. ASTM D4972.
- Saturated Hydraulic Conductivity. ASTM D2434.

All these data were used during the groundwater model construction and application.

In addition to groundwater modeling, a harbor water hydrodynamic model was also conducted. The surface water flow and wave numeric model used DELFT3D modeling software to determine the hydrodynamic properties associated with the NBH estuary system.

2.3 Geography/Geology/Soils

NBH is located on the north shore of Buzzards Bay and is a small urban estuary composed of the drowned, smooth-floored valley of the Acushnet River, which flows south into Buzzards Bay and the Atlantic Ocean.

NBH is part of Buzzards Bay and was formed by processes associated with the Laurentide Ice Sheet that centered on Labrador and Hudson Bay during the final or Wisconsin Stage of the Pleistocene Epoch, which started approximately 50,000 to 70,000 years before present (Howes 1996). The glacial drift, which consists of mostly glacial outwash sand with little silt and clay, overlies the bedrock, which is mostly “biotite” gneiss or layered feldspathic gneiss, in the NBH area.

The bedrock contour map for the site has been presented in the Aerovox Phase II CSA report (AECOM 2015). The top of the bedrock elevation at the Aerovox site ranges from 0 to -30 ft. mean sea level (msl). The depth to the bedrock increases generally from the west to the east (harbor); therefore, the thickness of the overburden material above the bedrock also increases toward the east.

Overburden materials at the on-shore Aerovox site vicinity consist of fill, peat, and glacial outwash/till. The fill materials range from approximately 2 ft. to 10 ft. in depth across the Aerovox Site. Beneath the harbor, organic marine sediment, silt, glacial outwash sand/till, and a small footprint of peat are present.

2.4 Hydrology

2.4.1 Climate

New Bedford is part of the humid continental (warm summer) climate zone (Köppen Climate Classification) (Pidwirny 2006). The climate is warm during summer when temperatures tend to be in the 70 degrees Fahrenheit (°F) range and very cold during winter when temperatures tend to be in the 20°F range. The warmest month of the year is July with an average maximum temperature of 83°F, while the coldest month of the year is January with an average minimum temperature of 20°F. Winds at New Bedford are predominately from the northwest in winter and southwest in summer (EBASCO 1991).

The annual average precipitation at New Bedford is 50.77 in. Rainfall is evenly distributed throughout the year. The wettest month of the year is December with an average rainfall of 4.77 in. (http://www.idcide.com/weather).

2.4.2 Surface Water

The Acushnet River drains through the glacial uplands of southeastern Massachusetts and discharges into NBH. The harbor has been divided into three areas consistent with geographical features of the area: the Upper Harbor, the Lower Harbor, and the Outer Harbor. The Upper Harbor, north of the Interstate 195 Bridge, comprises approximately 187 acres. The Aerovox Site is located on the western bank of the Upper Harbor area (Figure 1-1).

Acushnet River and the Upper Harbor are influenced strongly by tidal action. Tidal cycles in the harbor are semi-diurnal, including two high tides and two low tides that occur each lunar day. The tidal cycles recorded between October 1 and December 31 of 2017 varied between approximately 5.1 and -0.6 ft. mean sea level (msl) (https://ma.usharbors.com, 2017). The tidal change ranges more than 5 ft. The average of the high tidal level is 3.9 ft. msl and the average of the low tidal levels is 0.2 ft. msl. The average and median of all the high

and low tidal levels records for the period are both 2.05 ft. msl, suggesting a normal distribution for tidal change cycles.

2.4.3 Groundwater

Groundwater flows under the Aerovox Site from west to east. Most of the aquifer in the vicinity of the Aerovox is relatively shallow. The bulk of the aquifer is comprised of glacially derived stratified sands deposited within a narrow bedrock valley. The sand deposits through the aquifer thins out to the west due to the steep bedrock slope and overlying glacial till material.

Groundwater movement under the NBH Site is typical of New England bedrock valley aquifers. The aquifer is bounded by elevated gneiss bedrock and till to the west. The bedrock and till provide limited groundwater storage capacity and are both relatively impermeable materials.

The shallow aquifer receives its recharge from rainfall and flows toward the lower lying Upper Harbor. The groundwater flow is thus largely driven by topography with flow from west to east. Detailed water measurement data and constructed water contour maps from two events (low tidal and high tidal condition) are presented in the Aerovox Phase II CSA report (AECOM 2015; Figures 2-14 and 2-19). The eastern flow pattern is generally shown in the figures. These figures also show the potential buffering impact of the sheet-pile walls on the groundwater levels at the shallow wells just west (on-shore side) of the wells. These shallow wells maintain relatively higher water levels even under low tidal harbor conditions.

3.0 Construction of Aerovox and Harbor Groundwater Flow Model

This section presents the construction and development of the Aerovox and Harbor site specific groundwater flow model. The objectives of the groundwater modeling are to delineate the PCB discharge to the harbor and estimate the groundwater and PCB mass flux into the nearby harbor area as input to the interim cap design.

3.1 Previous Groundwater Modeling Study

Brown and Caldwell developed a groundwater flow model for the Aerovox site during the Phase III Remedial Action Plan (Brown and Caldwell 2016). The numerical groundwater flow model was developed to evaluate, confirm and, where appropriate, refine the understanding of groundwater behavior in and around the Aerovox site to support the development of a Phase III Remedial Action Plan. The model was subsequently used to:

- Evaluate how groundwater would be influenced by the implementation of various remedial alternatives that may be considered;
- Assess whether, and the degree to which remedial alternatives would require groundwater management (e.g., groundwater extraction, containment, etc.); and
- Provide an initial evaluation of approaches for groundwater management, if required.

This model was constructed primarily for the on-shore Aerovox site. It incorporated all data from the lithologic and field investigations conducted at the site up to 2016. This on-shore lithological information used for that model was considered for the initial development of the Aerovox and Harbor site-specific flow model.

3.2 Construction of the Aerovox and Harbor Groundwater Flow Model

The new groundwater model was developed to provide a detailed representation of both the on-shore Aerovox site and the harbor to meet its objectives in providing input for the interim cap design for the harbor. Therefore, construction of the three-dimensional numerical Aerovox and Harbor site-specific groundwater flow model used all available information from both on-shore and harbor investigations. These data include:

- Land topography;
- Detailed harbor bathymetry;
- Lithological (hydrogeological unit) areal and vertical distribution;
- Physical and hydraulic properties;
- Groundwater and surface water boundary conditions; and
- Groundwater and surface water data.

All these site-specific physical conditions are represented in the 3-D numerical model.

Simulation of groundwater flow near the Aerovox site was performed using MODFLOW (McDonald and Harbaugh 1988), which is a finite-difference groundwater flow code developed by the U.S. Geological Survey (USGS). MODFLOW is capable of simulating both transient and steady state saturated groundwater flow in one, two, or three dimensions. A number of different boundary conditions are available; including general head, areal recharge, injection or extraction wells, evapotranspiration, drains, and streams or rivers. The code simulates groundwater flow using a block-centered, finite difference approach. Aquifers can be simulated as unconfined, confined, or a combination of unconfined and confined. The finite-difference equations may be solved using a strongly implicit procedure, slice-successive over-relaxation, or preconditioned conjugate gradient method.

MODFLOW was selected for the site because it is in the public domain, is widely used by the scientific community, has been rigorously tested and verified, and provides a variety of software tools that are publicly available for graphical pre-processing and post processing. The model code was also used for the groundwater modeling for the proposed confined disposal facility (CDF) C for the NBH site (FW 2001), the Pilot CDF facility (Jacobs 2015), and the Aerovox site (Brown and Caldwell 2016).

Groundwater Vistas (ESI 2011), a graphic modeling interface software suite containing the MODFLOW model and other models with pre- and post-processing capabilities, was used for the model construction, refinement, simulation, and result process/visualization.

3.2.1 Aerovox and Harbor Model Domain and Discretization

The site-specific groundwater flow model domain was set to be near the natural groundwater/surface water flow boundary or at locations far enough from areas of interest that any boundary variation would have minimal impact on the groundwater flow regime within the model domain. The model domain covers an area from 100 ft. west of the former Aerovox site in the west to the middle channel of the harbor in the east and 450 ft. north of the Aerovox site boundary to the north and approximately 625 ft. south to the Aerovox boundary in the south (Figure 3-1). The active model domain covers 2,225,200 square feet (ft^2) (51.1 acres) in area.

The western domain boundary lies at west of the former Aerovox site where the land topography rises upward with increasing bedrock elevation. The eastern domain boundary is the center of NBH. The southern and northern boundaries are set far enough from the Aerovox Site that there will be no hydraulic impact from the boundary conditions on the simulation of the groundwater flow near the Aerovox Site. The hydraulic gradients along the southern and northern boundaries are also parallel to these boundaries so there is likely minimal groundwater flow across them.

Discretization is the process of transferring continuous functions, models, variables, and equations into discrete units in a numerical representation. Model discretization refers to the assignment and alignment of the numerical cells in the model and establishes its relationship of those cells to actual natural and engineered conditions.

The model uses a uniform areal (horizontal) grid system. The grid sizes are 10 ft. by 10 ft. across the model domain. This horizontal grid size was adequate to represent the site's features and to provide sufficient flow resolution for the purpose of the modeling analysis (Figure 3-2).

The model uses six variable thickness layers to represent the variability of the strata and their vertical distributions. The represented strata include harbor marine sediment, on land fill material, peat, glacial sand/till, and bedrock. To represent the weathering of the bedrock zone and its potential to transfer water due to weathering fractures, the bedrock is defined as multiple zones from the top to the bottom. The upper bedrock zone is represented as weathered bedrock, followed by less fractured bedrock, and competent bedrock in the lower zone. The competent bedrock zone is assumed to be an aquitard where very little active groundwater flow occurs due to limited porosity. The top of the competent bedrock zone is assumed to be -180 ft. msl in the model, a significant depth where the interaction of on-site groundwater and harbor would be minimally affected by the defined boundary conditions. Therefore, the bottom of the model is set at -180 ft. msl where it is a no-flow boundary. Figure 3-3 shows a cross section of the model from the west to the east.

The constructed model has 150 rows, 200 columns, and six layers. It has a total of 180,000 cells with 133,512 active cells in the model.

3.2.2 Model Layer Geometry

The upper boundary (top of the model layer 1) reflects the current land topography and harbor bathometry. The current land topography is based on the topographic data obtained from MassGIS (MassGIS 2017). The dataset is the 2006 Light Detection and Ranging (LIDAR) data by the Federal Emergency Management Agency (FEMA) for Bristol and Plymouth Counties. The harbor bathymetry data are based on the 2017 dataset (Jacobs 2017). The two sets of data were combined to create the model layer 1 topo using SURFER, a 3-D mapping and graphic visualization tool software (Golden Software 2016). Figure 3-4 shows the topography and bathymetry of the site.

The first two model layers represent the fill materials on land, peat, and marine sediment in the harbor. Layer 3 represents the stratified glacial sand/till. Layers 4, 5, and 6 represent the weathered bedrock, fractured bedrock, and less fractured bedrock, respectively.

The surface of the glacial sand/till and bedrock at the Aerovox site has been well defined through Phase II and Phase III investigations (AECOM 2015; Brown and Caldwell 2016). Based on these investigations, Brown and Caldwell constructed two surfaces for the Aerovox site and applied the surfaces in its groundwater model

(Brown and Caldwell 2016). The surface information was used as the on-shore data for this model development. The on-shore data, along with glacial sand and bedrock elevations determined from the boring logs in the harbor conducted during this model development analysis, were used to construct the glacial sand/till and weathered bedrock surface for this Aerovox and Harbor model. The surfaces are used to define the tops of the model layers 3 and 4, respectively. The peat layer identified at the Aerovox site and within the harbor as shown in Figure 2-13 of the Aerovox Phase II CSA (AECOM 2015) and is represented within model layer 2. Layer 2 is assumed to be 2 ft. in thickness.

The bedrock is divided into three zones from the top to the bottom in the model layers as weathered bedrock (model layer 4), followed by fractured bedrock (model layer 5), and less fractured bedrock (model layer 6). Model layer 4 is assumed to have a thickness of 30 ft. and model layer 5 is assumed to have a thickness of 50 ft. The top of the competent bedrock is assumed to be -180 ft. msl that forms the base of model.

3.2.3 Boundary Conditions

Boundary conditions in the model refer to both external and internal model cells that are defined to react in a specific way during the numerical model simulation. External conditions include boundary conditions along all six sides of the model, and internal boundary conditions including well, wall, river, drain, or other defined features.

The Aerovox and Harbor flow model assumes a constant head boundary along the west side of the model. Based on the long-term groundwater monitoring data, a constant head value of 3.5 ft. msl is assumed for all these cells. The constant head condition allows the groundwater to flow into and out of the model based on head difference among the model cells. The model boundary was established at a sufficient distance from the key plume and assessment locations so the constant head boundary would not affect the changes to the flow regime near the on-shore and harbor areas.

A no-flow boundary was assumed to occur along the middle channel of the harbor that forms the east side of the model. This was based on the general assumption that the middle of the harbor is either the natural groundwater convergent or divergent flow boundary; a boundary the groundwater will not cross. A no-flow boundary was also assumed for the southern and northern extents. The general groundwater flow is eastward, parallel to these boundaries so that there was likely minimal groundwater flow across these boundaries. As mentioned earlier, the bottom of the model at -180 ft. msl is assumed to be a no-flow boundary for the competent bedrock zone.

The river package was used for the top model layer (#1) cells within the harbor area. The streambed bottom elevation varies according to harbor bathymetry. The river boundary was selected because the river cells allow variable groundwater-surface water interaction through the harbor cells under various tidal head condition and streambed topography.

Figure 3-5 shows the boundary conditions applied in the model.

Precipitation is the sole source of groundwater recharge for the on-shore portion of the topmost layers in the model. Groundwater recharge is a function of precipitation, runoff, and evapotranspiration. The net recharge to groundwater is therefore a function of infrastructure, geologic strata, surface slope, and vegetation. Different recharge rates were assigned to the model based on these site conditions. Existing buildings, for example, might have very little recharge, followed by the capped Aerovox site where the pavement prevents most

recharge to the groundwater. The model cells within the harbor have zero recharge defined in the model because these cells have been defined as river cells.

Even though the large industrial buildings and paved area may either have minimal or reduced recharge over most of the footprint, there are many roof drain points and surface storm run-off drains and ditches that may provide some groundwater recharge to the aquifer along these locations. To determine these recharge features would be time consuming and uncertain. Because this model is primarily applied to the areas between the contaminant locations near the shoreline and harbor area, a low uniform recharge rate was applied for the whole building footprint area and the paved areas. The asphalt cap was placed over the whole Aerovox site. The 3-in. thick asphalt cap would have minimal groundwater recharge through the cap, if the cap functions perfectly. However, to apply the model to a long-term scenario, the cap is assumed to have leakage so that surface water will go through the cap to recharge the groundwater. Therefore, these recharge assumptions in the model are likely conservative (i.e., higher recharge groundwater flux).

The net groundwater recharge rates were adjusted during model calibration. The recharge zones applied in the final model are shown in Figure 3-6.

3.2.4 Aquifer Materials and Hydraulic Properties

Based on the previous Aerovox site, harbor investigations, and field activities associated with this cap design action, the main aquifer material types were identified:

- Fill material and shallow on-shore soil;
- Peat;
- Marine sediment;
- Glacial sand/till; and
- Bedrock (weathered, fractured, less fractured, and competent).

Figure 3-7 shows the areal distribution of the aquifer materials in model layers 1, 2, and 3, respectively. The areal distribution of the materials was defined based on previous site investigation (AECOM 2015; Jacobs 2017). Model layers 4, 5, and 6 have the same aquifer properties (weathered, fractured, and less fractured). The vertical west-east section from the Aerovox site to the harbor is also presented in the figure which shows all the hydraulic conductivity values for the materials that were assigned based on site specific data and literature values for the applied materials types. Hydraulic conductivity values were measured in the laboratory for marine sediment and glacial till samples obtained from the three borings during the cap design field investigation. These marine sediments are organic clay and organic silt. The five measured values of vertical hydraulic conductivity for the marine deposits were in the range of 1E-06 to 1E-08 centimeters per second (cm/s) (2.2E-06, 3.2E-07, 1.46E-07, 1.4E-07, to 6.4E-08 cm/s) for the 1-ft. sample interval measured. The measured hydraulic conductivity for the glacial till sample was 1.2E-07 cm/s. These values are quite low for the respective material types compared to the standard values based on the texture of the material and typical ranges reported in the literatures. Therefore, the site-specific data were used as initial model input parameters and subsequently applied values in the final model were adjusted based on the model calibration.

To reflect the true anisotropic nature, the materials were represented by using different horizontal and vertical hydraulic conductivity values. Table 3-1 lists the hydraulic property values for the materials for the final calibration run.

3.2.5 Engineered Construction Features

The sheet-pile walls that were installed in the 1980s along the harbor boundary at the Aerovox site were intended to cut off migration of PCBs to the harbor. The sheet-pile wall was installed to the bottom of the peat layer. These vertical construction features might have the greatest potential impact on the shallow groundwater flow from the site into the harbor because shallow groundwater movement is predominantly horizontal.

The sheet piles were represented in the model by a wall package. Representative hydraulic conductivities of the sheet piles are based on standard values (1.0E-07 cm/s). An effective wall thickness of 0.1 ft. was assumed in the model. Because the sheet piles were placed to the bottom of the peat, the sheet-pile walls are represented in model layers 1 and 2 as shown in Figure 3-5.

3.2.6 Constructed Flow Model Summary

Table 3-2 lists the model summary information on model domain, grid, boundary conditions, and key parameters.

4.0 Flow Model Calibration and Application

After the 3-D model was constructed, the MODFLOW 2000 code (Harbaugh, et al 2000) was used to conduct the flow model runs to perform calibration, mass balance, simulations, and sensitivity analyses. MODFLOW-2000 code is an improved version of the original MODFLOW.

4.1 Flow Model Calibration and Mass Balance Check

Calibration of a groundwater flow model refers to the process of adjusting model input parameters (e.g., hydraulic conductivity) and boundary conditions (e.g., precipitation recharge, stream and river conductances, etc.) to obtain a reasonable match in water flow directions and field, potentiometric surface, and mass balance between conceptual model/field observed and model simulated conditions. In practice, this usually involves an iterative process of adjusting hydraulic properties and/or boundary conditions in the model. For all stages of the model calibration process, parameter values and boundary conditions were constrained by hydrogeologic data collected in the field and literature values.

As reported in the Aerovox Phase II CSA report (AECOM 2015), the water levels at the site were strongly influenced by the daily tidal levels in the harbor. The tidal cycles recorded between October 1 and December 31 of 2017 varied between approximately 5.1 and -0.6 ft. The average and median of all the high and low tidal levels both are 2.05 ft, suggesting a normal distribution of tidal change cycles.

During the model calibration, adjustments in recharge and hydraulic conductivity were performed because they are the parameters with the highest uncertainty. The groundwater water levels at the site were used as calibration targets. Detailed water measurement data and water contour maps are presented in the Aerovox Phase II CSA report (Figure 2-14 and 2-19) (AECOM 2015). Due to the high variability of the water levels and their transient nature in response to tidal levels in the harbor, several steady state model simulations were

performed by applying variable tidal levels in the harbor (river stage elevations in the model). Five river stages were applied for the model runs: (1) the highest tidal level (5.1 ft. msl); (2) the lowest tidal level (-0.6 ft. msl); (3) average of all high and low tidal levels (likely mean harbor level is 2.05 ft. msl); (4) the average of the all high tidal levels (3.9 ft. msl); and (5) the average of the all low tidal levels (0.2 ft. msl). As discussed in section 2.4.2, these tidal levels were recorded between October 1 and December 31 of 2017.

The groundwater elevations at the Aerovox site change due to regular, continuous daily tides. This is in contrast to a typical aquifer setting where water level changes are often identified over a much longer period of time. A synoptic water level measurement event in a typical aquifer setting in the field (in a day or few days) can be considered to be in equilibrium (steady-state) with all of its boundary conditions. Therefore, the water levels at the monitoring wells under tidal influence may not be in equilibrium either within the dataset (not at same time) or within the boundary conditions due to their transient nature and delayed response to the boundary conditions. Taking these detailed fluctuations into account in a model calibration would require detailed, small time-step transient simulations and application of additional numerical input parameters in the model that are not available in the field, such as specific storativity. It would require extensive effort beyond the scope of the analysis. Because this model is primarily used to predict long term impact of PCBs to the harbor, application of the small time-step transient model would be impractical as well. Therefore, a steady-state model simulation approach using multiple boundary conditions was used. Often, over long periods of modeled time, the difference in the mass balance calculations between the steady state and the transient models is minimal if the steady-state condition represents the average condition of the transient states.

Figure 4-1 shows the model predicted potentiometric maps at various model layers for the tidal level of 2.05 ft. msl, the average harbor level. Under this condition, the water levels at the Aerovox site range from 2.1 to 3.5 ft. Due to the presence of the peat layer and its impact on the groundwater movement, there are slightly higher water levels for the area where the peat layer is present. The predicted water contours in shallow water zones also show the impact of the sheet pile wall, which impedes the groundwater flow. The water levels predicted by the model match reasonably well with the water level ranges recorded at the monitoring wells under various tidal conditions.

The maps in Figure 4-1 also show the flow vectors that indicate the flow direction and relative flow velocity in three dimensions. As the figure shows, the groundwater flow is primarily toward the harbor with a relatively small flow gradient. The shallow model layers on shore have downward flow gradients while the groundwater is discharging into the harbor. The model results match well with the site conceptual model and the general understanding of the flow regime.

Based on the multiple model simulations during the model calibration, the final model parameters were selected as discussed earlier.

The water balance for the model runs also shows that all water has been mathematically accounted for, and that the MODFLOW simulation has correctly solved the governing flow equations. The water balance error for the model simulations are mostly less than 0.1%, which is well within the typically accepted limit (5%) of model calibration.

4.2 Model Application

After the model input parameters were finalized during model calibration, the calibrated flow model was used to simulate the groundwater flow under various harbor conditions. These generated flow fields were used to develop an additional fate-transport model for PCBs.

The same five river stages used in model calibration effort were also applied for the final model runs after model calibration:

- the highest tidal level (5.1 ft. msl) - This is the highest tidal level recorded for the period;
- the lowest tidal level (-0.6 ft. msl) - This is the lowest tidal level recorded for the period;
- the average of all high and low tidal levels (mean harbor level at 2.05 ft. msl);
- the average of the all high tidal levels (3.9 ft. msl) - This is the higher tidal level based on the average of the high tide elevation; and
- the average of the all low tidal levels (0.2 ft. msl) - This is the lower tidal level based on the average of the low tide elevation.

Of the five harbor conditions, only the average of the all tidal levels represents a relatively steady-state condition level. All others are only applied for a very short period of time. Therefore, the groundwater levels at the site are not likely to be in equilibrium with these harbor boundary conditions.

Figure 4-2 shows the results for harbor conditions using the average of the all low tidal levels (0.2 ft. msl). This is the most likely scenario when the groundwater will have the maximum flux into the river if the lower tidal level were to be consistent throughout the day. Compared to the results of the average condition for all tidal levels (high and low) as shown in Figure 4-1, the flow gradient is steeper.

Figure 4-3 shows the results for the harbor condition for the average of the all high tidal levels (3.9 ft. msl). The higher harbor water level would cause the reverse of the flow direction and harbor water will push into the groundwater zone, which varies from the average or low tidal conditions.

Figure 4-4 shows the groundwater flow fields for three conditions in a west-east cross section. The three conditions are the average low tidal, harbor average level, and average high tidal. As illustrated in the figure, the groundwater flow patterns change based on the harbor condition in term of water levels, flow gradients, and flow directions, respectively.

Based on the model predicted flow field, the groundwater discharge flux to the harbor water body within the model domain was calculated. For the average harbor tidal level (2.05 ft. msl), the groundwater discharge flux rate is 1,705.3 cubic feet per day (ft^3/day). For the average low tidal level condition (0.2 ft. msl), the groundwater discharge flux rate to the harbor is 3368.68 ft^3/day. For the average high tidal level condition (3.9 ft. msl), the groundwater discharge flux rate to the harbor is essentially zero.

4.3 Sensitivity Analysis

Several sensitivity runs were conducted to evaluate the impact of the key model parameters and design features. These parameters included:

- Marine sediment hydraulic conductivity
- Wall thickness
- Recharge rate
- Harbor tidal Levels

Table 4-1 summarizes the results and impacts to the groundwater discharge. These results were expected and matched with the general understanding of the conceptual model.

5.0 Aerovox PCB Fate and Transport Analyses

Numerical fate-transport modeling analysis was conducted to evaluate and quantify the potential PCB mass migration out of the Aerovox site and discharge into the surface water of the harbor. The fate transport model was also used to delineate the future PCB discharge areas in the harbor to aid the interim cap design.

5.1 MT3D Fate-Transport Modeling

MT3D (Zheng 1990), a fate-transport model code, was used to predict the future contaminant movement and resultant concentrations.

MT3D is a comprehensive 3-D numerical model for simulating solute transport in complex hydrogeologic settings. MT3D is a numerical simulation code that models the fate and transport of dissolved, single-species contaminants in saturated groundwater systems. MT3D calculates concentration distributions, concentration histories at selected receptor points and hydraulic sinks (e.g., extraction wells), and the mass of contaminants in the groundwater system. The code can simulate 3-D transport in complex steady-state and transient flow fields and can represent anisotropic dispersion, source-sink mixing processes, first-order transformation reactions, and linear and nonlinear sorption. MT3D is linked with the USGS groundwater flow simulator, MODFLOW, and is designed specifically to handle advective-dominated transport problems without the need to construct refined models specifically for solute transport.

To model PCB fate and transport, input parameters were developed to describe hydrodynamic dispersion, retardation, and degradation processes. These parameters include dispersivity, soil/water partition coefficient (Kd), and contaminant half-life. Contaminant release mechanisms or processes, such as source location and release history, and present contaminant distribution are also important. Bulk density and porosity are physical parameters of the aquifer matrix that also influence contaminant transport.

Initial and boundary conditions were developed for the fate-transport model. Initial conditions include the current distribution of PCBs in sediment. Boundary conditions retained from the NBH Aerovox flow model include sources, general head boundaries, no-flow boundaries, and recharge.

5.2 Transport Model Parameters

Physical, chemical, and biological processes that potentially influence contaminant fate and transport of PCB in groundwater at Aerovox include:

- Advection;

- Hydrodynamic dispersion;
- Retardation; and
- Biodegradation.

Parameters Controlling Advection

Advection involves physical transport of contaminants entrained in flowing groundwater. Model parameters that control advection include hydraulic gradients, vertical and horizontal hydraulic conductivity, and porosity. The values from the calibrated NBH Aerovox flow model were used for the fate-transport modeling.

Hydrodynamic Dispersion Parameters

Hydrodynamic dispersion refers to the spreading of a solute by the combined action of mechanical dispersion and molecular diffusion. Dispersion causes some of the solute to move faster and some to move slower than the average linear velocity of groundwater. Mechanical dispersion is caused by the variations in the magnitude and direction of velocity of groundwater. Molecular diffusion results from solute concentration gradients, which cause the solute to move from regions of higher concentration to regions of lower concentration. Solute-transport modeling uses longitudinal, transverse, and vertical dispersivities to describe the mechanical dispersion in a 3-D porous medium. Dispersivity is an aquifer property and is not contaminant-specific.

Based on the extensive studies performed at the Massachusetts Military Reservation, Otis Air National Guard Base site on the material types and properties that are similar to the NBH [Air Force Center for Engineering and the Environment (AFCEE) 1999], a longitudinal dispersivity of 1 ft, a transverse dispersivity of 0.1 ft., and a vertical dispersivity of 0.01 ft. were used for the Aerovox site (Table 5-1).

Retardation Parameters

Adsorption of contaminants to the aquifer matrix retards their rates of migration. For a given mass of contaminant, the fraction available for advective transport is influenced by the adsorptive properties of the soil matrix. The Kd describes the ratio of adsorbed to dissolved contaminant. The retardation factor is the empirical parameter commonly used in transport models to describe the chemical interaction between a constituent and geological materials (i.e., soils, sediments, and rocks). The retardation factor accounts for processes such as surface adsorption, absorption into the soil structure, chemical precipitation, and physical filtration of colloids. The retardation factor (Rf) is defined as:

$$R_f = 1 + K_d \frac{\rho_b}{n_e} \qquad (1)$$

Where: ρ_b = bulk density of the soil (grams per cubic centimeter [g/cm^3]),
n_e = effective porosity of aquifer matrix (volume/volume), and
K_d = soil/water partition coefficient (grams per milliliter [g/mL]).

For a given mass of constituent, the fraction available for advective transport is influenced by the sorptive properties of the geologic matrix. The solid/water partition coefficient is very important in estimating the potential

for the sorption of dissolved constituents in contact with subsurface media. The Kd describes the ratio of sorbed to dissolved constituent:

$$K_d = \frac{C_s}{C_{aq}} \quad (2)$$

Where: C_s = concentration of solute in soil (milligrams per gram [mg/g]), and
C_{aq} = concentration of solute in aqueous solution (g/mL).

The linear, Freundlich, and Langmuir isotherms are the most commonly used relations for describing equilibrium controlled reversible sorption. These sorption isotherms describe the functional relationship between dissolved and sorbed constituent concentrations at equilibrium under a constant temperature. The linear sorption isotherm assumes that the sorbed concentration is directly proportional to the dissolved concentration. The nonlinear Freundlich and Langmuir isotherms require definition of empirical values that are obtained from experimental measurements. Empirical parameters necessary to implement Freundlich or Langmuir isotherms are lacking for this site; hence, the linear isotherm is employed in transport simulations. The linear isotherm uses a single distribution coefficient, Kd, to define the relationship between the constituent concentrations in the dissolved phase and the concentrations of sorbed material in the porous matrix.

Porosity affects the transport calculation in two important ways. It is a factor in calculating seepage velocity, which controls advective transport, and it defines the pore volume of a model cell available for storage of constituent mass. Bulk density of the hydrogeologic media also affects the retardation as indicated by the equation above.

For the hydrogeological units and material types used in the model, site-specific data from the site are applied if they are available. For those not available, general literature values are used.

The Kd values for various PCBs were calculated from an average organic carbon fraction (foc) for the Aerovox and aquifer materials from the cap field investigation and organic carbon-water partition coefficients (Koc) of PCB compounds (U.S. Department of Energy 2017). For PCBs, the Kds were calculated based on relationship:

$$Kd = Koc * foc \quad (3)$$

Table 5-1 lists the key PCB chemical properties and applied fate-transport parameters used for the model simulations.

Degradation Parameters

Degradation in groundwater refers to chemical changes in a contaminant due to processes such as microbial activity either in the presence of oxygen (aerobic) or in its absence (anaerobic). These changes transform a contaminant into another distinct chemical constituent or breakdown product. Degradation rates are stated in terms of the half-life of a contaminant. The half-life of a constituent is the time for one half of the total mass to decay.

For this analysis, no decay of PCB was used during solute transport simulation. This means that the only mechanism for mass reduction within the model domain is by outflow through model boundary conditions (river cells).

5.3 Current PCB Contamination and Model Representation

The current PCB soil and sediment concentrations at Aerovox site and in the harbor have been identified (Jacobs 2017). Figure 5-1 shows the total PCB distribution in the shallow and the deep soil/sediment zone.

The soil and sediment concentration and distribution were mapped into the 3-D Aerovox and harbor model as the current condition. Figure 5-2 shows the model representation of the PCB current sources. To represent the total mass in the system as close as possible, the average concentrations for each range were assumed for each zone as shown in the figure. For example, 5.5 milligrams per kilogram (mg/kg) is assumed to be the concentration for the 1 - 10 mg/kg zone. The sources were used as the starting condition for the fate-transport model prediction projected over time in the simulation.

The initial groundwater concentrations for the source zone assigned in the groundwater model were calculated from the soil concentration based on the linear isotherm equilibrium used from the Kd values developed for applicable material types as listed in Table 5-1. The calculated groundwater concentrations for the source zone in the marine sediment range from 0.00147 milligrams per liter (mg/L) for a PCB sediment concentration of 5.5 mg/kg to 2.67 mg/L for a sediment concentration of 10,000 mg/kg.

One consideration in the fate-transport modeling of the PCB in the groundwater system is the solubility limit of the PCB compounds. As shown in Table 5-1, the three PCB compounds have solubility limits of 0.277, 0.1, 0.043 mg/L, respectively. PCB 1242 has the highest solubility (0.277 mg/L). Therefore, applying the calculated groundwater concentration in the highly contaminated source zones based on Kd relationship would result in concentrations above the solubility limit. To represent these source areas properly with consideration of the solubility limit in the groundwater fate-transport model, the higher solubility limit of PCB-1242 (0.277 mg/L) was applied for these areas where calculated groundwater concentrations are higher. In addition, to represent the continuous long-term release of these highly contaminated sources zones, a constant source (in terms of source aqueous concentration) was applied for these areas for the modeling period (100 years). This scenario will produce the maximum impact (highest contaminant flux) to the harbor water body from the contaminated soil/sediment sources through the groundwater pathway. For the modeling analysis, these constant source zones are the areas with soil concentrations above 1,000 mg/kg (Figure 5-1).

5.4 Fate and Transport Modeling of PCBs

The fate-transport transport modeling was performed using the MT3DMS code (Zheng and Wang 1999). It is a modular three-dimensional multi-species transport model for simulation of advection, dispersion, and chemical reactions of constituents in groundwater systems. MT3DMS is an expanded capability version of the original MT3D code (Zheng 1990). MT3DMS is linked with MODFLOW flow model results to specifically handle advectively-dominated transport problems.

Fate-transport modeling simulations were conducted for three key PCB Aroclors, including PCB 1242, 1248, and 1252. Due to the complex nature of the total PCB composition in the soil and sediment, and for each model run, each individual PCB model is conservatively assumed to have the total PCB concentration as identified at the site (Figure 5-1). For the base case simulation, the fate and transport modeling runs were based on the

groundwater flow field generated from the MODFLOW model for the average tidal level condition (2.05 ft. msl). Each PCB fate and transport model was run for 100 years.

Because PCB-1248 has the lowest Koc among the three PCBs, it has the lowest Kd and it is the most mobile of the three PCBs. Therefore, PCB-1248 was used as a proxy to conservatively model PCBs. Figure 5-3 shows the model-predicted PCB-1248 groundwater plume projected for the 100-year period. The plume at the four intervals was shown (0, 10, 50, and 100 year) in Figure 5-3. The plume maps for each time interval are very similar and there is little migration or reduction in PCB 1248 concentrations. PCB-1248 is relatively immobile in the groundwater flow system in the NBH soil/sediment aquifer matrix.

PCB-1242 and 1254 modeling results were similar to PCB-1248. PCB-1242 result was comparable to the PCB-1248 result because they have very similar Koc (thus Kd) values. PCB-1254 has a much higher Koc (thus larger Kd) and was even less mobile compared to PCB-1242 and 1248 model simulations.

The PCB fate-transport modeling results suggest that, due to the relatively high Kds, PCBs are not very mobile in New Bedford Harbor groundwater. PCB is strongly retarded by the aquifer materials along the flow path. The soil/sediment sources will remain in place and only a small amount of PCBs in the groundwater will discharge into the harbor water even in areas of extremely high PCB concentrations in sediment.

5.5 Modeling of PCBs at Low Tidal Condition

Considering the variable tidal changes at the site, a PCB fate-transport simulation was also run for the low tidal condition. The average of the low tidal level (0.2 ft. msl) in the harbor was used. PCB-1248 was used to conduct the simulation.

Figure 5-4 shows the model predicted PCB-1248 groundwater plume changes for the 100-year period for the low tidal condition. The plume at the four intervals is shown in the figure (0, 10, 50, and 100 year). The plume maps for each time-step are comparable with little change to the PCB-1248 plume or reduction in concentration in the contamination area.

The low tidal condition represents a conservative condition because the low tidal level is used as a steady-state (constant) boundary condition. The low tidal harbor condition will create the highest hydraulic gradient across the Aerovox site and the highest vertical gradient under the harbor. However, the condition is not likely because the low tidal levels only happen twice a day for very short time periods. As discussed earlier, the low tidal condition (0.2 ft. msl) is the average of all the lowest tidal level.

5.6 Potential PCB Mass Flux into Harbor

PCB mass flux into the harbor through groundwater pathway was evaluated based on the fate-transport model results for the two representative scenarios discussed above (i.e., the average tidal condition and average of lowest tidal condition). The mass flux is calculated based on groundwater flux rate and concentration at its respective time. The groundwater flux rate is based on flow model simulation and the concentration is based on fate-transport simulation results for the same applied flow condition. Each individual applicable groundwater-harbor water interaction cell (i.e., water flux and concentration) was used to generate the total mass flux. PCB-1248 was used to represent PCBs in the model.

Table 5-2 provides a summary of the model-predicted PCB mass flux into the harbor via groundwater pathway by conductive flow. Because almost all of the contaminated source area is within the footprint of the proposed cap, the PCB mass discharge rate would be the same across the cap area. For the average tidal condition (i.e., 2.05 ft. msl), the total PCB discharge flux rates range from 0.163 to 0.164 kilograms per year (kg/yr) for the 100 year simulation. For the average of low tidal condition (0.2 ft. msl), the total PCB discharge flux rates would be between 0.311 to 0.312 kg/yr. Note that the average low tidal condition is not likely because the harbor would have to maintain tide levels common to daily low tides throughout each day.

Several factors will affect the PCB mass flux rate into the harbor through the groundwater pathway. The key factors are Kd, PCB solubility, and the water flux rate. A higher Kd will reduce the PCB mass discharge into the harbor due to a higher retardation factor. A higher PCB solubility will result in higher mass discharge rate due to elevated groundwater concentrations in the high concentration source areas. The groundwater flux rate is a function of harbor tidal conditions. A higher water flux rate will increase the PCB mass discharge because additional PCB mass dissolved in the groundwater will move or advect with the water flow.

The key factors (Kd, solubility, flux rate) were evaluated in the fate-transport modeling either through sensitivity analyses or use conservative (highest impact) parameters. Three PCB Aroclors (PCB-1242, 1248, and 1254) with variable Kds were modeled. The PCB Aroclor with the lowest Kd (PCB-1248) was used to represent the composite PCB mass discharge in the model. The higher PCB solubility of PCB-1248 (0.277 mg/L) was applied in the model simulation. The modeling of PCB-1248 will likely produce the most adverse impact (higher mass) to the harbor by the groundwater pathway. The average tidal condition in the harbor was used in the model as the base case. However, the average low daily tidal levels was used as a sensitivity run to represent an elevated groundwater flux, and therefore provide a conservative estimate of PCB transport to the harbor.

6.0 Modeling of Proposed Interim Cap Design

The current condition Aerovox and NBH groundwater model was modified to conduct a preliminary evaluation of the likely impact of the proposed Aerovox cap on the groundwater and surface interaction in the harbor area.

6.1 Model Modification

The constructed current condition Aerovox and NBH flow model was modified to incorporate the features of the proposed interim cap. These new features include spatial extent, cover topography, and cap material properties. Figure 6-1 shows the extent of the Aerovox cap. The cap covers all the area of deep PCB contamination while a few small shallow contaminated areas outside of the cap will be dredged. The composition of the cap layers is shown in Figure 6-2.

To represent the future condition after cap is constructed, the current condition groundwater flow model was modified:

- New top model layer
- Cap geometry
- Cap material property

The new model top layer was added to include the new interim cap above the marine sediment. Because the 3-D difference model requires continuation of the model layer at each location, modeling was completed by

dividing model layer 1 in the current flow model into two layers and only the top 0.5 ft. was assigned as the new model layer 1. The additional cap was added to the model layer 1 in the new model based on cap design cover bathymetry. The extent of the cap is based on area as shown in Figure 6-1. The cap consists of mostly sand/gravel materials, with a hydraulic conductivity value of 0.01 cm/s and represents sand material that was assigned for the whole cap profile. Figure 6-3 shows the cap representation in the cap in the flow model both in model layer 1 and in a west-east cross section.

Table 6-1 lists the future condition (capped) model summary information on model domain, grid, boundary conditions, and key parameters.

6.2 Model Result and Conclusions

After the cap was constructed in the model, a flow simulation was conducted to predict the groundwater flow impact around the interim cap area for the average tidal condition (2.05 ft. msl) in the harbor. Figure 6-4 shows the predicted flow field in the same west east cross-section. It is similar to the results of the current condition flow model. The groundwater in the harbor sediment near the cap still maintains the upward flow vector. The model predicted water flux into the harbor within the cap area is 222 ft^3/day under average tidal conditions. The current condition model predicts 203 ft^3/day for the same area. The difference is likely due to the harbor water's horizontal flow into the cap in place and then discharging into other locations in the cap due to minor changes in cap elevation. The water fluxes across the same marine sediment bottom interface in the cap area within the two condition models are 176.6 ft^3/day for the original model and 169.3 ft^3/day for the cap condition model.

The preliminary modeling analysis suggests that there will be very little change in groundwater-surface water interaction in the area with the cap design. This is because the cap layers are composed of high conductivity materials (gravel/sand) that would have minimal impact to the water flux. The lower conductivity marine sediment layer beneath the cap is the unit controlling water flux.

6.3 Fate-Transport Modeling and Mass Flux Evaluation

Fate-transport modeling analysis was conducted to evaluate and quantify the potential PCB mass discharge into the surface water of the harbor after the cap placement.

The impact of the cap on the PCB discharge into harbor has two major effects. First, the cap will provide a physical separation between the contaminated sediment and harbor water. Second, the cap has an organic clay/sand mixing layer that is designed to provide further retardation of the PCB migration.

The applicable foc of the organic clay/sand layer in the model was developed based on literature. The carbon content of the organoclay is about 30 percent organic carbon (CETCO 2014). However, because the cap calls for a mixture of 85 percent sand with 15 percent organoclay, the simple mass based organic carbon content would be 4.5 percent. However, considering the realistic mixture of clay and sand where the clay will likely occupy the pore space of the sand, the effective organic carbon content that the groundwater will interact with when it travels through the sand will be higher. Therefore, a scenario using 10 percent organic carbon content was also considered.

Table 6-2 summarizes the results of the model-predicted PCB mass discharge rates through the cap for the two foc condition runs. Compared to the current condition, the PCB mass discharge into the harbor is greatly

reduced. There will be very little PCB discharge through the cap during the early years resulting from the retardation of the PCB migration due to the newly placed organoclay/sand mixing layer in the cap.

7.0 Conclusions

A detailed groundwater flow and fate-transport analysis was conducted to delineate the discharge of PCBs to the harbor from the Aerovox site via groundwater pathway to support an interim cap design in NBH. A 3-D groundwater model was constructed using the latest Aerovox site and harbor data. This groundwater flow model was first used to predict the groundwater flow regime in the Aerovox area and the adjacent harbor. In addition, fate-transport modeling was conducted to determine the long-term movement of PCBs in groundwater at Aerovox and in the harbor sediment and its potential impact on the harbor surface water.

The fate-transport model results suggest that, due to the relatively high Kd of PCB and relatively low hydraulic gradients of groundwater in a harbor setting strongly influenced by tidal activity, PCB contamination in soil and sediment will likely stay in place and be strongly retarded by the aquifer materials along the flow path. The spread of the PCB contamination through groundwater pathway in the future is limited. Therefore, the cap design is sufficient to reduce the risk of direct exposure. The fate-transport modeling results for PCBs also suggested that the higher level of sediment contamination in the harbor is not likely the result of groundwater migration from the onshore Aerovox subsurface source. As is the case of most of the PCB sediment contamination, the primary pathway is historically direct discharge.

Preliminary groundwater flow modeling based on the proposed design of the interim cap suggests that there will be very little change in groundwater-surface water interaction in the area with the cap design. This is due to the fact that the cap layers are composed of high conductivity materials (gravel/sand) that would have minimal impact to the water flux. Fate-transport modeling of PCB through the cap suggests a significant reduction of PCB mass flux rate into the harbor. The proposed cap design provides both a physical separation between the contaminated sediment and harbor water and further retardation of the PCB migration due to the newly placed organoclay/sand mixing layer in the cap.

8.0 References

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Figures

Legend

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0 600 Feet

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Aerial Photography MASSGIS 2009

JACOBS™

Upper Harbor Showing Former Aerovox Property Location

New Bedford Harbor Superfund Site

NAME: jpiccuito Date: 4/6/2018

Figure 1-1

Path: Y:\NBH\Projects\35BG1001\20180406\ArcGIS\Aerovox_NBH_Location_Map_Final_20180406.mxd

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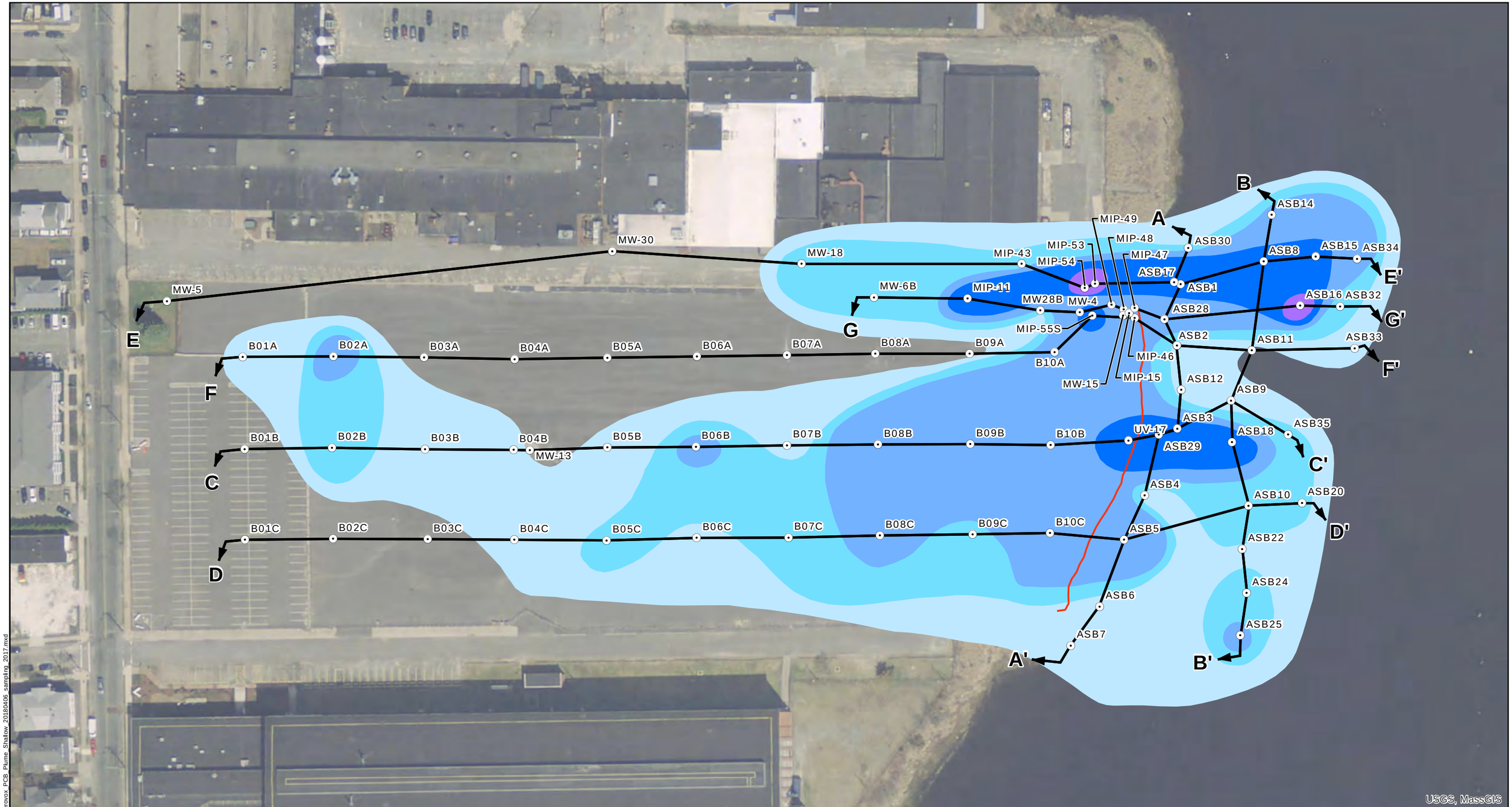
Aerovox Site and
Nearby New Bedford Harbor

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 1 Aerovox Site.cdr

Figure 2-1



Legend

- Aerovox Boring Location
- Aerovox Cross Section Location
- Sheet Pile Location

Total PCB

Concentration (mg/kg)

- 1-10
- 10-100
- 100-1,000
- 1,000-10,000
- >10,000

Shallow Soils/Sediments
Aerovox Site: 0-13 ft bgs
New Bedford Harbor: 0-7 ft bgs

Aerial Photography MASSGIS 2014

N

0 50 100 Feet

1:1,200

JACOBS

PCB Distribution for Former Aerovox Site Area Shallow Soils/Sediments

New Bedford Harbor Superfund Site

Date: 4/6/2018

Figure 2-2

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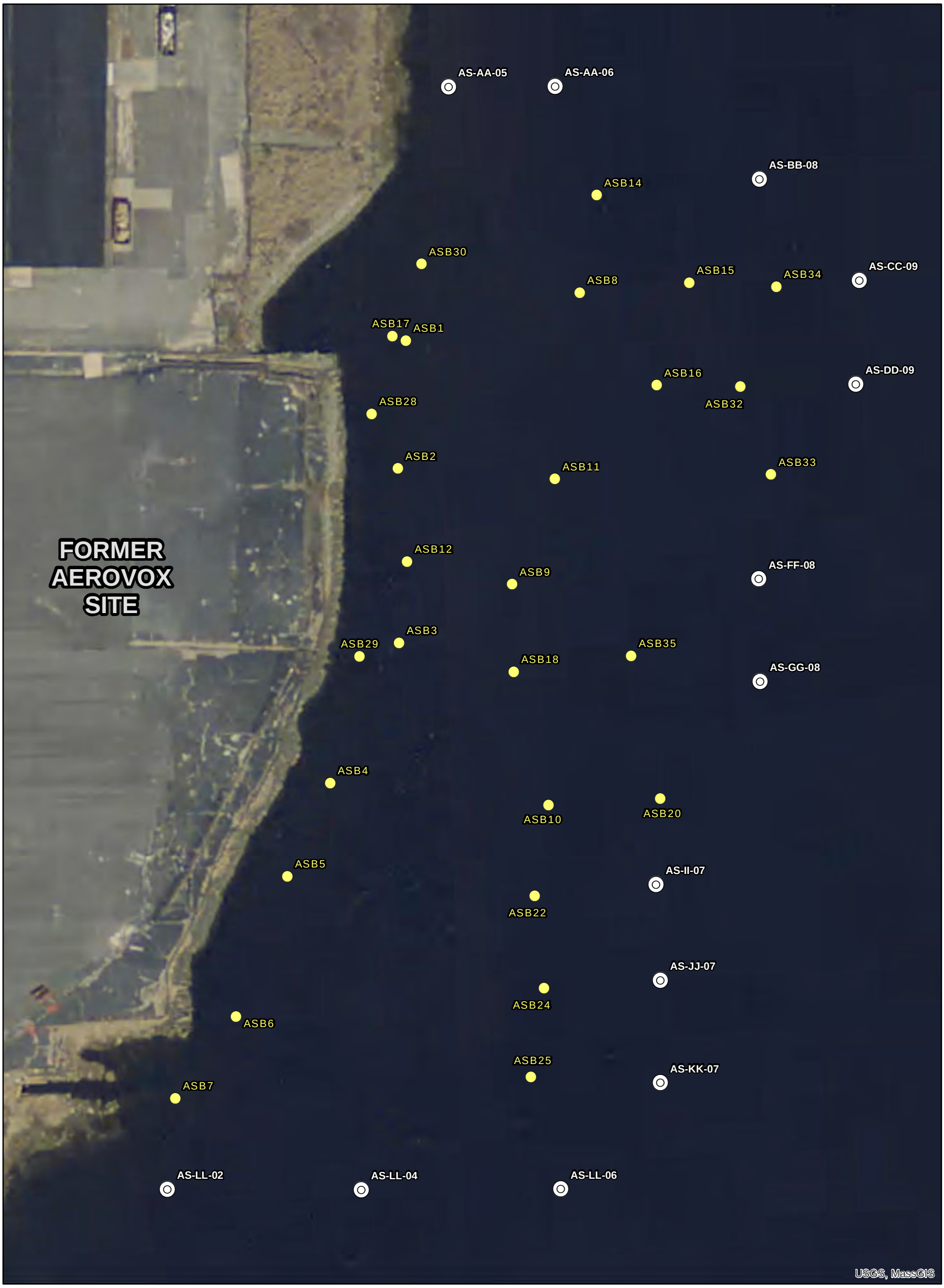

Legend

Aerovox Boring Location

DNAPL Data Gap Sediment Location

N

0 25 50 Feet 1:600

JACOBS

Aerovox DNAPL Data Gap Sampling Locations

New Bedford Harbor Superfund Site

Date: 4/6/2018

Figure 2-3

Path: Y:\NBH\Projects\35BG1001\20180406\ArcGIS\Aerovox_DNAPL_data_gap_locations_20180406.mxd

Legend

- Aerovox Boring Location
- Aerovox New Boring Location

N

0 25 50 Feet 1:600

JACOBS

Aerovox Borehole Locations

New Bedford Harbor Superfund Site

Date: 4/6/2018

Figure 2-4

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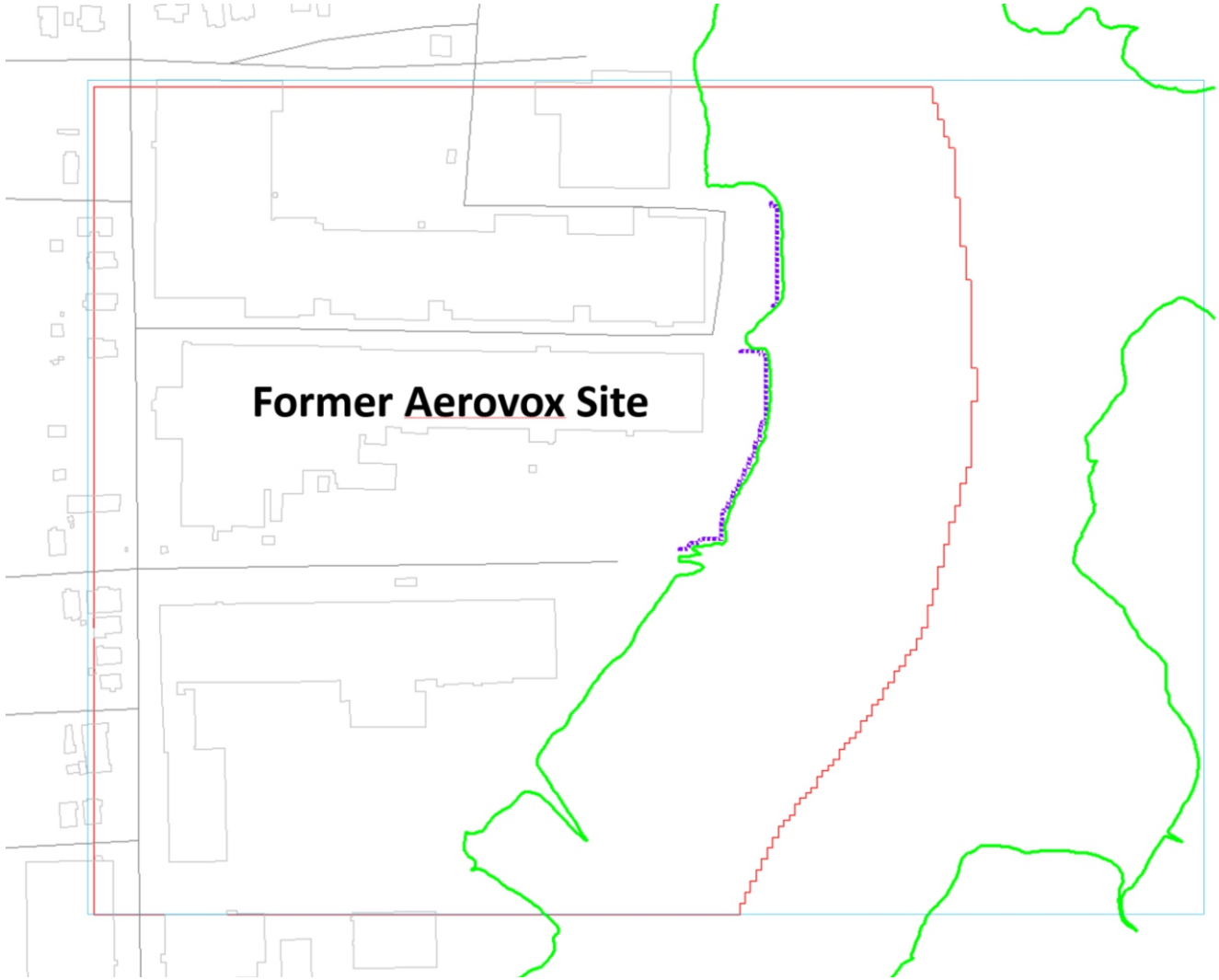

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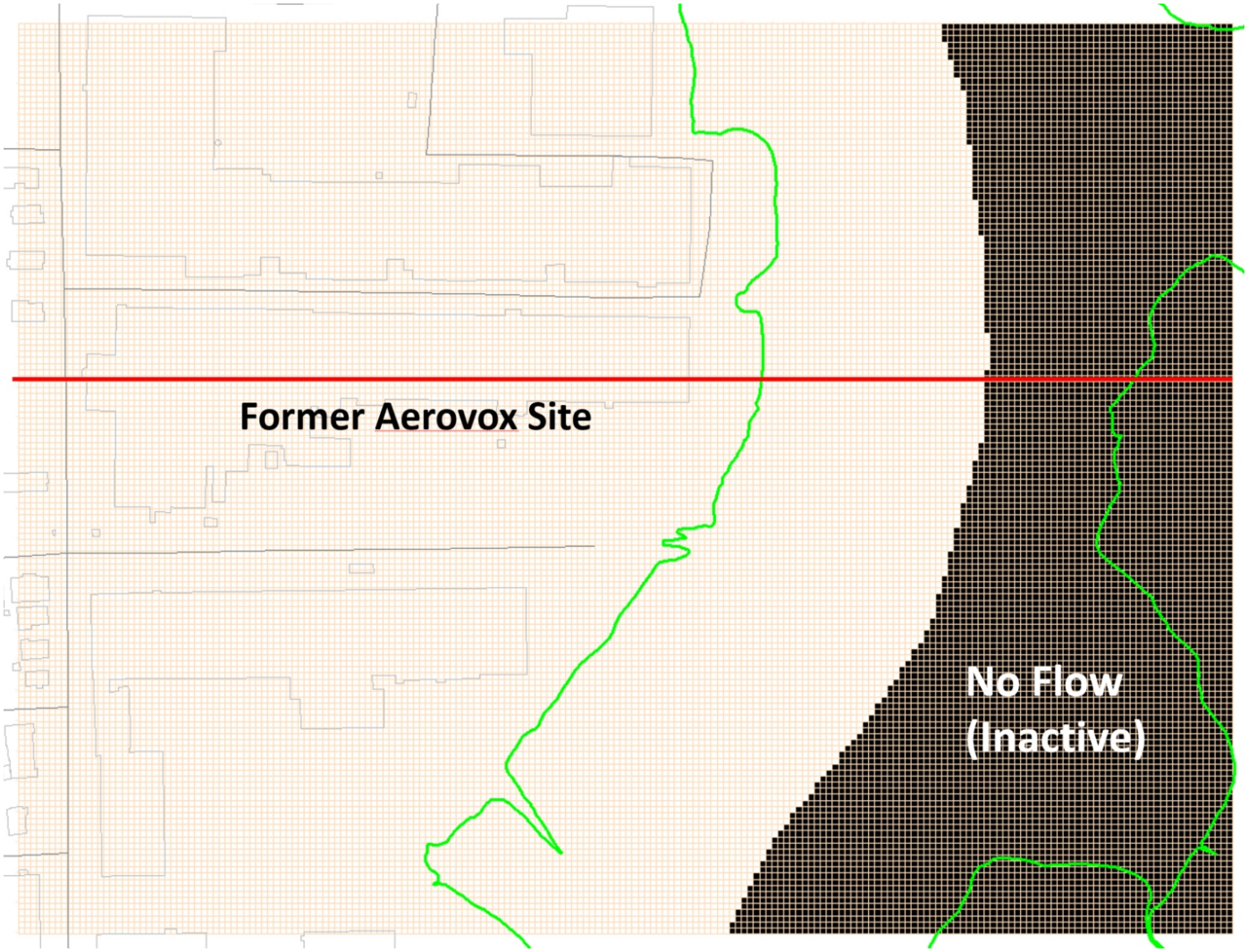
Aerovox and Harbor
Model Domain

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-1 Model Domain.cdr

Figure 3-1



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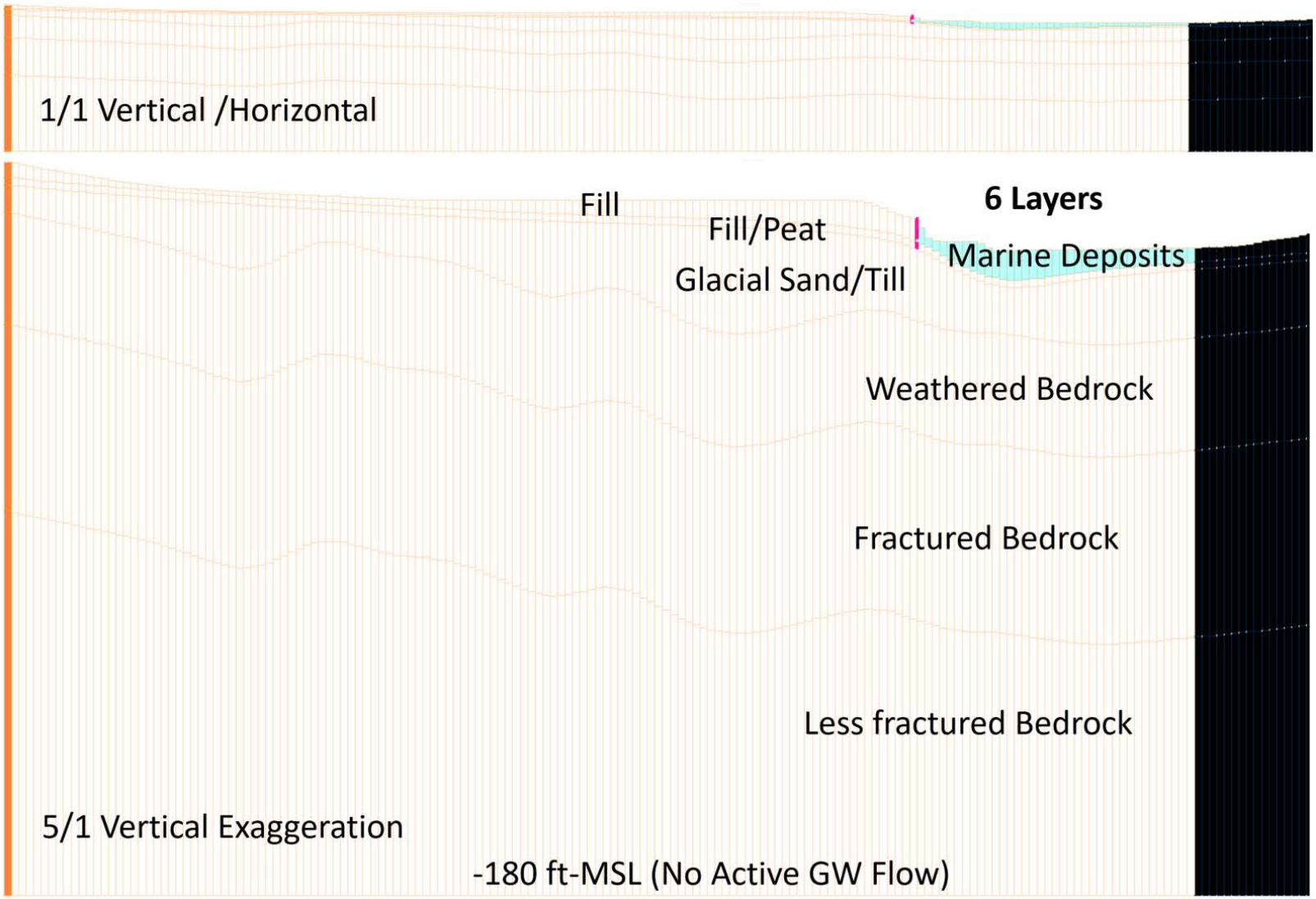
Aerovox and Harbor
Model Grid

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-2 Model Grid.cdr

Figure 3-2



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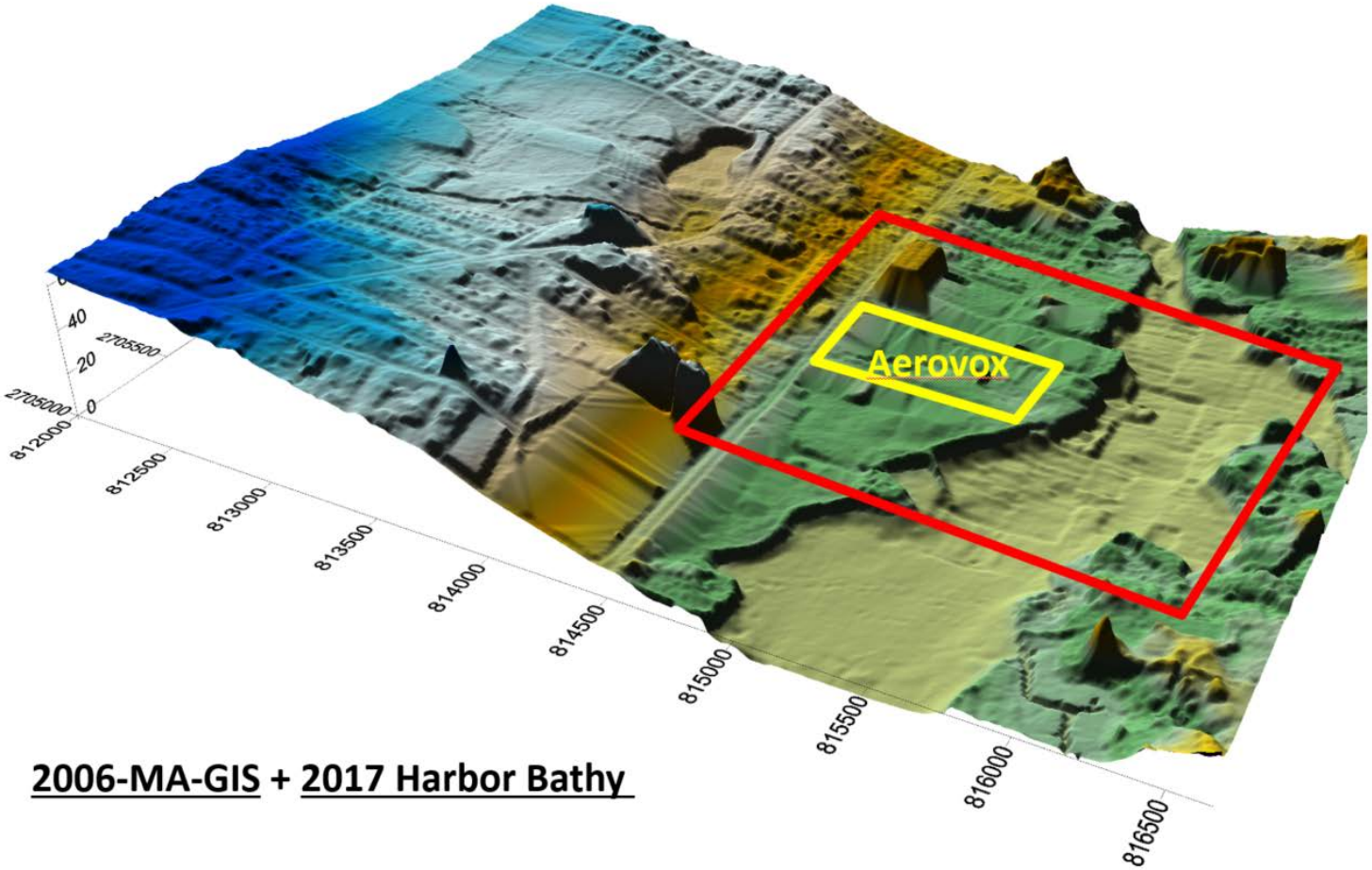
Aerovox and Harbor Model Vertical Presentation

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

Figure 3-3

Site-Topo with Harbor Bathymetry
(Model Domain - RED)



2006-MA-GIS + 2017 Harbor Bathy

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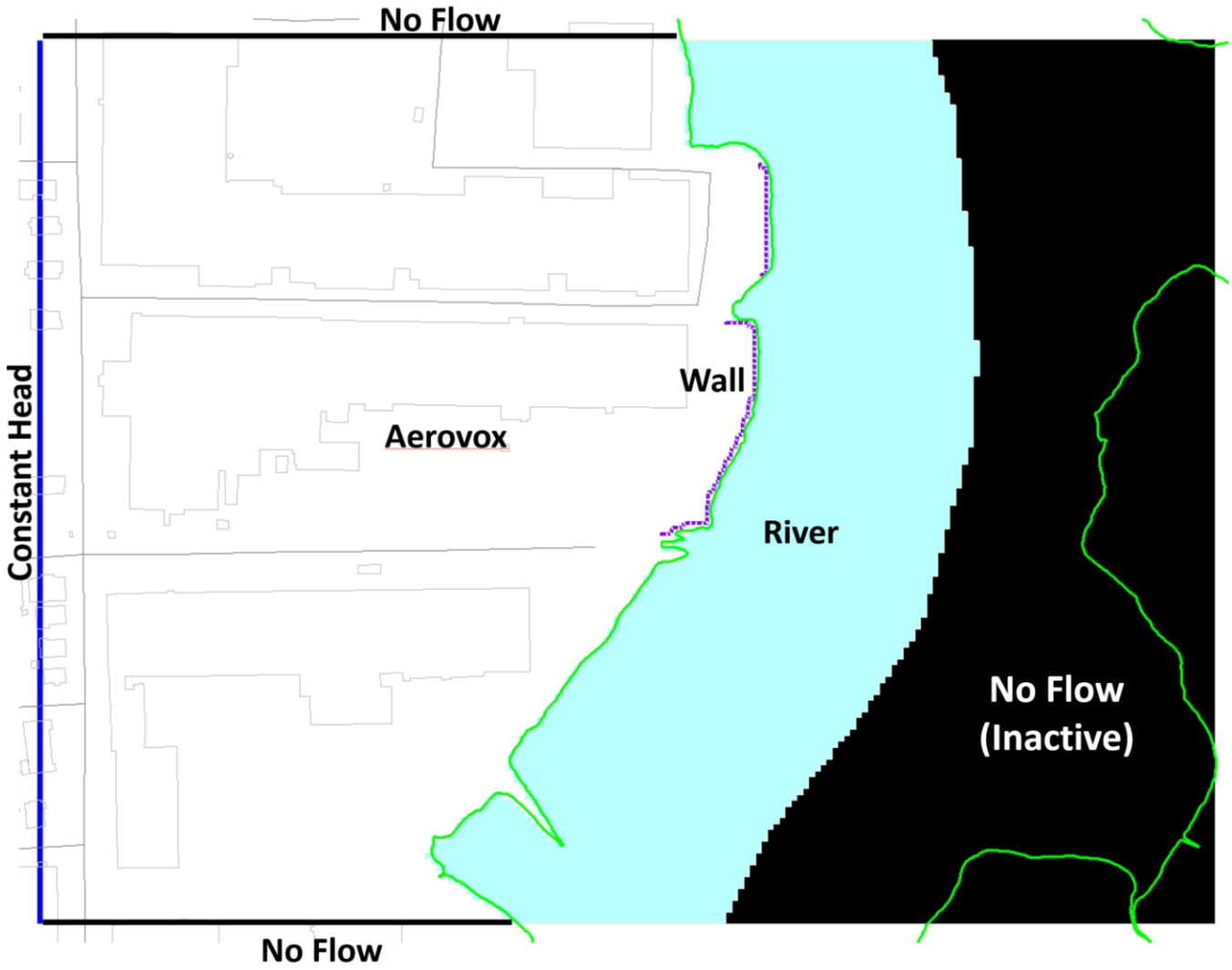
Aerovox and Harbor Model Topographic Representation

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

Figure 3-4



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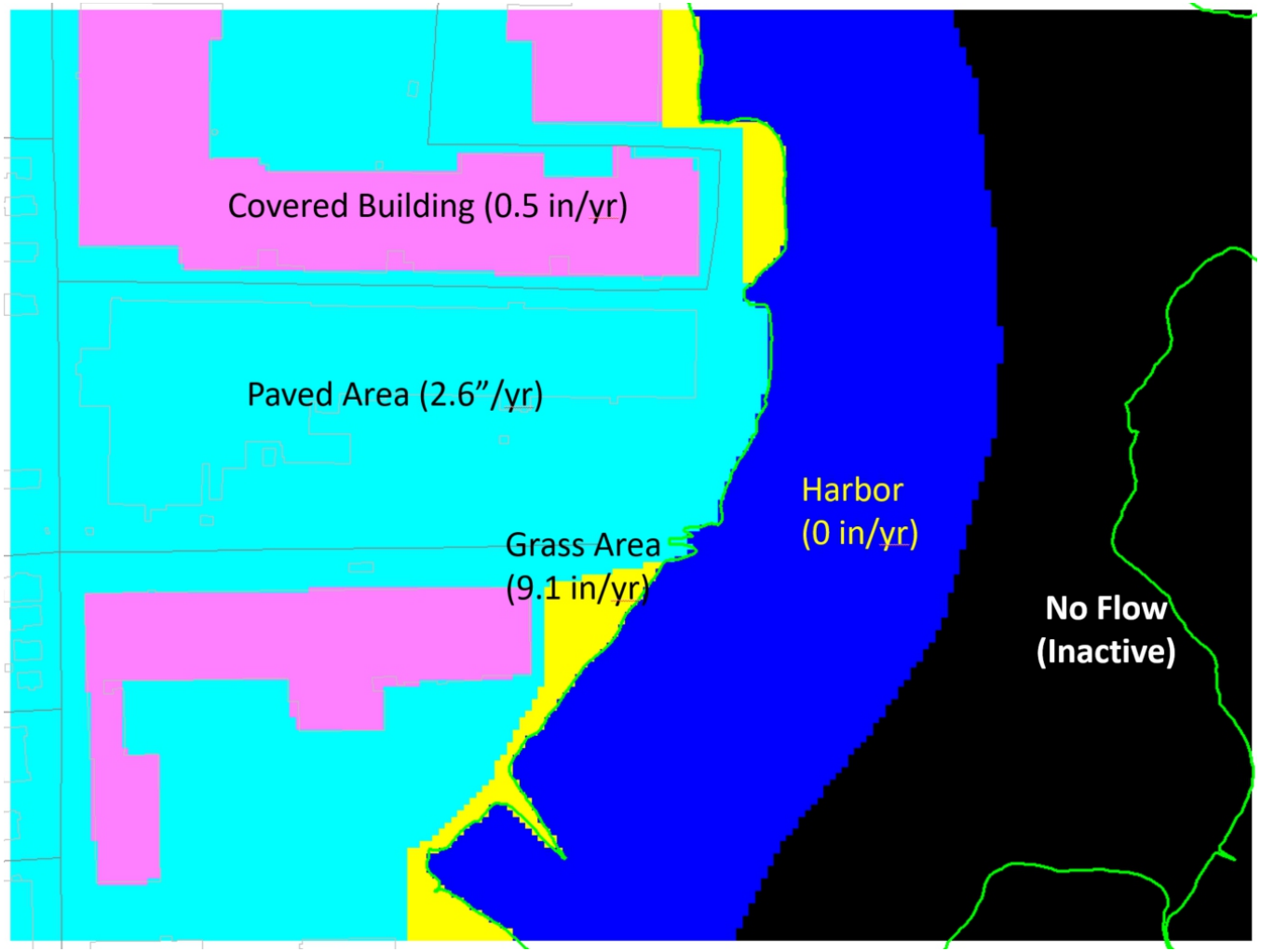
Aerovox and Harbor
Model Boundary Condition

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-5 Model Boundary.cdr

Figure 3-5



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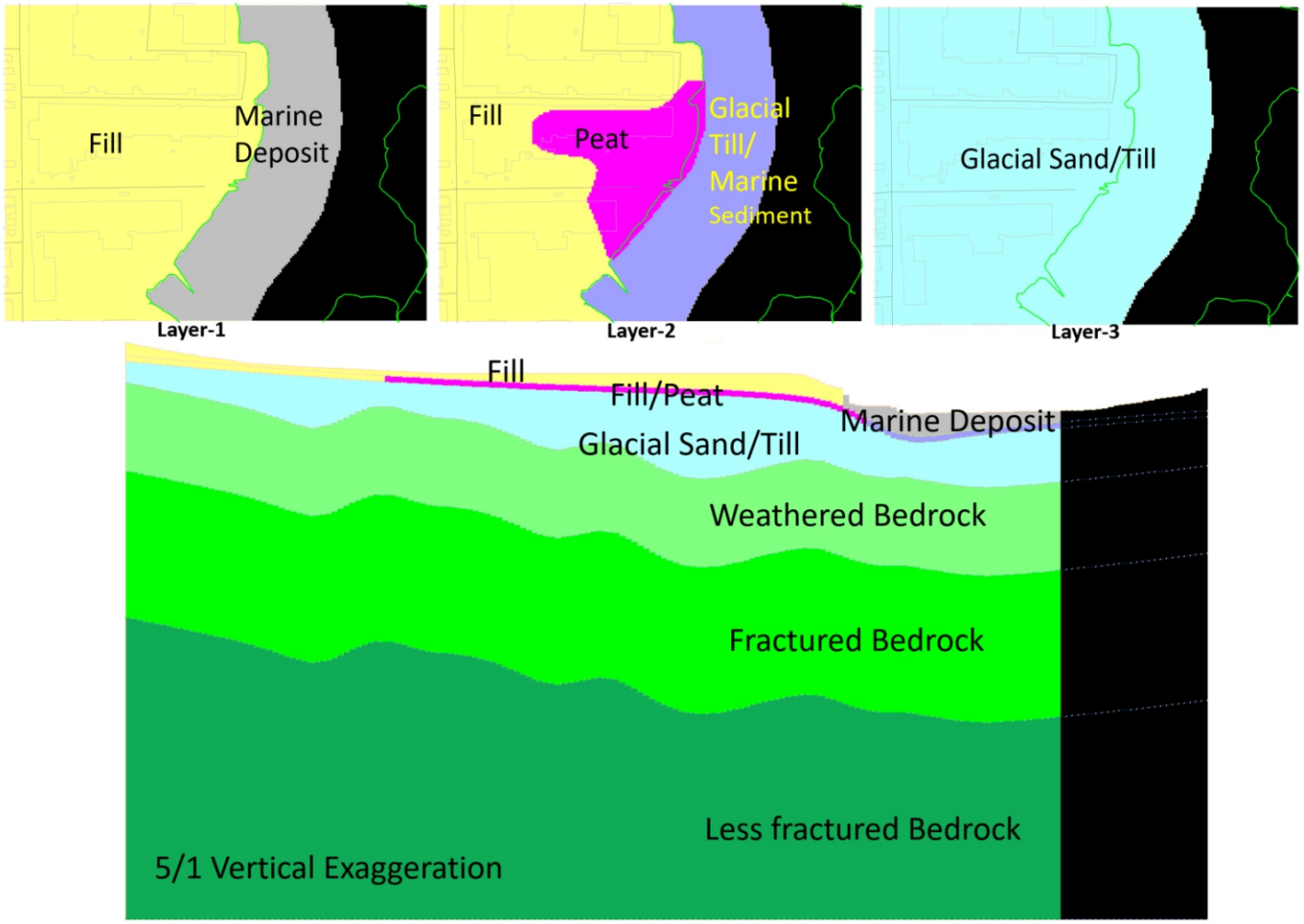
Aerovox and Harbor
Model Recharge Distribution

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-6 Model Recharge.cdr

Figure 3-6



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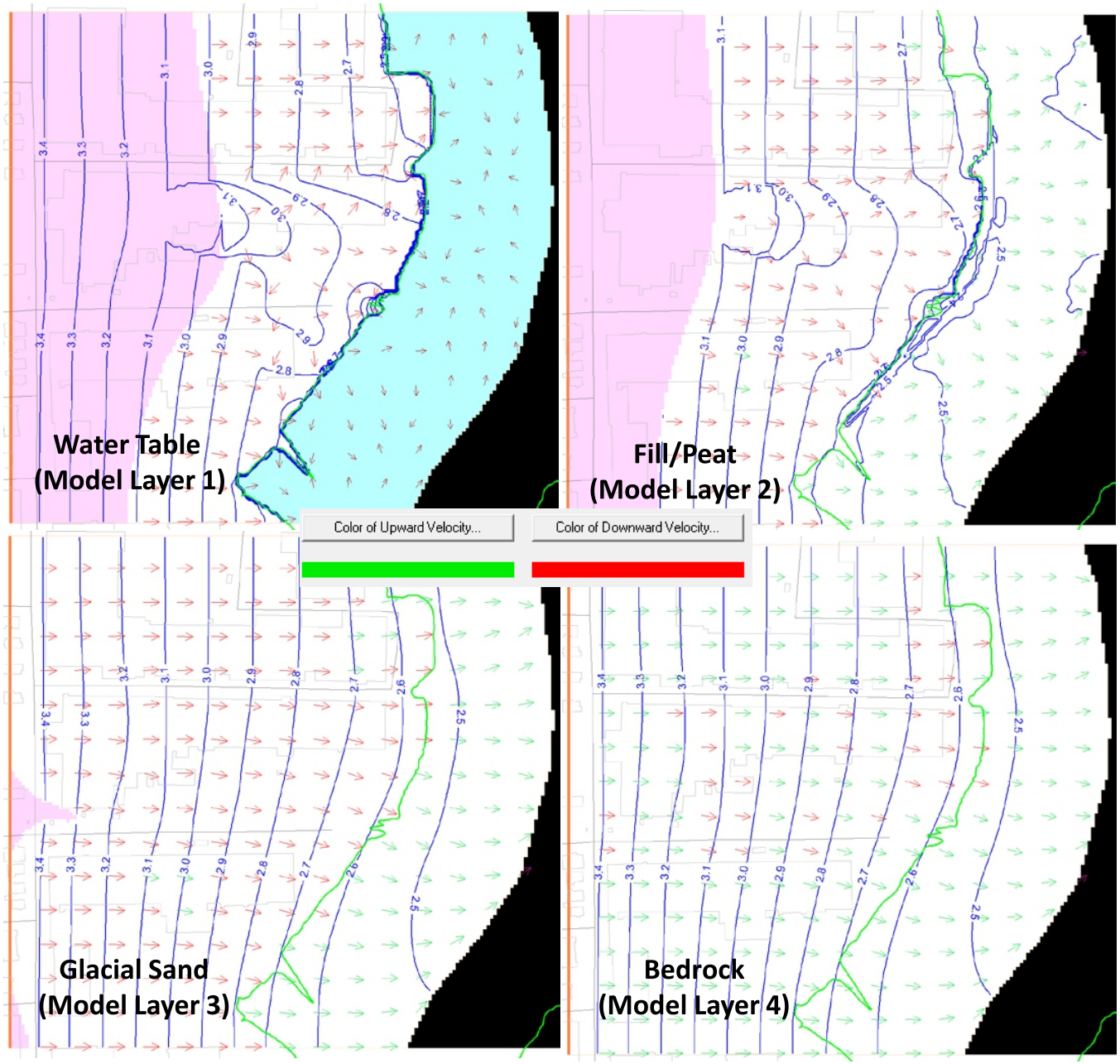
Aerovox and Harbor
Model Property Zone Distribution

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-7 Model Properties.cdr

Figure 3-7



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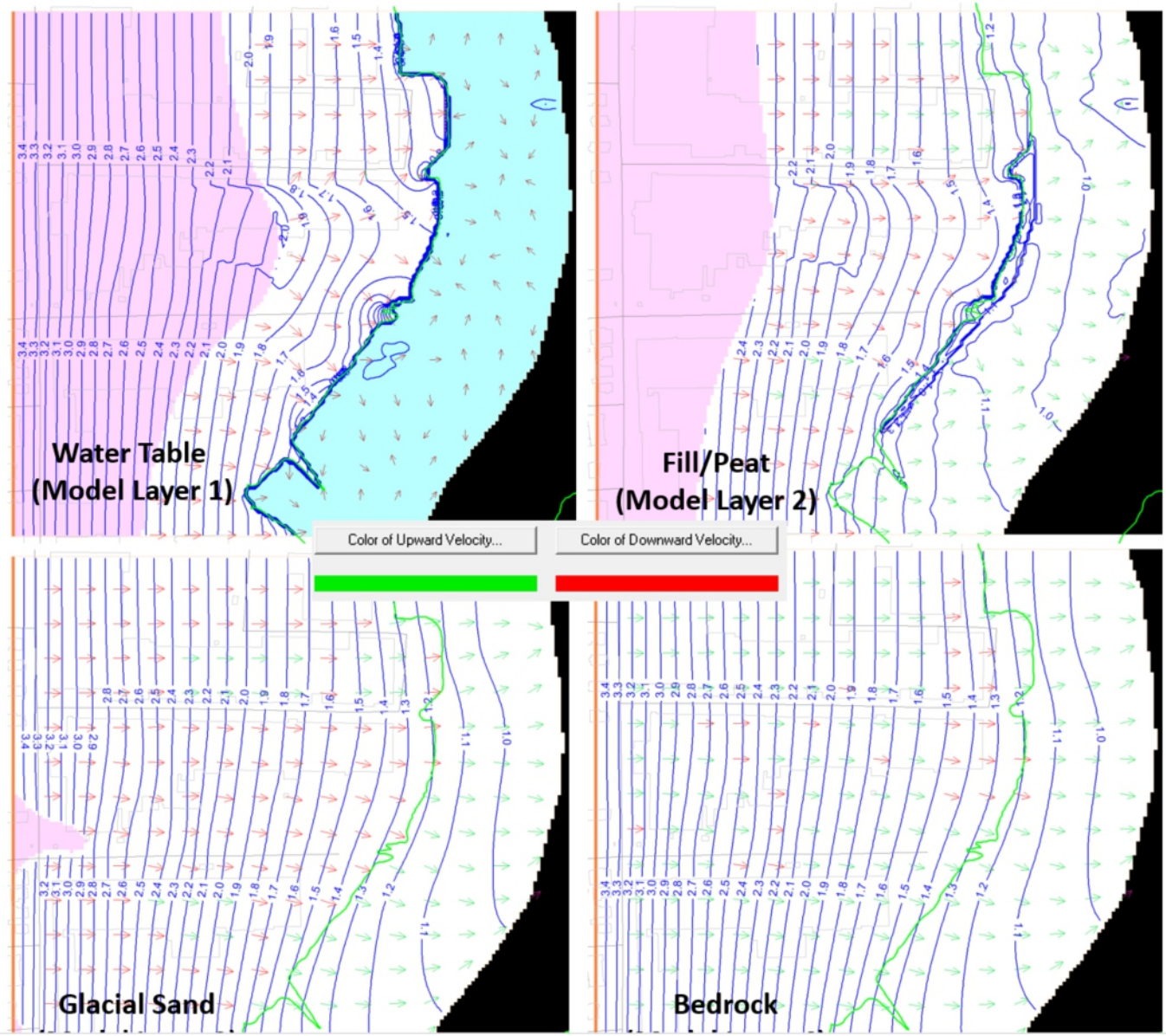
Modeled Water Levels and
Flow Field (Average Tidal Condition)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

06/07/18 dmf
Figure 4-1 Modeled WL Avg.cdr

Figure 4-1



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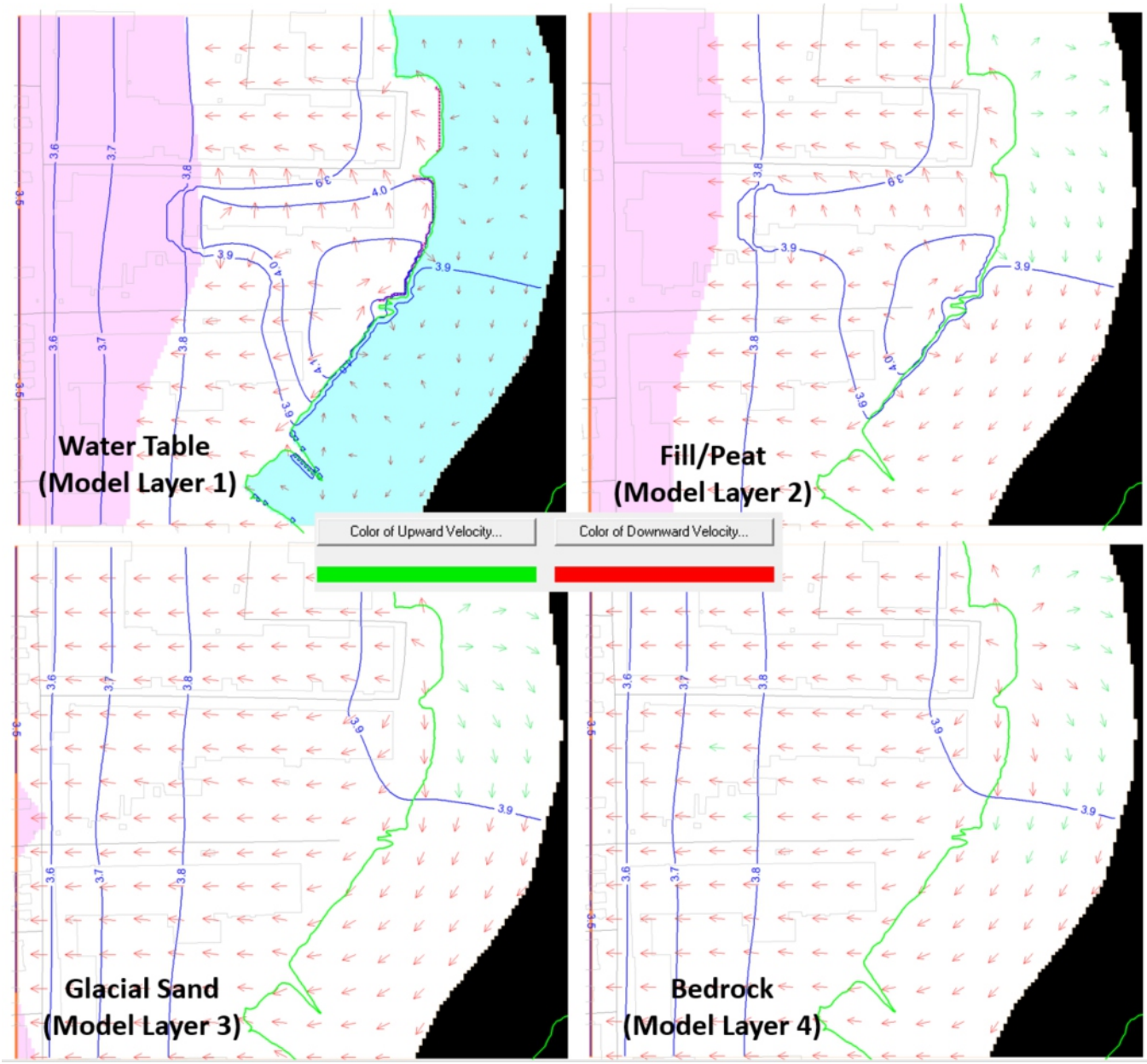
Modeled Water Levels and
Flow Field (Low Tidal Condition)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 4-2 Modeled WL Low.cdr

Figure 4-2



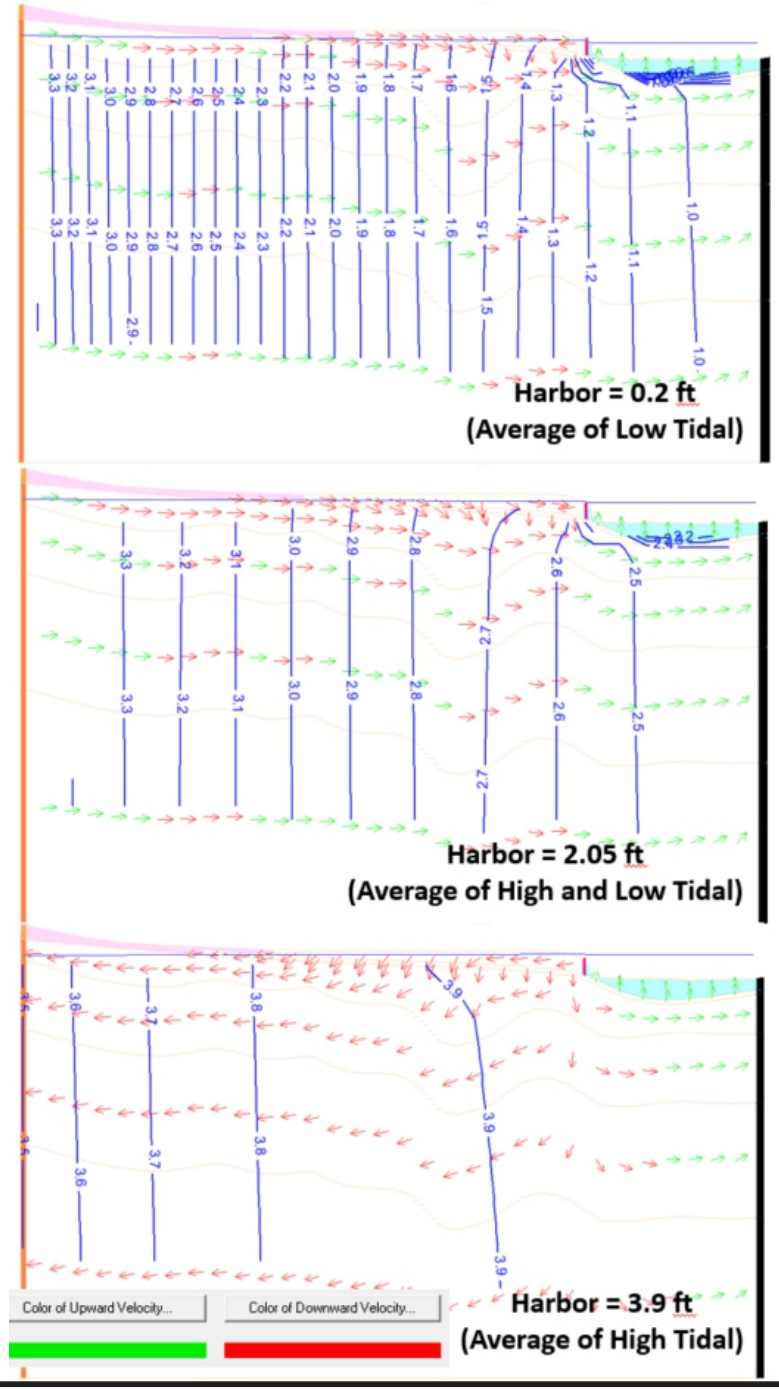
JACOBS™

Modeled Water Levels and
Flow Field (High Tidal Condition)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 4-3 Modeled WL High.cdr

Figure 4-3



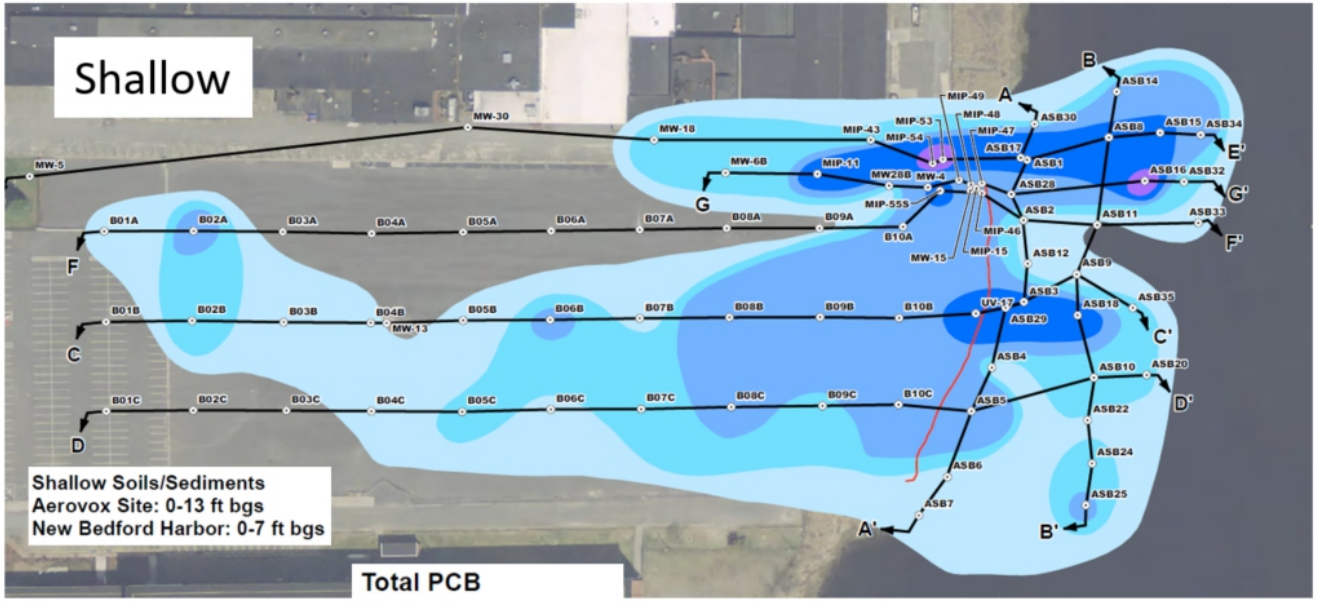
JACOBS™

Modeled Water Levels and Flow Field in Cross Section

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 4-4 Modeled WL XC.cdr

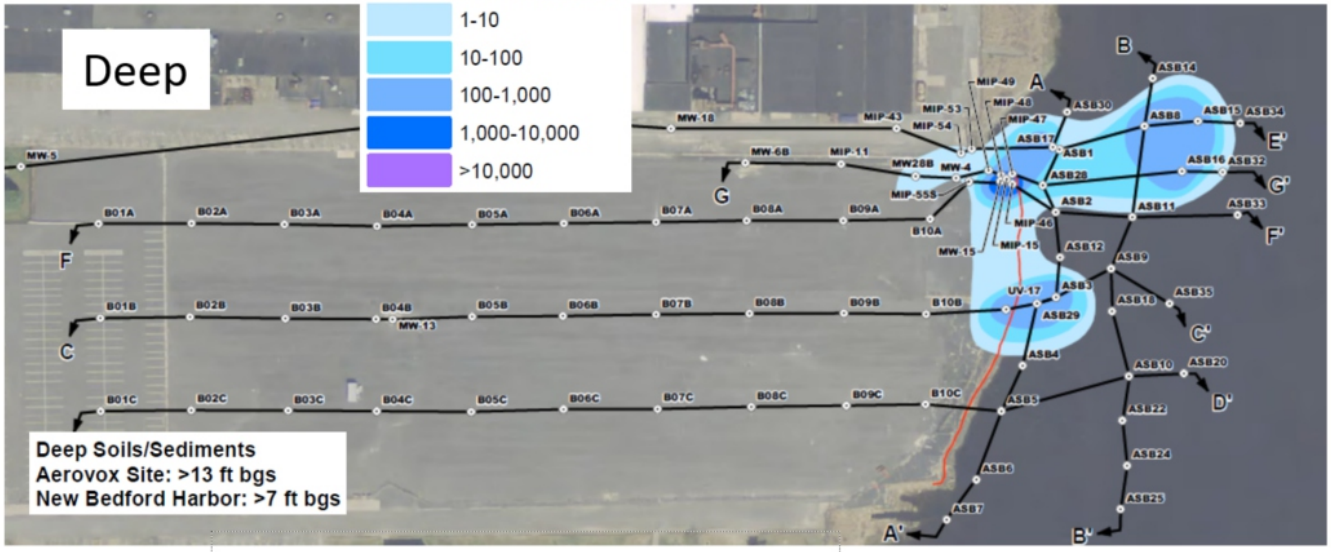
Figure 4-4



Total PCB

Concentration (mg/kg)

- 1-10
- 10-100
- 100-1,000
- 1,000-10,000
- >10,000



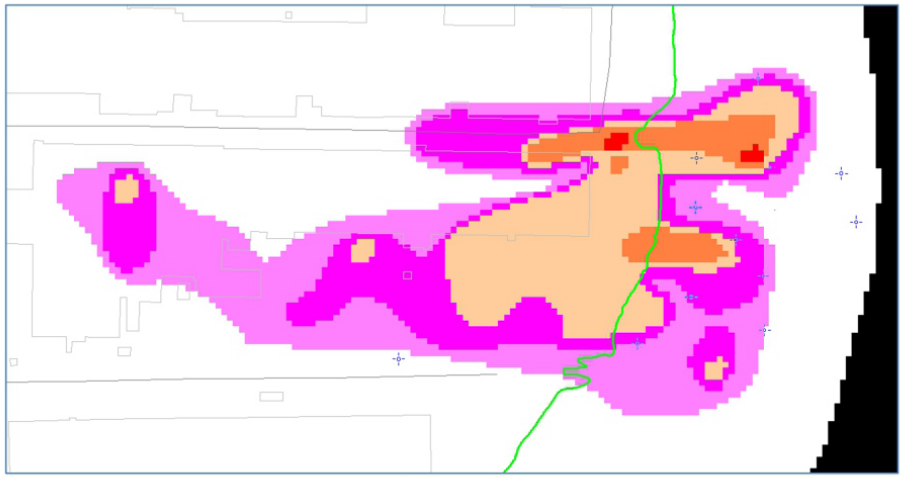
JACOBS™

PCB Soil and Sediment Contamination Distribution

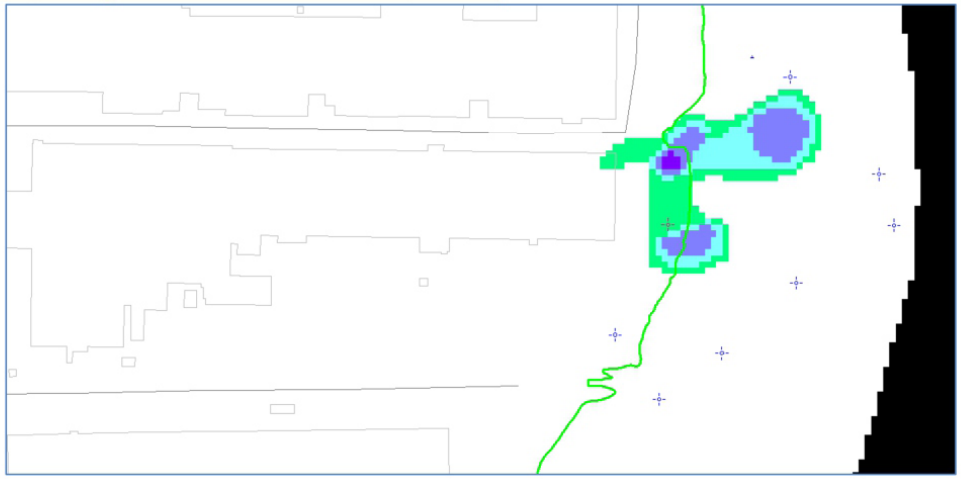
New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 5-1 PCB Contamination.cdr

Figure 5-1



Shallow Zone



Deep Zone

PCB Concentration (mg/kg)

5.5	5.5
55	55
550	550
1000	1000
10000	

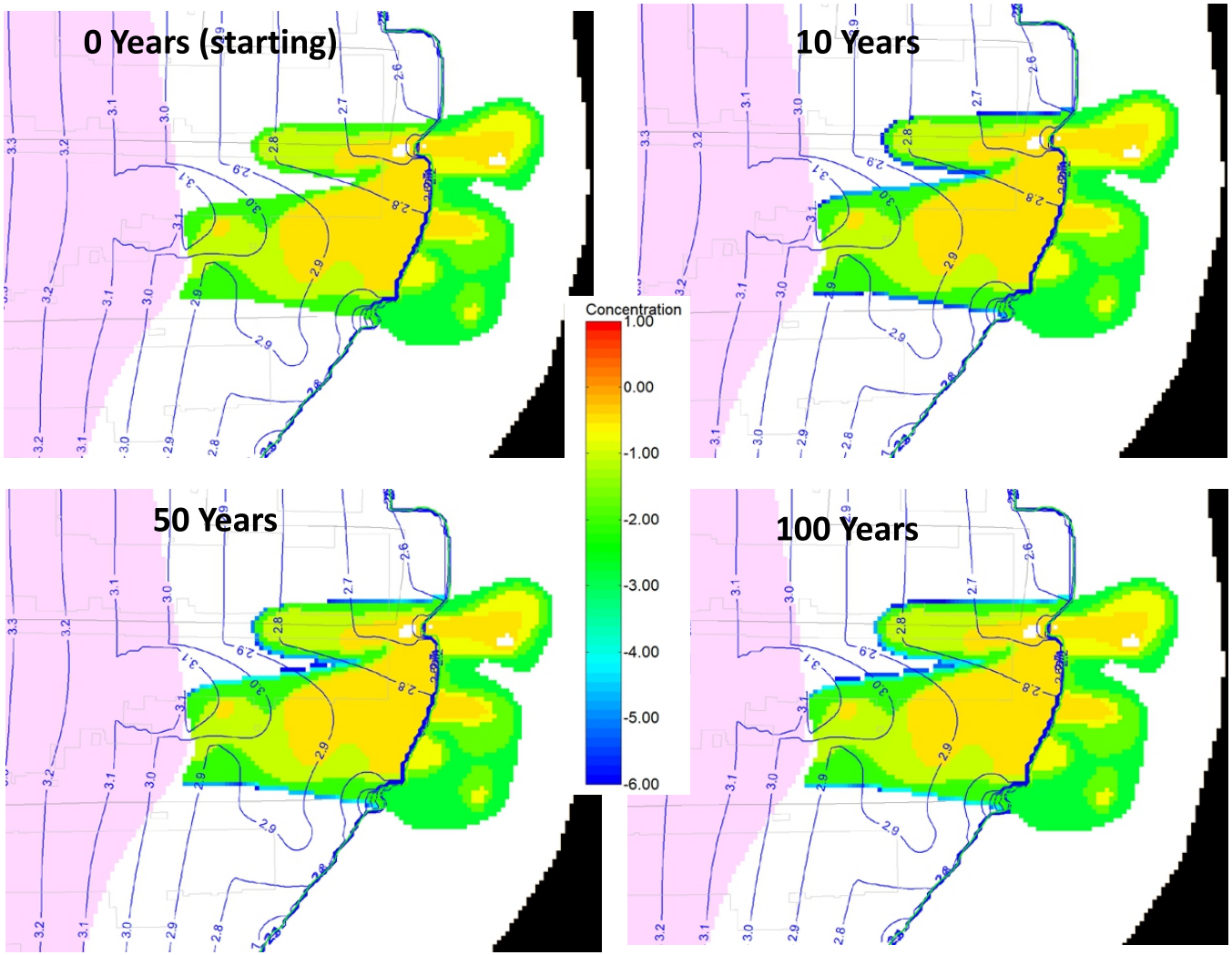
JACOBS™

PCB Source
Representation in the Model

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 5-2 PCB Source.cdr

Figure 5-2



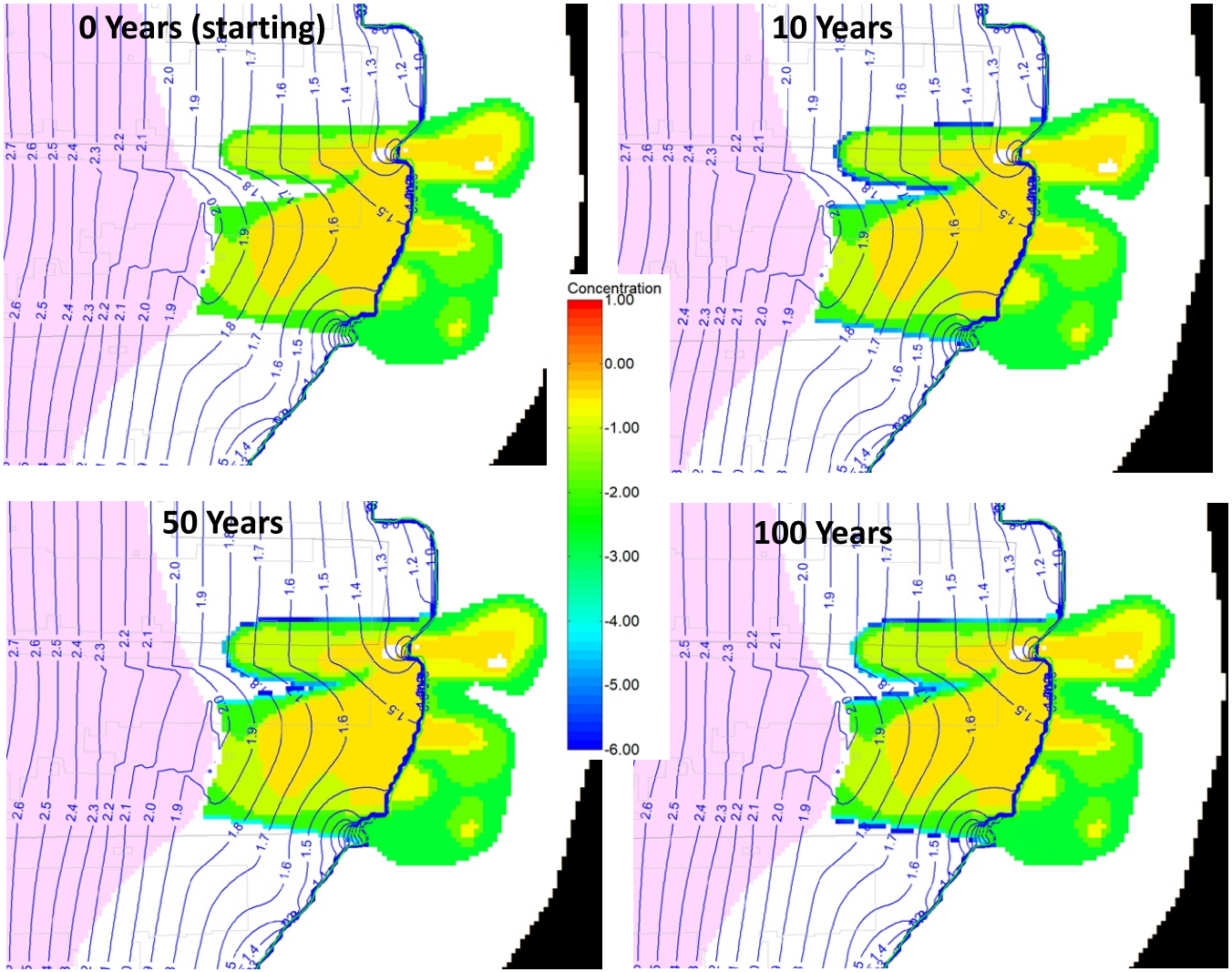
JACOBS™

Model Predicted PCB
Plume Changes with Time
(Mean Tidal Level)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

06/07/18 dmf
Figure 5-3 Predicted PCB Mean.cdr

Figure 5-3



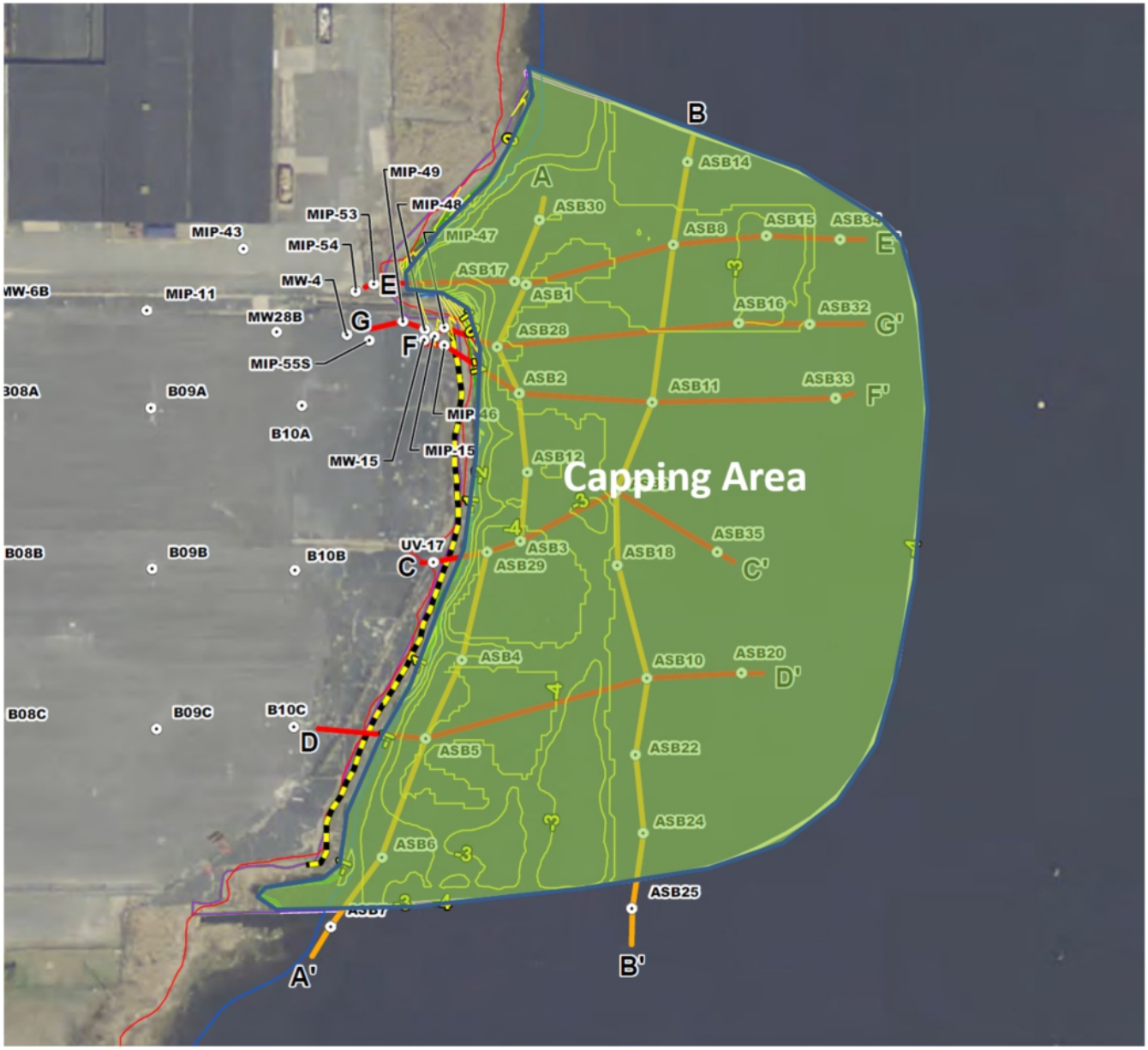
JACOBS™

Model Predicted PCB
Plume Changes with Time
(Low Tidal Level)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

06/07/18 dmf
Figure 5-4 Predicted PCB Low.cdr

Figure 5-4



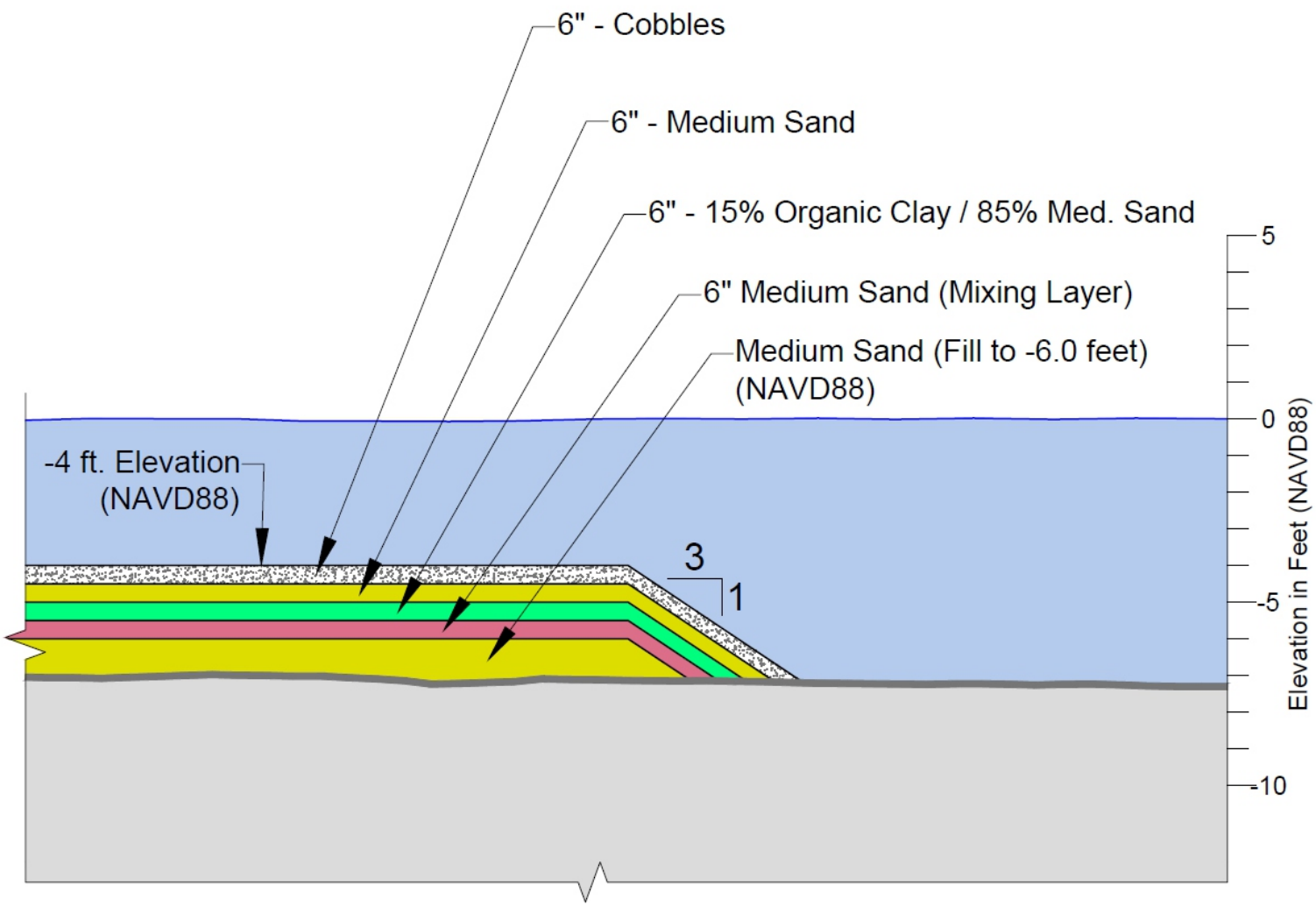
JACOBS™

Preliminary Interim Cap Area

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-1 Preliminary Interim Cap.cdr

Figure 6-1



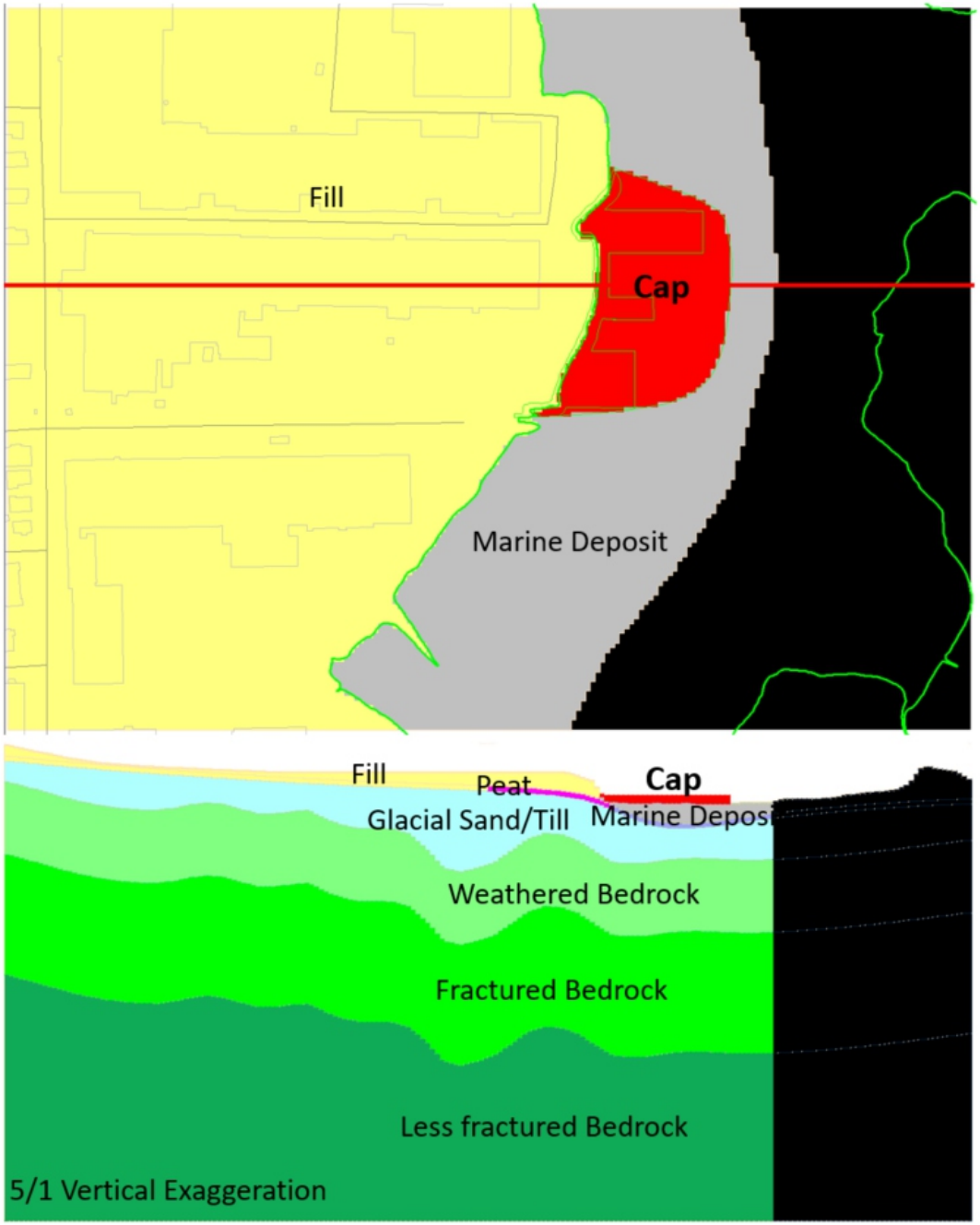
JACOBS™

Interim Cap Layers

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-2 Interim Cap Layers.cdr

Figure 6-2



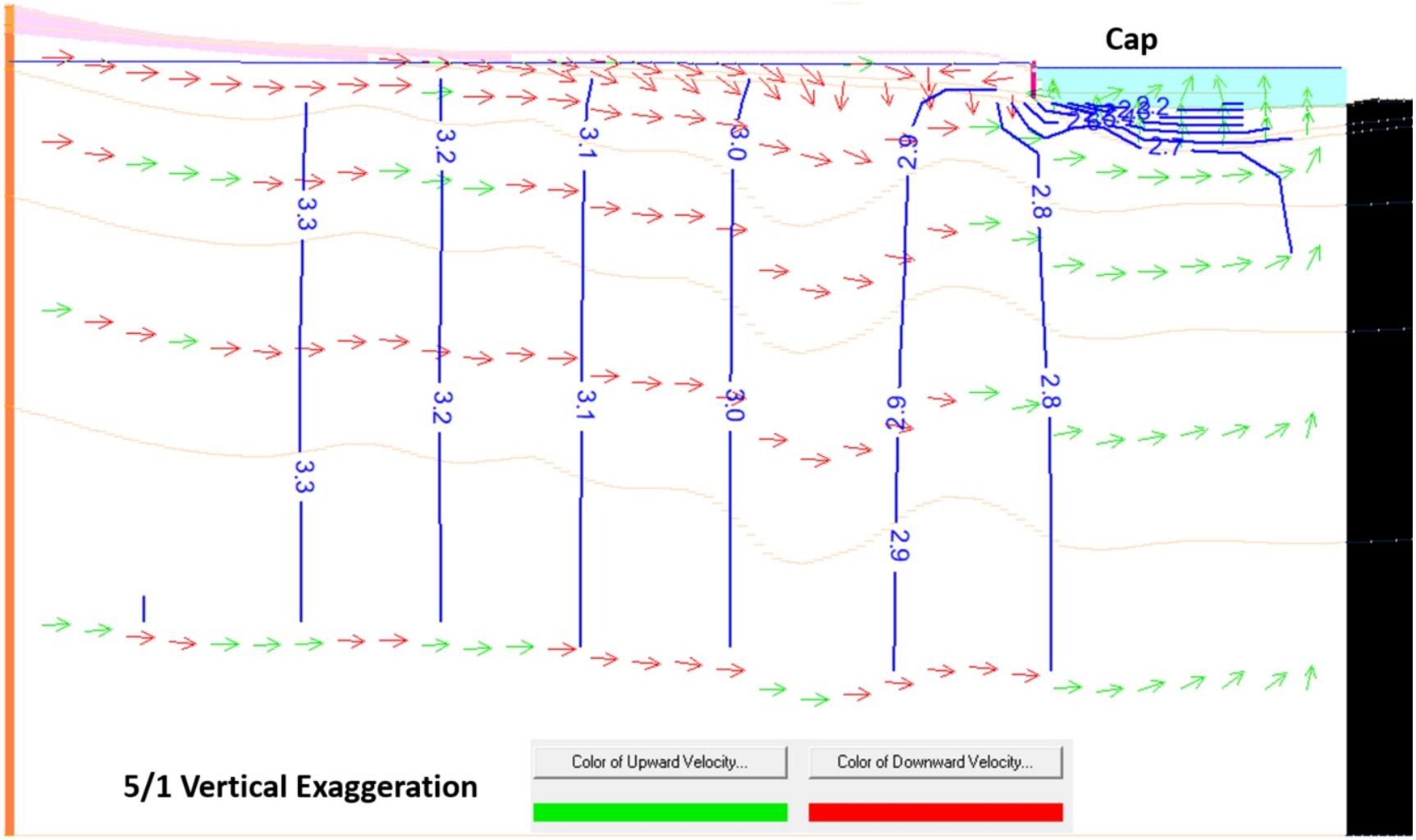
JACOBS™

Cap Representation in the Future Condition Model

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-3 Cap Future.cdr

Figure 6-3



JACOBS™

Model Predicted Flow Field
for the Cap Condition Model

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-4 MP Flow Field.cdr

Figure 6-4

Tables

Table 3-1
Hydraulic Conductivity Applied in the Base Condition Model

Material or Hydrogeologic Unit	Model Layer	Kx (H)	Ky (H)	Kz (V)	Anisotropy Ratio (H/V)	Unit
Fill/Silty Soil (on-land)	1 and 2	10	10	5	2	ft/day
Marine Deposit (organic marine material)	1	0.02	0.02	0.01	2	ft/day
Clay/Peat	2	0.02	0.02	0.004	5	ft/day
Marine/outwash mixing layer	2	0.2	0.2	0.1	2	ft/day
Glacial Outwash Sand/Till	3	30	30	6	5	ft/day
weathered bedrock	4	9	9	9	1	ft/day
fractured bedrock	5	3	3	3	1	ft/day
Less fractured Bedrock	6	1	1	1	1	ft/day

ft/day – feet per day

Table 3-2
Model Domain and Parameter Summary

Category	Parameter	Value	Unit
Model Domain	Total Area	3,000,000	ft^2
	Active Area	2,225,200	ft^2
GRID INFORMATION	Number of Rows	150	
	Number of Columns	200	
	Number of Layers	6	
	Total Cells	180,000	number of cells
	Total Active Cells	133,512	number of cells
	Percent Active	74%	
GRID DIMENSIONS	Row Spacings	10	ft
	Column Spacings	10	ft
	Layer Thickness	Variable	ft
COORDINATE TRANSFORMATION	X Offset (to SP83-ft Coordinate System)	814,400	ft
	Y Offset (to SP83-ft Coordinate System)	2,706,000	ft
	Rotation	0	degree
MODEL BOUNDARY CONDITIONS	Constant Heads	900	number of cells
	Rivers	6,606	number of cells
	Drains	0	number of cells
	Walls	156	number of cells
	No Flow	46,488	number of cells

ft = feet
ft^2 = square feet

Table 4-1
Summary Sensitivity Analysis Parameters

	Base case relative to base condition parameters	**Impact on groundwater flux into Harbor**
Marine sediment hydraulic conductivity	Higher vertical K value	Higher discharge flux
Wall thickness	Thicker wall assumption (1 ft. vs 0.1 ft. for 1E-07 cm/s K wall in the model)	No obvious change
Recharge rate	Higher recharge	Higher discharge flux
Harbor Tidal Levels	Higher or lower	Lower or higher flux, respectively

cm/sec = centimeters per second
ft. = feet

Table 5-1
Fate-Transport Model Parameters

Material-Specific				COC-Specific		
				PCB-1242	**PCB-1248**	**PCB-1254**
			Solubility (mg/L) -->	0.277	0.1	0.043
			Koc (L/kg) -->	78100	76530	130500
Material Type	**Bulk density (g/cm^3)**	**porosity**	**foc**	**Kd (L/Kg)**	**Kd (L/Kg)**	**Kd (L/Kg)**
Marine Sediment	1.4	0.4	0.049	3826.9	3750.0	6394.5
Peat	1.4	0.35	0.049	3826.9	3750.0	6394.5
Fill	1.72	0.35	0.01	781.0	765.3	1305.0
Sand	2	0.25	0.0014	109.3	107.1	182.7
Weathered/ fractured bedrock	2.39	0.1	0.001	78.1	76.5	130.5
Less fractured (deeper) bedrock	2.52	0.05	0.001	78.1	76.5	130.5

COC = contaminant of concern
foc = organic carbon fraction
g/cm^3 = grams per cubic centimeter
Kd = soil/water partition coefficient
L/kg = liters per kilogram
mg/L = milligrams per liter
PCB = polychlorinated biphenyl

Table 5-2
Model Predicted PCB Mass Discharge to Harbor Via Groundwater

Modeled Year	Harbor = 2.05 ft-msl	Harbor = 0.2 ft-msl
	kg/year	kg/year
0	0.164	0.312
10	0.164	0.312
50	0.163	0.311
100	0.163	0.311

ft-msl = feet mean sea level
kg/year = kilograms per year

Table 6-1
Future Condition (Capped) Model Domain and Parameter Summary

Category	Parameter	Value	Unit
Model Domain	Total Area	3,000,000	ft^2
	Active Area	2,225,200	ft^2
Grid Information	Number of Rows	150	
	Number of Columns	200	
	Number of Layers	7	
	Total Cells	210,000	number of cells
	Total Active Cells	155,764	number of cells
	Percent Active	74	%
Grid Dimensions	Row Spacings	10	ft
	Column Spacings	10	ft
	Layer Thickness	Variable	ft
Coordinate Transmformation	X Offset (to SP83-ft Coordinate System)	814,400	ft
	Y Offset (to SP83-ft Coordinate System)	2,706,000	ft
	Rotation	0	degree
Model Boundary Conditions	Constant Heads	1,050	number of cells
	Rivers	6,501	number of cells
	Drains	0	number of cells
	Walls	234	number of cells
	No Flow	54,236	number of cells

Table 6-2
Model Predicted PCB Mass Discharge to Harbor Through Cap

Modeled Year	Current	Capped	
	kg/year	foc=0.1	foc=0.045
0	0.164	0.000	0.000
10	0.164	0.000	0.000
50	0.163	0.001	0.003
100	0.163	0.003	0.007

foc = organic carbon fraction
kg/year = kilograms per year

Appendix F

ERDC Column Study Report

CEERD-EPE 11 May 2018

TECHNICAL MEMORANDUM FOR: Daniel Groher, CENAE-EPG

SUBJECT: Laboratory Testing for Evaluation of Proposed Cap Design for Aerovox Sediment Site

1. BACKGROUND: The Aerovox site has low permeability, fine-grained, somewhat organic sediment contaminated with PCB NAPL just below the surface sediments. The site is subject to tidal pumping and low groundwater seepage rates. A temporary cap is being proposed to contain the PCBs at the site until source control is completed and recontamination can be prevented. Due to enhanced migration processes (groundwater advection, tidal pumping and gas ebullition) and conditions (NAPL, at the site), the cap is being designed to include an amendment of organoclay to enhance the sequestration of NAPL and PCBs.

2. SCOPE: A laboratory column test study was undertaken to determine the need for an amendment, the time required to achieve breakthrough, the performance of cap and the adequacy of the proposed cap design.

3. PROPOSED CAP: The minimum specifications for the proposed cap consist from bottom to top of a 6-inch sacrificial sand layer to control mixing with the sediment, a 6-inch isolation layer of 85% sand/15% organoclay by weight, a 6-inch sand confinement layer and a 6-inch gravel layer for erosion control. Conservative site conditions for design/performance considerations include an upward Darcian groundwater velocity of 17.3 cm/yr, a low gas ebullition rate, no bioturbation, and no net erosion or deposition.

4. LABORATORY TESTING: Two columns were set up in the sediment research laboratory at the U.S. Army Research and Development Center. The first column represented a typical sand cap placed over contaminated sediment. The second column represented the proposed cap. A schematic of the two caps is shown in Figure 1. The columns are 8 inches in diameter. Column 1 was run the first week at a flow rate of 1.1 mL/min, corresponding to a Darcian velocity of 4.9 cm/day, about 2 sediment pore volumes per day or 1.2 cap pore volumes per day. After one week, 10 mL of a somewhat dilute NAPL suspension was injected in a gravel layer at the bottom of the column and the flow rate was increased to 2.2 mL/min, corresponding to a Darcian velocity of 9.8 cm/day or about 1.2 column pore volumes (sand cap, sediment, and sand base) per day. The column test was run for an additional 24 days after the NAPL injection, corresponding to 235 cm of advection, about 29 column pore volumes, 95 sediment pore volume or 58 cap pore volumes.

5. For Column 2 testing, 10 mL of a more concentrated NAPL suspension was injected at the base of the column and the flow rate was set at 2.2 mL/min, corresponding to a Darcian velocity of 9.8 cm/day or about 0.8 column pore volumes (sand and organoclay cap, sediment, and sand base) per day. The column test was run for 24 days after the NAPL injection, corresponding to 235 cm of advection or about 19 column pore volumes, 95 sediment pore volumes and 120 organoclay pore volumes.

6. Water released from the top of column were collected for PCBs analysis by low resolution congener analysis. Water samples were collected from Column 1 after Week 1 (immediately before NAPL was injected), after Week 2, after Week 3 and at the end of the testing, Day 31. Water samples were collected from Column 2 after Week 1, after Week 2, after Week 3 and at the end of the testing, Day 24.

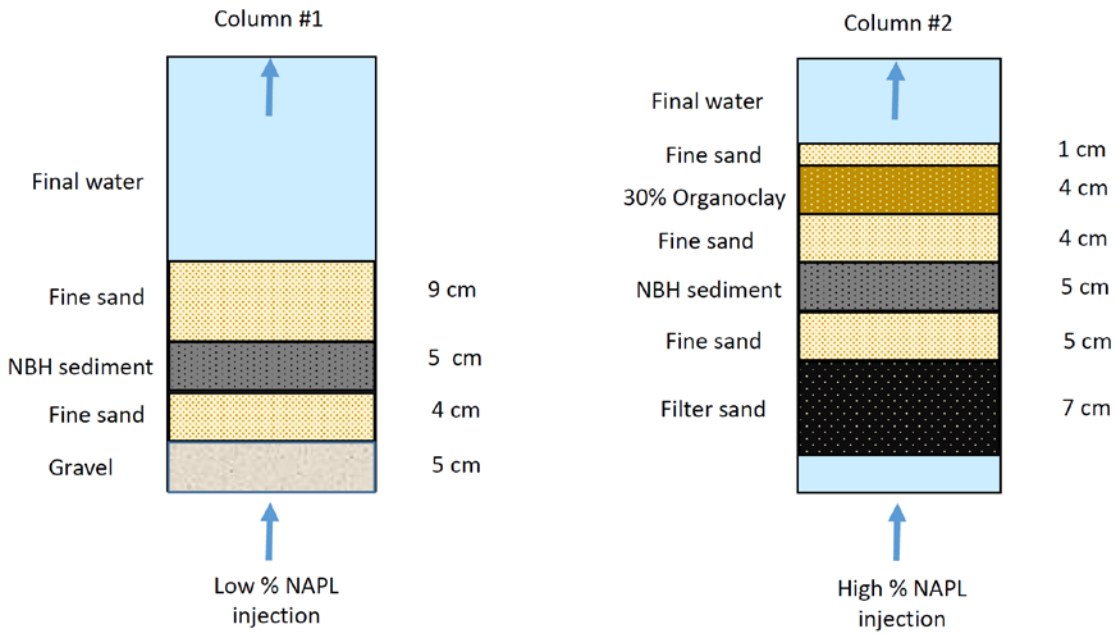


Figure 1. Schematics of laboratory test columns profiles.

7. RESULTS: The results of the testing of the overlying (released) water produced by the advection are given in Table 1. The simulated times for advection are estimated by adjusting the laboratory test days by the ratio of laboratory Darcian velocity to field Darcian velocity. The simulated times for sequestration are estimated by adjusting the laboratory test days by the ratio of laboratory Darcian velocity to field Darcian velocity and the ratio of organic carbon mass in the proposed design to the organic carbon in the laboratory column.

Table 1. PCBs Concentrations in Released Water

Column 1 (Sand Cap)			
Time	**PCBs Conc. In Overlying Water**	**Simulated Time**	
		Advection	**Sequestration**
Day	**ng/L**	**years**	**years**
7	595	2	6
14	0.545	6	18
21	225	10	30
31	535	16	45
Column 2 (Organoclay Cap)			
Time	**PCBs Conc. In Overlying Water**	**Simulated Time**	
		Advection	**Sequestration**
Day	**ng/L**	**years**	**years**
7	ND	4	7.5
14	0.815	8	15
24	7.6	14	26.3

8. DISCUSSION: The sand cap showed a very large breakthrough of the contaminated pore water from the contaminated sediment layer during the first week of testing before any NAPL was injected. Using the test results in a partitioning analysis of the proposed cap yields predictions that a 2% breakthrough of the sediment pore water PCBs concentration would be expected in about 1 year under field conditions and 20% breakthrough in about 5 years and 50% breakthrough in about 10 years. The organoclay cap showed a detectable release of PCBs during the second week of testing and a small breakthrough, about 1% of the sediment pore water PCBs concentration, at the end of testing. Analysis of the test results shows that 1% breakthrough would be expected in about 25 years under field conditions and 5% breakthrough in about 100 years.

Paul R. Schroeder, PhD, PE

Carlos E. Ruiz, PhD

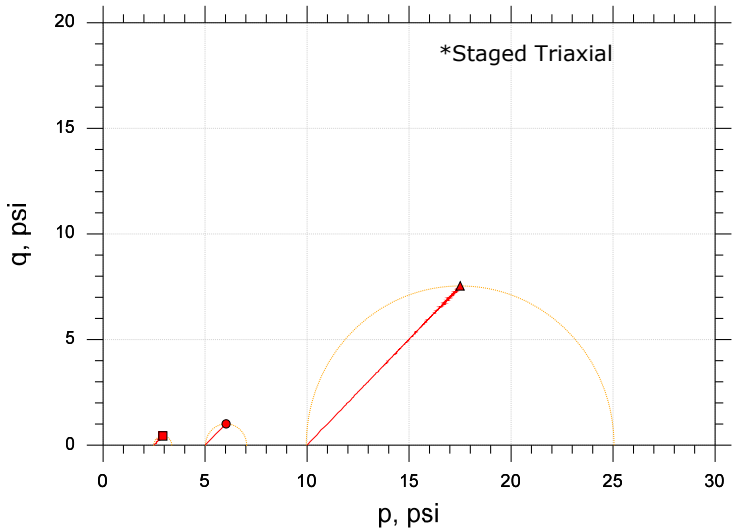
Research Civil Engineers
Environmental Laboratory
U.S. Army Engineer Research and Development Center

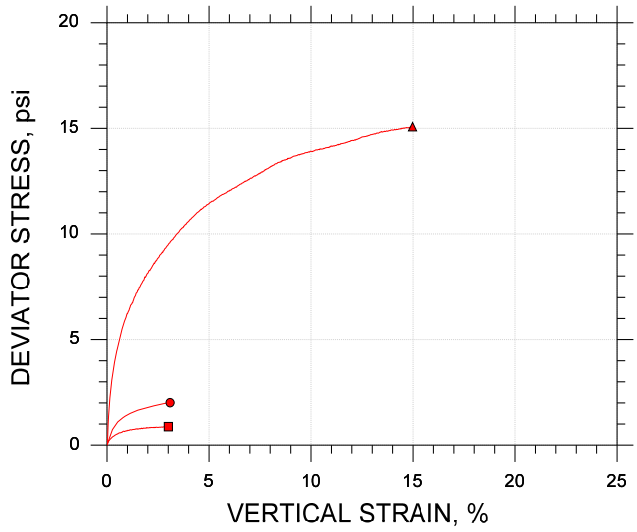
Appendix G

Physical Analysis and Geotechnical Laboratory Reports

Client: Jacobs Engineering Group	
Project Name: New Bedford Harbor	
Project Location: New Bedford, MA	
Project Number: GTX-306296	
Tested By: md	Checked By: njh
Boring ID: ---	
Preparation: intact	
Description: Wet, black silt	
Classification: ---	
Group Symbol: ---	
Liquid Limit: ---	Plastic Limit: ---
Plasticity Index: ---	Estimated Specific Gravity: 2.6

CONSOLIDATED DRAINED TRIAXIAL TEST

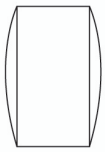




Symbol		■	●	▲	
Sample ID		RA-C002301	RA-C002301	RA-C002301	
Depth, ft		0.0-0.5	0.0-0.5	0.0-0.5	
Test Number		CD-6-1	CD-6-2	CD-6-3	
Initial	Height, in	5.000	4.600	4.460	
	Diameter, in	2.500	2.500	2.500	
	Moisture Content (from Cuttings), %	109.8			
	Dry Density, pcf	39.6			
	Saturation (Wet Method), %	92.1			
	Void Ratio	3.10			
Before Shear	Moisture Content, %			111.7	
	Dry Density, pcf			41.6	
	Cross-sectional Area (Method A), in²			5.196	
	Saturation, %			100.0	
	Void Ratio			2.90	
	Back Pressure, psi	32.00	32.87	31.88	
Vertical Effective Consolidation Stress, psi		2.188	4.027	9.918	
Horizontal Effective Consolidation Stress, psi		2.492	5.003	10.00	
Vertical Strain after Consolidation, %		4.557	14.62	1.342	
Volumetric Strain after Consolidation, %		-0.05178	0.5485	-0.1393	
Time to 50% Consolidation, min		0.3600			
Shear Strength, psi		0.4368	1.006	7.541	
Strain at Failure, %		3.00	3.09	15.0	
Strain Rate, %/min		0.1000	0.1000	0.1000	
Deviator Stress at Failure, psi		0.8736	2.013	15.08	
Effective Minor Principal Stress at Failure, psi		2.492	5.024	9.964	
Effective Major Principal Stress at Failure, psi		3.365	7.037	25.05	
B-Value		0.96	---	---	

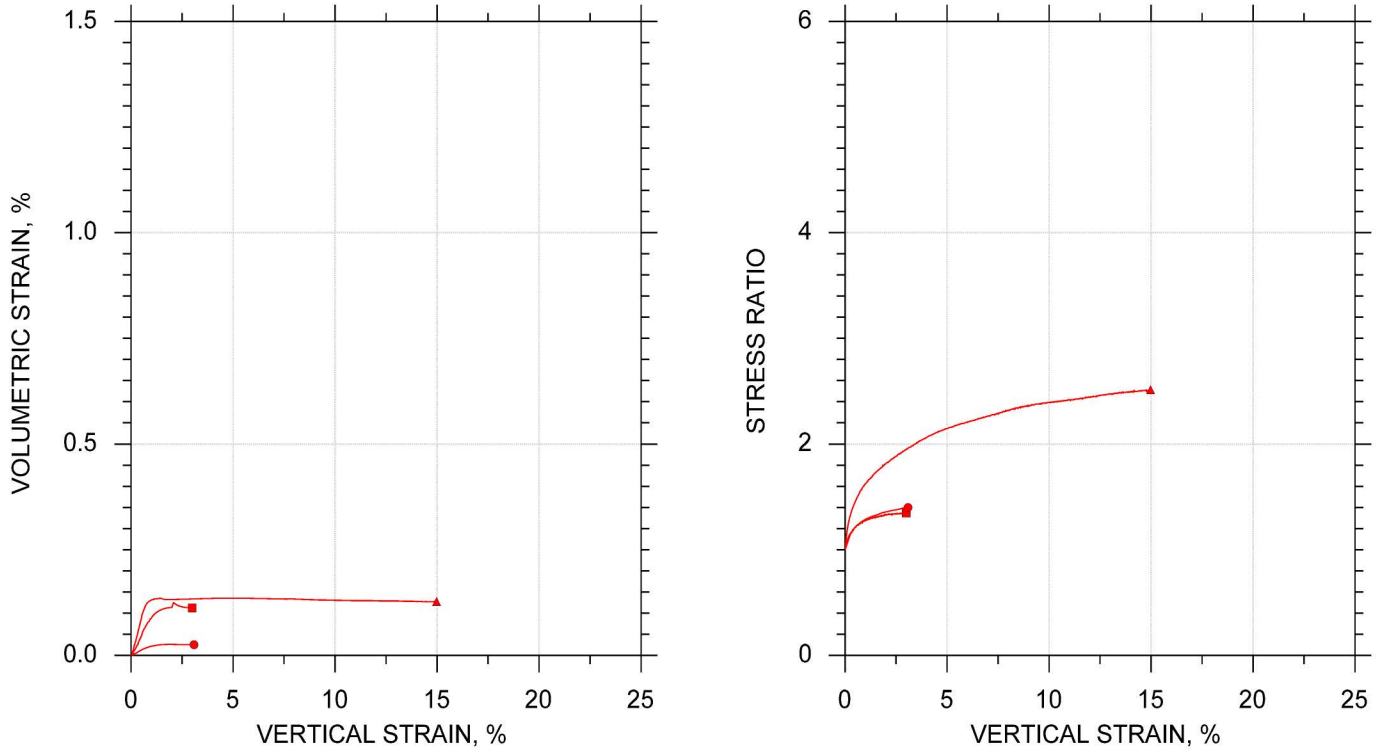
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

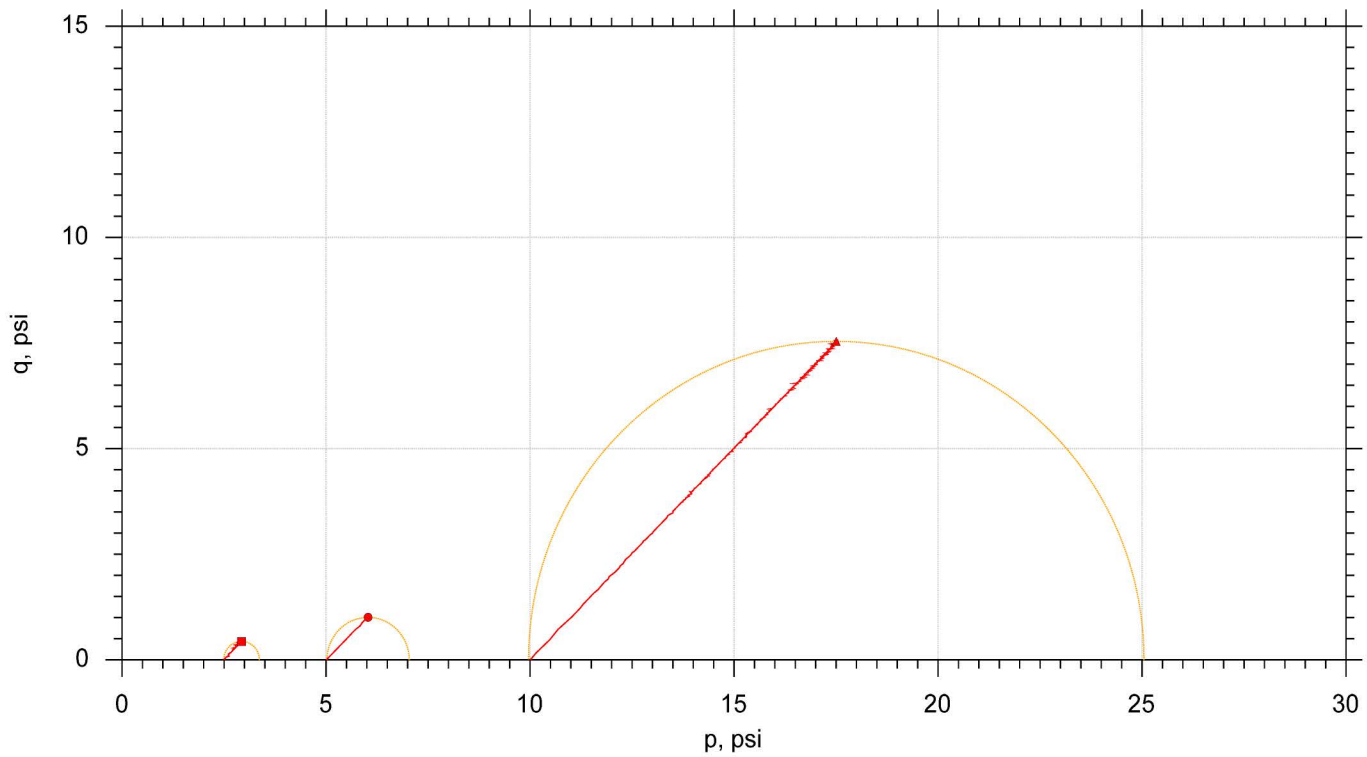
Remarks:



System T - STAGED TRIAXIAL TEST

CONSOLIDATED DRAINED TRIAXIAL TEST





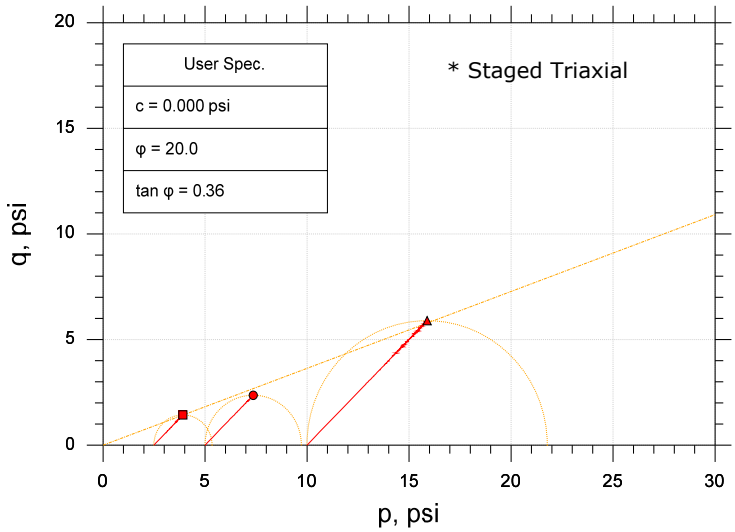
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	RA-C002301	CD-6-1	0.0-0.5	md	10/30/17	njh	11/20/17	306296-CD-6-1n.dat
●	RA-C002301	CD-6-2	0.0-0.5	md	11/01/17	njh	11/20/17	306296-CD-6-2n.dat
▲	RA-C002301	CD-6-3	0.0-0.5	md	11/02/17	njh	11/20/17	306296-CD-6-3n.dat

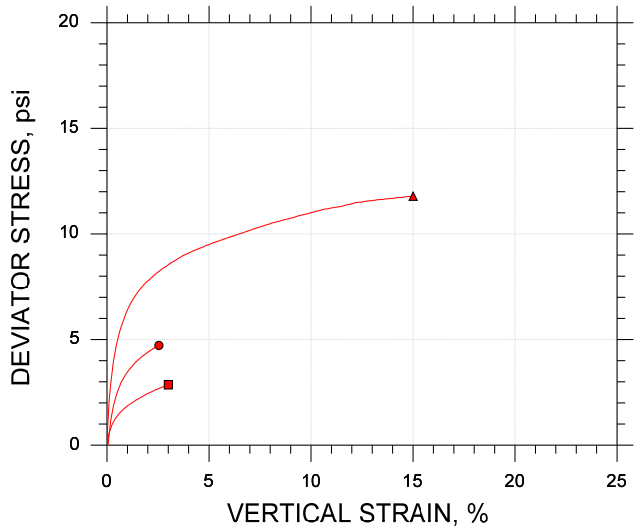
GeoTesting EXPRESS

Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
Boring No.: ---	Sample Type: intact	
Description: Wet, black silt		
Remarks: System T - STAGED TRIAXIAL TEST		

Client: Jacobs Engineering Group	
Project Name: New Bedford Harbor	
Project Location: New Bedford, MA	
Project Number: GTX-306296	
Tested By: md	Checked By: njh
Boring ID: ---	
Preparation: intact	
Description: Moist, dark gray silt	
Classification: ---	
Group Symbol: ---	
Liquid Limit: ---	Plastic Limit: ---
Plasticity Index: ---	Estimated Specific Gravity: 2.7

CONSOLIDATED DRAINED TRIAXIAL TEST

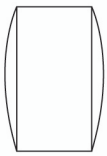




Symbol		■	●	▲	
Sample ID		RA-C002303	RA-C002303	RA-C002303	
Depth, ft		1.2-1.7	1.2-1.7	1.2-1.7	
Test Number		CD-5-1	CD-5-2	CD-5-3	
Initial	Height, in	5.200	4.914	4.757	
	Diameter, in	2.500	2.500	2.500	
	Moisture Content (from Cuttings), %	89.8			
	Dry Density, pcf	54.2			
	Saturation (Wet Method), %	115.1			
	Void Ratio	2.11			
Before Shear	Moisture Content, %			63.7	
	Dry Density, pcf			62.0	
	Cross-sectional Area (Method A), in²			4.738	
	Saturation, %			100.0	
	Void Ratio			1.72	
	Back Pressure, psi	30.00	32.97	37.87	
Vertical Effective Consolidation Stress, psi		2.367	4.956	9.927	
Horizontal Effective Consolidation Stress, psi		2.494	5.001	9.999	
Vertical Strain after Consolidation, %		1.897	0.7020	1.111	
Volumetric Strain after Consolidation, %		7.667	4.420	4.945	
Time to 50% Consolidation, min		317.0			
Shear Strength, psi		1.430	2.360	5.894	
Strain at Failure, %		3.00	2.54	15.0	
Strain Rate, %/min		0.1000	0.1000	0.1000	
Deviator Stress at Failure, psi		2.861	4.720	11.79	
Effective Minor Principal Stress at Failure, psi		2.477	5.001	9.991	
Effective Major Principal Stress at Failure, psi		5.338	9.721	21.78	
B-Value		1.0	---	---	

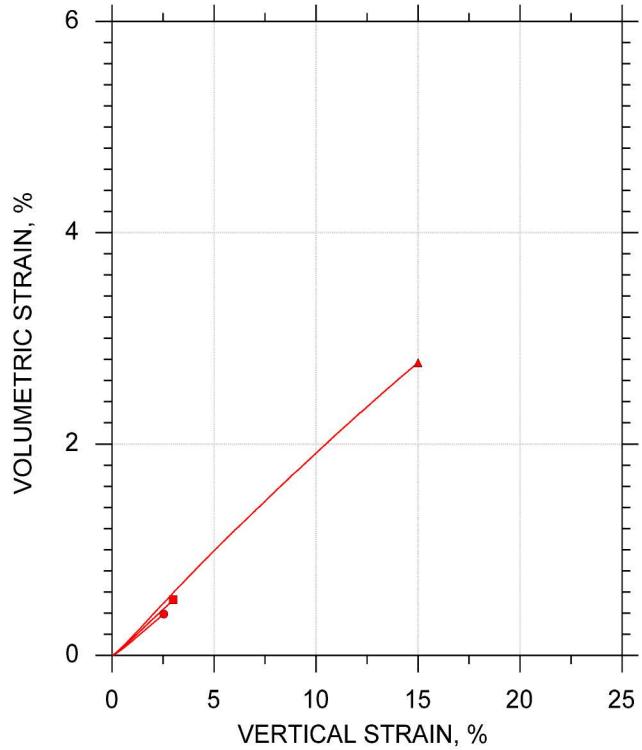
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

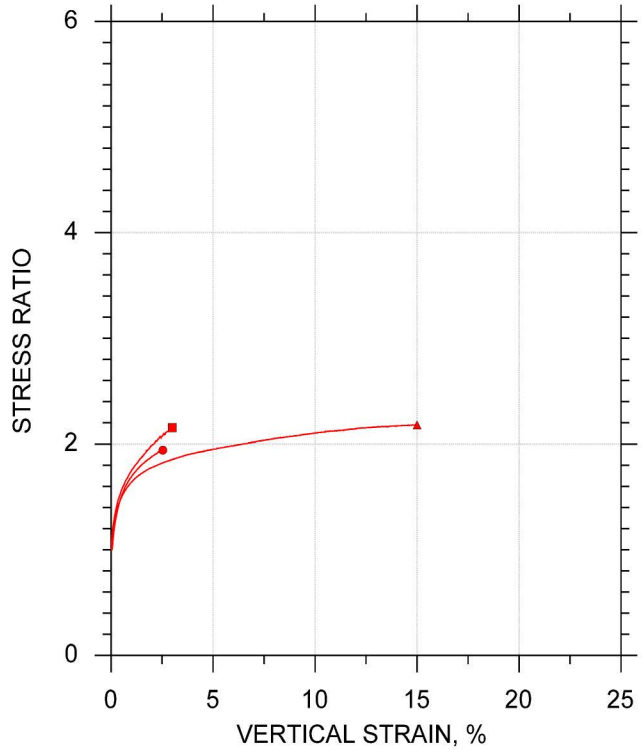
Remarks:

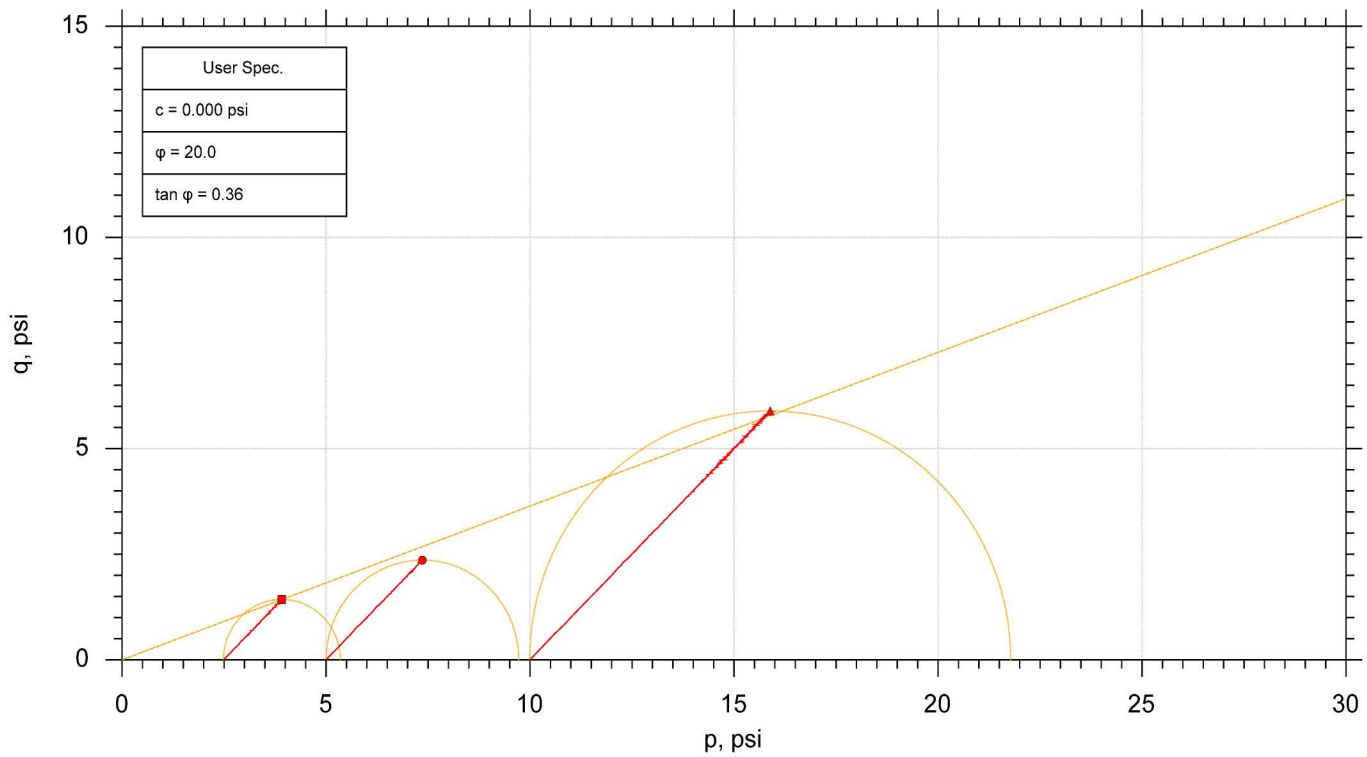


System S - STAGED TRIAXIAL TEST

CONSOLIDATED DRAINED TRIAXIAL TEST







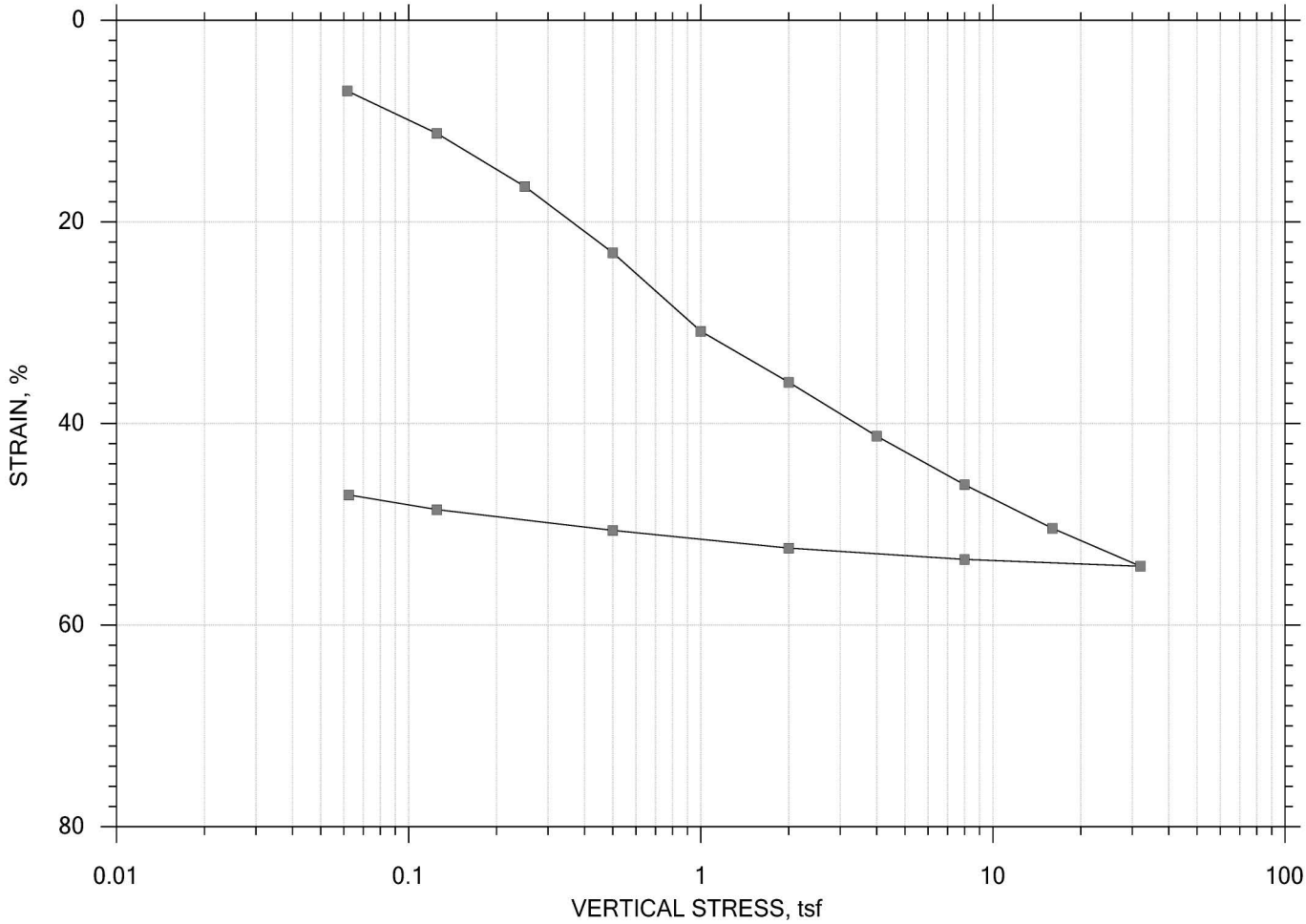
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	RA-C002303	CD-5-1	1.2-1.7	md	10/30/17	njh	11/20/17	306296-CD-5-1n.dat
●	RA-C002303	CD-5-2	1.2-1.7	md	11/01/17	njh	11/20/17	306296-CD-5-2n.dat
▲	RA-C002303	CD-5-3	1.2-1.7	md	11/02/17	njh	11/20/17	306296-CD-5-3n.dat

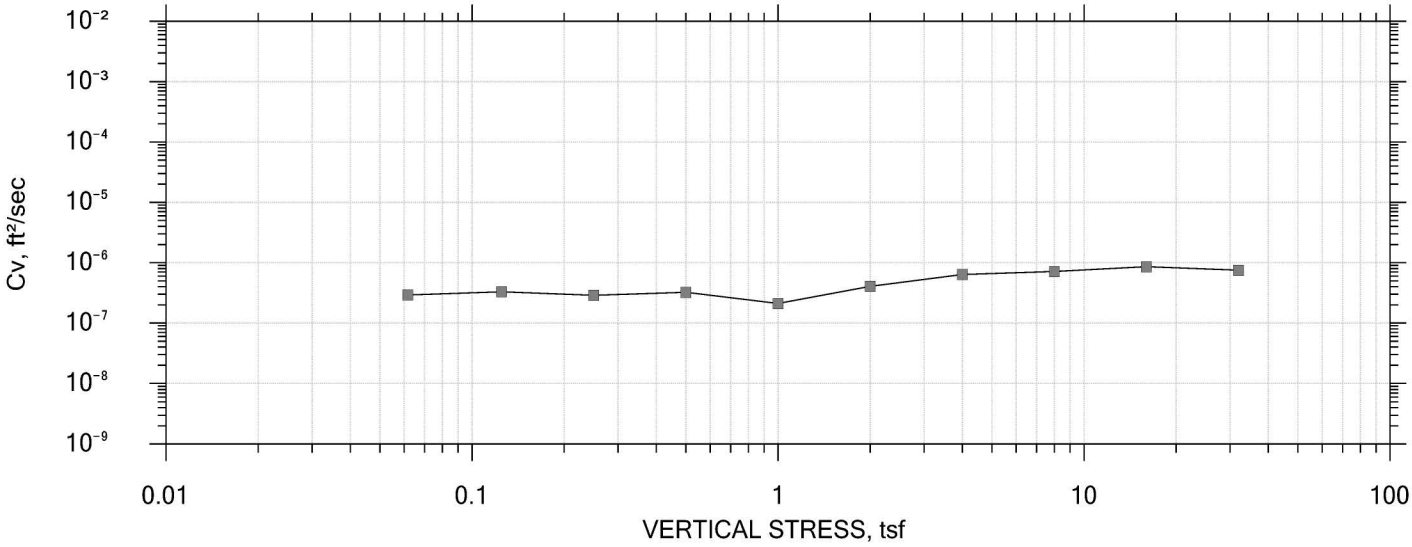
GeoTesting EXPRESS

Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
Boring No.: ---	Sample Type: intact	
Description: Moist, dark gray silt		
Remarks: System S - STAGED TRIAXIAL TEST		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

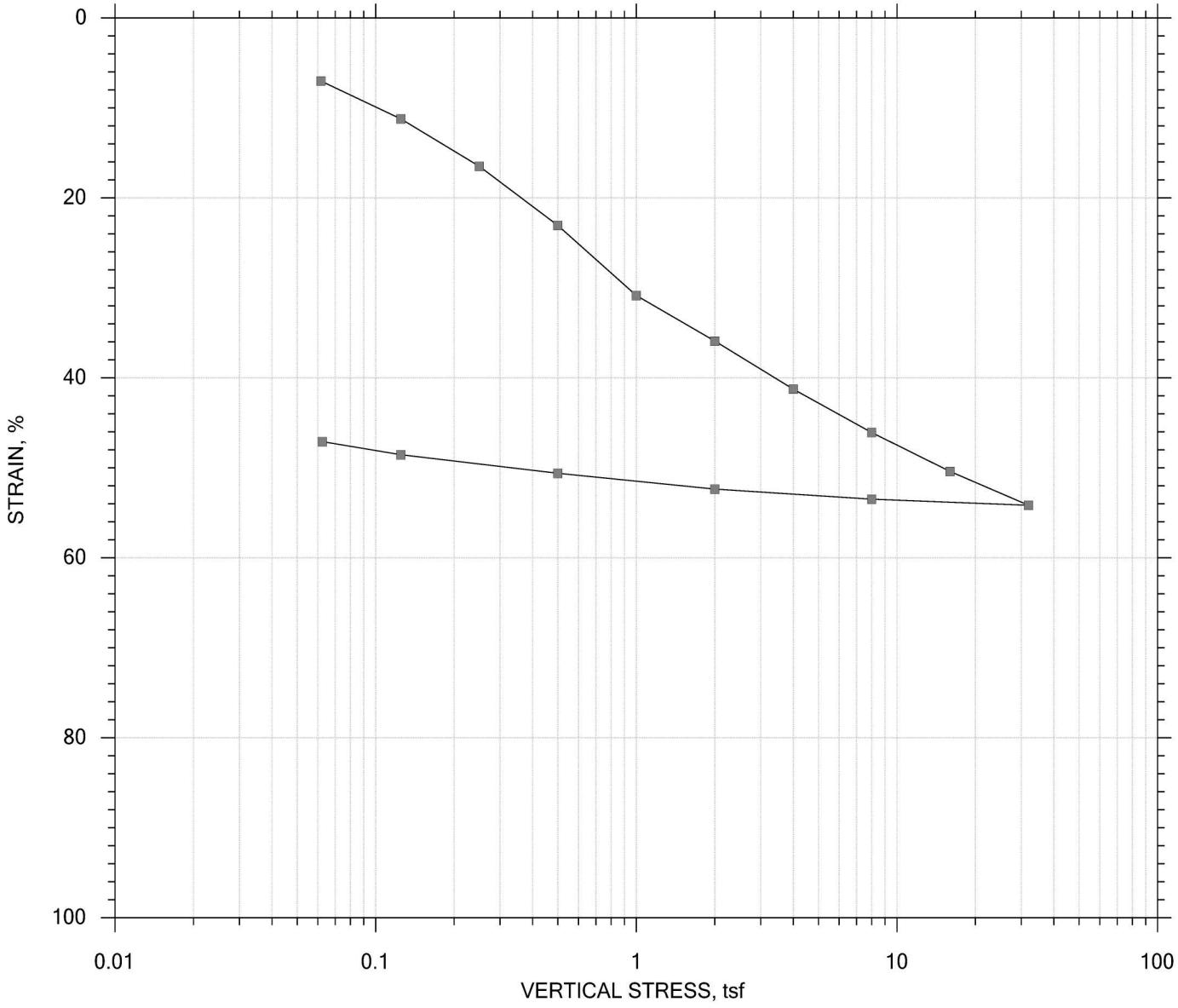




GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	98.71	36.63
Preconsolidation Stress: ---				Dry Unit Weight, pcf	46.255	85.657
Compression Ratio: ---				Saturation, %	100.00	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	2.72	1.01
LL: ---	PL: ---	PI: ---	GS: 2.76			

GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor
Boring No.: ---
Sample No.: RA-C002302
Test No.: IP-3A

Location: New Bedford, MA
Tested By: md
Test Date: 11/20/17
Sample Type: intact

Project No.: GTX-306296
Checked By: njh
Depth: 0.5-1.2 ft
Elevation: ---

Soil Description: Wet, gray silt with clay and shells
Remarks: System T, Swell Pressure = 0.0617 tsf

Estimated Specific Gravity: 2.76
Initial Void Ratio: 2.72
Final Void Ratio: 1.01

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

Specimen Diameter: 2.50 in
Initial Height: 1.00 in
Final Height: 0.54 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	D-1290	RING		B-1950
Wt. Container + Wet Soil, gm	121.94	227.49	190.49	89.560
Wt. Container + Dry Soil, gm	66.140	168.66	168.66	67.730
Wt. Container, gm	8.4400	109.06	109.06	8.1300
Wt. Dry Soil, gm	57.700	59.600	59.600	59.600
Water Content, %	96.71	98.71	36.63	36.63
Void Ratio	---	2.72	1.01	---
Degree of Saturation, %	---	100.00	100.00	---
Dry Unit Weight, pcf	---	46.255	85.657	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor
Boring No.: ---
Sample No.: RA-C002302
Test No.: IP-3A

Location: New Bedford, MA
Tested By: md
Test Date: 11/20/17
Sample Type: intact

Project No.: GTX-306296
Checked By: njh
Depth: 0.5-1.2 ft
Elevation: ---

Soil Description: Wet, gray silt with clay and shells
Remarks: System T, Swell Pressure = 0.0617 tsf

Displacement at End of Increment

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/tsf	k ft/day
1	0.0617	0.07015	2.46	7.02	90.445	2.53e-007	1.14e+000	7.75e-004
2	0.125	0.1122	2.30	11.2	60.033	3.38e-007	6.64e-001	6.05e-004
3	0.250	0.1649	2.11	16.5	70.031	2.60e-007	4.21e-001	2.95e-004
4	0.500	0.2305	1.86	23.0	47.969	3.29e-007	2.62e-001	2.33e-004
5	1.00	0.3084	1.57	30.8	128.433	1.02e-007	1.56e-001	4.28e-005
6	2.00	0.3590	1.39	35.9	29.359	3.71e-007	5.06e-002	5.06e-005
7	4.00	0.4125	1.19	41.2	16.722	5.54e-007	2.67e-002	3.99e-005
8	8.00	0.4607	1.01	46.1	14.779	5.27e-007	1.21e-002	1.71e-005
9	16.0	0.5041	0.846	50.4	10.352	6.35e-007	5.42e-003	9.28e-006
10	32.0	0.5416	0.707	54.2	9.908	5.64e-007	2.34e-003	3.56e-006
11	8.00	0.5348	0.732	53.5	2.407	2.17e-006	2.80e-004	1.64e-006
12	2.00	0.5236	0.774	52.4	23.766	2.29e-007	1.87e-003	1.15e-006
13	0.500	0.5060	0.839	50.6	70.987	8.14e-008	1.17e-002	2.58e-006
14	0.125	0.4854	0.916	48.5	351.562	1.77e-008	5.48e-002	2.62e-006
15	0.0625	0.4709	0.970	47.1	0.000	0.00e+000	2.33e-001	0.00e+000

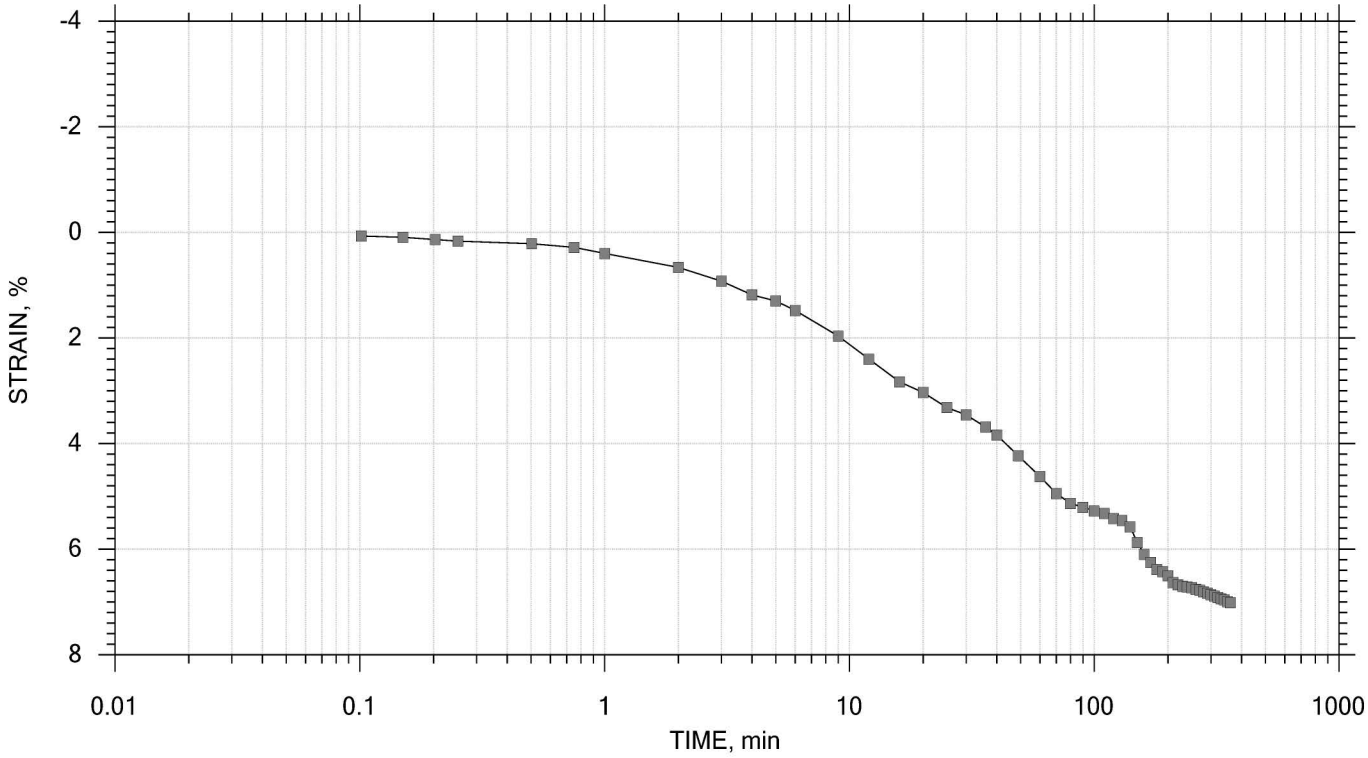
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0617	0.07015	2.46	7.02	0.000	0.00e+000	1.14e+000	0.00e+000	0.00e+000
2	0.125	0.1122	2.30	11.2	14.900	3.16e-007	6.64e-001	5.66e-004	0.00e+000
3	0.250	0.1649	2.11	16.5	0.000	0.00e+000	4.21e-001	0.00e+000	0.00e+000
4	0.500	0.2305	1.86	23.0	12.101	3.03e-007	2.62e-001	2.15e-004	0.00e+000
5	1.00	0.3084	1.57	30.8	15.322	1.99e-007	1.56e-001	8.34e-005	0.00e+000
6	2.00	0.3590	1.39	35.9	6.295	4.02e-007	5.06e-002	5.49e-005	0.00e+000
7	4.00	0.4125	1.19	41.2	3.362	6.40e-007	2.67e-002	4.61e-005	0.00e+000
8	8.00	0.4607	1.01	46.1	2.286	7.92e-007	1.21e-002	2.57e-005	0.00e+000
9	16.0	0.5041	0.846	50.4	1.607	9.50e-007	5.42e-003	1.39e-005	0.00e+000
10	32.0	0.5416	0.707	54.2	1.543	8.41e-007	2.34e-003	5.32e-006	0.00e+000
11	8.00	0.5348	0.732	53.5	0.000	0.00e+000	2.80e-004	0.00e+000	0.00e+000
12	2.00	0.5236	0.774	52.4	0.000	0.00e+000	1.87e-003	0.00e+000	0.00e+000
13	0.500	0.5060	0.839	50.6	0.000	0.00e+000	1.17e-002	0.00e+000	0.00e+000
14	0.125	0.4854	0.916	48.5	0.000	0.00e+000	5.48e-002	0.00e+000	0.00e+000
15	0.0625	0.4709	0.970	47.1	0.000	0.00e+000	2.33e-001	0.00e+000	0.00e+000

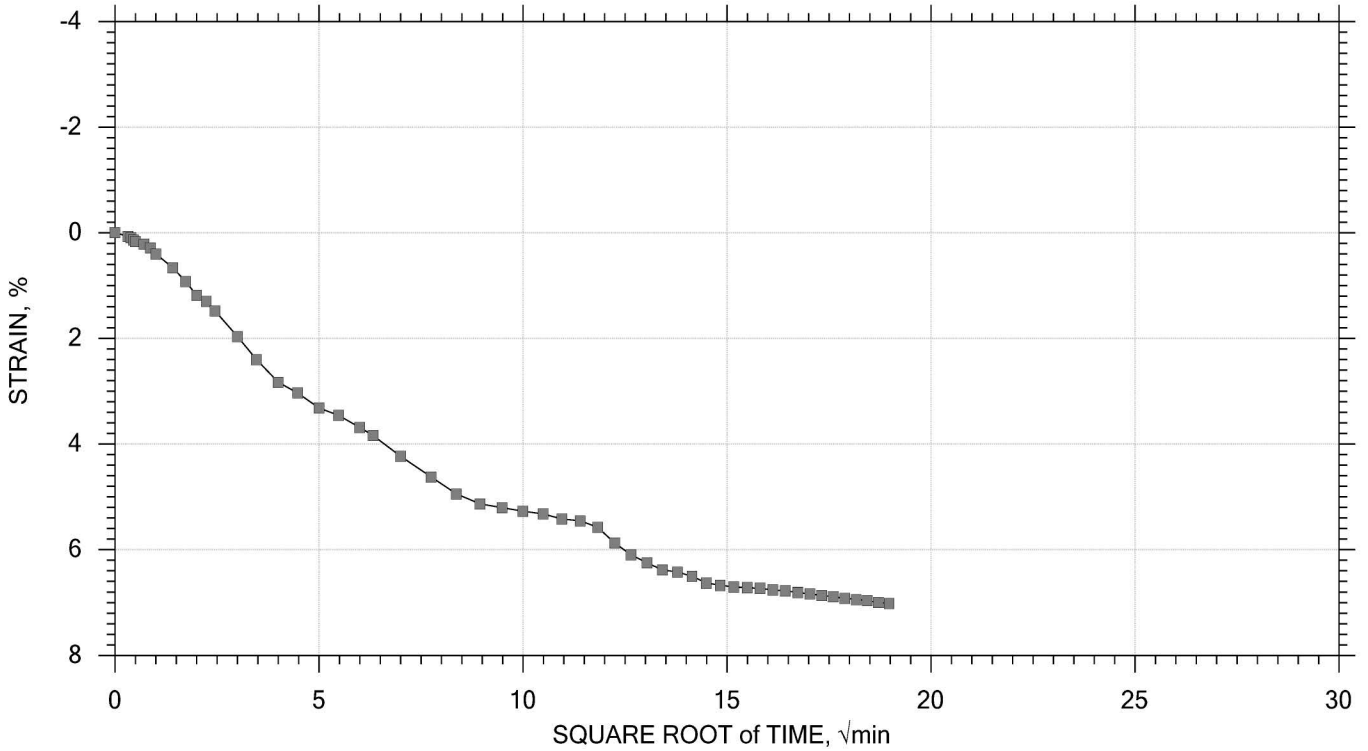
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Volume Step 1 of 15

Stress: 0.061667 tsf





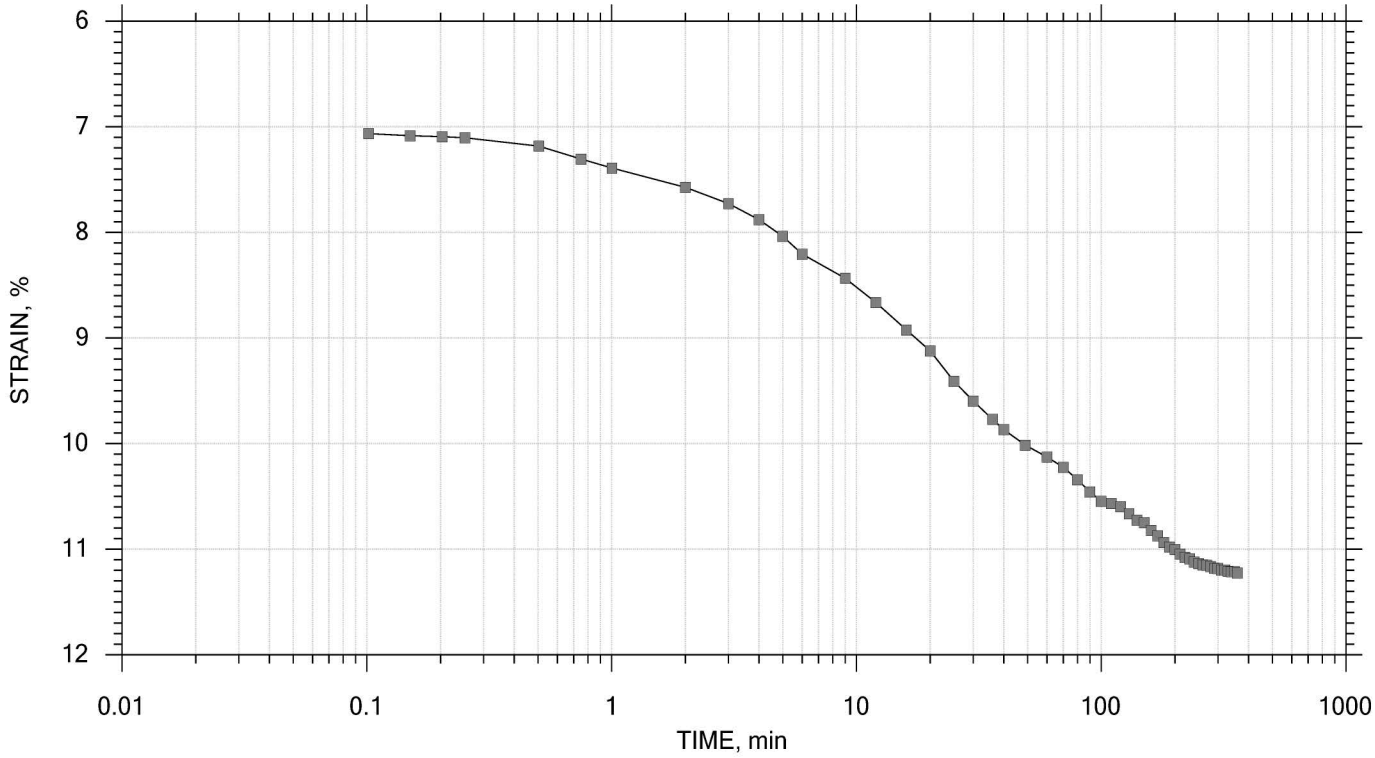
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

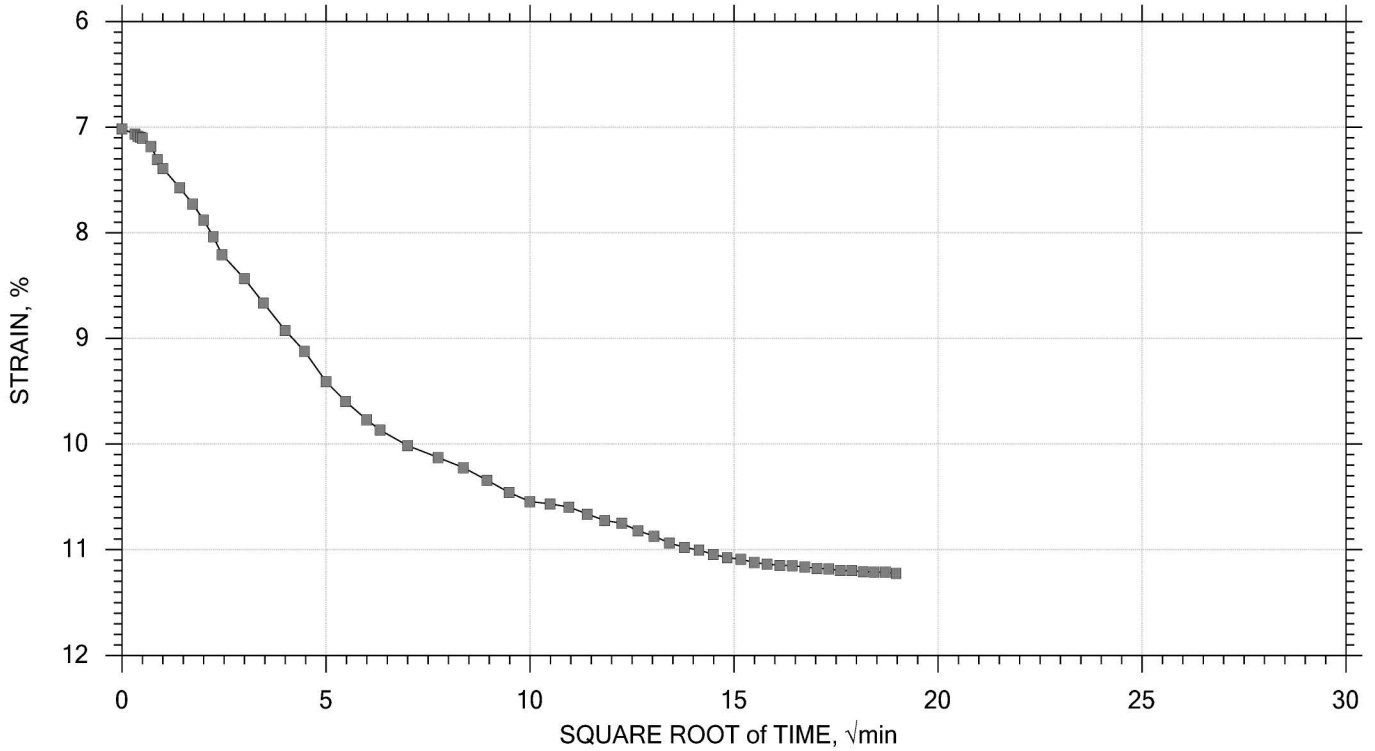
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 0.125 tsf





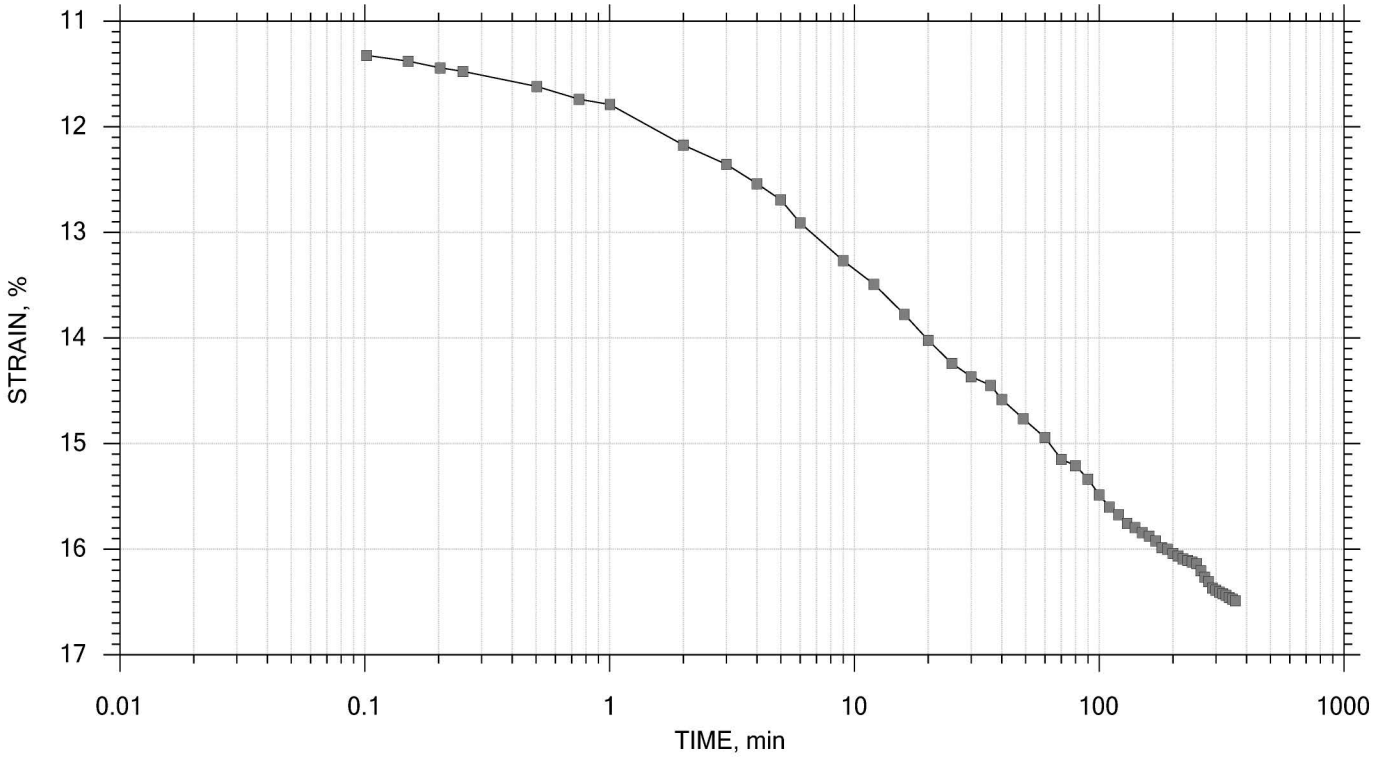
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

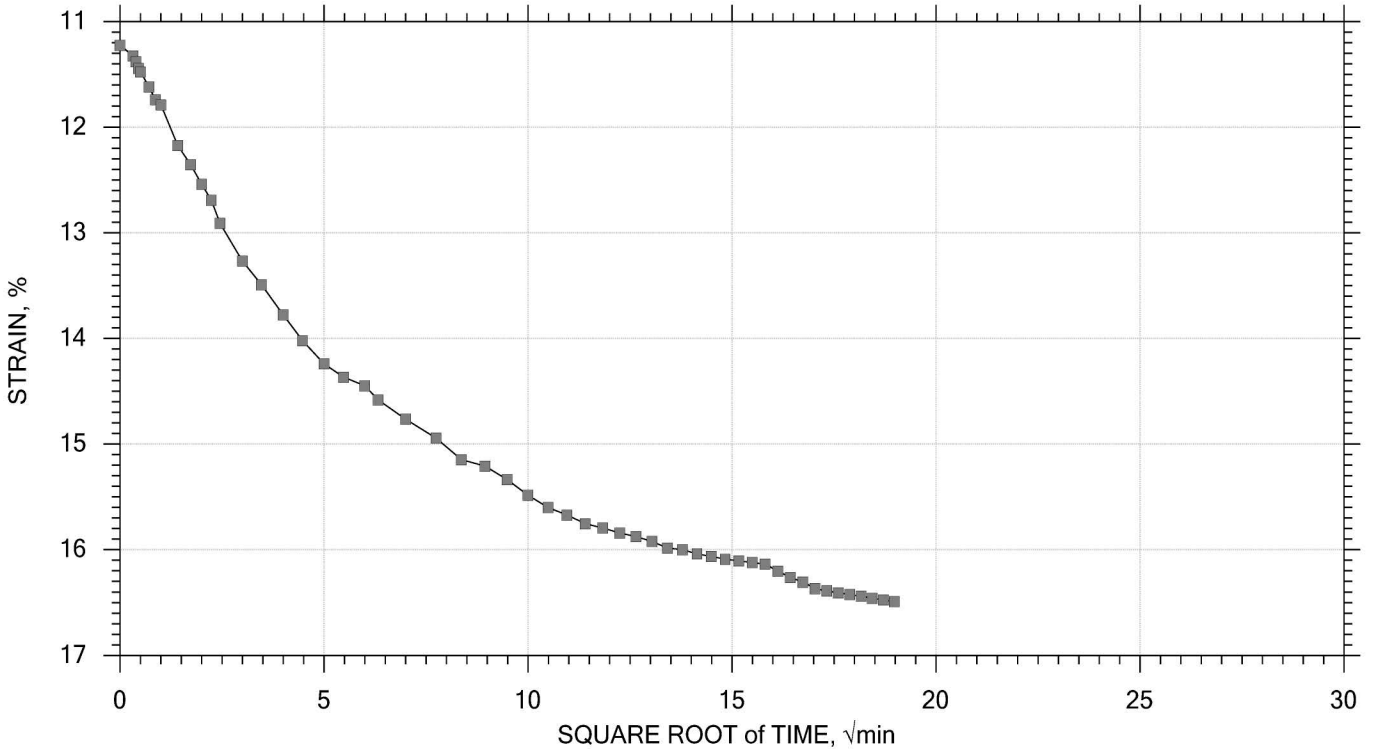
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 0.25 tsf





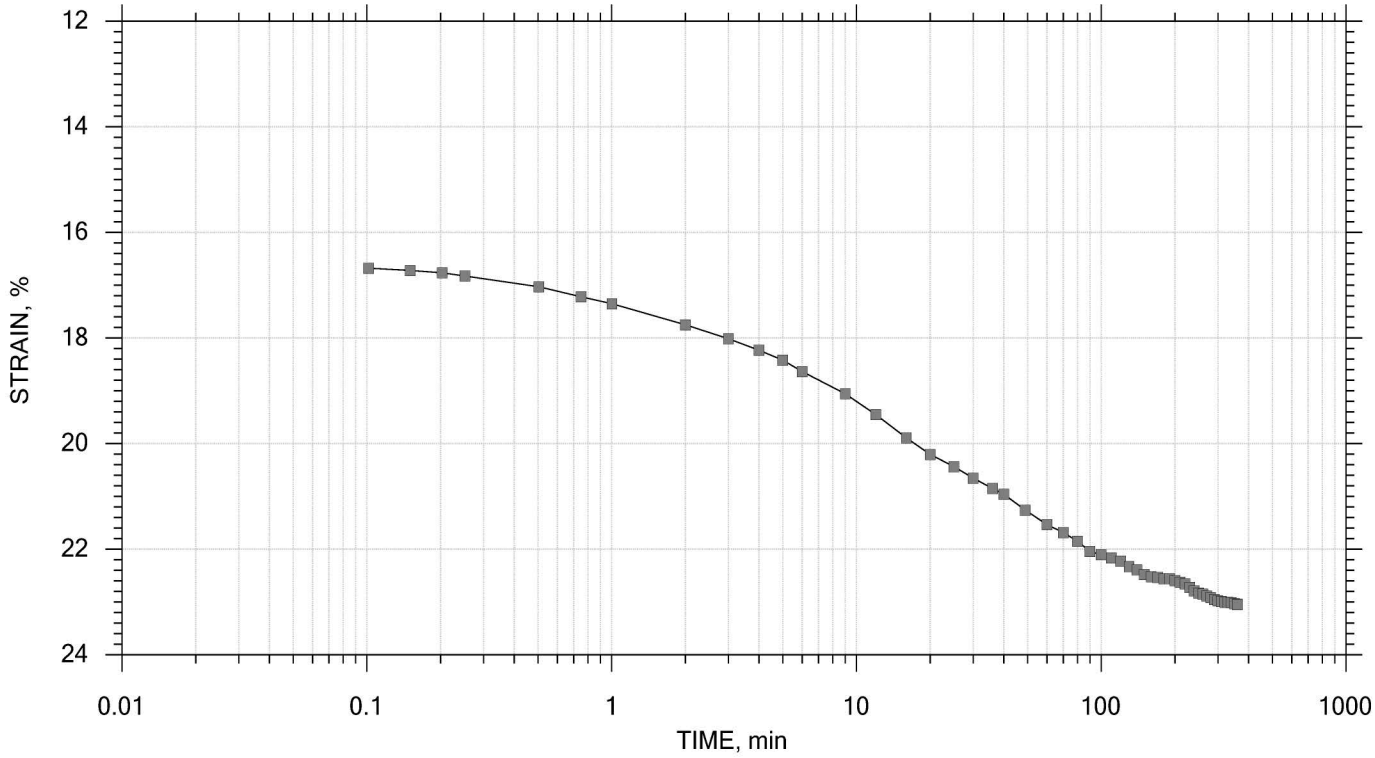
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

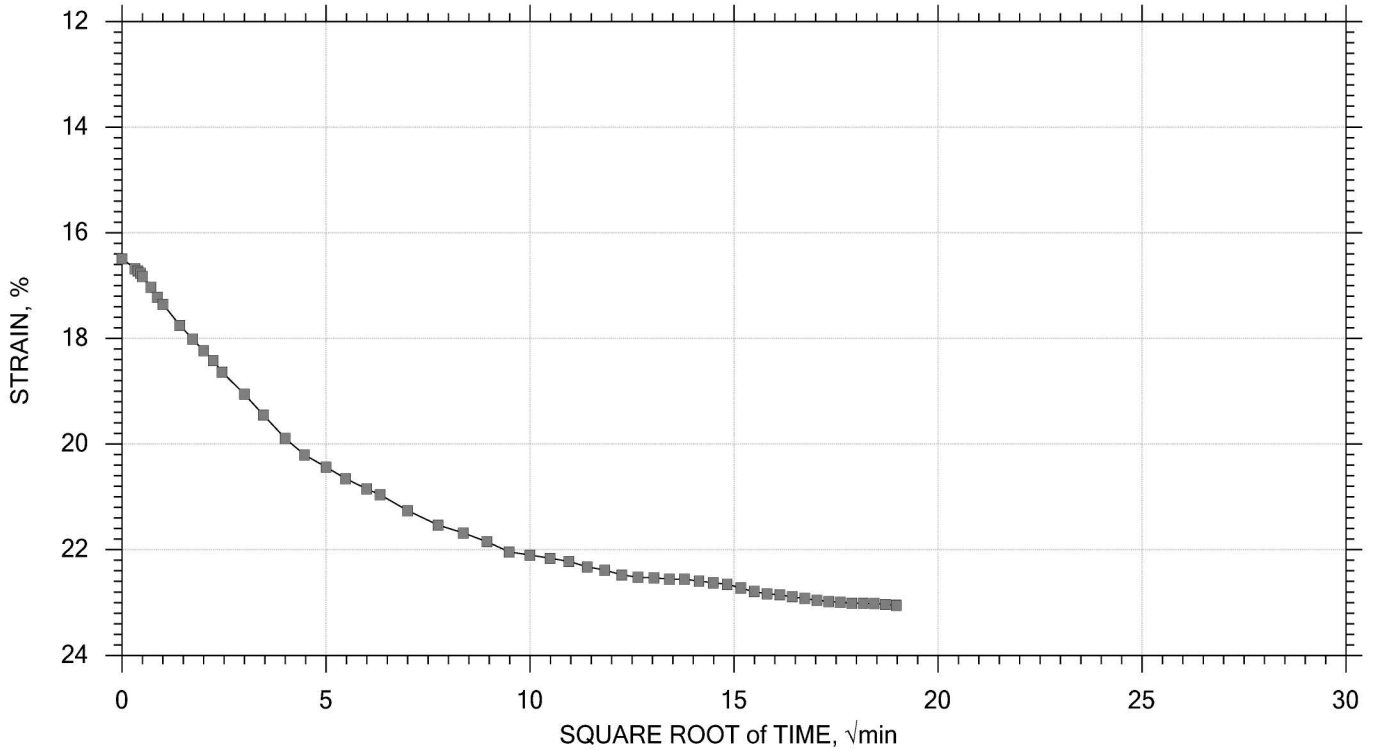
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 0.5 tsf





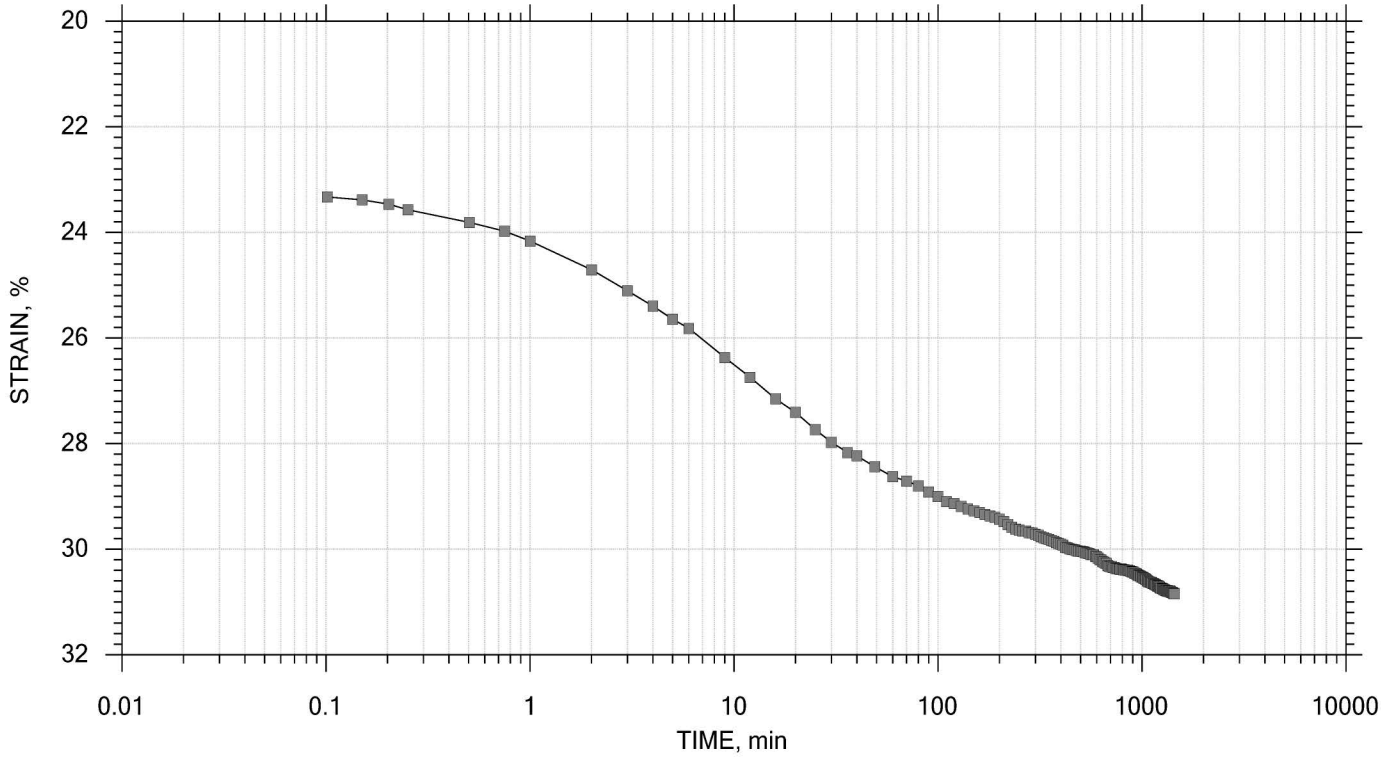
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

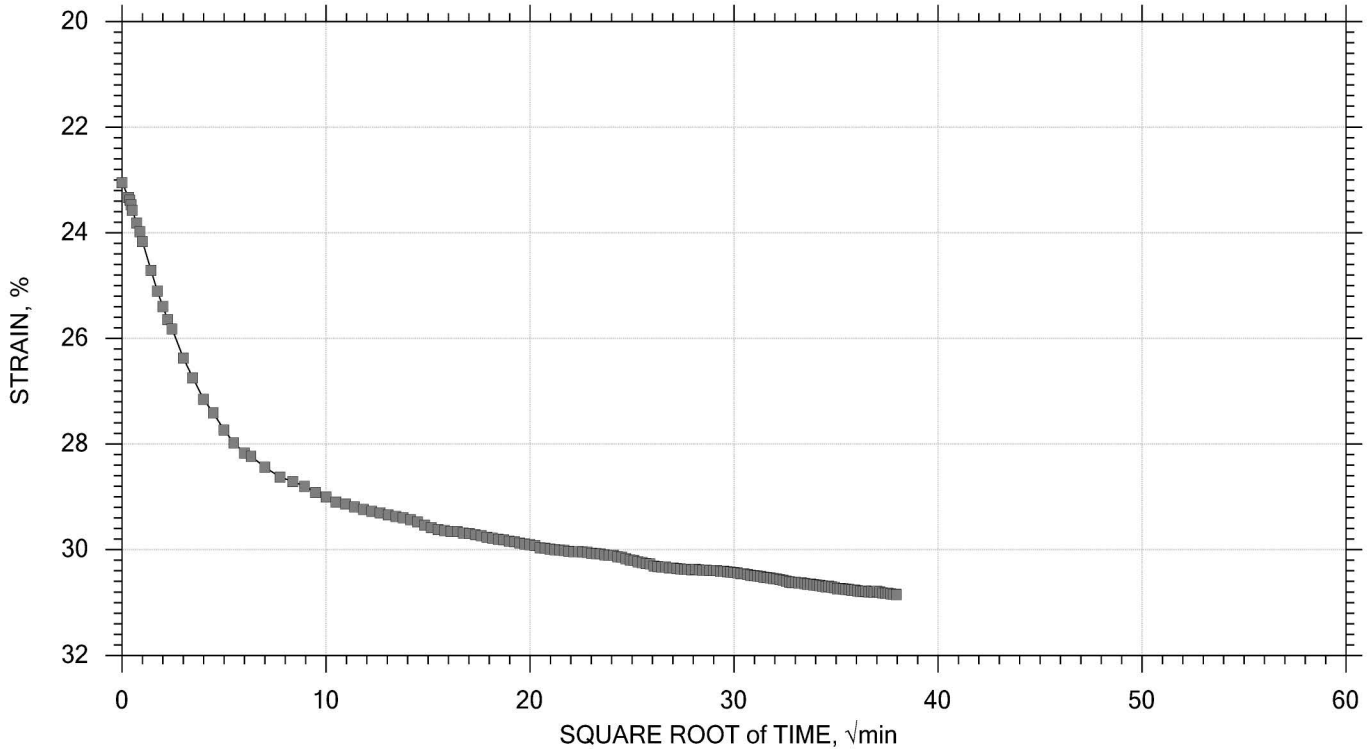
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 1 tsf





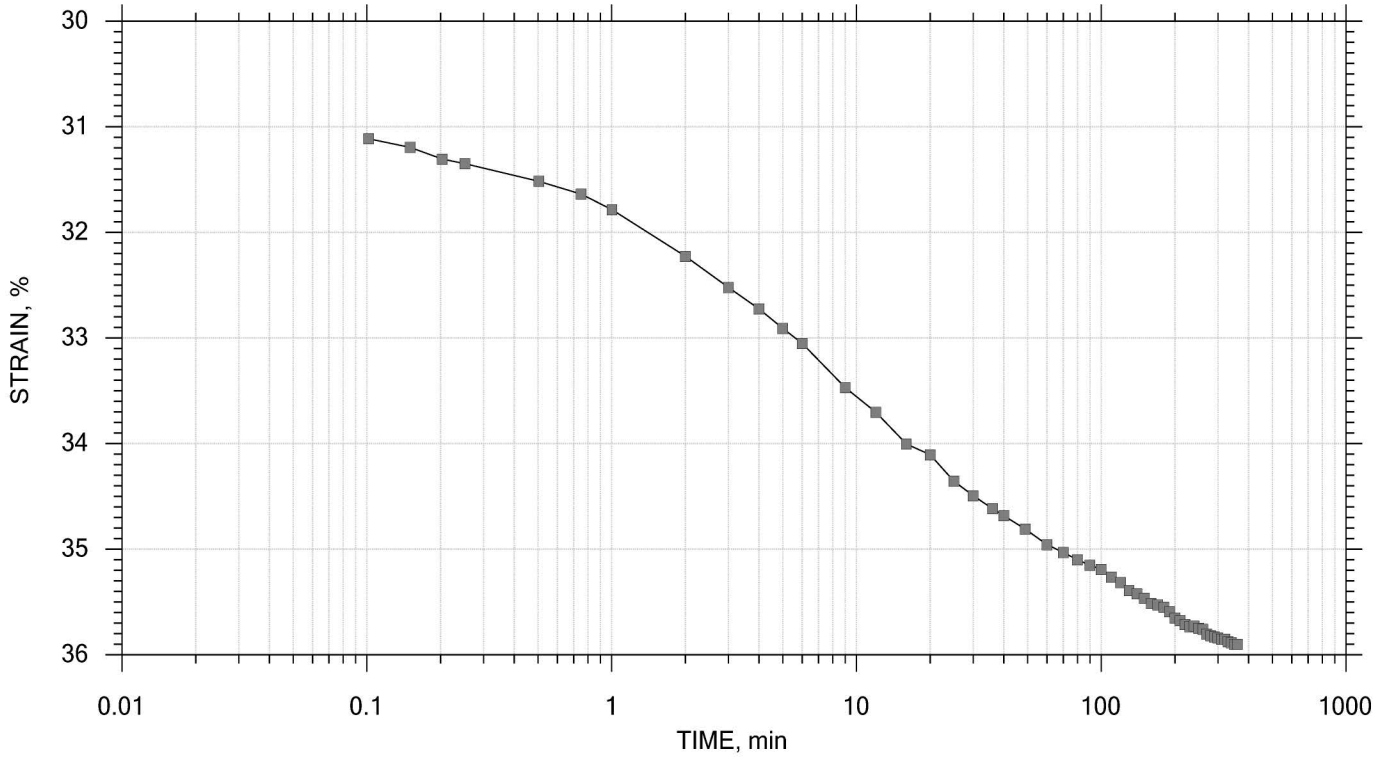
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

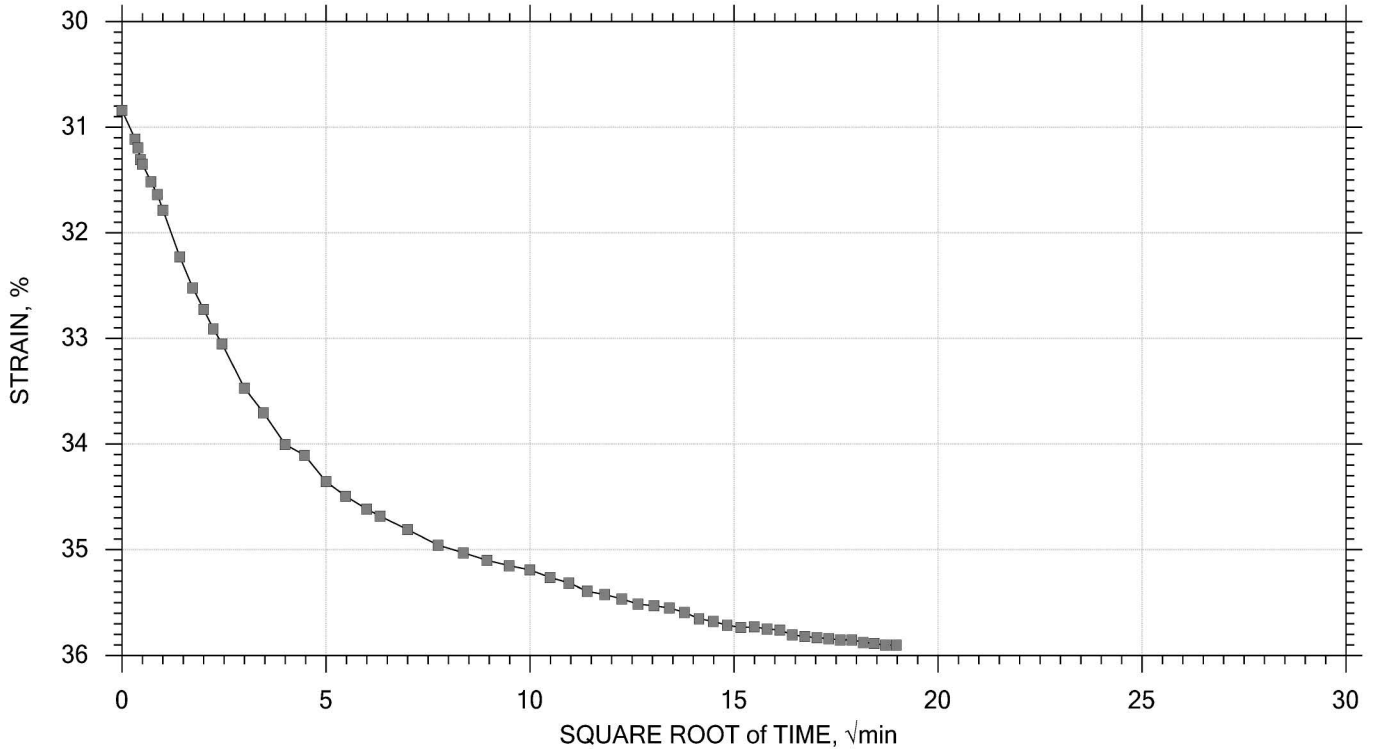
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 2 tsf





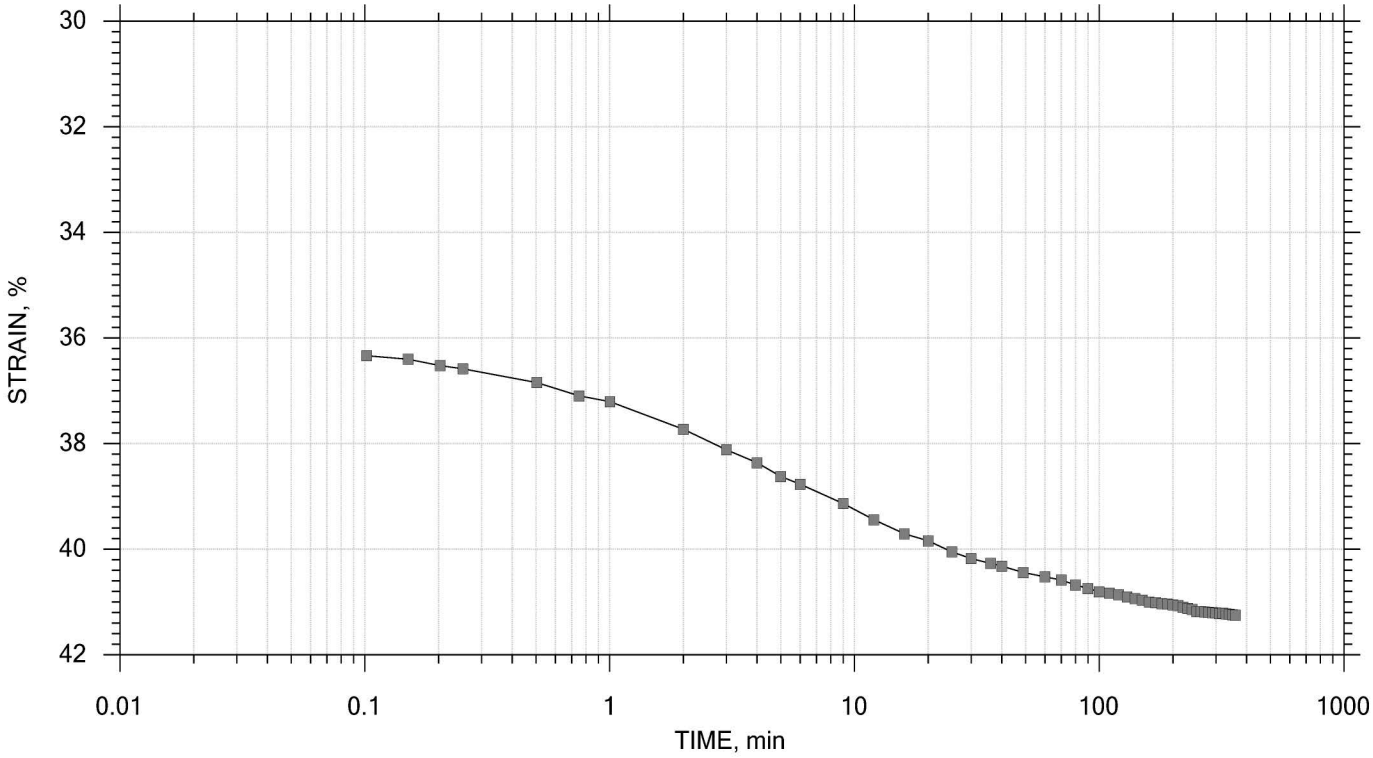
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

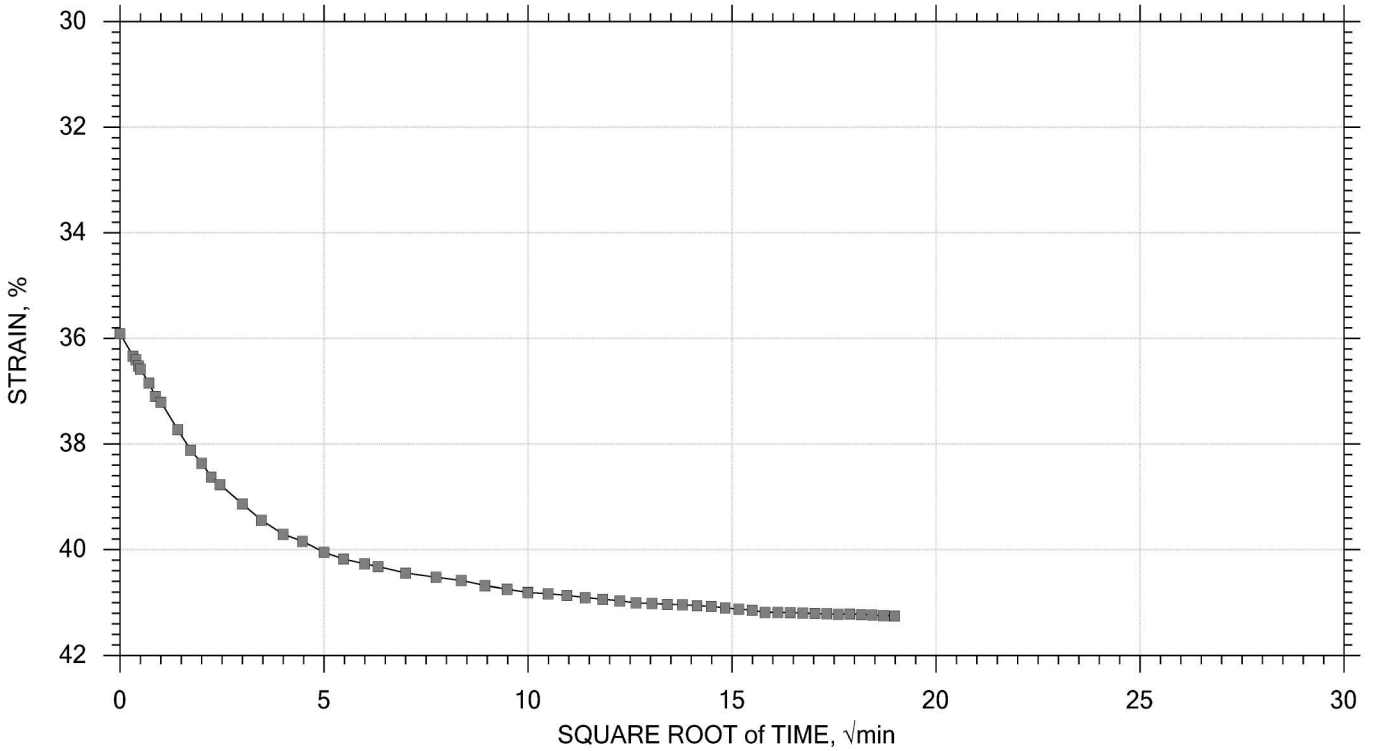
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4 tsf





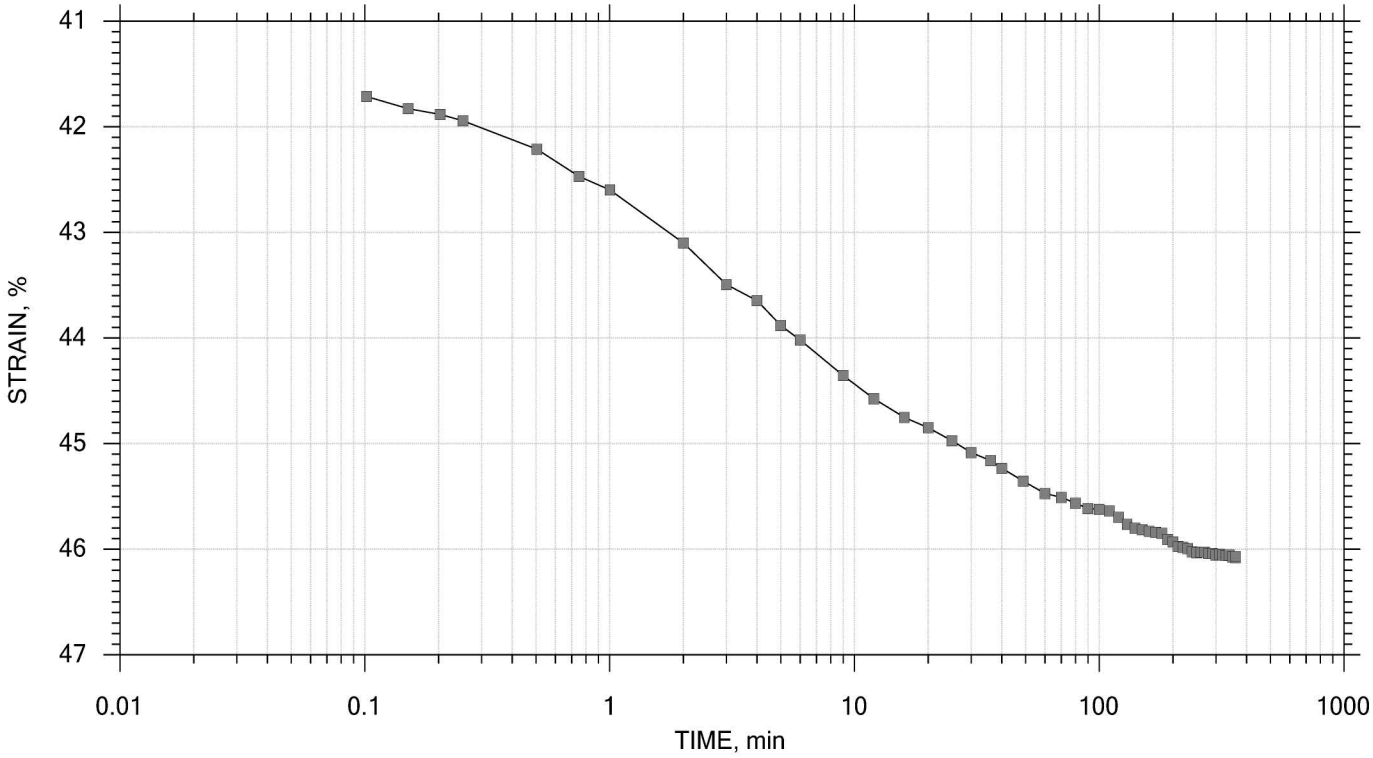
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

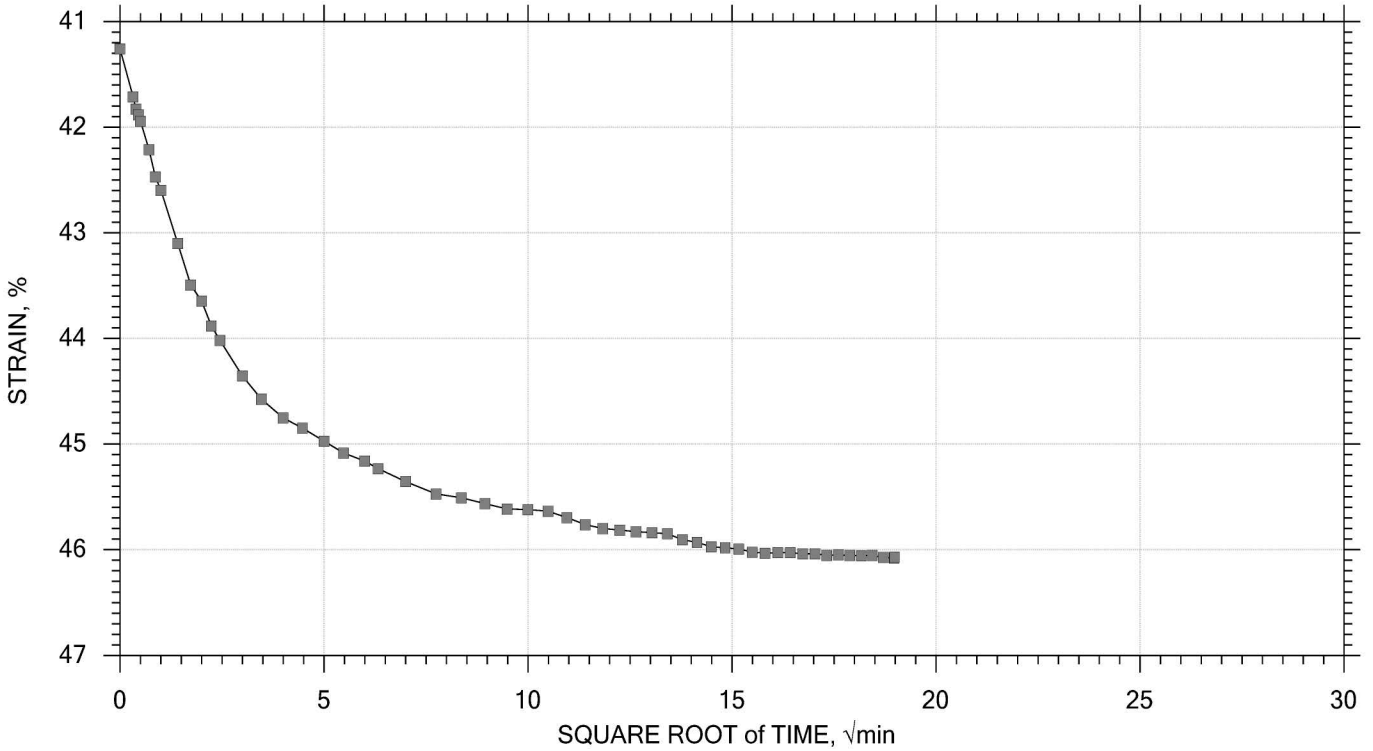
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 8 tsf





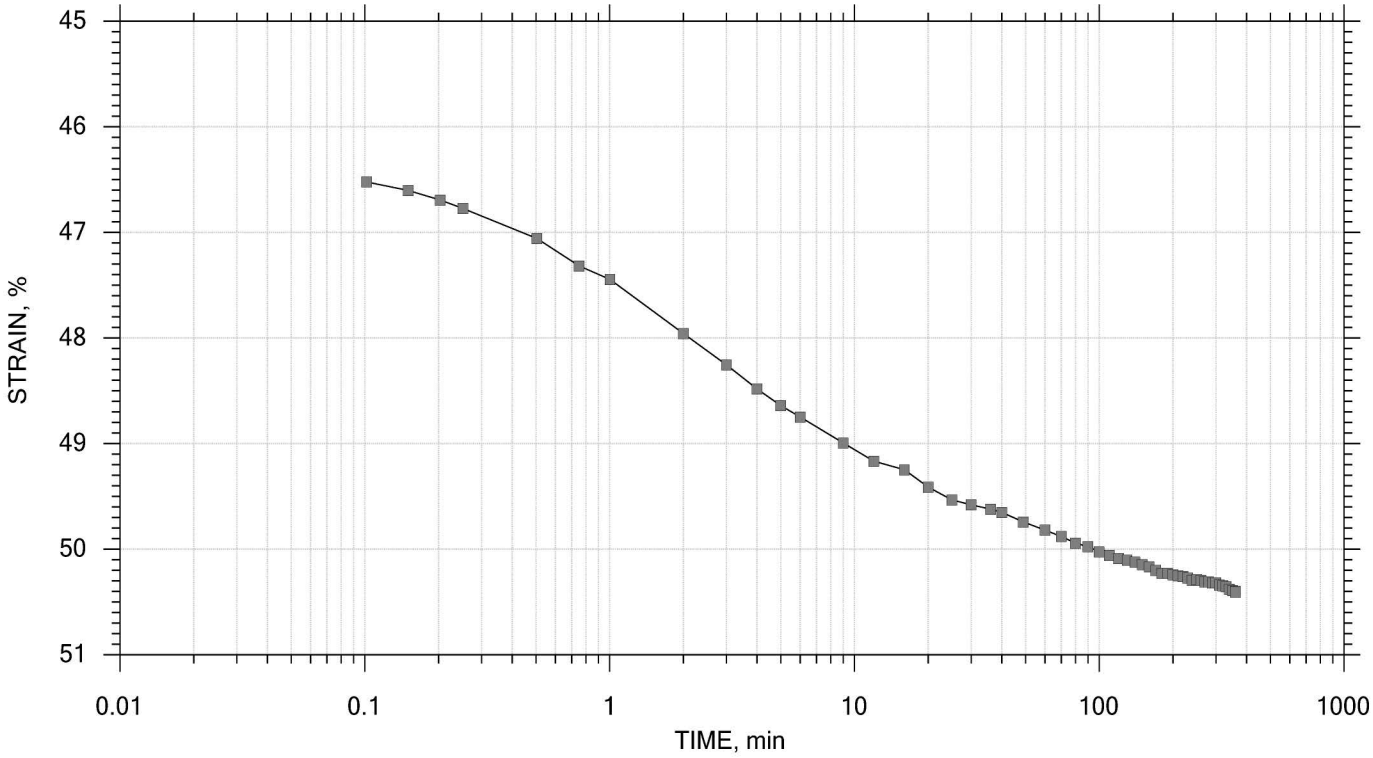
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

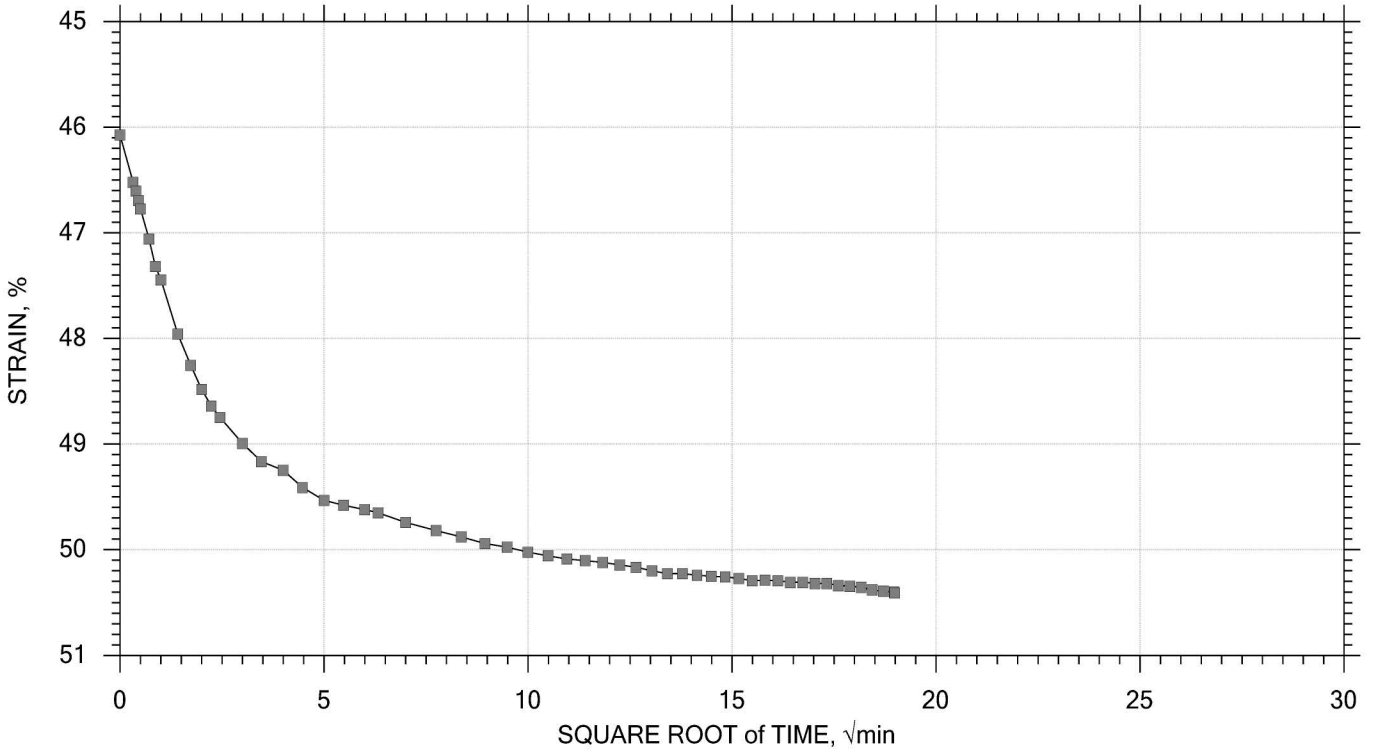
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 16 tsf





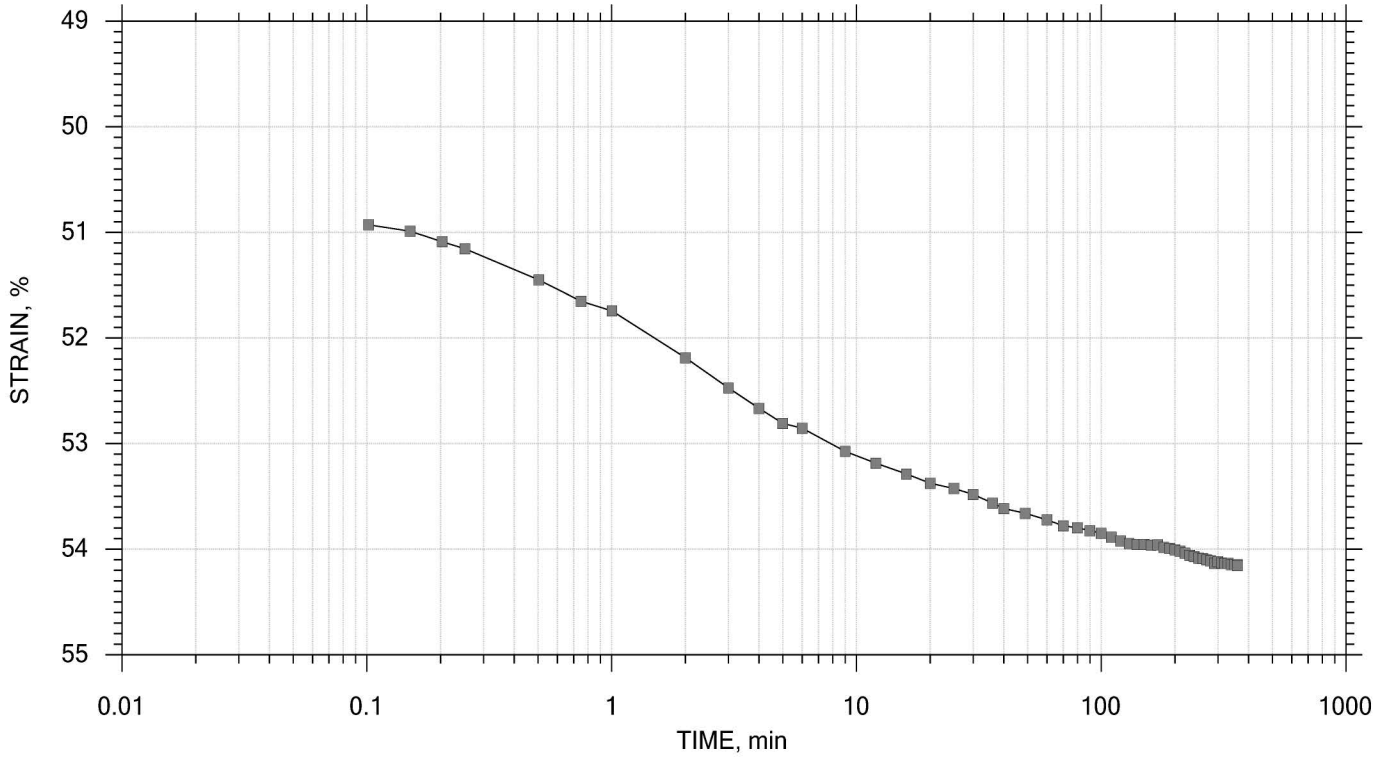
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

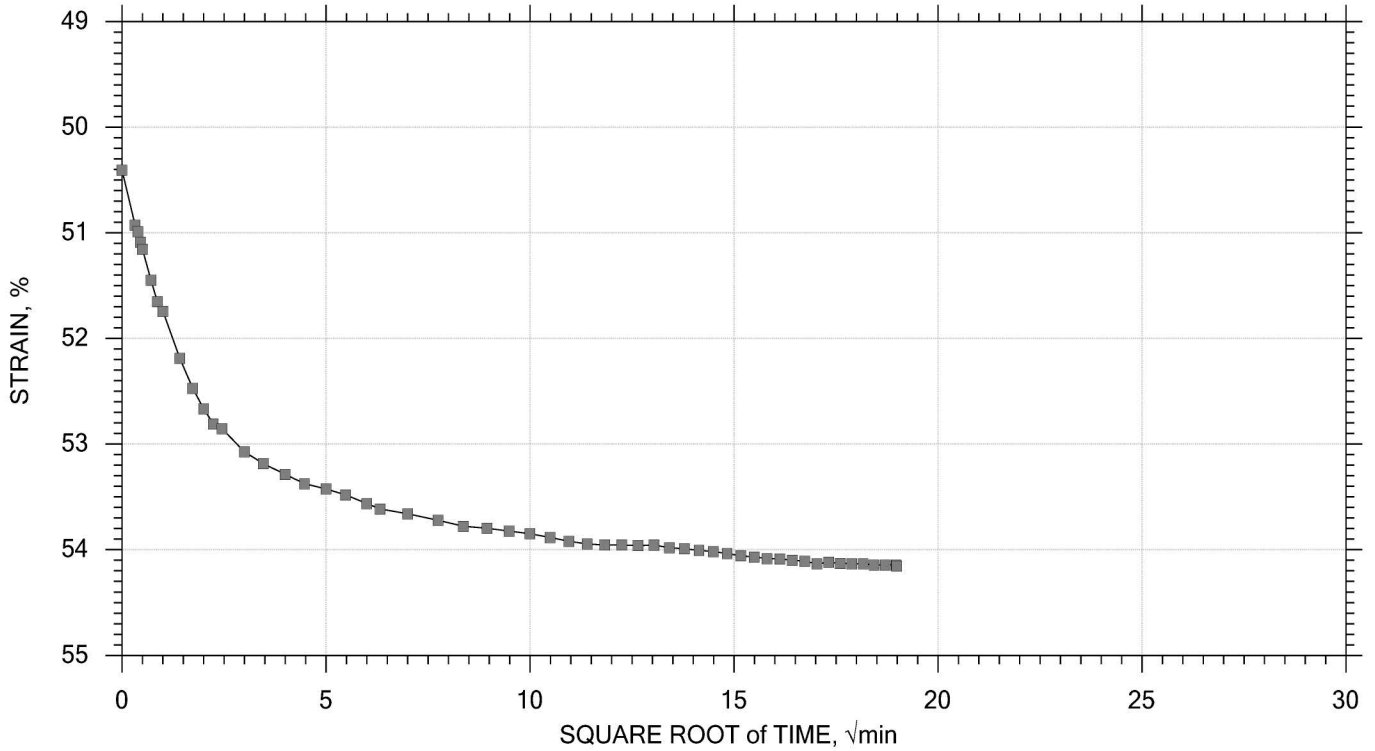
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 32 tsf





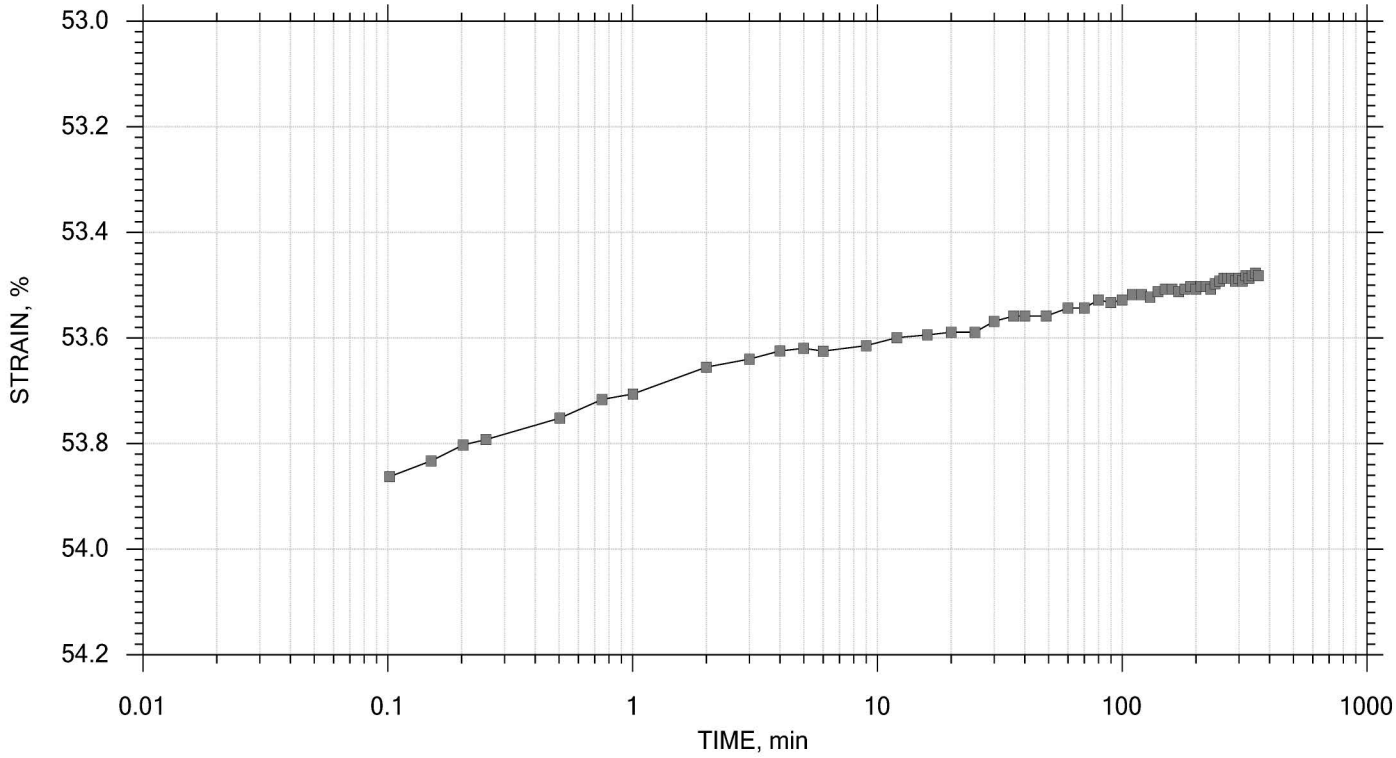
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

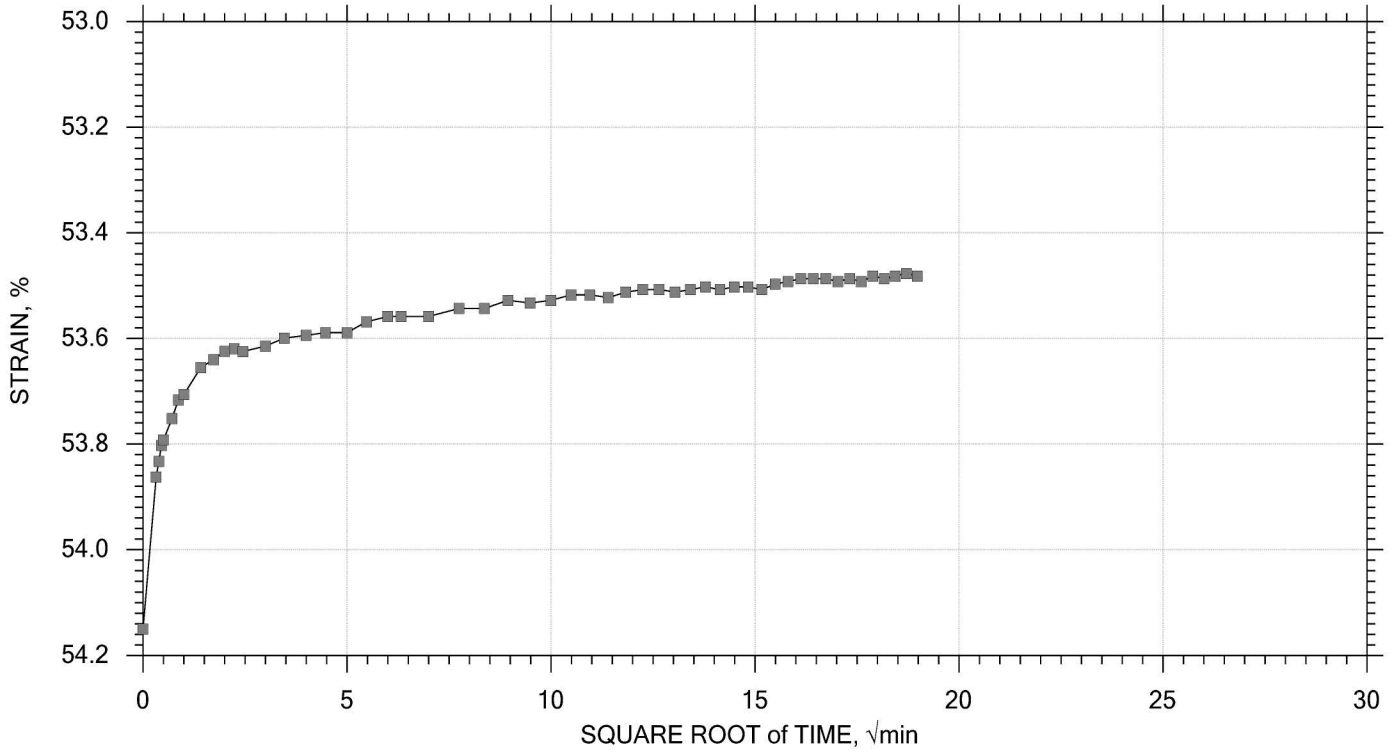
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 8 tsf





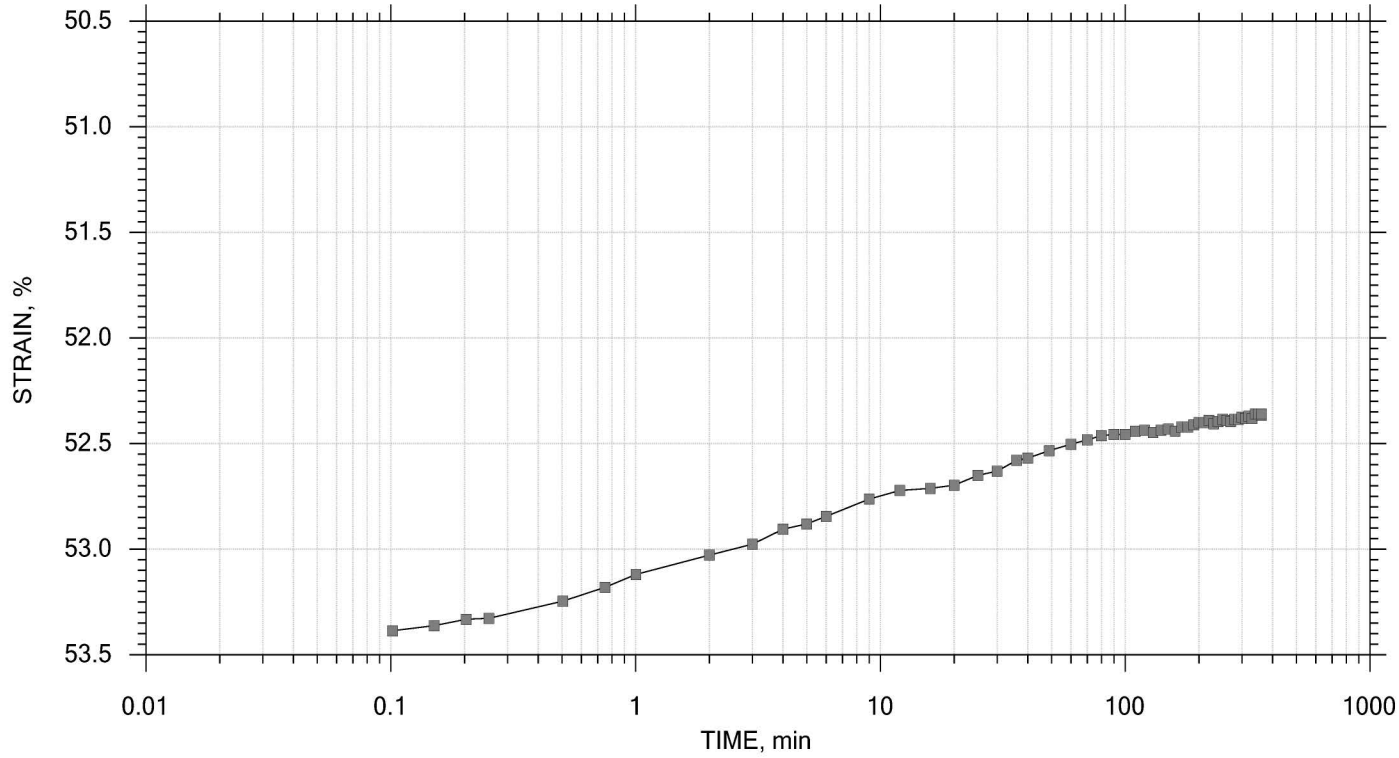
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

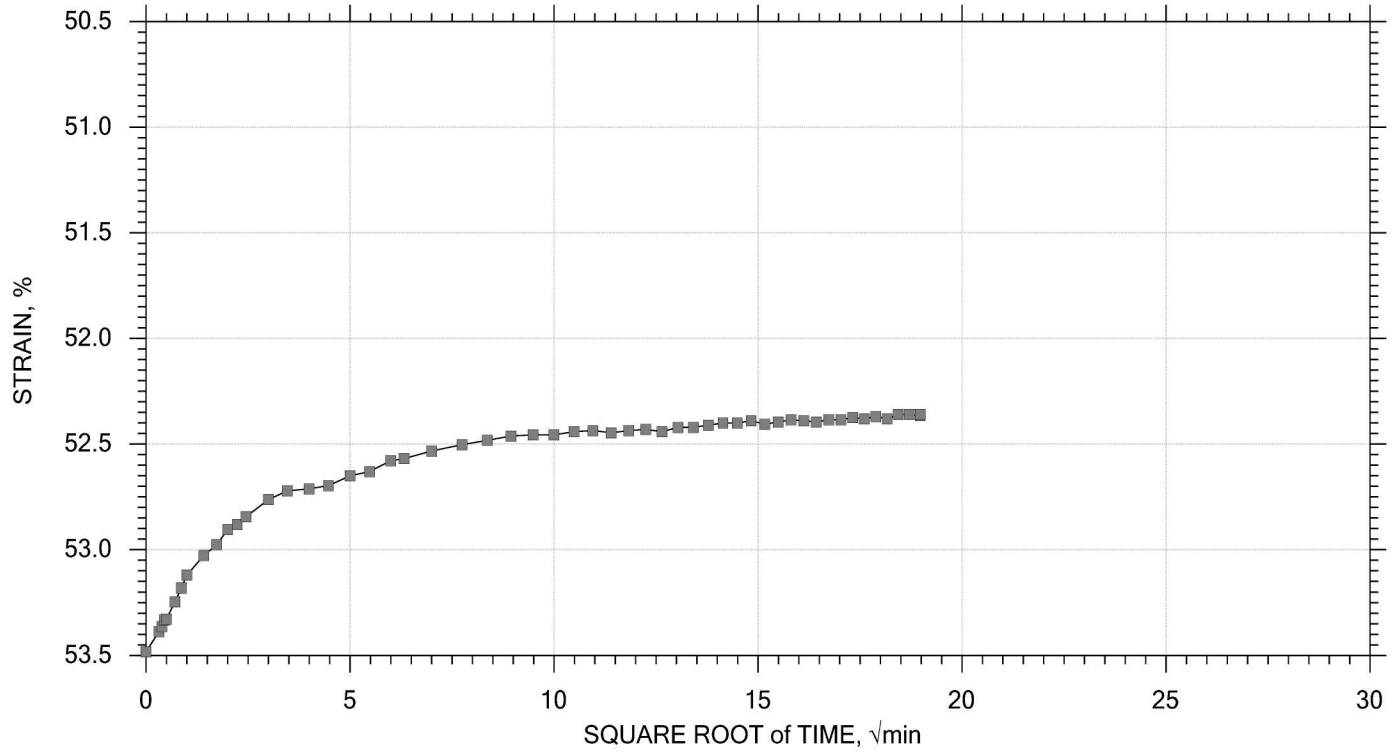
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2 tsf





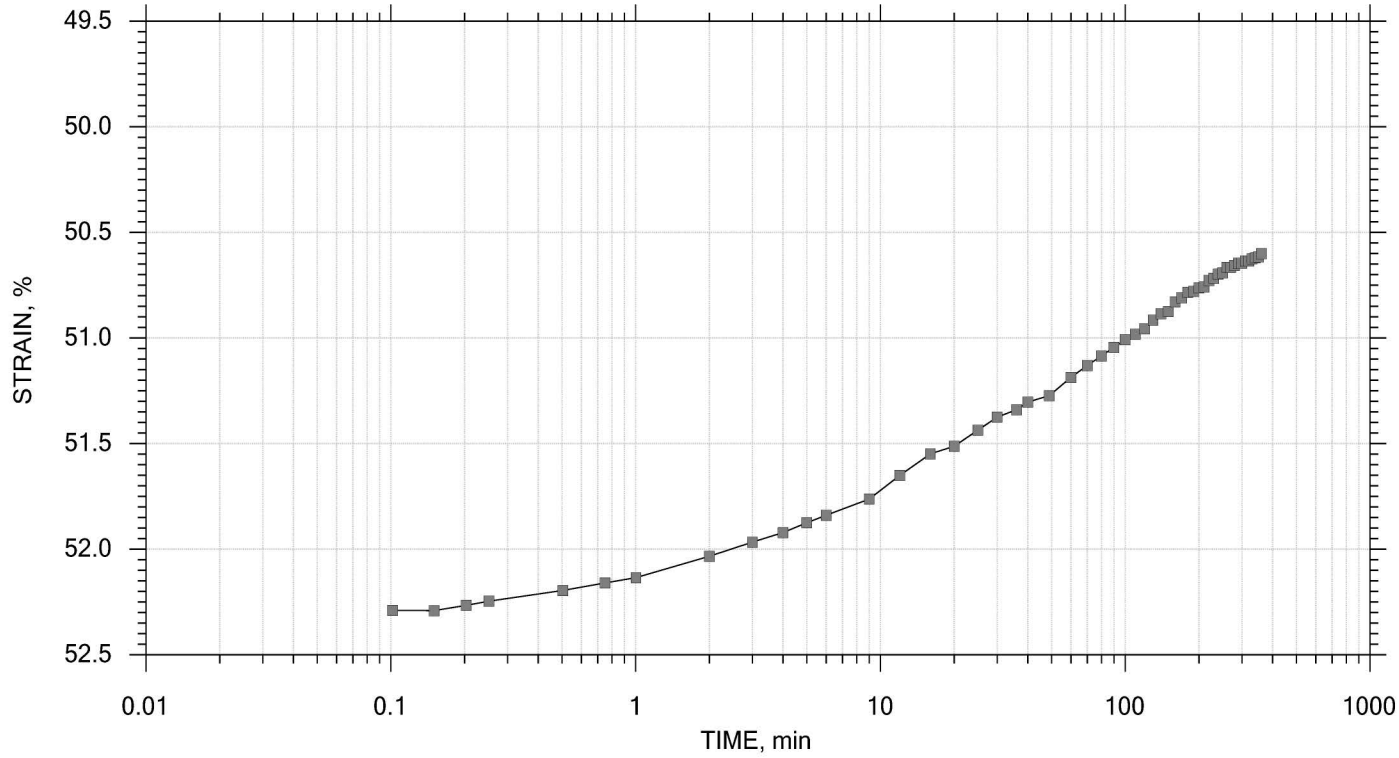
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

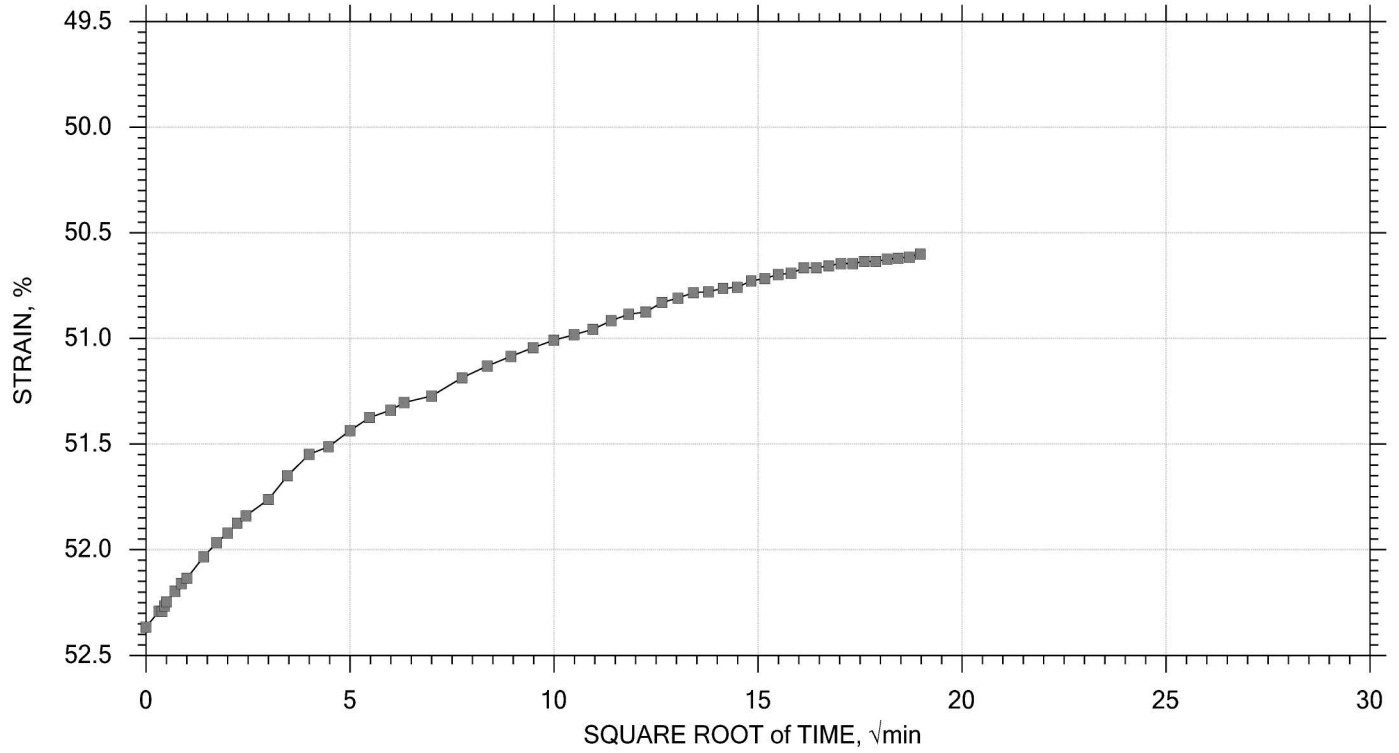
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 0.5 tsf





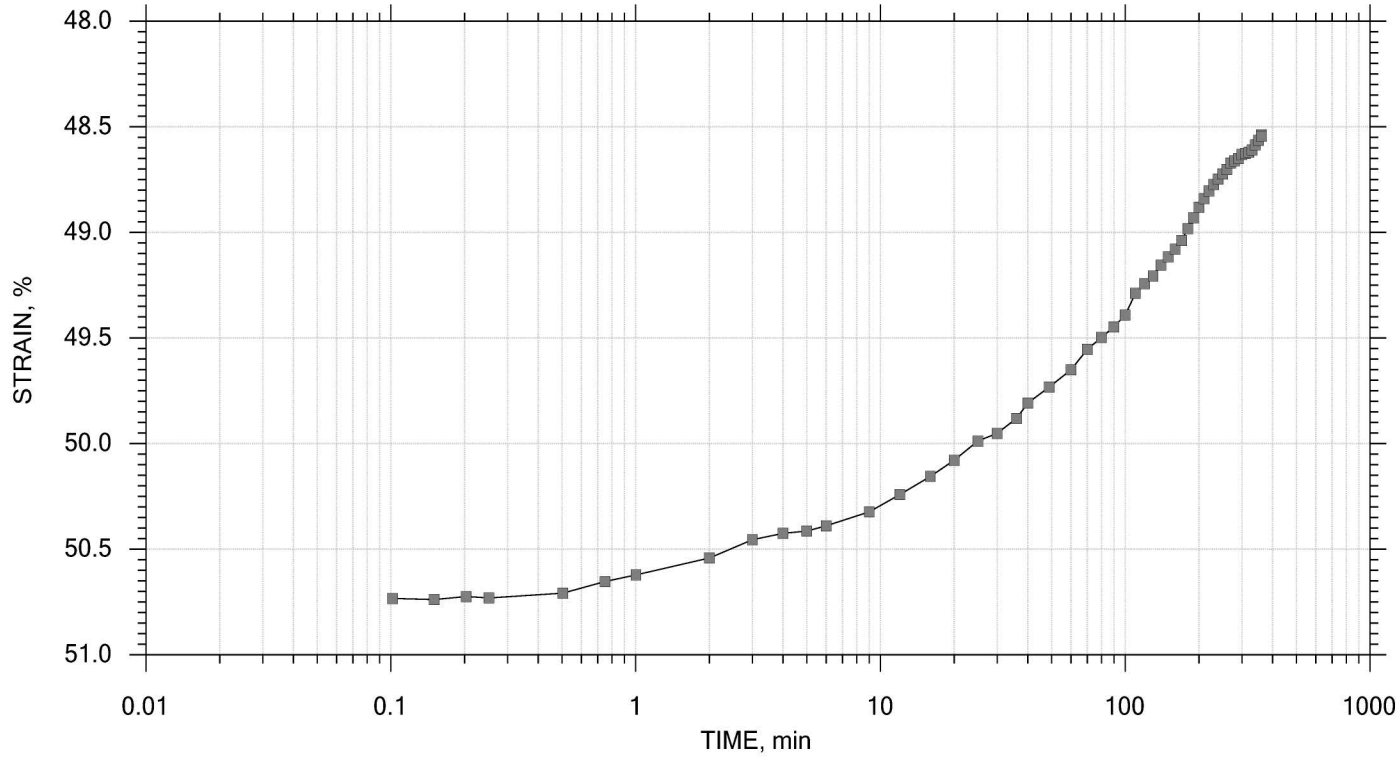
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

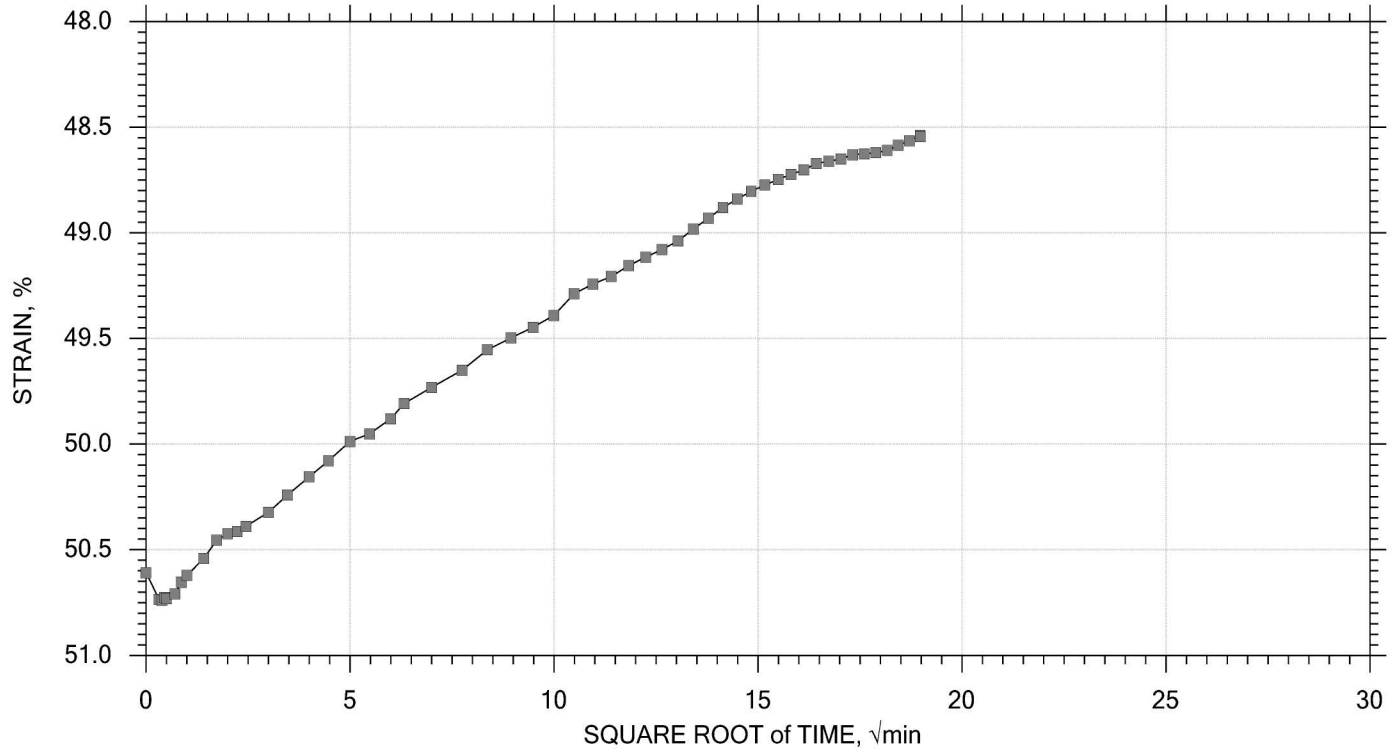
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 0.125 tsf





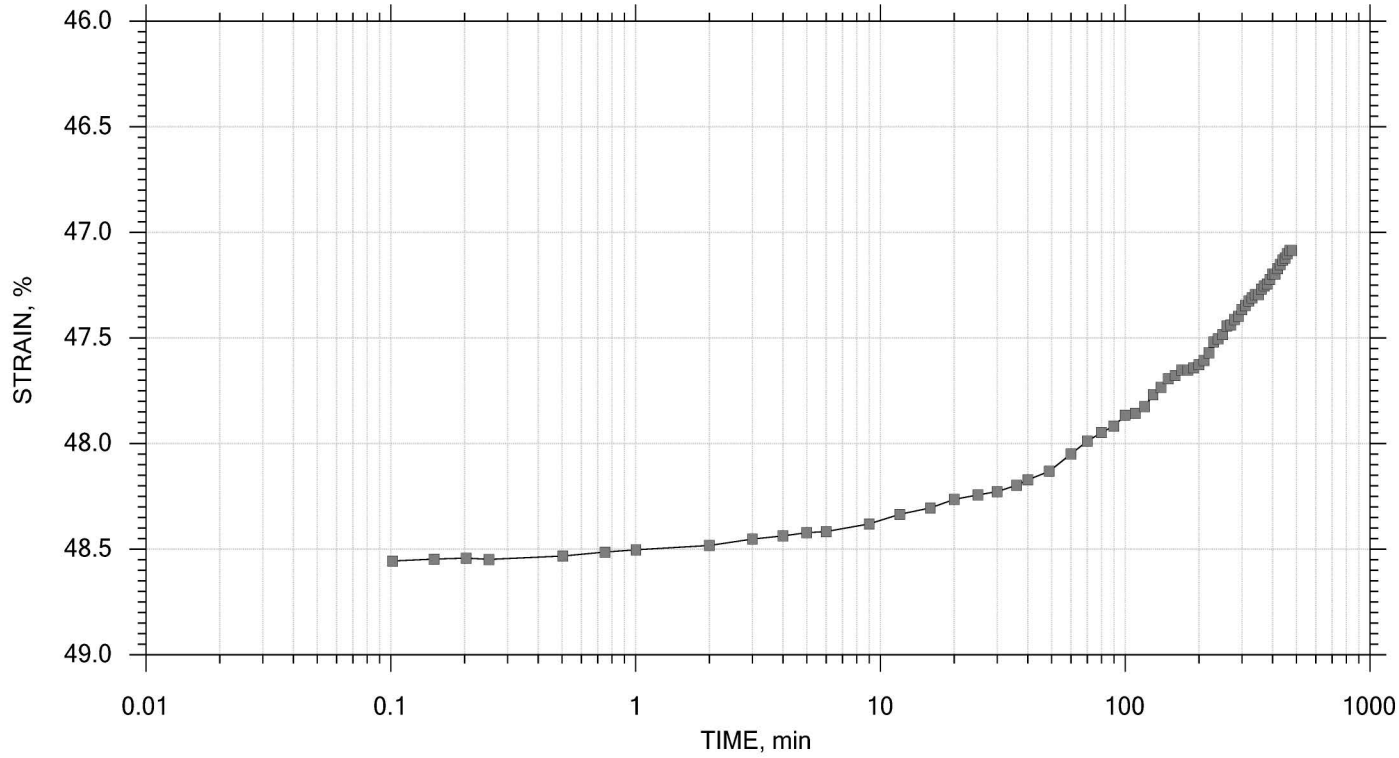
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

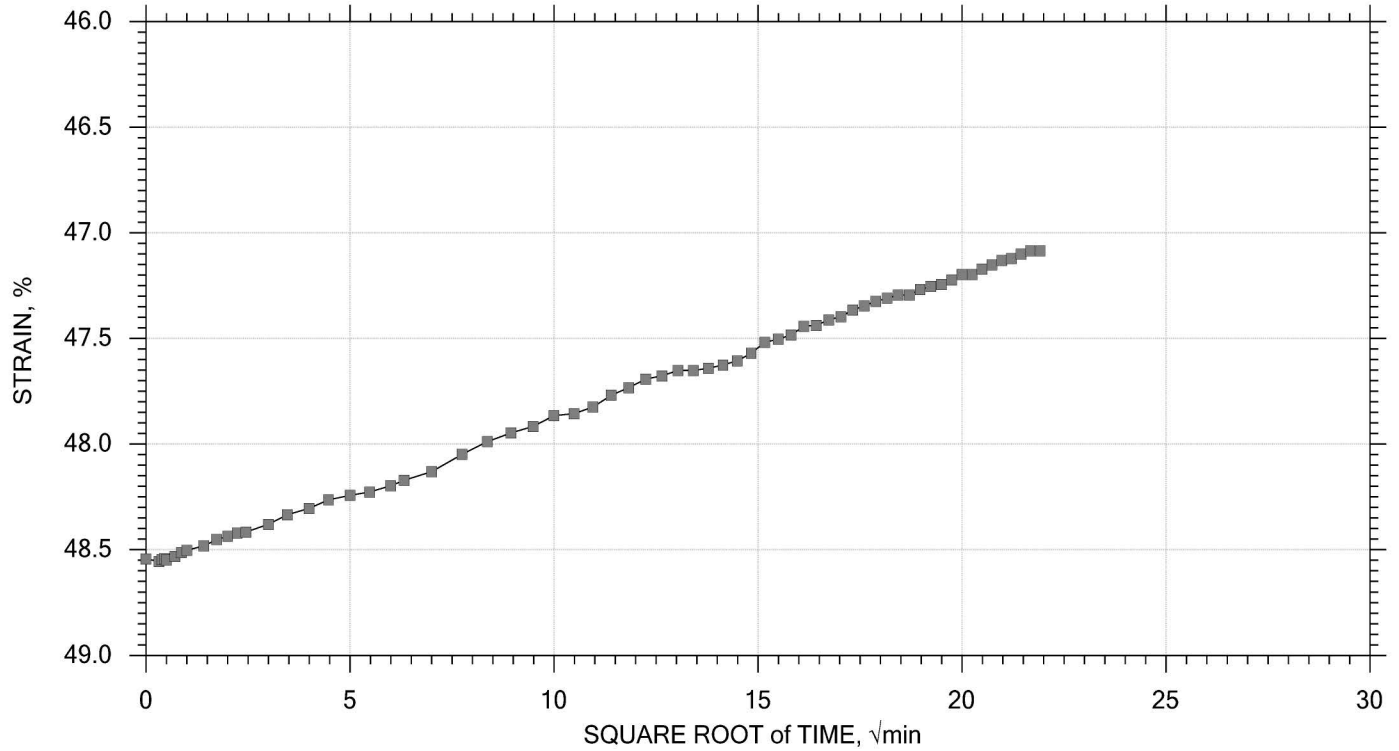
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 0.0625 tsf

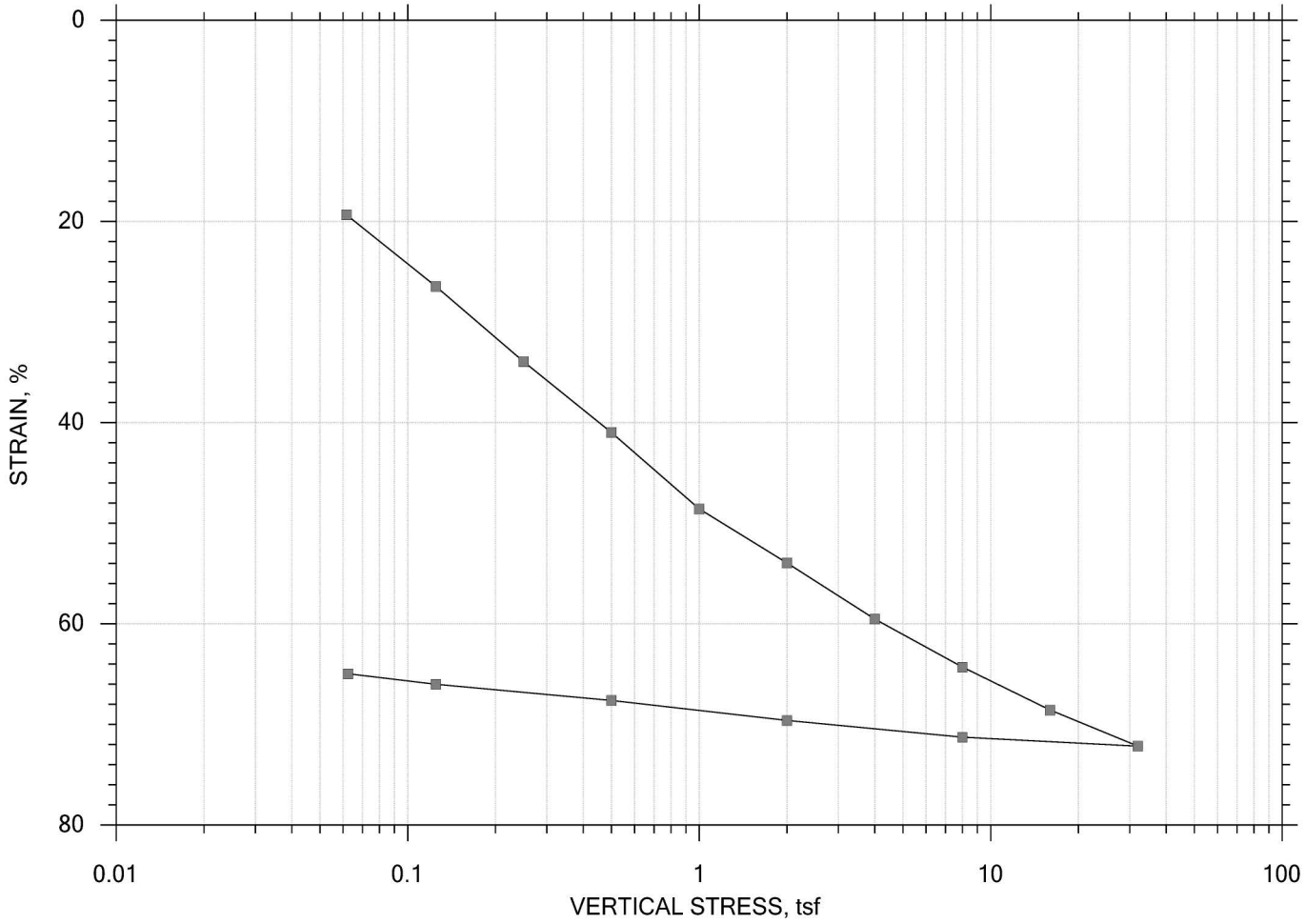


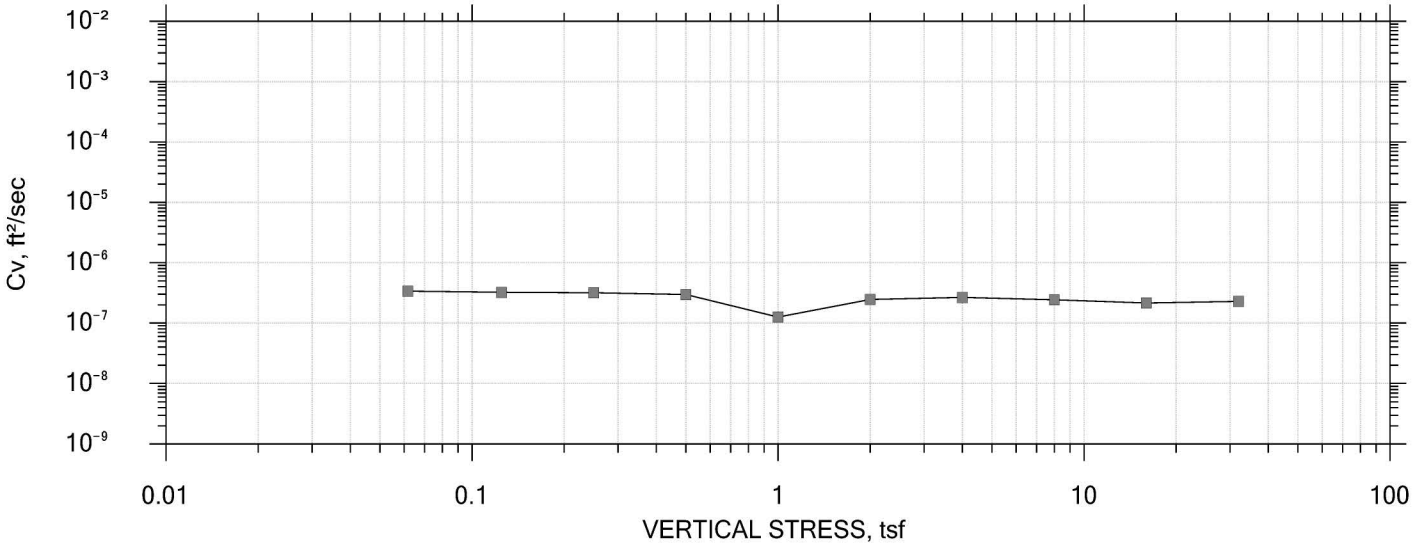


GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002302	Test Date: 11/20/17	Test No.: IP-3A
	Depth: 0.5-1.2 ft	Sample Type: intact	Elevation: ---
	Description: Wet, gray silt with clay and shells		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

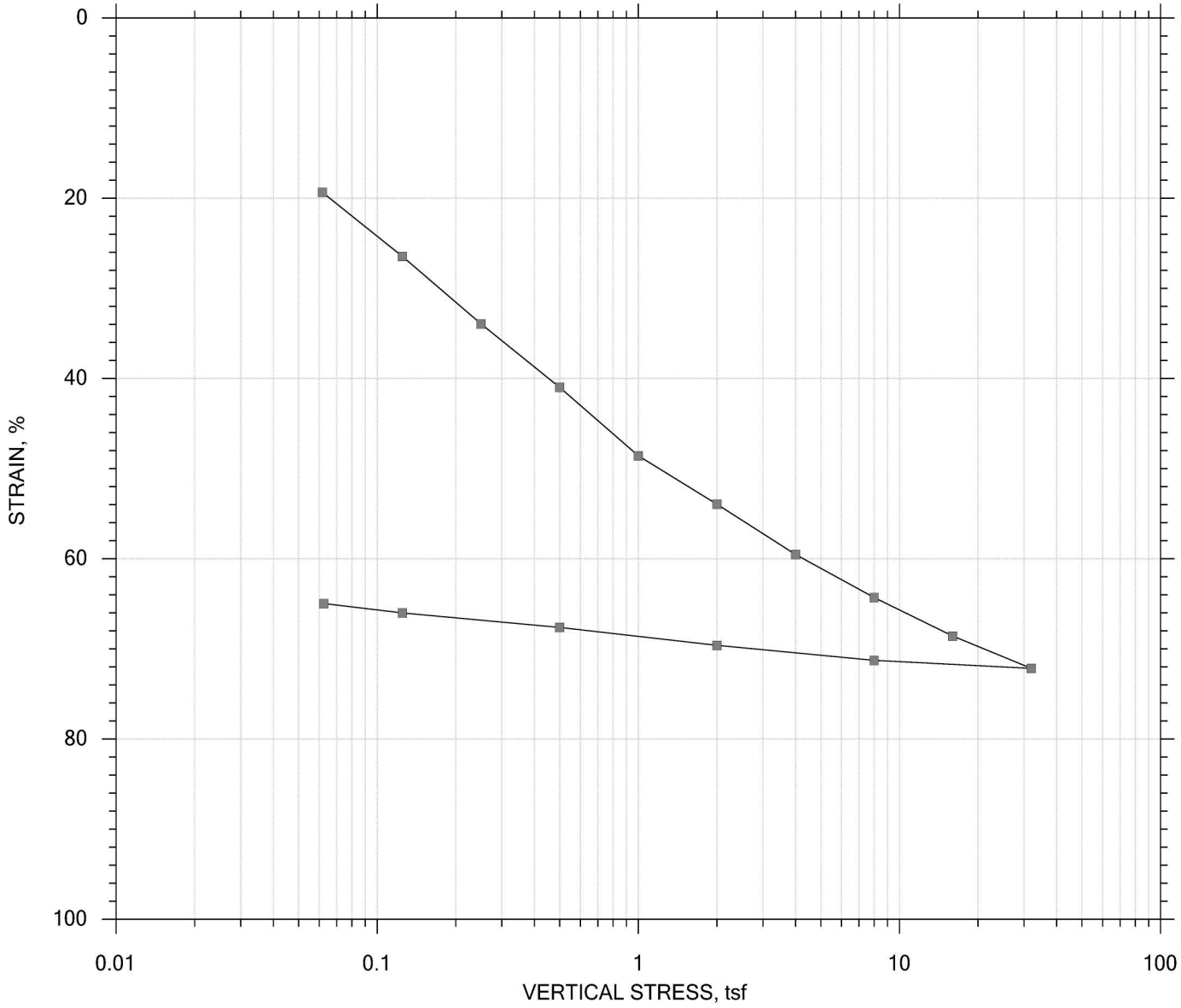




GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	197.87	43.60
Preconsolidation Stress: ---				Dry Unit Weight, pcf	26.299	75.14
Compression Ratio: ---				Saturation, %	99.99	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	5.01	1.10
LL: ---	PL: ---	PI: ---	GS: 2.53			

GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
Boring No.: ---	Tested By: md	Checked By: njh
Sample No.: RA-C002401	Test Date: 11/13/17	Depth: 0.0-0.5 ft
Test No.: IP-2	Sample Type: intact	Elevation: ---

Soil Description: Wet, black silt
Remarks: System S, Swell Pressure = 0.0617 tsf

Estimated Specific Gravity: 2.53	Liquid Limit: ---	Specimen Diameter: 2.50 in
Initial Void Ratio: 5.01	Plastic Limit: ---	Initial Height: 1.00 in
Final Void Ratio: 1.10	Plasticity Index: ---	Final Height: 0.35 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-1254	RING		B-1886
Wt. Container + Wet Soil, gm	385.22	209.88	157.60	55.230
Wt. Container + Dry Soil, gm	120.89	142.83	142.83	40.970
Wt. Container, gm	8.3500	108.94	108.94	8.2600
Wt. Dry Soil, gm	112.54	33.887	33.887	32.710
Water Content, %	234.88	197.87	43.60	43.60
Void Ratio	---	5.01	1.10	---
Degree of Saturation, %	---	99.99	100.00	---
Dry Unit Weight, pcf	---	26.299	75.140	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor
Boring No.: ---
Sample No.: RA-C002401
Test No.: IP-2

Location: New Bedford, MA
Tested By: md
Test Date: 11/13/17
Sample Type: intact

Project No.: GTX-306296
Checked By: njh
Depth: 0.0-0.5 ft
Elevation: ---

Soil Description: Wet, black silt
Remarks: System S, Swell Pressure = 0.0617 tsf

Displacement at End of Increment

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/tsf	k ft/day
1	0.0617	0.1935	3.85	19.3	64.562	3.10e-007	3.14e+000	2.62e-003
2	0.125	0.2646	3.42	26.5	51.242	2.85e-007	1.12e+000	8.61e-004
3	0.250	0.3395	2.97	34.0	40.778	2.93e-007	6.00e-001	4.74e-004
4	0.500	0.4098	2.55	41.0	32.230	2.98e-007	2.81e-001	2.26e-004
5	1.00	0.4857	2.09	48.6	127.504	5.87e-008	1.52e-001	2.40e-005
6	2.00	0.5394	1.77	53.9	32.695	1.78e-007	5.38e-002	2.59e-005
7	4.00	0.5953	1.43	59.5	21.967	2.09e-007	2.79e-002	1.58e-005
8	8.00	0.6429	1.15	64.3	19.441	1.83e-007	1.19e-002	5.88e-006
9	16.0	0.6857	0.889	68.6	19.210	1.44e-007	5.35e-003	2.08e-006
10	32.0	0.7215	0.674	72.2	13.884	1.55e-007	2.24e-003	9.37e-007
11	8.00	0.7126	0.727	71.3	2.533	7.75e-007	3.71e-004	7.75e-007
12	2.00	0.6961	0.827	69.6	23.032	9.31e-008	2.76e-003	6.94e-007
13	0.500	0.6762	0.947	67.6	83.881	2.88e-008	1.33e-002	1.03e-006
14	0.125	0.6600	1.04	66.0	157.082	1.72e-008	4.31e-002	2.00e-006
15	0.0625	0.6497	1.11	65.0	0.000	0.00e+000	1.66e-001	0.00e+000

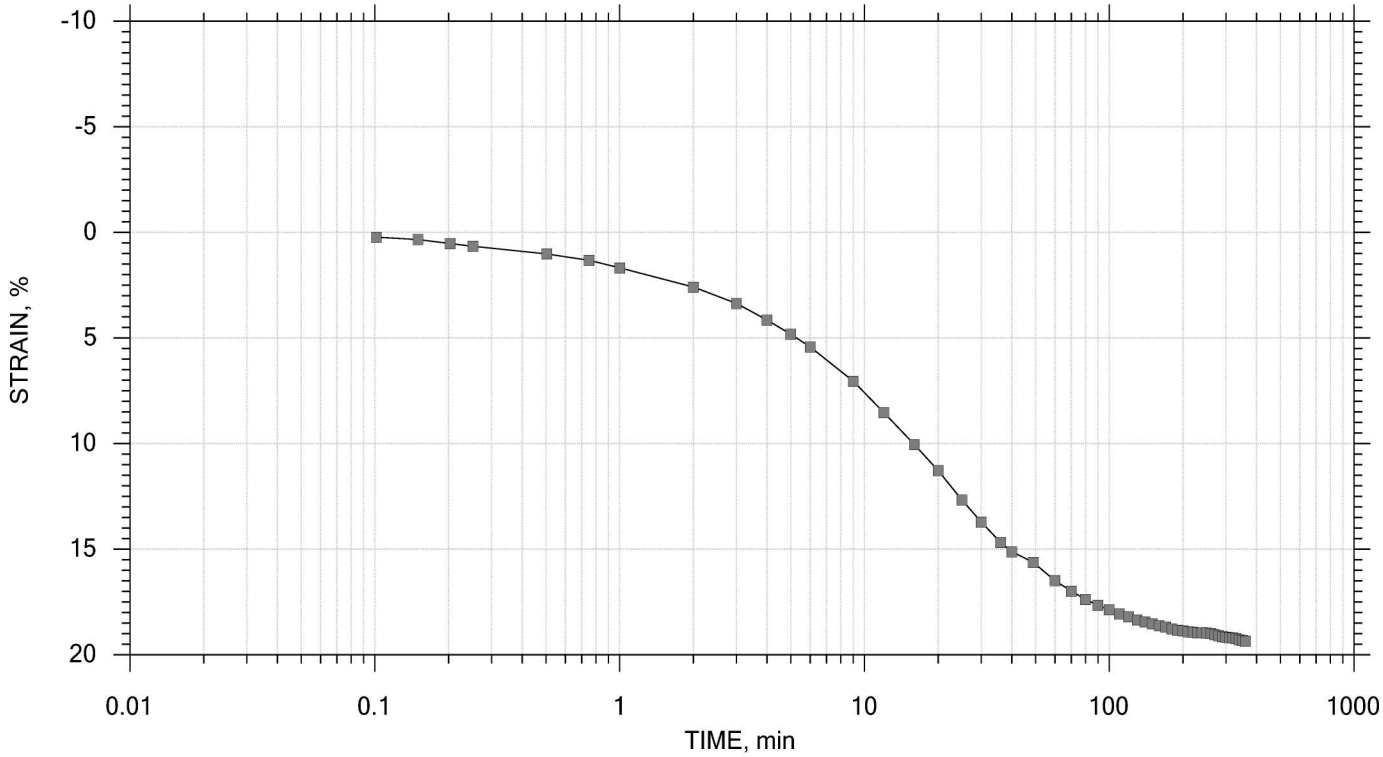
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0617	0.1935	3.85	19.3	13.244	3.51e-007	3.14e+000	2.97e-003	0.00e+000
2	0.125	0.2646	3.42	26.5	9.907	3.42e-007	1.12e+000	1.03e-003	0.00e+000
3	0.250	0.3395	2.97	34.0	8.876	3.13e-007	6.00e-001	5.06e-004	0.00e+000
4	0.500	0.4098	2.55	41.0	8.151	2.73e-007	2.81e-001	2.07e-004	0.00e+000
5	1.00	0.4857	2.09	48.6	14.548	1.20e-007	1.52e-001	4.89e-005	0.00e+000
6	2.00	0.5394	1.77	53.9	4.666	2.90e-007	5.38e-002	4.21e-005	0.00e+000
7	4.00	0.5953	1.43	59.5	3.494	3.05e-007	2.79e-002	2.30e-005	0.00e+000
8	8.00	0.6429	1.15	64.3	3.188	2.59e-007	1.19e-002	8.33e-006	0.00e+000
9	16.0	0.6857	0.889	68.6	2.281	2.82e-007	5.35e-003	4.07e-006	0.00e+000
10	32.0	0.7215	0.674	72.2	1.719	2.91e-007	2.24e-003	1.76e-006	0.00e+000
11	8.00	0.7126	0.727	71.3	0.000	0.00e+000	3.71e-004	0.00e+000	0.00e+000
12	2.00	0.6961	0.827	69.6	0.000	0.00e+000	2.76e-003	0.00e+000	0.00e+000
13	0.500	0.6762	0.947	67.6	0.000	0.00e+000	1.33e-002	0.00e+000	0.00e+000
14	0.125	0.6600	1.04	66.0	0.000	0.00e+000	4.31e-002	0.00e+000	0.00e+000
15	0.0625	0.6497	1.11	65.0	0.000	0.00e+000	1.66e-001	0.00e+000	0.00e+000

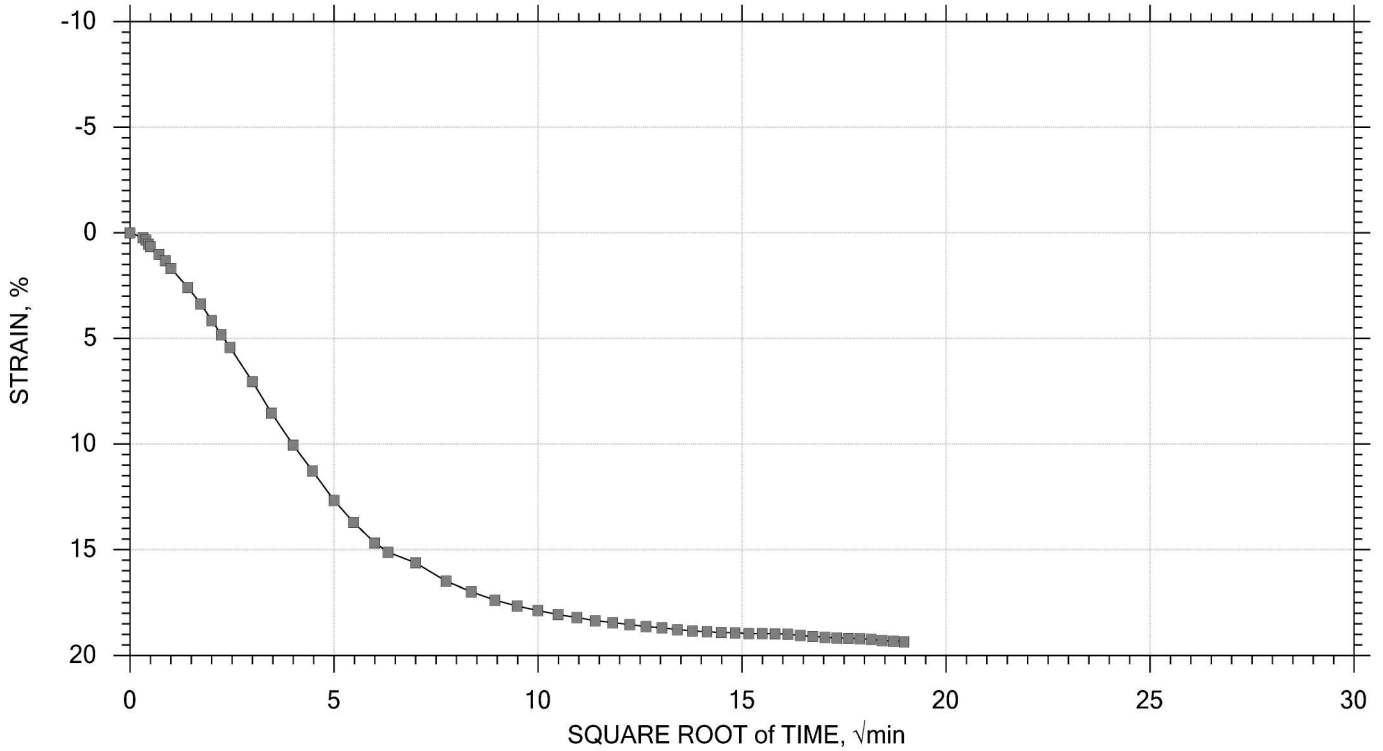
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Volume Step 1 of 15

Stress: 0.061656 tsf





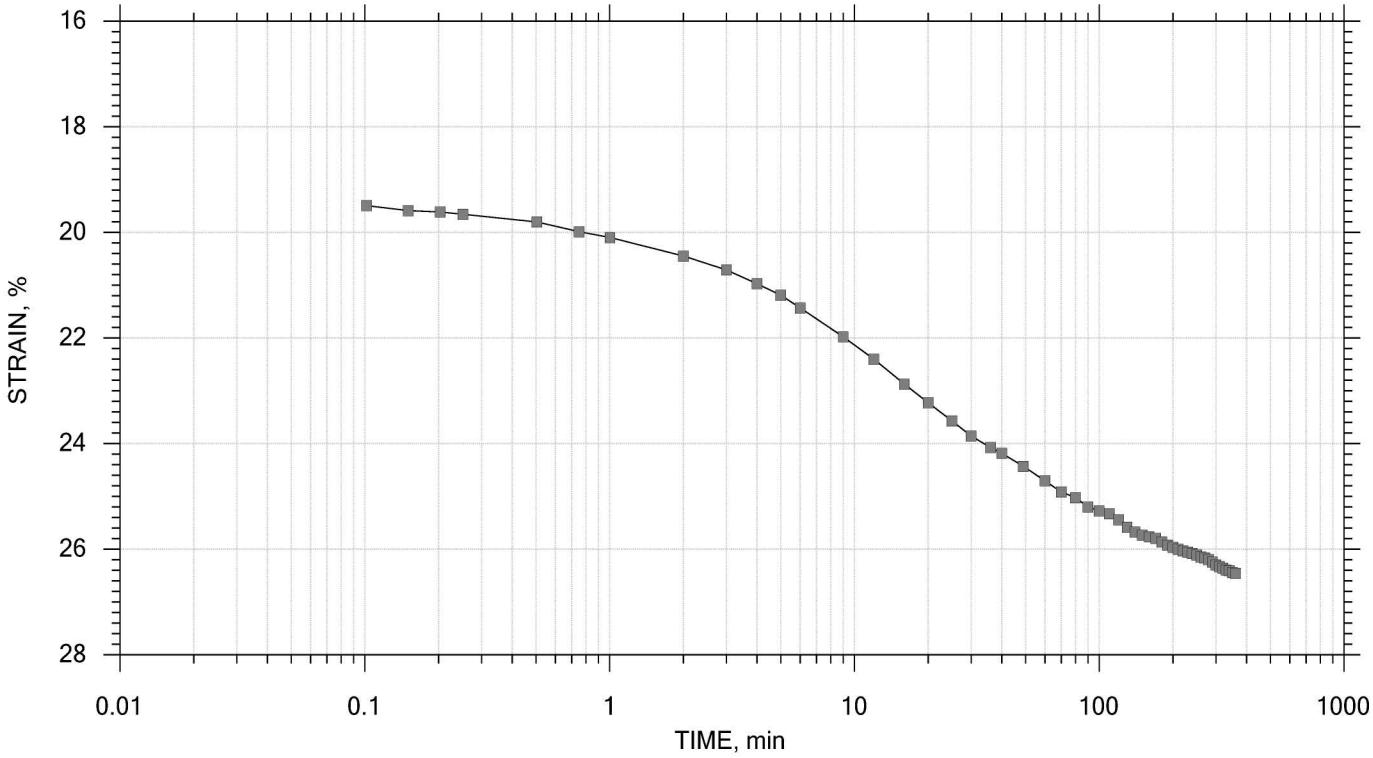
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

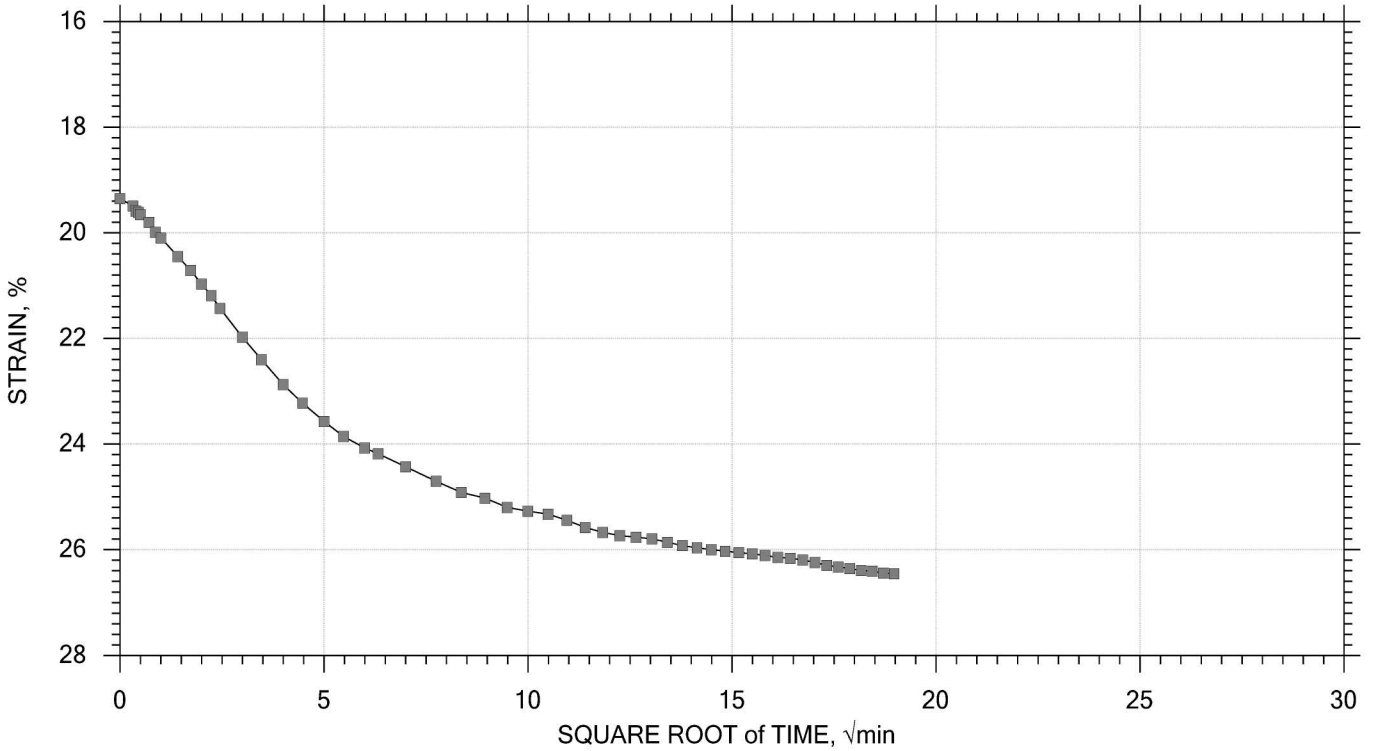
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 0.125 tsf





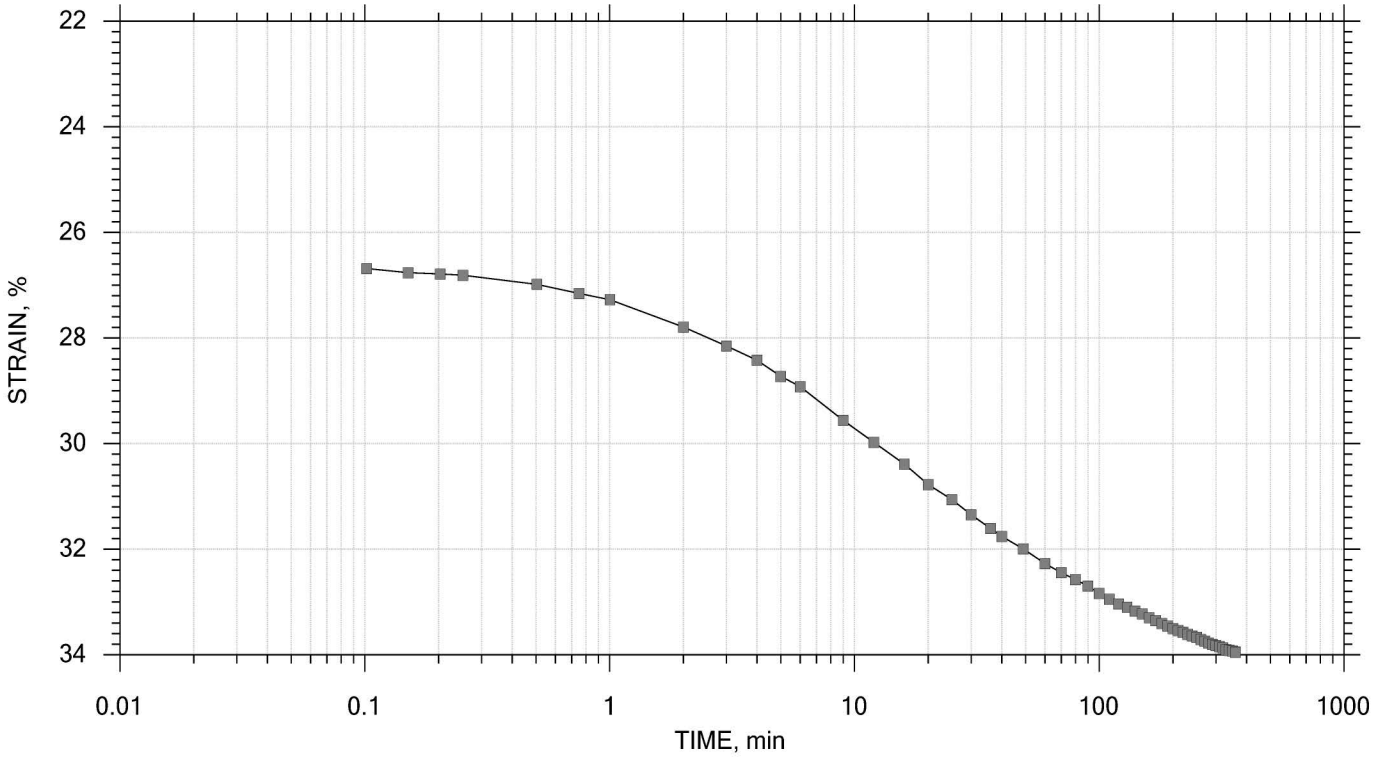
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

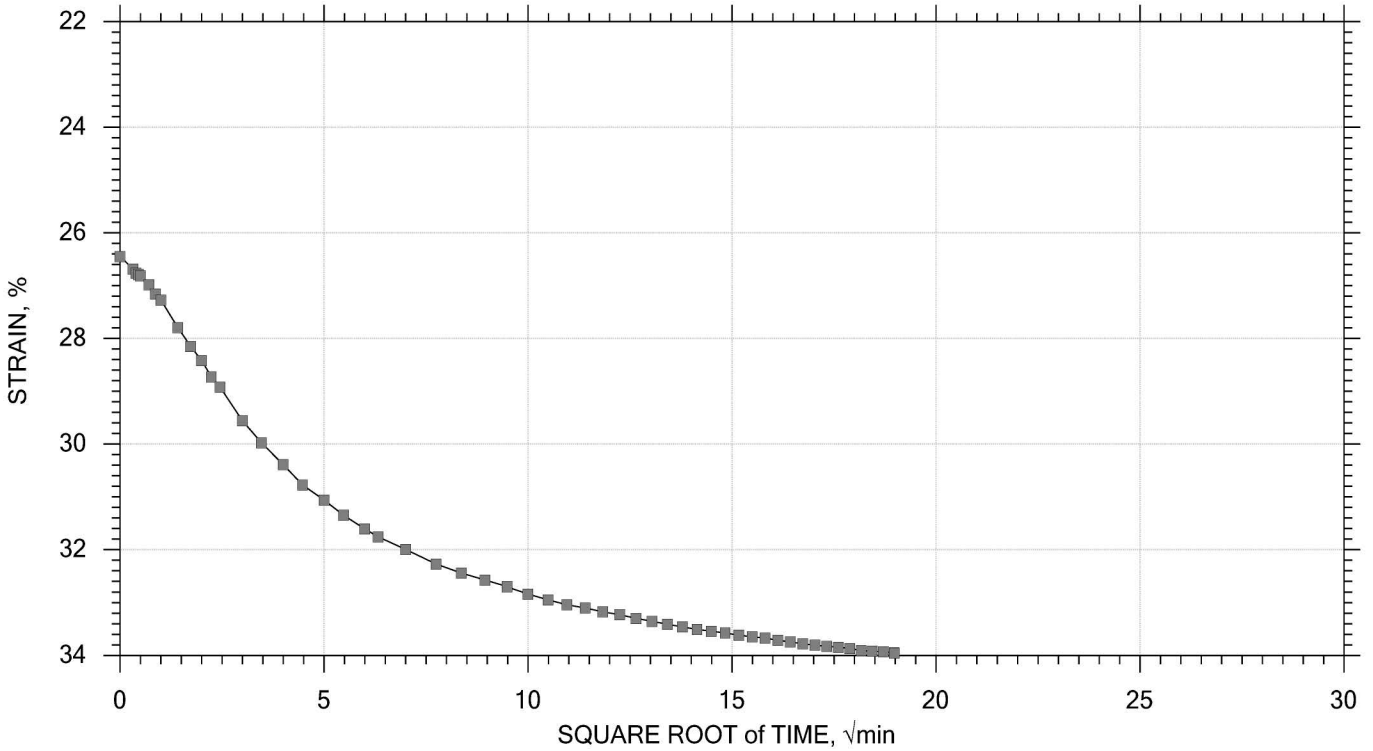
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 0.25 tsf





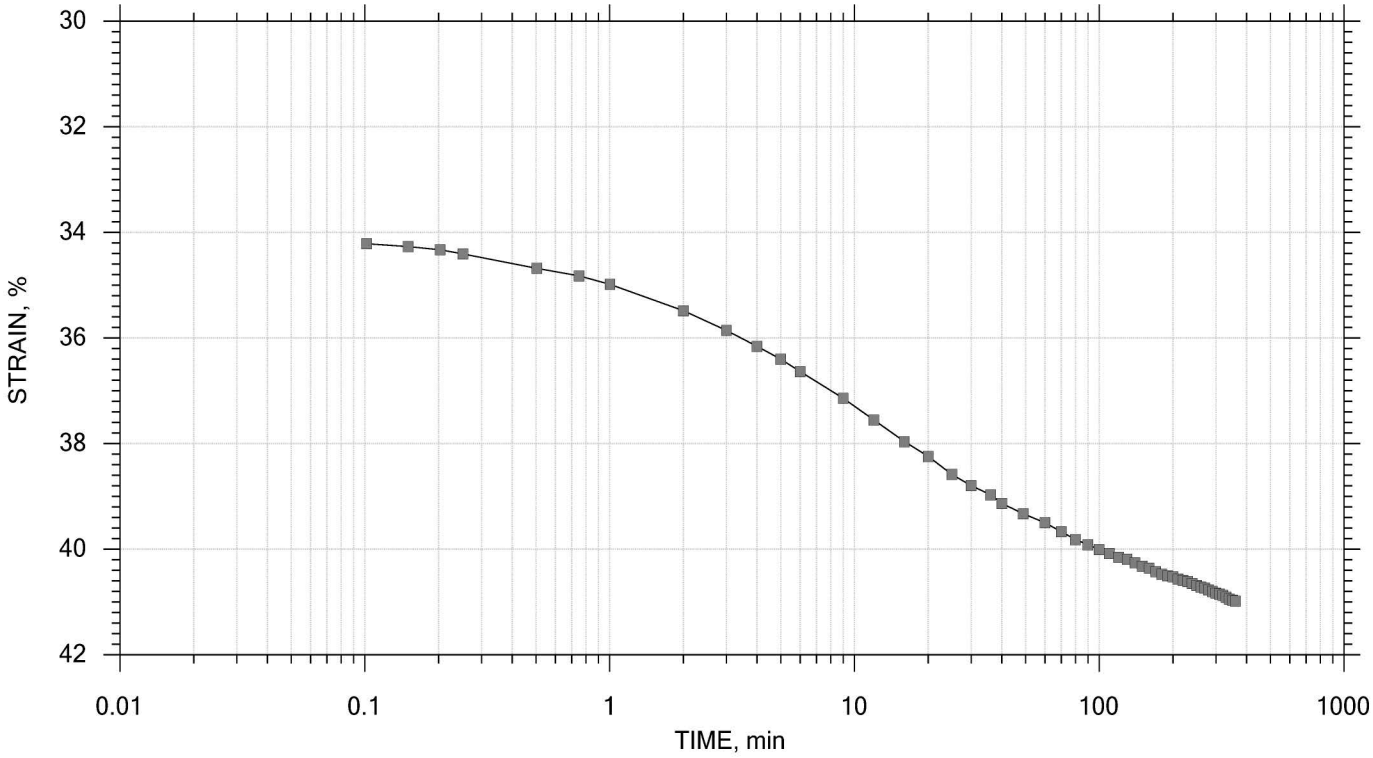
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

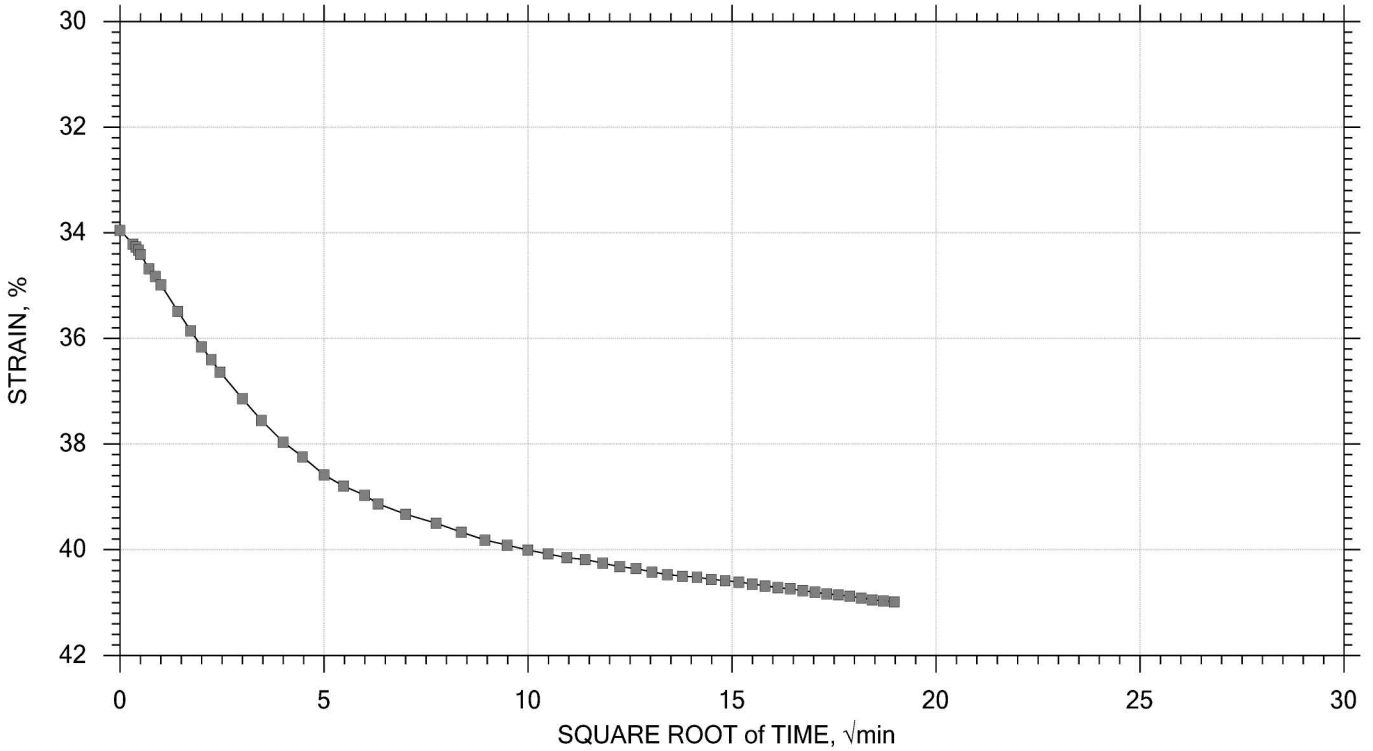
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 0.5 tsf





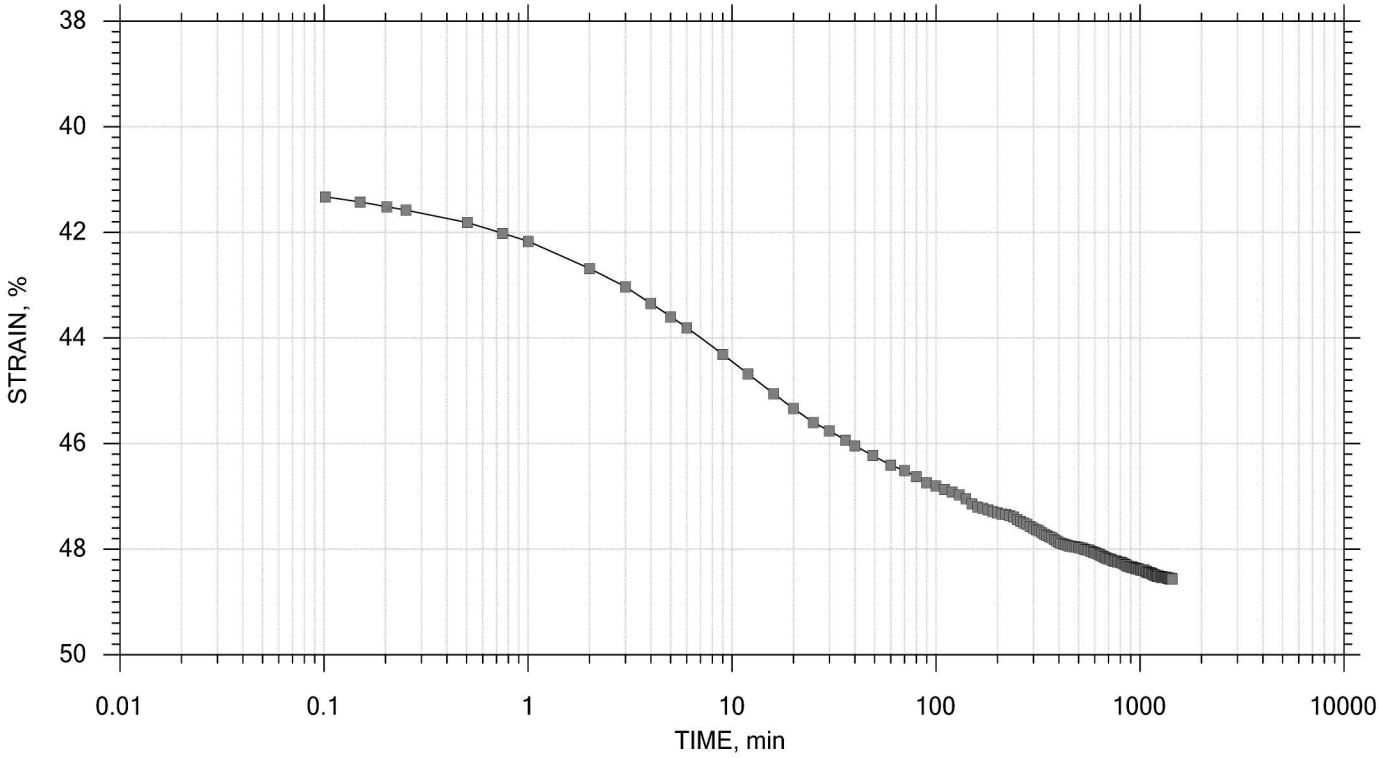
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

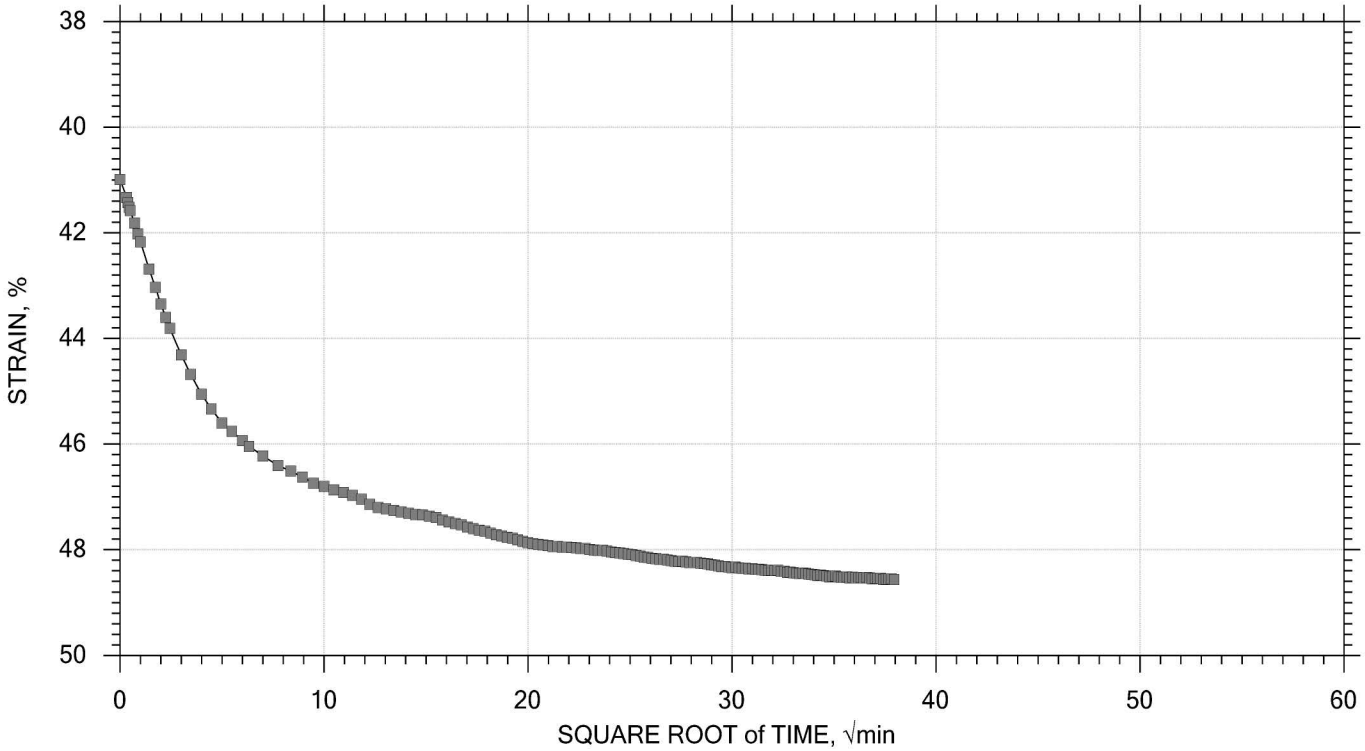
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 1 tsf





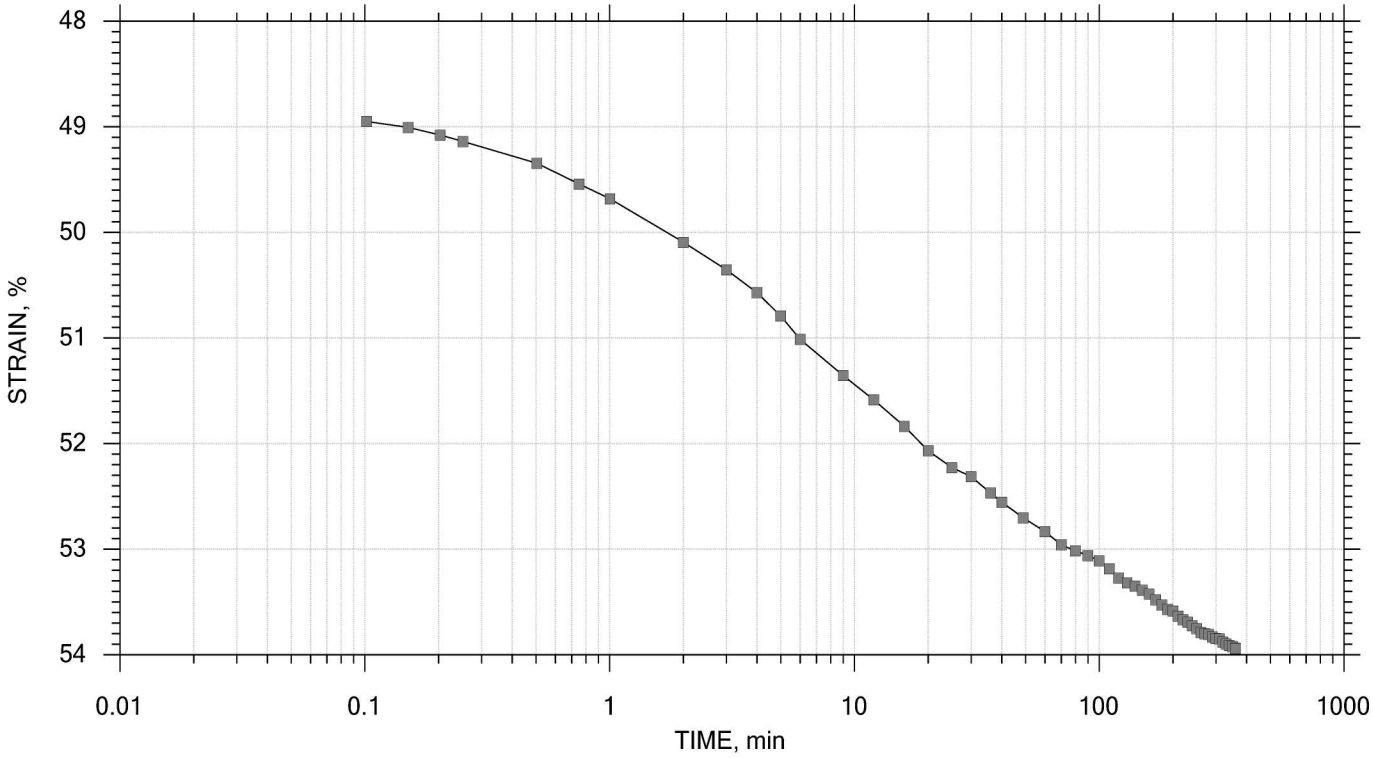
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

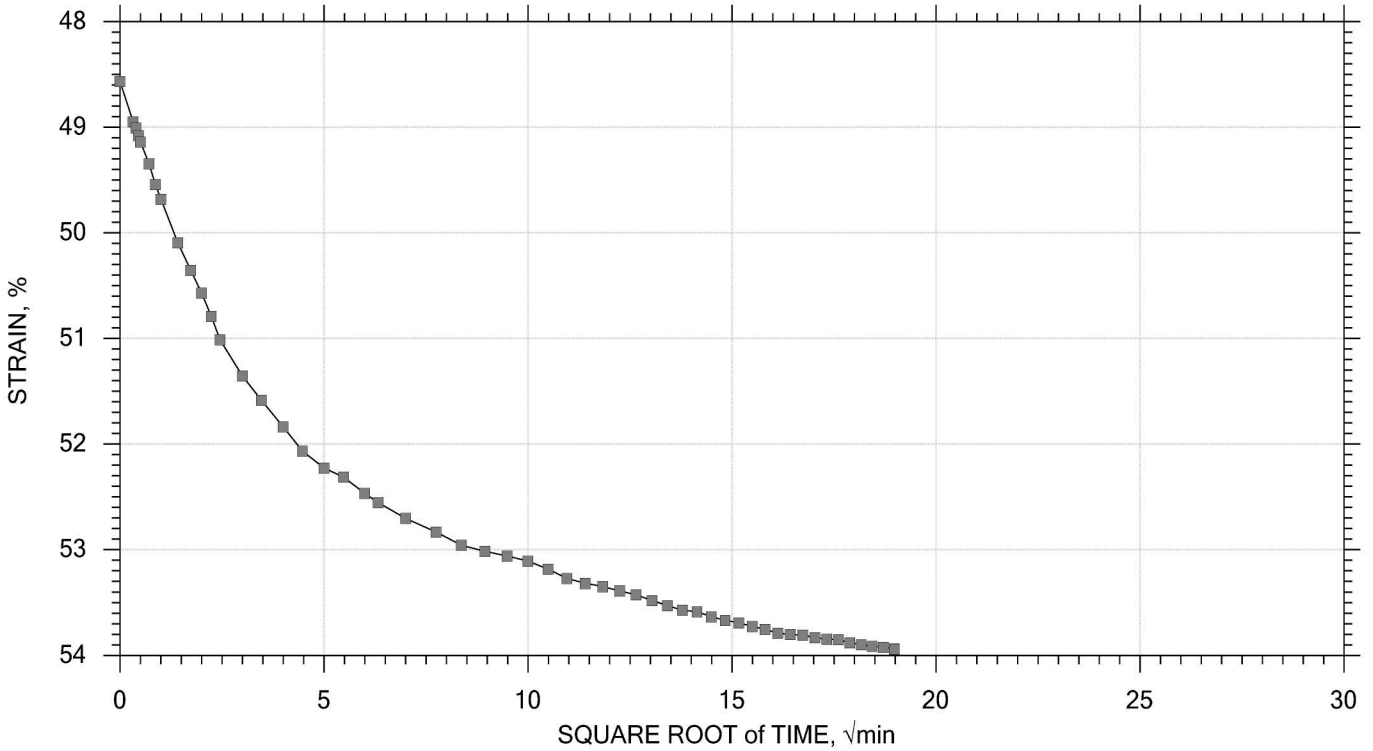
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 2 tsf





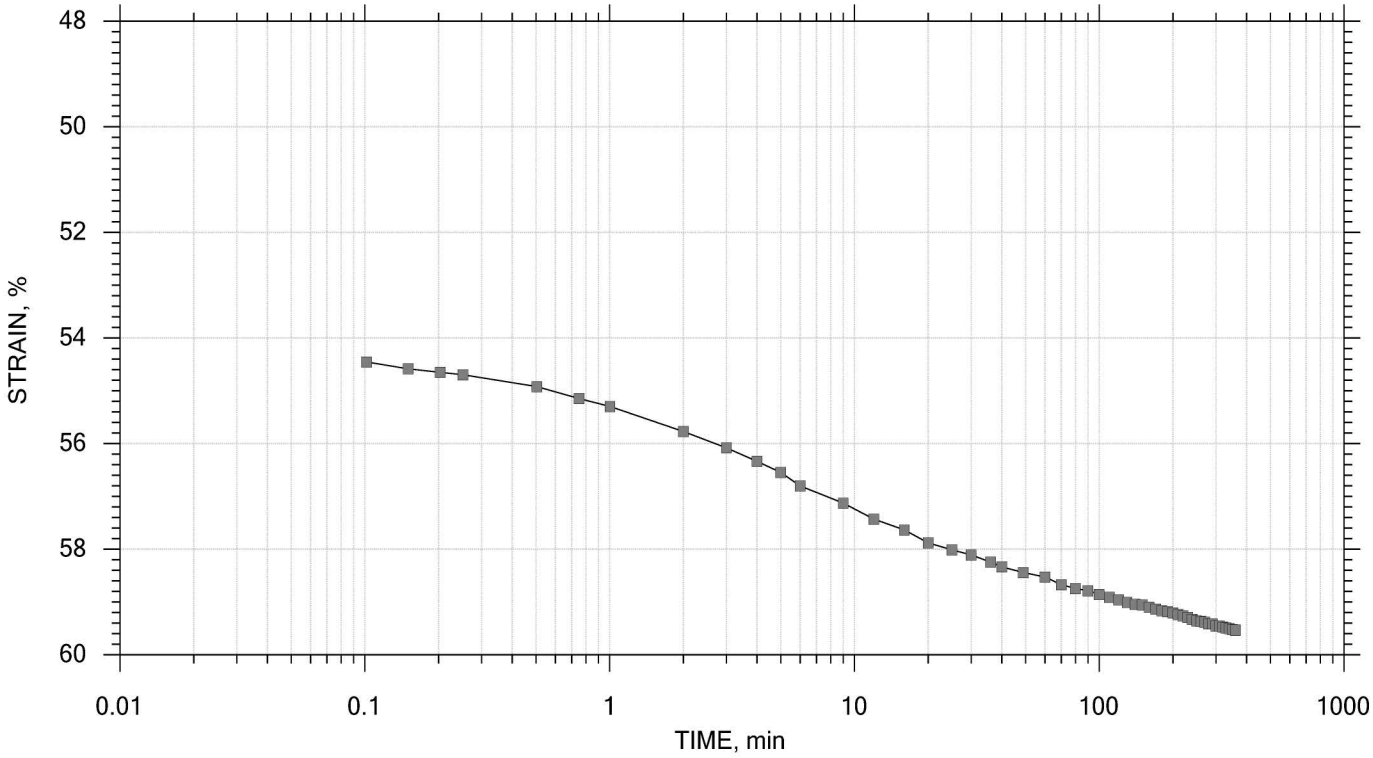
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

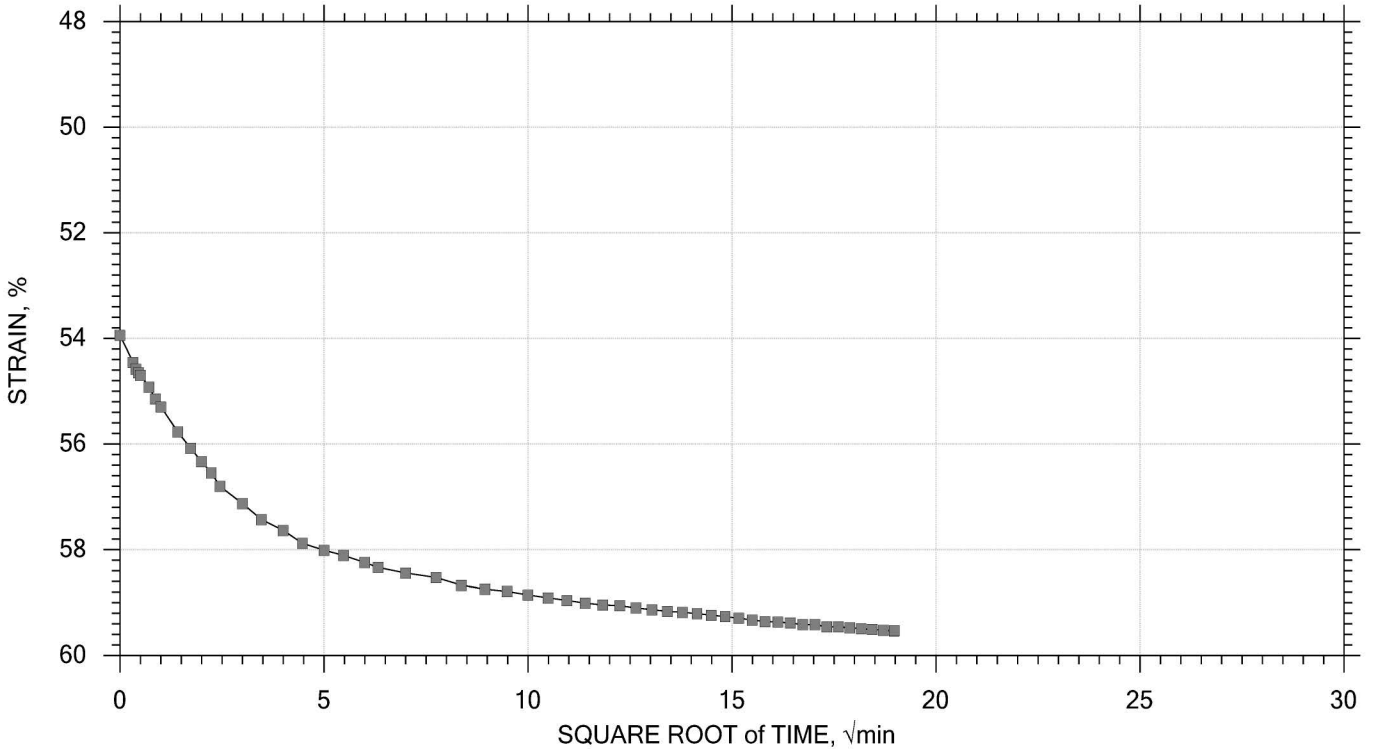
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4 tsf





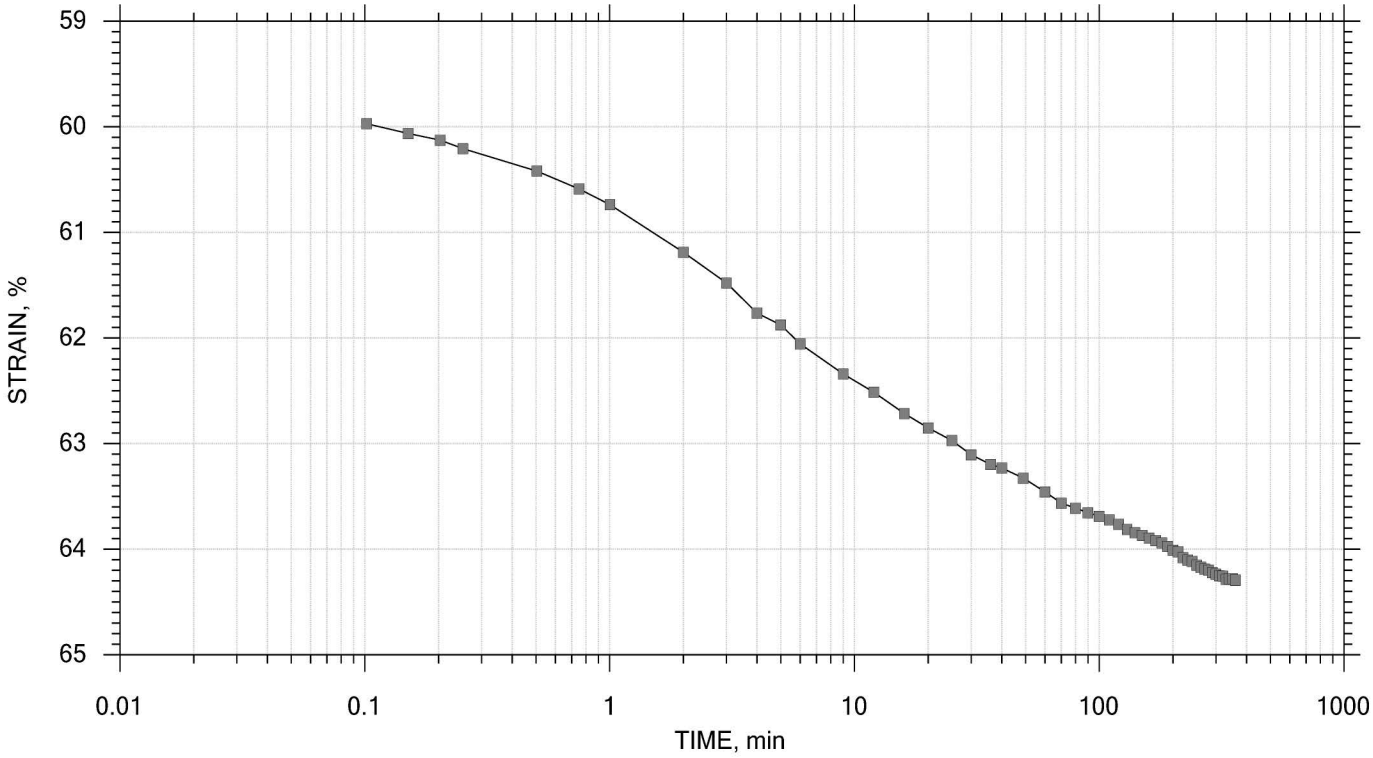
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

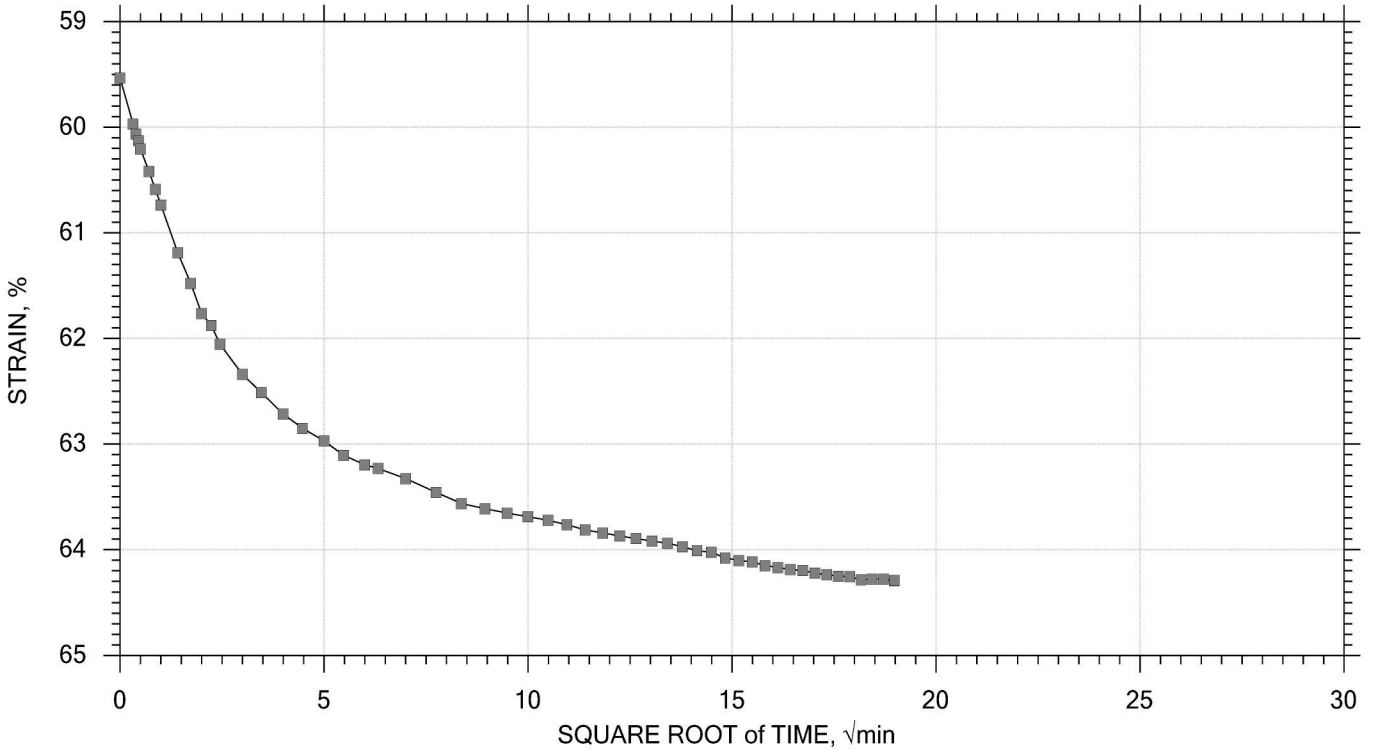
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 8 tsf





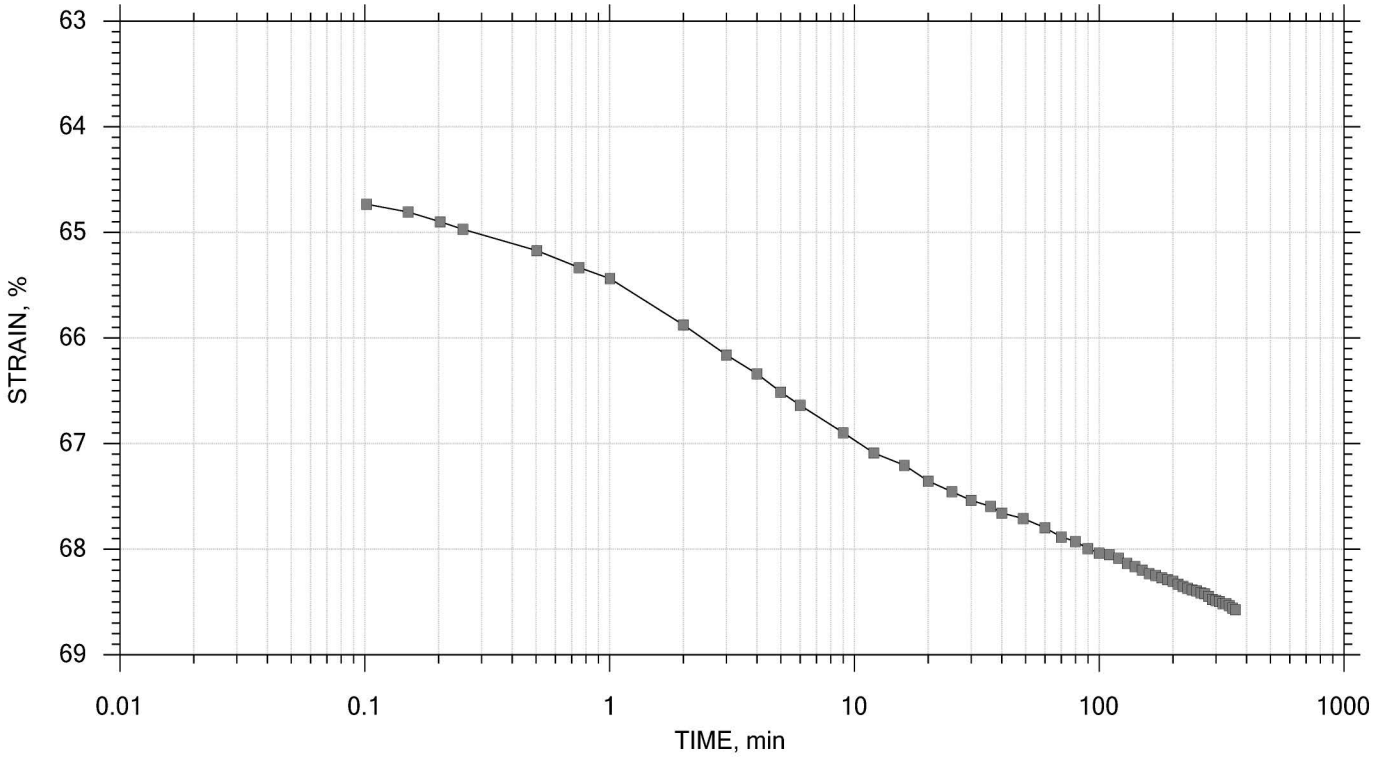
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

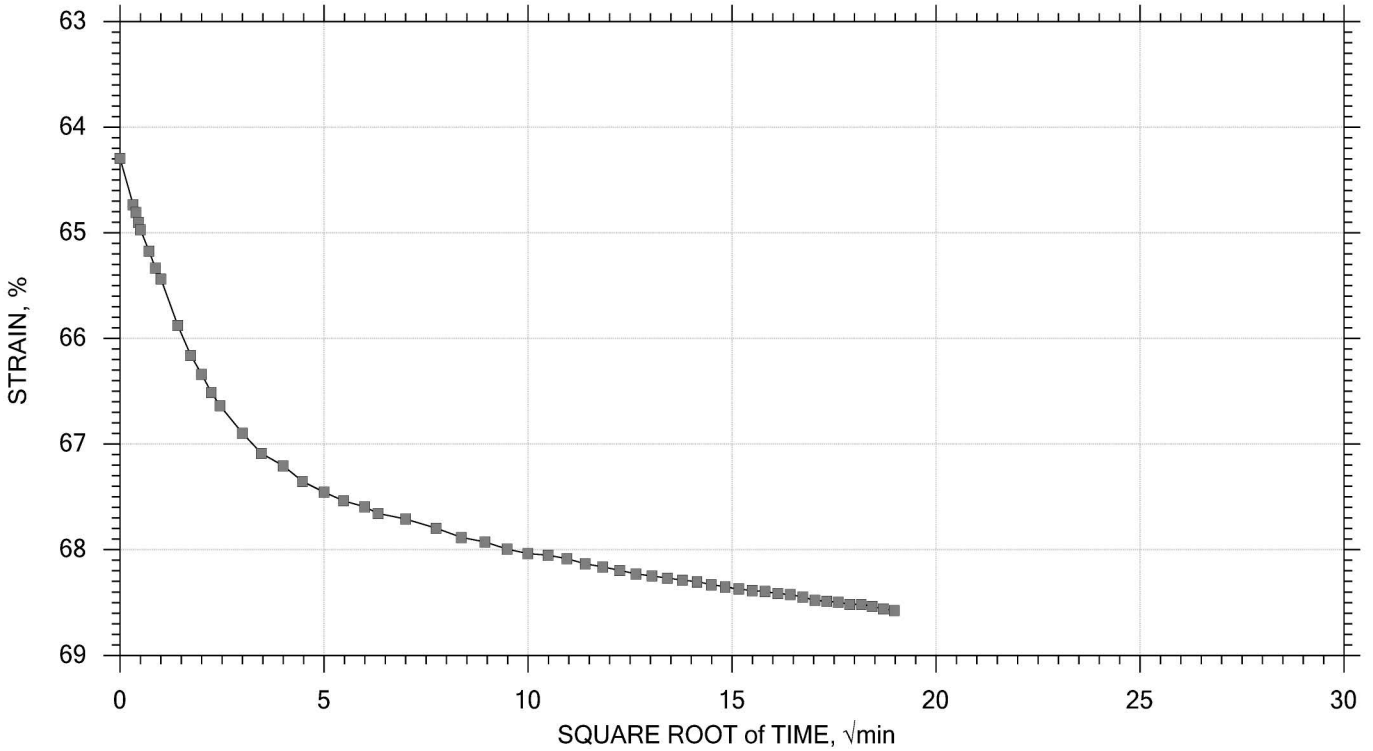
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 16 tsf





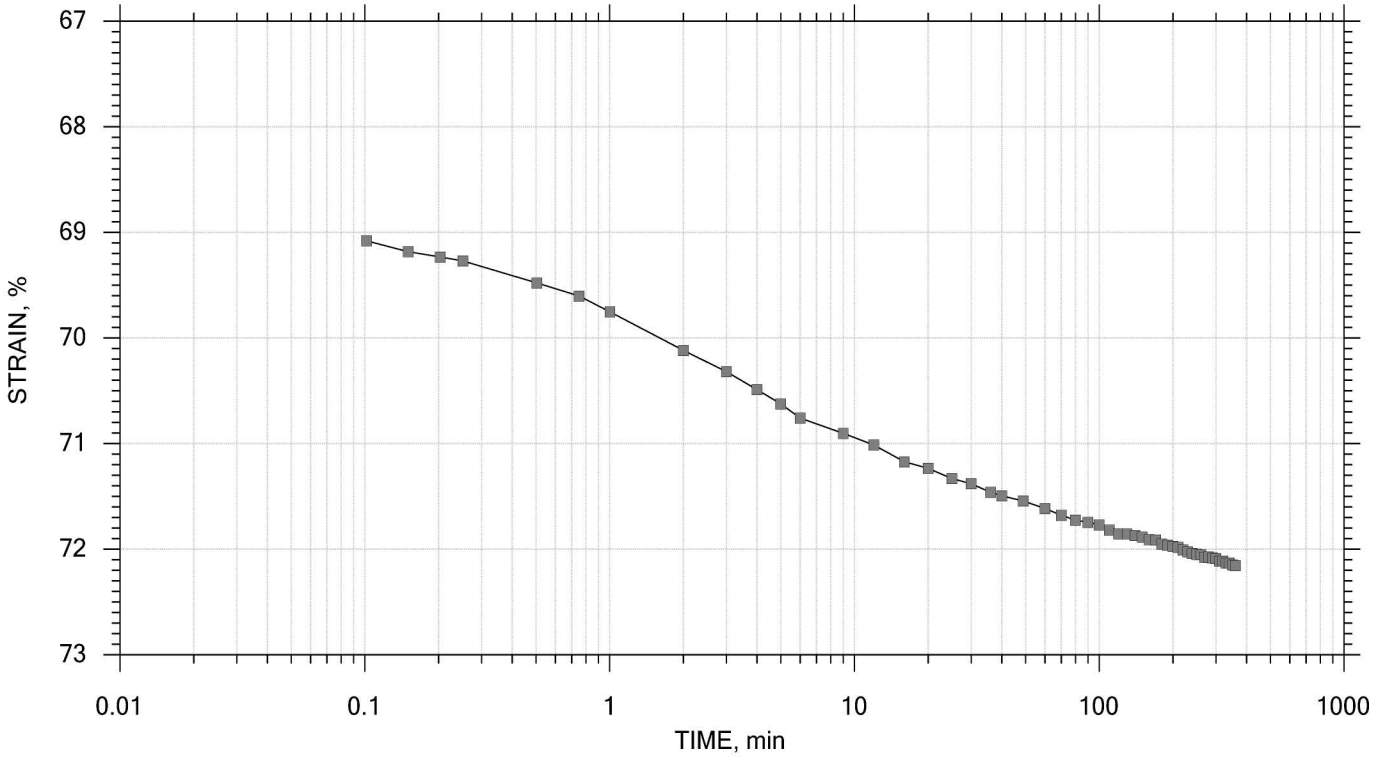
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

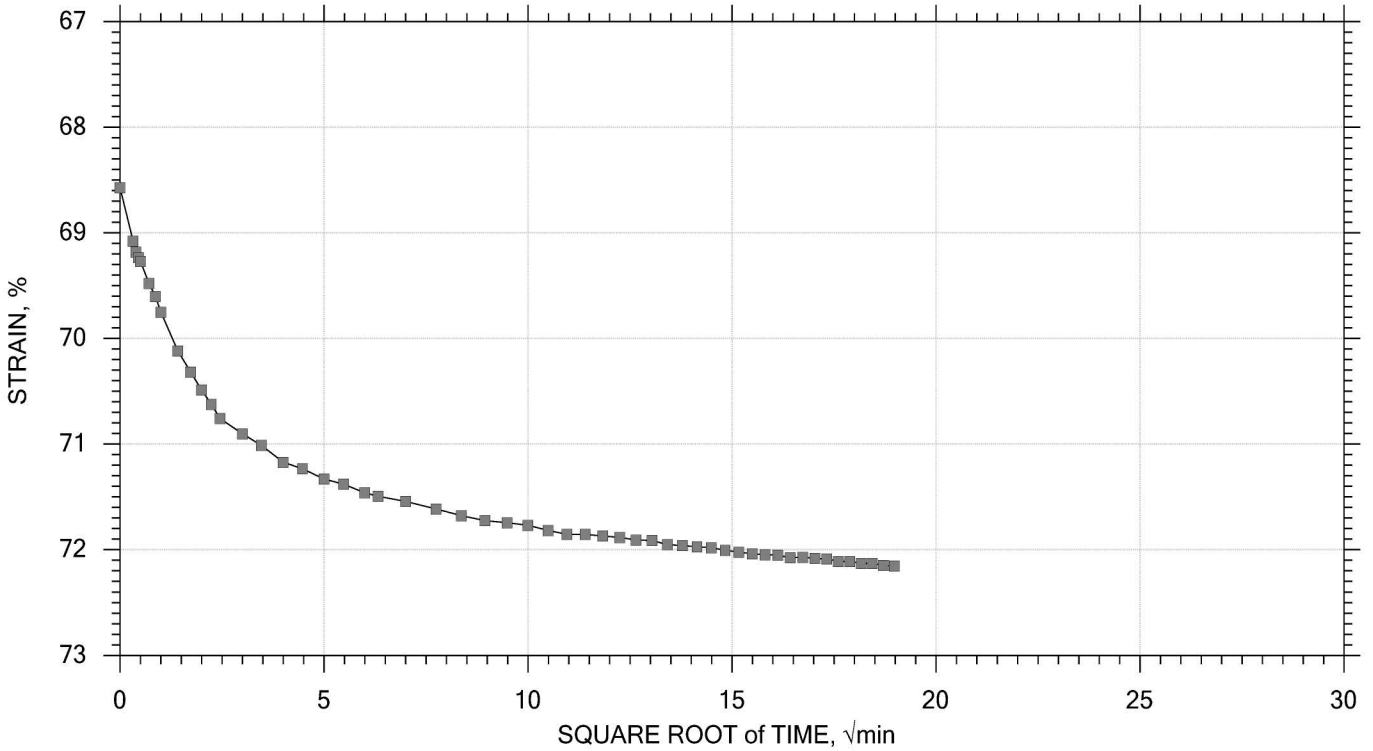
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 32 tsf





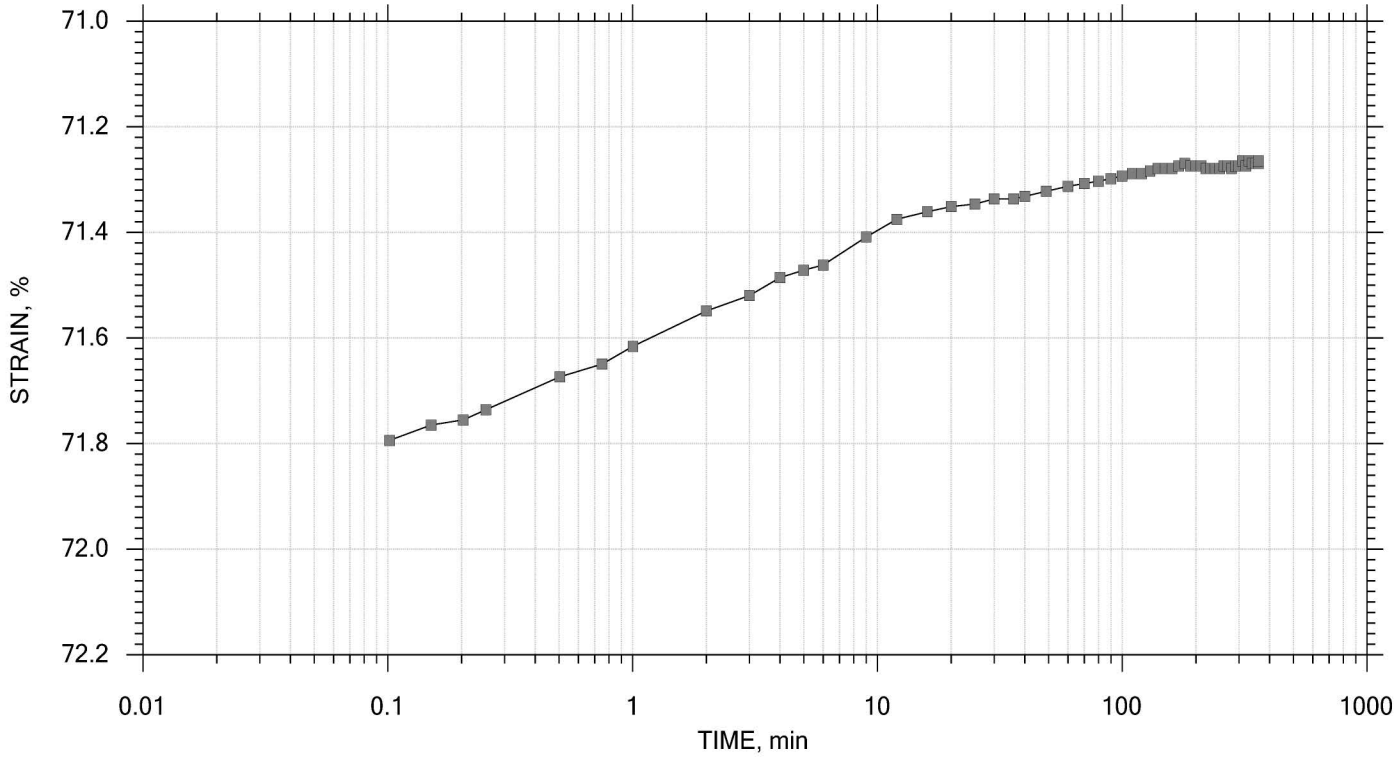
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

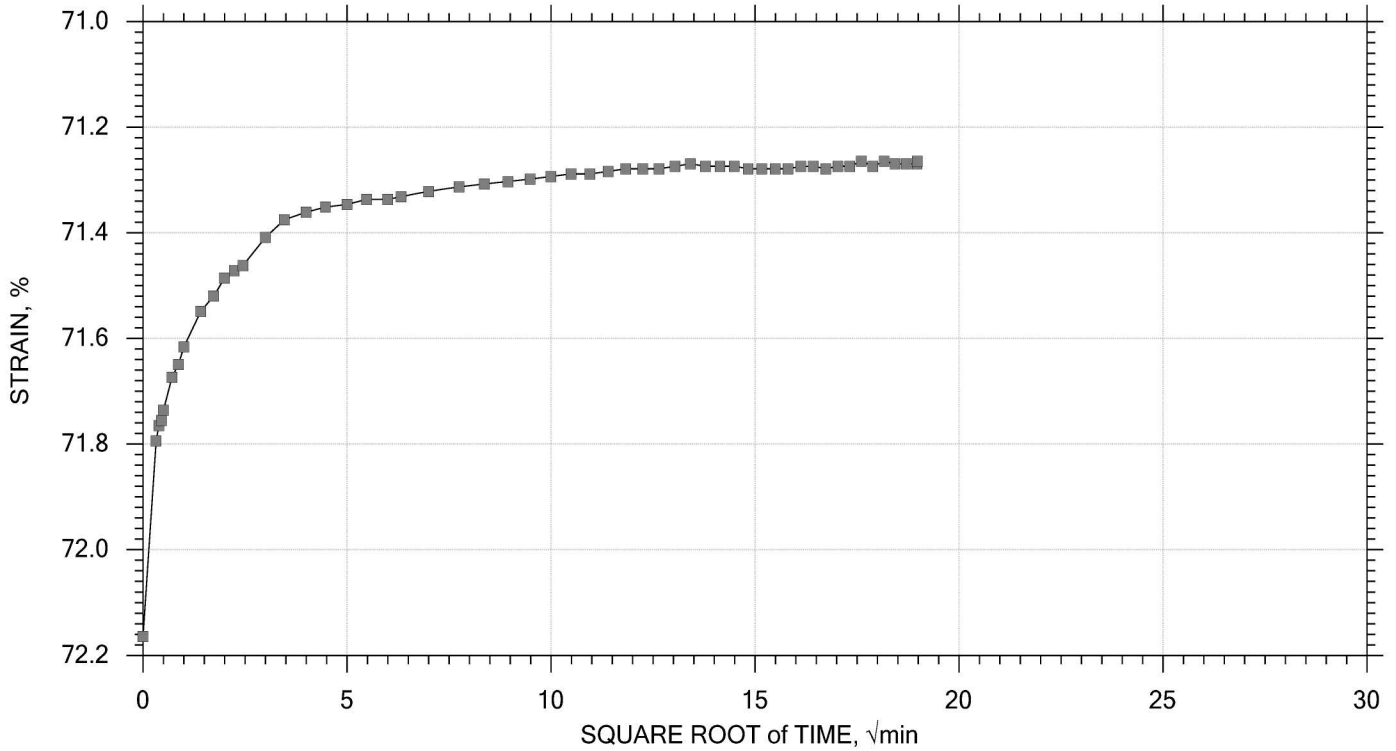
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 8 tsf





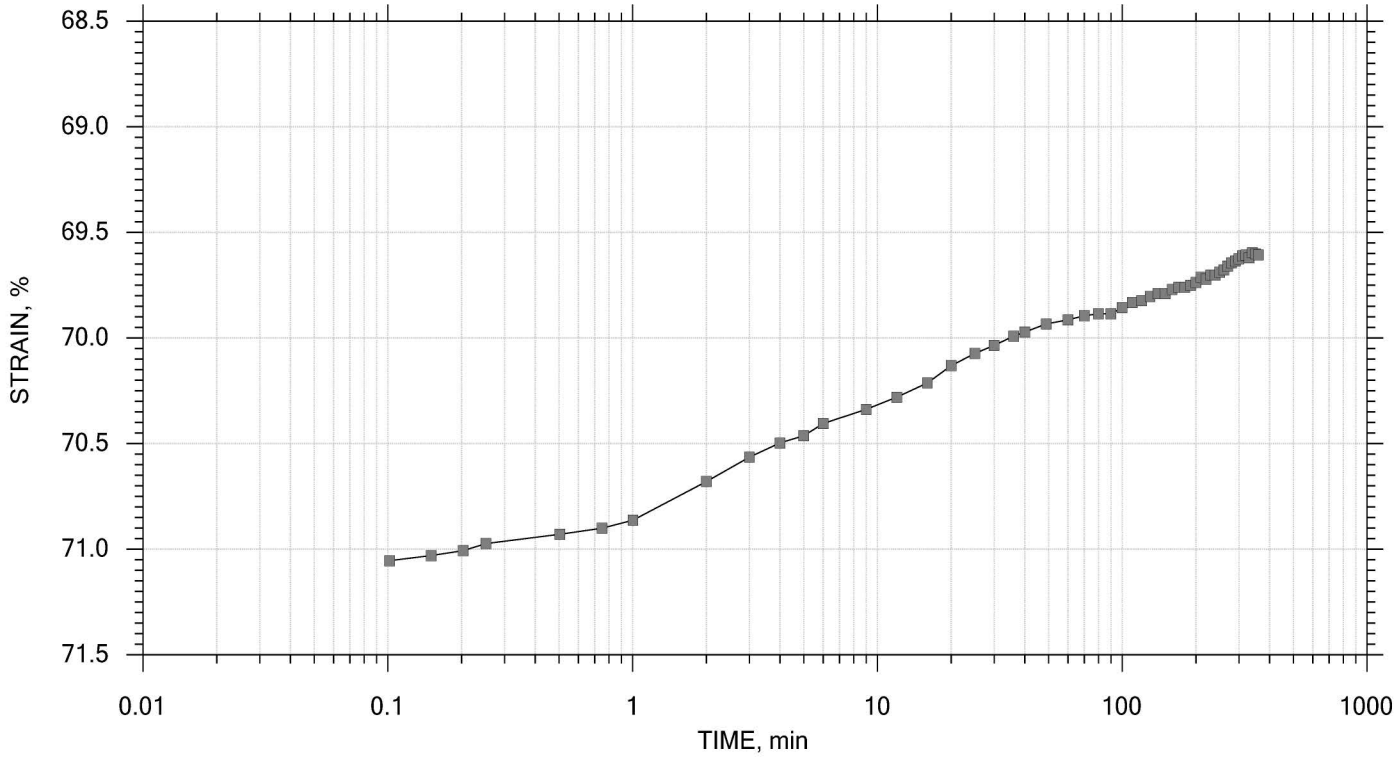
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

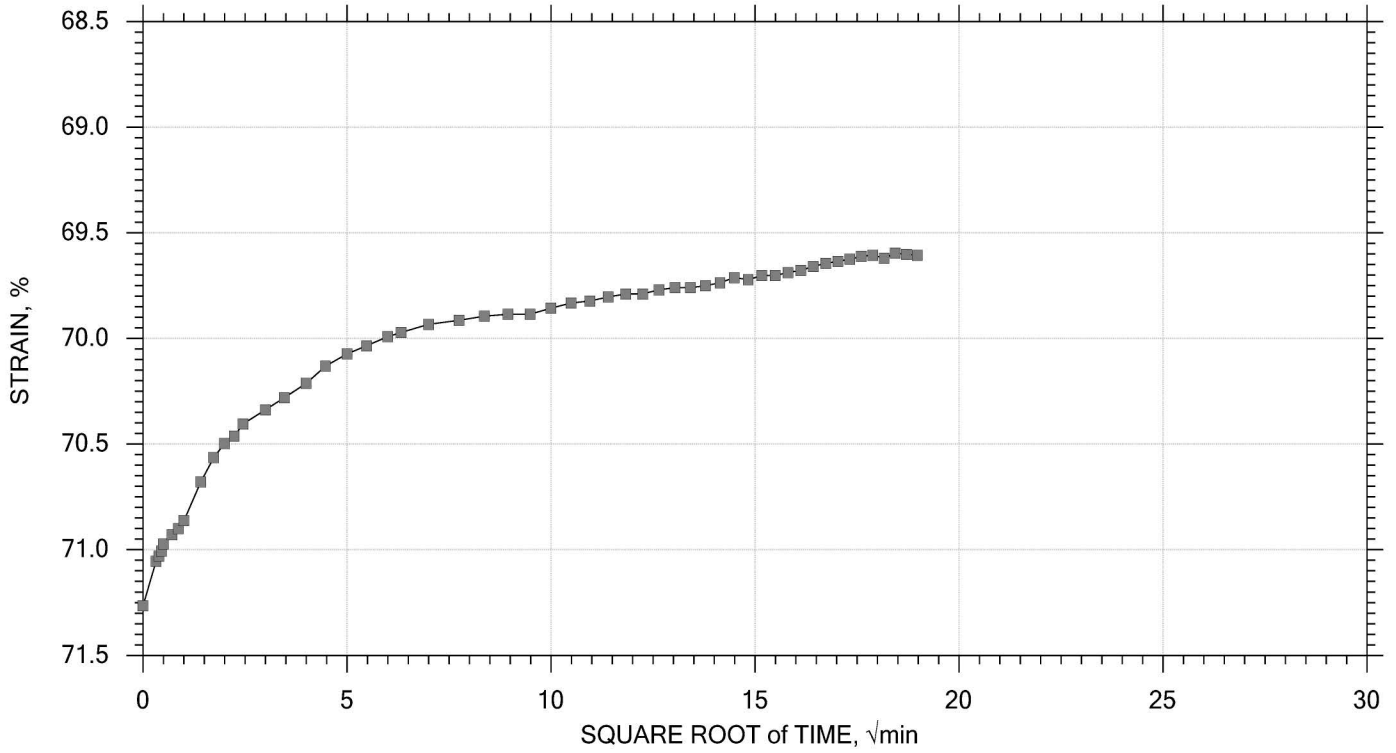
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2 tsf





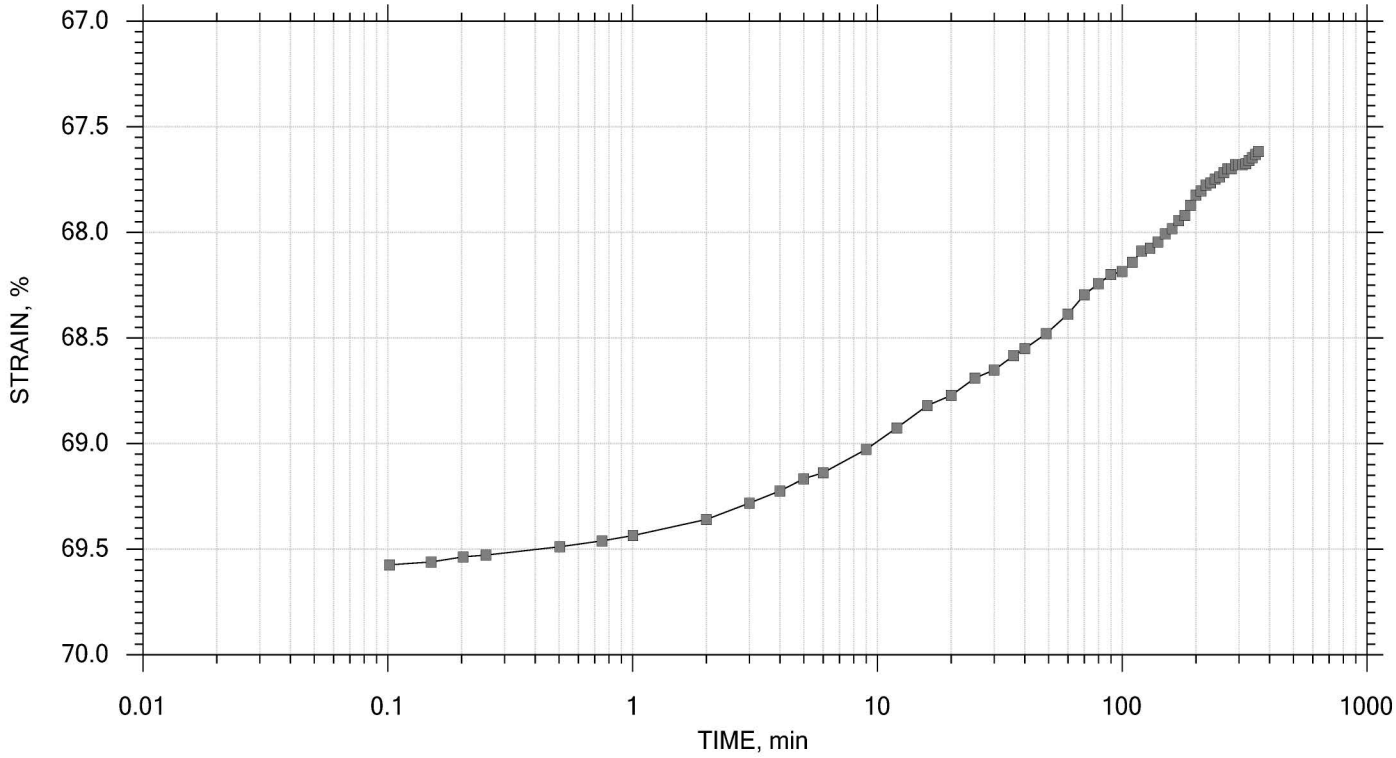
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

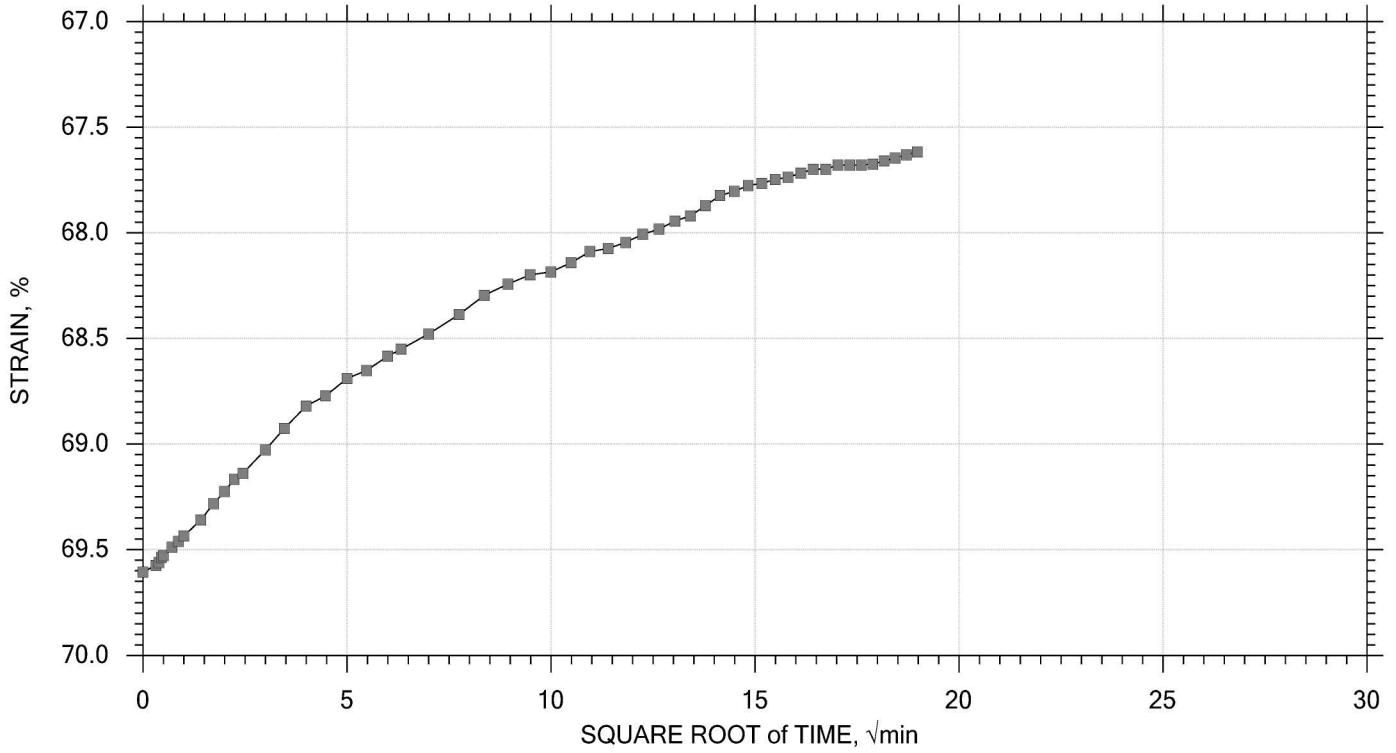
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 0.5 tsf





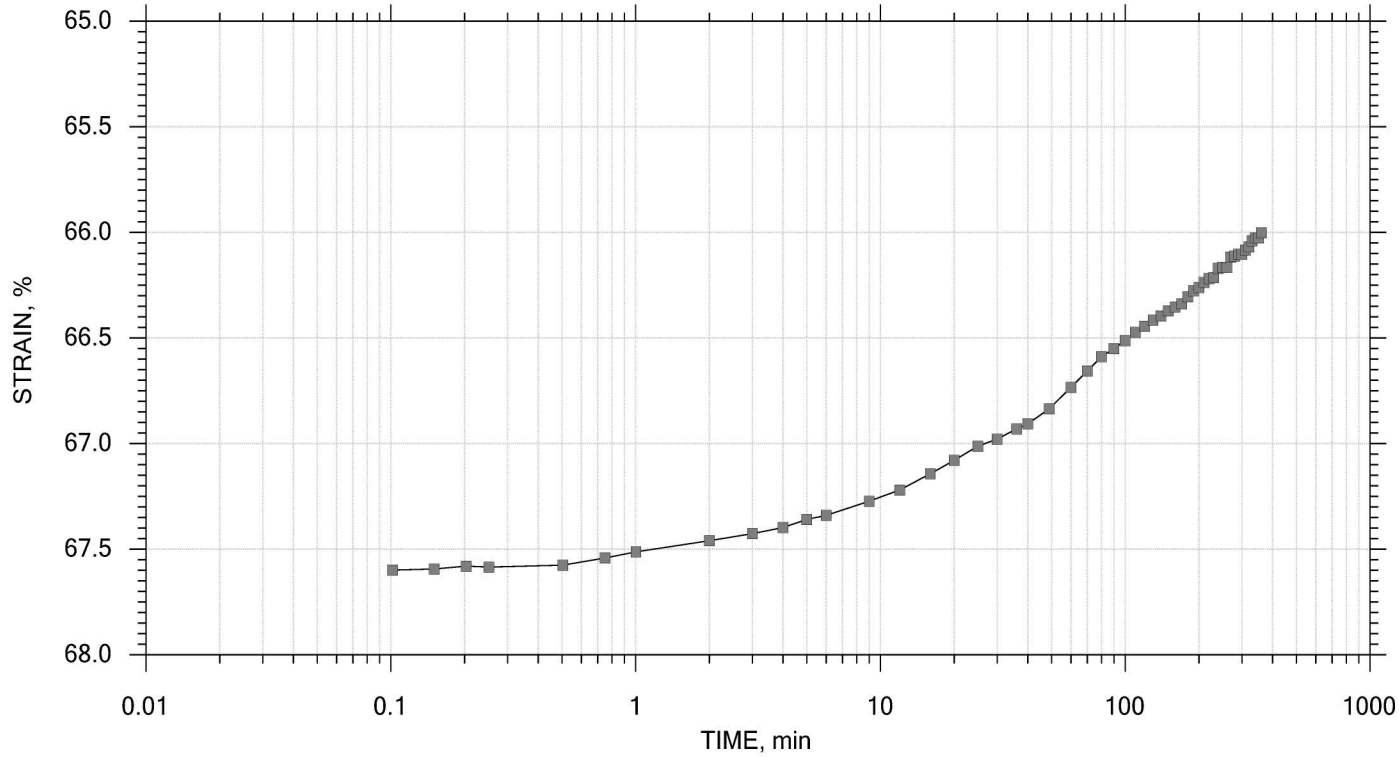
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

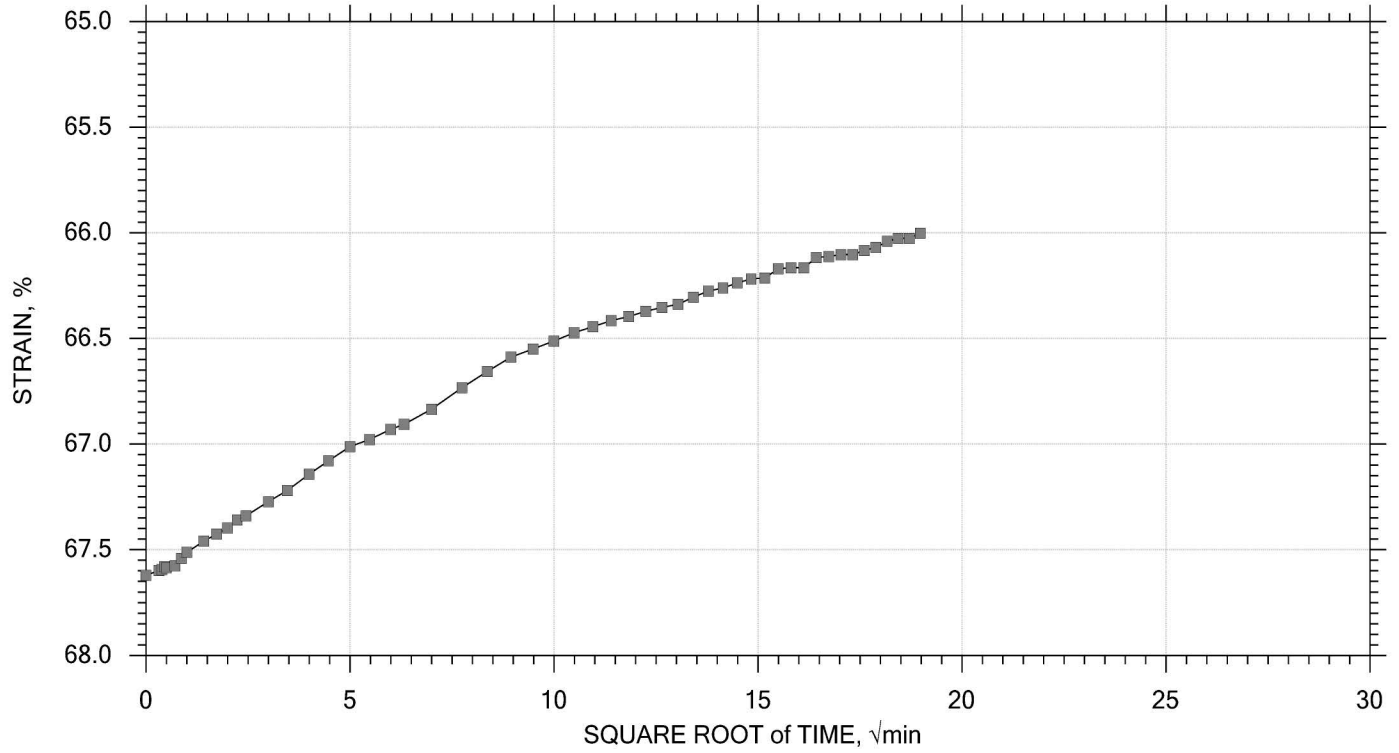
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 0.125 tsf





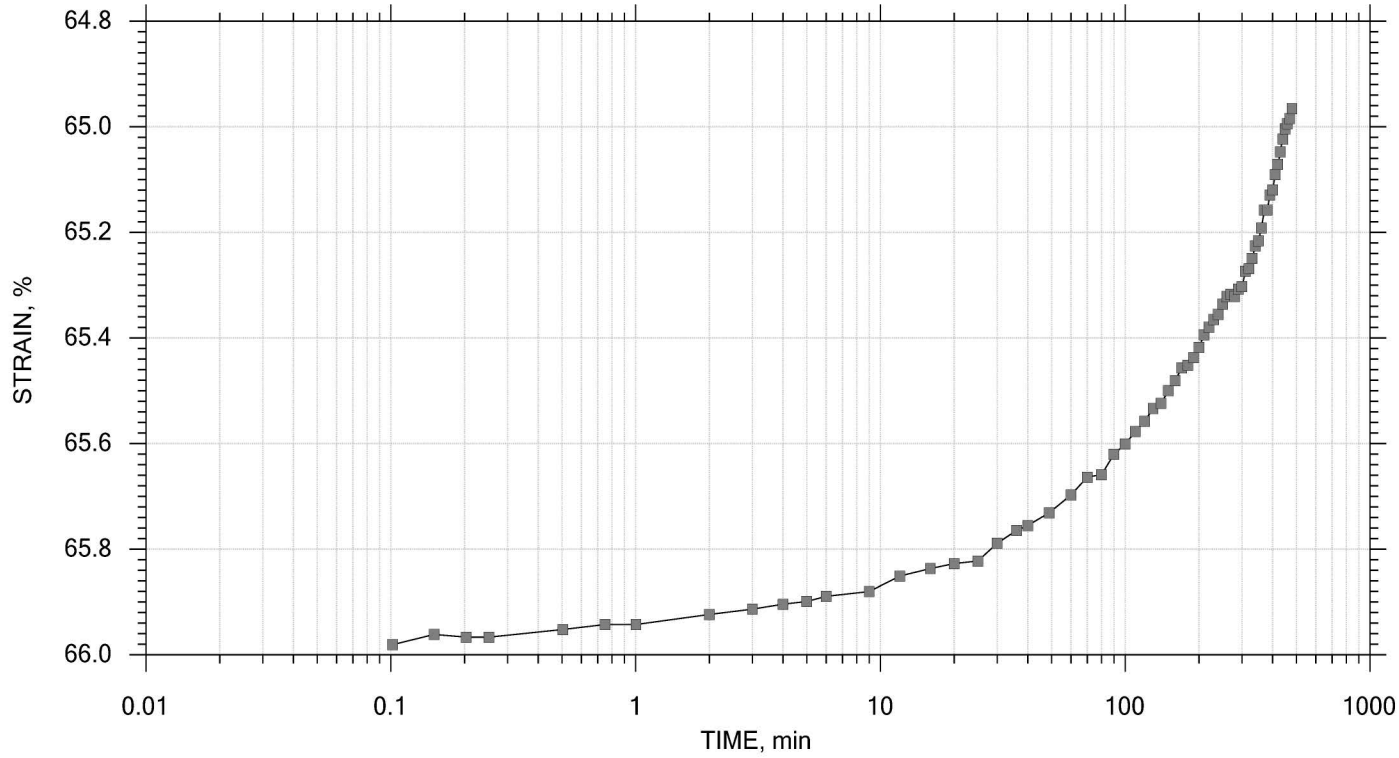
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

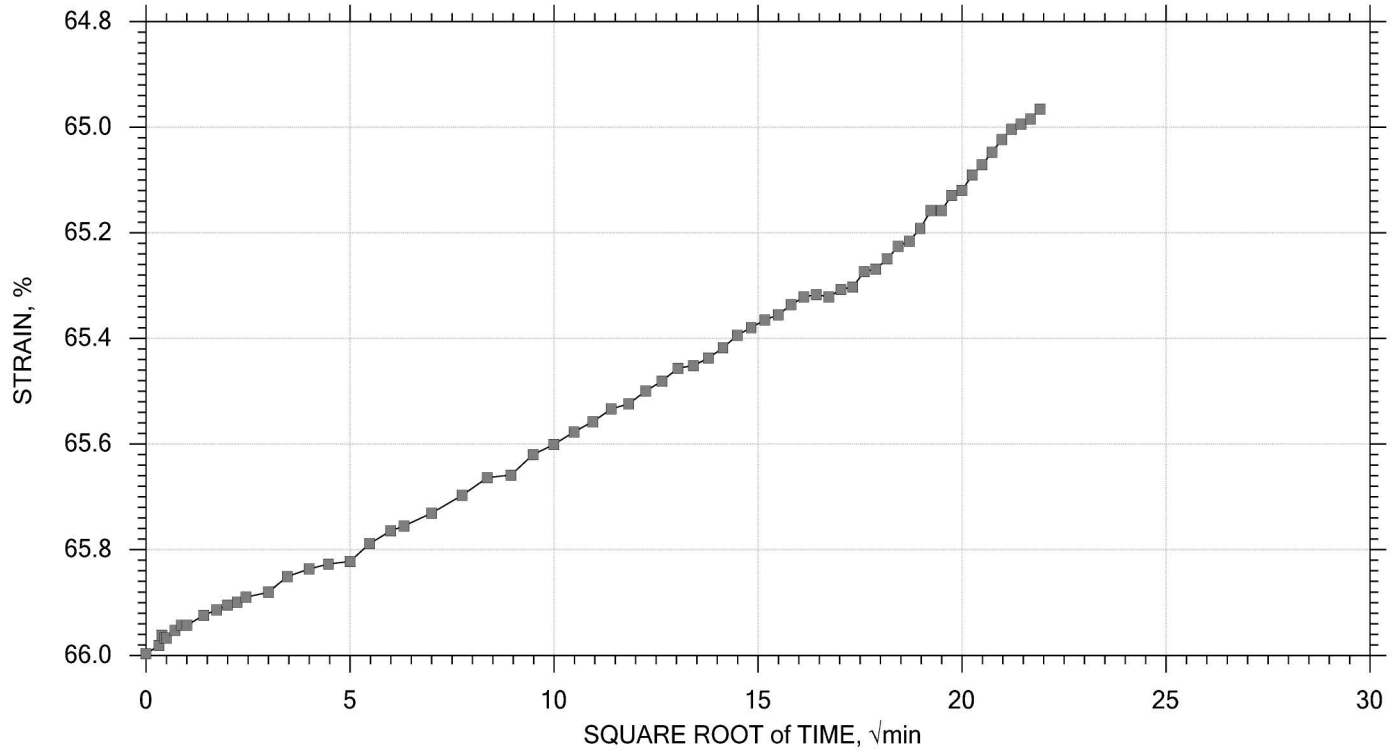
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 0.0625 tsf

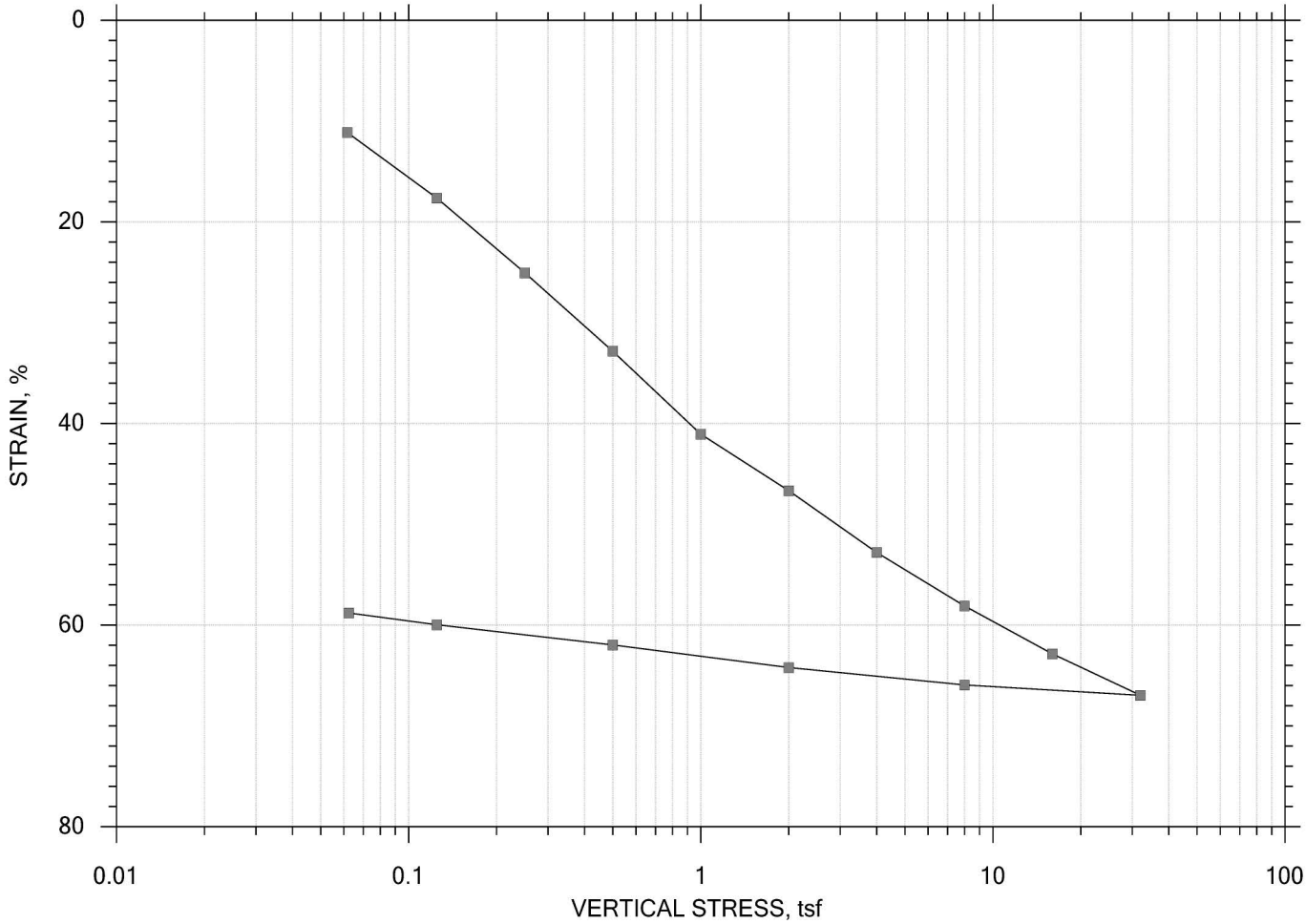


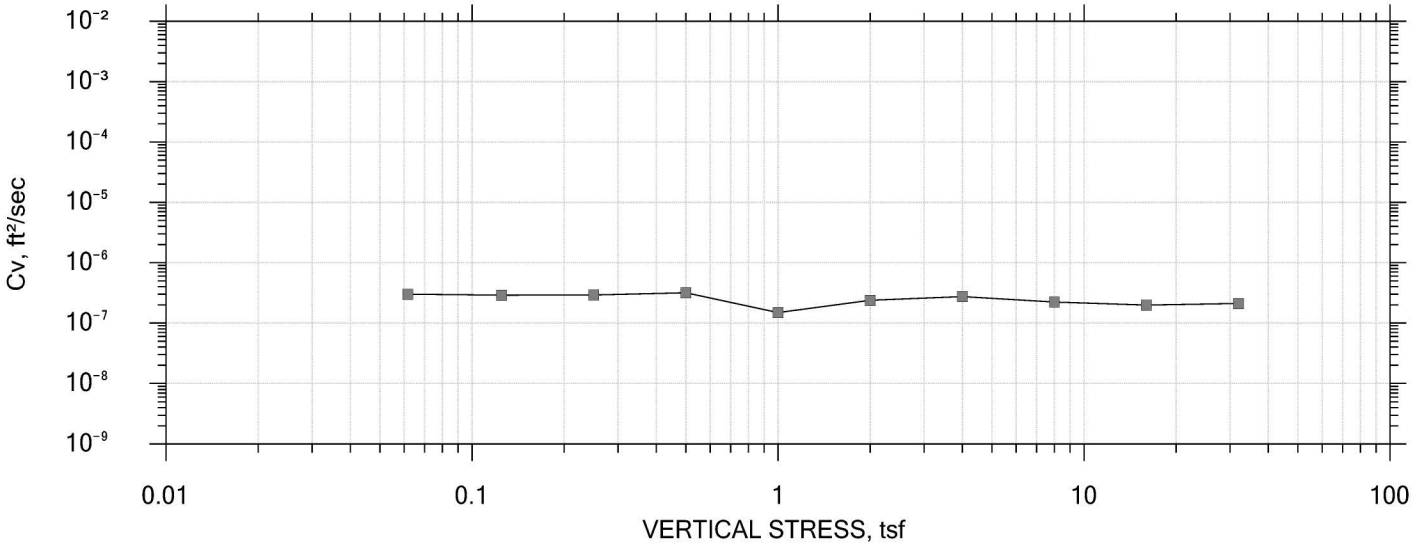


GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002401	Test Date: 11/13/17	Test No.: IP-2
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System S, Swell Pressure = 0.0617 tsf		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT

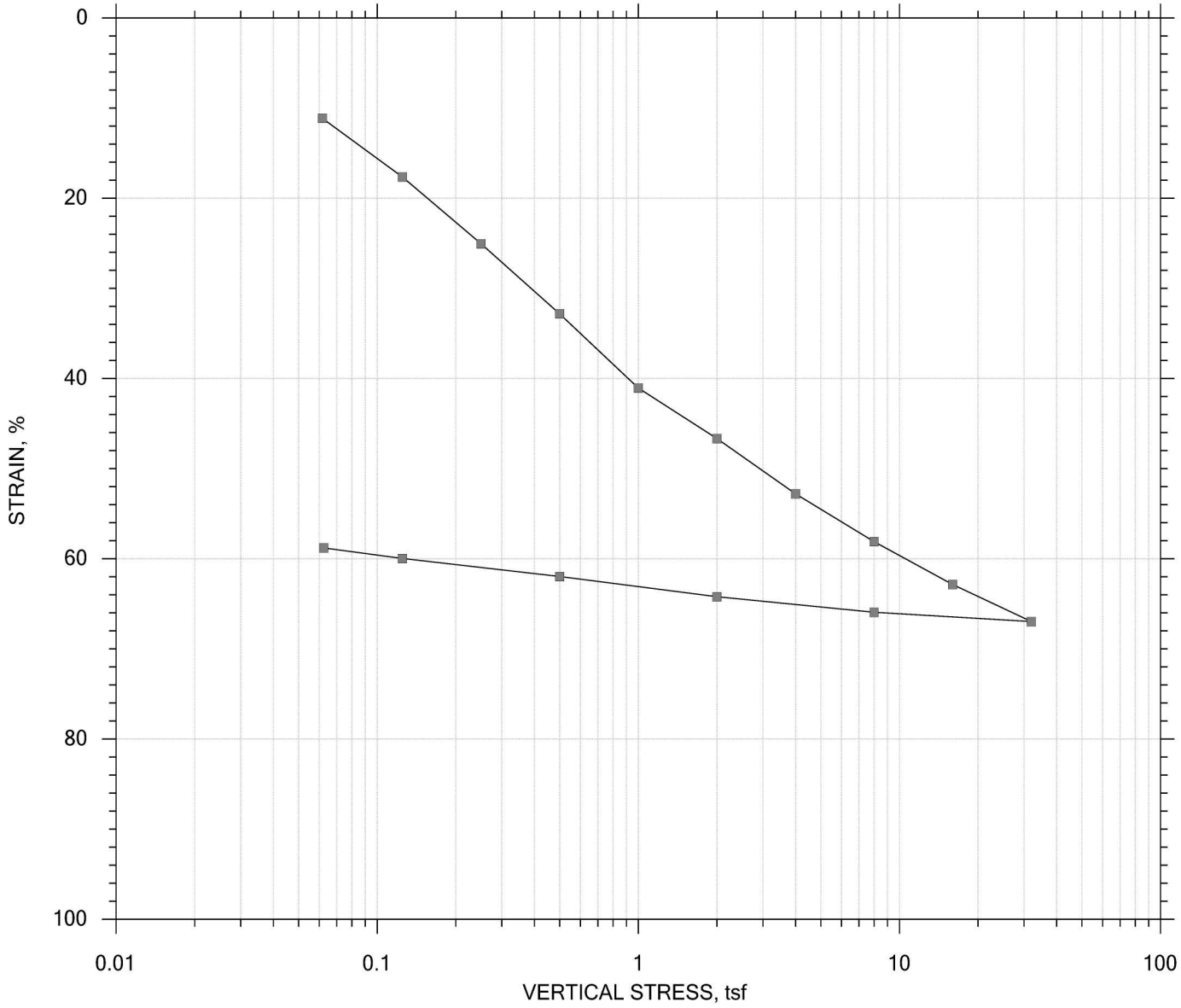




GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

SUMMARY REPORT



					Before Test	After Test
Current Vertical Effective Stress: ---				Water Content, %	170.58	45.17
Preconsolidation Stress: ---				Dry Unit Weight, pcf	29.793	74.481
Compression Ratio: ---				Saturation, %	99.81	100.00
Diameter: 2.5 in		Height: 1 in		Void Ratio	4.42	1.17
LL: ---	PL: ---	PI: ---	GS: 2.59			

GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		
	Displacement at End of Increment		

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor
Boring No.: ---
Sample No.: RA-C002501
Test No.: IP-1

Location: New Bedford, MA
Tested By: md
Test Date: 11/13/17
Sample Type: intact

Project No.: GTX-306296
Checked By: njh
Depth: 0.0-0.5 ft
Elevation: ---

Soil Description: Wet, black silt
Remarks: System T, Swell Pressure = 0.0617 tsf

Estimated Specific Gravity: 2.59
Initial Void Ratio: 4.42
Final Void Ratio: 1.17

Liquid Limit: ---
Plastic Limit: ---
Plasticity Index: ---

Specimen Diameter: 2.50 in
Initial Height: 1.00 in
Final Height: 0.40 in

	Before Consolidation		After Consolidation	
	Trimmings	Specimen+Ring	Specimen+Ring	Trimmings
Container ID	C-1070	RING		D-1487
Wt. Container + Wet Soil, gm	225.37	215.37	167.23	62.900
Wt. Container + Dry Soil, gm	82.550	149.89	149.89	45.910
Wt. Container, gm	8.2600	111.50	111.50	8.3000
Wt. Dry Soil, gm	74.290	38.388	38.388	37.610
Water Content, %	192.25	170.58	45.17	45.17
Void Ratio	---	4.42	1.17	---
Degree of Saturation, %	---	99.81	100.00	---
Dry Unit Weight, pcf	---	29.793	74.481	---

Note: Specific Gravity and Void Ratios are calculated assuming the degree of saturation equals 100% at the end of the test. Therefore, values may not represent actual values for the specimen.

One-Dimensional Consolidation by ASTM D2435 - Method B

Project: New Bedford Harbor
Boring No.: ---
Sample No.: RA-C002501
Test No.: IP-1

Location: New Bedford, MA
Tested By: md
Test Date: 11/13/17
Sample Type: intact

Project No.: GTX-306296
Checked By: njh
Depth: 0.0-0.5 ft
Elevation: ---

Soil Description: Wet, black silt
Remarks: System T, Swell Pressure = 0.0617 tsf

Displacement at End of Increment

	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Sq.Rt T90 min	Cv ft²/sec	Mv 1/tsf	k ft/day
1	0.0617	0.1112	3.82	11.1	80.765	2.71e-007	1.80e+000	1.32e-003
2	0.125	0.1765	3.47	17.7	65.231	2.76e-007	1.03e+000	7.67e-004
3	0.250	0.2505	3.06	25.1	49.888	3.04e-007	5.92e-001	4.86e-004
4	0.500	0.3283	2.64	32.8	44.466	2.79e-007	3.11e-001	2.34e-004
5	1.00	0.4105	2.20	41.0	134.143	7.27e-008	1.64e-001	3.22e-005
6	2.00	0.4667	1.89	46.7	41.048	1.88e-007	5.62e-002	2.85e-005
7	4.00	0.5279	1.56	52.8	26.978	2.30e-007	3.06e-002	1.90e-005
8	8.00	0.5810	1.27	58.1	26.488	1.84e-007	1.33e-002	6.58e-006
9	16.0	0.6285	1.01	62.9	25.912	1.48e-007	5.94e-003	2.37e-006
10	32.0	0.6696	0.792	67.0	17.541	1.72e-007	2.56e-003	1.19e-006
11	8.00	0.6594	0.847	65.9	7.859	3.52e-007	4.25e-004	4.03e-007
12	2.00	0.6421	0.941	64.2	61.584	4.86e-008	2.87e-003	3.77e-007
13	0.500	0.6196	1.06	62.0	105.897	3.16e-008	1.50e-002	1.28e-006
14	0.125	0.5997	1.17	60.0	433.338	8.63e-009	5.32e-002	1.24e-006
15	0.0625	0.5880	1.23	58.8	0.000	0.00e+000	1.87e-001	0.00e+000

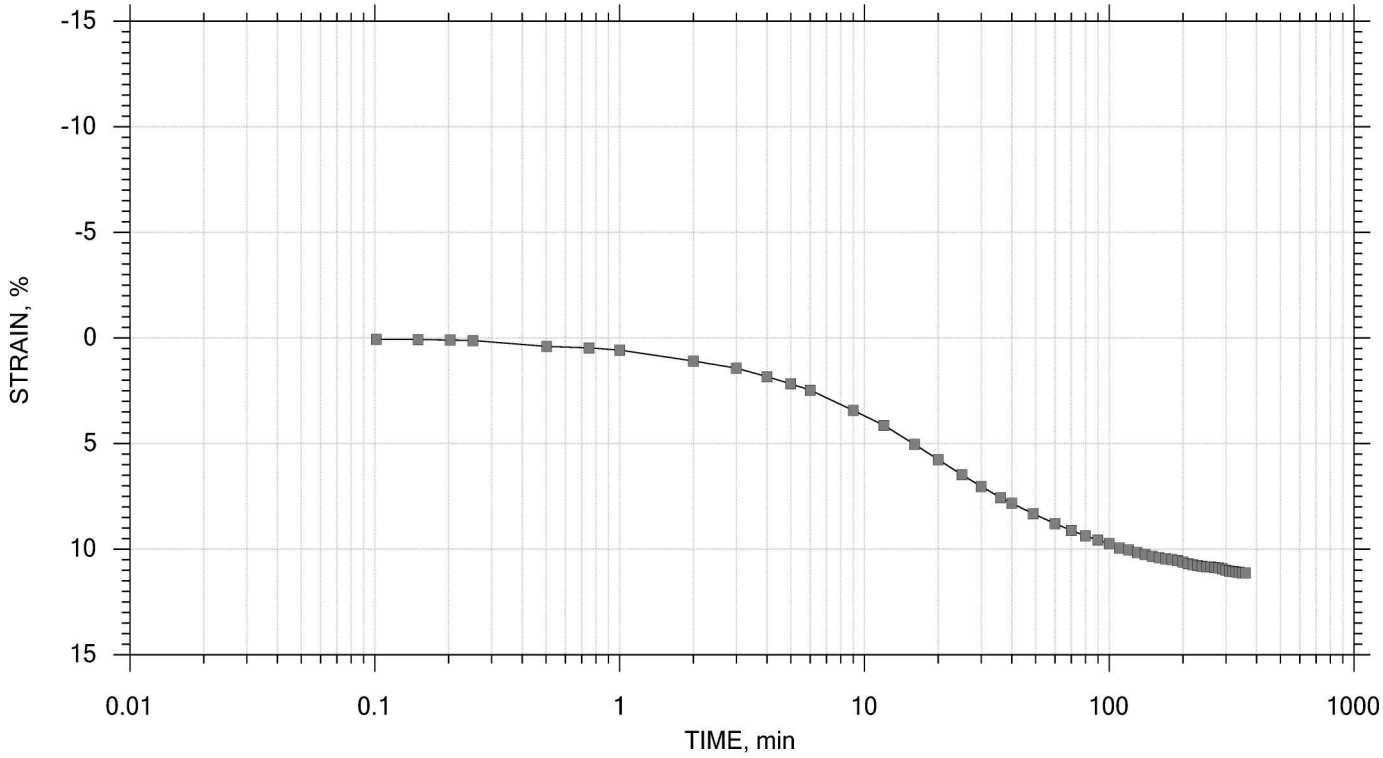
	Applied Stress tsf	Final Displacement in	Void Ratio	Strain at End %	Log T50 min	Cv ft²/sec	Mv 1/tsf	k ft/day	Ca %
1	0.0617	0.1112	3.82	11.1	15.915	3.19e-007	1.80e+000	1.55e-003	0.00e+000
2	0.125	0.1765	3.47	17.7	14.389	2.90e-007	1.03e+000	8.07e-004	0.00e+000
3	0.250	0.2505	3.06	25.1	13.322	2.65e-007	5.92e-001	4.23e-004	0.00e+000
4	0.500	0.3283	2.64	32.8	8.707	3.31e-007	3.11e-001	2.77e-004	0.00e+000
5	1.00	0.4105	2.20	41.0	0.000	0.00e+000	1.64e-001	0.00e+000	0.00e+000
6	2.00	0.4667	1.89	46.7	6.516	2.76e-007	5.62e-002	4.18e-005	0.00e+000
7	4.00	0.5279	1.56	52.8	5.006	2.88e-007	3.06e-002	2.38e-005	0.00e+000
8	8.00	0.5810	1.27	58.1	4.838	2.34e-007	1.33e-002	8.37e-006	0.00e+000
9	16.0	0.6285	1.01	62.9	3.919	2.27e-007	5.94e-003	3.64e-006	0.00e+000
10	32.0	0.6696	0.792	67.0	3.129	2.24e-007	2.56e-003	1.55e-006	0.00e+000
11	8.00	0.6594	0.847	65.9	0.000	0.00e+000	4.25e-004	0.00e+000	0.00e+000
12	2.00	0.6421	0.941	64.2	0.000	0.00e+000	2.87e-003	0.00e+000	0.00e+000
13	0.500	0.6196	1.06	62.0	0.000	0.00e+000	1.50e-002	0.00e+000	0.00e+000
14	0.125	0.5997	1.17	60.0	0.000	0.00e+000	5.32e-002	0.00e+000	0.00e+000
15	0.0625	0.5880	1.23	58.8	0.000	0.00e+000	1.87e-001	0.00e+000	0.00e+000

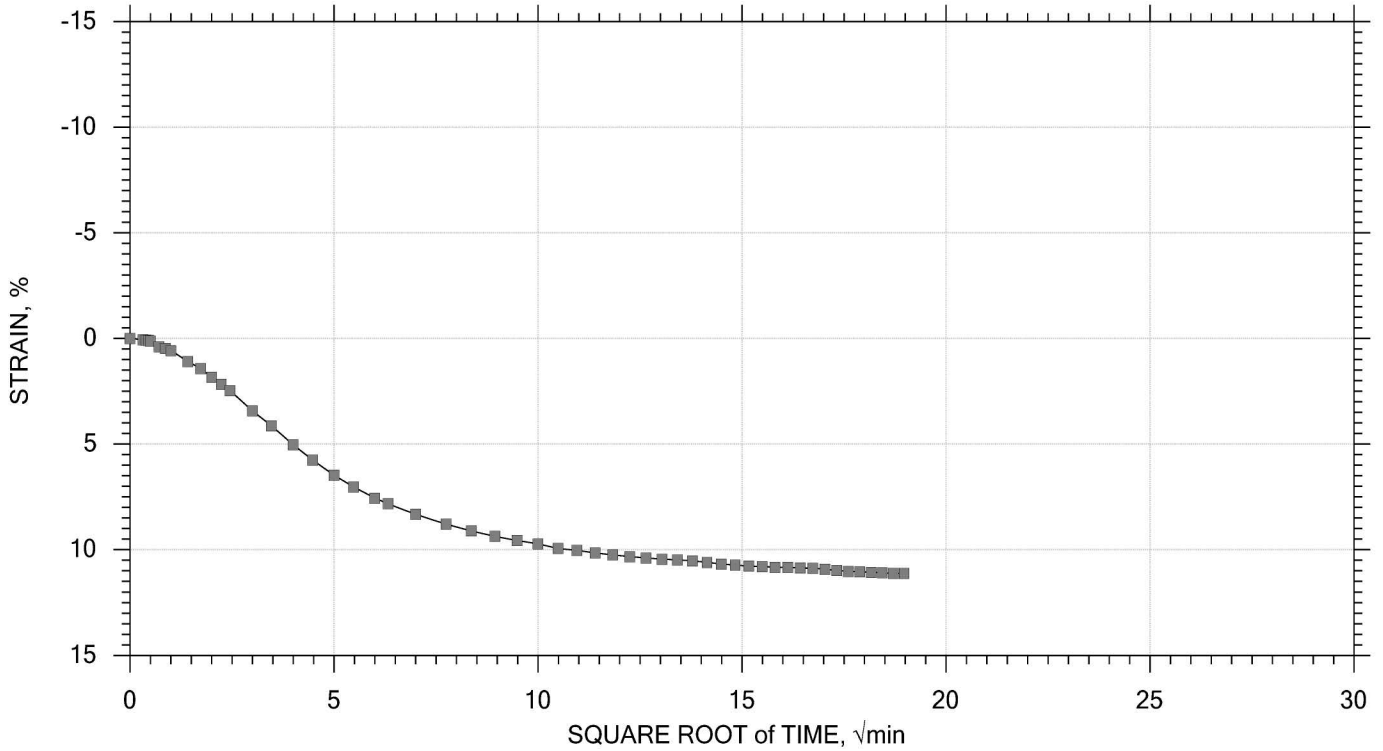
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Volume Step 1 of 15

Stress: 0.061667 tsf





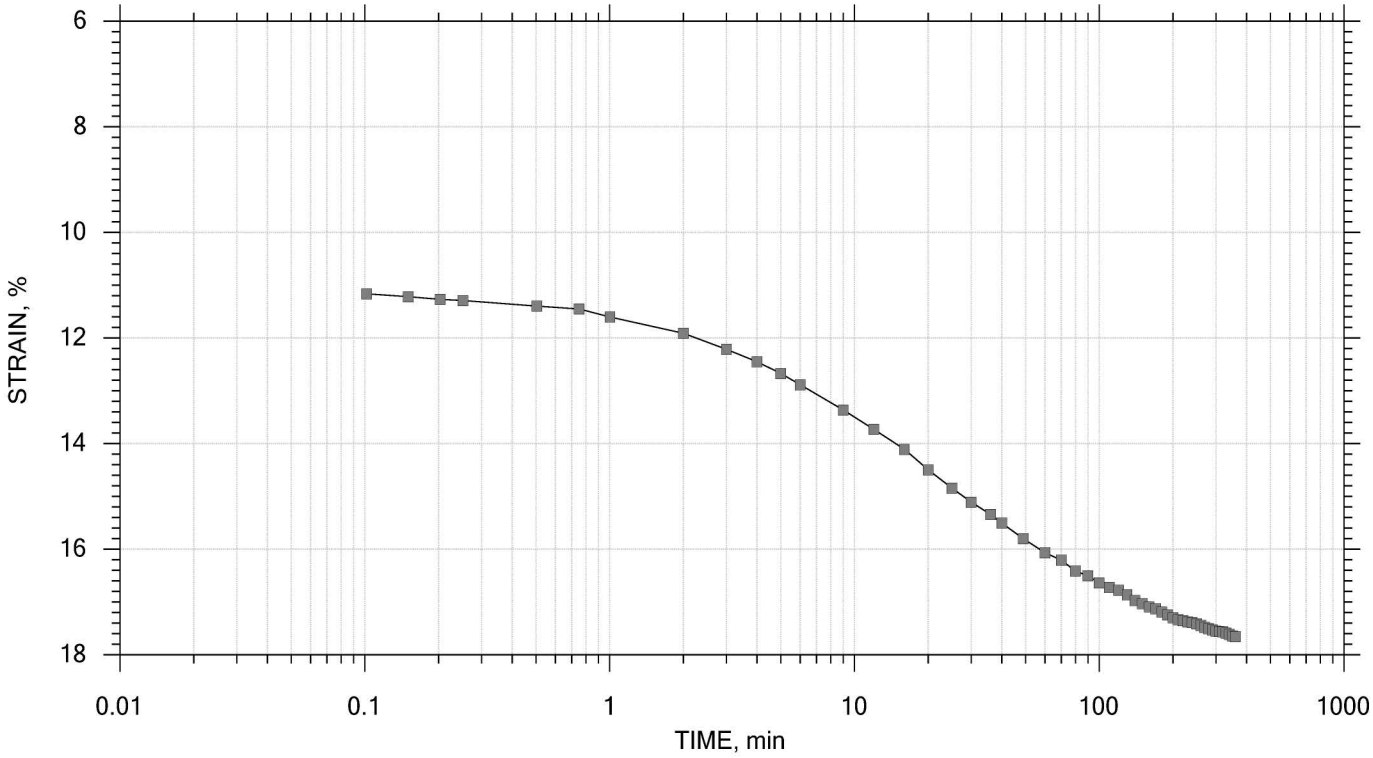
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

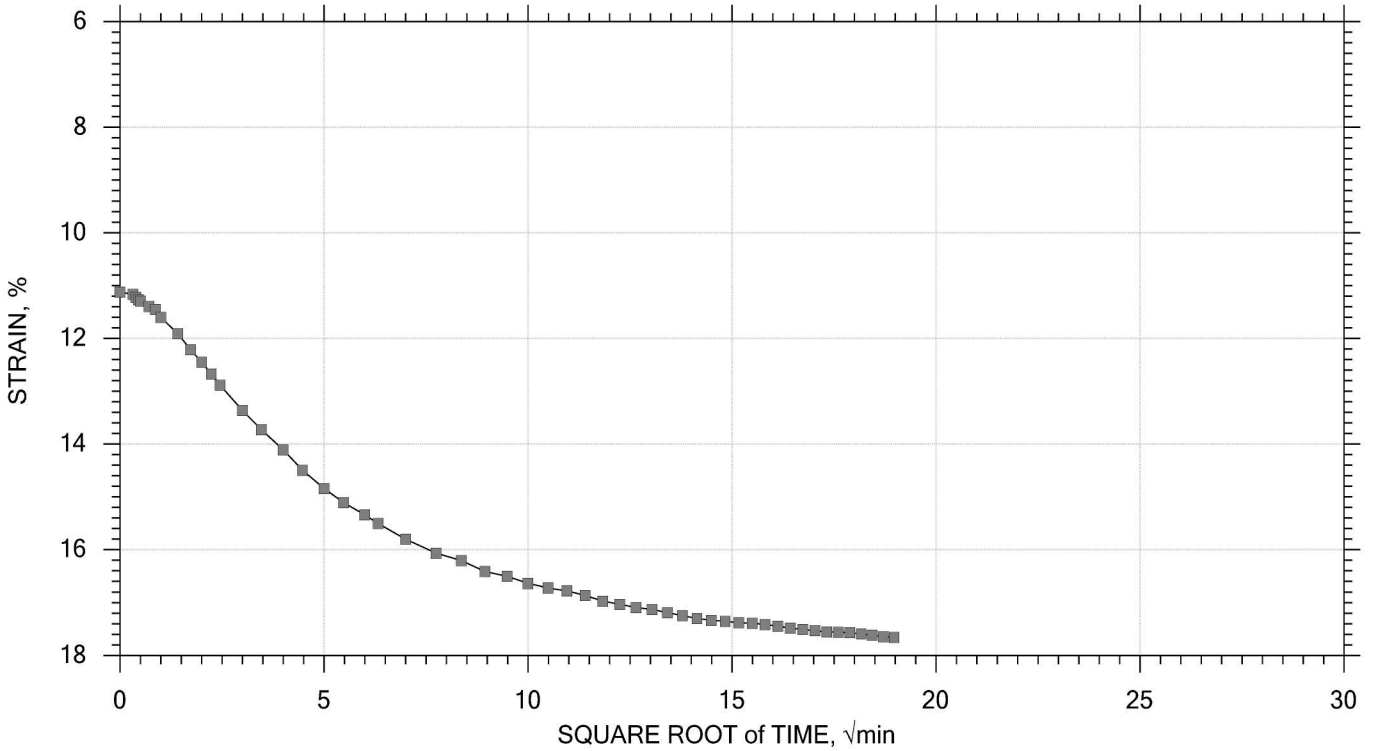
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 2 of 15

Stress: 0.125 tsf





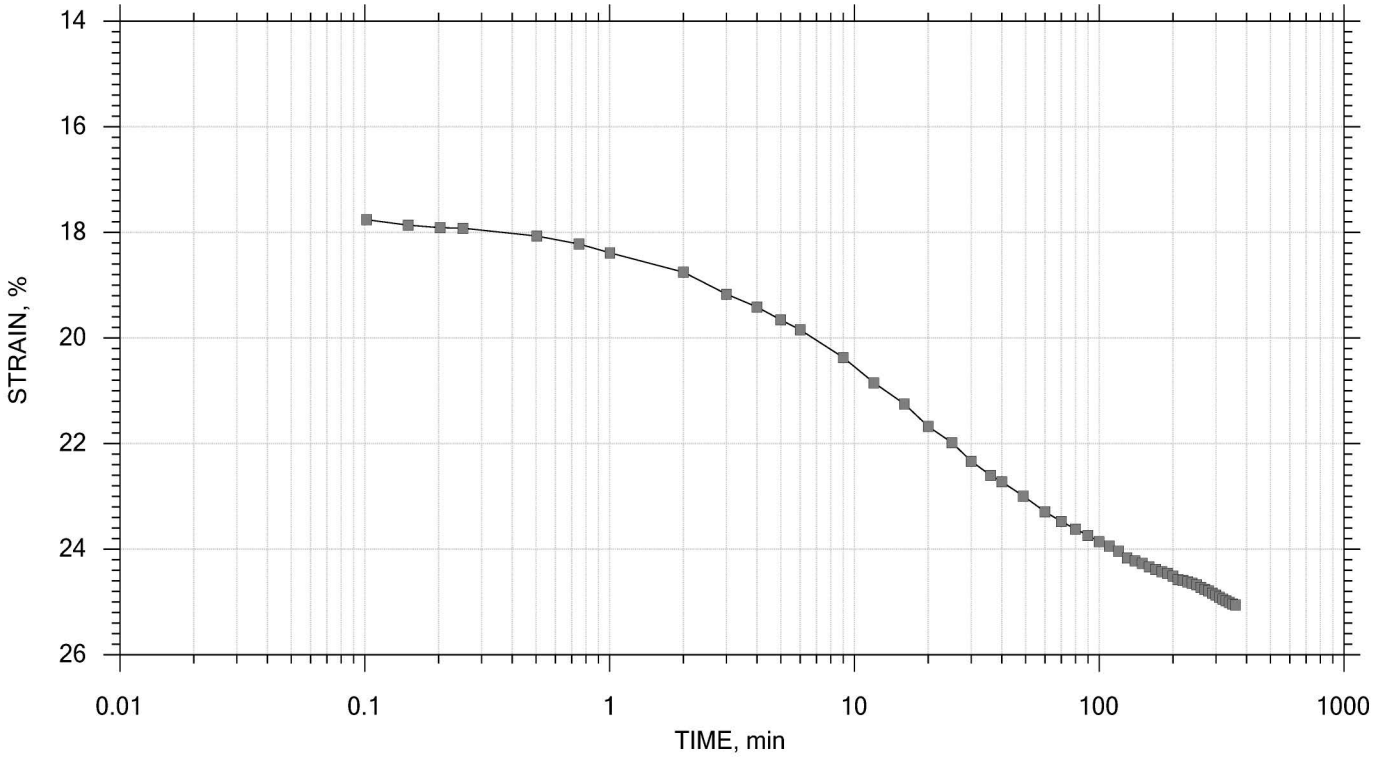
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

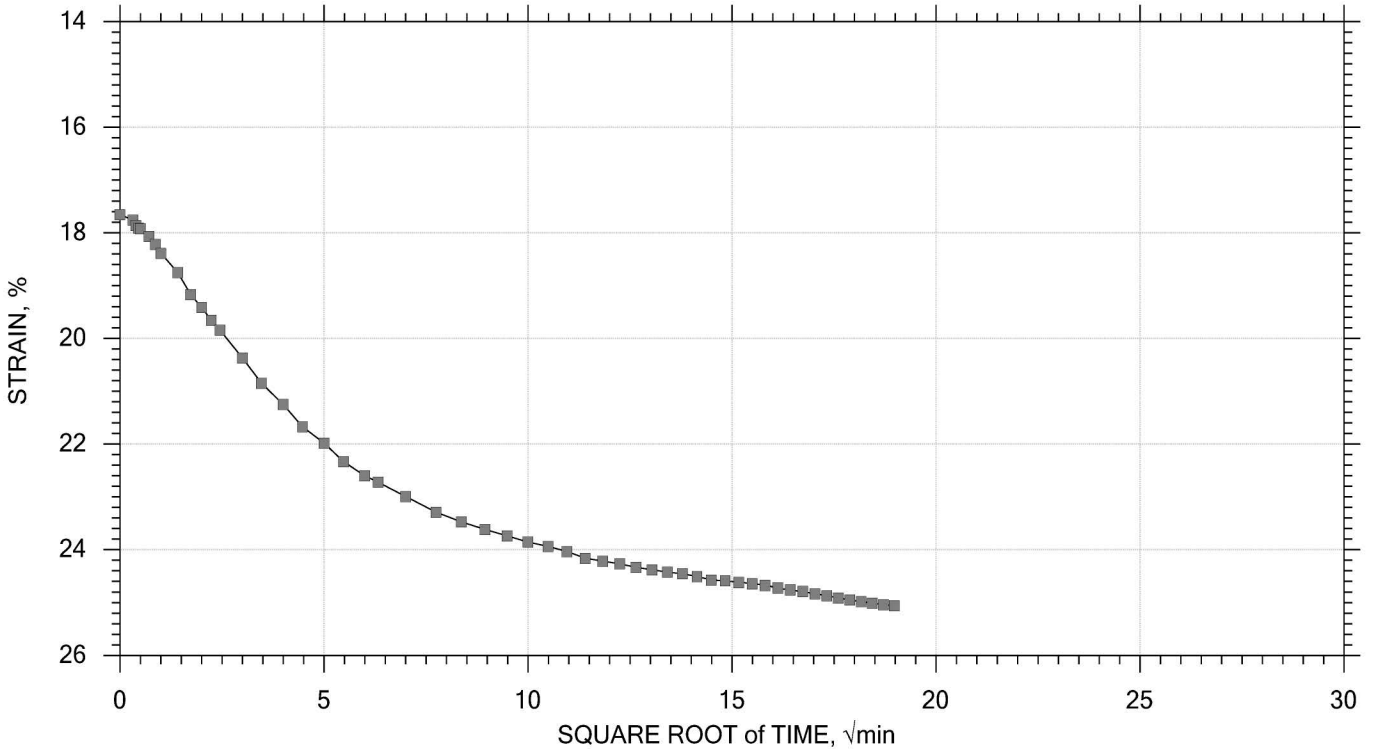
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 3 of 15

Stress: 0.25 tsf





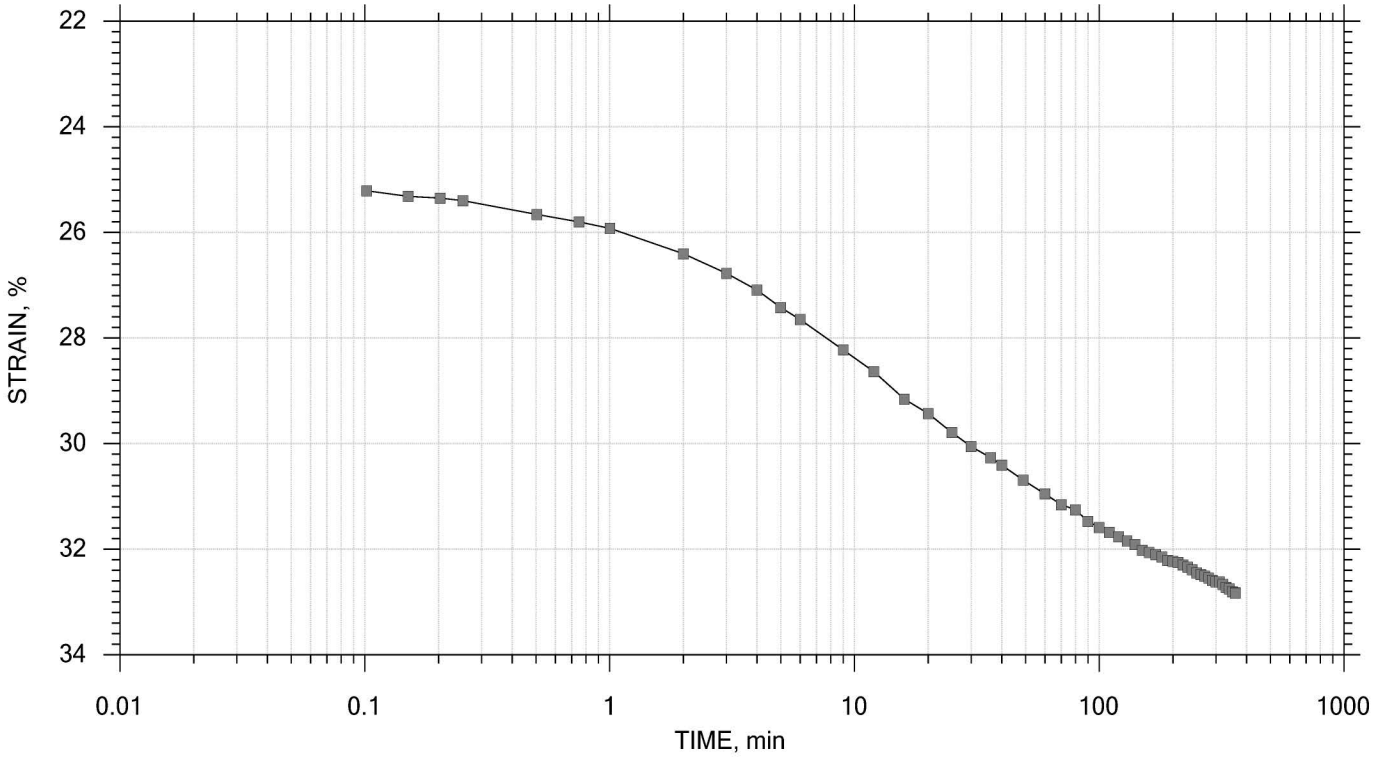
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

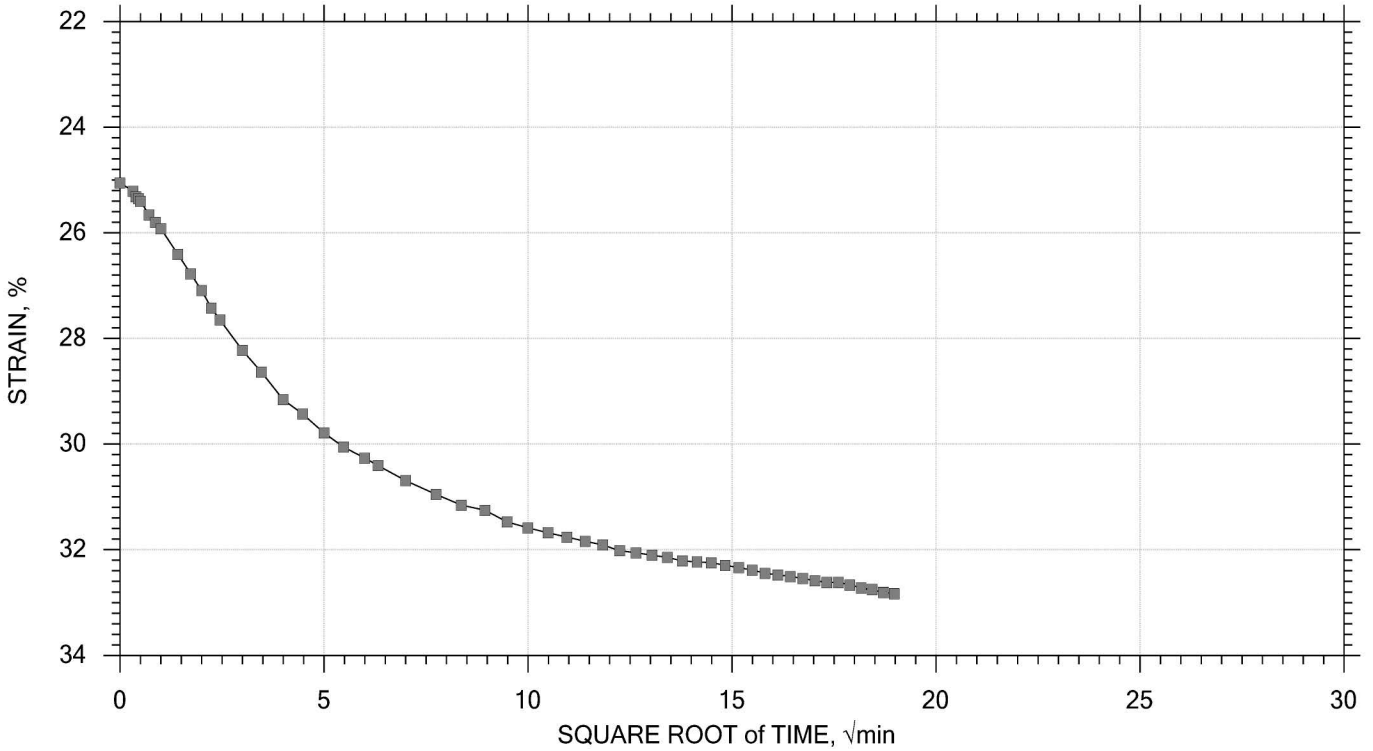
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 4 of 15

Stress: 0.5 tsf





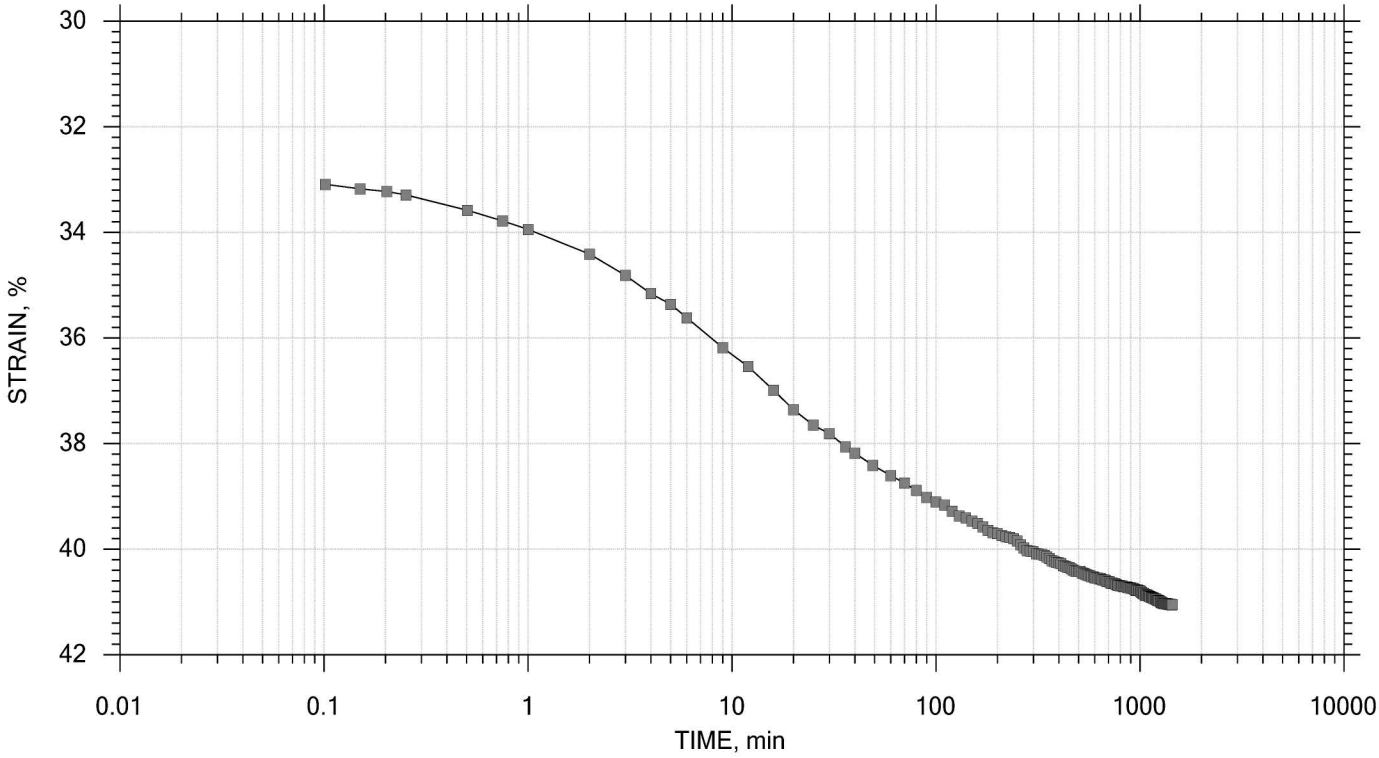
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

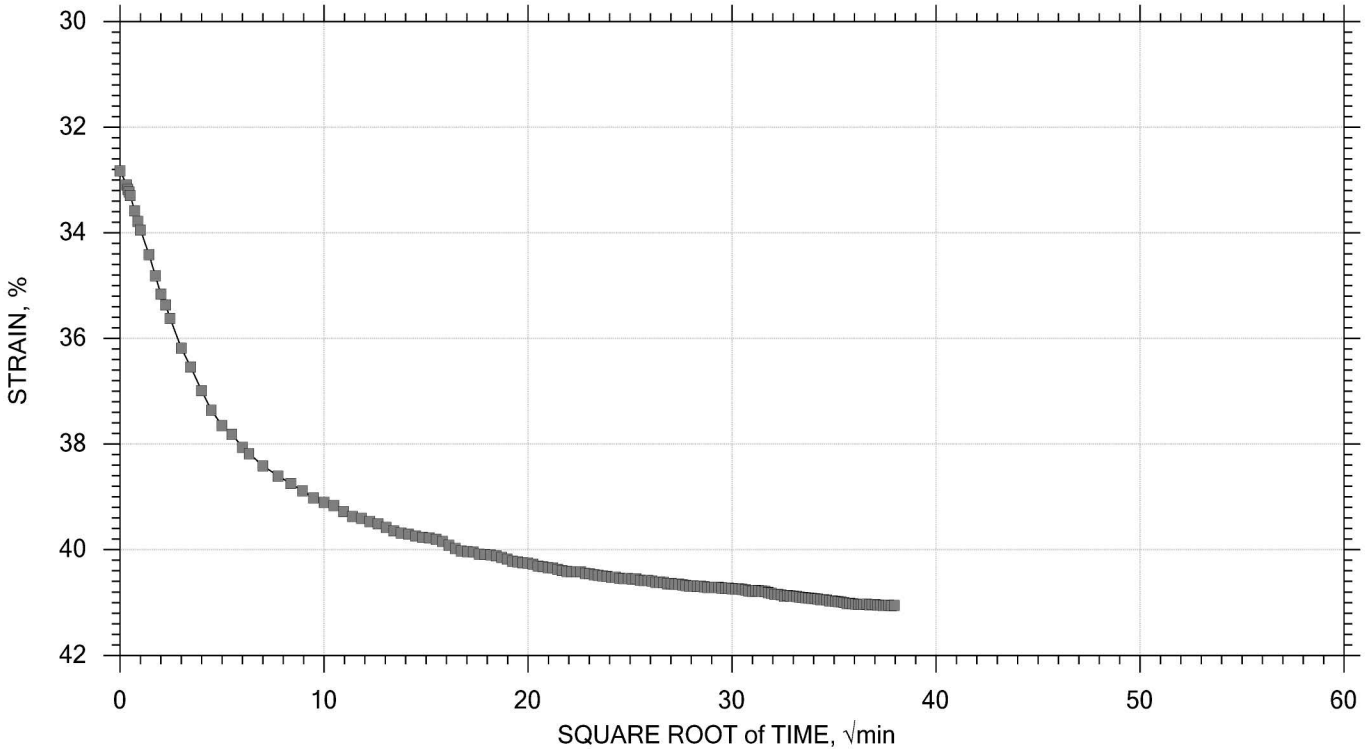
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 5 of 15

Stress: 1 tsf





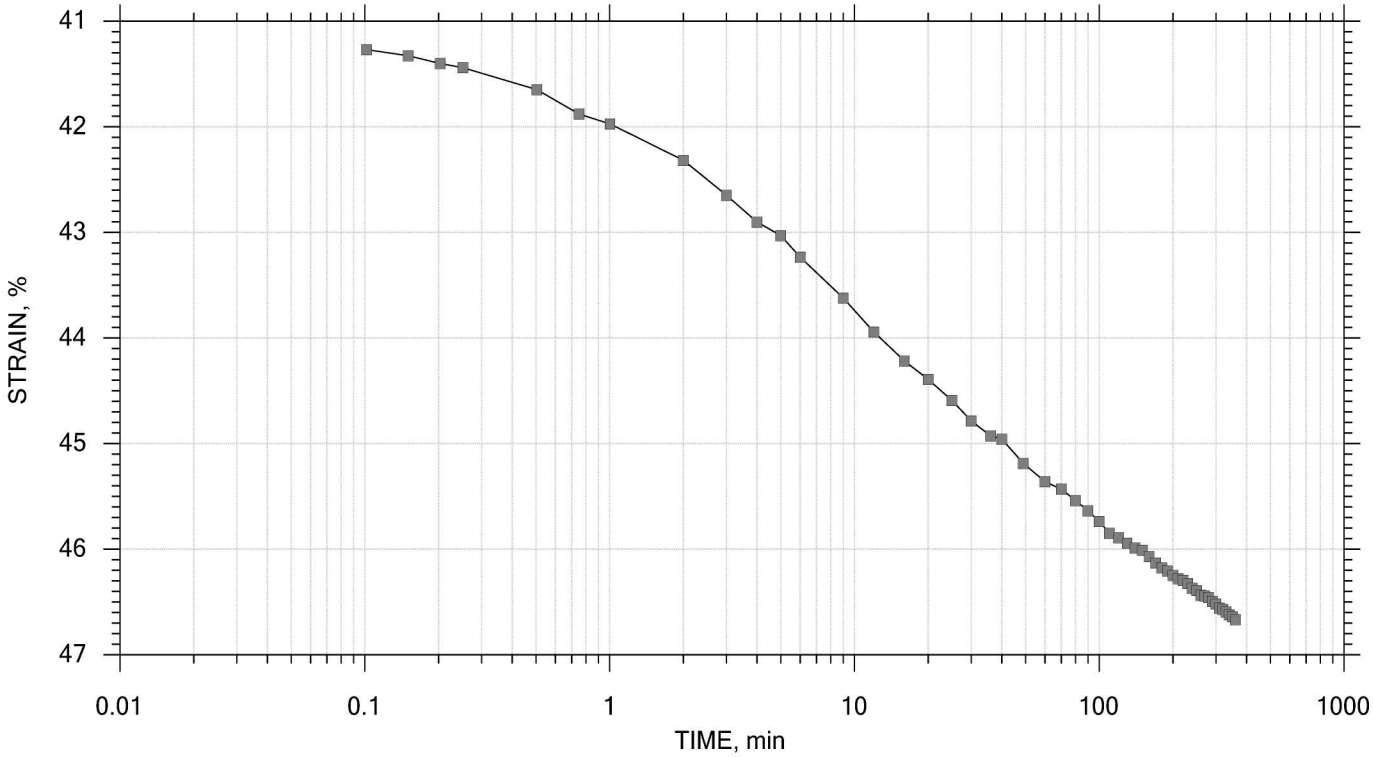
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

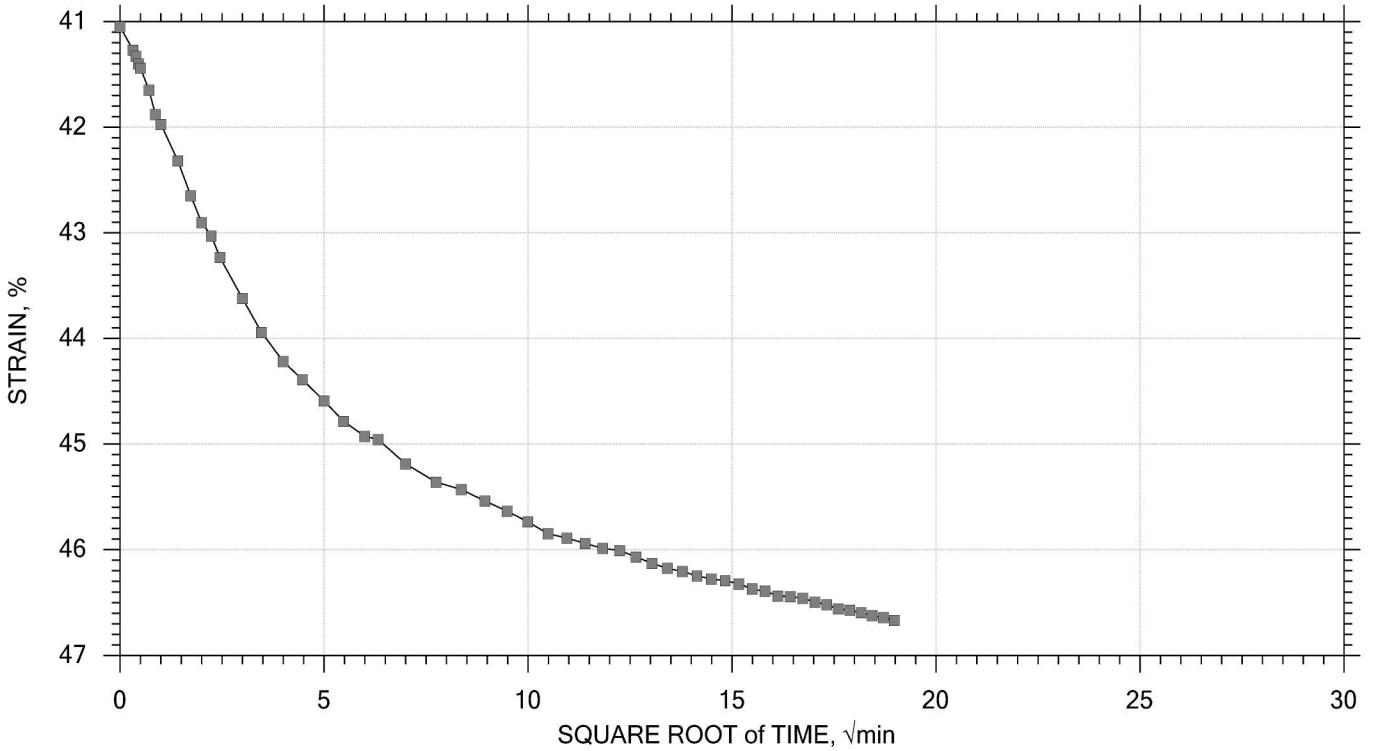
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 6 of 15

Stress: 2 tsf





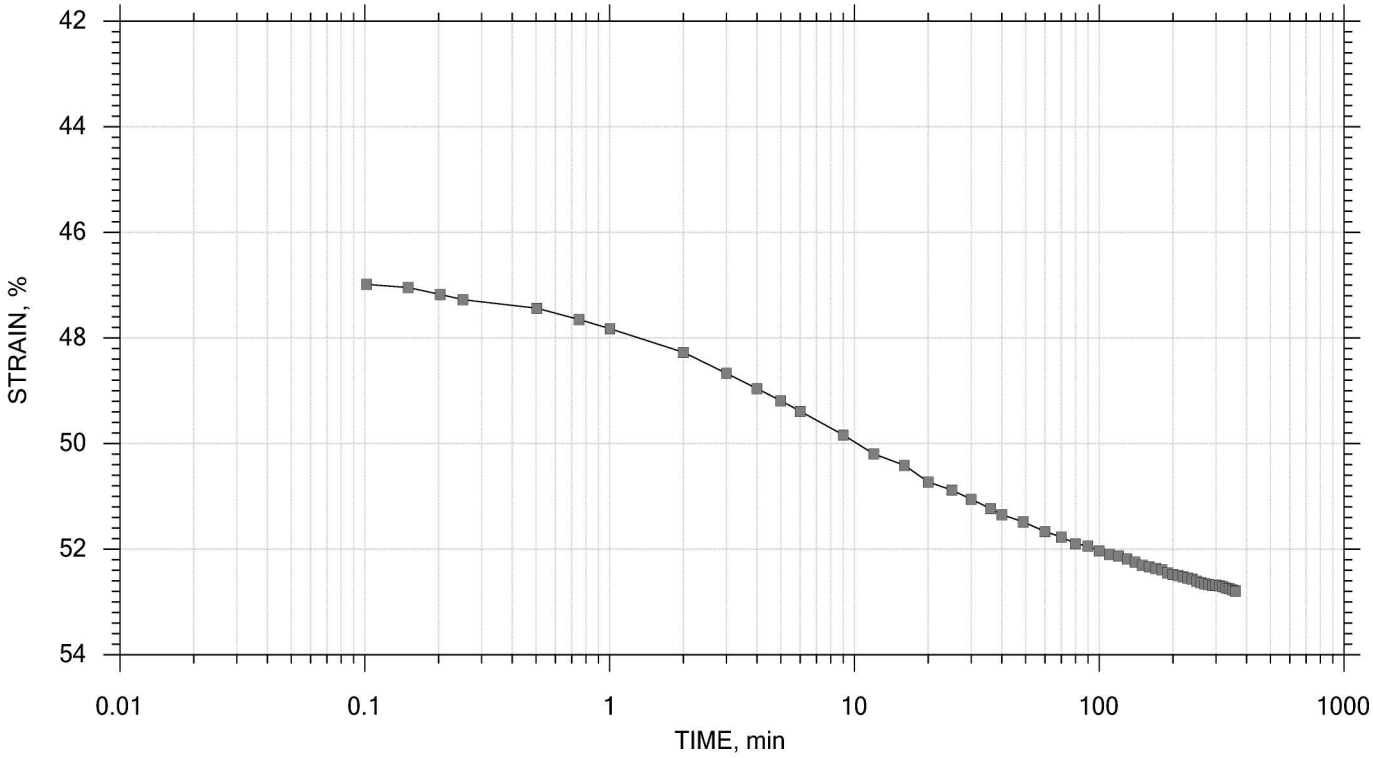
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

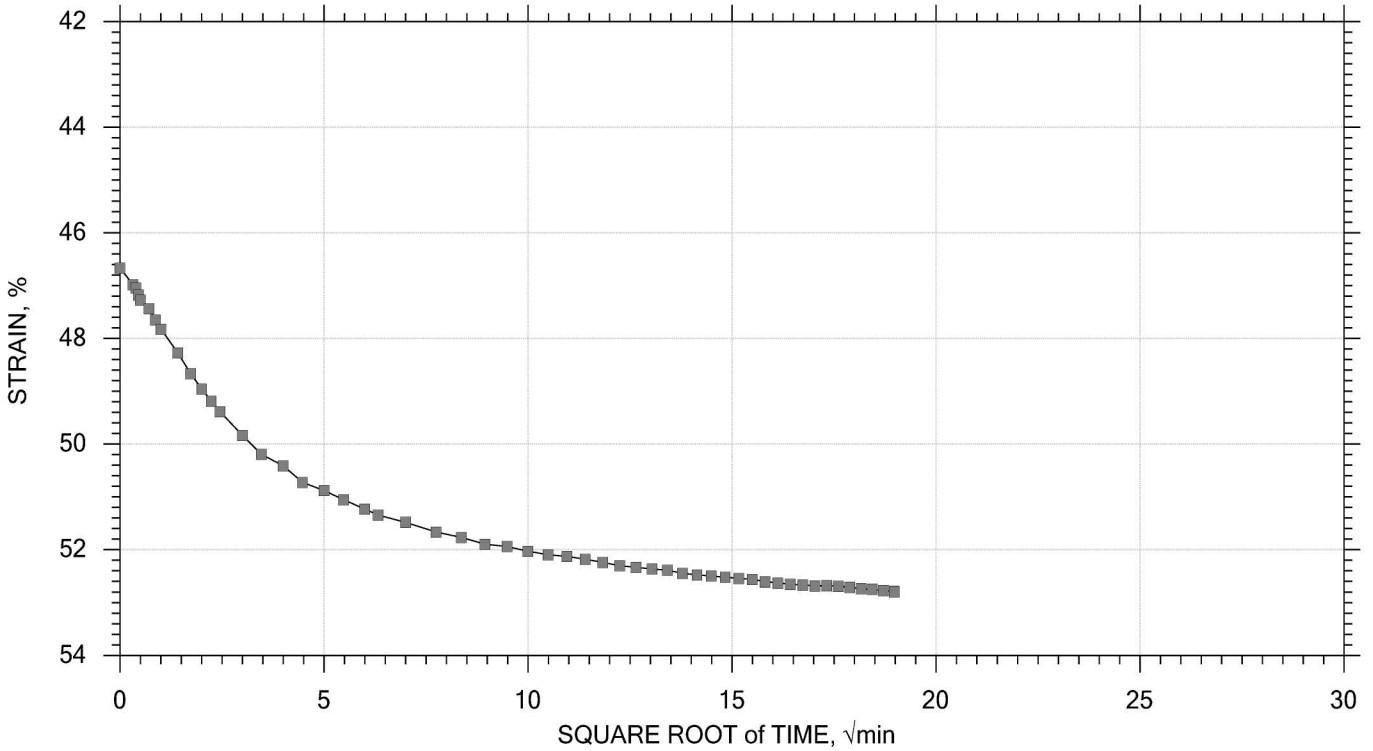
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 7 of 15

Stress: 4 tsf





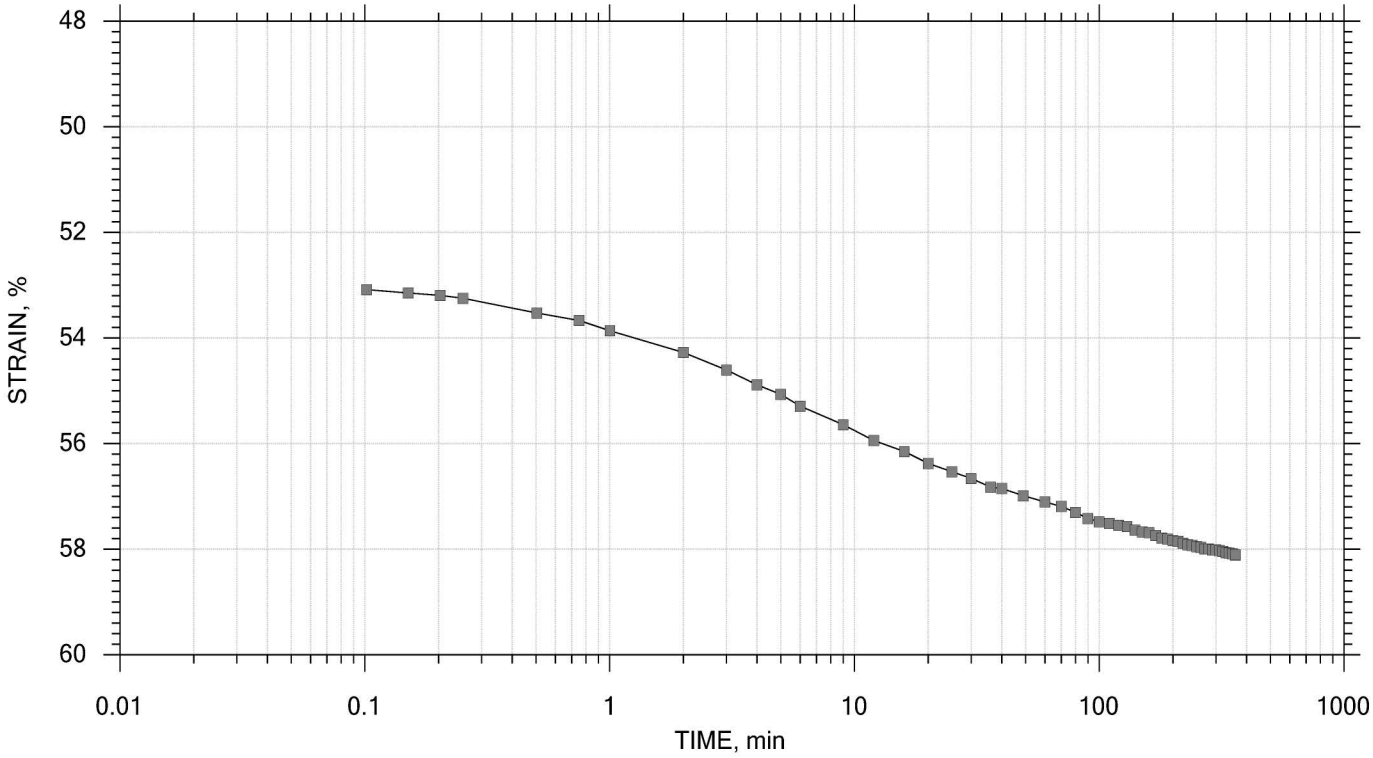
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

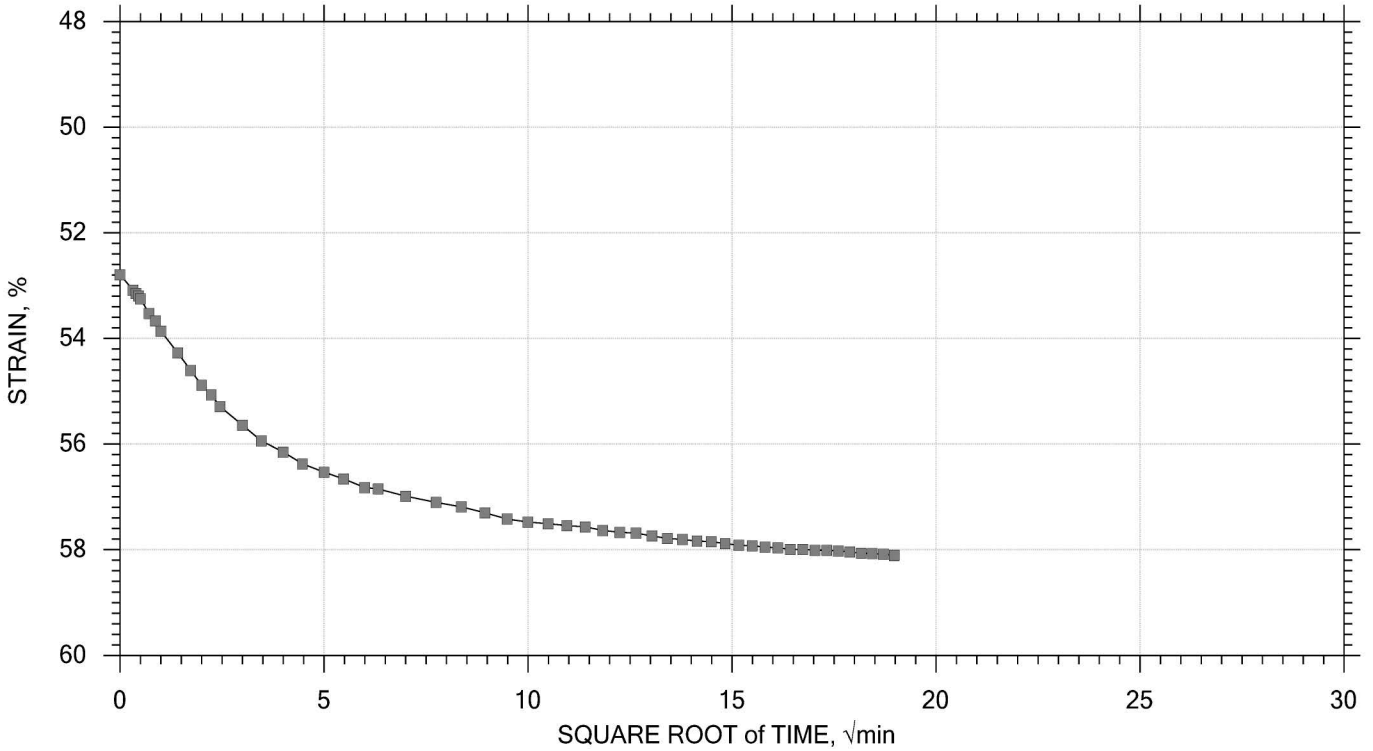
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 8 of 15

Stress: 8 tsf





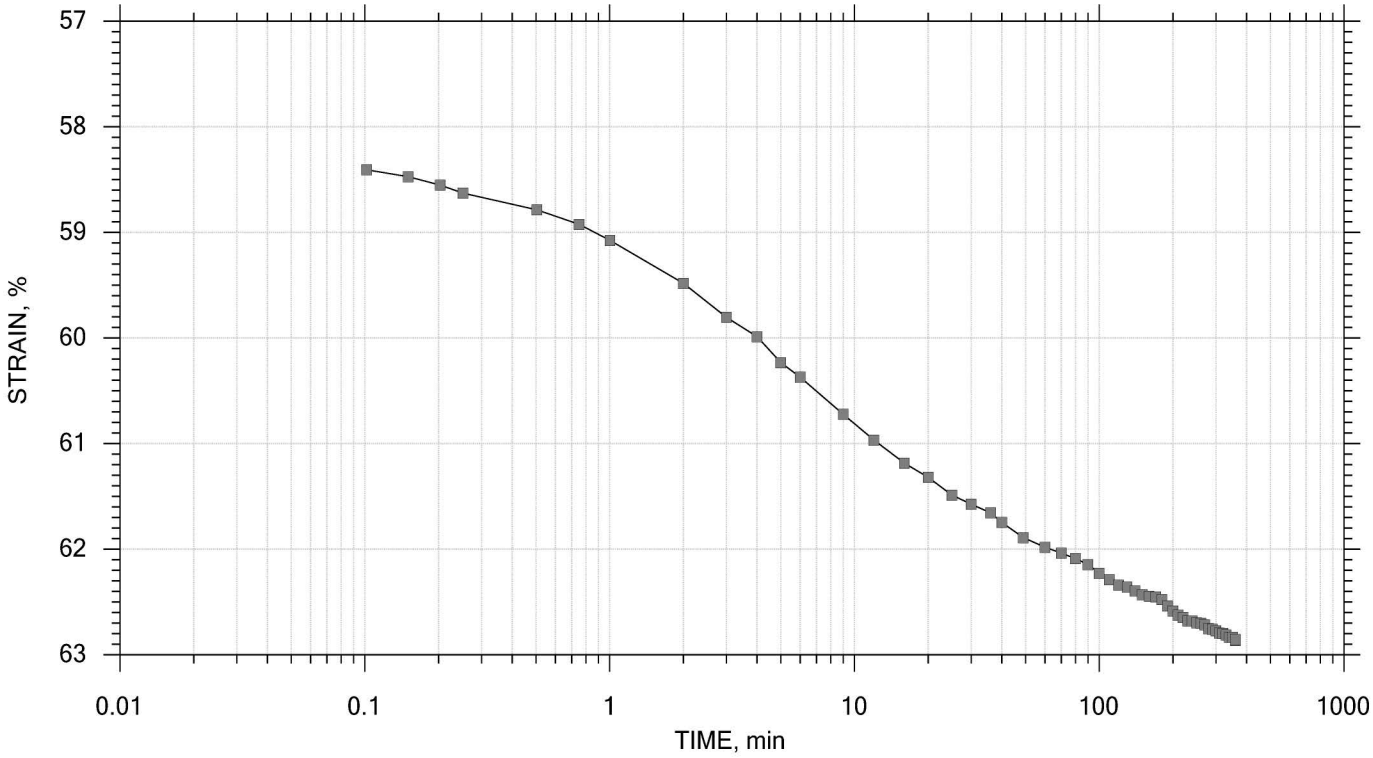
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

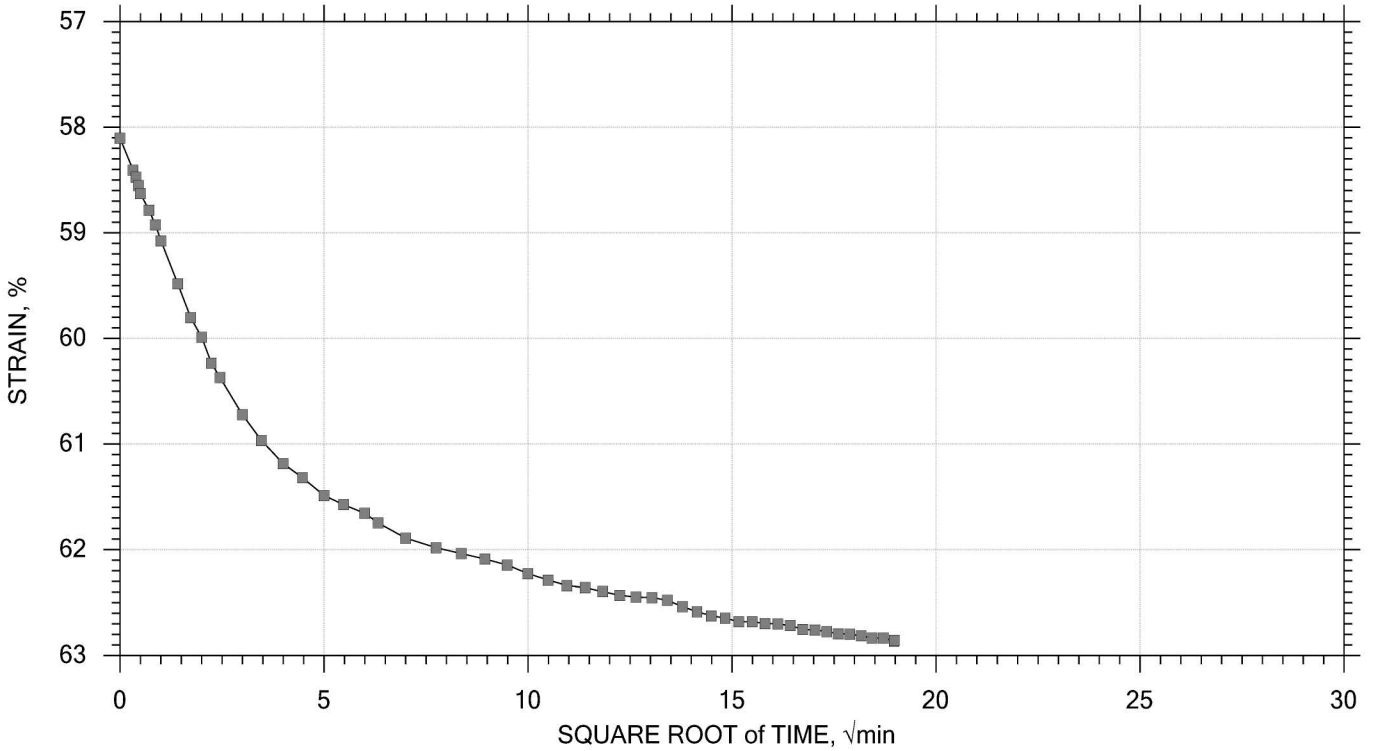
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 9 of 15

Stress: 16 tsf





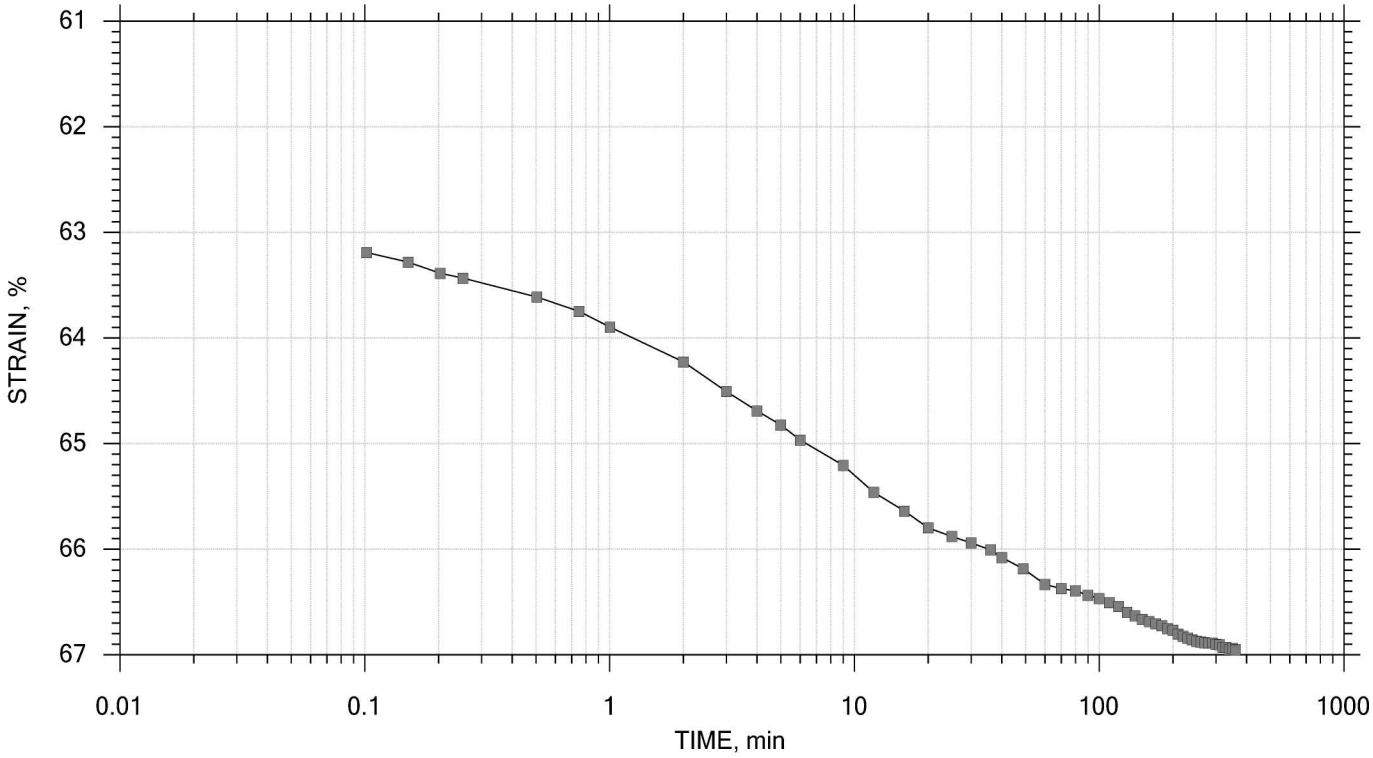
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

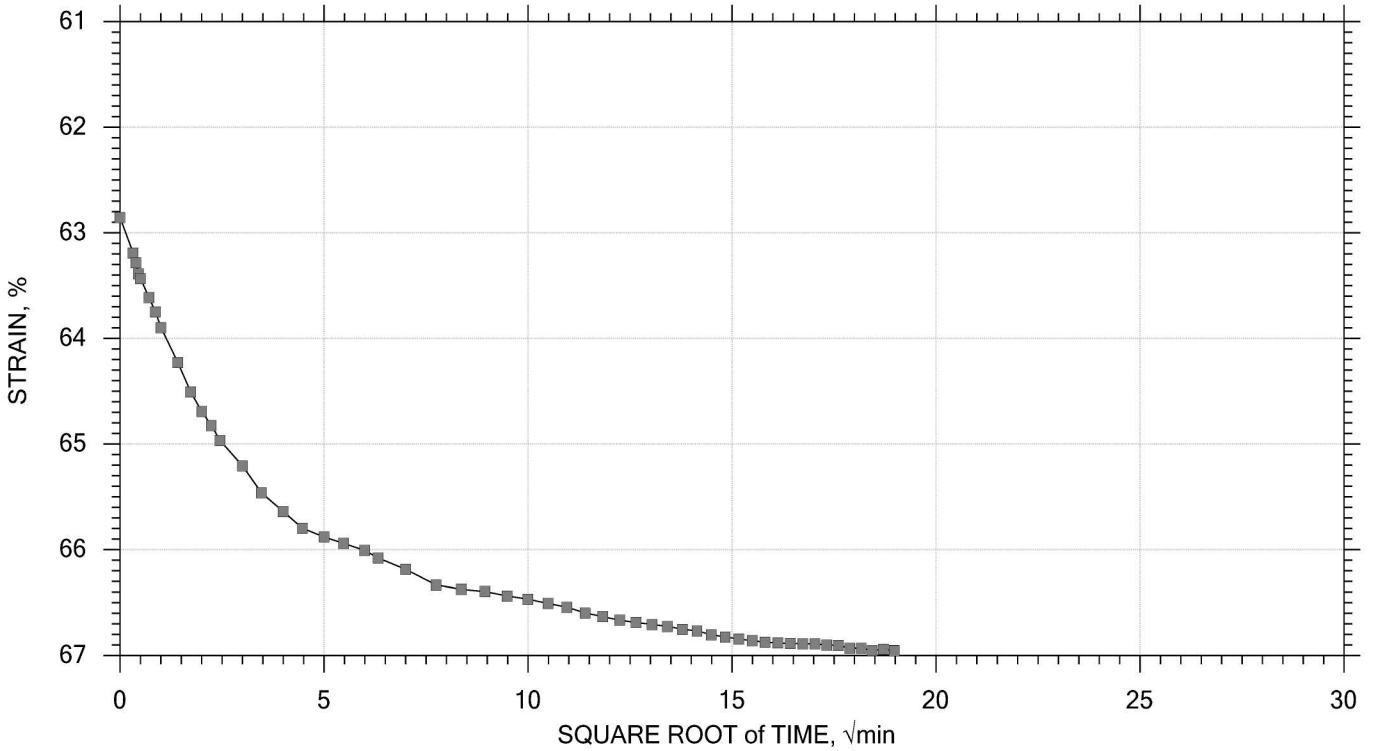
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 10 of 15

Stress: 32 tsf





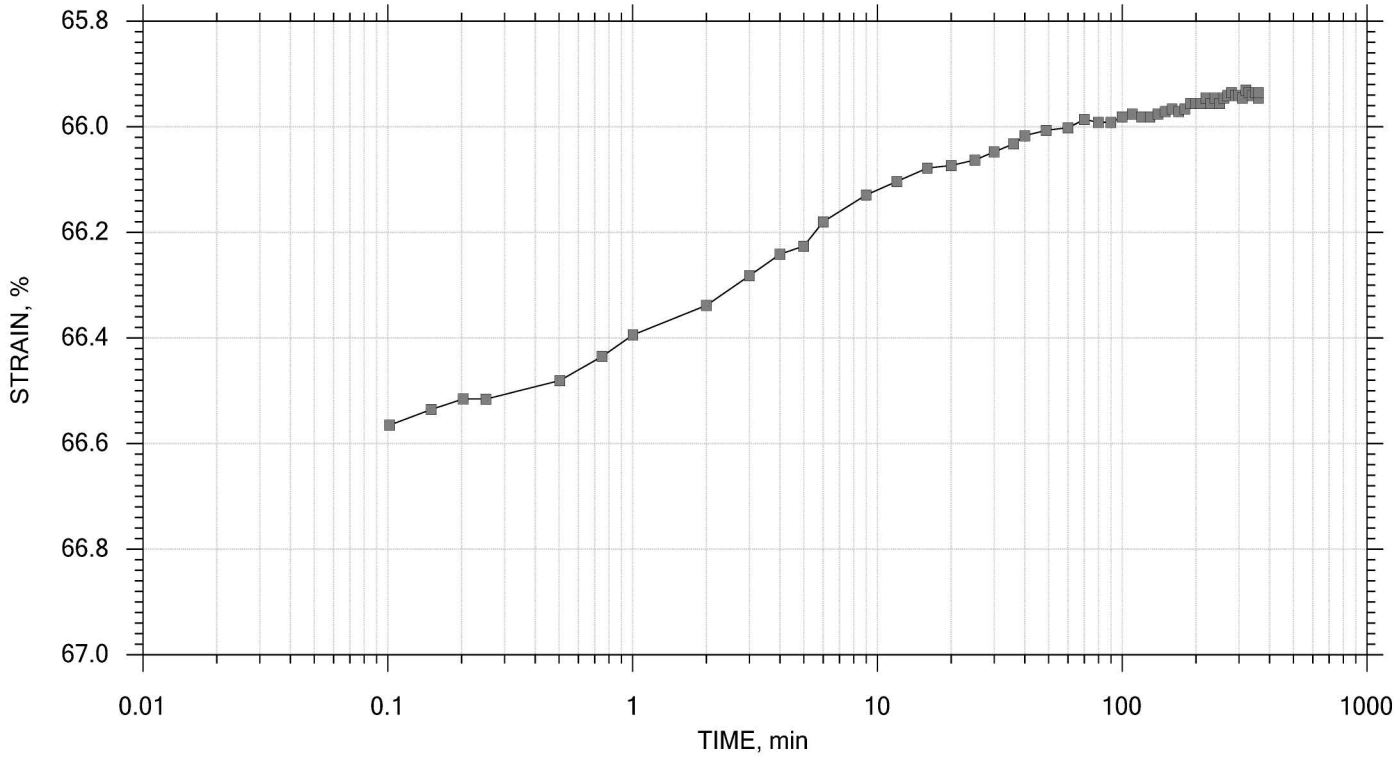
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

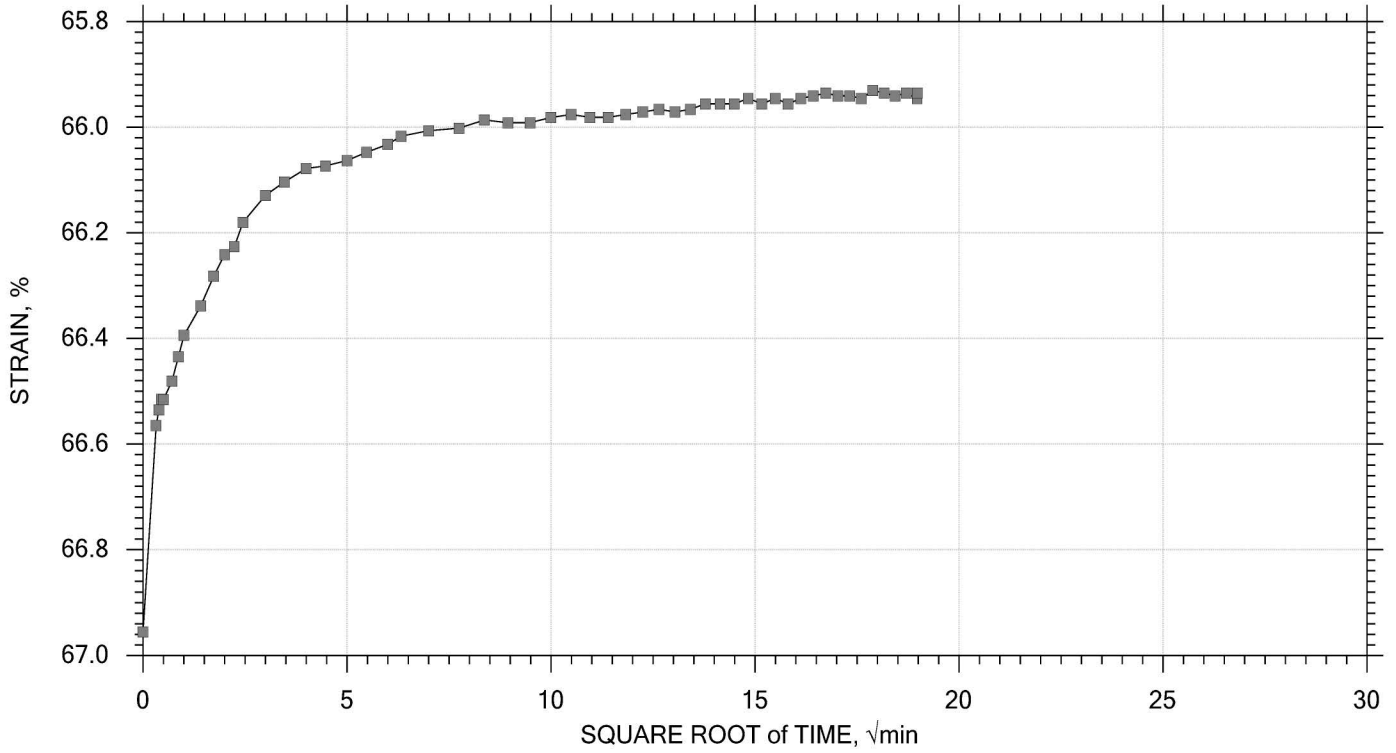
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 11 of 15

Stress: 8 tsf





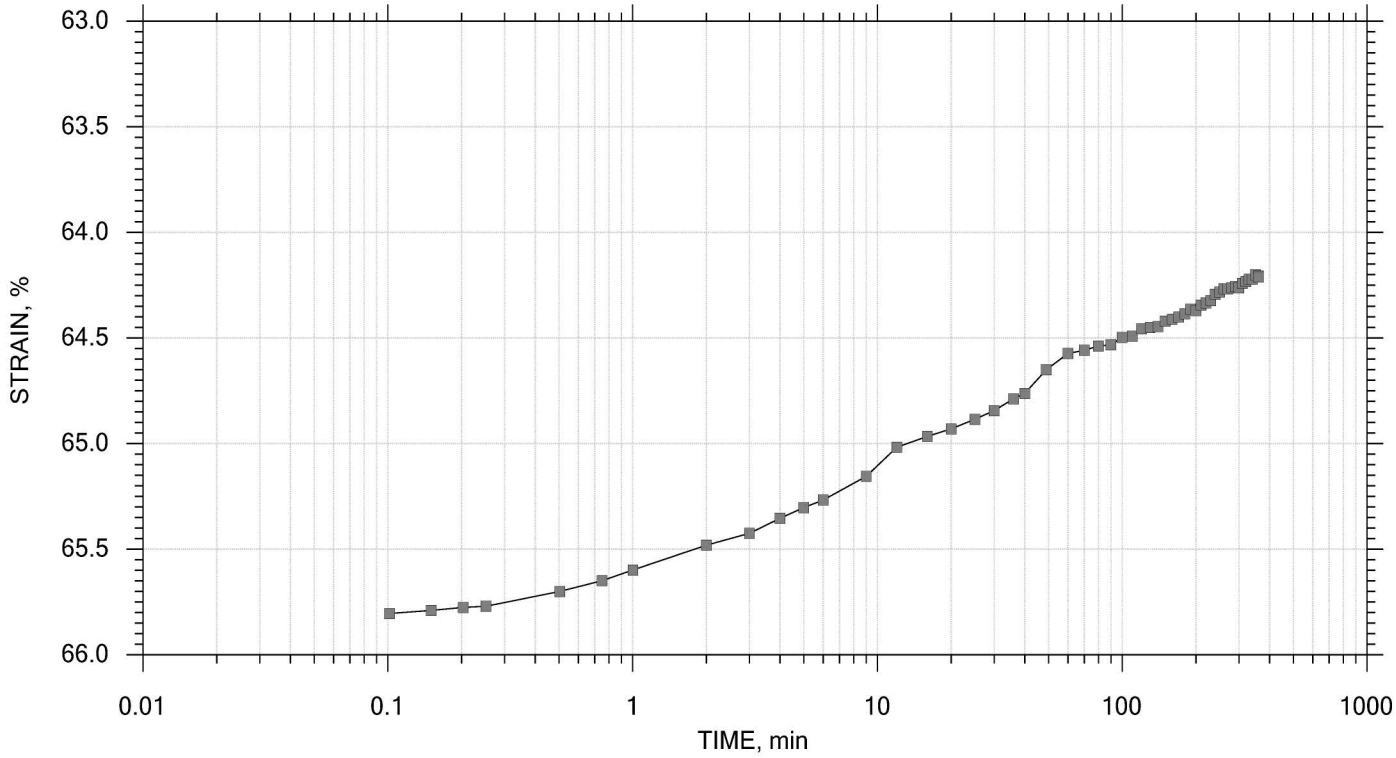
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

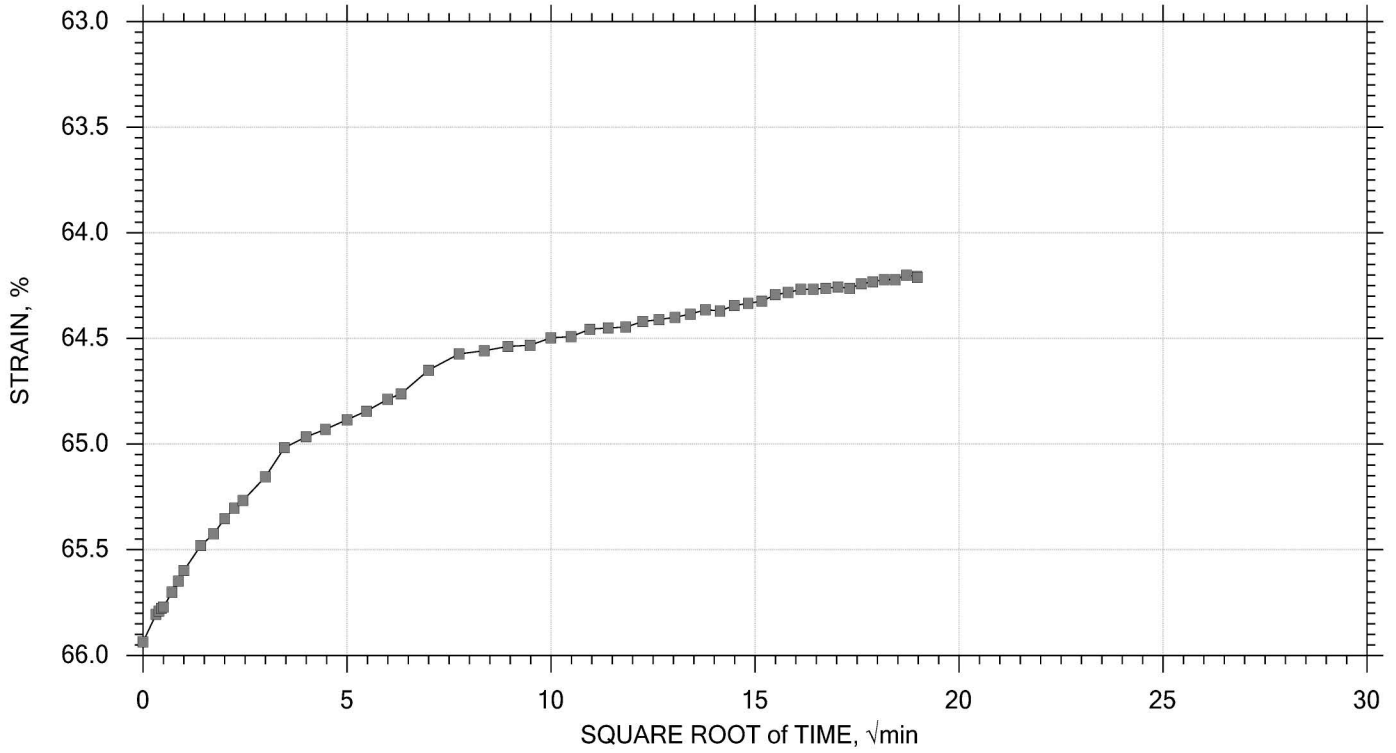
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 12 of 15

Stress: 2 tsf





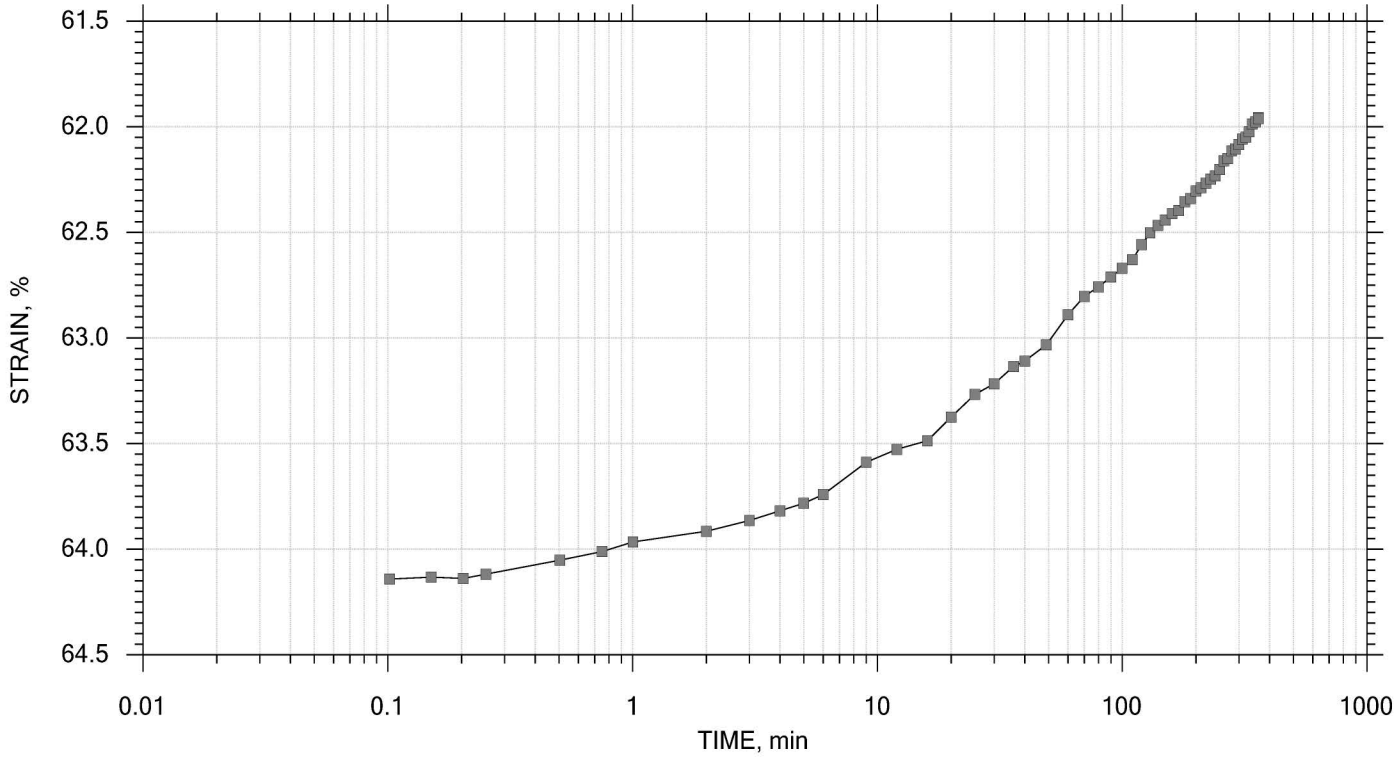
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

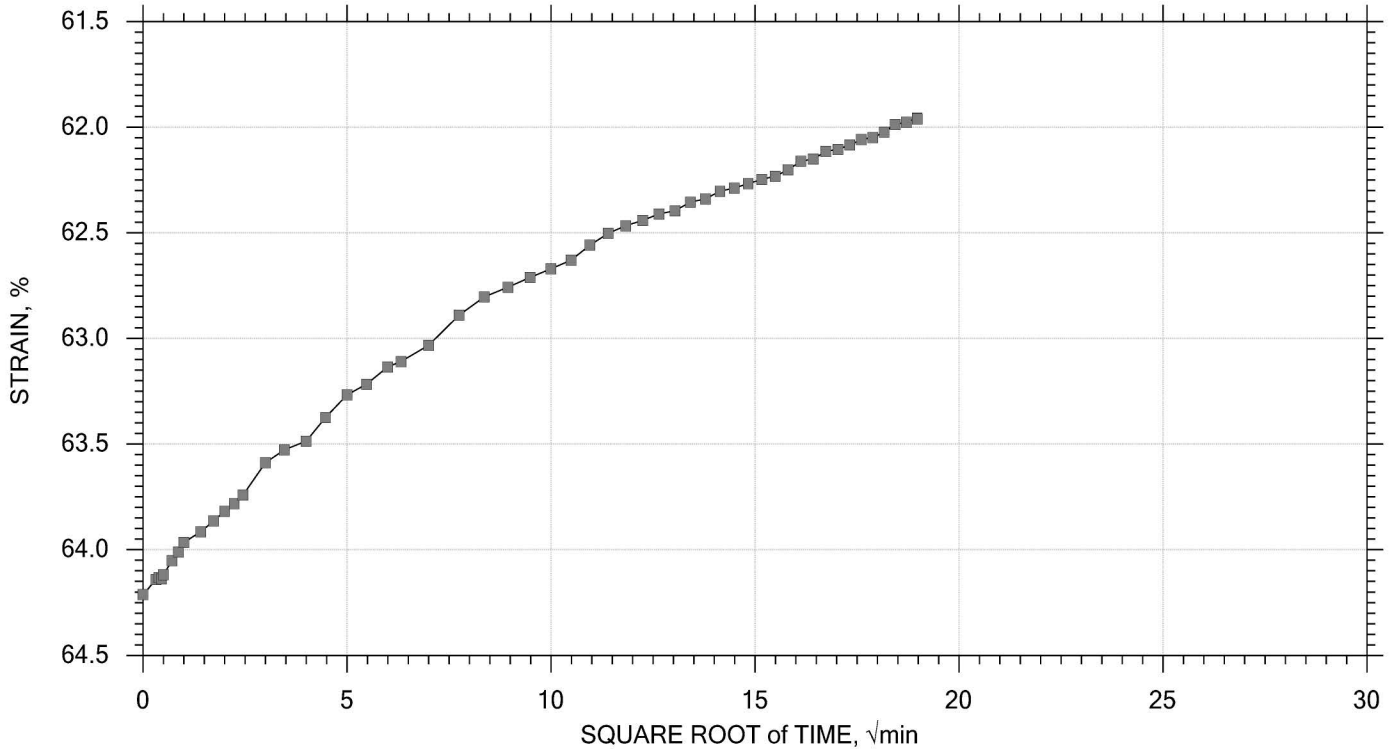
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 13 of 15

Stress: 0.5 tsf





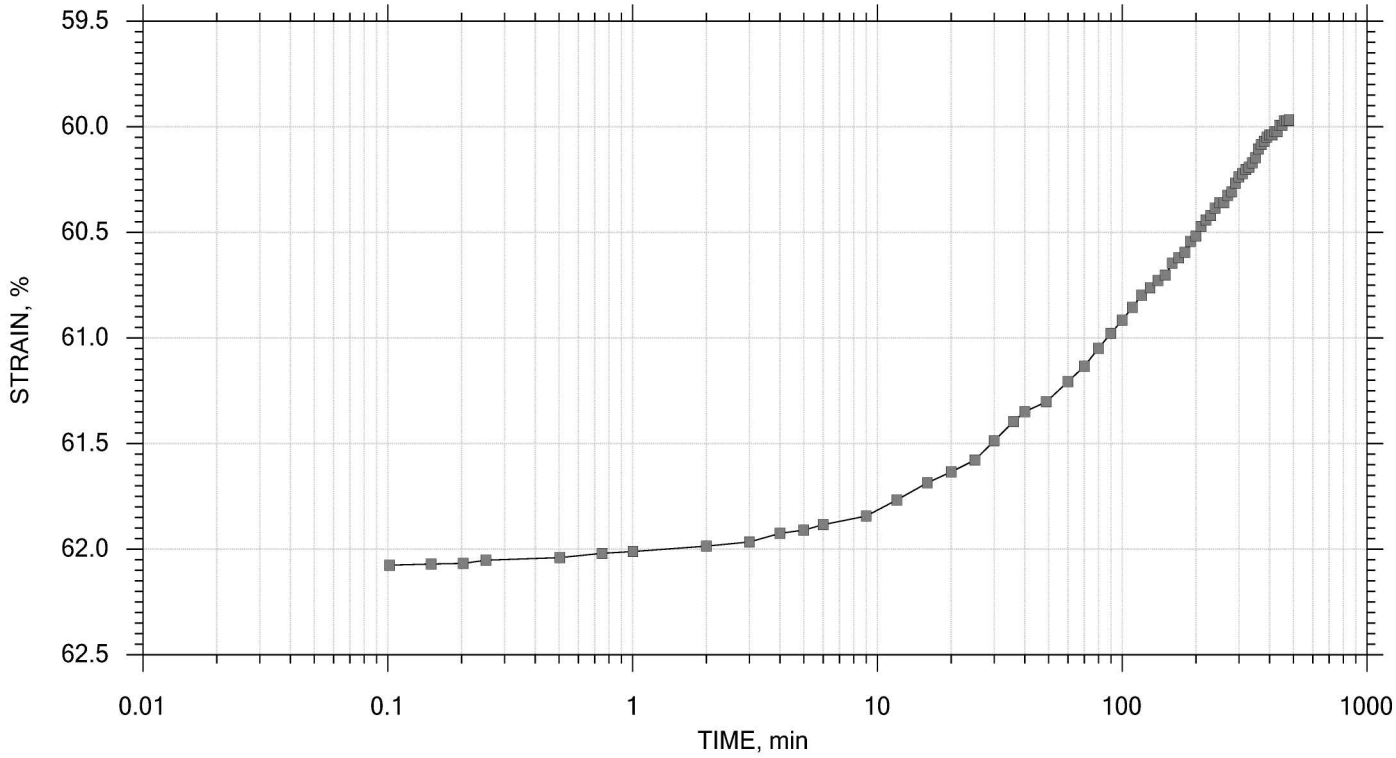
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

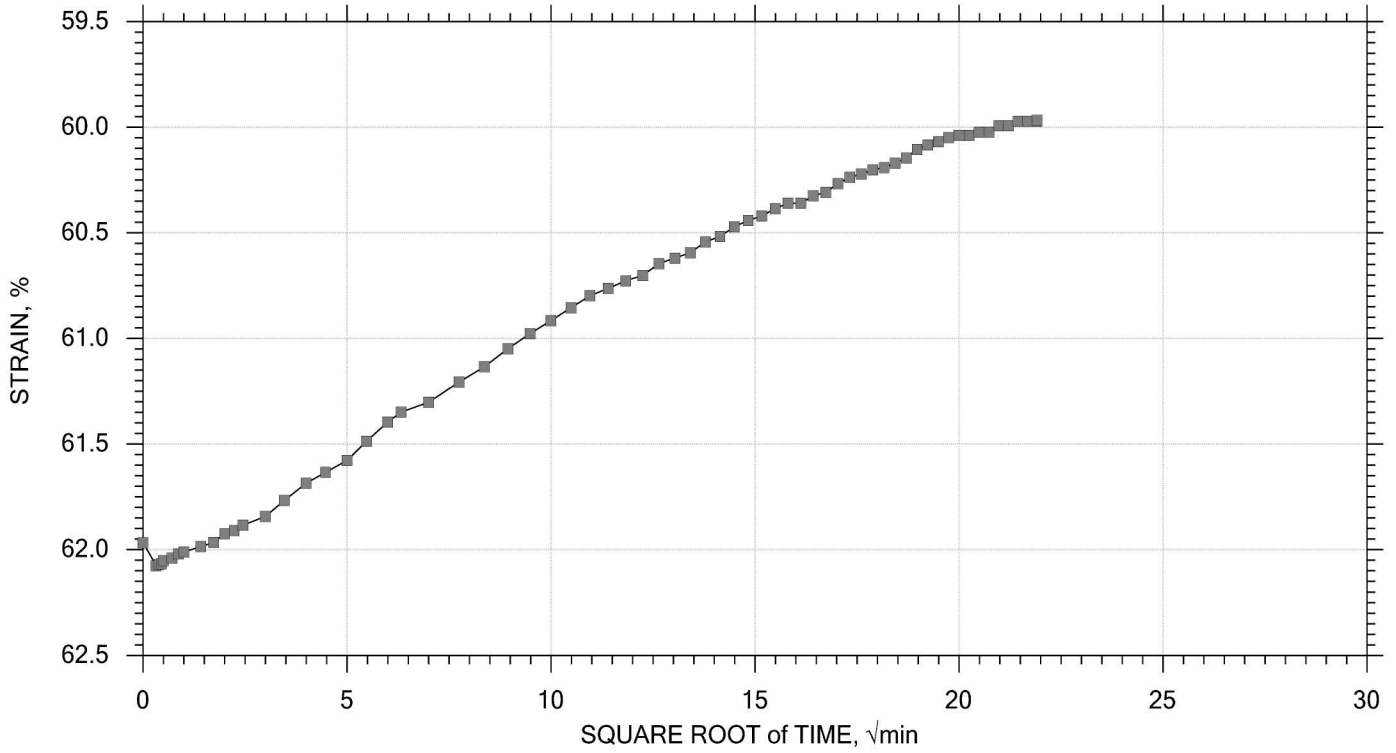
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 14 of 15

Stress: 0.125 tsf





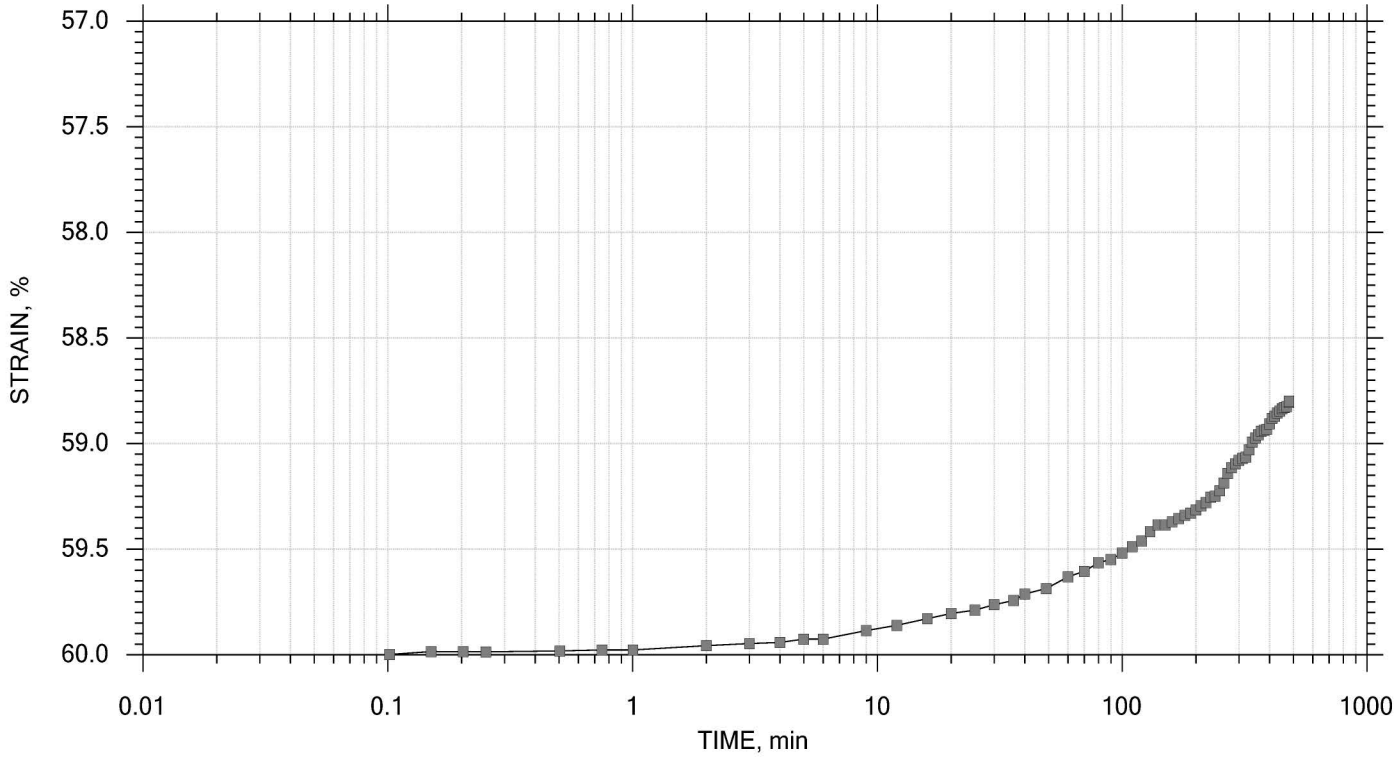
GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

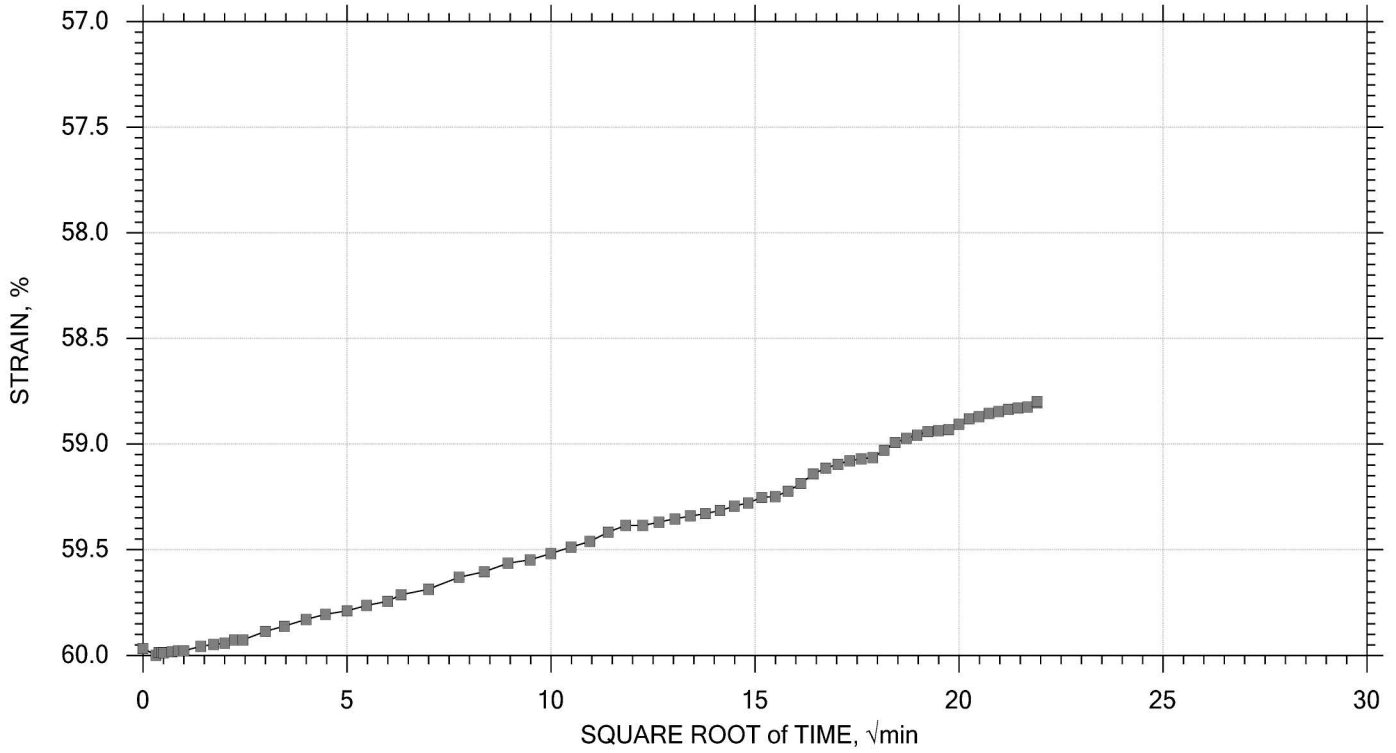
One-Dimensional Consolidation by ASTM D2435 - Method B

TIME CURVES

Constant Load Step 15 of 15

Stress: 0.0625 tsf





GeoTesting EXPRESS	Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-306296
	Boring No.: ---	Tested By: md	Checked By: njh
	Sample No.: RA-C002501	Test Date: 11/13/17	Test No.: IP-1
	Depth: 0.0-0.5 ft	Sample Type: intact	Elevation: ---
	Description: Wet, black silt		
	Remarks: System T, Swell Pressure = 0.0617 tsf		

Client:	Jacobs Engineering Group		
Project Name:	New Bedford Harbor		
Project Location:	New Bedford, MA		
GTX #:	307167		
Start Date:	11/20/2017	Tested By:	eec
End Date:	11/29/2017	Checked By:	emm
Boring #:	---		
Sample #:	ASB-36 -0.0-1.0		
Depth:	---		
Visual Description:	Moist, dark gray organic silt		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084

Constant Volume

Sample Type: Remolded

Permeant Fluid: De-aired Distilled water

Orientation: Vertical

Cell #: ---

Sample Preparation: Target Compaction: 44.5 pcf at the as-recieved moisture content (99.8%). Values specified by client. Material >3/8-inch screened out of sample prior to testing (0%).Trimmings moisture content =101.3 %

Measured Specific Gravity: 2.54

Parameter	Initial	Final
Height, in	1.90	1.40
Diameter, in	2.83	2.60
Area, in^2	6.29	5.31
Volume, in^3	12.0	7.4
Mass, g	285.1	210.2
Bulk Density, pcf	90.7	107.5
Moisture Content, %	95.5	44.1
Dry Density, pcf	46.4	74.6
Degree of Saturation, %	100	100

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90.02	Increased Cell Pressure, psi:	95.23	Cell Pressure Increment, psi:	5.21
Sample Pressure, psi:	84.35	Corresponding Sample Pressure, psi:	89.24	Sample Pressure Increment, psi:	4.89
				B Coefficient:	0.94

FLOW DATA

Date	Trial #	Pressure, psi Cell	Pressure, psi Sample	Manometer Readings Z_1	Manometer Readings Z_2	Manometer Readings Z_1-Z_2	Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
11/28	1	90.0	84.4	14.0	13.7	0.3	39	49.6	1.4E-07	19.7	1.008	1.4E-07
11/28	2	90.0	84.4	14.0	13.7	0.3	41	49.6	1.4E-07	19.7	1.008	1.4E-07
11/28	3	90.0	84.4	14.0	13.7	0.3	40	49.6	1.4E-07	19.7	1.008	1.4E-07
11/28	4	90.0	84.4	14.0	13.7	0.3	41	49.6	1.4E-07	19.7	1.008	1.4E-07

PERMEABILITY AT 20° C: 1.4 x 10^{-7} cm/sec (@ 5 psi effective stress)

Client:	Jacobs Engineering Group		
Project Name:	New Bedford Harbor		
Project Location:	New Bedford, MA		
GTX #:	307167		
Start Date:	11/20/2017	Tested By:	eec
End Date:	11/29/2017	Checked By:	emm
Boring #:	---		
Sample #:	ABS-36-1.0-2.0		
Depth:	---		
Visual Description:	Moist, dark gray organic silt with sand		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084

Constant Volume

Sample Type: Remolded

Permeant Fluid: De-aired Distilled water

Orientation: Vertical

Cell #: ---

Sample Preparation: Target Compaction: 48.4 pcf at the as-recieved moisture content (87.8%). Values specified by client. Material >3/8-inch screened out of sample prior to testing (0%).Trimmings moisture content =101.3 %

Measured Specific Gravity: 2.54

Parameter	Initial	Final
Height, in	1.79	1.69
Diameter, in	2.85	2.85
Area, in^2	6.38	6.38
Volume, in^3	11.4	10.8
Mass, g	272.1	259.9
Bulk Density, pcf	90.6	91.6
Moisture Content, %	90.6	82.0
Dry Density, pcf	47.5	50.3
Degree of Saturation, %	99	97

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	90.66	Increased Cell Pressure, psi:	95.43	Cell Pressure Increment, psi:	4.77
Sample Pressure, psi:	84.58	Corresponding Sample Pressure, psi:	89.23	Sample Pressure Increment, psi:	4.65
				B Coefficient:	0.97

FLOW DATA

Date	Trial #	Pressure, psi Cell	Pressure, psi Sample	Manometer Readings Z_1	Manometer Readings Z_2	Manometer Readings Z_1-Z_2	Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
11/28	1	90.7	84.6	11.5	11.0	0.5	37	33.8	3.1E-07	19.7	1.008	3.2E-07
11/28	2	90.7	84.6	11.5	11.0	0.5	35	33.8	3.3E-07	19.7	1.008	3.3E-07
11/28	3	90.7	84.6	11.5	11.0	0.5	37	33.8	3.1E-07	19.7	1.008	3.2E-07
11/28	4	90.7	84.6	11.5	11.0	0.5	37	33.8	3.1E-07	19.7	1.008	3.2E-07

PERMEABILITY AT 19.7° C: 3.2 x 10^{-7} cm/sec (@ 5 psi effective stress)

Client:	Jacobs Engineering Group		
Project Name:	New Bedford Harbor		
Project Location:	New Bedford, MA		
GTX #:	307167		
Start Date:	11/20/2017	Tested By:	eec
End Date:	11/29/2017	Checked By:	emm
Boring #:	---		
Sample #:	ASB-37 -0.0-1.0		
Depth:	---		
Visual Description:	Moist, dark gray sandy organic clay		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084

Constant Volume

Sample Type: Remolded

Permeant Fluid: De-aired Distilled water

Orientation: Vertical

Cell #: ---

Sample Preparation: Target Compaction: 48.8 pcf at the as-recieved moisture content (86.9%). Values specified by client. Material >3/8-inch screened out of sample prior to testing (0%).Trimmings moisture content =82.3 %

Measured Specific Gravity: 2.51

Parameter	Initial	Final
Height, in	2.00	1.80
Diameter, in	2.88	2.80
Area, in^2	6.51	6.16
Volume, in^3	13.0	11.1
Mass, g	297.7	275.4
Bulk Density, pcf	86.9	94.5
Moisture Content, %	82.6	68.9
Dry Density, pcf	47.6	55.9
Degree of Saturation, %	90	96

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	89.73	Increased Cell Pressure, psi:	95.02	Cell Pressure Increment, psi:	5.29
Sample Pressure, psi:	84.13	Corresponding Sample Pressure, psi:	89.19	Sample Pressure Increment, psi:	5.06
				B Coefficient:	0.96

FLOW DATA

Date	Trial #	Pressure, psi Cell	Pressure, psi Sample	Manometer Readings Z_1	Manometer Readings Z_2	Manometer Readings Z_1-Z_2	Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
11/29	1	89.7	84.1	13.0	10.0	3.0	34	35.8	2.2E-06	19.7	1.008	2.2E-06
11/29	2	89.7	84.1	13.0	10.0	3.0	32	35.8	2.4E-06	19.7	1.008	2.4E-06
11/29	3	89.7	84.1	13.0	10.0	3.0	36	35.8	2.1E-06	19.7	1.008	2.1E-06
11/29	4	89.7	84.1	13.0	10.0	3.0	35	35.8	2.2E-06	19.7	1.008	2.2E-06

PERMEABILITY AT 20° C: 6.2 x 10^{-6} cm/sec (@ 5 psi effective stress)

Client:	Jacobs Engineering Group		
Project Name:	New Bedford Harbor		
Project Location:	New Bedford, MA		
GTX #:	307167		
Start Date:	11/20/2017	Tested By:	eec
End Date:	11/29/2017	Checked By:	emm
Boring #:	---		
Sample #:	ASB-38 -0.0-1.0		
Depth:	---		
Visual Description:	Moist, dark gray organic clay with gravel		

Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter by ASTM D5084

Constant Volume

Sample Type: Remolded

Permeant Fluid: De-aired Distilled water

Orientation: Vertical

Cell #: ---

Sample Preparation: Target Compaction: 45.0 pcf at the as-recieved moisture content (95.9%). Values specified by client. Material >3/8-inch screened out of sample prior to testing (0%).Trimmings moisture content =95.9 %

Measured Specific Gravity: 2.51

Parameter	Initial	Final
Height, in	1.90	1.85
Diameter, in	2.80	2.80
Area, in^2	6.16	6.16
Volume, in^3	11.7	11.4
Mass, g	276.2	265.1
Bulk Density, pcf	89.8	88.5
Moisture Content, %	97.5	89.5
Dry Density, pcf	45.5	46.7
Degree of Saturation, %	100	95

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	91.05	Increased Cell Pressure, psi:	95.78	Cell Pressure Increment, psi:	4.73
Sample Pressure, psi:	86.28	Corresponding Sample Pressure, psi:	90.70	Sample Pressure Increment, psi:	4.42
				B Coefficient:	0.93

*B value did not increase with increase in pressure. Final degree of saturation >95%.

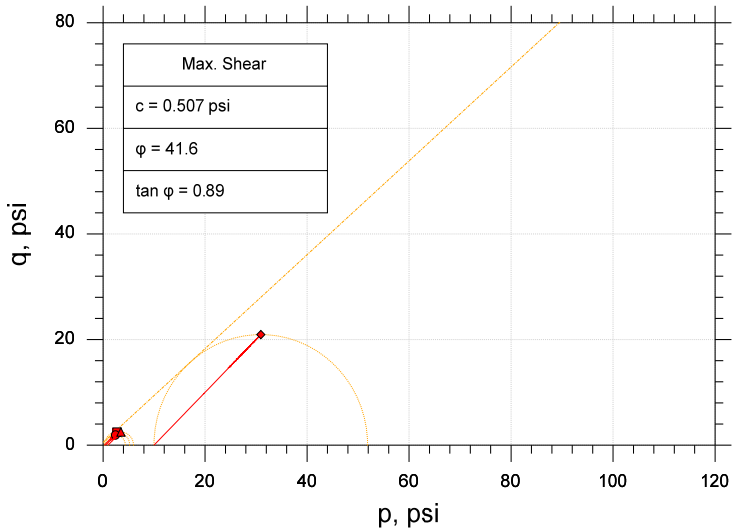
FLOW DATA

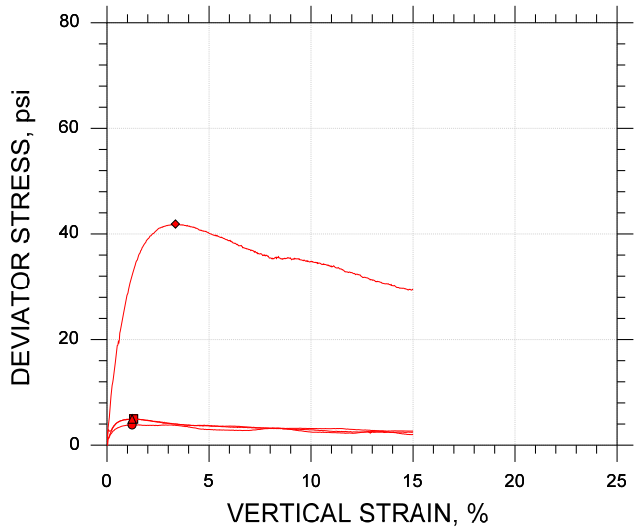
Date	Trial #	Pressure, psi Cell	Pressure, psi Sample	Manometer Readings Z_1	Manometer Readings Z_2	Manometer Readings Z_1-Z_2	Elapsed Time, sec	Gradient	Permeability K, cm/sec	Temp, °C	R_t	Permeability K @ 20 °C, cm/sec
11/28	1	91.1	86.3	11.2	11.1	0.1	42	30.0	6.3E-08	19.7	1.008	6.3E-08
11/28	2	91.1	86.3	11.2	11.1	0.1	40	30.0	6.6E-08	19.7	1.008	6.7E-08
11/28	3	91.1	86.3	11.2	11.1	0.1	44	30.0	6.0E-08	19.7	1.008	6.1E-08
11/28	4	91.1	86.3	11.2	11.1	0.1	41	30.0	6.5E-08	19.7	1.008	6.5E-08

PERMEABILITY AT 20° C: 6.4 x 10^{-8} cm/sec (@ 5 psi effective stress)

Client: Jacobs Engineering Group	
Project Name: New Bedford Harbor	
Project Location: New Bedford, MA	
Project Number: GTX-307167	
Tested By: md	Checked By: njh
Boring ID: ---	
Preparation: reconstituted	
Description: Wet, gray sand with gravel	
Classification: ---	
Group Symbol: ---	
Liquid Limit: ---	Plastic Limit: ---
Plasticity Index: ---	Estimated Specific Gravity: 2.65

CONSOLIDATED DRAINED TRIAXIAL TEST by ASTM D7181

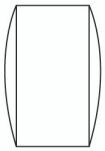
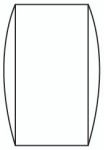
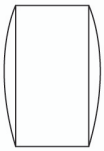
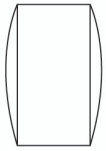




Symbol	■	●	▲	◆
Sample ID	ASB-38 -15-16	ASB-38 -15-16	ASB-38 -15-16	ASB-38 -15-16
Depth, ft	---	---	---	---
Test Number	CD-2-1	CD-2-2	CD-2-3	CD-2-4
Initial: Height, in	4.000	4.000	4.000	4.000
Initial: Diameter, in	2.000	2.000	2.000	2.000
Initial: Moisture Content (from Cuttings), %	11.1	11.5	15.3	13.4
Initial: Dry Density, pcf	110.	109.	106.	108.
Initial: Saturation (Wet Method), %	57.9	59.4	72.0	66.1
Initial: Void Ratio	0.506	0.512	0.564	0.538
Before Shear: Moisture Content, %	19.7	19.1	21.8	19.6
Before Shear: Dry Density, pcf	109.	110.	105.	109.
Before Shear: Cross-sectional Area (Method A), in²	3.165	3.133	3.167	3.107
Before Shear: Saturation, %	100.0	100.0	100.0	100.0
Before Shear: Void Ratio	0.522	0.505	0.579	0.518
Before Shear: Back Pressure, psi	82.50	111.5	122.0	150.8
Vertical Effective Consolidation Stress, psi	0.2549	0.5107	1.032	9.999
Horizontal Effective Consolidation Stress, psi	0.2475	0.5061	1.002	9.990
Vertical Strain after Consolidation, %	-0.003740	-0.003735	-0.005124	0.1264
Volumetric Strain after Consolidation, %	-0.1924	-0.06491	-0.5965	1.084
Time to 50% Consolidation, min	0.1600	0.1600	0.1600	16.00
Shear Strength, psi	2.477	1.924	2.482	20.94
Strain at Failure, %	1.30	1.23	1.23	3.35
Strain Rate, %/min	0.01000	0.01000	0.01000	0.01000
Deviator Stress at Failure, psi	4.954	3.849	4.963	41.88
Effective Minor Principal Stress at Failure, psi	0.2719	0.5061	1.022	9.998
Effective Major Principal Stress at Failure, psi	5.226	4.355	5.985	51.87
B-Value	0.97	0.97	0.95	0.95

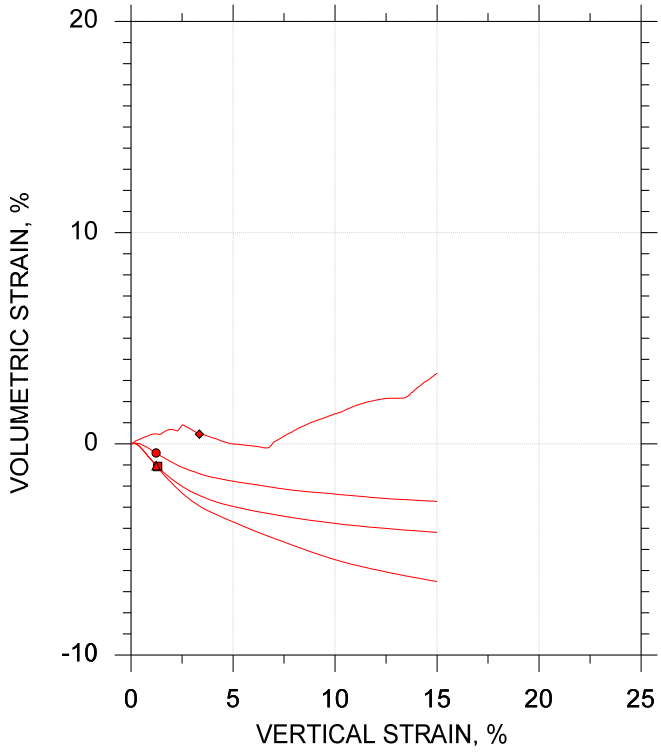
Notes:
- Before Shear Saturation set to 100% for phase calculation.
- Moisture Content determined by ASTM D2216.
- Deviator Stress includes membrane correction.
- Values for c and φ determined from best-fit straight line for the specific test conditions. Actual strength parameters may vary and should be determined by an engineer for site conditions.

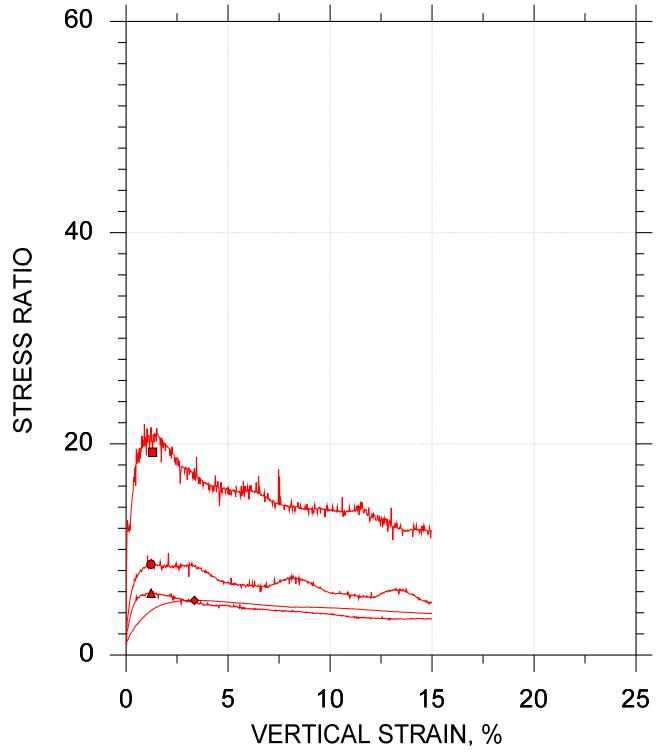
Remarks:

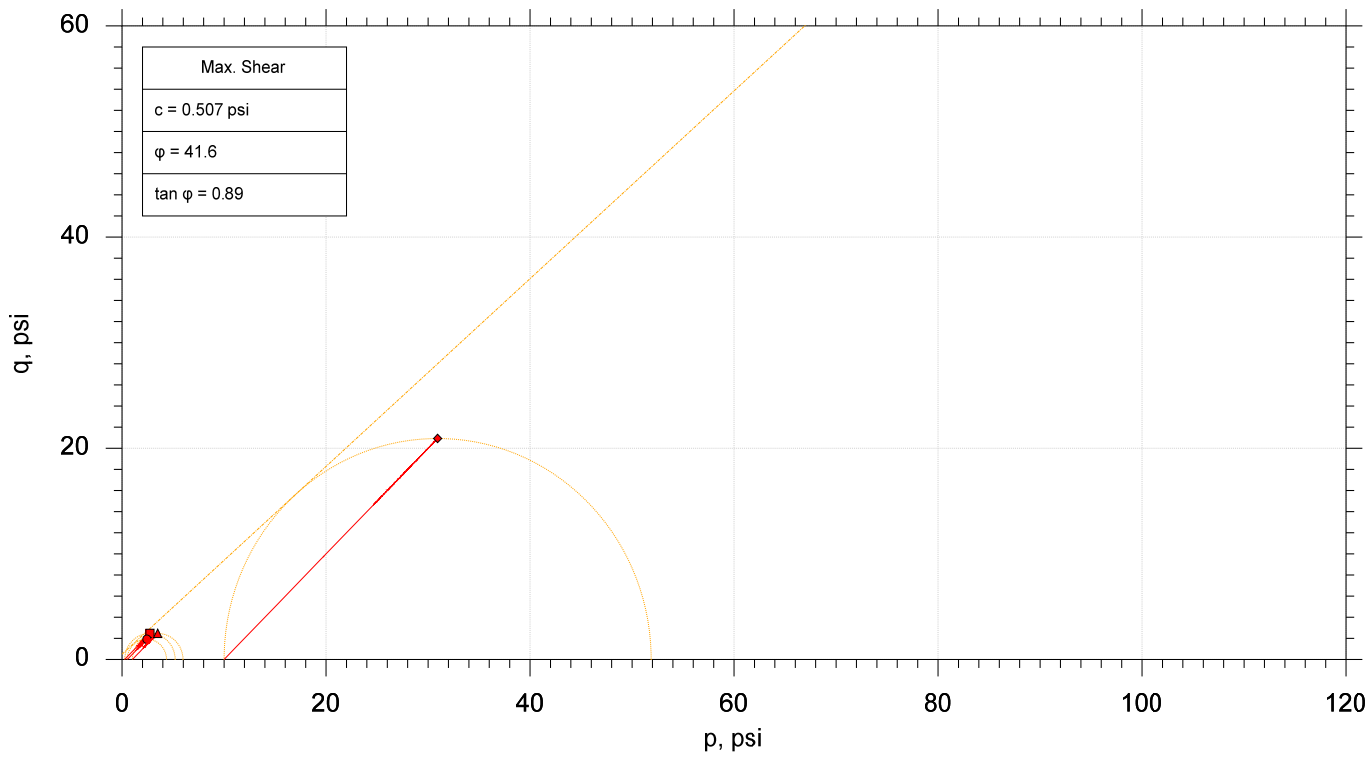





System S, Target Compaction: 122.04 pcf wet density (provided by client)

CONSOLIDATED DRAINED TRIAXIAL TEST
by ASTM D7181







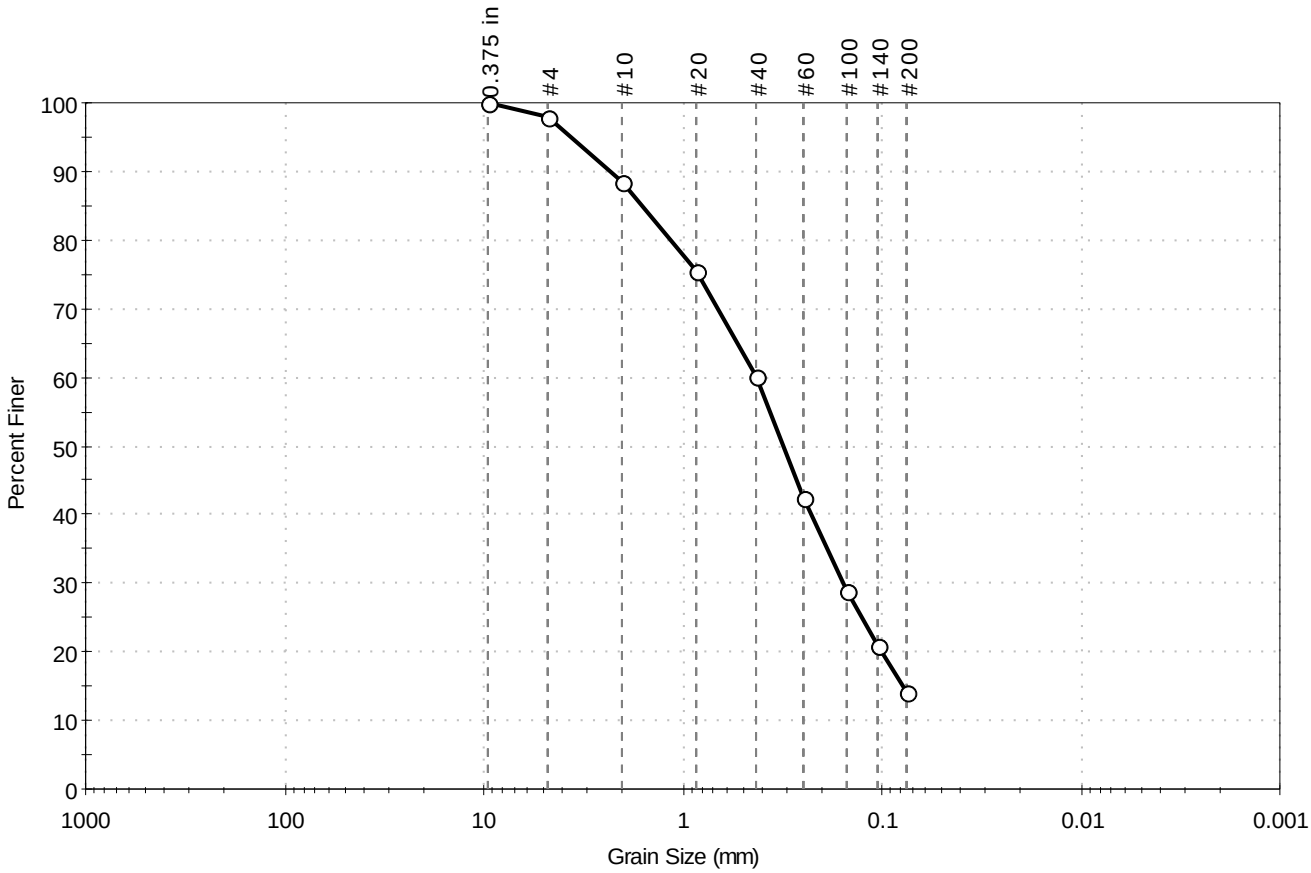
	Sample No.	Test No.	Depth	Tested By	Test Date	Checked By	Check Date	Test File
■	ASB-38 -15-16	CD-2-1	---	md	11/22/17	njh	12/6/17	307167-CD-2-1n.dat
●	ASB-38 -15-16	CD-2-2	---	md	11/22/17	njh	12/6/17	307167-CD-2-2n.dat
▲	ASB-38 -15-16	CD-2-3	---	md	11/22/17	njh	12/6/17	307167-CD-2-3n.dat
◆	ASB-38 -15-16	CD-2-4	---	md	11/27/17	njh	12/6/17	307167-CD-2-4n.dat

GeoTesting EXPRESS

Project: New Bedford Harbor	Location: New Bedford, MA	Project No.: GTX-307167
Boring No.: ---	Sample Type: reconstituted	
Description: Wet, gray sand with gravel		
Remarks: System S, Target Compaction: 122.04 pcf wet density (provided by client)		

Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V1-102417-2	Test Date:	11/30/17	Checked By:	emm
Depth :	---	Test Id:	433576		
Test Comment:	---				
Visual Description:	Moist, very dark gray silty sand				
Sample Comment:	Sample contains organics				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	2.2	83.7	14.1

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	88		
#20	0.85	76		
#40	0.42	60		
#60	0.25	42		
#100	0.15	29		
#140	0.11	21		
#200	0.075	14		

Coefficients

D_{85} = 1.5870 mm D_{30} = 0.1565 mm

D_{60} = 0.4214 mm D_{15} = 0.0785 mm

D_{50} = 0.3129 mm D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

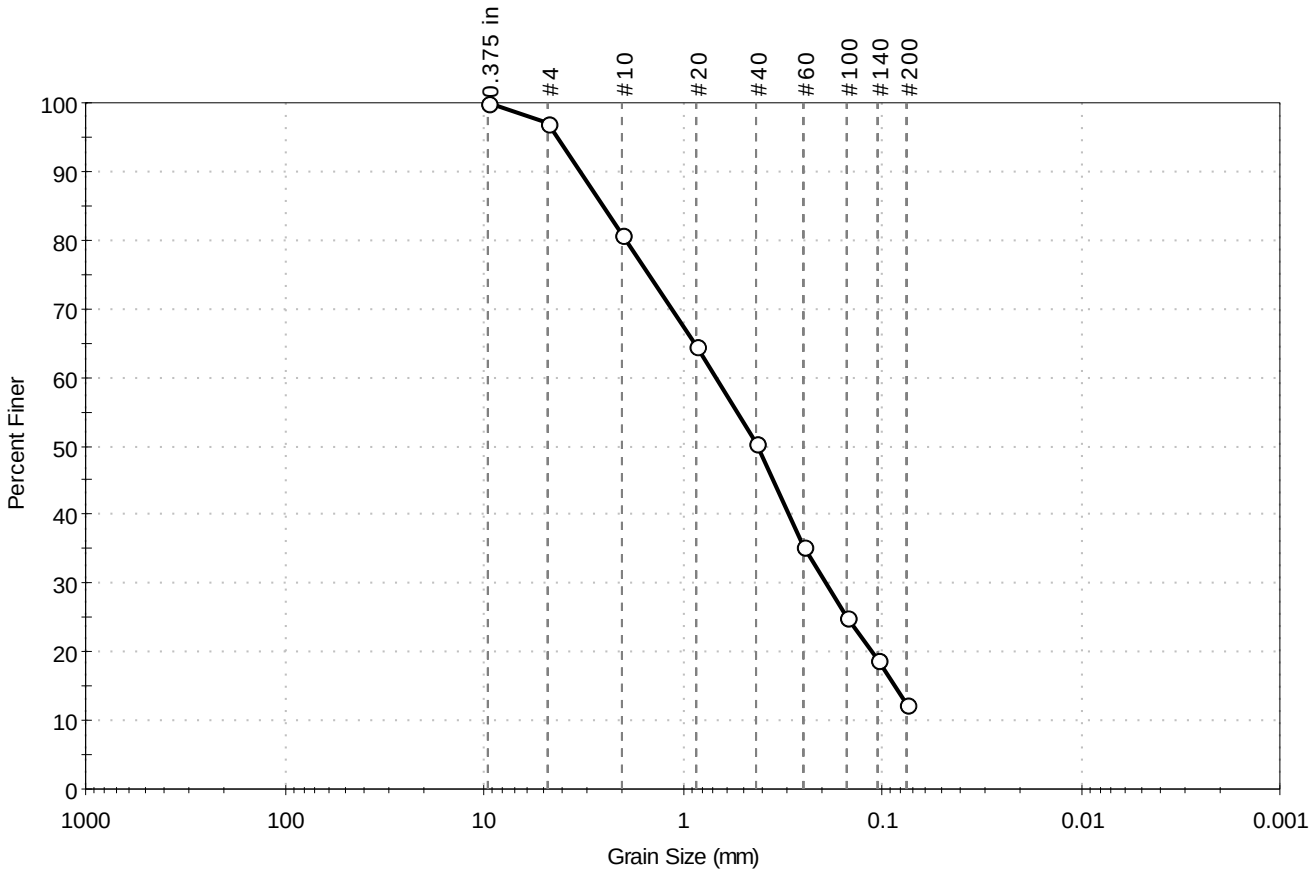
Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V1-103017-2	Test Date:	11/30/17	Checked By:	emm
Depth :	---	Test Id:	433577		
Test Comment:	---				
Visual Description:	Moist, dark gray silty sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	3.1	84.6	12.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	97		
#10	2.00	81		
#20	0.85	65		
#40	0.42	50		
#60	0.25	35		
#100	0.15	25		
#140	0.11	19		
#200	0.075	12		

Coefficients

D_{85} = 2.4986 mm D_{30} = 0.1919 mm
D_{60} = 0.6773 mm D_{15} = 0.0865 mm
D_{50} = 0.4184 mm D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR

Sand/Gravel Hardness : HARD

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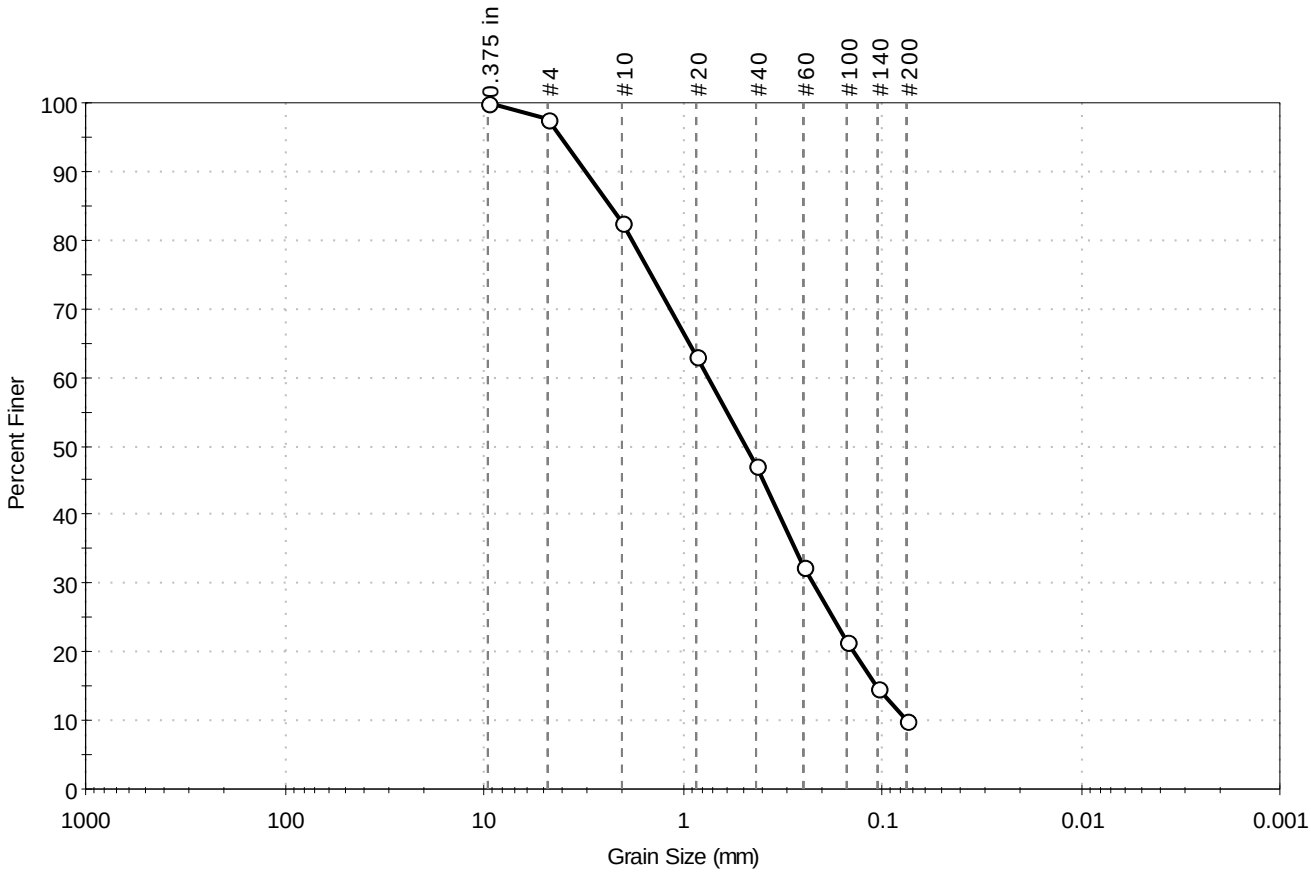
Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V1-110917-2	Test Date:	11/28/17	Checked By:	emm
Depth :	---	Test Id:	433578		
Test Comment:	---				
Visual Description:	Moist, dark gray sand with silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	2.2	87.8	10.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
0.375 in	9.50	100		
#4	4.75	98		
#10	2.00	83		
#20	0.85	63		
#40	0.42	47		
#60	0.25	33		
#100	0.15	21		
#140	0.11	15		
#200	0.075	10.0		

Coefficients

D_{85} = 2.2872 mm D_{30} = 0.2224 mm

D_{60} = 0.7451 mm D_{15} = 0.1066 mm

D_{50} = 0.4815 mm D_{10} = 0.0751 mm

C_u = 9.921 C_c = 0.884

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

Sample / Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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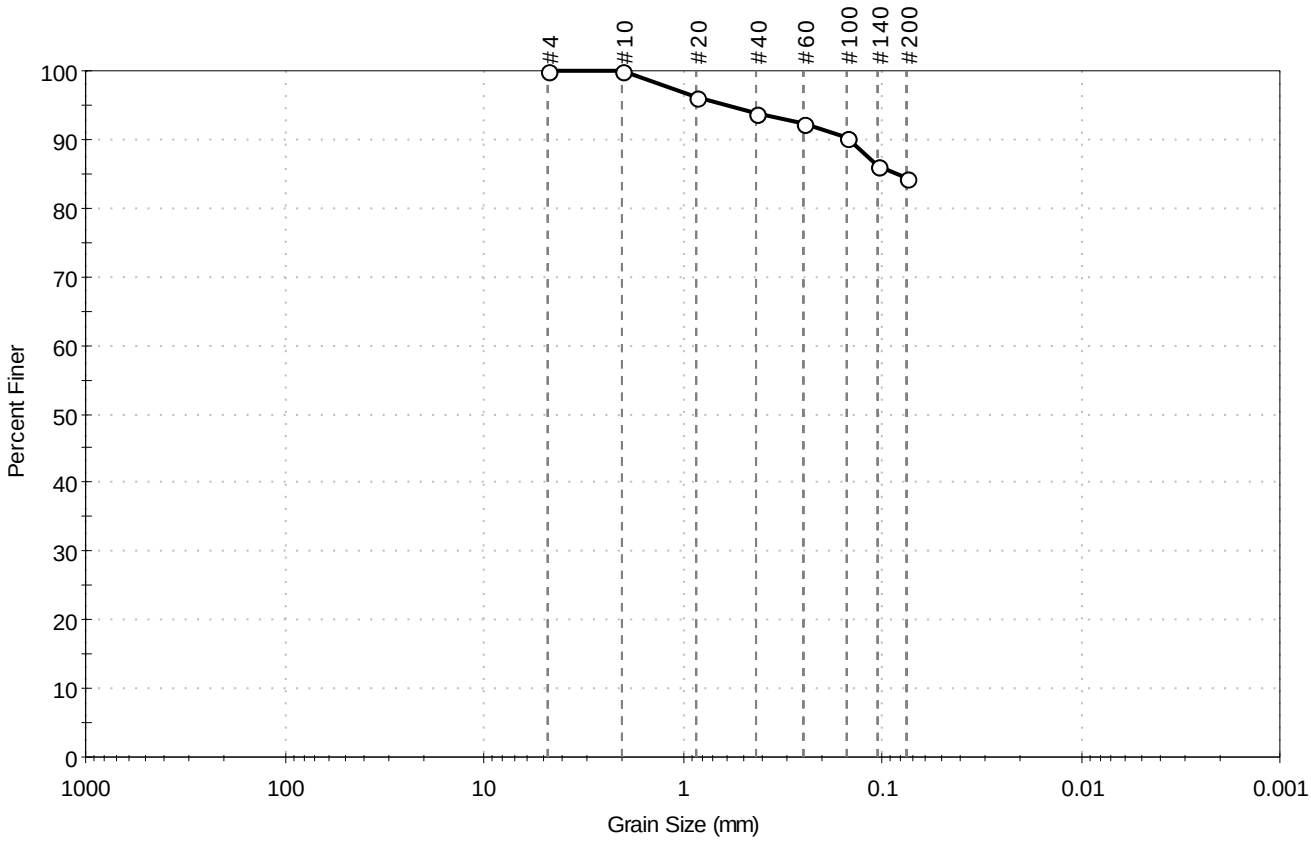
Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V2-20171024	Test Date:	11/30/17	Checked By:	emm
Depth :	---	Test Id:	433571		
Test Comment:	---				
Visual Description:	Moist, very dark gray silt with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	15.6	84.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	96		
#40	0.42	94		
#60	0.25	92		
#100	0.15	90		
#140	0.11	86		
#200	0.075	84		

Coefficients

D_{85} = 0.0846 mm D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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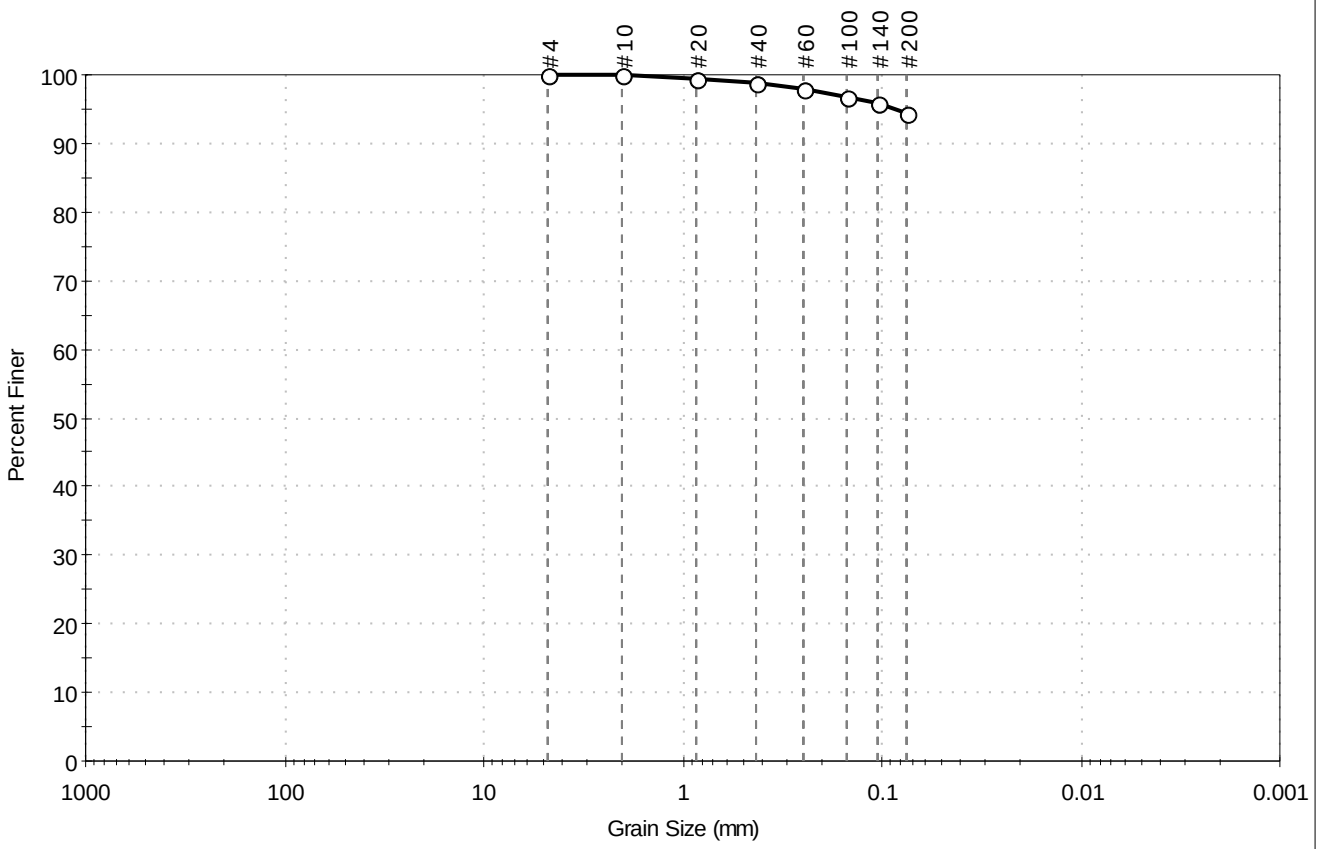
Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V2-20171027	Test Date:	11/28/17	Checked By:	emm
Depth :	---	Test Id:	433572		
Test Comment:	---				
Visual Description:	Moist, very dark gray silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	5.7	94.3

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	98		
#100	0.15	97		
#140	0.11	96		
#200	0.075	94		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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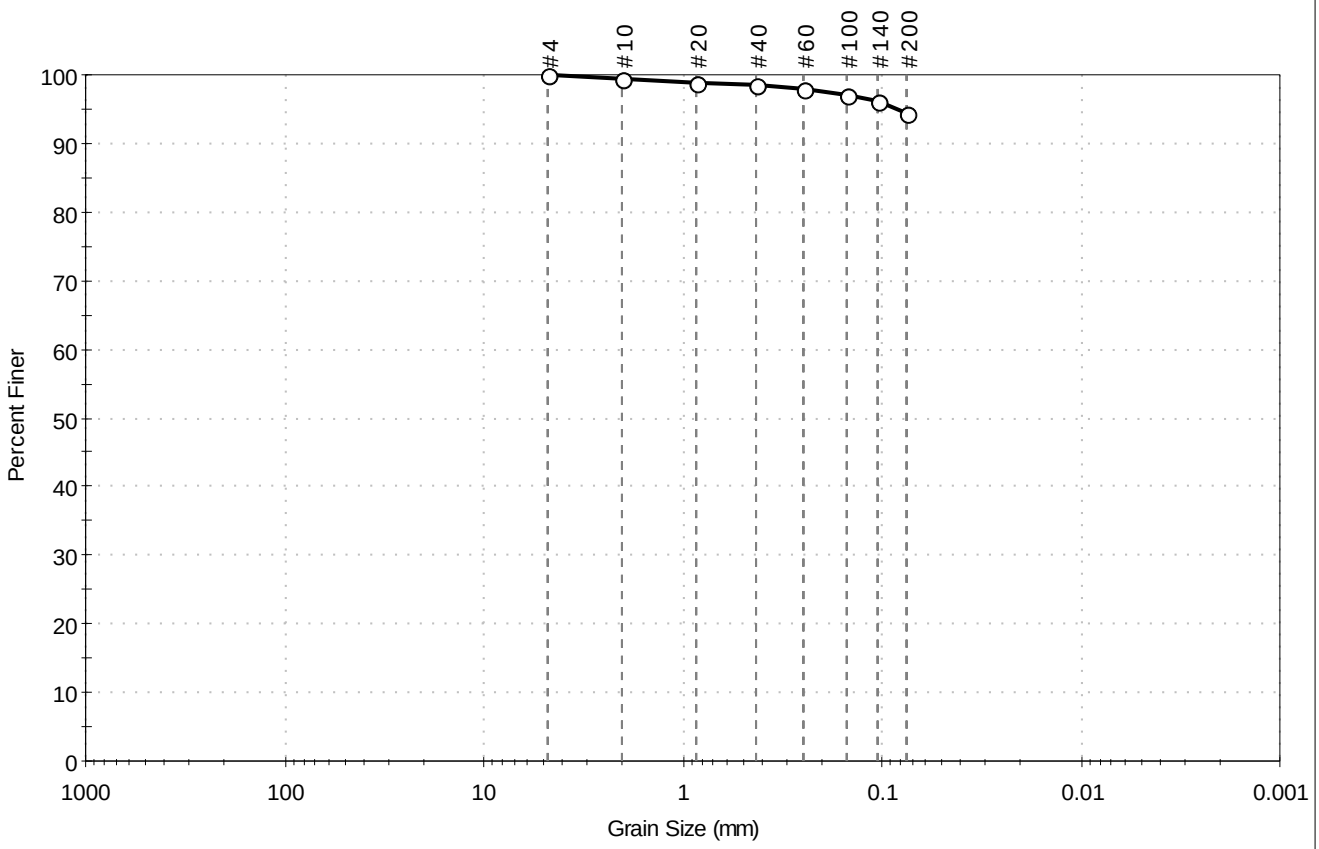
Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V2-20171102	Test Date:	11/30/17	Checked By:	emm
Depth :	---	Test Id:	433573		
Test Comment:	---				
Visual Description:	Moist, very dark gray silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	5.6	94.4

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	99		
#20	0.85	99		
#40	0.42	99		
#60	0.25	98		
#100	0.15	97		
#140	0.11	96		
#200	0.075	94		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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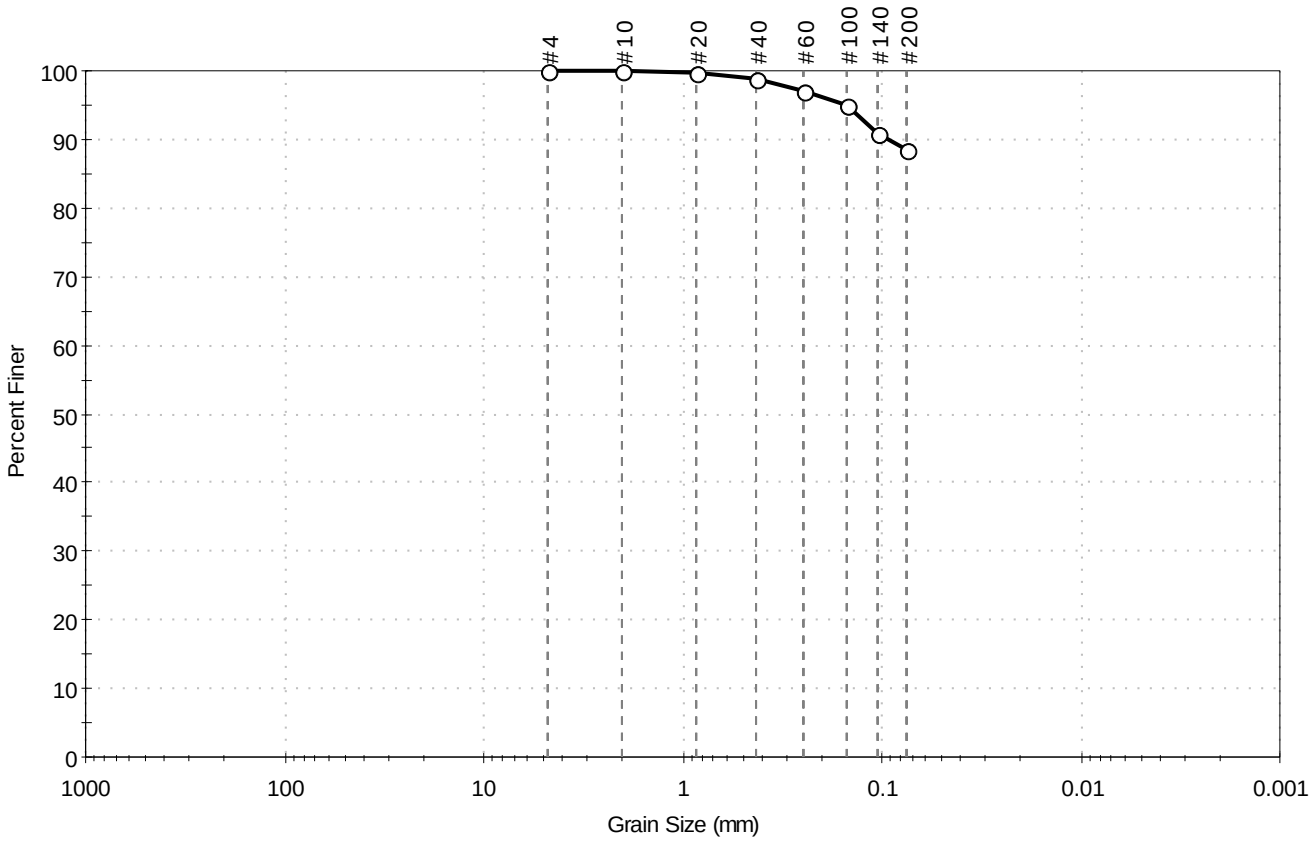
Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V2-20171107	Test Date:	11/30/17	Checked By:	emm
Depth :	---	Test Id:	433574		
Test Comment:	---				
Visual Description:	Moist, very dark gray silt				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	11.5	88.5

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	100		
#40	0.42	99		
#60	0.25	97		
#100	0.15	95		
#140	0.11	91		
#200	0.075	88		

Coefficients

D_{85} = N/A D_{30} = N/A

D_{60} = N/A D_{15} = N/A

D_{50} = N/A D_{10} = N/A

C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

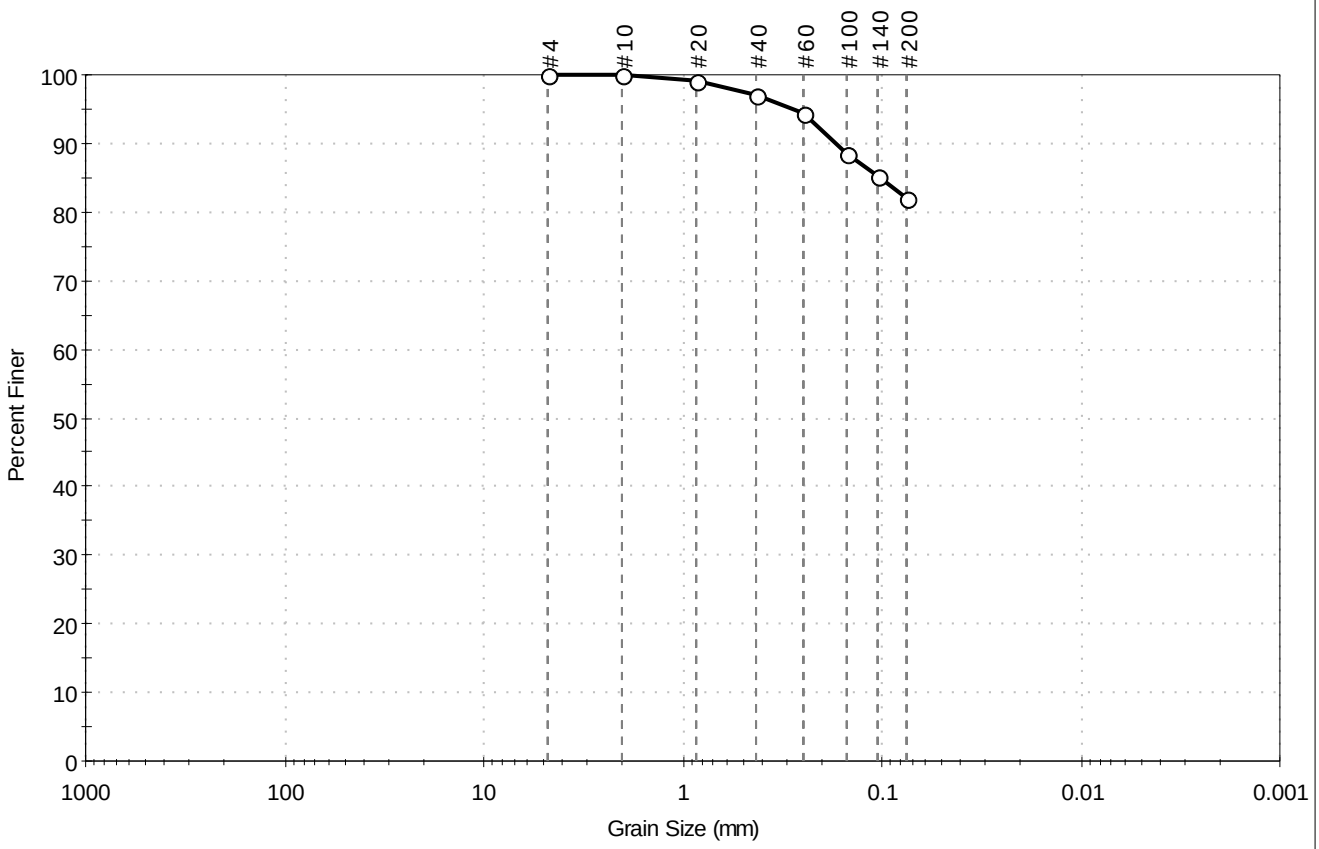
Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

printed 12/6/2017 6:58:43 PM

Client:	Jacobs Engineering Group				
Project:	New Bedford Harbor				
Location:	New Bedford, MA			Project No:	GTX-307334
Boring ID:	---	Sample Type:	bag	Tested By:	jbr
Sample ID:	V2-20171109	Test Date:	11/28/17	Checked By:	emm
Depth :	---	Test Id:	433575		
Test Comment:	---				
Visual Description:	Moist, very dark gray silt with sand				
Sample Comment:	---				

Particle Size Analysis - ASTM D422



% Cobble	% Gravel	% Sand	% Silt & Clay Size
---	0.0	18.0	82.0

Sieve Name	Sieve Size, mm	Percent Finer	Spec. Percent	Complies
#4	4.75	100		
#10	2.00	100		
#20	0.85	99		
#40	0.42	97		
#60	0.25	95		
#100	0.15	88		
#140	0.11	85		
#200	0.075	82		

Coefficients

D_{85} = 0.1030 mm D_{30} = N/A
D_{60} = N/A D_{15} = N/A
D_{50} = N/A D_{10} = N/A
C_u = N/A C_c = N/A

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

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Appendix H

Consolidation Calculations

Cut/Fill Report

Generated: 2018-02-13 10:59:22

By user: taylorsa

Drawing: C:\Users\taylorsa\Desktop\C:\Users\taylorsa\Desktop\Dredge Area INO AVX CAP DESIGN.dwg

Volume Summary

Name	Type	Cut Factor	Fill Factor	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
PD to minus 6	full	1.000	1.000	130137.59	1905.13	4150.16	2245.02<Fill>

Totals

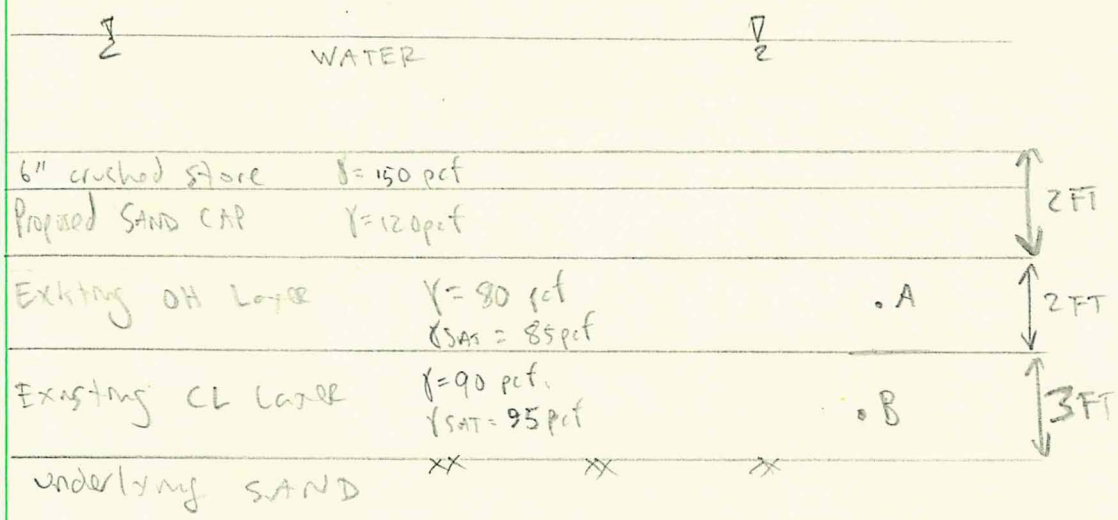
	2d Area (Sq. Ft.)	Cut (Cu. Yd.)	Fill (Cu. Yd.)	Net (Cu. Yd.)
Total	130137.59	1905.13	4150.16	2245.02<Fill>

* Value adjusted by cut or fill factor other than 1.0

Aerovox Settlement Calculations

Worst Case w/ updating 6" crushed stone layer

FBD:



Design Criteria:

1) consolidation settlement for cohesive layers (primary)

2) Time rate consolidation

Calculations:

1) ultimate settlement OH Layer

AT point A

$\sigma'_{vo} = 1FT\,(85\,pcf - 62.4\,pcf) = 22.6\,psf$

$\sigma'_{vf} = \sigma'_{vo} + \sigma'_{CAP} = 22.6\,pcf + .5(150\,pcf - 62.4) + 1.5(120\,pcf - 62.4)$

$= 152.8\,psf$

$H_o = 2FT$ (assume single drainage from underlying clay)

$C_c = 2$ (refer to Landva paper for C_c vs w relationship)

Settlement (NC deposit) $= \Delta H = \dfrac{H_o C_c}{1+e_o} \log\left(\dfrac{\sigma'_F}{\sigma_o}\right)$

$e_o = 4.98$ (from LAB Results)

$\Delta H = \dfrac{2FT\ 2}{1+4.98} \log \dfrac{152.8}{22.6} = \underline{0.6\ FT}$

1) ultimate settlement OH & CL combined

AT Point B

$\sigma_{vo} = 2FT(85-62.4) + 1.5FT(95-62.4)$
$= 94.1$ psf

$\sigma'_{vf} = \sigma'_{vo} + \sigma'_{cap} = 94.1 \text{ psf} + .5(150-62.4) + 1.5(120-62.4)$
$= 224.3$ psf

$H_o = 3FT$ (assume single drainage from OH layer)

$C_c = 1.2$ (assume 60 percent soil properties for OH layer)

settlement (NC) $= \Delta H = \frac{H_o C_c}{1+e_o} \log \frac{\sigma'_{vf}}{\sigma'_{vo}}$

$e_o = 3.0$

$\Delta H = \frac{3 + 1.2}{1+3} \log \frac{224.3}{94.1} = \underline{.4 \text{ FT}}$

TOTAL settlement $\Delta H_{vIT} = \Delta H_{PTA} + \Delta H_{PTB}$

$\Delta H_{vIT} = 0.6FT + 0.4 FT = \boxed{1.0 \text{ FT}}$

2) Time RATE Consolidation (OH layer only)

95% consolidation

$T = \frac{c_v t}{D^2}$, From U vs T chart $U = 0.95$, $T = 1.163$

$C_v = 3.0 e^{-7} ft^2/sec$ (From Lab data)

$D = 2FT$ (assume single drainage from underlying clay)

$t = \frac{T D^2}{C_v} = \frac{1.163 (2FT)^2}{3e^{-7} ft^2/sec} = 180$ days

50% consolidation

$T = 0.197$

$t = \frac{0.197 (2FT)^2}{3e^{-7} ft^2/sec} = 30$ days

2) Time Rate Consolidation (OH & CL combined)

95% consolidation

$T = \frac{c_v t}{D^2}$, $D = \frac{5 \text{ ft}}{2}$ (assume double drainage for entire cohesive layer)

$t = \frac{1.163 (2.5)^2}{3 e^{-7} \text{ ft}^2/\text{sec}} = \underline{280 \text{ days}}$

Note: c_v is combined due to no c_v value for CL layer and therefore the time rate consolidation can be increased in the field.

National® Brand 42-381 50 SHEETS EYE-EASE® - 5 SQUARES 42-382 100 SHEETS EYE-EASE® - 5 SQUARES 42-389 200 SHEETS EYE-EASE® - 5 SQUARES

Legend

0 80

Horizontal Scale in Feet

0 1"

Vertical Scale in Feet

JACOBS®

Aerovox Temp Cap Design

New Bedford Harbor Superfund Site

Figure P-1

Appendix I

CapSim Model Screen Shots and Output

CapSim Pages

1-Chemical Input

Load materials- put in PCB 101, TCE, cis-1,2-DCE, VC

CapSim 3.6

Please provide the following chemical properties:

		Number	Chemical name	Molecular Weight	Temperature	Molecular diffusivity in water	Organic carbon partition coefficient	Dissolved organic carbon partition coefficient	Reference
					°C	cm²/s	log(L/kg)	log(L/kg)	
Edit	Delete	1	PCB 1242	266.5	20.0	4.2e-6	5.61	5.19	ATSDR
Edit	Delete	2	PCB80	291.99	20.0	5.39e-6	5.53	4.1	Mackay/SPARC/Hawker
Edit	Delete	3	PCB82	326.43	20.0	5.21e-6	5.3	3.9	Mackay/SPARC/Hawker
Edit	Delete	4	TCE	131.4	20.0	9.1e-6	1.9345	1.3766	ATSDR/GSI
Edit	Delete	5	CIS 1,2 DCE	96.94	20.0	1.13e-5	1.69	0.76	

Add chemicals

OK

2- Kinetic Reaction Properties

CapSim 3.6

Please input the kinetic processes in the system:

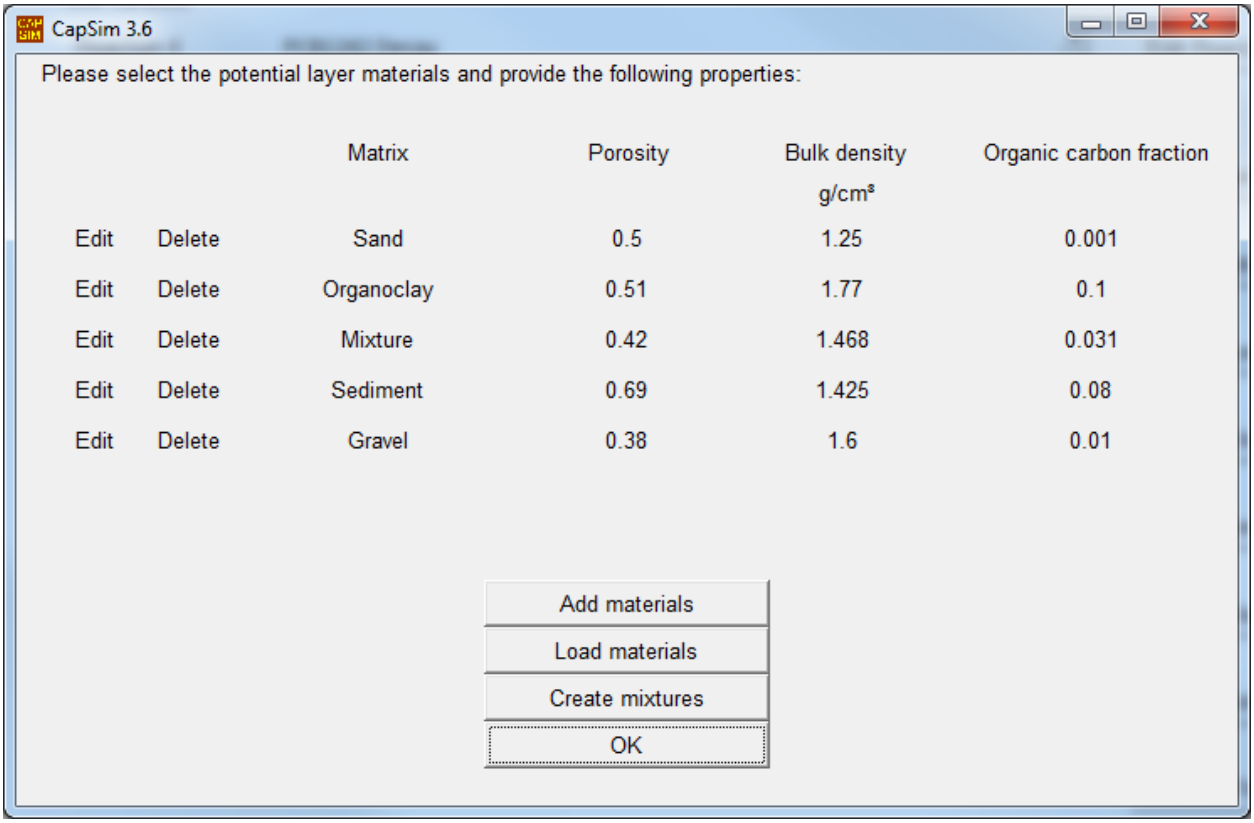
		Number	Name	Chemical equation	Rate equation
Edit	Delete	1	Reaction 4	PCB1242 Decay	$r = \lambda_1 C_{PCB1242}$
Edit	Delete	2	Reaction 2	PCB80 Decay	$r = \lambda_2 C_{PCB80}$
Edit	Delete	3	Reaction 3	PCB82 Decay	$r = \lambda_3 C_{PCB82}$
Edit	Delete	4	Reaction 4	TCE Decay	$r = \lambda_4 C_{TCE}$
Edit	Delete	5	Reaction 5	CIS 1,2 CDCE Decay	$r = \lambda_5 C_{CIS\ 1,2\ CDCE}$

Add reactions

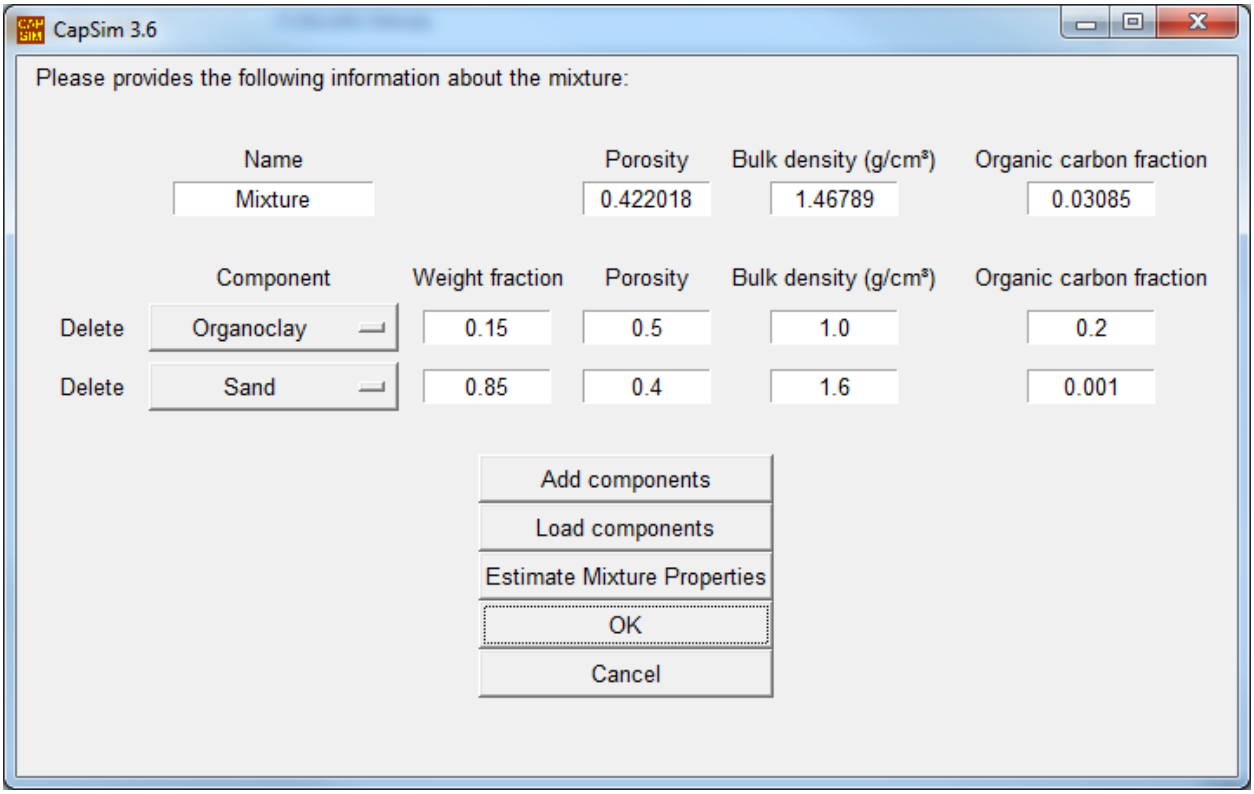
OK

3 -Material Input

Load materials- sand, organoclay, etc.



Mixture properties can be calculated through the model:



Sorption Properties are established using the model database, conservatively assumed linear properties

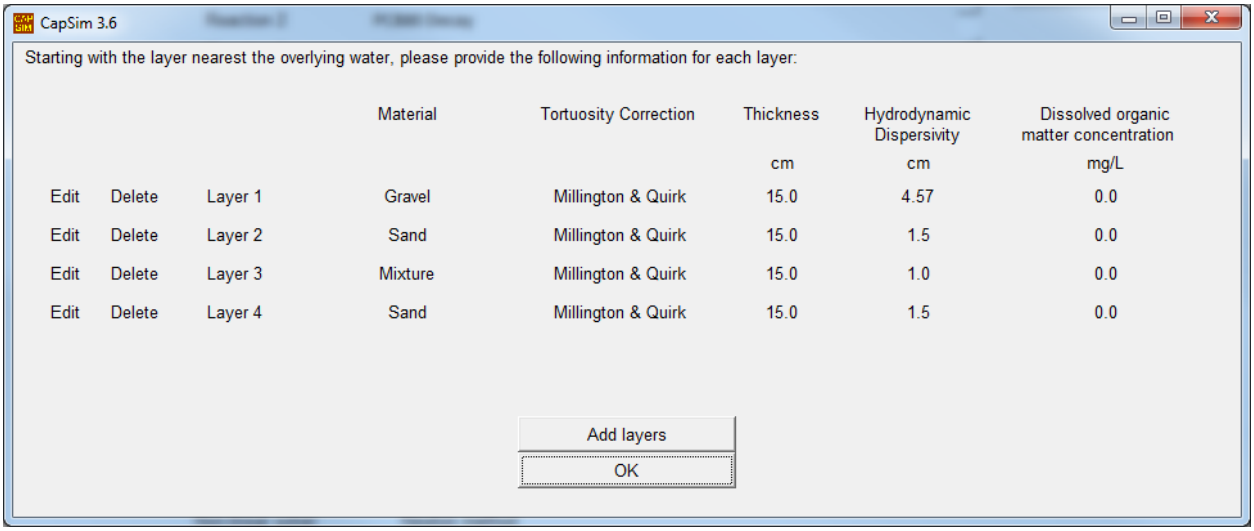
CapSim 3.6

Please input the sorption isotherms and corresponding coefficients for chemicals in each layer:

Matrix	Chemical		Sorption Isotherm	Isotherm coefficients			Kinetic options
Sand	PCB 1242	Edit	Linear--Kocfoc	K_{oc} = 4.89	log(L/kg)	f_{oc} = 0.001	Equilibrium
	PCB80	Edit	Linear--Kocfoc	K_{oc} = 5.53	log(L/kg)	f_{oc} = 0.001	Equilibrium
	PCB82	Edit	Linear--Kocfoc	K_{oc} = 5.3	log(L/kg)	f_{oc} = 0.001	Equilibrium
	TCE	Edit	Linear--Kocfoc	K_{oc} = 1.9345	log(L/kg)	f_{oc} = 0.001	Equilibrium
	CIS 1,2 DCE	Edit	Linear--Kocfoc	K_{oc} = 1.69	log(L/kg)	f_{oc} = 0.001	Equilibrium
Organoclay	PCB 1242	Edit	Linear--Kocfoc	K_{oc} = 4.89	log(L/kg)	f_{oc} = 0.1	Equilibrium
	PCB80	Edit	Linear--Kocfoc	K_{oc} = 5.53	log(L/kg)	f_{oc} = 0.1	Equilibrium
	PCB82	Edit	Linear--Kocfoc	K_{oc} = 5.3	log(L/kg)	f_{oc} = 0.1	Equilibrium
	TCE	Edit	Linear--Kocfoc	K_{oc} = 1.9345	log(L/kg)	f_{oc} = 0.1	Equilibrium
	CIS 1,2 DCE	Edit	Linear--Kocfoc	K_{oc} = 1.69	log(L/kg)	f_{oc} = 0.1	Equilibrium
Sediment	PCB 1242	Edit	Linear--Kocfoc	K_{oc} = 4.89	log(L/kg)	f_{oc} = 0.08	Equilibrium
	PCB80	Edit	Linear--Kocfoc	K_{oc} = 5.53	log(L/kg)	f_{oc} = 0.08	Equilibrium
	PCB82	Edit	Linear--Kocfoc	K_{oc} = 5.3	log(L/kg)	f_{oc} = 0.08	Equilibrium
	TCE	Edit	Linear--Kocfoc	K_{oc} = 1.9345	log(L/kg)	f_{oc} = 0.08	Equilibrium
	CIS 1,2 DCE	Edit	Linear--Kocfoc	K_{oc} = 1.69	log(L/kg)	f_{oc} = 0.08	Equilibrium

OK

5- Cap Design – conservatively assumed 0mg/L DOC



CapSim 3.6

Starting with the layer nearest the overlying water, please provide the following information for each layer:

			Material	Tortuosity Correction	Thickness	Hydrodynamic Dispersivity	Dissolved organic matter concentration
					cm	cm	mg/L
Edit	Delete	Layer 1	Gravel	Millington & Quirk	15.0	4.57	0.0
Edit	Delete	Layer 2	Sand	Millington & Quirk	15.0	1.5	0.0
Edit	Delete	Layer 3	Mixture	Millington & Quirk	15.0	1.0	0.0
Edit	Delete	Layer 4	Sand	Millington & Quirk	15.0	1.5	0.0

Add layers

OK

6- Kinetic Processes – establish first order decay

CapSim 3.6

Please input the reaction information in each layer:

Layer			Reaction	Chemical equation	Rate equation	Coefficient
Layer 1	Edit	Delete	Reaction 2	PCB80 Decay	$r = \lambda_{2,1} C_{PCB80}$	$\lambda_{2,1} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 3	PCB82 Decay	$r = \lambda_{3,1} C_{PCB82}$	$\lambda_{3,1} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 4	TCE Decay	$r = \lambda_{4,1} C_{TCE}$	$\lambda_{4,1} = 0.221\ yr^{-1}$
	Edit	Delete	Reaction 5	CIS 1,2 CDCE Decay	$r = \lambda_{5,1} C_{CIS\ 1,2\ CDCE}$	$\lambda_{5,1} = 0.125\ yr^{-1}$
Layer 2	Edit	Delete	Reaction 2	PCB80 Decay	$r = \lambda_{2,2} C_{PCB80}$	$\lambda_{2,2} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 3	PCB82 Decay	$r = \lambda_{3,2} C_{PCB82}$	$\lambda_{3,2} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 4	TCE Decay	$r = \lambda_{4,2} C_{TCE}$	$\lambda_{4,2} = 0.221\ yr^{-1}$
	Edit	Delete	Reaction 5	CIS 1,2 CDCE Decay	$r = \lambda_{5,2} C_{CIS\ 1,2\ CDCE}$	$\lambda_{5,2} = 0.125\ yr^{-1}$
Layer 3	Edit	Delete	Reaction 2	PCB80 Decay	$r = \lambda_{2,3} C_{PCB80}$	$\lambda_{2,3} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 3	PCB82 Decay	$r = \lambda_{3,3} C_{PCB82}$	$\lambda_{3,3} = 0.143\ yr^{-1}$
	Edit	Delete	Reaction 4	TCE Decay	$r = \lambda_{4,3} C_{TCE}$	$\lambda_{4,3} = 0.221\ yr^{-1}$
	Edit	Delete	Reaction 5	CIS 1,2 CDCE Decay	$r = \lambda_{5,3} C_{CIS\ 1,2\ CDCE}$	$\lambda_{5,3} = 0.125\ yr^{-1}$

OK

Process can be edited – example:

CapSim 3.6

Please input the following information for the added kinetic process:

Layer	Reaction	Chemical equation	Rate equation	Coefficient λ
Layer 1	Reaction 2	PCB80 Decay	$r = \lambda_{2,1} C_{PCB80}$	0.143 yr^{-1}

OK

Cancel

Rate Coefficient calculated using decay rate constant formula from USEPA Groundwater Issue, Calculation and Use of First-Order Rate Constants for MNA, using half life time provided by ERDC assuming 50% reduction in concentration.

$T=(-Ln(Cf/Ci))/K$

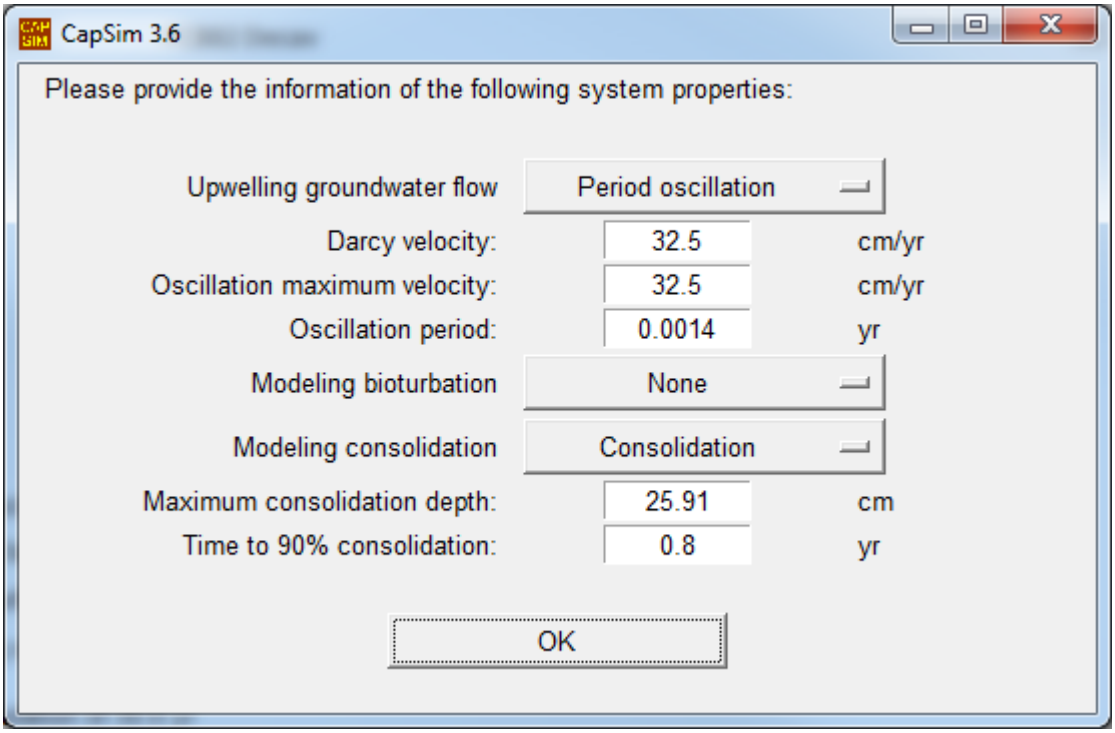
T=time in years – assumed half life provided by ERDC

Cf= assumed to be 50% reduction of Ci

Ci = assumed to be an initial concentration

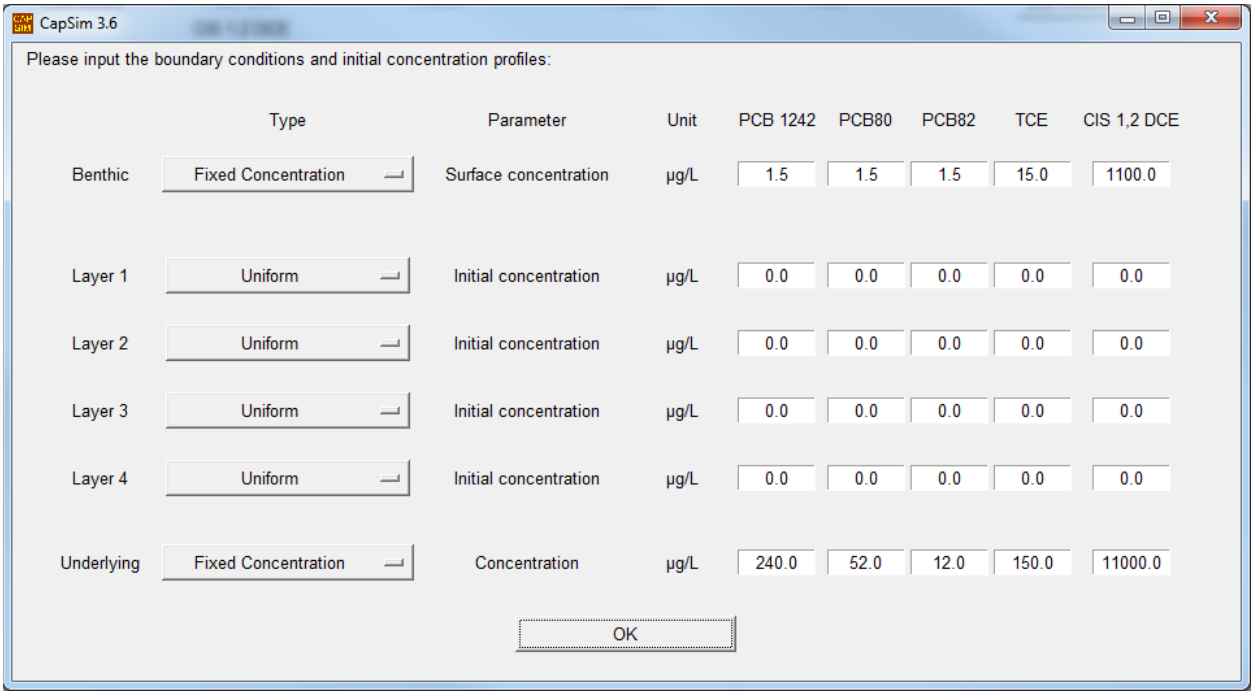
K = bulk first order decay rate coefficient

7-Sysem Parameters



Assumes 4 hours per 24 hours of upwelling from groundwater to harbor based upon initial groundwater model run. Darcy calculated using highest k value (from analytical) and largest gradient (from piezometer water levels, 2017)

8- Boundary Conditions and Initial Concentration



CapSim 3.6

Please input the boundary conditions and initial concentration profiles:

	Type	Parameter	Unit	PCB 1242	PCB80	PCB82	TCE	CIS 1,2 DCE
Benthic	Fixed Concentration	Surface concentration	µg/L	1.5	1.5	1.5	15.0	1100.0
Layer 1	Uniform	Initial concentration	µg/L	0.0	0.0	0.0	0.0	0.0
Layer 2	Uniform	Initial concentration	µg/L	0.0	0.0	0.0	0.0	0.0
Layer 3	Uniform	Initial concentration	µg/L	0.0	0.0	0.0	0.0	0.0
Layer 4	Uniform	Initial concentration	µg/L	0.0	0.0	0.0	0.0	0.0
Underlying	Fixed Concentration	Concentration	µg/L	240.0	52.0	12.0	150.0	11000.0

OK

**** VOC concentrations based off values from recent microwell groundwater sampling (Jacobs, 2017)**

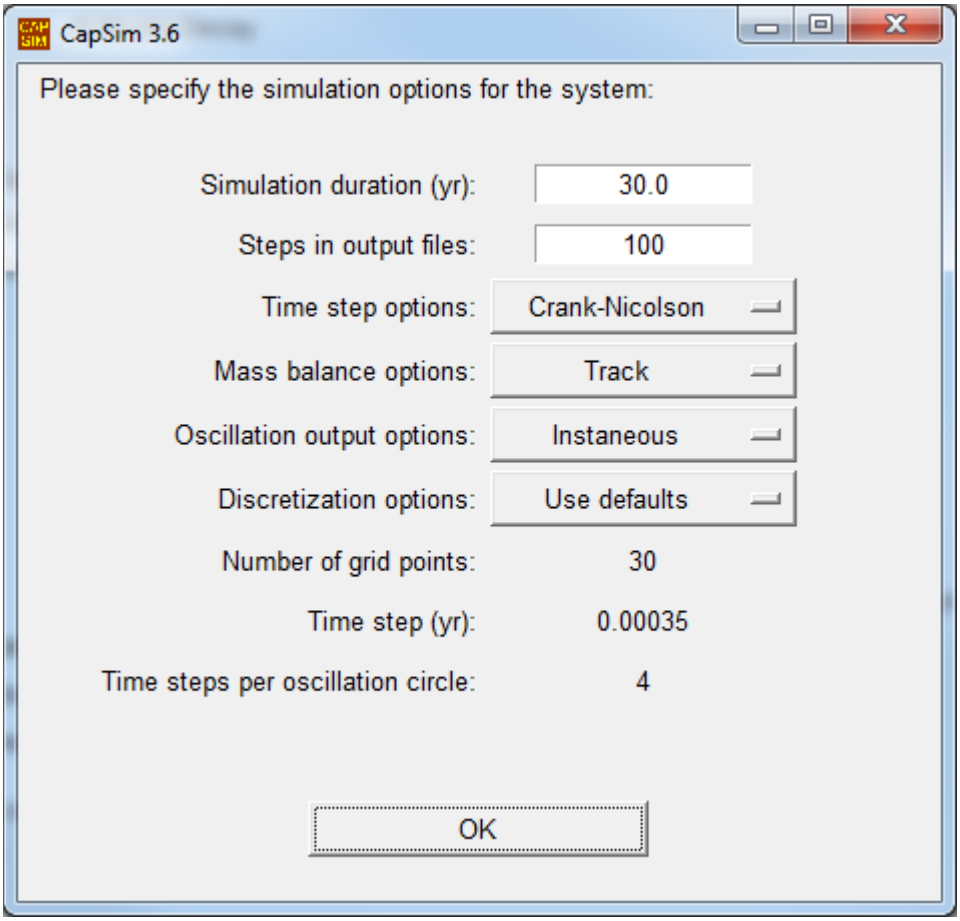
Assumed worst case – Solubility-

Aroclor 1242 = 240 PPB

Aroclor 1248 =PCB 80 = 52 PPB

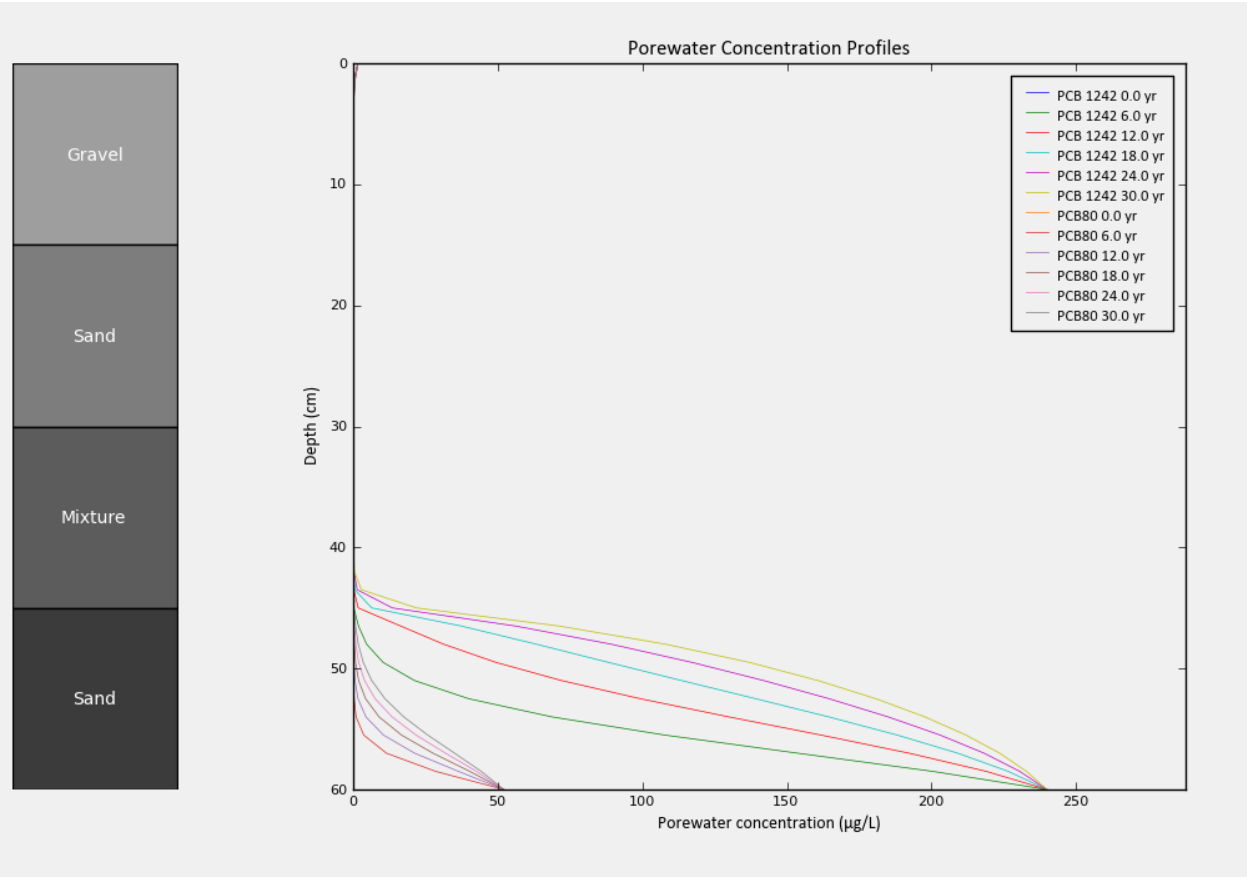
Aroclor1254 = PCB 82 = 12 PPB

9-Simulation Options



OUTPUT

PCB graph – after 30 years PCBs do not migrate through mixture layer (15% organoclay)



Note: Model only allowed for PCB 1242 and PCB 80 to be shown. PCB 82 behaves similar to PCB 80.

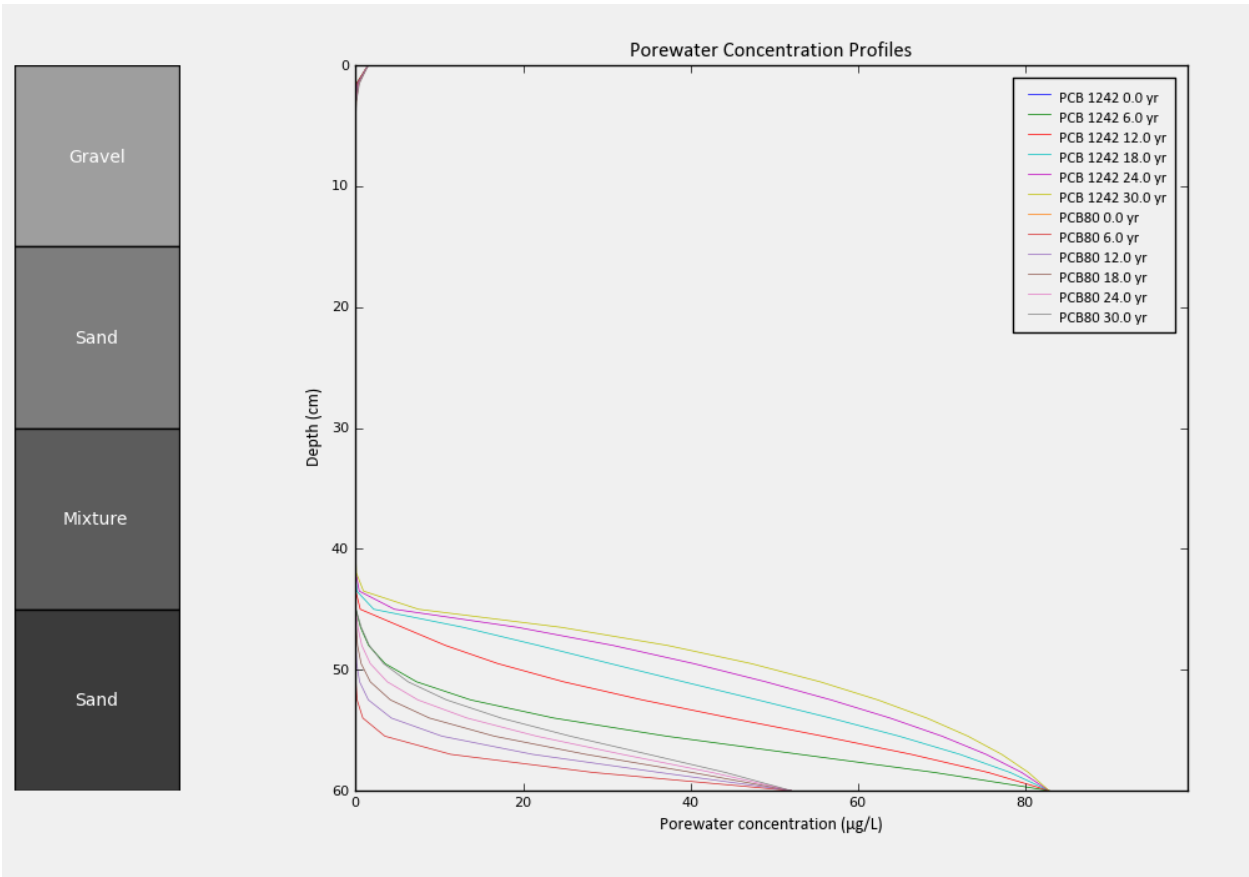
Additional Model run using max concentrations observed at Aerovox (MW15B)

Aroclor 1242 = 82.8 PPB

Aroclor 1254 = 11.8 PPB

**** VOC concentrations based off values from recent microwell groundwater sampling (Jacobs, 2017), Aroclor 1248 was not observed at a max concentration at MW15B, therefore the solubility value was used in the second model run.**

Aroclor 1248 = 52 PPB



Appendix J

Theoretical Pore Water Evaluation Calculations

ApJ. POREWATER VALUE FOR MODEL & DESIGN -

HANDEX®
Practical Businessl Solutions

Client: USACE
Job Location: New Bedford Harbor
Task Order Number: TO#5
Date: 16 March
Project: 35BG0708
Scale: NA
By: C Anderson
Checked By:

Theoretical PCB conc in sediment porewater

$$C_{DIS} = C_{sed} / f_{oc} K_{oc}$$

C_{DIS} = PCB conc in porewater (mg/l)

C_{sed} = PCB conc in sediment = 596 mg/kg (sample LL-02-00-05)

f_{oc} = fraction of organic carbon = 0.08 gm/gm (avg of sample data)

K_{oc} = organic partitioning coeff for Aroclor 1242 = 5.61
= 0.7489

$$C_{DIS} = (596) / .08(.7489) = 9947.92 \text{ ug/l (ppb)}$$

From Battelle porewater sampling document (AppA.)
porewater C_{max} = 36.9 ppb

PCB 1254 Solubility = 240 ppb

∴ since PCB conc cannot be greater than solubility - solubility will be used as worst case, conservation porewater value.

POREWATER VALUE FOR MODEL & DESIGN

HANDEX®
Practical Business Solutions

Client:
Job Location:
Task Order Number:

Date:
Project:
Scale:

By:
Checked By:

PCB transport - (Flux)

$$\text{Flux}_{\text{Advect max}} = K_f A C_{pw}$$
$$= V A C_{pw}$$

ASSUME
TOC = f_{oc} = 8% (avg of samples)
Diffusive flux = 2.380 g/m²/yr from Battelle, 2007

V = Darcy velocity - calculated using max K from lab data
= 32.5 cm/yr = 0.089 cm/day

Max Advective flux = g/acr/yr

$$0.089 \frac{cm}{day} (1 \text{ acr}) \left(240 \frac{ug}{l}\right)$$

$$.089 \frac{cm}{day} \cdot \frac{1 m}{100 cm} (1 \text{ acre}) \left(240 \frac{ug}{l} \cdot \frac{1 \times 10^{-6} g}{1 ug}\right) \left(\frac{365 d}{1 y}\right)$$

$$\left(\frac{.089 cm}{day} \cdot \frac{1 m}{100 cm}\right) \left(\frac{4040 m^2}{acre}\right) \left(\frac{240 \times 10^{-6} gm}{l}\right) \left(\frac{1000 l}{m^3}\right)$$

= 0.863 gm/acre/day = 314.97 g/acr/yr

max Advective flux = .315 kg/yr.

$$\text{Diffusive} = 2.380 \frac{g}{m^2 yr} \left(\frac{4040 m^2}{acre}\right) = 9615.2 \text{ g/acr/yr}$$
= 9.61 kg/yr.

∴ Diffusive is major transport mechanism

Appendix K

Capping Model Data Assumptions and Values

Aerovox Design Assumptions

1. Molecular Weight (MW)
   PCB (1242) = 266.5
   PCB 80 (1248) =291.99
   PCB 82 (1254) =326.43
   TCE = 131.4
   Cis – 1,2 DCE = 96.94

2. Log Octanol water partition coefficient (log Kow) – EPA (1996), GSI Environmental Database, ATSDR
   PCB 1242 = 5.6
   PCB 80 (1248) = 6.34
   PCB 82 (1254) = 6.5
   TCE = 2.4731
   Cis-1,2 DCE = 1.86 (assumed same as 1,2 DCE)
   Vinyl Chloride = 1.38
3. Molecular diffusion coefficient (Dw) – CapSim model supplied PCB, TEXAS TCEQ tables 03/2017 version, NJDEP Site Remediation program 06/2008
   PCB (1242) = 4.2E-6
   PCB 80 = 5.39E-6
   PCB 82 = 5.21 E-6
   TCE = 9.1E-6
   Cis – 1,2 DCE = 1.13x10-5

4. Organic Carbon Partition Coefficient log(Koc) CapSim model supplied PCB, EPA (1996), Donald Mackay, Wan-Ying Shiu and Kuo-Ching Ma (2000). Physical-Chemical Properties and Environmental Fate Handbook, Chapman & Hall/CRC netBBASE
   PCB (1242) = 5.61
   PCB 80 = 5.53
   PCB 82 = 5.3
   TCE = 1.9345
   Cis-1,2 DCE= 1.69

5. Dissolved Organic Carbon Partition Coefficient log(Kdoc) CapSim model supplied PCB, Env Sci & Technology (2000, Burkhard – EPA NHEERL) Used Burkhardt equation
   PCB (1242) = 5.19
   PCB 80 = 4.1
   PCB 82 = 3.9
   TCE = 1.3766
   Cis-1,2 DCE= 0.76

Cap Materials

1. Porosity
   Sand = 0.4 (civil engineering PE handbook, 2003)
   Organoclay = 0.5 (CETCO)
   sand/organo clay = 0.422 (CapSim generated) – 15% organoclay be weight
   sand/organoclay = 0.428 (capSim generated) – 20% organocly by weight
   sediment (calculates from lab values) = 0.69
2. Dry Bulk density (g/cm2)
   Sand = 1.602 (civil engineering PE handbook, 2003)
   Organoclay = 1 (CETCO)
   Sand/organoclay (15%) = 1.467 (CETCO)
   sand/organoclay (20%) = 1.428 (CETCO)
   sediment = 1.425 g/cm3 (median value from analytical data)
3. Organic Carbon Fraction (ITRC, CETCO)
   Sand = 0.003
   Organoclay = 0.2
   Sand/organoclay (15%) = 0.03085
   Sand/organoclay (20%)= 0.0408
   Sediment = 0.08 (average % organic content determined by lab)

CapSim Parameters

Concentration – dissolved porewater concentration – using highest PCB concentration determined by Battelle (36.9 ppb) and greatest concentrations of TCE and CIS 1,2 from shallow piezometer (Jacobs).

PCB (1242) = 12 ppb
PCB 80 = 12 ppb
PCB 82 = 12 ppb
TCE = 150 ppb
Cis-1,2 DCE= 11,000 ppb

Bulk density – on dry basis (pcf) values from analytical results

OL/ML = 88.98
ML = 90.9
SP = 137.8

Sorption Kinetics – first order decay times the porewater concentration

PCB assumes PCB doesn't breakdown – assumed half-life of 7 years = 0.142/yr
TCE to cis 1,2 DCE anaerobic half-life 1650 days = 0.221/yr
Cis – 1,2 DCE to vinyl chloride anaerobic half-life 2900 days = 0.125/yr

Decay rates - ERDC

Velocity – Darcy velocity calculated using lab provided k.

K=2.3 E-6 cm/sec
Max hydraulic gradient = 0.448
Darcy flux= v = -K ($\Delta h/\Delta l$) = 1.0304E-6 cm/sec = 32.49 cm/yr
Oscillation upwelling rates of 4 hours per day, based upon groundwater model and CapSim model documentation for tidally influenced
Consolidation is included
Consolidation = 25.91 cm (appr 0.85 ft) based on model run and hand calculations
Time to 90% consolidation – 0.8 years – calculated.

Cap Layers:

Bioturbation – 12 inches (30.38 cm) – medium sand – may require armoring – needs Lally model rerun.

Confining Layer – 6 inches (15 cm) – 85% clean medium sand w/ 15% organoclay by weight

Smoothing/sequestering layer – 6 inches (15 cm) medium sand

Additional sand will be required to achieve initial elevation of -6ft, approximately 4,150 cu yds

Appendix L

Steady State Model Outputs

STEADY-STATE CAP DESIGN MODEL
from Lampert and Reible (2009)*
Version 4.11
6/6/2012

Instructions: This spreadsheet determines concentrations and fluxes in a two layer sediment cap at steady-state, assuming advection, diffusion, dispersion, deposition/erosion, sorption onto colloidal organic matter, and boundary layer mass transfer. This is normally used to estimate migration through an active layer (lower layer) and a conventional cap layer (upper layer). **This model does not consider a bioturbation layer!** The deposition velocity is negative in the case of erosion, and is assumed to be constant and to have minimal effect on the thickness of the cap. The cells in GREEN are input cells; these can be changed for the design of interest. Cells in YELLOW are commonly used parameter estimates. These can be changed but note that physically unrealistic parameter values may result. A second worksheet calculates the transient profiles for a semi-infinite case. DO NOT CHANGE THE CELLS IN RED (or the spreadsheet will not function properly). These are calculated values for model outputs. The third worksheet title "array" allows the user to create an array of outputs for a given input (e.g., to study different compounds for a given site).

Contaminant Properties			NOTES
Contaminant	PCB 1242 @ solubility		
Octanol-water partition coefficient, log K_{ow}	5.6		ATSDR
Water Diffusivity, D_w	4.2E-06	cm^2/s	
Active Cap Decay Rate, λ_1	0.00	yr^{-1}	Conservatively assumed 0
Conventional Layer Decay Rate, λ_2	0.00	yr^{-1}	Conservatively assumed 0
Sediment/Conventional Cap Properties			
Contaminant Pore Water Concentration, C_0	2.40E+02	ug/L	
Conventional Cap layer fraction organic carbon, $(f_{oc})_{bio}$	0.003		
Colloidal Organic Carbon Concentration, ρ_{DOC}	0	mg/L	Conservatively assumed 0
Darcy Velocity, V (positive is upwelling)	32	cm/yr	
Depositional Velocity, V_{dep} *(positive is deposition of sediments)*	0	cm/yr	Conservatively assumed 0
Conventional Cap Placed thickness	15	cm	6 inches sand
Conventional Cap Consolidation Depth	1	cm	assumed consolidation of granular layer
Conventional Cap Layer Thickness	14	cm	
Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G		
Conventional Cap Layer Porosity, ε	0.4		
Conventional Cap Layer Particle Density, ρ_P	2.6		typical value for sand
Conventional Cap Layer Diffusion Coefficient	71	cm^2/yr	

Active Cap Properties

Active Cap Layer thickenss	15	cm	15% organiclay/85% medium sand
Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G		
Active Cap consolidation depth	1	cm	assumed consolidation of granular layer
Underlying sediment consolidation due to cap placement	21.3	cm	calculated 0.7ft consolidation
Porosity, ε	0.422		calculated for sand/organoclay
Particle Density, ρ_P	1.47	g/cm^3	calculated for sand/organoclay
Active Layer Loading $kg/m^2/cm$	8.4966	1.74	$lb/ft^2/cm$
Kd in active layer	141514	L/kg	calculated for sand/organoclay
Depth of Interest, *z- from cap-water interface*	0	cm	
Fraction organic carbon at depth of interest, $f_{oc}(z)$	0.001		

Commonly Used Parameter Estimates

Organic Carbon Partition Coefficient, log K_{oc}	5.15	log L/kg
Colloidal Organic Carbon Partition Coefficient, log K_{DOC}	4.78	log L/kg
Boundary Layer Mass Transfer Coefficient, k_{bl}	0.75	cm/hr
Dispersivity- active layer, α	1.00	cm (not allowed to be less than 1 cm)
Dispersivity- conventional layer	1.00	cm (not allowed to be less than 1 cm)
Active Cap Layer Diffusion/Dispersion Coeff., D_1	74	cm^2/yr
Conventional cap Layer Diffusion/Dispersion Coeff., D_2	71	cm^2/yr

Output

Pore Water Concentration at Depth, *C(z)*	1.167	ug/L
Loading at Depth, *W(z)*	165.2	ug/kg
Average Conventional Cap Layer Loading	85842	ug/kg
Flux to Overlying Water Column, *J*	76800	$ug/m^2/yr$
Cap-Conventional Layer Interface Concentration, C_{bio}/C_0, C_{bio}	99.82%	
Cap-Water Interface Concentration, C_{bl}/C_0, C_{bl}	0.49%	
Average Conventional Cap Concentration	84.25%	
Characteristic Time to~1% of steady state, $t_{adv/diff}$	14450.8	yr

Dimensionless Parameters

Active Cap Layer Peclet No., Pe_1	6.06
Active Cap Layer Damkohler No., Da_1	0.00
β = SQRT($Pe_1^2/4+Da_1$)	3.03
Conventional Cap Layer Peclet No., Pe_2	6.31
Conventional Cap Layer Damkohler No., Da_2	0.00
γ = SQRT($Pe_2^2/4+Da_2$)	3.153
Sherwood Number at Interface, *Sh*	1290.1

Other Parameters

Cap final thickness, h_{cap}	28.00	cm	11.02355 inch
Active Cap Effective thickness (w/ot conventional layer, h_{eff})	14	cm	5.511741 inch
Active Layer Retardation Factor, R_1	120239		
Conventional Cap Layer Retardation Factor, R_2	663		
Effective Advective Velocity, U	32.00	cm/yr	(not allowed to be more negative than that which will offset diffusion)
Characteristic Advection Time-Active cap layer, t_{adv}	52604.0	yr	
Characteristic Diffusion Time-Active cap layer, t_{diff}	19924.2	yr	
Characteristic Reaction Time-Active cap layer, t_{decay}	infinity	yr	

*Lampert, D.J. and Reible, D.D. 2009. “An Analytical Modeling Approach for Evaluation of Capping of Contaminated Sediments,” Soil & Sediment Contamination, 2009, 18(4):470-488.

STEADY-STATE CAP DESIGN MODEL
from Lampert and Reible (2009)*
Version 4.11
6/6/2012

Instructions: This spreadsheet determines concentrations and fluxes in a two layer sediment cap at steady-state, assuming advection, diffusion, dispersion, deposition/erosion, sorption onto colloidal organic matter, and boundary layer mass transfer. This is normally used to estimate migration through an active layer (lower layer) and a conventional cap layer (upper layer). **This model does not consider a bioturbation layer!** The deposition velocity is negative in the case of erosion, and is assumed to be constant and to have minimal effect on the thickness of the cap. The cells in GREEN are input cells; these can be changed for the design of interest. Cells in YELLOW are commonly used parameter estimates. These can be changed but note that physically unrealistic parameter values may result. A second worksheet calculates the transient profiles for a semi-infinite case. DO NOT CHANGE THE CELLS IN RED (or the spreadsheet will not function properly). These are calculated values for model outputs. The third worksheet title "array" allows the user to create an array of outputs for a given input (e.g., to study different compounds for a given site).

Contaminant Properties			NOTES
Contaminant	PCB 1248 @ solubility		
Octanol-water partition coefficient, log K_{ow}	6.34		ATSDR
Water Diffusivity, D_w	5.4E-06	cm^2/s	
Active Cap Decay Rate, λ_1	0.00	yr^{-1}	Conservatively assumed 0
Conventional Layer Decay Rate, λ_2	0.00	yr^{-1}	Conservatively assumed 0
Sediment/Conventional Cap Properties			
Contaminant Pore Water Concentration, C_0	5.20E+01	ug/L	
Conventional Cap layer fraction organic carbon, f_{oc}) $_{bio}$	0.003		
Colloidal Organic Carbon Concentration ρ_{DOC}	0	mg/L	Conservatively assumed 0
Darcy Velocity, V (positive is upwelling)	32	cm/yr	
Depositional Velocity, V_{dep} *(positive is deposition of sediments)*	0	cm/yr	Conservatively assumed 0
Conventional Cap Placed thickness	15	cm	6 inches sand
Conventional Cap Consolidation Depth	1	cm	assumed consolidation of granular layer
Conventional Cap Layer Thickness	14	cm	
Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G		
Conventional Cap Layer Porosity ε	0.4		
Conventional Cap Layer Particle Density ρ_P	2.6		typical value for sand
Conventional Cap Layer Diffusion Coefficient	82	cm^2/yr	
Active Cap Properties			
Active Cap Layer thickenss	15	cm	15% organoclay/85% medium sand

Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G			
Active Cap consolidation depth	1	cm		assumed consolidation of granular layer
Underlying sediment consolidation due to cap placement	21.3	cm		calculated 0.7ft consolidation
Porosity, ε	0.422			calculated for sand/organoclay
Particle Density, ρ_P	1.47	g/cm^3		calculated for sand/organoclay
Active Layer Loading $kg/m^2/cm$	8.4966		1.74	$lb/ft^2/cm$
Kd in active layer	659204	L/kg		calculated for sand/organoclay
Depth of Interest, *z- from cap-water interface*	0	cm		
Fraction organic carbon at depth of interest, $f_{oc}(z)$	0.001			

Commonly Used Parameter Estimates

Organic Carbon Partition Coefficient, log K_{oc}	5.82	log L/kg
Colloidal Organic Carbon Partition Coefficient, log K_{DOC}	5.45	log L/kg
Boundary Layer Mass Transfer Coefficient, k_{bl}	0.75	cm/hr
Dispersivity- active layer, α	1.00	cm (not allowed to be less than 1 cm)
Dispersivity- conventional layer	1.00	cm (not allowed to be less than 1 cm)
Active Cap Layer Diffusion/Dispersion Coeff., D_1	86	cm^2/yr
Conventional cap Layer Diffusion/Dispersion Coeff. D_2	82	cm^2/yr

Output

Pore Water Concentration at Depth, $C(z)$	0.253	ug/L
Loading at Depth, $W(z)$	166.8	ug/kg
Average Conventional Cap Layer Loading	84165	ug/kg
Flux to Overlying Water Column, J	16640	$ug/m^2/yr$
Cap-Conventional Layer Interface Concentration, C_{bio}/C_0, C_{bio}	99.58%	
Cap-Water Interface Concentration, C_{bl}/C_0, C_{bl}	0.49%	
Average Conventional Cap Concentration	81.84%	
Characteristic Time to~1% of steady state, $t_{adv/diff}$	60289.7	yr

Dimensionless Parameters

Active Cap Layer Peclet No., Pe_1	5.22
Active Cap Layer Damkohler No., Da_1	0.00
β = SQRT($Pe_1^2/4+Da_1$)	2.61
Conventional Cap Layer Peclet No. Pe_2	5.46
Conventional Cap Layer Damkohler No. Da_2	0.00
γ = SQRT($Pe_2^2/4+Da_2$)	2.728
Sherwood Number at Interface, Sh	1116.3

Other Parameters

Cap final thickness, h_{cap}	28.00	cm	11.02361 inch

Active Cap Effective thickness (w/ot conventional layer, h_{eff})	14	cm	5.511796 inch
Active Layer Retardation Factor, R_1	560100		
Conventional Cap Layer Retardation Factor, R_2	3085		
Effective Advective Velocity, U	32.00	cm/yr	(not allowed to be more negative than that which will offset diffusion)
Characteristic Advection Time-Active cap layer, t_{adv}	245043.0	yr	
Characteristic Diffusion Time-Active cap layer, t_{diff}	79963.8	yr	
Characteristic Reaction Time-Active cap layer, t_{decay}	infinity	yr	

*Lampert, D.J. and Reible, D.D. 2009. "An Analytical Modeling Approach for Evaluation of Capping of Contaminated Sediments," Soil & Sediment Contamination, 2009, 18(4):470-488.

STEADY-STATE CAP DESIGN MODEL
from Lampert and Reible (2009)*
Version 4.11
6/6/2012

Instructions: This spreadsheet determines concentrations and fluxes in a two layer sediment cap at steady-state, assuming advection, diffusion, dispersion, deposition/erosion, sorption onto colloidal organic matter, and boundary layer mass transfer. This is normally used to estimate migration through an active layer (lower layer) and a conventional cap layer (upper layer). **This model does not consider a bioturbation layer!** The deposition velocity is negative in the case of erosion, and is assumed to be constant and to have minimal effect on the thickness of the cap. The cells in GREEN are input cells; these can be changed for the design of interest. Cells in YELLOW are commonly used parameter estimates. These can be changed but note that physically unrealistic parameter values may result. A second worksheet calculates the transient profiles for a semi-infinite case. DO NOT CHANGE THE CELLS IN RED (or the spreadsheet will not function properly). These are calculated values for model outputs. The third worksheet title "array" allows the user to create an array of outputs for a given input (e.g., to study different compounds for a given site).

Contaminant Properties			NOTES
Contaminant	PCB 1254		
Octanol-water partition coefficient, log K_{ow}	6.5		ATSDR
Water Diffusivity, D_w	5.2E-06	cm^2/s	
Active Cap Decay Rate, λ_1	0.00	yr^{-1}	Conservatively assumed 0
Conventional Layer Decay Rate, λ_2	0.00	yr^{-1}	Conservatively assumed 0
Sediment/Conventional Cap Properties			
Contaminant Pore Water Concentration, C_0	1.20E+01	ug/L	
Conventional Cap layer fraction organic carbon, $f_{(oc)\,bio}$	0.003		
Colloidal Organic Carbon Concentration, ρ_{DOC}	0	mg/L	Conservatively assumed 0
Darcy Velocity, V (positive is upwelling)	32	cm/yr	
Depositional Velocity, V_{dep} *(positive is deposition of sediments)*	0	cm/yr	Conservatively assumed 0
Conventional Cap Placed thickness	15	cm	6 inches sand
Conventional Cap Consolidation Depth	1	cm	assumed consolidation of granular layer
Conventional Cap Layer Thickness	14	cm	
Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G		
Conventional Cap Layer Porosity, ε	0.4		
Conventional Cap Layer Particle Density, ρ_P	2.6		typical value for sand
Conventional Cap Layer Diffusion Coefficient	80	cm^2/yr	
Active Cap Properties			
Active Cap Layer thickenss	15	cm	15% organoclay/85% medium sand

Cap Materials -Granular (G) or Consolidated Silty/Clay (C)	G			
Active Cap consolidation depth	1	cm		assumed consolidation of granular layer
Underlying sediment consolidation due to cap placement	21.3	cm		calculated 0.7ft consolidation
Porosity, ε	0.422			calculated for sand/organoclay
Particle Density, ρ_P	1.47	g/cm^3		calculated for sand/organoclay
Active Layer Loading $kg/m^2/cm$	8.4966		1.74	$lb/ft^2/cm$
Kd in active layer	919390	L/kg		calculated for sand/organoclay
Depth of Interest, *z- from cap-water interface*	0	cm		
Fraction organic carbon at depth of interest, $f_{oc}(z)$	0.001			

Commonly Used Parameter Estimates

Organic Carbon Partition Coefficient, log K_{oc}	5.96	log L/kg
Colloidal Organic Carbon Partition Coefficient, log K_{DOC}	5.59	log L/kg
Boundary Layer Mass Transfer Coefficient, k_{bl}	0.75	cm/hr
Dispersivity- active layer, α	1.00	cm (not allowed to be less than 1 cm)
Dispersivity- conventional layer	1.00	cm (not allowed to be less than 1 cm)
Active Cap Layer Diffusion/Dispersion Coeff., D_1	84	cm^2/yr
Conventional cap Layer Diffusion/Dispersion Coeff. D_2	80	cm^2/yr

Output

Pore Water Concentration at Depth, $C(z)$	0.058	ug/L
Loading at Depth, $W(z)$	53.7	ug/kg
Average Conventional Cap Layer Loading	27208	ug/kg
Flux to Overlying Water Column, J	3840	$ug/m^2/yr$
Cap-Conventional Layer Interface Concentration, C_{bio}/C_0, C_{bio}	99.62%	
Cap-Water Interface Concentration, C_{bl}/C_0, C_{bl}	0.49%	
Average Conventional Cap Concentration	82.21%	
Characteristic Time to~1% of steady state, $t_{adv/diff}$	85434.9	yr

Dimensionless Parameters

Active Cap Layer Peclet No., Pe_1	5.33
Active Cap Layer Damkohler No., Da_1	0.00
β = SQRT($Pe_1^2/4+Da_1$)	2.67
Conventional Cap Layer Peclet No. Pe_2	5.57
Conventional Cap Layer Damkohler No. Da_2	0.00
γ = SQRT($Pe_2^2/4+Da_2$)	2.785
Sherwood Number at Interface, Sh	1139.5

Other Parameters

Cap final thickness, h_{cap}	28.00	cm	11.02361 inch

Active Cap Effective thickness (w/ot conventional layer, h_{eff})	14	cm	5.5118 inch
Active Layer Retardation Factor, R_1	781170		
Conventional Cap Layer Retardation Factor, R_2	4303		
Effective Advective Velocity, U	32.00	cm/yr	(not allowed to be more negative than that which will offset diffusion)
Characteristic Advection Time-Active cap layer, t_{adv}	341761.0	yr	
Characteristic Diffusion Time-Active cap layer, t_{diff}	113910.8	yr	
Characteristic Reaction Time-Active cap layer, t_{decay}	infinity	yr	

*Lampert, D.J. and Reible, D.D. 2009. "An Analytical Modeling Approach for Evaluation of Capping of Contaminated Sediments," Soil & Sediment Contamination, 2009, 18(4):470-488.

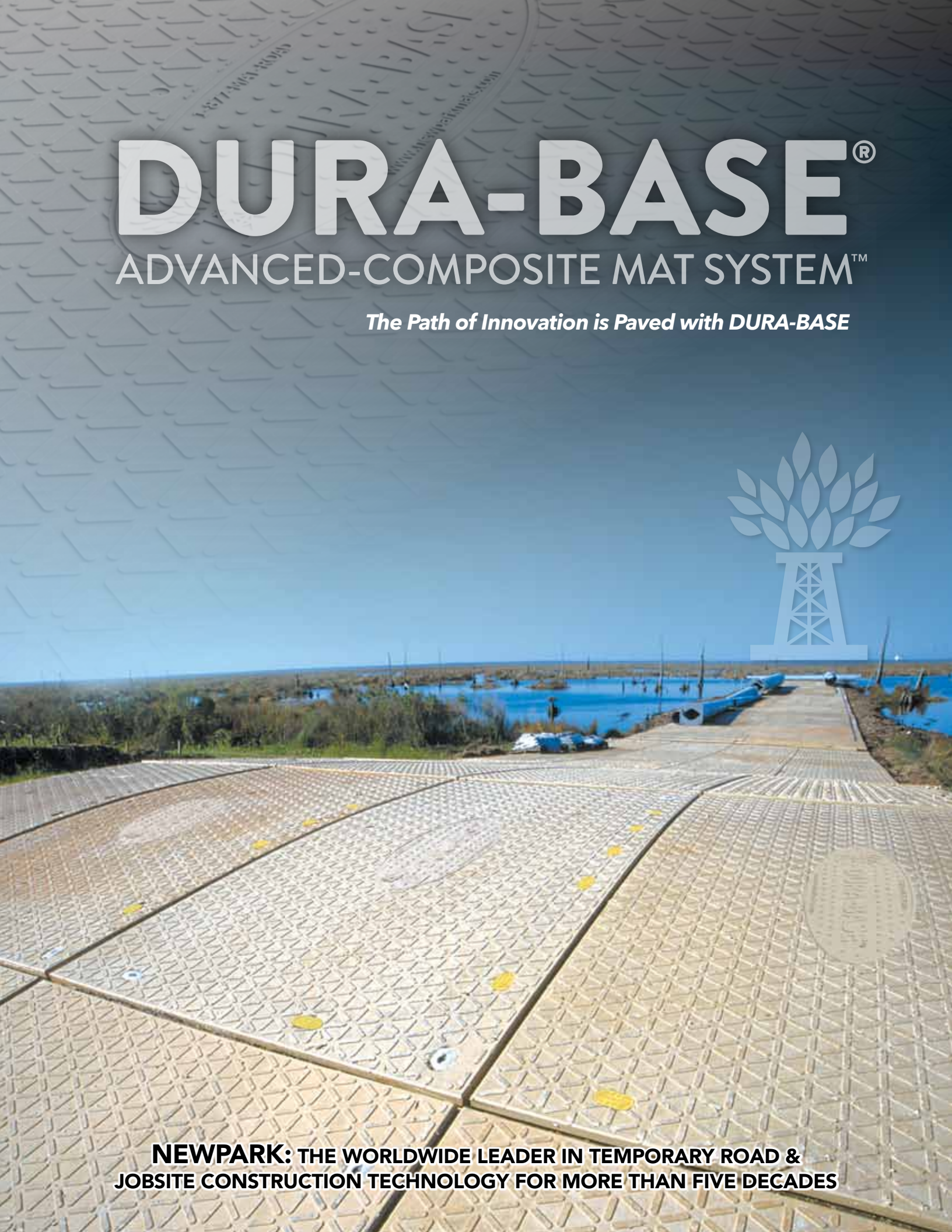
Appendix M

Cap Material Specifications and Catalog Cut Sheets

DURA-BASE®

ADVANCED-COMPOSITE MAT SYSTEM™

The Path of Innovation is Paved with DURA-BASE



NEWPARK: THE WORLDWIDE LEADER IN TEMPORARY ROAD & JOBSITE CONSTRUCTION TECHNOLOGY FOR MORE THAN FIVE DECADES

DURA-BASE Advanced-Composite Mats – a flagship product of Newpark Mats & Integrated Services – provides safe, cost-effective access and diverse applications in extreme environments. Our mat system has been proven to be invaluable for use in a number of industries including oil & gas, utilities, construction, petrochemical, pipelines and many more.

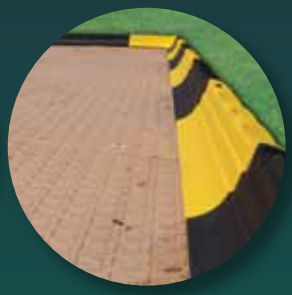
Specialized Features

Each individual mat measures 8′ x 14′ x 4″ thick (2.44m x 4.27m x 10.2cm) and weighs approximately 1,000 lbs (454kg).*

OVERLAP LIP
Helps interlock each mat forming a continuous work surface.

LINER PROTECTION
Superior protection provided by mats to minimize aggregate on site, thus saving cost.

TREAD PATTERN
Design improves traction for load-bearing vehicles and heavy equipment.



BERMS
Aid in management of any possible spills on work platform and keeps debris off site.

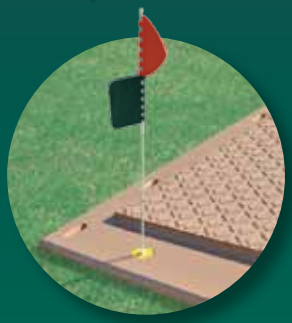
RAMPS
Provide entry points for vehicles and controls traffic flow on work platform.

POSITIONING BAR
Aligns and adjusts mat holes prior to insertion of locking pin.

T-WRENCH
Locks and unlocks each pin when turned 90°.

PIN EXTRACTOR
Removes the pin once unlocked.

SAFETY BARRIER FENCING SYSTEM
Offers protection from unintentionally entering or exiting the jobsite.

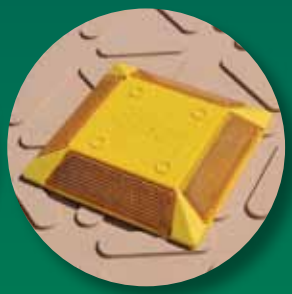


ROAD MARKER SYSTEM
Used for directions, warnings, restrictions or other information.

SPACER SUPPORT
Slides under edge of mat for added support.

LOCKING PIN
Inserted into mat and turned 90° to lock into position. **MUD CAP** Keeps locking pin hex-nuts clear of dirt and debris.

PINHOLE PLUG
Inserted into unused holes to significantly reduce mud flowback onto the mat surface.



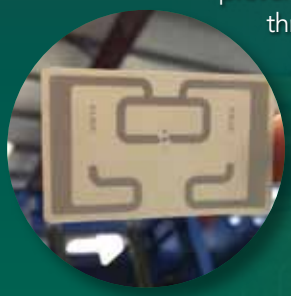
REFLECTORS
Help guide traffic during nighttime activities.

FLEXIBILITY
Follows surface contours.

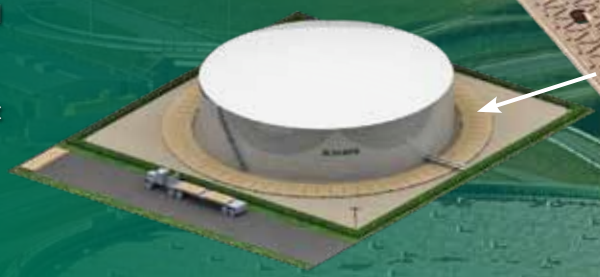
**All published measurements and weights are nominal. Mats can support compressive loads up to 600 lbs. per square inch.*

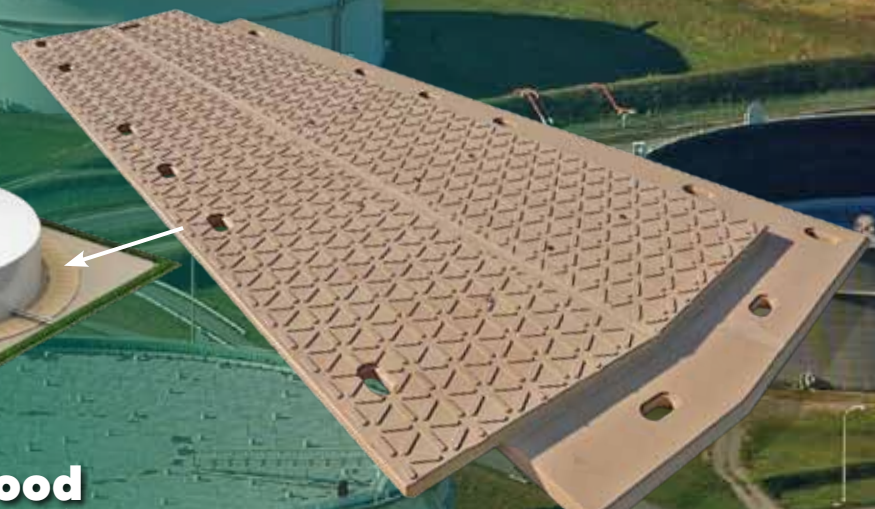
Rugged. Reusable. Recyclable.

The proprietary DURA-BASE formulation integrates UV protection and static dissipation. The welded design provides a single piece sealed mat, which eliminates weight gain from water contaminants. This, in turn, prevents environmental risks from cross-contamination threats like club root, raspberry crazy ants, soybean cyst and others. All DURA-BASE mats are recyclable, and have one of the lowest carbon footprints of any mat product. Newpark supports sustainability and environmental responsibility by offering a buy-back program and mat recycling at our Carencro, Louisiana facility.



RADIO-FREQUENCY IDENTIFICATION (RFID) TAG
Built into each manufactured mat for the purpose of tracking.





New **TURNING MAT COMPONENT** gives personnel and equipment a solid work platform to perform maintenance around storage tanks and other circular areas.

DURA-BASE vs Wood Transportation Comparison

Compare	*DURA-BASE*	*Wood*
Weight per Mat	1000 lbs. (454 kg)	Between 2200 lbs. and 2800 lbs.
Flatbed Truckload Capacity	46 DURA-BASE Mats per load	20 wood mats per load
If 1500 mats required for location	33 truckloads of DURA-BASE mats would be needed for site	84 truckloads of wood mats would be needed for same location

Net Results Are Substantial Transport Cost Savings

UTILITIES

Industry-leading Logistics at Less Cost

DURA-BASE is engineered to provide a stable work platform or access roads regardless of weather or difficult terrain. This rugged mat system provides ground protection and stability on almost any surface from sand to muskeg, tundra, mud, tidal marsh, native prairie, permafrost, wetlands or other environmentally sensitive areas.

DURA-BASE provided a stable platform for this utility project

Delivery

Cover 4,186 sq ft with one truckload (46 DURA-BASE mats) and save on transportation cost.

Forklift

Easy to stack, move and place mats using a forklift, loader or other similar equipment.

Grapple Truck

With this specialized vehicle, our mats can be both transported and laid from a single vehicle, thus reducing traffic at the jobsite.

All-weather work surface for drilling operations

OIL & GAS

Temporary road to rig platform

Drill site staging in Louisiana swamp

Equipment inspection on solid mat surface

Rigging up on DURA-BASE mats

Pig tracking operation on solid work pad

PIPELINE

Construction Site Concrete Pour

Highway construction job site

Temporary mat road used during pipeline construction

Directional drilling under Mississippi River

CONSTRUCTION

Crane supported by our mats during pile driving project

MILITARY SUPPORT

Chinook Landing Pad

HEAVY HAUL

Heavy Hauling Specialty Projects

(Top Left) DURA-BASE mats were used as a temporary pathway to move the Space Shuttle Endeavor to California Science Center at Exhibition Park.

(Top Right) This huge production vessel was successfully transported on a road constructed of DURA-BASE mats.

(Bottom Left) This 700 ton U-505 German submarine, a National Historic Landmark, was moved with assistance on a DURA-BASE mat road to its permanent location at the Chicago Museum of Science & Industry.

(Bottom Right) DURA-BASE mats played a critical role during the heavy haul transport of this 3,300 ton section of Mississippi River Bridge near Hastings, Minnesota.

T-REX Mat Cleaning System™

Our T-REX Mat Cleaning System is precision engineered to clean DURA-BASE Advanced-Composite Mats with unparalleled speed and efficiency, vastly reducing turn-around times and cleaning cost. The T-REX is fully automated and can operate around the clock. Its advanced capability is designed to tackle even the toughest oil and synthetic contaminants in one pass. And unlike power washing, there is no worry about how long jobs may actually take – so you can **know your true cost up front**.

Additional Services

Oilfield site construction including dirt hauling, grading and drainage, DURA-BASE mat transportation, installation and removal, pile driving and temporary jobsite bridge building. Ask your Newpark mat representative about these and other services.

New Research & Development Complex

The 50,000 sq ft manufacturing plant expansion along with our research and development facility allow us to meet the growing demands for our domestic and international customers.

Out-matting the competition one innovation at a time.

DURA-BASE®

ADVANCED-COMPOSITE MAT SYSTEM™

HOUSTON 9320 Lakeside Blvd., Suite 100 • The Woodlands, TX 77381 • Office: (281) 362-6800 • Fax: (281) 362-6801

CARENCRO 2900 Hwy 93 • Carencro, LA 70520 • Plant: (337) 896-8976 • Fax: (337) 896-1971

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A Product of NEWPARK MATS & INTEGRATED SERVICES ***The Worldwide Leader In Temporary Road and Jobsite Construction Technology For More Than Five Decades***

06/13/2017

Performance Data Sheet

DURA-BASE®
ADVANCED-COMPOSITE MAT SYSTEM

In an effort to establish performance standards and to explore feasibility for new applications, Newpark Mats & Integrated Services (NMIS) has designed and conducted numerous tests with the DURA-BASE® Composite Mat System. The results viewed by NMIS as most significant are presented in abbreviated form in this document. Anyone having questions regarding the data presented, or issues not addressed here, may contact NMIS at (281) 362-6800.

General Specifications

Overall Dimensions *(Large Mat)*: 8' x 14' x 4" (2.44m x 4.27m x 10.2cm)
Surface Dimensions *(Large Mat)*: 7' x 13' (2.13m x 3.96m)
Weight *(Large Mat)*: 1000 lbs. (454kg)

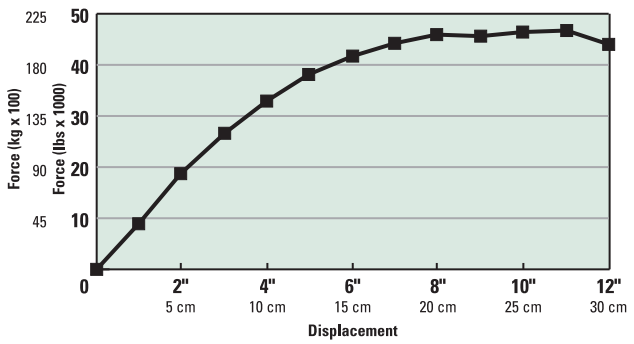
Overall Dimensions *(Small Mat)*: 8' x 7'6" x 4" (2.44m x 2.29m x 10.2cm)
Surface Dimensions *(Small Mat)*: 7' x 6'6" (2.13m x 1.98m)
Weight *(Small Mat)*: 550 lbs. (249kg)

Material (primary): High Density Polyethylene
Coefficient of Friction (neoprene on wet mat): 0.6

**All measurements and weights are nominal.*

Strength

Testing has demonstrated mat tolerance to extreme deflection while maintaining high load bearing capacity in pure bending [span = 4 feet (1.2m)]. Pure compressive load capacity is approximately 600 psi (40 kg/cm^2). Compressive loads in excess of 1000 psi (70 kg/cm^2) have been observed in laboratory tests.



NMIS routinely utilizes the mats for unpermitted loads over subgrades of 2 CBR and above.

Traffic

Traffic tests on differing soil conditions have shown the mats to be suitable for an average expected life in excess of 15 years. Fatigue tests have shown no appreciable damage at 60,000 cycles [6 inch (15cm) deflection of 8 foot (2.5m) span].

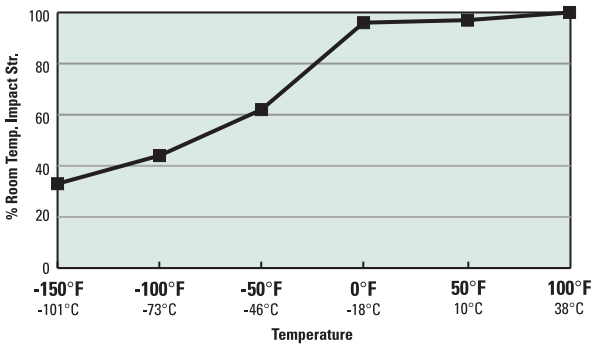
Static Dissipation

Plastics, left untreated, exhibit poor electrical conductivity. This condition, when present in mat material, can lead to a buildup of static charge on the plastic or personnel and result in arcing (mild shock). The DURA-BASE® Composite Mats contain an additive that combines with the plastic and increases the conductivity so a charge may rapidly dissipate, virtually eliminating the potential for static buildup.

Tests have shown the mat surface conductivity to be approximately 10e8 Ohms. The upper limit for a dissipative material is 10e10 Ohms. Field tests have shown the dissipative properties of the composite mat to be equivalent to those of wooden mats.

Temperature Effects

Izod impact tests were conducted to determine the effect of low temperature on material toughness. The results show a transition between -40°F and -4°F (-40°C and -20°C) where the material toughness begins to drop off. All specimens tested above -99°F (-72°C) exhibited signs of ductile failure. The graph presented here shows the impact results relative to room temperature. The impact strength at room temperature of 72°F (22°C) is 2,509 ft-lb/in (134 J/m). DURA-BASE® mats have been successfully employed in environments where -30°F (-34.4°C) temperatures were observed for an extended period of time.



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TENCATE GEOSYNTHETICS
Americas

Mirafi® 135N

Mirafi® 135N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 135N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

TenCate Geosynthetics Americas Laboratories are accredited by Geosynthetic Accreditation Institute – Laboratory Accreditation Program (GAI-LAP).

Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	80 (356)	80 (356)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	30 (134)	30 (134)
CBR Puncture Strength	ASTM D6241	lbs (N)	175 (79)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	50 (0.30)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	2.1	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	155 (6315)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.5 x 110)
Roll Area	yd^2 (m^2)	500 (418)	600 (502)

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TENCATE GEOSYNTHETICS
Americas

Mirafi® 140NL

Mirafi® 140NL is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 140NL is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	90 (401)	90 (401)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	40 (178)	40 (178)
CBR Puncture Strength	ASTM D6241	lbs (N)	250 (1113)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	50 (0.30)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	2.0	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	145 (5907)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.57 x 110)
Roll Area	yd^2 (m^2)	500 (418)	600 (502)

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TENCATE GEOSYNTHETICS
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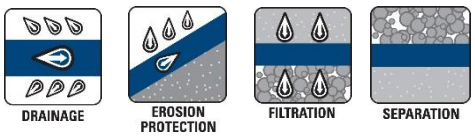
Mirafi® 140NC



Mirafi® 140NC is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 140NC is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	100 (445)	100 (445)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	45 (200)	45 (200)
CBR Puncture Strength	ASTM D6241	lbs (N)	250 (1113)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	2.0	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	140 (5704)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.57 x 110)
Roll Area	yd^2 (m^2)	500 (418)	600 (502)

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TENCATE GEOSYNTHETICS
Americas

Mirafi® 140N

Mirafi® 140N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 140N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids. Mirafi® 140N meets AASHTO M288 Class 3 for Elongation > 50%.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	120 (534)	120 (534)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	50 (223)	50 (223)
CBR Puncture Strength	ASTM D6241	lbs (N)	310 (1380)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.7	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	135 (5500)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 360 (4.5 x 110)
Roll Area	yd^2 (m^2)	500 (418)	600 (502)

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TENCATE GEOSYNTHETICS
Americas

Mirafi® 150N

Mirafi® 150N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 150N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	135 (601)	135 (601)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	55 (245)	55 (245)
CBR Puncture Strength	ASTM D6241	lbs (N)	350 (1558)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.4	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	108 (4400)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
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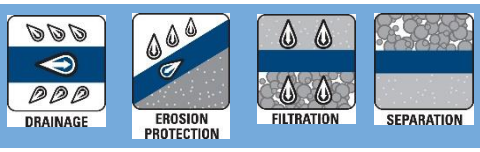
Mirafi® 160N



Mirafi® 160N is a nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 160N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids. Mirafi® 160N meets AASHTO M288 Class 2 for Elongation > 50%.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	160 (712)	160 (712)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	60 (267)	60 (267)
CBR Puncture Strength	ASTM D6241	lbs (N)	410 (1825)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.5	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	110 (4481)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.5 x 91)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
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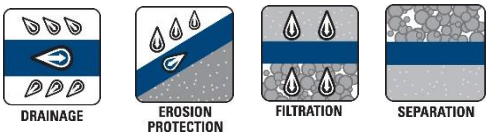
Mirafi® 170N



Mirafi® 170N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 170N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	180 (801)	180 (801)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	75 (334)	75 (334)
CBR Puncture Strength	ASTM D6241	lbs (N)	450 (2003)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.4	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	105 (4278)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.5 x 91)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
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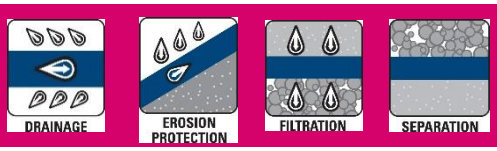
Mirafi® 180N



Mirafi® 180N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 180N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids. Mirafi® 180N meets AASHTO M288 Class 1 for Elongation > 50%.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	205 (912)	205 (912)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	80 (356)	80 (356)
CBR Puncture Strength	ASTM D6241	lbs (N)	500 (2224)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	80 (0.18)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.4	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	95 (3870)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)	

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TENCATE GEOSYNTHETICS
Americas

Mirafi® 180NC

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Weight	ASTM D5261	oz/yd^2 (g/m^2)	7.5 (254)	
Grab Tensile Strength	ASTM D4632	lbs (N)	205 (912)	205 (912)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	80 (356)	80 (356)
CBR Puncture Strength	ASTM D6241	lbs (N)	550 (2447)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	1.0	
Flow Rate	ASTM D4491	gal/min/ft^2 (l/min/m^2)	70 (2852)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Sizes	
Roll Dimensions (width x length)	ft (m)	12.5 x 360 (3.8 x 110)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)	

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TENCATE GEOSYNTHETICS
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Mirafi® 1100N

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	250 (1113)	250 (1113)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	100 (445)	100 (445)
CBR Puncture Strength	ASTM D6241	lbs (N)	700 (3115)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	100 (0.15)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.8	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	75 (3056)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
Americas

Mirafi® 1100NC

Mirafi® 1100NC is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 1100NC is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Weight	ASTM D5261	oz/yd^2 (g/m^2)	9.5 (322)	
Grab Tensile Strength	ASTM D4632	lbs (N)	250 (1113)	250 (1113)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	90 (401)	90 (401)
CBR Puncture Strength	ASTM D6241	lbs (N)	600 (2670)	
			Maximum Opening Size	
Apparent Opening Size (AOS)[1]	ASTM D4751	U.S. Sieve (mm)	70 (0.212)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.7	
Flow Rate	ASTM D4491	gal/min/ft^2 (l/min/m^2)	65 (2648)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)
Estimated Roll Weight	lb (kg)	320 (145)

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TENCATE GEOSYNTHETICS
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Mirafi® 1100NPA

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	270 (1202)	270 (1202)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	100 (445)	100 (445)
Puncture Strength[1]	ASTM D4833	lbs (N)	100 (445)	
CBR Puncture Strength	ASTM D6241	lbs (N)	700 (3115)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	100 (0.15)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.8	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	75 (3056)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

[1] ASTM D4833 has been replaced with ASTM D6241

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.5 x 91)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
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Mirafi® 1120N

Mirafi® 1120N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 1120N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	300 (1335)	300 (1335)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	115 (512)	115 (512)
CBR Puncture Strength	ASTM D6241	lbs (N)	800 (3560)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	100 (0.15)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.8	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	65 (2648)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size
Roll Dimensions (width x length)	ft (m)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	500 (418)

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TENCATE GEOSYNTHETICS
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Mirafi® 1160N

Mirafi® 1160N is a needlepunched nonwoven geotextile composed of polypropylene fibers, which are formed into a stable network such that the fibers retain their relative position. Mirafi® 1160N is inert to biological degradation and resists naturally encountered chemicals, alkalis, and acids.

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Mechanical Properties	Test Method	Unit	Minimum Average Roll Value	
			MD	CD
Grab Tensile Strength	ASTM D4632	lbs (N)	380 (1691)	380 (1691)
Grab Tensile Elongation	ASTM D4632	%	50	50
Trapezoid Tear Strength	ASTM D4533	lbs (N)	140 (623)	140 623)
CBR Puncture Strength	ASTM D6241	lbs (N)	1025 (4561)	
			Minimum Roll Value	
Permittivity	ASTM D4491	sec^{-1}	0.7	
Flow Rate	ASTM D4491	$gal/min/ft^2$ ($l/min/m^2$)	50 (2037)	
			Maximum Opening Size	
Apparent Opening Size (AOS)	ASTM D4751	U.S. Sieve (mm)	100 (0.15)	
			Minimum Test Value	
UV Resistance (at 500 hours)	ASTM D4355	% strength retained	70	

Physical Properties	Unit	Roll Size	
Roll Dimensions (width x length)	ft (m)	15 x 150 (4.57 x 46)	15 x 300 (4.57 x 91.4)
Roll Area	yd^2 (m^2)	250 (209)	500 (418)

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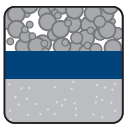
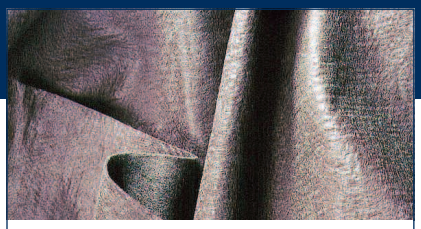


Mirafi® N-Series Nonwoven Polypropylene Geotextiles

for Soil Separation and Drainage



Mirafi® N-Series Nonwoven Geotextiles

TenCate develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

The Difference Mirafi® N-Series Nonwoven Geotextiles Make:

- Construction. Mirafi® N-Series polypropylene nonwoven geotextiles easily conform to the ground or trench surface for trouble free installation.
- Strength. Mirafi® N-Series geotextiles withstand installation stresses with high puncture and tear resistance.
- Drainage. High permittivity properties provide high water flow rates while providing excellent soil retention.
- Environmental. Mirafi® N-Series geotextiles are chemically stable in a wide range of aggressive environments.
- Cost Effective. Mirafi® N-Series geotextiles provide economical solutions to many civil engineering applications including a cost effective alternative to graded aggregate filters.

APPLICATIONS

Mirafi® N-Series nonwoven geotextiles are used in a wide variety of applications including soil separation and drainage applications. Lightweight nonwovens are predominantly used for subsurface drainage applications along highways, within embankments, under airfields, and athletic fields. For these drainage structures to be effective, they must have a properly designed protective filter.

Mirafi® N-Series nonwoven geotextiles eliminates the challenge of determining the aggregate gradation required to match soil conditions, finding a convenient and economical source of a specific aggregate, transporting and placing graded aggregate, and assuring that the constructed in-place drainage system provides effective filter performance.

Heavyweight nonwovens are used in critical subsurface drainage systems, soil separation, permanent erosion control, and geomembrane liner protection within landfills. These geotextiles provide the required strength and abrasion resistance to withstand installation and application stresses to create an effective, long term drainage solution.

INSTALLATION GUIDELINES*

French and Trench Drains Geosynthetic Placement

Cut geosynthetic to proper width prior to placement. Width should be enough to conform to the trench perimeter with at least a 6in (15cm) top overlap. Place the geosynthetic roll over the trench, and unroll enough geosynthetic that the geosynthetic can be placed down into the trench. Anchor the edges of the geosynthetic with heavy objects to prevent the geosynthetic from falling into the trench. Where overlaps are necessary between rolls, allow for 3 ft (1m) overlap from the upstream to the downstream roll.

* These guidelines serve as a general basis for installation. Detailed instructions are available from your TenCate® representative.

Protective & Outdoor Fabrics
Aerospace Composites
Armour Composites
Geosynthetics
Industrial Fabrics
Synthetic Grass

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materials that make a difference

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Mirafi® N-Series Nonwoven Polypropylene Geotextiles

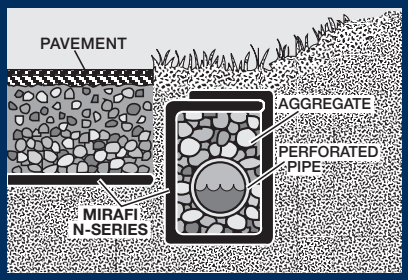
for Soil Separation and Drainage

Property / Test Method	Units	140NL	140NC	140N	160N	170N	180N	1100N	1120N	1160N
MECHANICAL PROPERTIES					**Minimum Average Roll Value**					
Grab Tensile Strength ASTM D4632										
Strength	lbs (N)	90 (401)	100 (445)	120 (534)	160 (712)	180 (801)	205 (912)	250 (1113)	300 (1335)	380 (1691)
Elongation	%	50	50	50	50	50	50	50	50	50
Trapezoid Tear Strength	lbs	40	45	50	60	75	80	100	115	140
ASTM D4533	(N)	(178)	(200)	(223)	(267)	(334)	(356)	(445)	(512)	(623)
CBR Puncture Strength	lbs	250	250	310	410	450	500	700	800	1025
ASTM D6241	(N)	(1113)	(1113)	(1380)	(1825)	(2003)	(2224)	(3115)	(3560)	(4561)
HYDRAULIC PROPERTIES										
					Maximum Opening Size					
Apparent Opening Size (AOS) ASTM D4751	US Sieve	50	70	70	70	70	80	100	100	100
	(mm)	(0.30)	(0.212)	(0.212)	(0.212)	(0.212)	(0.18)	(0.15)	(0.15)	(0.15)
					Minimum Roll Value					
Permittivity ASTM D4491	sec^{-1}	2.0	2.0	1.7	1.5	1.4	1.4	0.8	0.8	0.7
Flow Rate ASTM D4491	$gal/min/ft^2$	145	140	135	110	105	95	75	65	50
	$(l/min/m^2)$	(5907)	(5704)	(5500)	(4481)	(4278)	(3870)	(3056)	(2648)	(2037)
					Minimum Test Value					
UV Resistance after 500 hrs. ASTM D4355	% strength	70	70	70	70	70	70	70	70	70

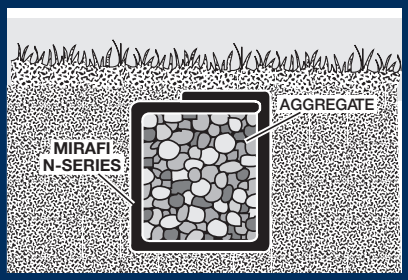
Packaging	Units	140NL	140NC	140N	160N	170N	180N	1100N	1120N	1160N
Roll Width	ft (m)	12.5 (3.8) 15.0 (4.57)	12.5 (3.8) 15.0 (4.57)	12.5 (3.8) 15.0 (4.57)	12.5 (3.8) 15.0 (4.57)	12.5 (3.8) 15.0 (4.57)	12.5 (3.8) 15.0 (4.57)	15.0 (4.57)	15.0 (4.57)	15.0 (4.57)
Roll Length	ft (m)	360 (110)	360 (110)	360 (110)	300 (91.4) 360 (110)	300 (91.4) 360 (110)	360 (110) 300 (91.4)	300 (91.4)	300 (91.4)	150 (46)
Area	yd^2 (m^2)	500 (418) 600 (502)	500 (418) 600 (502)	500 (418) 600 (502)	500 (418) 600 (502)	500 (418) 600 (502)	500 (418) 600 (502)	500 (418)	500 (418)	250 (209)

Note: Values and methods could change without notice

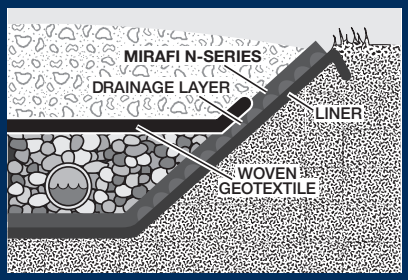
Mirafi® N-Series Nonwoven Geotextiles



Cut-off/Interceptor Drain Along a Roadway Or Another Critical Structure



French Drain Without Pipe



Liner Protection Within a Landfill

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ISO 9001 FM 61026

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ORGANOCLAY® PM-200

ORGANIC ADSORPTION MEDIA

DESCRIPTION

ORGANOCLAY® PM-200 is a proprietary granular media that is highly effective in adsorbing organic compounds, particularly non-aqueous phase liquids (NAPLs), dissolved polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs).

APPLICATIONS

ORGANOCLAY® PM-200 is specially formulated for use in the following applications:

- Bulk active in situ sediment capping
- Permeable reactive barrier

BENEFITS

ORGANOCLAY® PM-200, consists of a coarser particle size than standard CETCO ORGANOCLAY® PM-199, which may:

- Aid in settling through water column when placing bulk active in situ sediment cap
- Provide better match particle size of coarse inert soil for better intermixing in use of permeable reactive barrier

PACKAGING

ORGANOCLAY® PM-200 is available in the following packaging options:

- 50 lb bag
- 1500 lb super sack

ORGANOCLAY® PM-200 is ideal for use in remediation applications where oils, greases, non-aqueous phase liquids (NAPL) and other organic contaminants are present.

TESTING DATA

PHYSICAL PROPERTIES

PROPERTY	TEST METHOD	RESULTS
Bulk Density	CETCO Test Method	44–56 lb/cu.ft.
Oil Adsorption Capacity	CETCO Test Method	0.5 lb/lb Minimum
Hydraulic Conductivity	mod ASTM D 2434/5084	$1x10^{-3}$ cm/sec Minimum
Quaternary Amine Content	CETCO Test Method	25–33% min. Quaternary Amine Loading

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UPDATED: MAY 2017

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FORM: TDS_ORGANOCLAY_PM-200_AM_EN_201705_V2

Appendix N

Armor Design Calculations

ARMOR DESIGN METHODOLOGY

The cause of shoreline bank erosion appears to be related to wind-driven wave action, ice scour and surface water runoff. To maintain the shoreline cap integrity, measures will be incorporated to protect it from these forces.

The Interim Cap armoring system was designed using standard United States Army Corps of Engineers (USACE) guidance for the protection of river and lake beds, channel bottoms and shorelines, specifically Shore Protection Manual (SPM, USACE, 1984) and the Coastal Engineering Manual (CEM, USACE, 2011). In addition, United Stated Department of Agriculture (USDA) Soil Conservation Service (SCS) Technical Release No. 69, Riprap for Slope Protection Against Wave Action was also used. These documents present calculations incorporating site specific environmental conditions including prevailing wind, wind speed, bank slopes, predominant fetch and water depth.

An ice study conducted by Andrew Tuthill was also used to evaluate ice scour as it relates to the interim cap design.

A PCB Fate and Transport model conducted by USACE Engineer Research and Development Center ERDC, 2017) was also utilized for information related to its hydrodynamic model including wave height, tide height range and NBH current velocities.

Calculation of Wind Stress

Wind speed was evaluated from two sources, the National Oceanic Atmospheric Administration (NOAA) weather station located at New Bedford Regional Airport and the weather station located at the New Bedford Harbor Superfund Site. In addition, information collected as part of the draft Hydrodynamic Model created by Lally Consulting, LLC was used in the evaluation of wind stress.

Wind Gauge Elevation: Prior to scaling the wind speed with the appropriate adjustment factors, the assumed NBH wind speed at the wind gauge must be scaled to a standard elevation. According to the USACE, the standard elevation is 10 meters (32.8 feet). Based on the available information the NOAA weather station is reportedly at 24.8 meters (81.36 feet). The NBH weather station is approximately 20 feet above the surface of NBH.

Wind Duration: As wind speeds are typically measured for short durations, the wind speed must be adjusted for the time it takes to bring the waves to maximum height (steady state). It is assumed steady state would be reached in an hour.

Stability: The New Bedford wind speed was also adjusted for instability related to temperature differences between the air and the water. The conditions where these differences would result in the greatest increase in wind speed are representative of winter conditions where the temperature of the

water is greater than the temperature of the air. For purposes of the design, it has been conservatively assumed that the water temperature is 50 degrees Fahrenheit (^{o}F) and the air temperature is 10 ^{o}F.

Location: To translate overland winds to over water winds, an adjustment factor must be used to account for the differences in surface roughness between the land and the water. The factor takes into account the surface of NBH which the wind acts upon (fetch length). The fetch length is typically measured across the water surface in the predominant wind direction. The fetch length is typically measured across the water surface in the direction of the predominant wind. As part of the design, fetch is measured specific to the wind direction to which it applies.

Coefficient of Drag: Once the wind speed has been adjusted, it is translated into a wind stress to account for the nonlinear relationship between wind stress and wind speed (USACE, 2011).

Design:

Wind Stress

The New Bedford Harbor specific maximum sustained winds have been conservatively assumed to be 55 miles per hour (mph) in a north/south direction and 30 mph in a west-east direction. Prevailing wind in the spring, fall and summer months is predominantly south to southwest (ERDC, 2017). Prevailing wind in winter is west to northwest (Tuthill, 2017). Significant wave height and wave period were calculated using formulas 3-39 and 3-40 from the Shore Protection Manual. The wind stress was calculated to be either 98 mph or 55 mph.

Fetch length

The fetch length or harbor surface over which the wind stress acts upon, was determined by measuring the distance across NBH in a west to east direction, and from the Coggeshall Bridge north to the Wood Street bridge. As the armor layer design considers winds along the north-south and west-east direction separately, two fetch lengths were calculated as part of the design process. The fetch length was estimated using USACE Shore Protection Manual (USACE, 984). For winds propagated west-east, the average distance is 625 ft., and winds in a north-south direction are 6,720 ft.

Average Water Depth

The average depth of NBH varies spatially. Assuming an average bottom depth, based upon current and expected post dredge elevations, indicated 20 feet. Using the above parameters, the maximum wave height was calculated using the two scenarios, one for shallow water and one for deep water.

Using the equations 3-39 and 3-40 from the USACE Shore Protection Manual (1984), the maximum wave height and wave period were calculated. The west east direction waves were calculated at 0.482 ft with a wave period of 0.979 seconds. A north south direction indicated a wave height of 2.609 ft and a wave period of 2.51 seconds.

Armor Layer

The armor layer configuration is based primarily on wave height, wave period, slope of bank and sediment bed, and specific characteristics of the armor stone. The appropriate weight of an individual armor unit (Wr) to be used in preventing erosion under specific wave conditions is calculated using equation 7-116 from the USACE Shore Protection Manual. Assumptions included the weight of stone is 165 lbs/ft3, the weight of water is 62.4 lbs/ft3, the stability coefficient is 2 for rough angular stone, the slope based on a 3H:1V (18.4 degrees) and the wave height (2.61 or 0.482ft).

This calculated 26.44 lb and 0.166 lb stone. Using 7-12 from the Shoreline Protection Manual, stone diameters were 7.4 and 1.5 inches.

To ensure complete coverage of the isolation layer, an assumed value for the minimum number of layers is 2. And using equation 7-121 from the Shoreline Protection Manual, indicates a thickness of 1.086 feet.

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Client:
Job Location:
Task Order Number:

Date:
Project:
Scale:

By:
Checked By:

WIND STRESS - USING WEATHER STATION DATA FROM SITE

11 NOV 2015 - 16 MARCH 2018

MAX WIND OBSERVED: 93.9 mph (instantaneous

AVERAGE WIND SPEED: 12.94 mph

MEDIAN WIND SPEED: 11.72 mph

NOAA - NB MUNICIPAL AIRPORT 11 NOV 2015 - 16 MAR 2018

MAX WIND = 61.1 mph (5 MIN, FASTEST)

AVERAGE = 25.48 mph (5 MIN, FASTEST)

MEDIAN = 23.9 mph (5 min, Fastest)

LALLY MODEL:

12.6 m/s = 28.1854 mph

20.6 m/s = 46.08089 mph

DIRECTION OF 0 degrees & 202.5 degrees

WIND SPEED @ Airport -

$U_f = 61.1$ mph

$U_t = 1$ hour

$$t = \frac{3600}{U_f} = \frac{3600}{61.1} = 58.92 \text{ sec}$$

$$U_f = 61.1 = U_{t_{58.92}} = 61.1 \text{ mph}$$

Using fig 3-13 (USACE, 1984) Shoulton manual

$t = 58.92$ & 59 sec $\quad \frac{U_{t=59}}{U_{3600}} = 1.24$, the 1-hour average wind speed is

$$U_{t_{3600sec}} = \frac{U_{t59}}{\left(\frac{U_{t59}}{U_{3600}}\right)} = \frac{61.1}{1.24} = 49.27 \text{ mph}$$

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Page _____ of _____

Client:
Job Location:
Task Order Number:

Date:
Project:
Scale:

By:
Checked By:

Wind stress and drag

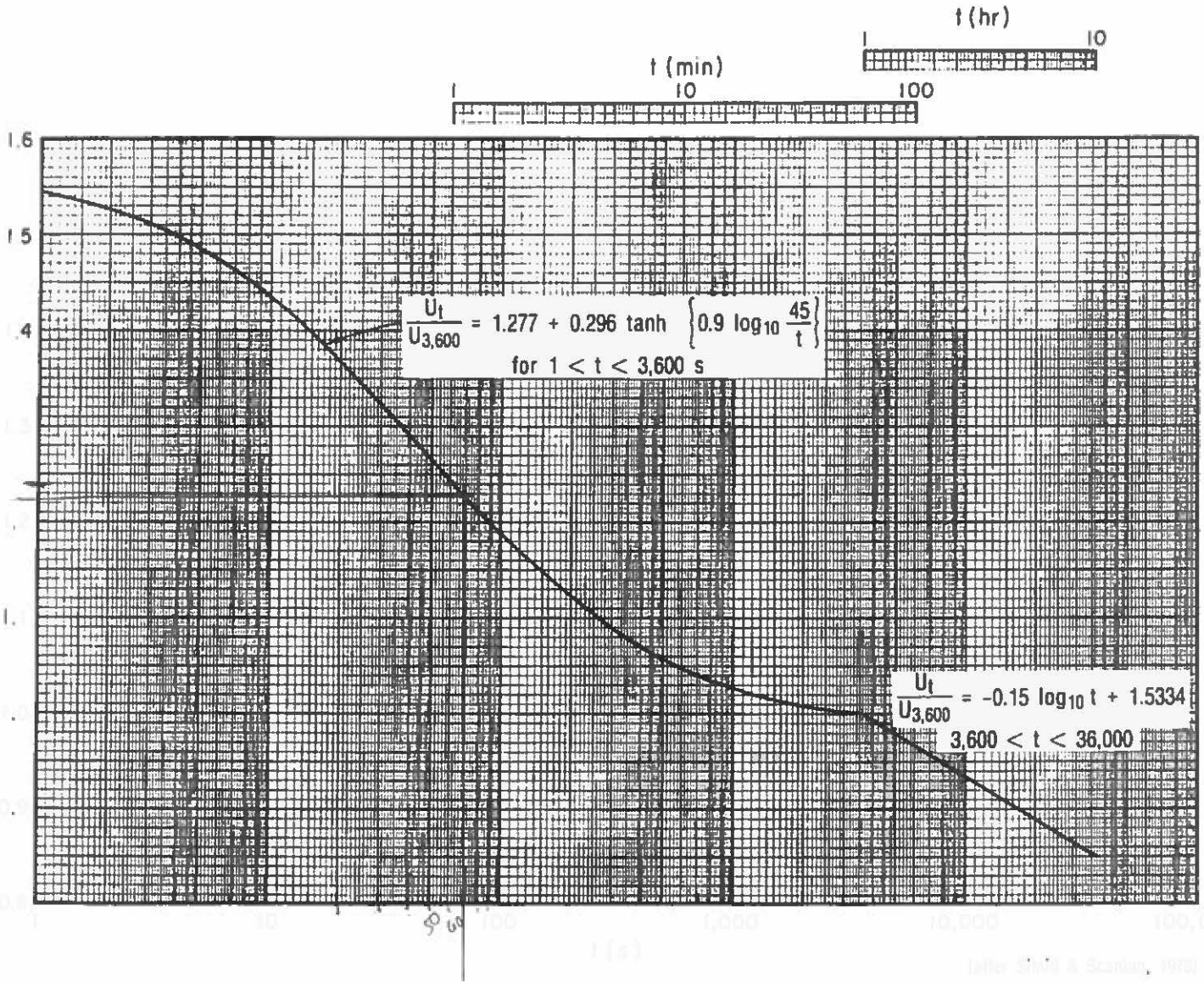
$\tau = C_D \rho_{air} U^2$

U_{10} = wind @ 10m above sea level
from site weather station

- max observed = 93.9 mph
- avg = 12.94
- median = 11.72
- NBH airport = 61.1 mph
  = 31 mph

$\rho_{air} = 0.76$ lb/ft³

C_D = drag coeff.


t (hr)
1
10
t (min)
1
10
100
1.6
1.5
1.4
$\frac{U_t}{U_{3,600}} = 1.277 + 0.296 \tanh \left\{0.9 \log_{10} \frac{45}{t}\right\}$
for $1 < t < 3,600$ s
$\frac{U_t}{U_{3,600}} = -0.15 \log_{10} t + 1.5334$
$3,600 < t < 36,000$

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Client:
Job Location:
Task Order Number:

Date:
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Scale:

By:
Checked By:

Stability Correction

ΔT_{as} = Air Sea Temp Difference

$T_a = 10$

$T_s = 40$

$\Delta T_{as} = T_a - T_s = 10 - 40 = -30F = -16.11°C$

∴ per USACE, 1984 - boundary layer is unstable and windspeed is effective in causing wave growth

$U = R_T\, U(10)$ = effective wind speed

R_T = Fig 3-14 = 1.07

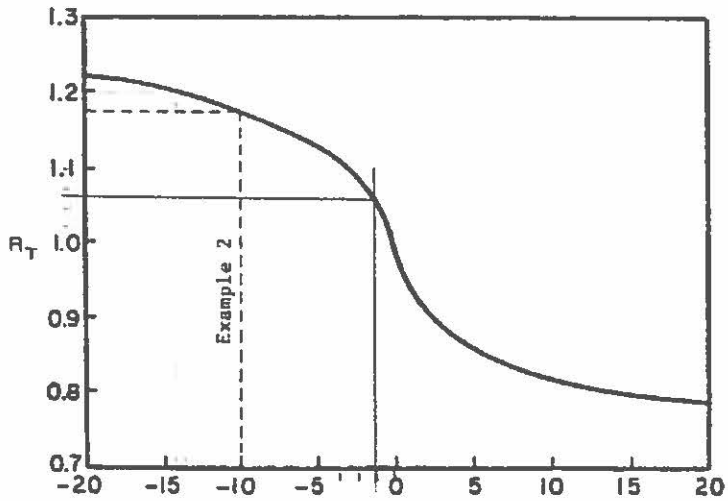
$U = 1.07(49.27) = 53mph$ (52.72)

Coeff of Drag for wind stress

$U_A = .589\, U^{1.23}$

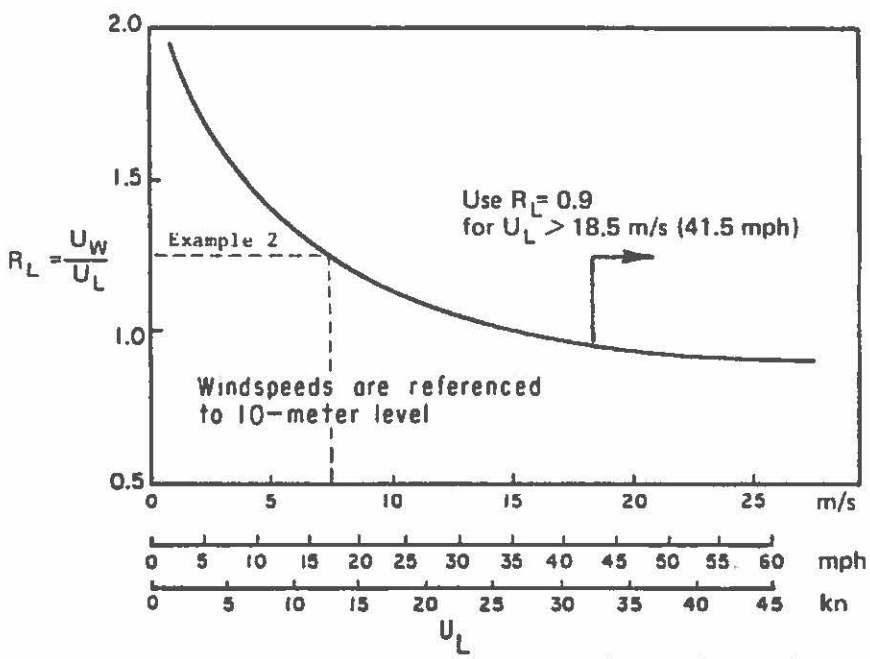
$= .589(53)^{1.23} = 88.77$

$= 77.8$



(Resio & Vincent, 1977b)

Figure 3-14. Amplification ratio, R_T , accounting for effects of air-sea temperature difference.



(after Resio & Vincent, 1977b)

Figure 3-15. Ratio, R_L , of windspeed over water, U_W , to windspeed over land, U_L , as a function of windspeed over land, U_L.

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Scale:

By:
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Fetch - wind wave -

From
3-39 &
3-40 Shore Protect. manual.

wind speed U_{10} = 55 mph

f = W.E dist = 625 ft

water depth = h = 20 ft

significant wave height H_s = 0.838 ft.
wave period T = 1.179 sec

U_{10} = 30 mph
f = 625
h = 20
H_s = 0.482 ft
T = 0.979 s

wind = 55
f = 6720
h = 20
H_s = 2.609
T = 2.511

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Page _____ of _____

Client: Date: By:
Job Location: Project: Checked By:
Task Order Number: Scale:

Armor - shoreline

γ_r = unit weight of stone $H = 3.0$ ft.

γ_w = unit weight of water

K_d = stability coeff - 20 & 4

θ = angle of bank (slope = 3H:1V, 18.4)

$$w_r = \frac{\left(\frac{165\,lb}{ft^3}\right)(3^3)}{2\left(\frac{165}{62.4}\right)^3 \cot(18.4)} \rightarrow 4455 = 40\ lb.$$

110.93 ~~111.156~~
~~110.93~~

from table 7-12 = ~~8"~~ 8.6 in.

for $K_d = 4.0$

$$w_r = \frac{4455}{221.86} = 20\ lb. \approx 6.0\ in.$$

$h = 2.61$ $w_r = \frac{165(2.61)^3}{2\left(\frac{165}{62.4}\right)^3 \cot 18.4} = 26.44\ lb = \approx 7.4''$ stone

$h = 0.482$ $= 165(0.482 = 0.166\ lb. \approx 1\frac{1}{2}''$ stone

Table 7-12. Weight and size selection dimensions of quarrystone[1].

Weight mt (tons)	Dimension m (ft)	Weight kg (lb)	Dimension m (ft)	Weight kg (lb)	Dimension cm (in)	Weight kg (lb)	Dimension cm (in)	Weight kg (lb)	Dimension cm (in.)
0.907 (1)	0.81 (2.64)	45.36 (100)	0.30 (0.97)	2.27 (5)	10.92 (4.30)				
1.814 (2)	1.02 (3.33)	90.72 (200)	9.38 (1.23)	4.54 (10)	13.77 (5.42)	0.23 (0.5)	5.08 (2.00)	0.01 (0.025)	1.88 (0.74)
2.722 (3)	1.16 (3.81)	136.08 (300)	0.43 (1.40)	6.81 (15)	15.77 (6.21)				
3.629 (4)	1.28 (4.19)	181.44 (400)	9.50 (1.54)	9.07 (20)	17.35 (6.83)	0.45 (1.0)	6.40 (2.52)	0.02 (0.050)	2.36 (0.93)
4.536 (5)	1.38 (4.52)	226.80 (500)	0.51 (1.66)	11.34 (25)	18.70 (7.36)				
5.443 (6)	1.46 (4.80)	272.16 (600)	0.54 (1.77)	13.61 (30)	19.86 (7.82)	0.68 (1.5)	7.32 (2.88	0.03 (0.75)	2.70 (1.06)
6.350 (7)	1.54 (5.05)	317.52 (700)	0.57 (1.86)	15.88 (35)	20.90 (8.23)				
7.258 (8)	1.61 (5.28)	362.88 (800)	0.60 (1.95)	18.14 (40)	21.84 (8.60)	0.91 (2.0)	8.05 (3.17)	0.04 (0.100)	2.97 (1.17)
8.165 (9)	1.67 (5.49)	408.24 (900)	0.62 (2.02)	20.41 (45)	22.73 (8.95)				
9.072 (10)	1.73 (5.69)	453.60 (1000)	0.64 (2.10)	22.68 (50)	23.55 (9.27)	1.13 (2.5)	8.66 (3.41)	0.06 (0.125)	3.20 (1.26)
9.979 (11)	1.79 (5.88)	498.96 (1100)	0.66 (2.16)	24.95 (55)	24.31 (9.57)				
10.866 (12)	1.84 (6.05)	544.32 (1200)	0.68 (2.23)	27.22 (60)	25.02 (9.85)	1.36 (3.0)	9.22 (3.63)	0.07 (0.150)	3.40 (1.34)
11.793 (13)	1.89 (6.21)	589.68 (1300)	0.70 (2.27)	29.48 (65)	25.70 (10.12)				
12.700 (14)	1.94 (6.37)	635.04 (1400)	0.72 (2.35)	31.75 (70)	26.34 (10.37)	1.59 (3.5)	9.70 (3.82)	0.08 (0.175)	3.58 (1.41)
13.608 (15)	1.98 (6.51)	680.40 (1500)	0.73 (2.40)	34.02 (75)	26.95 (10.61)				
14.515 (16)	2.03 (6.66)	725.76 (1600)	0.75 (2.45)	36.29 (80)	27.53 (10.84)	1.81 (4.0	10.13 (3.99)	0.09 (0.200)	3.73 (1.47)
15.422 (17)	2.07 (6.79)	771.12 (1700)	0.76 (2.50)	38.56 (85)	28.09 (11.06)				
16.330 (18)	2.11 (6.92)	816.48 (1800)	0.78 (2.55)	40.82 (90)	28.65 (11.28)	2.04 (4.5)	10.54 (4.15)	0.10 (0.225)	3.89 (1.53)
17.237 (19)	2.15 (7.05)	861.84 (1900)	0.80 (2.60)	43.09 (95)	29.16 (11.48)				
18.144 (20)	2.19 (7.17)	907.20 (2000)	0.81 (2.64)	45.36 (100)	29.54 (11.63)	2.27 (5.0)	10.92 (4.30)	0.11 (0.250)	4.04 (1.59)

[1] Dimensions correspond to size measured by sieve, grizzly, or visual inspection for stone of 25.9 kilonewtons per cubic meter unit weight. Do not use for determining structure crest width or layer thickness.

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Model - Lally

Bed Shear 8 N/m² → medium gravel 0.31 - .63 in
(wind, wave, tide)

Ice scour

Boat scour / prop wash - 25hp -

2ft from MLLW to cap.
non-ducted @ 102 hp D_{50} = 2 1/4"
Ducted @ 102 hp D_{50} = 3 1/2"
coarse gravel / small cobble

Appendix O

Existing Site Conditions Report

New Bedford Harbor Superfund Site

U.S. Army Corps of Engineers New England District

Existing Conditions Technical Memorandum

ACE-J23-35BG2000-M17-0007|0

June 2018

New Bedford Harbor Superfund Site

Project no:	35BG2000
Document title:	Existing Conditions Technical Memorandum
Document No.:	ACE-J23-35BG2000-M17-0007
Revision:	0
Date:	June 2018
Client name:	U.S. Army Corps of Engineers New England District
Project manager:	Steve Fox
Author:	Morgan Biddle

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Document history and status

Revision	Date	Description	By	Review	Approved

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2.0 Survey Areas 1
3.0 Survey Methods and Sequence 1
4.0 Survey Compliance 1
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Figure 2 Grid of Analyzed Asphalt Cap

Appendices

Appendix A Data for Initial Elevations at Site
Appendix B Photographs of Existing Damage in Their Respective Grid Cells

Acronyms and Abbreviations

Aerovox facility	former Aerovox Corporation property
ft.	foot/feet
in.	inch
Jacobs	Jacobs Engineering Group, Inc.
Site	designated protection area

1.0 Purpose

The purpose of this technical memorandum is to review and document existing asphalt and site conditions at the former Aerovox property. A pre and post construction survey will be conducted.

2.0 Survey Areas

The area being identified in this memorandum includes a bituminous asphalt parking lot as well as an asphalt cap and sheetpile wall at the former Aerovox facility. The area consists of 10 acres and is bounded by Graham Street to the north, Hadley Street to the south, Belleville Avenue to the west, and the Acushnet River to the east.

Equipment and materials used to construct the New Bedford Harbor Interim Cap will be temporarily stored at the former Aerovox property. Protective mats will be placed on the asphalt surface, in the designated area shown in Figure 1, as well as a more robust protection system along the sheet pile wall. The sheet pile wall will be protected using filter fabric, covered with at least 12 in of 1 ½ in minus (dense grade) covered by either composite mats or 8 in oak crane mats. Monitoring will occur throughout construction to assure no damage to the asphalt cap occurs. The methods to determine pre-existing conditions at this site are described below.

3.0 Survey Methods and Sequence

A sheetpile elevation survey and photo-documentation of pre-existing conditions was conducted on 6 June 2018. A grid system, see Figure 2, was used to organize and document site conditions. This grid subdivides the site into approximately 55 ft. by 50 ft. square intervals. At each of these intervals, any discrepincies within the arewa were noted using photo-documentation and can be found in Appendix B. Photographs are organized by grid cell. If an abnormality in the surface was observed, additional documentation including measurements using reference materials were collected. In conjunction with this grid analysis, a sheetpile elevation survey was conducted to document location and elevation. See Appendix A.

A subsequent event will be conducted after the interim cap is constructed and installed. Photographs will be collected using the same grid sequencing, and compared to the initial documentation. Any variance of changes will be noted and documented. A post construction elevation survey will be conducted of the sheet pile wall and compared to the 6 June 2018 survey. Any variance will be documented.

4.0 Survey Compliance

Surveys will comply with current U.S. Army Corps of Engineers Engineering and Design Policies, Guidance, and Requirements.

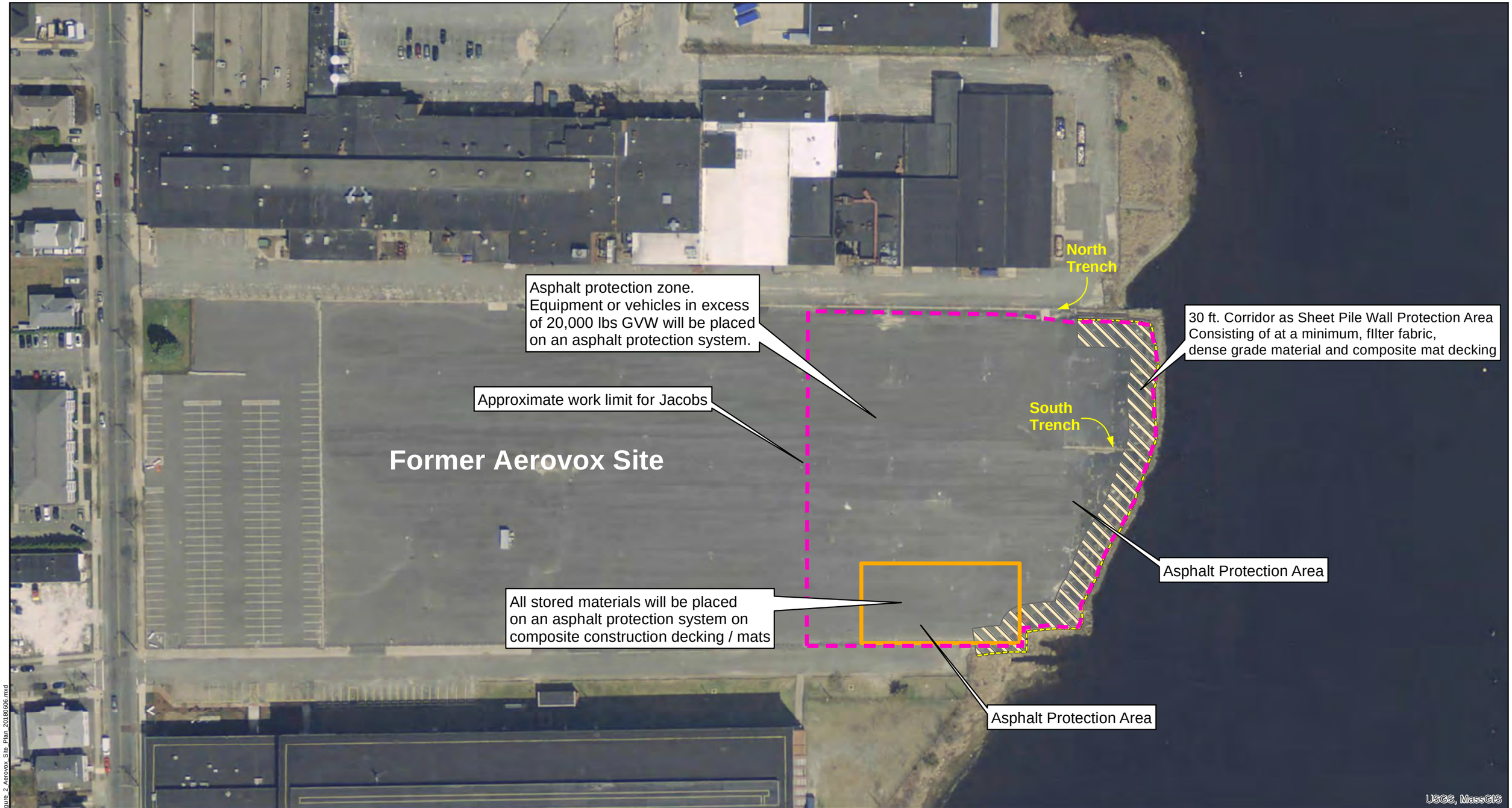
5.0 Deliverables

Pre and post construction deliverables will include:

- Topographic map of specified area;
- Photo of the subdivided site;

- Photographs of existing conditions; and
- Data file(s) of surveys presented in an xyz ASCII text file, comma or tab delimited.

Figures



Legend

- Sheet Pile Location
- 30 ft. Sheet Pile Protection Buffer
- Proposed Laydown and Storage Area
- Proposed Cap Protection Area

Aerial Photography MASSGIS 2014

N

0 50 100 Feet

1:1,200

JACOBS

Former Aerovox Site Area

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/6/2018

Figure 1

Path: Y:\NB\Projects\35BG1001\20180201\ArcGIS\Figure_2_Aerovox_Site_Plan_20180606.mxd

Legend

- Sheet Pile Location
- 30 ft. Sheet Pile Protection Buffer
- Proposed Laydown and Storage Area
- Proposed Cap Protection Area

Aerial Photography MASSGIS 2014

N

1:600

JACOBS

Former Aerovox Site
Photo Points

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/13/2018 **Figure 2**

Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Aerovox_Site_Photos_20180611.mxd

Appendices

Appendix A
Data of Current Elevations at Site

Location	Easting	Northing	Std. Dev
PREEXIST001	815448.341	2706666.45	3.925
PREEXIST002	815449.073	2706661.67	3.783
PREEXIST003	815449.763	2706654.572	3.551
PREEXIST004	815462.178	2706665.56	3.455
PREEXIST005	815462.434	2706661.739	3.356
PREEXIST006	815462.471	2706655.137	3.198
PREEXIST007	815469.207	2706659.875	3.14
PREEXIST008	815472.985	2706656.087	2.75
PREEXIST009	815464.964	2706688.282	4.101
PREEXIST010	815470.13	2706683.201	3.864
PREEXIST011	815473.399	2706678.142	3.577
PREEXIST012	815491.368	2706695.746	3.904
PREEXIST013	815492.093	2706687.154	3.509
PREEXIST014	815491.88	2706679.865	3.126
PREEXIST015	815491.526	2706695.899	3.858
PREEXIST016	815516.189	2706697.279	3.56
PREEXIST017	815512.783	2706687.945	3.279
PREEXIST018	815511.837	2706681.382	2.94
PREEXIST019	815527.43	2706685.625	2.766
PREEXIST020	815530.912	2706682.325	2.521
PREEXIST021	815527.66	2706696.509	3.157
PREEXIST022	815532.671	2706696.159	2.837
PREEXIST023	815519.05	2706714.89	3.892
PREEXIST024	815528.36	2706712.559	3.632
PREEXIST025	815534.006	2706710.405	3.139
PREEXIST026	815527.811	2706728.512	4.021
PREEXIST027	815536.648	2706727.429	3.724
PREEXIST028	815542.104	2706725.634	3.114
PREEXIST029	815530.883	2706739.718	3.916
PREEXIST030	815540.285	2706737.695	3.446
PREEXIST031	815546.239	2706735.369	2.714
PREEXIST032	815536.333	2706749.806	3.725

Location	Easting	Northing	Std. Dev
PREEXIST033	815546.1	2706748	3.41
PREEXIST034	815551.9	2706746	2.95
PREEXIST035	815557.2	2706762	2.895
PREEXIST036	815549.8	2706765	3.4
PREEXIST037	815541.9	2706767	3.662
PREEXIST038	815549.4	2706781	3.42
PREEXIST039	815556.9	2706779	3.099
PREEXIST040	815563.6	2706777	2.773
PREEXIST041	815572.1	2706789	2.697
PREEXIST042	815565.1	2706791	2.997
PREEXIST043	815556.4	2706793	3.242
PREEXIST044	815563.4	2706805	3.203
PREEXIST045	815573.3	2706804	2.967
PREEXIST046	815579.9	2706801	2.878
PREEXIST047	815586.1	2706816	2.621
PREEXIST048	815579.5	2706818	3.064
PREEXIST049	815572.5	2706819	3.365
PREEXIST050	815578.9	2706835	3.311
PREEXIST051	815585.4	2706835	2.925
PREEXIST052	815591	2706832	2.76
PREEXIST053	815600.2	2706847	2.17
PREEXIST054	815591.6	2706851	2.593
PREEXIST055	815583.4	2706851	2.94
PREEXIST056	815589	2706862	2.639
PREEXIST057	815596.7	2706861	2.465
PREEXIST058	815602.6	2706860	2.467
PREEXIST059	815608.3	2706871	2.352
PREEXIST060	815600.3	2706871	2.413
PREEXIST061	815591.2	2706872	2.608
PREEXIST062	815592.6	2706876	3.03
PREEXIST063	815601.6	2706876	2.627
PREEXIST064	815610.1	2706875	2.317
PREEXIST065	815613.2	2706890	2.943

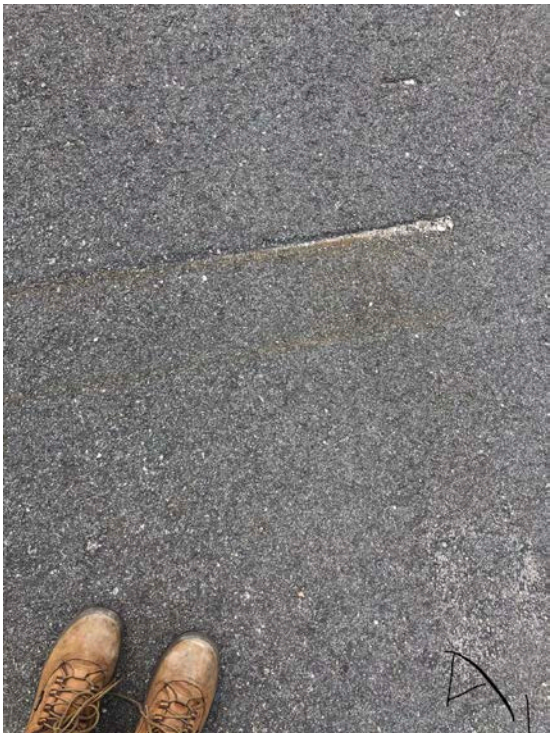
Location	Easting	Northing	Std. Dev
PREEXIST066	815605.2	2706892	3.73
PREEXIST067	815597.8	2706893	4.385
PREEXIST068	815599.2	2706907	4.983
PREEXIST069	815605.1	2706907	4.704
PREEXIST070	815612.5	2706906	3.91
PREEXIST071	815611.5	2706923	4.42
PREEXIST072	815606	2706923	5.102
PREEXIST073	815599.2	2706924	5.523
PREEXIST074	815598.6	2706938	5.663
PREEXIST075	815604.1	2706938	5.306
PREEXIST076	815611	2706937	4.323
PREEXIST077	815612.3	2706952	3.338
PREEXIST078	815606.9	2706953	3.603
PREEXIST079	815599.2	2706953	4.349
PREEXIST080	815599.6	2706969	4.151
PREEXIST081	815607.5	2706968	4.087
PREEXIST082	815614.3	2706968	3.68
PREEXIST083	815613.5	2706983	4.261
PREEXIST084	815606.2	2706983	4.599
PREEXIST085	815599	2706983	4.923
PREEXIST086	815598	2706995	4.812
PREEXIST087	815604.7	2706997	4.677
PREEXIST088	815611.2	2706998	4.33
PREEXIST089	815598.6	2707001	4.733
PREEXIST090	815607.1	2707013	4.238
PREEXIST091	815599.9	2707015	4.436
PREEXIST092	815598	2707009	4.567
PREEXIST093	815577.2	2707004	6.027
PREEXIST094	815577.8	2707011	6.057
PREEXIST095	815578.2	2707018	5.927
PREEXIST096	815564	2707018	6.391
PREEXIST097	815563.5	2707012	6.383
PREEXIST098	815562.8	2707006	6.336

Location	Easting	Northing	Std. Dev
PREEXIST099	815549.2	2707004	6.609
PREEXIST100	815548.9	2707012	6.677
PREEXIST101	815549.2	2707019	6.892
PREEXIST102	815533	2707005	6.982
PREEXIST103	815532	2707012	7.059
PREEXIST104	815531.5	2707017	7.107
TOPSHEETPRE001	815531.1	2707020	7.662
TOPSHEETPRE002	815549.3	2707020	7.371
TOPSHEETPRE003	815564.1	2707019	7.029
TOPSHEETPRE004	815578.7	2707018	6.471
TOPSHEETPRE005	815600.3	2707016	5.325
TOPSHEETPRE006	815609.2	2707014	5.383
TOPSHEETPRE007	815612.5	2706998	5.401
TOPSHEETPRE008	815615.2	2706984	5.349
TOPSHEETPRE009	815616.6	2706968	4.23
TOPSHEETPRE010	815613.7	2706952	3.973
TOPSHEETPRE011	815612	2706937	5.111
TOPSHEETPRE012	815612.7	2706923	5.377
TOPSHEETPRE013	815614.3	2706906	4.786
TOPSHEETPRE014	815614.3	2706890	3.885
TOPSHEETPRE015	815610.4	2706874	3.588
TOPSHEETPRE016	815609.1	2706870	3.425
TOPSHEETPRE017	815604.5	2706859	3.403
TOPSHEETPRE018	815601	2706847	3.594
TOPSHEETPRE019	815594	2706830	3.658
TOPSHEETPRE020	815588.3	2706815	3.941
TOPSHEETPRE021	815581.3	2706800	3.802
TOPSHEETPRE022	815573.8	2706788	3.791
TOPSHEETPRE023	815565.6	2706776	3.866
TOPSHEETPRE024	815558.1	2706761	3.656
TOPSHEETPRE025	815552.7	2706746	3.851
TOPSHEETPRE026	815547.3	2706735	3.908
TOPSHEETPRE027	815542.9	2706725	3.839

Location	Easting	Northing	Std. Dev
TOPSHEETPRE028	815535	2706710	4.101
TOPSHEETPRE029	815533.7	2706696	3.977
TOPSHEETPRE030	815532	2706682	3.679
TOPSHEETPRE031	815511.9	2706681	3.691
TOPSHEETPRE032	815491.9	2706679	3.817
TOPSHEETPRE033	815473.5	2706677	3.866
TOPSHEETPRE034	815473.3	2706655	3.835
TOPSHEETPRE035	815462.5	2706655	3.833
TOPSHEETPRE036	815449.9	2706654	4.048

Appendix B
Photographs of Existing Conditions

A1



A1

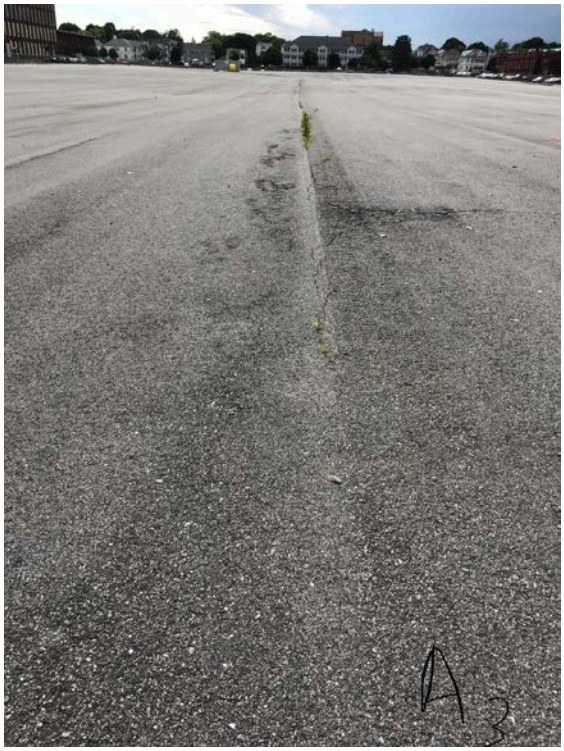
A1

A1

A6

A2

A3



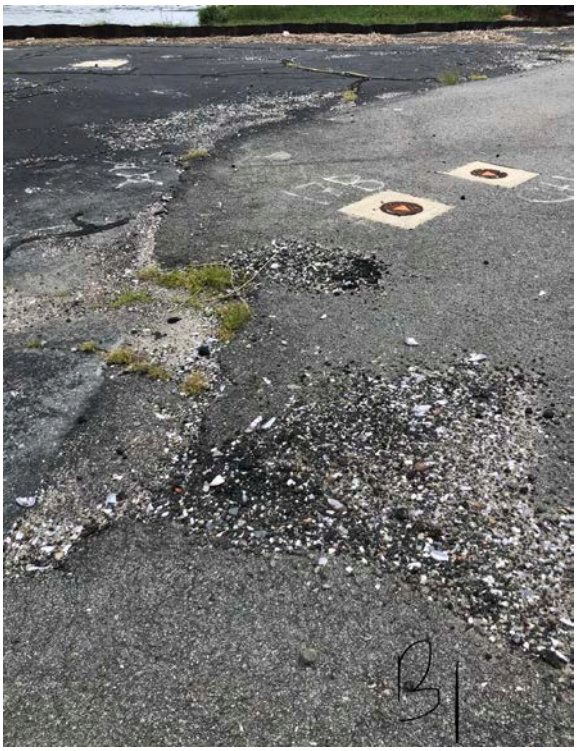
A3

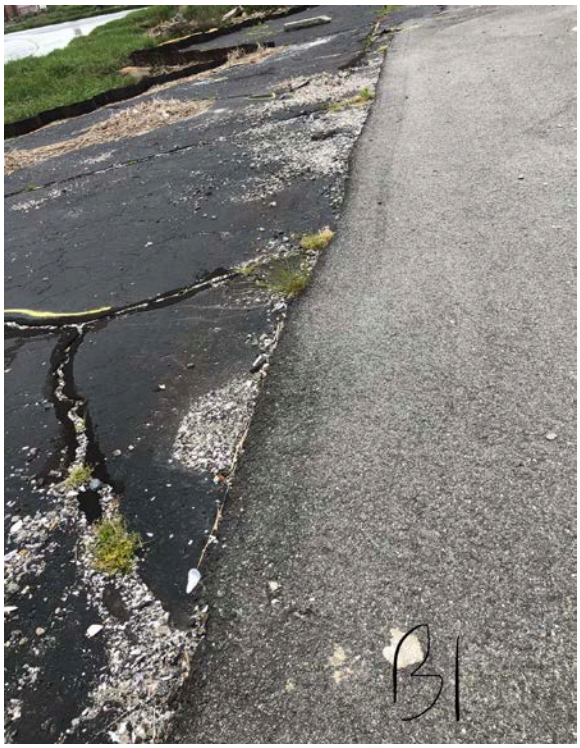
A4

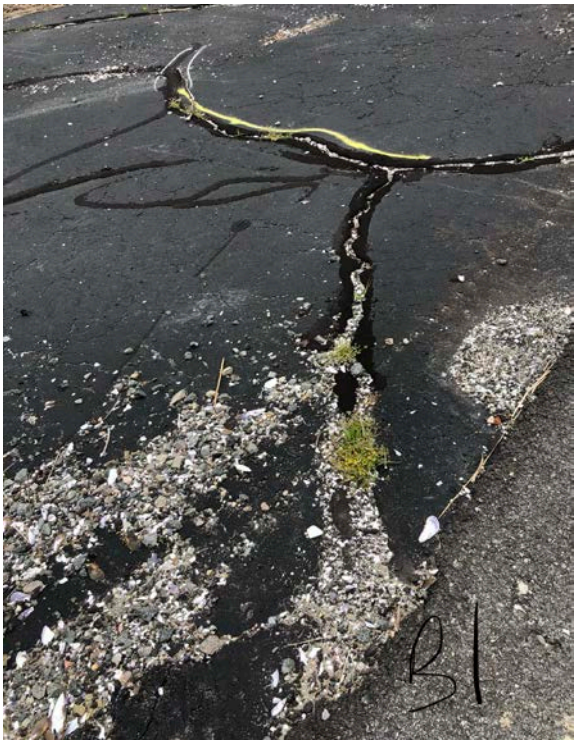
A5

A6

B1

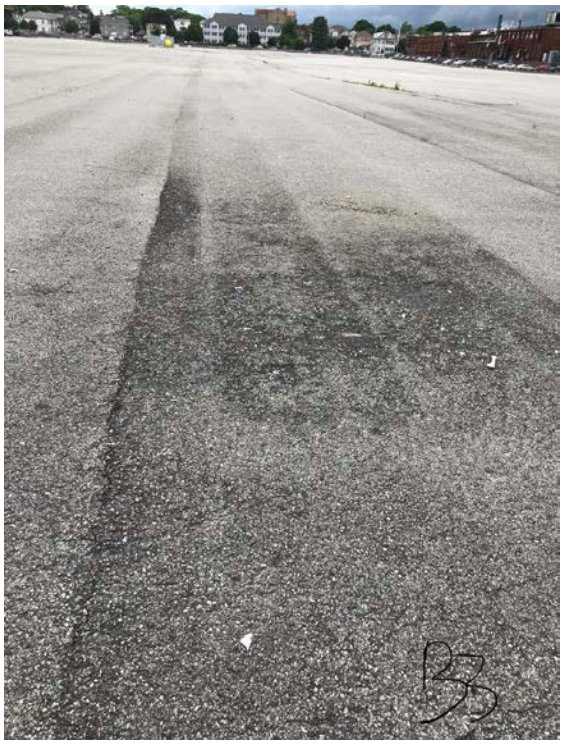






B2

B3



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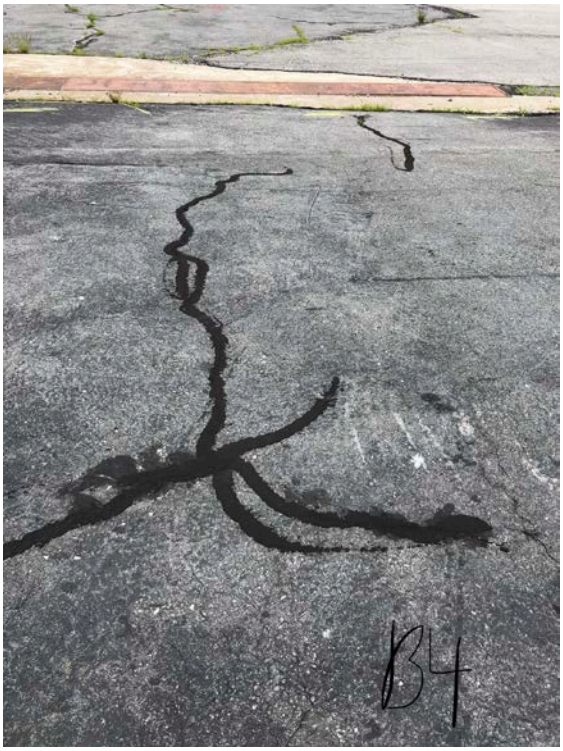

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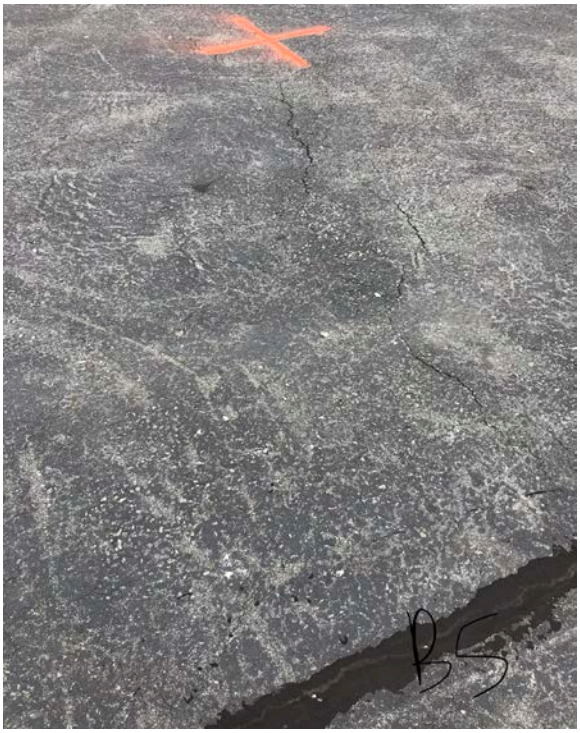
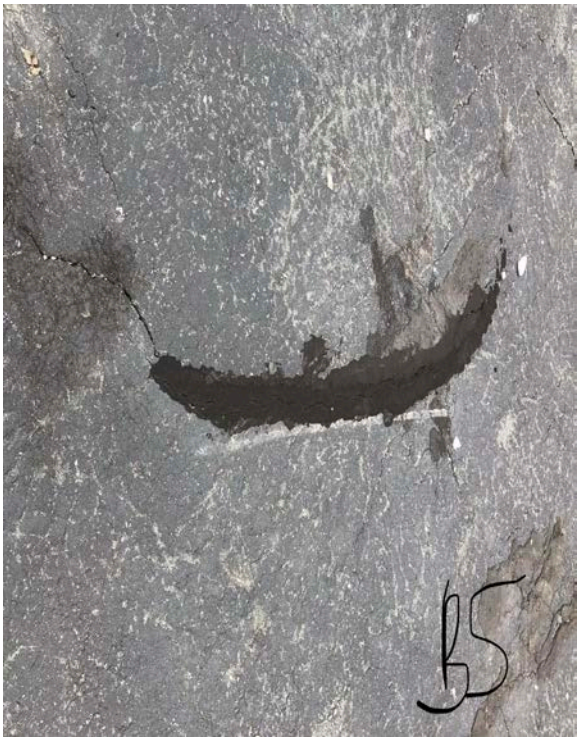
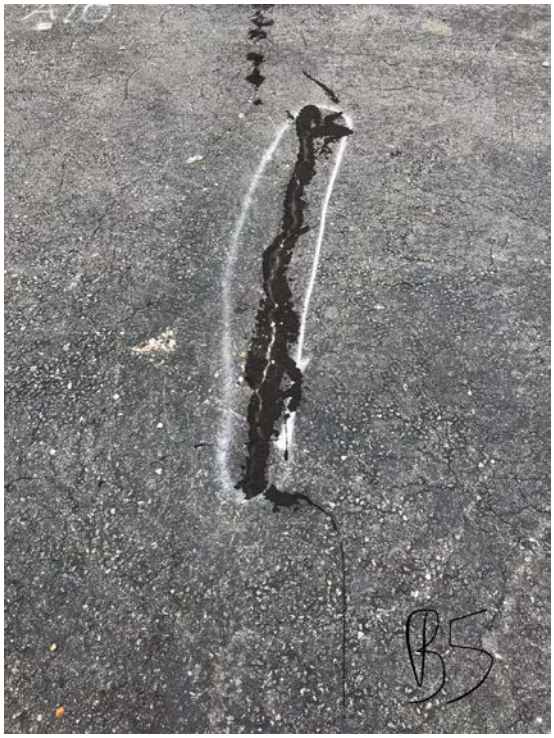




B5

B5


B5

B6

B6

B6

B6

B6

BL

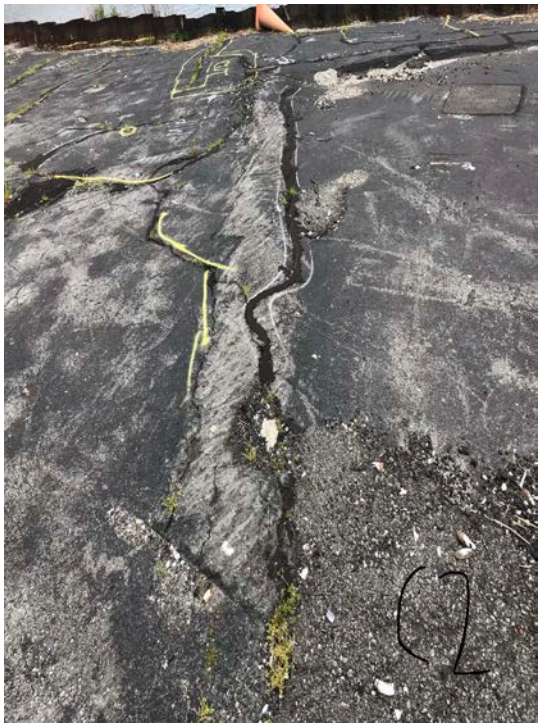
BL

BL

BL

C1

C2



C3

C4

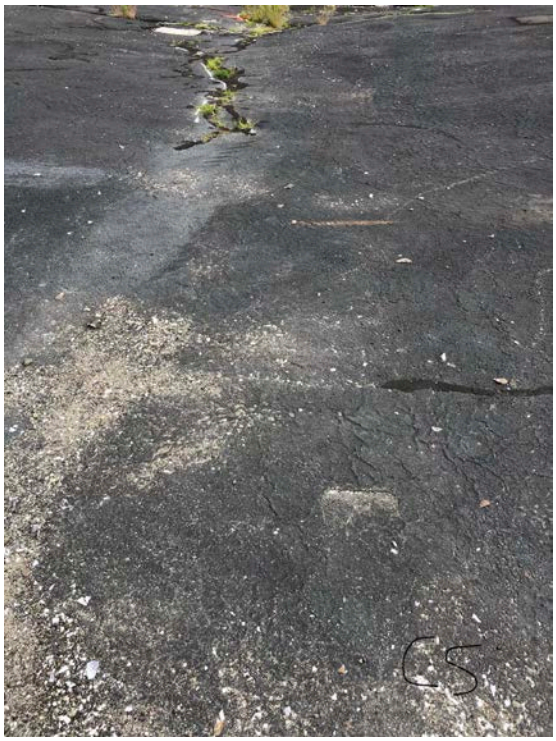
C4

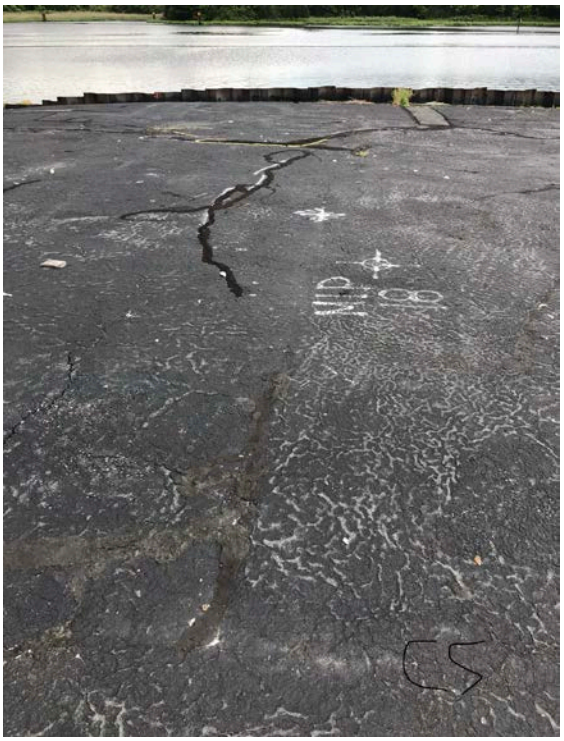
C4

C4

MW-7B
C4

C5





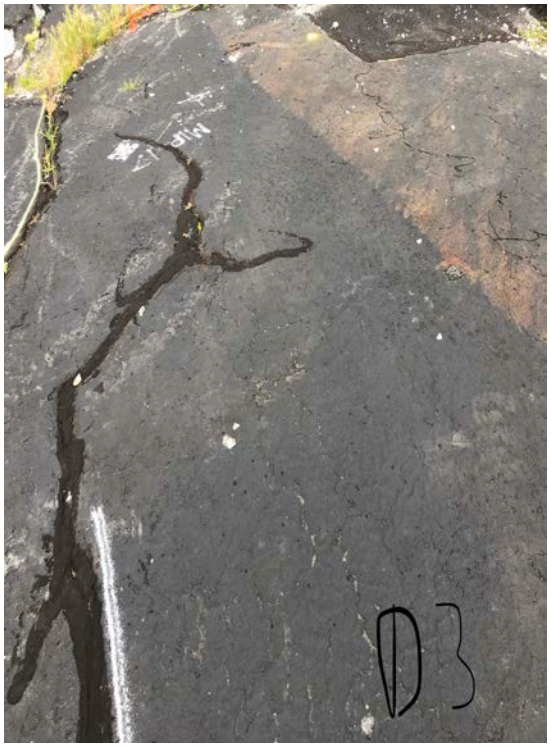
CS

C6

D1

D2

D3



D4

Appendix P

Cap Limit Coordinates

Cap_Boundary_Points_20180413

Id	X	Y
0	815657.19	2707169.06
1	815666.31	2707164.96
2	815675.75	2707161.68
3	815685.11	2707158.16
4	815694.62	2707155.07
5	815704.15	2707152.07
6	815713.67	2707148.99
7	815723.00	2707145.41
8	815732.29	2707141.71
9	815741.58	2707138.00
10	815750.87	2707134.30
11	815760.34	2707131.07
12	815769.80	2707127.85
13	815779.27	2707124.63
14	815788.72	2707121.36
15	815798.16	2707118.05
16	815807.59	2707114.73
17	815816.88	2707111.05
18	815826.13	2707107.23
19	815835.32	2707103.29
20	815843.96	2707098.27
21	815852.48	2707093.05
22	815860.97	2707087.77
23	815869.58	2707082.69
24	815877.60	2707076.73
25	815884.50	2707069.53
26	815889.52	2707060.99
27	815892.02	2707051.35
28	815893.97	2707041.54
29	815896.02	2707031.76
30	815897.82	2707021.92
31	815899.43	2707012.06
32	815900.36	2707002.10
33	815901.25	2706992.14
34	815902.24	2706982.19
35	815903.30	2706972.25
36	815903.44	2706962.25
37	815903.44	2706952.25
38	815902.79	2706942.28
39	815902.09	2706932.30
40	815901.38	2706922.33
41	815900.68	2706912.35
42	815899.69	2706902.40
43	815898.55	2706892.47
44	815897.41	2706882.53
45	815896.28	2706872.60
46	815895.14	2706862.66
47	815894.01	2706852.73
48	815892.87	2706842.79
49	815891.42	2706832.90
50	815889.86	2706823.02

Cap_Boundary_Points_20180413

Id	X	Y
51	815888.31	2706813.14
52	815886.52	2706803.31
53	815883.80	2706793.68
54	815881.05	2706784.07
55	815878.27	2706774.46
56	815874.58	2706765.17
57	815870.84	2706755.90
58	815866.58	2706746.86
59	815861.69	2706738.16
60	815855.40	2706730.39
61	815849.10	2706722.63
62	815841.49	2706716.14
63	815833.88	2706709.65
64	815825.49	2706704.23
65	815816.99	2706698.97
66	815808.08	2706694.42
67	815799.16	2706689.91
68	815790.00	2706685.90
69	815780.74	2706682.13
70	815771.32	2706678.81
71	815761.53	2706676.74
72	815751.69	2706675.01
73	815741.82	2706673.36
74	815731.97	2706671.63
75	815722.11	2706669.97
76	815712.21	2706668.59
77	815702.31	2706667.20
78	815692.40	2706665.81
79	815682.49	2706664.48
80	815672.55	2706663.40
81	815662.61	2706662.31
82	815652.67	2706661.26
83	815642.71	2706660.29
84	815632.76	2706659.32
85	815622.80	2706658.47
86	815612.82	2706657.86
87	815602.84	2706657.24
88	815592.86	2706656.50
89	815582.89	2706655.75
90	815572.94	2706654.76
91	815563.01	2706653.56
92	815553.04	2706652.89
93	815543.27	2706651.86
94	815533.28	2706651.58
95	815523.28	2706651.30
96	815513.28	2706651.02
97	815505.35	2706650.79

Legend

- Cap Edge Location Point (10 ft Spacing)
- Sheet Pile Location

Aerial Photography MASSGIS 2014

DRAFT

0 20 40 Feet

1:600

JACOBS

Aerovox Cap Boundary Point Locations 10 ft Spacing

New Bedford Harbor Superfund Site

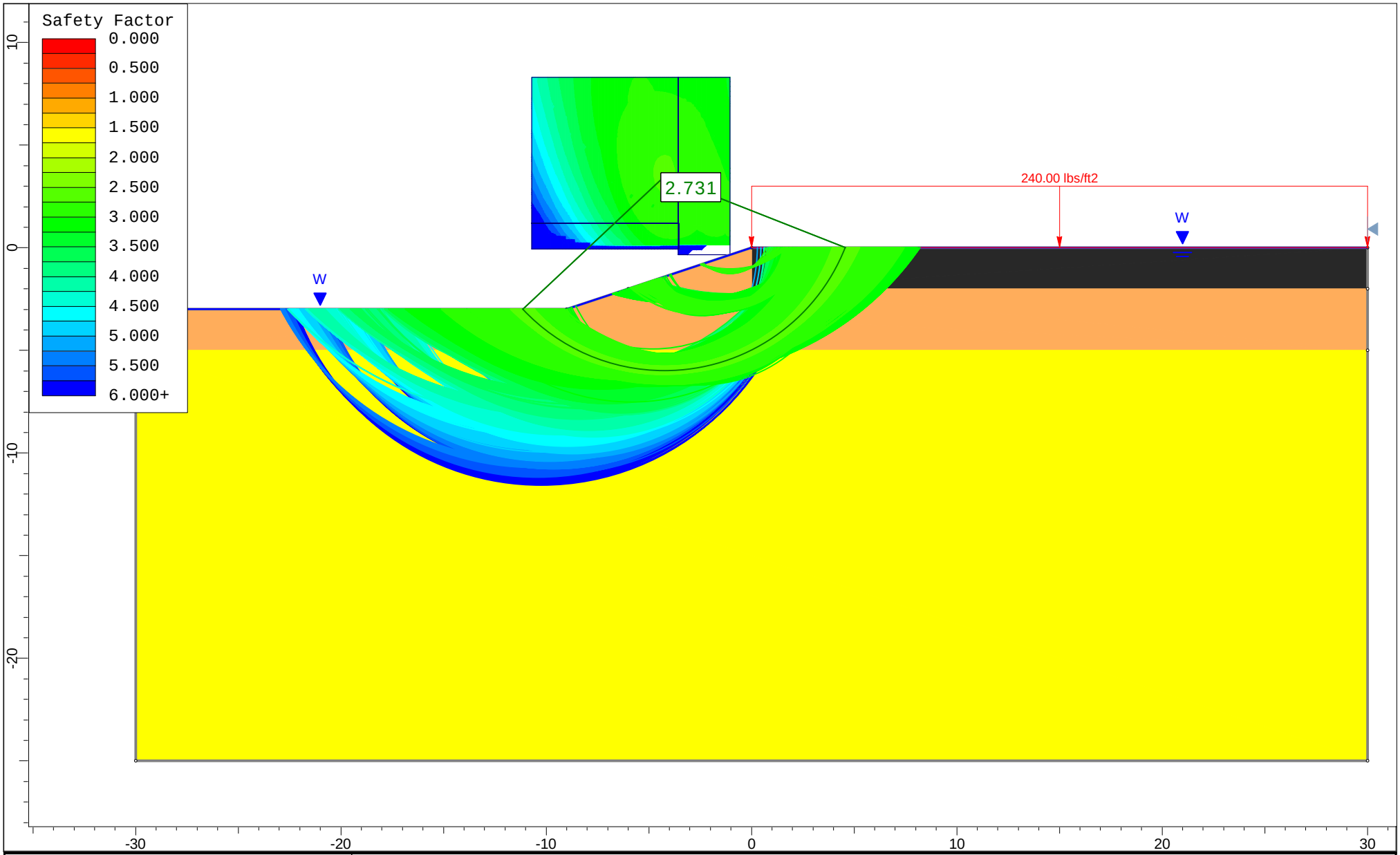
Date: 4/13/2018

Figure X-X

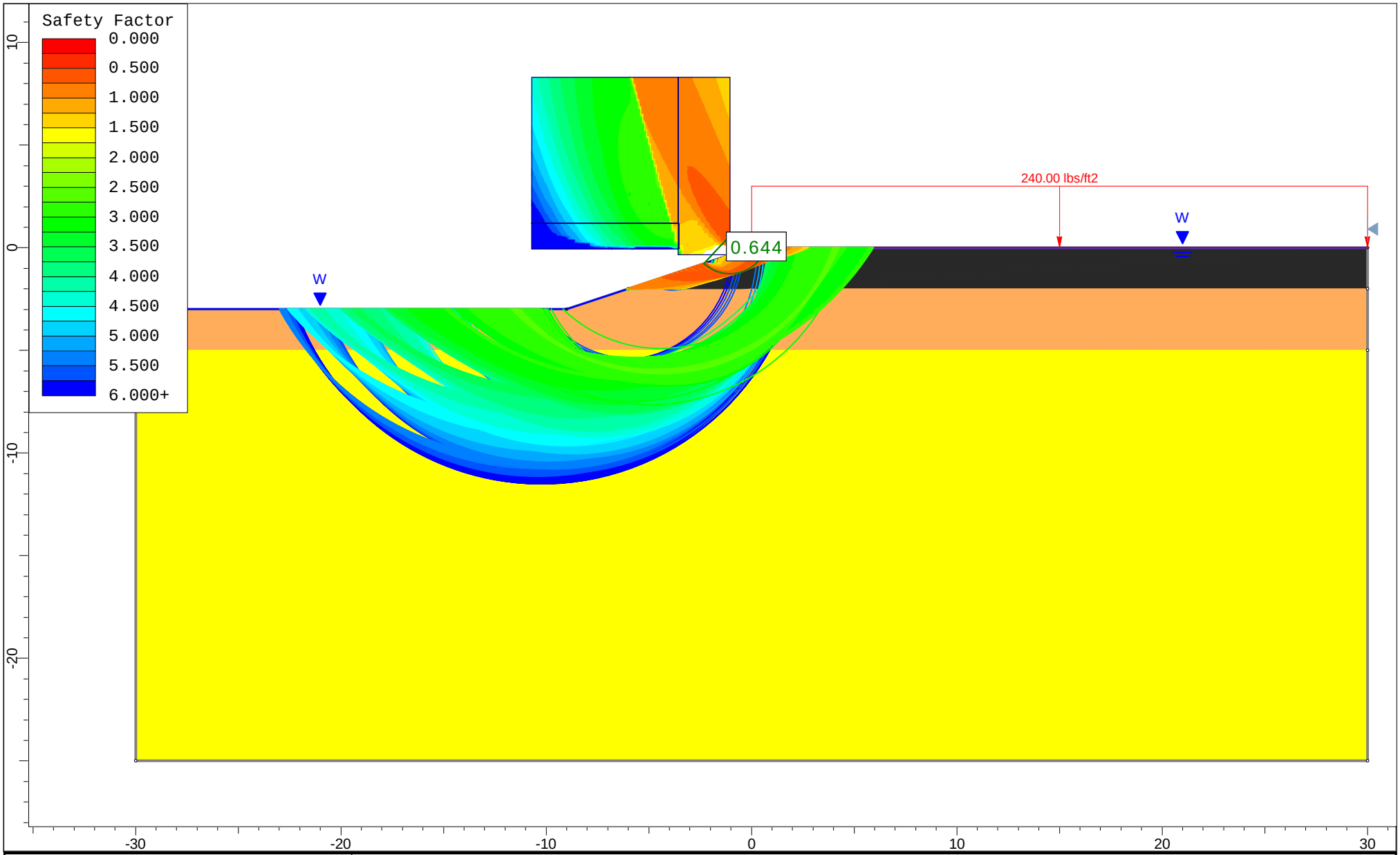
Path: Y:\NBH\Projects\35BG1001\20180201\ArcGIS\Working\Aerovox_Cap_Boundary_Coordinates_Working_20180413.mxd

Appendix Q

Slope Stability Calculations



rocscience	Project	SLIDE - An Interactive Slope Stability Program	
	Analysis Description		
	Drawn By	Scale 1:78	Company
SLIDEINTERPRET 7.020	Date 11/6/2017, 11:16:37 AM		File Name 3-1 Slope.slim



rocscience	Project	SLIDE - An Interactive Slope Stability Program	
	Analysis Description		
	Drawn By	Scale 1:78	Company
SLIDEINTERPRET 7.020	Date 11/6/2017, 11:16:37 AM		File Name 3-1 Slope.slim

Slide Analysis Information
SLIDE - An Interactive Slope Stability Program

Project Summary

File Name:	3-1 Slope
Slide Modeler Version:	7.02
Project Title:	SLIDE - An Interactive Slope Stability Program
Date Created:	11/6/2017, 11:16:37 AM

General Settings

Units of Measurement:	Imperial Units
Time Units:	days
Permeability Units:	feet/second
Failure Direction:	Right to Left
Data Output:	Standard
Maximum Material Properties:	20
Maximum Support Properties:	20

Analysis Options

Slices Type:	Vertical
Analysis Methods Used	
	Bishop simplified
	Corps of Engineers #1
	Janbu simplified
Number of slices:	50
Tolerance:	0.005
Maximum number of iterations:	75
Check malpha < 0.2:	Yes
Create Interslice boundaries at intersections with water tables and piezos:	Yes
Initial trial value of FS:	1
Steffensen Iteration:	Yes

Groundwater Analysis

Groundwater Method:	Water Surfaces
Pore Fluid Unit Weight [lbs/ft3]:	62.4
Use negative pore pressure cutoff:	Yes
Maximum negative pore pressure [psf]:	0
Advanced Groundwater Method:	None

Random Numbers

Pseudo-random Seed:	10116
Random Number Generation Method:	Park and Miller v.3

Surface Options

Surface Type:	Circular
Search Method:	Grid Search
Radius Increment:	15
Composite Surfaces:	Disabled
Reverse Curvature:	Invalid Surfaces
Minimum Elevation:	Not Defined
Minimum Depth:	Not Defined
Minimum Area:	Not Defined
Minimum Weight:	Not Defined

Seismic

Advanced seismic analysis:	No
Staged pseudostatic analysis:	No

Loading

1 Distributed Load present

Distributed Load 1	
Distribution:	Constant
Magnitude [psf]:	240
Orientation:	Normal to boundary

Material Properties

Property	Material 1	Material 2	Material 3
Color			
Strength Type	Mohr-Coulomb	Mohr-Coulomb	Mohr-Coulomb
Unit Weight [lbs/ft3]	80	85	120
Cohesion [psf]	0	200	0
Friction Angle [deg]	20	22	32
Water Surface	None	None	None
Ru Value	0	0	0

Global Minimums

Method: bishop simplified

FS	3.228310
Center:	-4.142, 5.170
Radius:	10.821
Left Slip Surface Endpoint:	-11.239, -3.000
Right Slip Surface Endpoint:	5.364, 0.000
Resisting Moment:	54100.2 lb-ft
Driving Moment:	16758.1 lb-ft
Total Slice Area:	52.172 ft2
Surface Horizontal Width:	16.6031 ft
Surface Average Height:	3.14231 ft

Method: janbu simplified

FS	2.731470
Center:	-4.237, 3.460
Radius:	9.458
Left Slip Surface Endpoint:	-11.145, -3.000
Right Slip Surface Endpoint:	4.564, 0.000
Resisting Horizontal Force:	4154.94 lb
Driving Horizontal Force:	1521.14 lb
Total Slice Area:	53.3374 ft2
Surface Horizontal Width:	15.7094 ft
Surface Average Height:	3.39525 ft

Method: corp of eng#1

FS	3.215030
Center:	-4.237, 5.455
Radius:	11.055
Left Slip Surface Endpoint:	-11.360, -3.000
Right Slip Surface Endpoint:	5.378, 0.000
Resisting Horizontal Force:	4406.18 lb
Driving Horizontal Force:	1370.5 lb
Total Slice Area:	51.6611 ft2
Surface Horizontal Width:	16.7379 ft
Surface Average Height:	3.08647 ft

Valid / Invalid Surfaces

Method: bishop simplified

Number of Valid Surfaces: 95312
Number of Invalid Surfaces: 11456

Error Codes:

Error Code -103 reported for 215 surfaces
Error Code -108 reported for 2 surfaces
Error Code -112 reported for 10319 surfaces
Error Code -114 reported for 920 surfaces

Method: janbu simplified

Number of Valid Surfaces: 96973
Number of Invalid Surfaces: 9795

Error Codes:

Error Code -103 reported for 215 surfaces
Error Code -108 reported for 192 surfaces
Error Code -112 reported for 8468 surfaces
Error Code -114 reported for 920 surfaces

Method: corp of eng#1

Number of Valid Surfaces: 94042
Number of Invalid Surfaces: 12726

Error Codes:

Error Code -103 reported for 215 surfaces
Error Code -108 reported for 401 surfaces
Error Code -111 reported for 191 surfaces
Error Code -112 reported for 10999 surfaces
Error Code -114 reported for 920 surfaces

Error Codes

The following errors were encountered during the computation:

-103 = Two surface / slope intersections, but one or more surface / nonslope external polygon intersections lie between them. This usually occurs when the slip surface extends past the bottom of the soil region, but may also occur on a benched slope model with two sets of Slope Limits.
-108 = Total driving moment or total driving force < 0.1. This is to limit the calculation of extremely high safety factors if the driving force is very small (0.1 is an arbitrary number).
-111 = safety factor equation did not converge
-112 = The coefficient M-Alpha = cos(alpha)(1+tan(alpha)tan(phi)/F) < 0.2 for the final iteration of the safety factor calculation. This screens out some slip surfaces which may not be valid in the context of the analysis, in particular, deep seated slip surfaces with many high negative base angle slices in the passive zone.
-114 = Surface with Reverse Curvature.

Slice Data

Global Minimum Query (bishop simplified) - Safety Factor: 3.22831

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.339772	4.08896	-39.8075	Material 2	200	22	70.8439	228.706	71.0501	0	71.0501	12.0094	12.0094
2	0.339772	11.9431	-37.5026	Material 2	200	22	73.3972	236.949	91.4515	0	91.4515	35.1265	35.1265
3	0.339772	19.178	-35.267	Material 2	200	22	75.714	244.428	109.964	0	109.964	56.4209	56.4209
4	0.339772	25.8451	-33.0915	Material 2	200	22	77.8155	251.213	126.755	0	126.755	76.0445	76.0445
5	0.339772	31.9869	-30.9687	Material 2	200	22	79.7187	257.357	141.963	0	141.963	94.1222	94.1222
6	0.339772	37.639	-28.8922	Material 2	200	22	81.4379	262.907	155.7	0	155.7	110.758	110.758
7	0.339772	43.1068	-26.8565	Material 2	200	22	83.0935	268.251	168.928	0	168.928	126.852	126.852
8	0.339772	50.567	-24.8568	Material 2	200	22	85.5348	276.133	188.435	0	188.435	148.81	148.81
9	0.339772	58.1824	-22.889	Material 2	200	22	88.0322	284.195	208.39	0	208.39	171.224	171.224
10	0.339772	65.4032	-20.9494	Material 2	200	22	90.3706	291.744	227.075	0	227.075	192.477	192.477
11	0.321624	68.8489	-19.0852	Material 3	0	32	44.4071	143.36	229.424	0	229.424	214.06	214.06
12	0.321624	75.8594	-17.2924	Material 3	0	32	48.5796	156.83	250.981	0	250.981	235.857	235.857
13	0.321624	82.4457	-15.5169	Material 3	0	32	52.4339	169.273	270.893	0	270.893	256.336	256.336
14	0.321624	88.6192	-13.7566	Material 3	0	32	55.9844	180.735	289.237	0	289.237	275.531	275.531
15	0.321624	94.3898	-12.0094	Material 3	0	32	59.244	191.258	306.075	0	306.075	293.473	293.473
16	0.321624	99.766	-10.2735	Material 3	0	32	62.223	200.875	321.466	0	321.466	310.188	310.188
17	0.321624	104.755	-8.54711	Material 3	0	32	64.9312	209.618	335.461	0	335.461	325.702	325.702
18	0.321624	109.361	-6.82851	Material 3	0	32	67.3767	217.513	348.093	0	348.093	340.025	340.025
19	0.321624	113.591	-5.11606	Material 3	0	32	69.5661	224.581	359.406	0	359.406	353.178	353.178
20	0.321624	117.447	-3.40818	Material 3	0	32	71.5058	230.843	369.426	0	369.426	365.168	365.168
21	0.321624	120.932	-1.70334	Material 3	0	32	73.2005	236.314	378.181	0	378.181	376.004	376.004
22	0.321624	124.048	0	Material 3	0	32	74.6542	241.007	385.692	0	385.692	385.692	385.692
23	0.321624	126.794	1.70334	Material 3	0	32	75.8703	244.933	391.974	0	391.974	394.23	394.23
24	0.321624	129.171	3.40818	Material 3	0	32	76.8517	248.101	397.046	0	397.046	401.623	401.623
25	0.321624	131.176	5.11606	Material 3	0	32	77.6	250.517	400.913	0	400.913	407.86	407.86
26	0.321624	132.808	6.82851	Material 3	0	32	78.1167	252.185	403.579	0	403.579	412.933	412.933
27	0.321624	134.063	8.54711	Material 3	0	32	78.402	253.106	405.053	0	405.053	416.836	416.836
28	0.321624	134.936	10.2735	Material 3	0	32	78.4559	253.28	405.333	0	405.333	419.553	419.553
29	0.321624	135.422	12.0094	Material 3	0	32	78.2775	252.704	404.412	0	404.412	421.063	421.063
30	0.321624	135.513	13.7566	Material 3	0	32	77.8658	251.375	402.283	0	402.283	421.346	421.346
31	0.321624	135.201	15.5169	Material 3	0	32	77.2184	249.285	398.939	0	398.939	420.378	420.378
32	0.321624	134.477	17.2924	Material 3	0	32	76.3328	246.426	394.363	0	394.363	418.127	418.127
33	0.321624	133.328	19.0852	Material 3	0	32	75.2047	242.784	388.536	0	388.536	414.557	414.557
34	0.338982	139.563	20.9471	Material 2	200	22	108.292	349.601	370.275	0	370.275	411.73	411.73
35	0.338982	135.77	22.8822	Material 2	200	22	126.163	407.294	513.073	0	513.073	566.32	566.32
36	0.338982	130.555	24.8453	Material 2	200	22	132.513	427.793	563.808	0	563.808	625.165	625.165
37	0.338982	125.823	26.84	Material 2	200	22	130.2	420.325	545.322	0	545.322	611.205	611.205
38	0.338982	120.659	28.8707	Material 2	200	22	127.725	412.337	525.551	0	525.551	595.973	595.973
39	0.338982	115.039	30.9418	Material 2	200	22	125.08	403.796	504.414	0	504.414	579.397	579.397
40	0.338982	108.932	33.059	Material 2	200	22	122.252	394.666	481.815	0	481.815	561.385	561.385
41	0.338982	102.305	35.2285	Material 2	200	22	119.226	384.9	457.643	0	457.643	541.837	541.837
42	0.338982	95.1148	37.4577	Material 2	200	22	115.987	374.443	431.762	0	431.762	520.627	520.627
43	0.338982	87.3107	39.7557	Material 2	200	22	112.514	363.231	404.011	0	404.011	497.607	497.607
44	0.338982	78.8303	42.1333	Material 2	200	22	108.782	351.181	374.186	0	374.186	472.593	472.593
45	0.338982	69.5959	44.604	Material 2	200	22	104.758	338.19	342.032	0	342.032	445.351	445.351
46	0.338982	59.5082	47.1851	Material 2	200	22	100.402	324.128	307.228	0	307.228	415.596	415.596
47	0.350308	50.2104	49.947	Material 1	0	20	38.1094	123.029	338.02	0	338.02	383.352	383.352
48	0.350308	37.8748	52.9268	Material 1	0	20	34.1538	110.259	302.935	0	302.935	348.138	348.138
49	0.350308	24.0651	56.1297	Material 1	0	20	29.8002	96.2042	264.319	0	264.319	308.716	308.716
50	0.350308	8.37607	59.6284	Material 1	0	20	24.9552	80.563	221.346	0	221.346	263.929	263.929

Global Minimum Query (janbu simplified) - Safety Factor: 2.73147

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.297763	3.85153	-45.6268	Material 2	200	22	88.5117	241.767	103.377	0	103.377	12.9075	12.9075
2	0.297763	11.2295	-43.1016	Material 2	200	22	91.4546	249.806	123.273	0	123.273	37.6866	37.6866
3	0.297763	17.9943	-40.6768	Material 2	200	22	94.1207	257.088	141.297	0	141.297	60.4071	60.4071
4	0.297763	24.2127	-38.3375	Material 2	200	22	96.5373	263.689	157.635	0	157.635	81.2923	81.2923
5	0.297763	29.9376	-36.0715	Material 2	200	22	98.7268	269.669	172.437	0	172.437	100.52	100.52
6	0.297763	35.2117	-33.8692	Material 2	200	22	100.707	275.079	185.828	0	185.828	118.234	118.234
7	0.297763	40.0702	-31.7225	Material 2	200	22	102.494	279.96	197.909	0	197.909	134.551	134.551
8	0.297763	45.339	-29.6244	Material 2	200	22	104.533	285.528	211.689	0	211.689	152.247	152.247
9	0.297763	51.9092	-27.5692	Material 2	200	22	107.29	293.059	230.33	0	230.33	174.314	174.314
10	0.313156	62.1786	-25.5007	Material 3	0	32	50.9843	139.262	222.867	0	222.867	198.548	198.548
11	0.313156	70.312	-23.4159	Material 3	0	32	57.0107	155.723	249.209	0	249.209	224.519	224.519
12	0.313156	77.9403	-21.3635	Material 3	0	32	62.5308	170.801	273.339	0	273.339	248.879	248.879
13	0.313156	85.0855	-19.3396	Material 3	0	32	67.5812	184.596	295.415	0	295.415	271.696	271.696
14	0.313156	91.7664	-17.3404	Material 3	0	32	72.1923	197.191	315.573	0	315.573	293.032	293.032
15	0.313156	97.9988	-15.3629	Material 3	0	32	76.39	208.657	333.92	0	333.92	312.932	312.932
16	0.313156	103.796	-13.4039	Material 3	0	32	80.196	219.053	350.557	0	350.557	331.445	331.445
17	0.313156	109.17	-11.4608	Material 3	0	32	83.6282	228.428	365.562	0	365.562	348.607	348.607
18	0.313156	114.129	-9.53098	Material 3	0	32	86.7028	236.826	379.002	0	379.002	364.445	364.445
19	0.313156	118.682	-7.61203	Material 3	0	32	89.4332	244.284	390.935	0	390.935	378.983	378.983
20	0.313156	122.834	-5.70164	Material 3	0	32	91.8297	250.83	401.413	0	401.413	392.245	392.245
21	0.313156	126.591	-3.7976	Material 3	0	32	93.9029	256.493	410.473	0	410.473	404.24	404.24
22	0.313156	129.955	-1.89776	Material 3	0	32	95.6598	261.292	418.153	0	418.153	414.984	414.984
23	0.313156	132.929	0	Material 3	0	32	97.1071	265.245	424.482	0	424.482	424.482	424.482
24	0.313156	135.512	1.89776	Material 3	0	32	98.25	268.367	429.477	0	429.477	432.732	432.732
25	0.313156	137.705	3.7976	Material 3	0	32	99.0921	270.667	433.16	0	433.16	439.737	439.737
26	0.313156	139.506	5.70164	Material 3	0	32	99.6368	272.155	435.54	0	435.54	445.488	445.488
27	0.313156	140.91	7.61203	Material 3	0	32	99.885	272.833	436.624	0	436.624	449.973	449.973
28	0.313156	141.915	9.53098	Material 3	0	32	99.8382	272.705	436.419	0	436.419	453.181	453.181
29	0.313156	142.513	11.4608	Material 3	0	32	99.4951	271.768	434.918	0	434.918	455.089	455.089
30	0.313156	142.696	13.4039	Material 3	0	32	98.8548	270.019	432.119	0	432.119	455.677	455.677
31	0.313156	142.456	15.3629	Material 3	0	32	97.9143	267.45	428.011	0	428.011	454.913	454.913
32	0.313156	141.78	17.3404	Material 3	0	32	96.6703	264.052	422.573	0	422.573	452.757	452.757
33	0.313156	140.657	19.3396	Material 3	0	32	95.1176	259.811	415.785	0	415.785	449.168	449.168
34	0.313156	139.068	21.3635	Material 3	0	32	93.2505	254.711	407.621	0	407.621	444.097	444.097
35	0.313156	136.997	23.4159	Material 3	0	32	91.0605	248.729	398.051	0	398.051	437.486	437.486
36	0.313156	134.421	25.5007	Material 3	0	32	88.5388	241.841	387.026	0	387.026	429.258	429.258
37	0.317697	129.695	27.638	Material 2	200	22	155.928	425.914	559.157	0	559.157	640.806	640.806
38	0.317697	124.892	29.8338	Material 2	200	22	153.824	420.165	544.926	0	544.926	633.143	633.143
39	0.317697	119.743	32.079	Material 2	200	22	150.52	411.142	522.594	0	522.594	616.939	616.939
40	0.317697	114.119	34.381	Material 2	200	22	146.982	401.476	498.669	0	498.669	599.238	599.238
41	0.317697	107.981	36.7482	Material 2	200	22	143.186	391.107	473.005	0	473.005	579.92	579.92
42	0.317697	101.281	39.191	Material 2	200	22	139.105	379.96	445.417	0	445.417	558.831	558.831
43	0.317697	93.9589	41.7222	Material 2	200	22	134.705	367.944	415.675	0	415.675	535.787	535.787
44	0.317697	85.9395	44.3577	Material 2	200	22	129.944	354.938	383.485	0	383.485	510.548	510.548
45	0.317697	77.126	47.1181	Material 2	200	22	124.763	340.787	348.461	0	348.461	482.807	482.807
46	0.317697	67.3893	50.0306	Material 2	200	22	119.087	325.282	310.086	0	310.086	452.162	452.162
47	0.317697	56.5516	53.1331	Material 2	200	22	112.807	308.128	267.625	0	267.625	418.05	418.05
48	0.359887	49.6876	56.7245	Material 1	0	20	41.8771	114.386	314.273	0	314.273	378.084	378.084
49	0.359887	32.4632	60.958	Material 1	0	20	35.4866	96.9305	266.314	0	266.314	330.223	330.223
50	0.359887	11.5665	65.8719	Material 1	0	20	27.9502	76.3452	209.756	0	209.756	272.158	272.158

Query 1 (janbu simplified) - Safety Factor: 2.73147

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.297763	3.85153	-45.6268	Material 2	200	22	88.5117	241.767	103.377	0	103.377	12.9075	12.9075
2	0.297763	11.2295	-43.1016	Material 2	200	22	91.4546	249.806	123.273	0	123.273	37.6866	37.6866
3	0.297763	17.9943	-40.6768	Material 2	200	22	94.1207	257.088	141.297	0	141.297	60.4071	60.4071
4	0.297763	24.2127	-38.3375	Material 2	200	22	96.5373	263.689	157.635	0	157.635	81.2923	81.2923
5	0.297763	29.9376	-36.0715	Material 2	200	22	98.7268	269.669	172.437	0	172.437	100.52	100.52
6	0.297763	35.2117	-33.8692	Material 2	200	22	100.707	275.079	185.828	0	185.828	118.234	118.234
7	0.297763	40.0702	-31.7225	Material 2	200	22	102.494	279.96	197.909	0	197.909	134.551	134.551
8	0.297763	45.339	-29.6244	Material 2	200	22	104.533	285.528	211.689	0	211.689	152.247	152.247
9	0.297763	51.9092	-27.5692	Material 2	200	22	107.29	293.059	230.33	0	230.33	174.314	174.314
10	0.313156	62.1786	-25.5007	Material 3	0	32	50.9843	139.262	222.867	0	222.867	198.548	198.548
11	0.313156	70.312	-23.4159	Material 3	0	32	57.0107	155.723	249.209	0	249.209	224.519	224.519
12	0.313156	77.9403	-21.3635	Material 3	0	32	62.5308	170.801	273.339	0	273.339	248.879	248.879
13	0.313156	85.0855	-19.3396	Material 3	0	32	67.5812	184.596	295.415	0	295.415	271.696	271.696
14	0.313156	91.7664	-17.3404	Material 3	0	32	72.1923	197.191	315.573	0	315.573	293.032	293.032
15	0.313156	97.9988	-15.3629	Material 3	0	32	76.39	208.657	333.92	0	333.92	312.932	312.932
16	0.313156	103.796	-13.4039	Material 3	0	32	80.196	219.053	350.557	0	350.557	331.445	331.445
17	0.313156	109.17	-11.4608	Material 3	0	32	83.6282	228.428	365.562	0	365.562	348.607	348.607
18	0.313156	114.129	-9.53098	Material 3	0	32	86.7028	236.826	379.002	0	379.002	364.445	364.445
19	0.313156	118.682	-7.61203	Material 3	0	32	89.4332	244.284	390.935	0	390.935	378.983	378.983
20	0.313156	122.834	-5.70164	Material 3	0	32	91.8297	250.83	401.413	0	401.413	392.245	392.245
21	0.313156	126.591	-3.7976	Material 3	0	32	93.9029	256.493	410.473	0	410.473	404.24	404.24
22	0.313156	129.955	-1.89776	Material 3	0	32	95.6598	261.292	418.153	0	418.153	414.984	414.984
23	0.313156	132.929	0	Material 3	0	32	97.1071	265.245	424.482	0	424.482	424.482	424.482
24	0.313156	135.512	1.89776	Material 3	0	32	98.25	268.367	429.477	0	429.477	432.732	432.732
25	0.313156	137.705	3.7976	Material 3	0	32	99.0921	270.667	433.16	0	433.16	439.737	439.737
26	0.313156	139.506	5.70164	Material 3	0	32	99.6368	272.155	435.54	0	435.54	445.488	445.488
27	0.313156	140.91	7.61203	Material 3	0	32	99.885	272.833	436.624	0	436.624	449.973	449.973
28	0.313156	141.915	9.53098	Material 3	0	32	99.8382	272.705	436.419	0	436.419	453.181	453.181
29	0.313156	142.513	11.4608	Material 3	0	32	99.4951	271.768	434.918	0	434.918	455.089	455.089
30	0.313156	142.696	13.4039	Material 3	0	32	98.8548	270.019	432.119	0	432.119	455.677	455.677
31	0.313156	142.456	15.3629	Material 3	0	32	97.9143	267.45	428.011	0	428.011	454.913	454.913
32	0.313156	141.78	17.3404	Material 3	0	32	96.6703	264.052	422.573	0	422.573	452.757	452.757
33	0.313156	140.657	19.3396	Material 3	0	32	95.1176	259.811	415.785	0	415.785	449.168	449.168
34	0.313156	139.068	21.3635	Material 3	0	32	93.2505	254.711	407.621	0	407.621	444.097	444.097
35	0.313156	136.997	23.4159	Material 3	0	32	91.0605	248.729	398.051	0	398.051	437.486	437.486
36	0.313156	134.421	25.5007	Material 3	0	32	88.5388	241.841	387.026	0	387.026	429.258	429.258
37	0.317697	129.695	27.638	Material 2	200	22	155.928	425.914	559.157	0	559.157	640.806	640.806
38	0.317697	124.892	29.8338	Material 2	200	22	153.824	420.165	544.926	0	544.926	633.143	633.143
39	0.317697	119.743	32.079	Material 2	200	22	150.52	411.142	522.594	0	522.594	616.939	616.939
40	0.317697	114.119	34.381	Material 2	200	22	146.982	401.476	498.669	0	498.669	599.238	599.238
41	0.317697	107.981	36.7482	Material 2	200	22	143.186	391.107	473.005	0	473.005	579.92	579.92
42	0.317697	101.281	39.191	Material 2	200	22	139.105	379.96	445.417	0	445.417	558.831	558.831
43	0.317697	93.9589	41.7222	Material 2	200	22	134.705	367.944	415.675	0	415.675	535.787	535.787
44	0.317697	85.9395	44.3577	Material 2	200	22	129.944	354.938	383.485	0	383.485	510.548	510.548
45	0.317697	77.126	47.1181	Material 2	200	22	124.763	340.787	348.461	0	348.461	482.807	482.807
46	0.317697	67.3893	50.0306	Material 2	200	22	119.087	325.282	310.086	0	310.086	452.162	452.162
47	0.317697	56.5516	53.1331	Material 2	200	22	112.807	308.128	267.625	0	267.625	418.05	418.05
48	0.359887	49.6876	56.7245	Material 1	0	20	41.8771	114.386	314.273	0	314.273	378.084	378.084
49	0.359887	32.4632	60.958	Material 1	0	20	35.4866	96.9305	266.314	0	266.314	330.223	330.223
50	0.359887	11.5665	65.8719	Material 1	0	20	27.9502	76.3452	209.756	0	209.756	272.158	272.158

Global Minimum Query (corp of eng#1) - Safety Factor: 3.21503

Slice Number	Width [ft]	Weight [lbs]	Angle of Slice Base [degrees]	Base Material	Base Cohesion [psf]	Base Friction Angle [degrees]	Shear Stress [psf]	Shear Strength [psf]	Base Normal Stress [psf]	Pore Pressure [psf]	Effective Normal Stress [psf]	Base Vertical Stress [psf]	Effective Vertical Stress [psf]
1	0.320841	3.54798	-39.0415	Material 2	200	22	74.706	240.182	99.4538	0	99.4538	38.8683	38.8683
2	0.320841	10.3844	-36.9308	Material 2	200	22	77.3628	248.724	120.595	0	120.595	62.4447	62.4447
3	0.320841	16.7222	-34.8771	Material 2	200	22	79.7197	256.301	139.351	0	139.351	83.7847	83.7847
4	0.320841	22.599	-32.8736	Material 2	200	22	81.8141	263.035	156.016	0	156.016	103.142	103.142
5	0.320841	28.0462	-30.9144	Material 2	200	22	83.6751	269.018	170.825	0	170.825	120.718	120.718
6	0.320841	33.0905	-28.9946	Material 2	200	22	85.326	274.326	183.962	0	183.962	136.676	136.676
7	0.320841	37.7547	-27.1099	Material 2	200	22	86.7858	279.019	195.579	0	195.579	151.149	151.149
8	0.320841	42.6641	-25.2564	Material 2	200	22	88.3548	284.063	208.064	0	208.064	166.381	166.381
9	0.320841	49.3563	-23.4309	Material 2	200	22	90.7386	291.727	227.033	0	227.033	187.709	187.709
10	0.320841	55.9037	-21.6302	Material 2	200	22	93.0223	299.069	245.205	0	245.205	208.318	208.318
11	0.320841	62.1346	-19.8518	Material 2	200	22	95.1316	305.851	261.991	0	261.991	227.644	227.644
12	0.342212	73.4605	-18.0351	Material 3	0	32	49.4586	159.011	254.47	0	254.47	238.367	238.367
13	0.342212	81.105	-16.179	Material 3	0	32	53.7612	172.844	276.608	0	276.608	261.01	261.01
14	0.342212	88.2579	-14.3402	Material 3	0	32	57.6362	185.302	296.545	0	296.545	281.811	281.811
15	0.342212	94.9322	-12.5163	Material 3	0	32	61.1114	196.475	314.427	0	314.427	300.86	300.86
16	0.342212	101.138	-10.7053	Material 3	0	32	64.2109	206.44	330.372	0	330.372	318.234	318.234
17	0.342212	106.886	-8.90509	Material 3	0	32	66.9552	215.263	344.493	0	344.493	334.002	334.002
18	0.342212	112.182	-7.11368	Material 3	0	32	69.3614	222.999	356.874	0	356.874	348.218	348.218
19	0.342212	117.032	-5.32924	Material 3	0	32	71.4447	229.697	367.59	0	367.59	360.926	360.926
20	0.342212	121.442	-3.54997	Material 3	0	32	73.218	235.398	376.717	0	376.717	372.175	372.175
21	0.342212	125.413	-1.77413	Material 3	0	32	74.6926	240.139	384.302	0	384.302	381.989	381.989
22	0.342212	128.949	0	Material 3	0	32	75.8777	243.949	390.398	0	390.398	390.398	390.398
23	0.342212	132.05	1.77413	Material 3	0	32	76.7816	246.855	395.051	0	395.051	397.429	397.429
24	0.342212	134.714	3.54997	Material 3	0	32	77.4111	248.879	398.291	0	398.291	403.093	403.093
25	0.342212	136.941	5.32924	Material 3	0	32	77.7725	250.041	400.148	0	400.148	407.403	407.403
26	0.342212	138.727	7.11368	Material 3	0	32	77.8699	250.354	400.65	0	400.65	410.369	410.369
27	0.342212	140.067	8.90509	Material 3	0	32	77.7072	249.831	399.813	0	399.813	411.988	411.988
28	0.342212	140.956	10.7053	Material 3	0	32	77.2876	248.482	397.656	0	397.656	412.267	412.267
29	0.342212	141.385	12.5163	Material 3	0	32	76.613	246.313	394.183	0	394.183	411.19	411.19
30	0.342212	141.347	14.3402	Material 3	0	32	75.6848	243.329	389.409	0	389.409	408.757	408.757
31	0.342212	140.831	16.179	Material 3	0	32	74.5032	239.53	383.328	0	383.328	404.944	404.944
32	0.342212	139.822	18.0351	Material 3	0	32	73.0681	234.916	375.943	0	375.943	399.734	399.734
33	0.326431	132.648	19.8673	Material 2	200	22	107.848	346.736	363.184	0	363.184	402.155	402.155
34	0.326431	132.143	21.6771	Material 2	200	22	107.681	346.199	361.855	0	361.855	404.657	404.657
35	0.326431	126.626	23.51	Material 2	200	22	131.486	422.733	551.283	0	551.283	608.482	608.482
36	0.326431	122.508	25.3688	Material 2	200	22	129.064	414.945	532.006	0	532.006	593.204	593.204
37	0.326431	118.028	27.2566	Material 2	200	22	126.524	406.779	511.798	0	511.798	576.98	576.98
38	0.326431	113.166	29.1772	Material 2	200	22	123.862	398.219	490.608	0	490.608	559.767	559.767
39	0.326431	107.902	31.1344	Material 2	200	22	121.07	389.244	468.395	0	468.395	541.529	541.529
40	0.326431	102.21	33.1329	Material 2	200	22	118.142	379.831	445.096	0	445.096	522.209	522.209
41	0.326431	96.0625	35.1782	Material 2	200	22	115.07	369.952	420.647	0	420.647	501.754	501.754
42	0.326431	89.4235	37.2763	Material 2	200	22	111.843	359.577	394.967	0	394.967	480.095	480.095
43	0.326431	82.252	39.4348	Material 2	200	22	108.45	348.669	367.969	0	367.969	457.16	457.16
44	0.326431	74.4979	41.6625	Material 2	200	22	104.877	337.182	339.538	0	339.538	432.857	432.857
45	0.326431	66.0996	43.9704	Material 2	200	22	101.108	325.064	309.543	0	309.543	407.08	407.08
46	0.326431	56.9799	46.3719	Material 2	200	22	97.1213	312.248	277.824	0	277.824	379.711	379.711
47	0.363051	52.0161	49.0332	Material 1	0	20	32.9608	105.97	291.15	0	291.15	329.112	329.112
48	0.363051	39.1966	51.9966	Material 1	0	20	29.0983	93.5518	257.031	0	257.031	294.271	294.271
49	0.363051	24.8713	55.1724	Material 1	0	20	24.9526	80.2233	220.412	0	220.412	256.277	256.277
50	0.363051	8.64665	58.6275	Material 1	0	20	20.5133	65.9509	181.199	0	181.199	214.842	214.842

Interslice Data

Global Minimum Query (bishop simplified) - Safety Factor: 3.22831

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-11.2389	-3	0	0	0
2	-10.8991	-3.28316	44.1794	0	0
3	-10.5594	-3.5439	92.9523	0	0
4	-10.2196	-3.78418	145.089	0	0
5	-9.87981	-4.0056	199.584	0	0
6	-9.54004	-4.20951	255.605	0	0
7	-9.20027	-4.39701	312.458	0	0
8	-8.86049	-4.56906	369.744	0	0
9	-8.52072	-4.72647	428.454	0	0
10	-8.18095	-4.86992	488.246	0	0
11	-7.84118	-5	548.477	0	0
12	-7.51955	-5.11128	588.283	0	0
13	-7.19793	-5.21141	629.031	0	0
14	-6.87631	-5.3007	670.078	0	0
15	-6.55468	-5.37944	710.851	0	0
16	-6.23306	-5.44786	750.838	0	0
17	-5.91143	-5.50616	789.583	0	0
18	-5.58981	-5.55449	826.672	0	0
19	-5.26818	-5.59301	861.74	0	0
20	-4.94656	-5.6218	894.453	0	0
21	-4.62494	-5.64096	924.518	0	0
22	-4.30331	-5.65052	951.668	0	0
23	-3.98169	-5.65052	975.668	0	0
24	-3.66006	-5.64096	996.311	0	0
25	-3.33844	-5.6218	1013.41	0	0
26	-3.01682	-5.59301	1026.82	0	0
27	-2.69519	-5.55449	1036.39	0	0
28	-2.37357	-5.50616	1042.01	0	0
29	-2.05194	-5.44786	1043.61	0	0
30	-1.73032	-5.37944	1041.1	0	0
31	-1.40869	-5.3007	1034.46	0	0
32	-1.08707	-5.21141	1023.66	0	0
33	-0.765446	-5.11128	1008.71	0	0
34	-0.443822	-5	989.655	0	0
35	-0.10484	-4.87024	978.3	0	0
36	0.234142	-4.72717	947.646	0	0
37	0.573124	-4.57021	904.053	0	0
38	0.912106	-4.39868	854.63	0	0
39	1.25109	-4.21178	799.682	0	0
40	1.59007	-4.00857	739.561	0	0
41	1.92905	-3.78793	674.68	0	0
42	2.26803	-3.54856	605.529	0	0
43	2.60702	-3.28884	532.695	0	0
44	2.946	-3.00686	456.894	0	0
45	3.28498	-2.70021	379.009	0	0
46	3.62396	-2.36588	300.154	0	0
47	3.96294	-2	221.767	0	0
48	4.31325	-1.5833	94.2595	0	0
49	4.66356	-1.11966	-34.2341	0	0
50	5.01387	-0.597765	-161.746	0	0
51	5.36418	0	0	0	0

Global Minimum Query (janbu simplified) - Safety Factor: 2.73147

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-11.1449	-3	0	0	0
2	-10.8472	-3.30435	57.8104	0	0
3	-10.5494	-3.58301	119.385	0	0
4	-10.2517	-3.83891	183.561	0	0
5	-9.9539	-4.07439	249.417	0	0
6	-9.65613	-4.2913	316.208	0	0
7	-9.35837	-4.49115	383.324	0	0
8	-9.06061	-4.67522	450.262	0	0
9	-8.76284	-4.84454	517.222	0	0
10	-8.46508	-5	584.967	0	0
11	-8.15192	-5.14937	634.218	0	0
12	-7.83877	-5.28499	685.863	0	0
13	-7.52561	-5.40748	738.922	0	0
14	-7.21246	-5.51739	792.547	0	0
15	-6.8993	-5.61517	846.005	0	0
16	-6.58614	-5.70121	898.65	0	0
17	-6.27299	-5.77584	949.917	0	0
18	-5.95983	-5.83933	999.307	0	0
19	-5.64668	-5.89191	1046.38	0	0
20	-5.33352	-5.93376	1090.74	0	0
21	-5.02036	-5.96502	1132.04	0	0
22	-4.70721	-5.98581	1169.96	0	0
23	-4.39405	-5.99619	1204.25	0	0
24	-4.0809	-5.99619	1234.65	0	0
25	-3.76774	-5.98581	1260.95	0	0
26	-3.45458	-5.96502	1282.97	0	0
27	-3.14143	-5.93376	1300.55	0	0
28	-2.82827	-5.89191	1313.54	0	0
29	-2.51512	-5.83933	1321.85	0	0
30	-2.20196	-5.77584	1325.39	0	0
31	-1.8888	-5.70121	1324.09	0	0
32	-1.57565	-5.61517	1317.91	0	0
33	-1.26249	-5.51739	1306.86	0	0
34	-0.949336	-5.40748	1290.94	0	0
35	-0.63618	-5.28499	1270.2	0	0
36	-0.323024	-5.14937	1244.73	0	0
37	-0.00986854	-5	1214.63	0	0
38	0.307828	-4.83364	1171.14	0	0
39	0.625525	-4.65145	1120.71	0	0
40	0.943222	-4.45232	1064.45	0	0
41	1.26092	-4.23494	1002.73	0	0
42	1.57862	-3.99772	936	0	0
43	1.89631	-3.7387	864.805	0	0
44	2.21401	-3.45542	789.836	0	0
45	2.53171	-3.14477	711.976	0	0
46	2.8494	-2.80267	632.393	0	0
47	3.1671	-2.42364	552.684	0	0
48	3.4848	-2	475.135	0	0
49	3.84468	-1.45161	317.858	0	0
50	4.20457	-0.803481	158.018	0	0
51	4.56446	0	0	0	0

Query 1 (janbu simplified) - Safety Factor: 2.73147

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-11.1449	-3	0	0	0
2	-10.8472	-3.30435	57.8104	0	0
3	-10.5494	-3.58301	119.385	0	0
4	-10.2517	-3.83891	183.561	0	0
5	-9.9539	-4.07439	249.417	0	0
6	-9.65613	-4.2913	316.208	0	0
7	-9.35837	-4.49115	383.324	0	0
8	-9.06061	-4.67522	450.262	0	0
9	-8.76284	-4.84454	517.222	0	0
10	-8.46508	-5	584.967	0	0
11	-8.15192	-5.14937	634.218	0	0
12	-7.83877	-5.28499	685.863	0	0
13	-7.52561	-5.40748	738.922	0	0
14	-7.21246	-5.51739	792.547	0	0
15	-6.8993	-5.61517	846.005	0	0
16	-6.58614	-5.70121	898.65	0	0
17	-6.27299	-5.77584	949.917	0	0
18	-5.95983	-5.83933	999.307	0	0
19	-5.64668	-5.89191	1046.38	0	0
20	-5.33352	-5.93376	1090.74	0	0
21	-5.02036	-5.96502	1132.04	0	0
22	-4.70721	-5.98581	1169.96	0	0
23	-4.39405	-5.99619	1204.25	0	0
24	-4.0809	-5.99619	1234.65	0	0
25	-3.76774	-5.98581	1260.95	0	0
26	-3.45458	-5.96502	1282.97	0	0
27	-3.14143	-5.93376	1300.55	0	0
28	-2.82827	-5.89191	1313.54	0	0
29	-2.51512	-5.83933	1321.85	0	0
30	-2.20196	-5.77584	1325.39	0	0
31	-1.8888	-5.70121	1324.09	0	0
32	-1.57565	-5.61517	1317.91	0	0
33	-1.26249	-5.51739	1306.86	0	0
34	-0.949336	-5.40748	1290.94	0	0
35	-0.63618	-5.28499	1270.2	0	0
36	-0.323024	-5.14937	1244.73	0	0
37	-0.00986854	-5	1214.63	0	0
38	0.307828	-4.83364	1171.14	0	0
39	0.625525	-4.65145	1120.71	0	0
40	0.943222	-4.45232	1064.45	0	0
41	1.26092	-4.23494	1002.73	0	0
42	1.57862	-3.99772	936	0	0
43	1.89631	-3.7387	864.805	0	0
44	2.21401	-3.45542	789.836	0	0
45	2.53171	-3.14477	711.976	0	0
46	2.8494	-2.80267	632.393	0	0
47	3.1671	-2.42364	552.684	0	0
48	3.4848	-2	475.135	0	0
49	3.84468	-1.45161	317.858	0	0
50	4.20457	-0.803481	158.018	0	0
51	4.56446	0	0	0	0

Global Minimum Query (corp of eng#1) - Safety Factor: 3.21503

Slice Number	X coordinate [ft]	Y coordinate - Bottom [ft]	Interslice Normal Force [lbs]	Interslice Shear Force [lbs]	Interslice Force Angle [degrees]
1	-11.3599	-3	0	0	0
2	-11.0391	-3.2602	49.8402	8.93304	10.1614
3	-10.7183	-3.50136	103.738	18.5934	10.1615
4	-10.3974	-3.72499	160.472	28.762	10.1614
5	-10.0766	-3.93234	219.065	39.2638	10.1614
6	-9.75574	-4.12447	278.725	49.9569	10.1614
7	-9.4349	-4.30228	338.804	60.725	10.1614
8	-9.11406	-4.46653	398.765	71.4721	10.1614
9	-8.79322	-4.61789	458.599	82.1963	10.1614
10	-8.47238	-4.75694	519.272	93.071	10.1614
11	-8.15154	-4.88416	580.306	104.01	10.1614
12	-7.8307	-5	641.169	114.919	10.1614
13	-7.48849	-5.11142	686.444	123.034	10.1614
14	-7.14628	-5.21071	732.3	131.253	10.1615
15	-6.80406	-5.29819	777.962	139.437	10.1614
16	-6.46185	-5.37416	822.756	147.465	10.1614
17	-6.11964	-5.43886	866.098	155.234	10.1614
18	-5.77743	-5.49248	907.476	162.65	10.1614
19	-5.43522	-5.53518	946.448	169.635	10.1614
20	-5.093	-5.56711	982.625	176.119	10.1614
21	-4.75079	-5.58834	1015.67	182.043	10.1615
22	-4.40858	-5.59894	1045.3	187.353	10.1614
23	-4.06637	-5.59894	1071.26	192.006	10.1614
24	-3.72416	-5.58834	1093.34	195.963	10.1614
25	-3.38194	-5.56711	1111.37	199.195	10.1614
26	-3.03973	-5.53518	1125.2	201.674	10.1615
27	-2.69752	-5.49248	1134.73	203.383	10.1615
28	-2.35531	-5.43886	1139.88	204.305	10.1614
29	-2.0131	-5.37416	1140.6	204.433	10.1614
30	-1.67088	-5.29819	1136.86	203.764	10.1615
31	-1.32867	-5.21071	1128.69	202.299	10.1614
32	-0.98646	-5.11142	1116.12	200.046	10.1614
33	-0.644248	-5	1099.23	197.019	10.1614
34	-0.317817	-4.88204	1091.59	195.649	10.1614
35	0.00861443	-4.75229	1079.78	193.532	10.1614
36	0.335045	-4.61029	1044.4	187.192	10.1615
37	0.661476	-4.45551	1004.18	179.982	10.1614
38	0.987907	-4.28734	959.4	171.957	10.1615
39	1.31434	-4.10507	910.401	163.174	10.1614
40	1.64077	-3.90789	857.552	153.702	10.1614
41	1.9672	-3.69482	801.273	143.615	10.1614
42	2.29363	-3.46474	742.042	132.999	10.1614
43	2.62006	-3.21628	680.407	121.952	10.1615
44	2.94649	-2.94781	617.013	110.589	10.1614
45	3.27292	-2.65735	552.619	99.0478	10.1614
46	3.59936	-2.34245	488.138	87.4907	10.1614
47	3.92579	-2	424.693	76.1192	10.1614
48	4.28884	-1.58187	314.917	56.4437	10.1614
49	4.65189	-1.11724	206.055	36.932	10.1614
50	5.01494	-0.595415	100.095	17.9404	10.1614
51	5.37799	0	0	0	0

List Of Coordinates

Water Table

X	Y
-30	-3
-9	-3
-6	-2
0	0
30	0

Distributed Load

X	Y
30	0
0	0

External Boundary

X	Y
0	0
-6	-2
-9	-3
-30	-3
-30	-5
-30	-25
30	-25
30	-5
30	-2
30	0

Material Boundary

X	Y
-6	-2
0	-2
30	-2

Material Boundary

X	Y
-30	-5
30	-5

Material Boundary

X	Y
0	-2
0	0

Appendix R

Float Stability Calculations

Shane Taylor | Jacobs | APR 16 2018

Aerovox Floating Dock Stability calculations

See attached Figures for Dock layout & cross-section

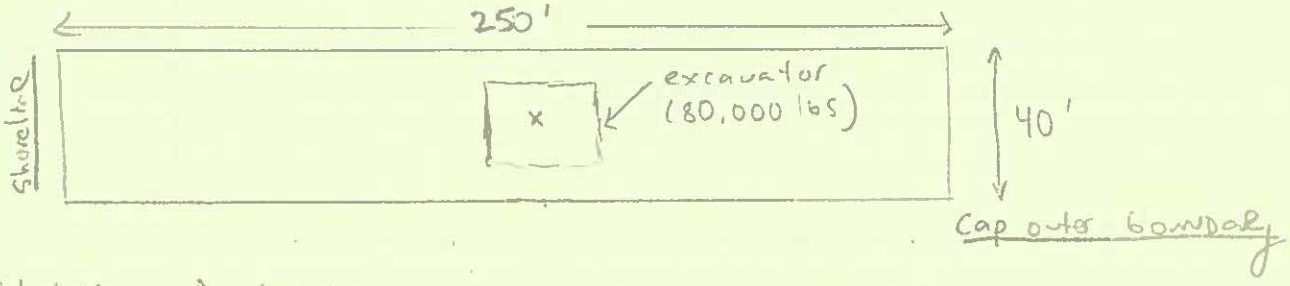
The Floating dock layout:

250 FT × 40 FT = 10,000 SF Footprint

WT per 6FT × 20FT section = 1000 LB

TOTAL weight = $\frac{10000\ SF}{120\ SF} \times 1000\ LB = 84{,}000\ LB$

During CAP placement operations, the Floating Dock with be fixed at both ends. Therefore, the stability analysis will be for re-positioning only in which the excavator will be centered. See Below.



Stability Analysis

Floating Dock with excavator and loaded truck

Weight = $W_{DOCK} + W_{EXC} + W_{TRUCK}$ = 84000 + 80000 + 80000

WT 244,000 LBS

Length: $L_B = 250\ FT$ $\quad Z_{bbar} = \frac{L_B}{2} = 125\ FT$

Width: $B_B = 40\ FT$ $\quad X_{bbar} = \frac{B_B}{2} = 20\ FT$

Depth: $D_B = 2.5\ FT$ $\quad Y_{bbar} = \frac{D_B}{2} = 1.25\ FT$

Water Plane Area: $A_B = 10{,}000\ SF$

Trans Mom of Inertia: $I_T = L_B \frac{B_B^3}{12} = 2.1 \times 10^6\ ft^4$

Long Mom of Inertia: $I_L = B_B \frac{L_B^3}{12} = 5.2 \times 10^7\ ft^4$

Excavator on Center

W_{EXC} = 80,000 LB

$Z_{Exc\,bar} = \frac{L_B}{2} = 200\,FT$

$X_{Exc\,bar} = \frac{B_B}{2} = 20\,FT$

$Y_{Exc\,bar} = D_B + 8FT = 10.5\,FT$

Vertical Center of Gravity

$$Y_G = \frac{W_{Dock}\,Y_{Bbar} + W_{Exc}\,Y_{Exc\,bar}}{W_T}$$

$= \underline{4.7\ FT}$

Port - Starboard Center of Gravity

$$X_G = \frac{W_{Dock}\,X_{bbar} + W_{Exc}\,X_{Exc\,bar}}{W_T}$$

$= 20\,FT$

$e_x = X_G - X_{bbar} = \underline{0\,FT}$

Fore - Aft Center of Gravity

$$Z_G = \frac{W_{Dock}\,Z_{bbar} + W_{Exc}\,Y_{Exc\,bar}}{W_T}$$

$= 125\,FT$

$e_z = Z_G - Z_{bbar} = \underline{0\,FT}$

Total Displacement

$\Delta = 244{,}000\ lbs = W_T$

Displaced Volume

$V_D = \frac{\Delta}{\gamma_w} = \frac{244{,}000}{62.4} = 3.910 \times 10^3\ ft^3$

Draft

$D = \frac{V_D}{A_B} = 0.4\,FT$

Center of Buoyancy

$KB = \frac{D}{2} = 0.2 FT$

Transverse Metacenter

$BM_T = \frac{I_T}{V_D} = 537 \ FT$

Long. Metacenter

$BM_L = \frac{I_L}{V_D} = 13299 \ FT$

Transverse Metacentric H_T

$GM_T = BM_T + KB - VG = 532 \ FT$ (pos ∴ stable ✓)

Long. Metacentric H_T

$GM_L = BM_L + KB - VG = 13294 \ FT$ (pos ∴ stable ✓)

Net List Moment

$M_x = \Delta e_x = 0$

List Angle

$\phi = \left| \operatorname{asin}\left[\frac{M_x}{\Delta GM_T}\right] \right|$, $\phi = 0° < 5°$ (stable)

Net Trim Moment

$M_z = \Delta e_z = 0$

Trim Angle

$\theta = \left| \operatorname{asin}\left[\frac{M_z}{\Delta GM_L}\right] \right|$ $\theta = 0° < 5°$ (stable)

Appendix S

Surface Water Run Off and Discharge Calculations

Client: Date: By:
Job Location: Project: Checked By:
Task Order Number: Scale:

Outfall Scour

ID — MAX velocity ft/sec

N Trench - cmc
S Trench - cmc
CB#1 - clay - 6" n=0.013
Hadley Street - conc - 36" n=0.013

Using Manning Equation $V = \frac{k}{n} R^{2/3} \sqrt{S}$ $k = 1.49$

$R = \frac{A}{P}$

$P = \frac{\theta d}{2}$

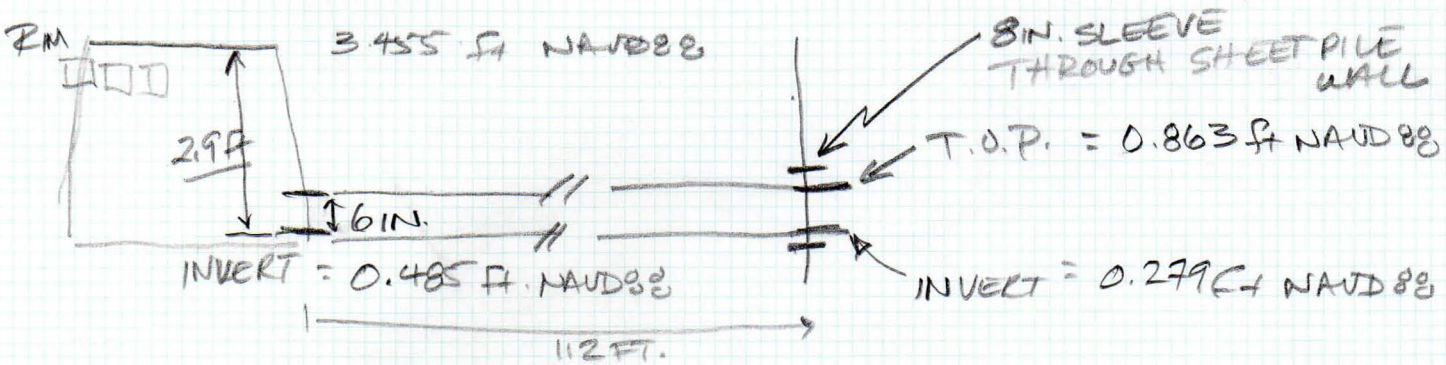
Outfall ID	Diam or Width (in)	(ft) water Depth	ft/ft Slope	(ft) Wetted Perim	ft² Area	(ft) Hydraulic Radius	Manning Coeff	ft/sec velocity
CB-6"	6"	0.5	0.00189	1.57	0.196	0.123	.013	1.22 ft/s
N. Ditch	12"	0.5	0.0305	1.57	.785	.245	.013	7.84
S Ditch	12"	0.5	0.024	1.57	.785	.245	.013	6.95 ft/s
Hadley	36"	2.0	.02	3.82	4.22	0.737	.013	13.22

Client: USACE - NAE
Job Location: NEW BEDFORD
Task Order Number: #5

Date: 15 MARCH 18
Project: 35260708
Scale:

By: CANDERSON
Checked By:

STORM DRAIN - AEROVOX



SLOPE OF DISCHARGE - $\frac{0.485 - 0.279}{112} = 0.00184\ ft/ft$

$\approx$ 0.2% slope

AEROVOX PROPERTY - ALL ASPHALT -
NO STRUCTURES
NO TOPO FOR PROPERTY
ASSUME 50% LOT DRAINS TO OB.

$Q = CiA$

Area = FROM CITY ASSESSOR'S MAPING
LOTS 112-88 & 112-252 (1.48AC) = 10.4 AC
(9.00 AC.)

$A = 10.4(43560) = 453024\ ft^2/2 = 226512\ ft^2$