



New Bedford Harbor Superfund Site

Aerovox Interim Sediment Cap 100% Design

U.S. Army Corps of Engineers New England District

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Project manager: Steve Fox
Author: Elizabeth Anderson

Jacobs
6 Otis Park Drive
Bourne, Massachusetts 02532-3870
United States
T +1.508.743.0214
F +1.508.743.9177
www.jacobs.com

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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 |
| C _s C | 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 ($\mu\text{g/L}$). The sediment porewater PCB concentrations ranged from 1.81 to 36.9 $\mu\text{g/L}$. 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 ($\text{mg/m}^2/\text{yr}$). Positive diffusive flux, indicating a transfer from the sediment porewater to surface water, yielded results of 5.04 to 2,380 $\text{mg/m}^2/\text{yr}$. [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).

Rotasonic 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/m²/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 (C_c) 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 C_c equal to 0.24 from the stress-strain relationship, and when plotted with a void ratio effective stress relationship, show a C_c 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 C_c 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 of 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](#) for details. 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 off site;
- 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 discovery 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 DREDGEPAK 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 DREDGEPAK® 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 the 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 (DREDGEPAK 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 DREDGEPAK 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

0 600 Feet

1:7,200

JACOBS™

NBH Area Map
New Bedford Harbor Superfund Site

| | | |
|----------------|-----------------|-----------------|
| NAME: jpiccuto | Date: 2/26/2013 | Figure 1 |
|----------------|-----------------|-----------------|

Path: Y:\NBH\Projects\56BG\708\20130225\ArcGIS\Aerovox_NBH_Location_Map_Final.mxd

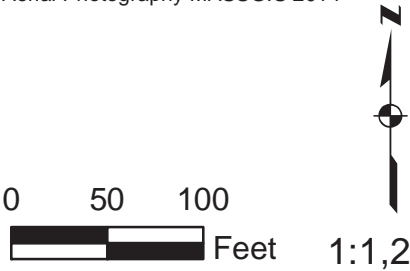
Aerial Photography MASSGIS 2009



USGS, MassGIS

Legend
Sheet Pile Location

Aerial Photography MASSGIS 2014



JACOBS

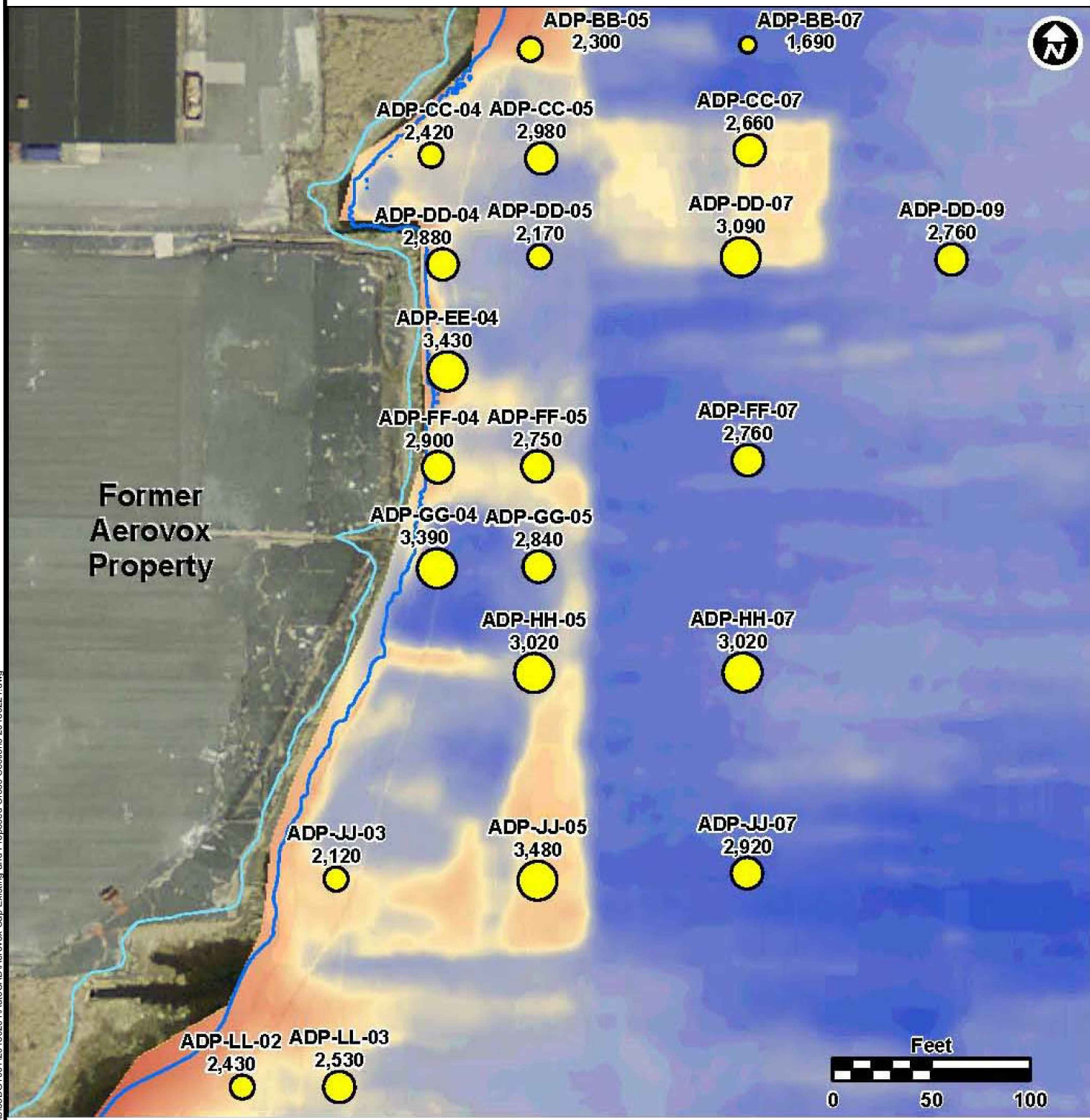
Former Aerovox Site Plan

New Bedford Harbor Superfund Site

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

Path: Y:\NBH\Projects\35BG1001\20180201\Aerovox_Site_Plan_20180319.mxd

Y:\NBH\Projects\3556\100120180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg
Last modified: 02/21/18, printed: 02/21/18 by ac



Legend

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

MHHW
MLLW

PCB (ng/L)

<2,000
2,000 - <2,500
2,500 - <3,000
≥3,000

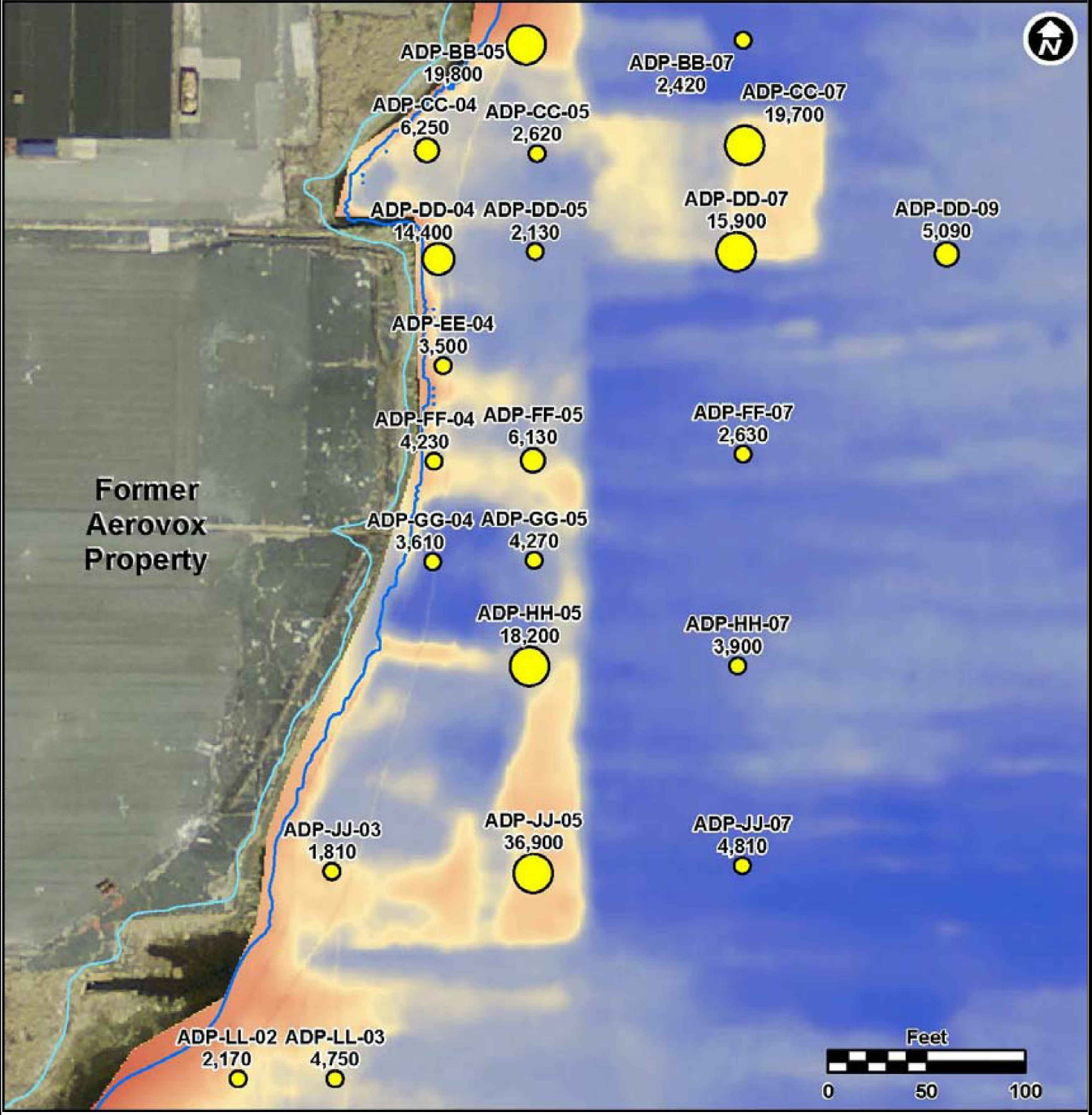
JACOBS™

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

02/21/18

Figure 3

Y:\NBH\Projects\3556G\001\20180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg
Last modified: 02/21/18, printed: 02/21/18 by ac



Legend

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

— MHHW
— MLLW

PCB (ng/L)

- <5,000
- 5,000 - <10,000
- 10,000 - <15,000
- ≥15,000

Final Aerovox Passive Sampler Report, Battelle, 2017

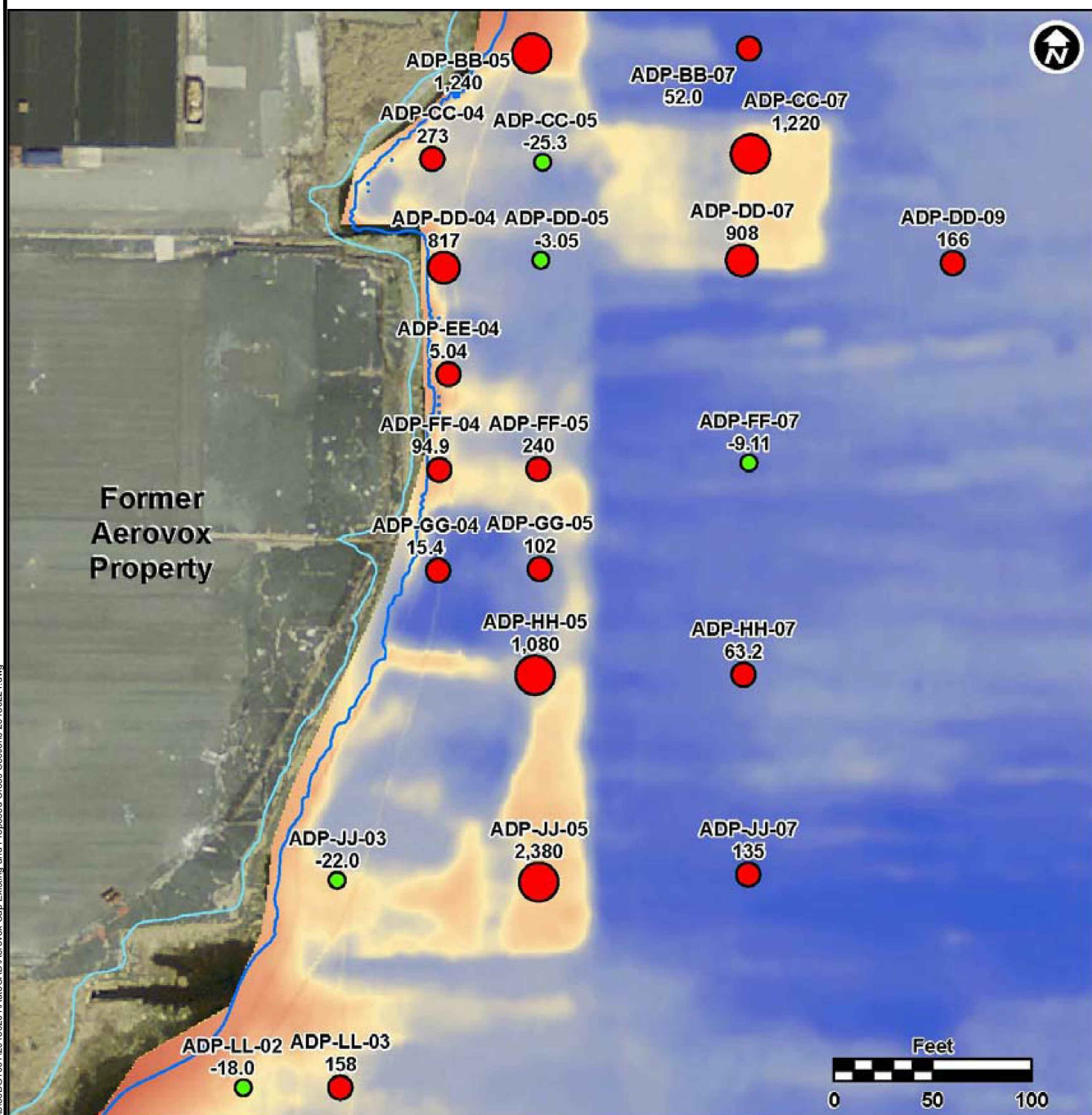
JACOBS™

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

02/21/18

Figure 4

Y:\NBH\Projects\3556G\001\20180201\AutoCAD\Aerovox Cap Existing and Proposed Cross Sections 20180221.dwg
Last modified: 02/21/18, printed: 02/21/18 by ac



Legend

Bathymetry (2015)
Source: Jacobs
(Feet NAVD88)

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



USGS, MassGIS

Legend

-  **Aerovox Boring Location**
-  **Aerovox Microwell Location**



JACOBS

**Boring and Microwell Locations
September - October 2017**

New Bedford Harbor Superfund Site

Date: 2/21/2018

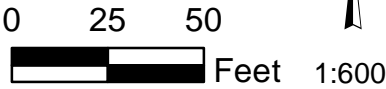
Figure 6



USGS, MassGIS

Legend

- Aerovox Boring Location
- Aerovox Sonic Boring Location



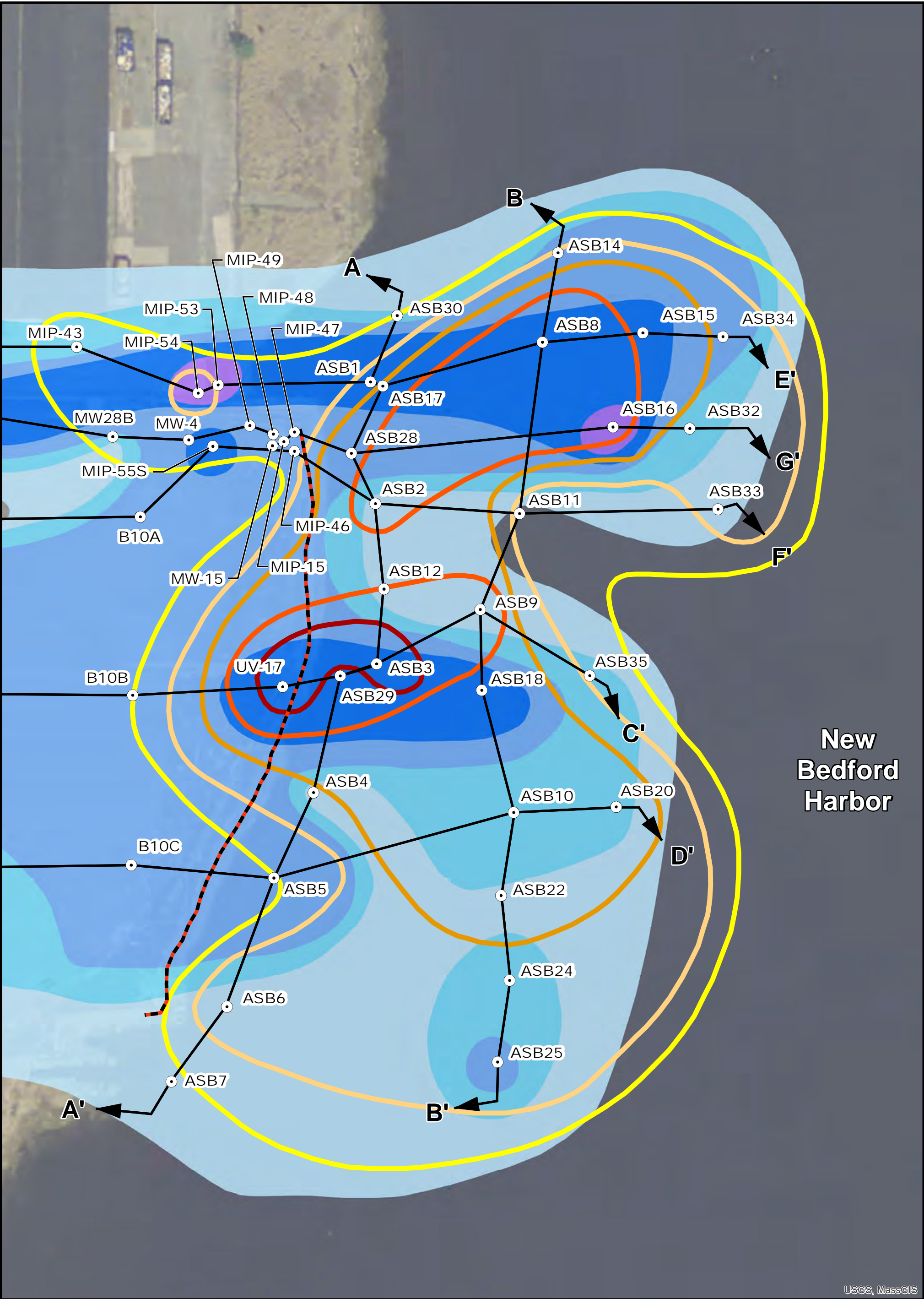
JACOBS

**Soil Boring Locations
September - October 2017**

New Bedford Harbor Superfund Site

Date: 7/5/2017

Figure 7



USGS, MassGIS

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

Aerial Photography MASSGIS 2014

0 20 40 Feet

1:600

PCB and VOC Distribution Map
Shallow Soils/Sediments

New Bedford Harbor Superfund Site

| | |
|------------------|----------|
| Date: 12/21/2017 | Figure 8 |
|------------------|----------|



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

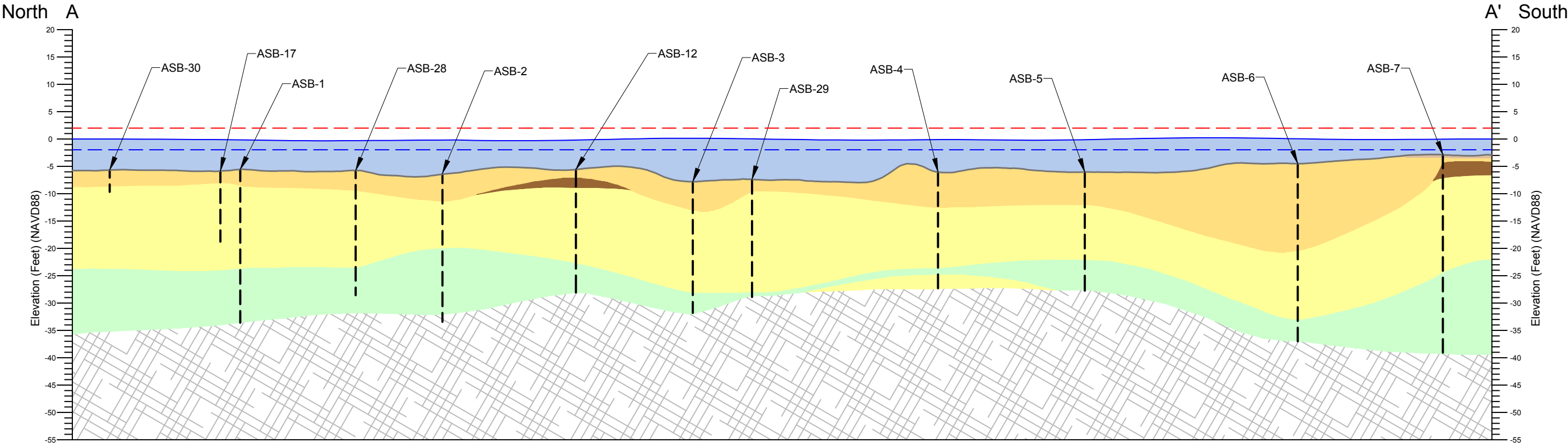
**Cross Section Locations
for Cap Area
Showing Proposed Finished
Surface Contours Zone 3**

New Bedford Harbor Superfund Site

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

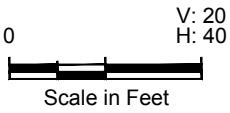
Path: Y:\NBBH\Projects\38BG1001\20180201\Aerovox\GIS\Figure 9 Aerovox_XSect_Finish_1ft_Contours_in_Zone_3_20180319.mxd

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



Legend

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



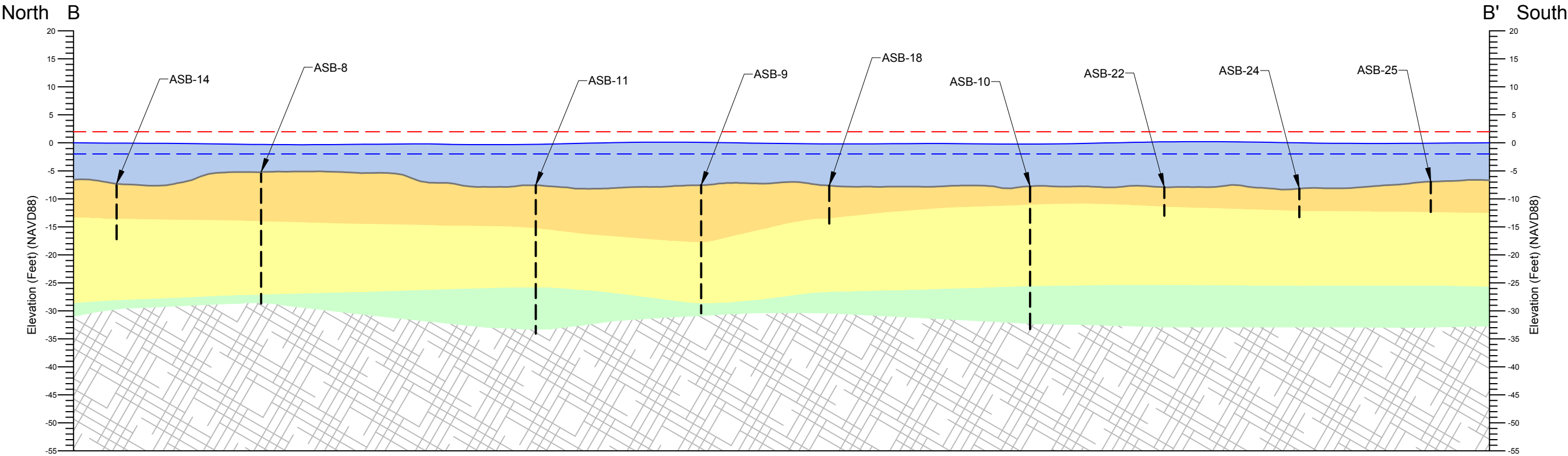
Aerovox Cross Section A - A'

New Bedford Harbor Superfund Site

02/09/18

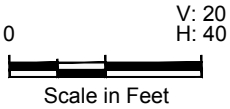
Figure 10

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



Legend

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



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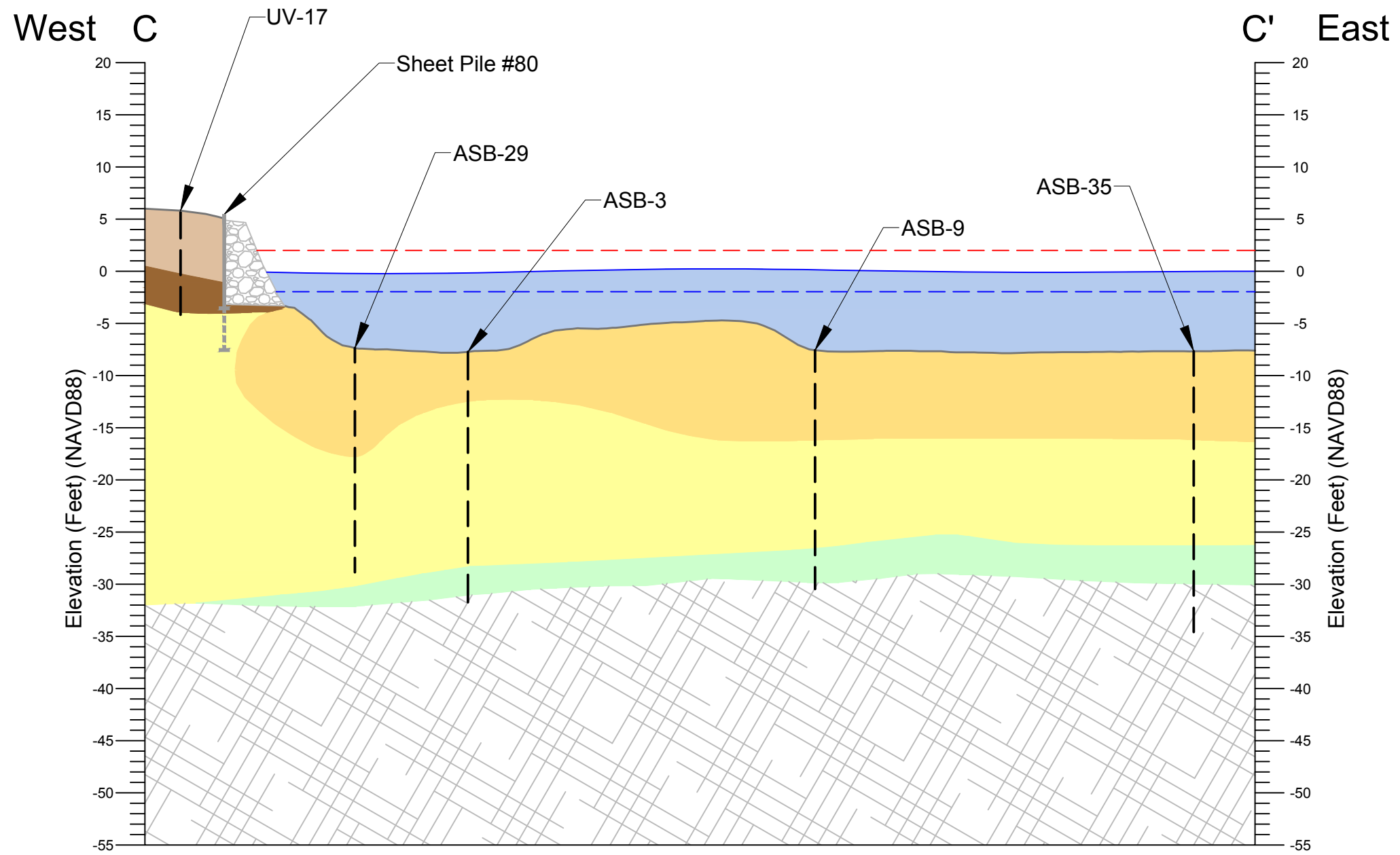
Aerovox Cross Section B - B'

New Bedford Harbor Superfund Site

02/09/18

Figure 11

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottj\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™

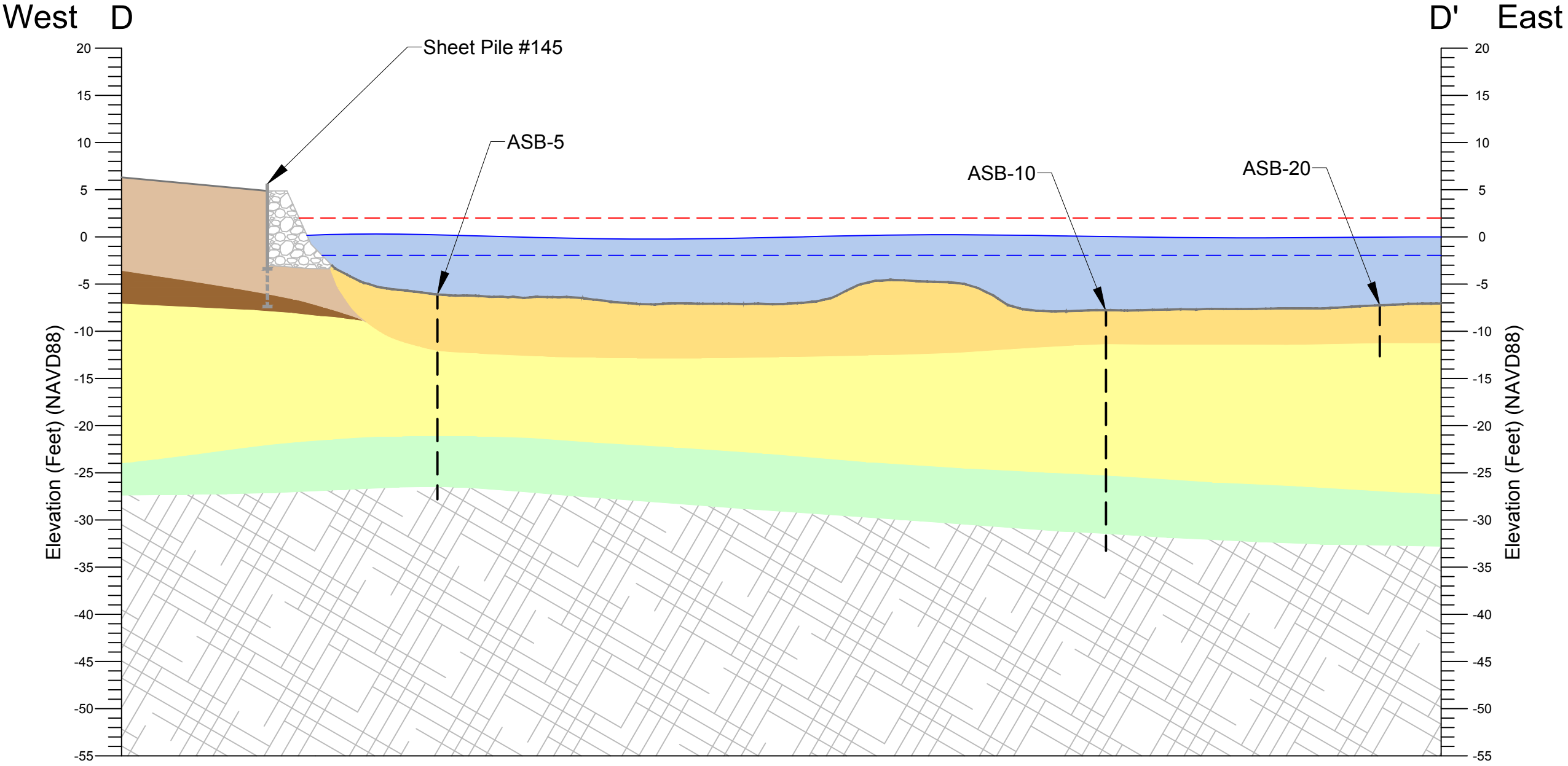
Aerovox Cross Section C - C'

New Bedford Harbor Superfund Site

02/09/18

Figure 12

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scott\p\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

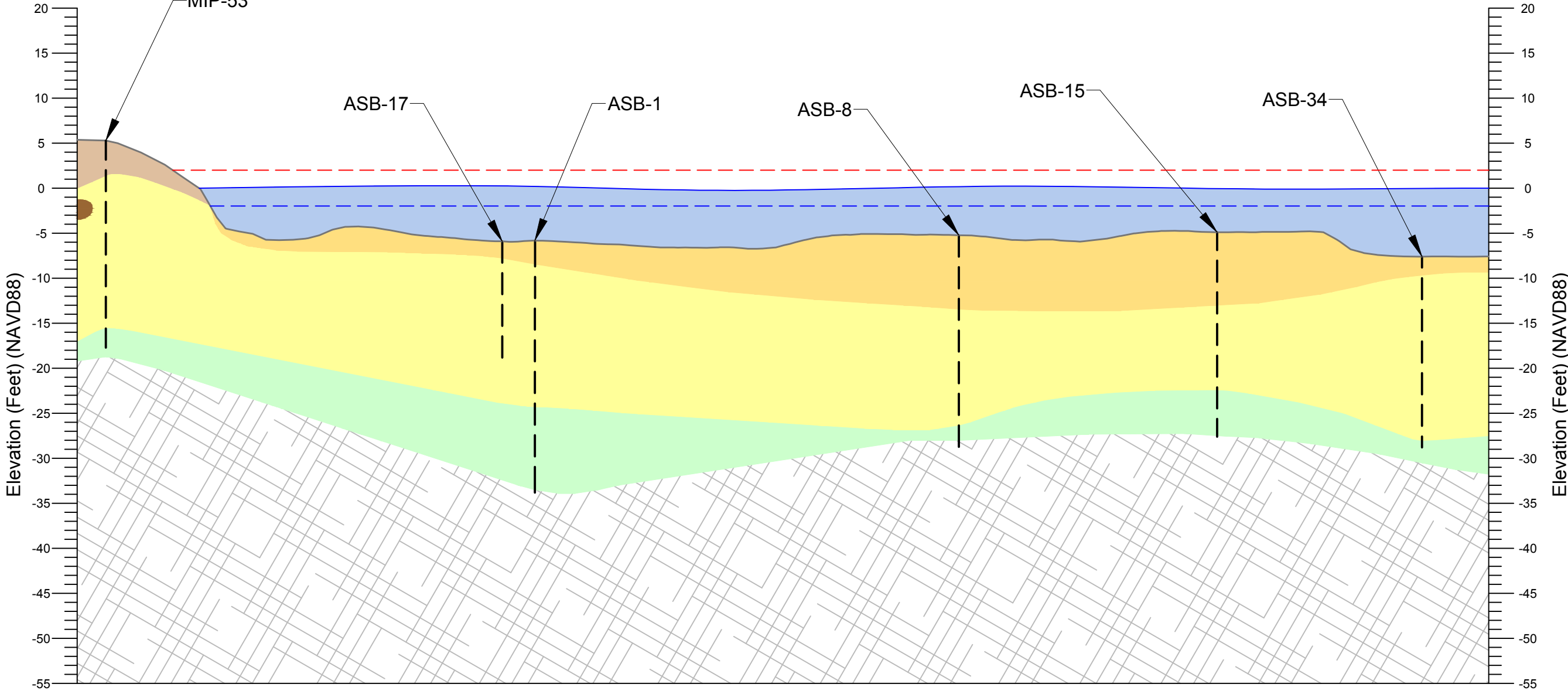


Aerovox Cross Section D - D'
New Bedford Harbor Superfund Site

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottj\Documents\NBH 2017\Aerovox Cross Sections for Bath Aerovox Cap Cross Sections 20180207.dwg

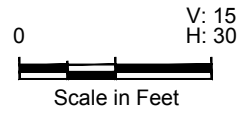
West E

E' East



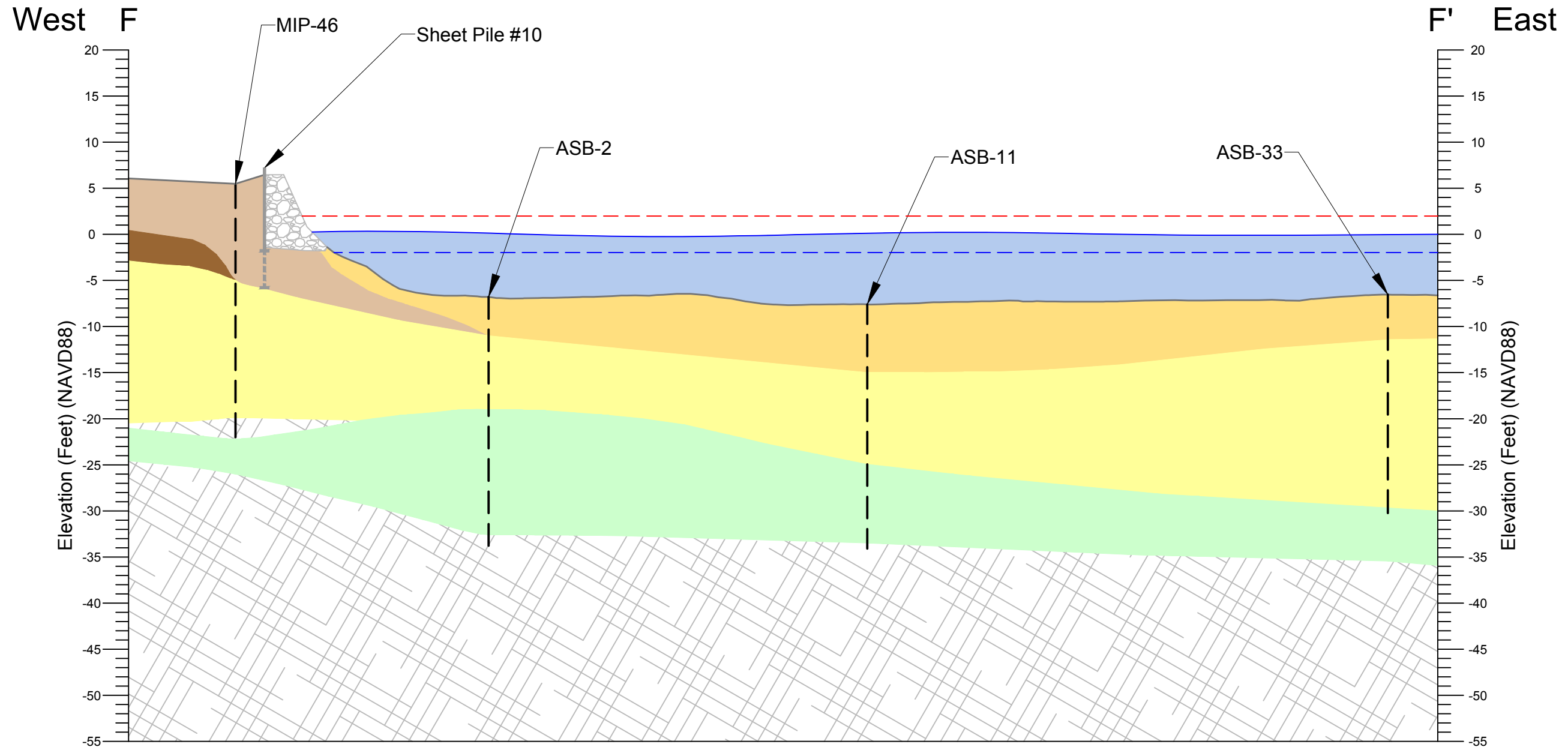
Legend

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



Aerovox Cross Section E - E'
New Bedford Harbor Superfund Site

last modified: 02/09/18 printed: 02/09/18 by sc C:\Users\scottj\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 15 30
Scale in Feet

JACOBS

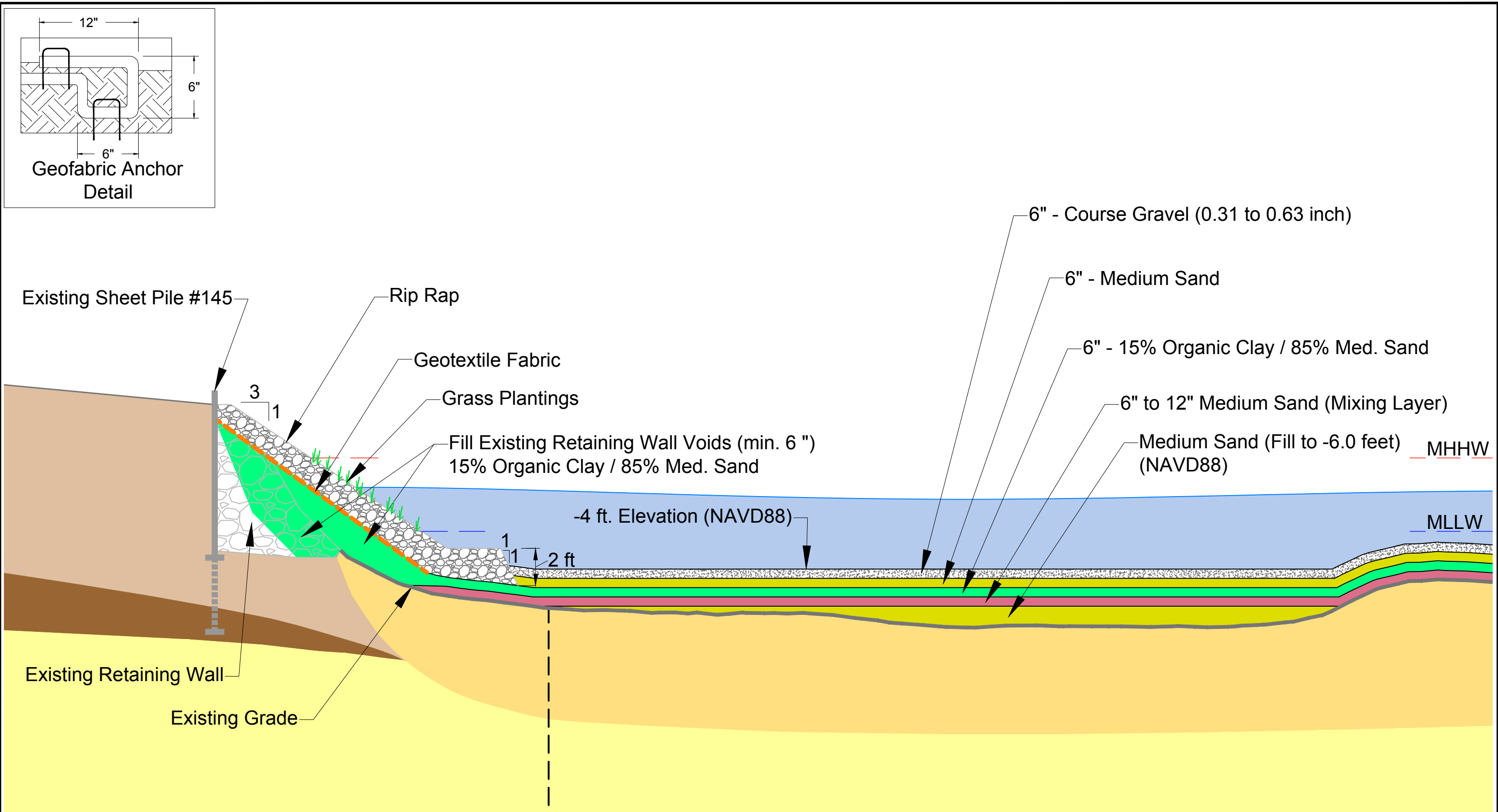
Aerovox Cross Section F - F'

New Bedford Harbor Superfund Site

02/09/18

Figure 15

last modified: 08/13/18 printed: 08/13/18 by: sc Y:\NBH\Projects\3556\101\20180201\AutoCAD\Figure 17 20 Aerovox Cap Existing and Proposed Cross Sections 20180613.dwg



Legend

| | | | | |
|--|-------------------------|--|-----------------|---|
| | Aerovox Boring Location | | Harbor Water | Sheetpile # 95 Sheetpile at 9 ft bgs Sheetpile at 13 ft bgs |
| | Existing Grade | | Marine Deposits | |
| | MHHW (1.99 ft, NAVD88) | | Glacial Outwash | |
| | MLLW (-1.97 ft, NAVD88) | | Glacial Till | |
| | | | Peat | |
| | | | Fill | |
| | | | Retaining Wall | |
| | | | Bedrock | |

ft bgs = feet below ground surface

Elevation Data: NAVD88

0 5 V: 5 H: 10

Scale in Feet

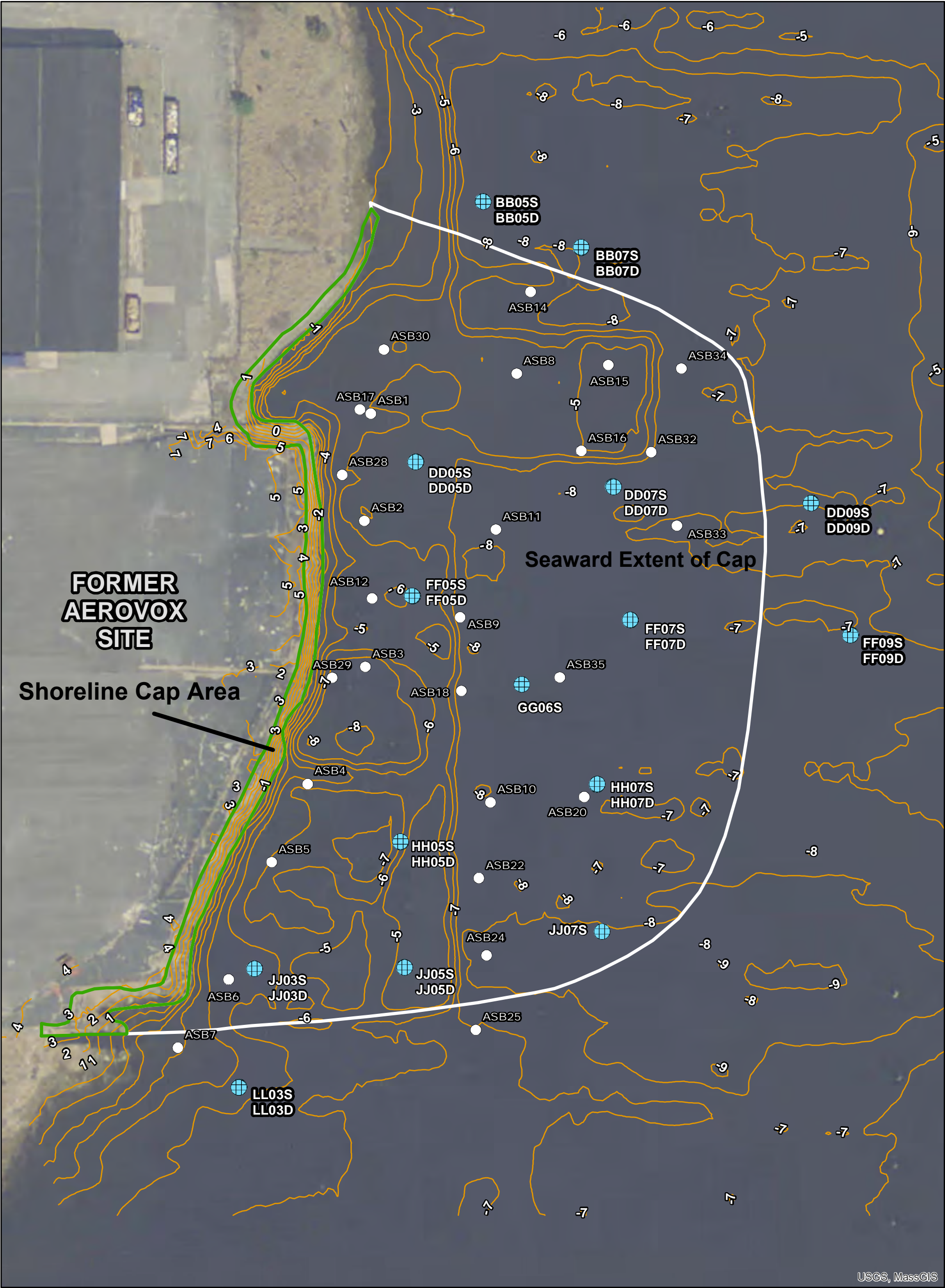
JACOBS

Aerovox Cross Section

Typical Shoreline and Subtidal Cap Detail

New Bedford Harbor Superfund Site

06/13/18 Figure 17



Path: Y:\NBH\Projects\358G\10011201\80201\AcGIS\Figure_18_Aerovox_borings_zones_with_microwell_locations_topo_bathy_20180319.mxd

Legend

- Aerovox Boring Location
- Aerovox Microwell Location
- Shoreline Cap Area
- Seaward Extent of Cap

Elevation Data NAVD88

1ft contours line (Dec 2017)

0 30 60 Feet 1:720

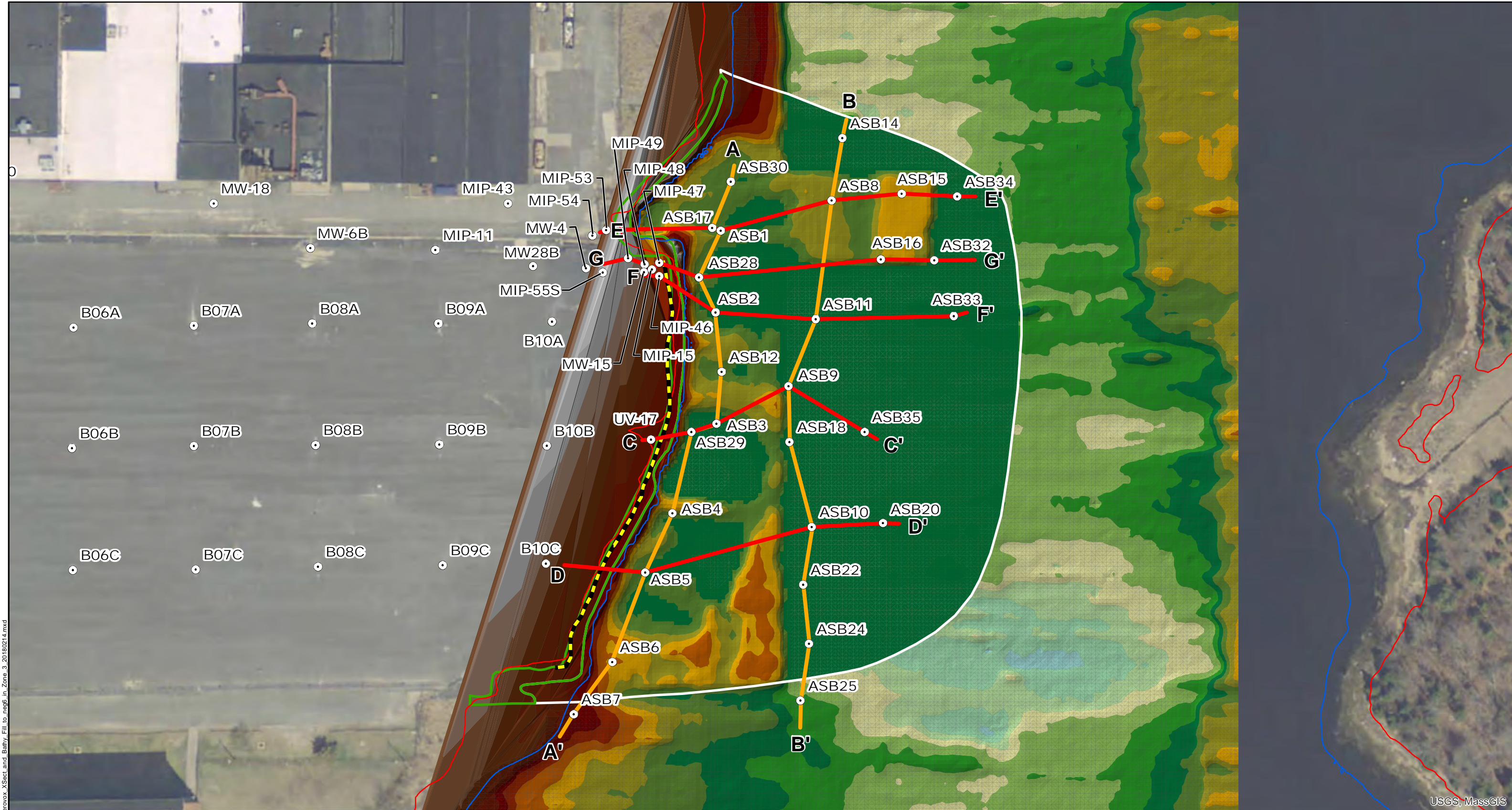
N

**Existing NBH
Bathymetric Elevations
1ft Contours**

New Bedford Harbor Superfund Site

Date: 3/19/2018

Figure 18



Path: Y:\NBBHP\Projects\38BG1001\20180201\AeroGIS\Aerovox_XSect.and.Bathy.Fill.to.neg6.in.Zone.3.20180214.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



1:900

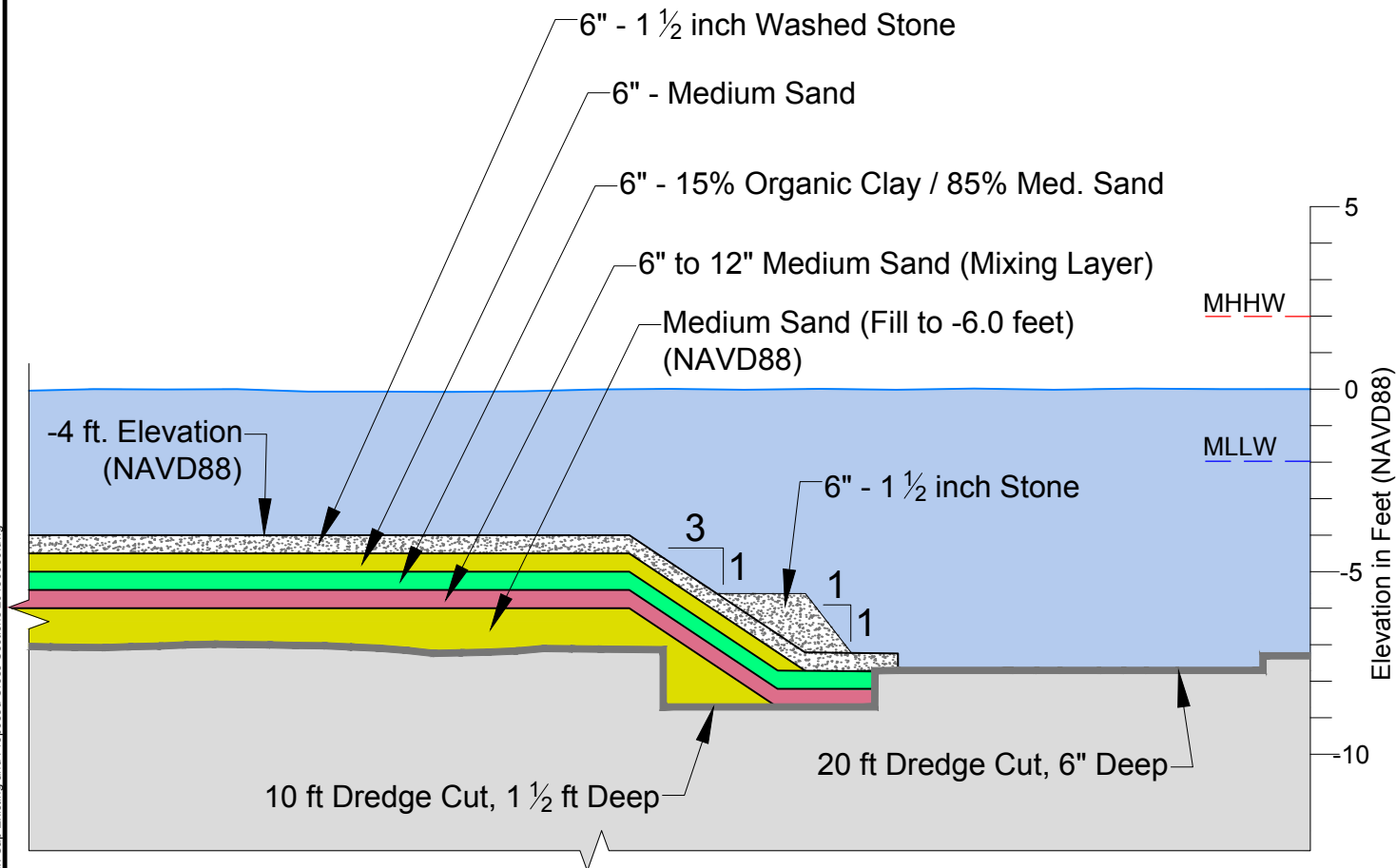
Pre Cap Bathymetric Elevations
with Smoothing Layer

New Bedford Harbor Superfund Site

| | | |
|--------------|-----------------|-----------|
| NAME: gscott | Date: 2/14/2018 | Figure 19 |
|--------------|-----------------|-----------|

Y:\NBH\Projects\355EG\10012018\201\AutoCAD\Figure 17 20 Aerovox Cap Existing and Proposed Cross Sections 20180606.dwg

Lead modified: 06/06/18 printed: 06/06/18 by ac



Legend

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

Elevation Data: NAVD88

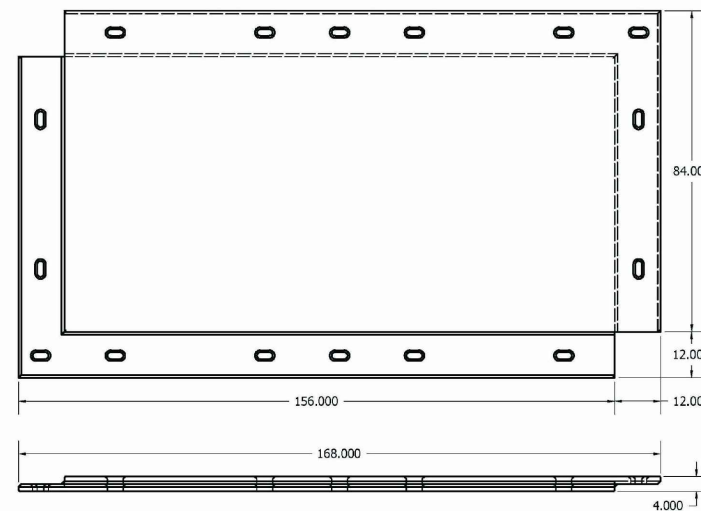
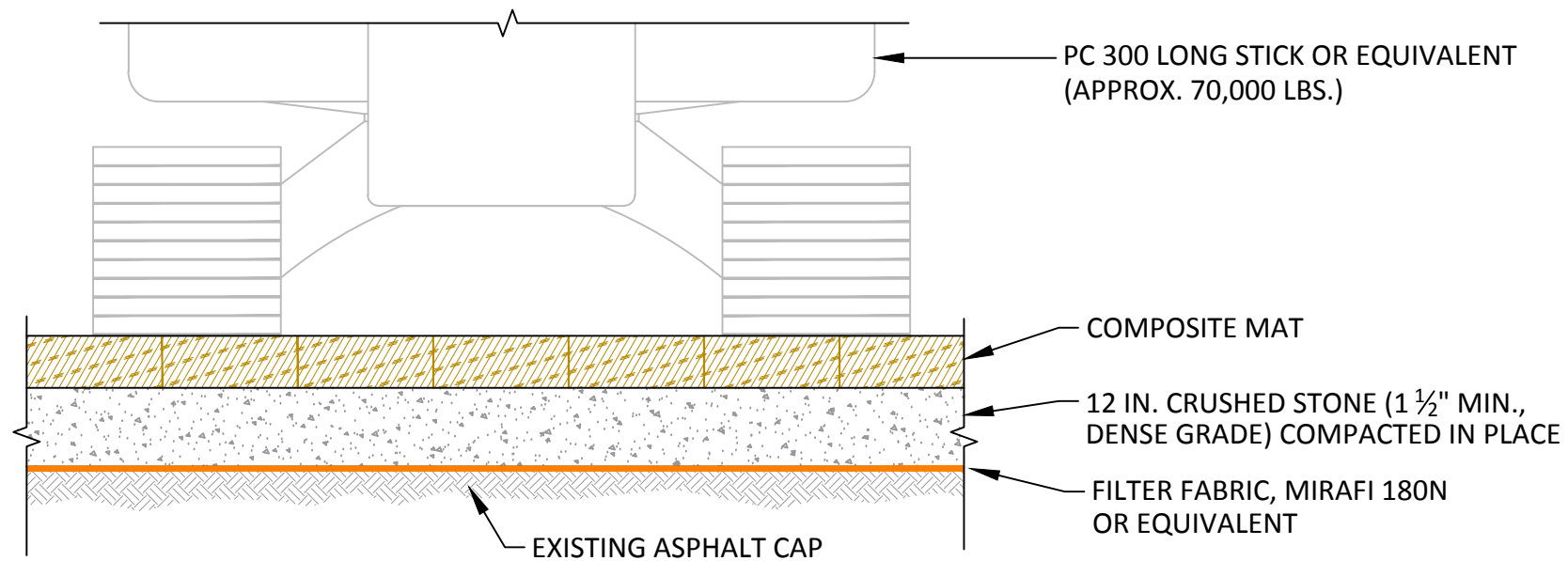


JACOBS

Aerovox Cross Section
Typical Subtidal Cap Edge Detail
New Bedford Harbor Superfund Site

06/06/18

Figure 20



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

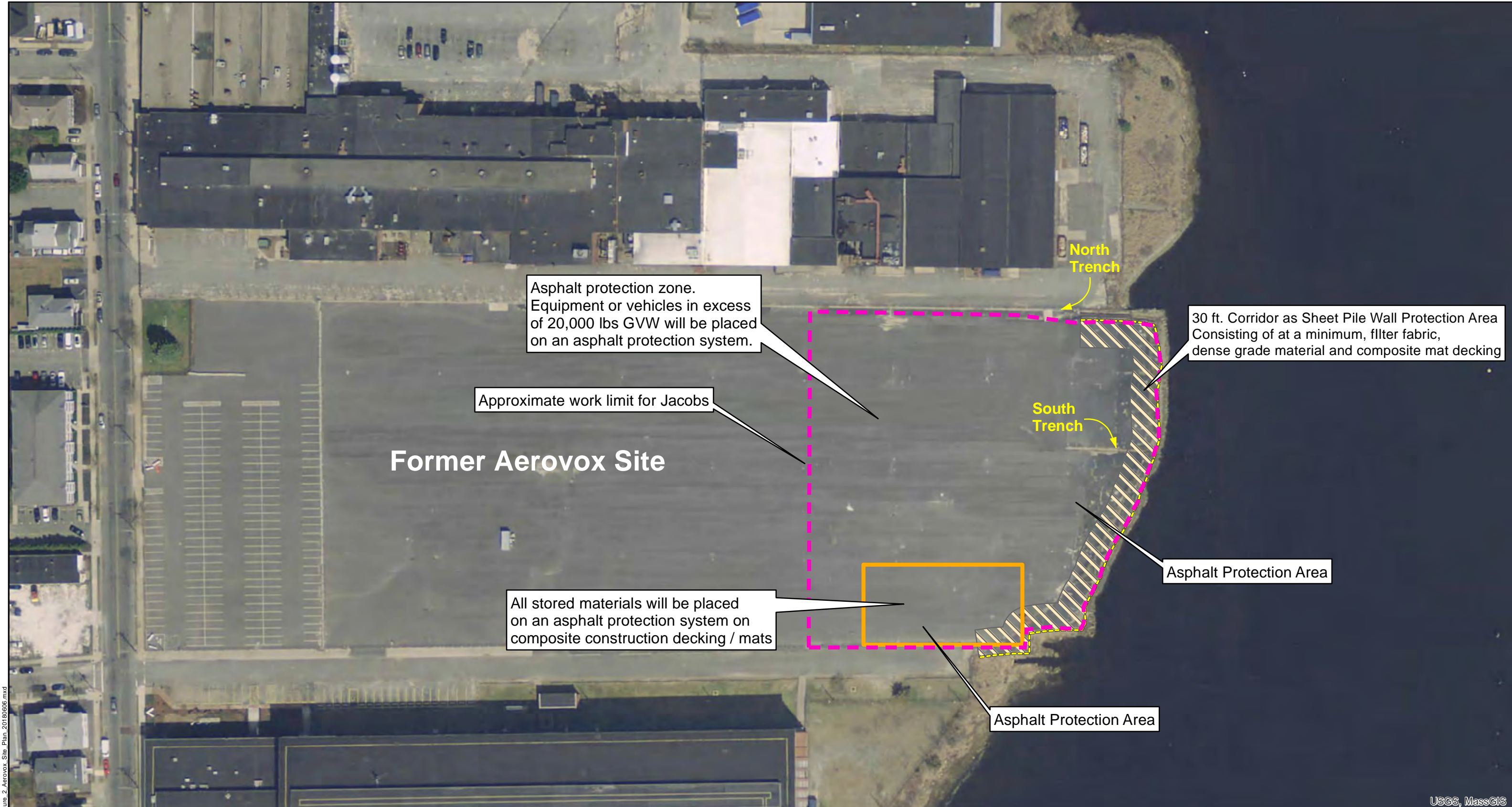
Not To Scale

JACOBS™

Aerovox
Asphalt Protection System
New Bedford Harbor Superfund Site





04/12/18

Figure 21

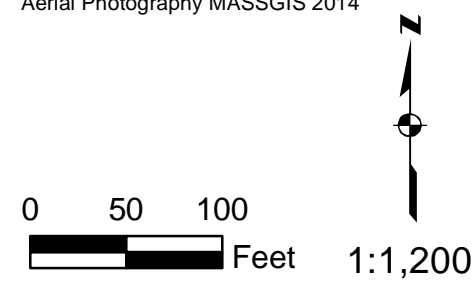



Path: Y:\NBBH\Projects\358BG1001\20180201\Aerovox_Site_Plan_20180606.mxd

Legend

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

Aerial Photography MASSGIS 2014





AVX Asphalt Protection Areas

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/6/2018

Figure 22



USGS, MassGIS

Legend

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

Aerial Photography MASSGIS 2014

0 20 40 60
Feet



1:720

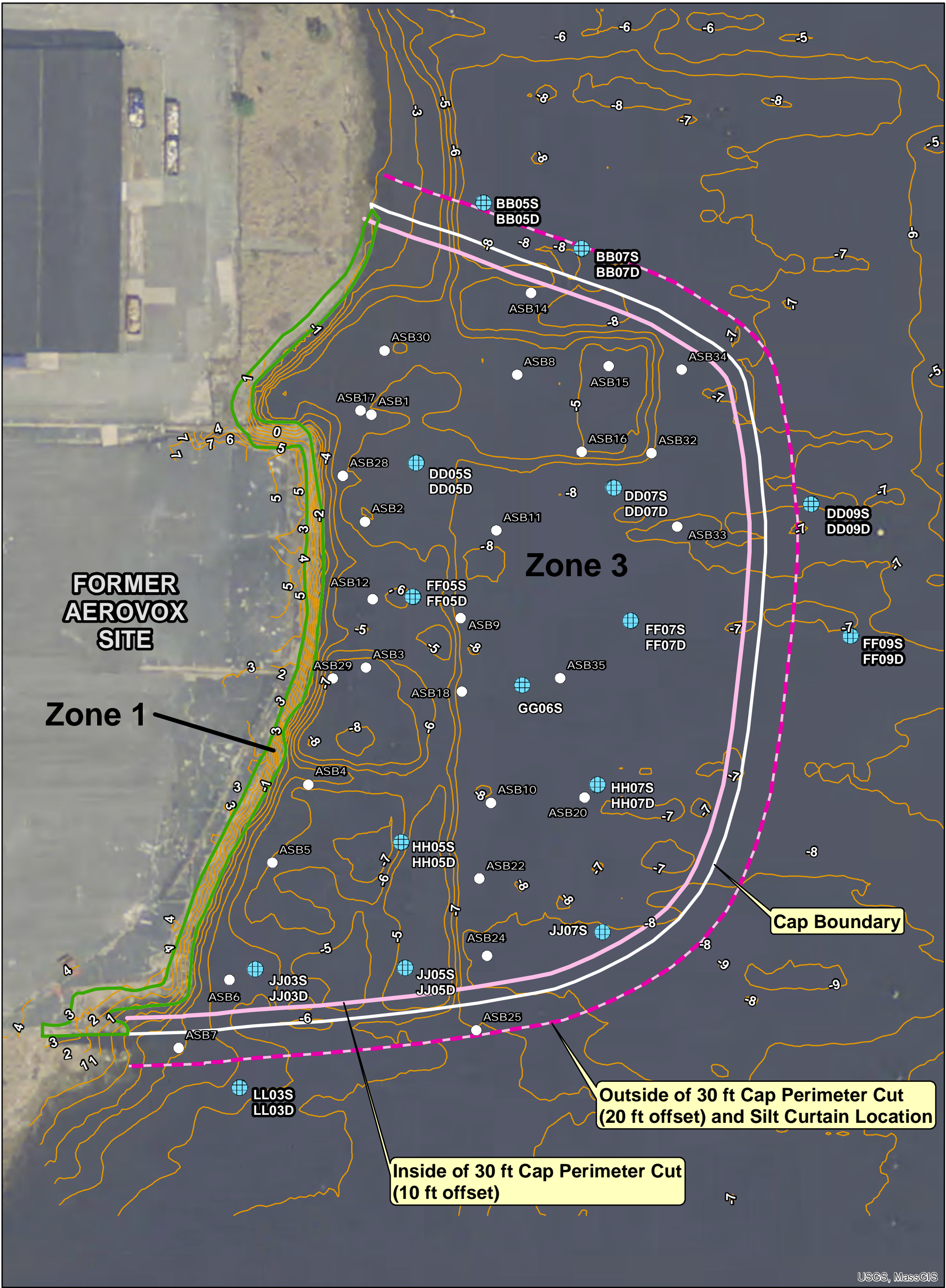
JACOBS

Aerovox Erosion Control Locations

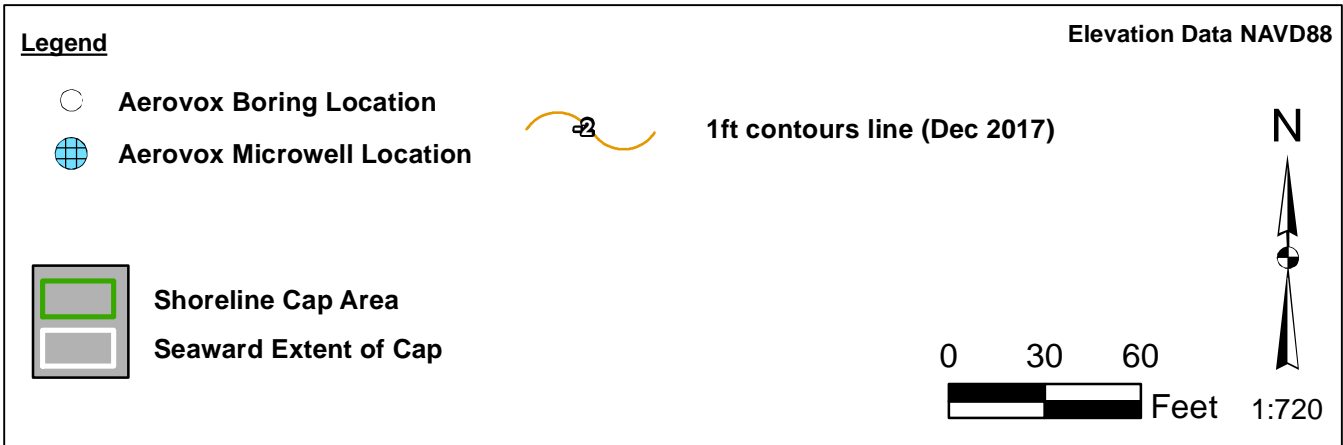
New Bedford Harbor Superfund Site

Date: 4/16/2018

Figure 23



Path: Y:\NBH\Projects\35BG-100120180201\ArcGIS\Aerovox_30ft_Cap_Perimeter_20180413.mxd



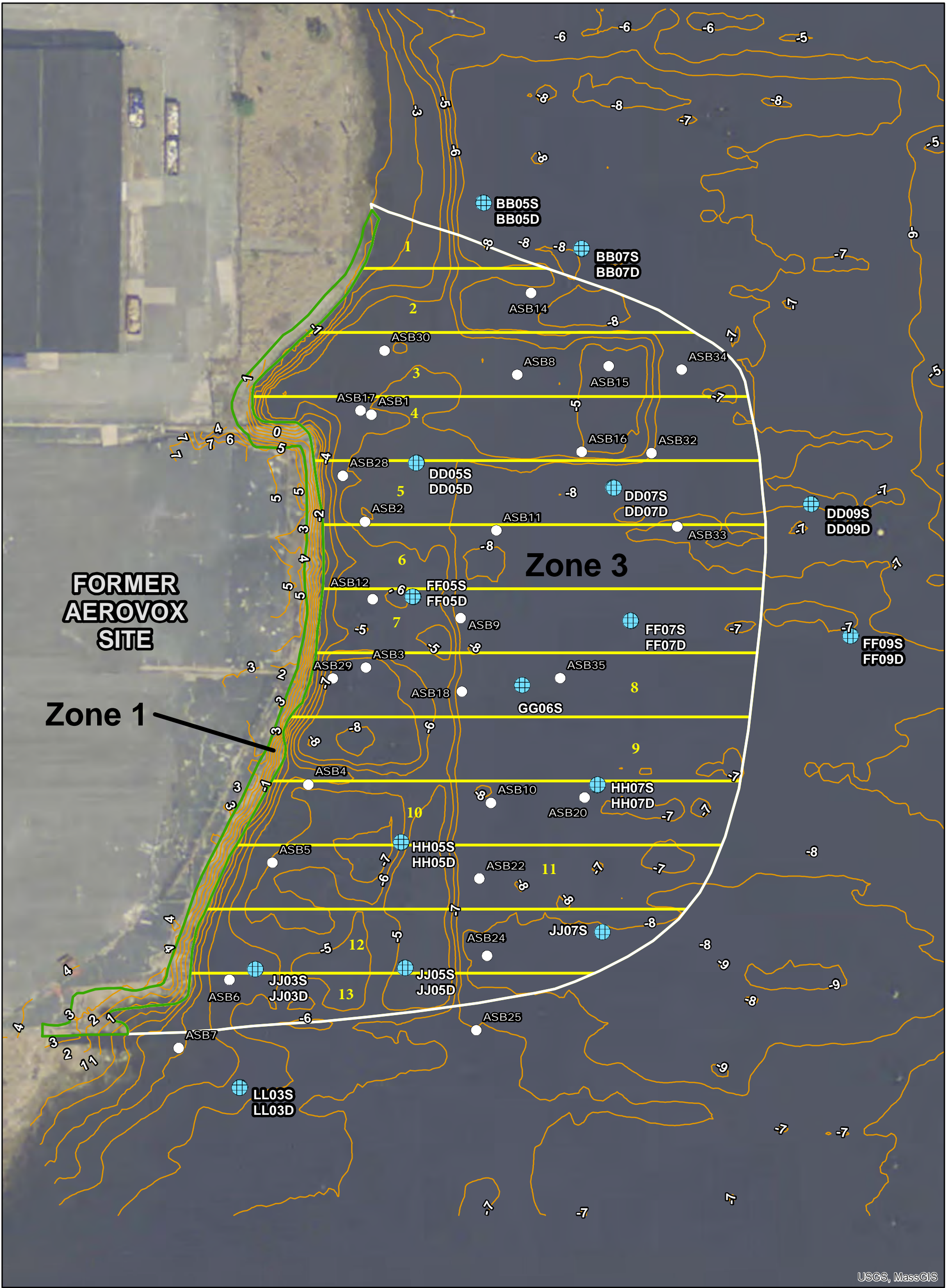
JACOBS

Silt Surtain and Cap Perimeter Dredge Area

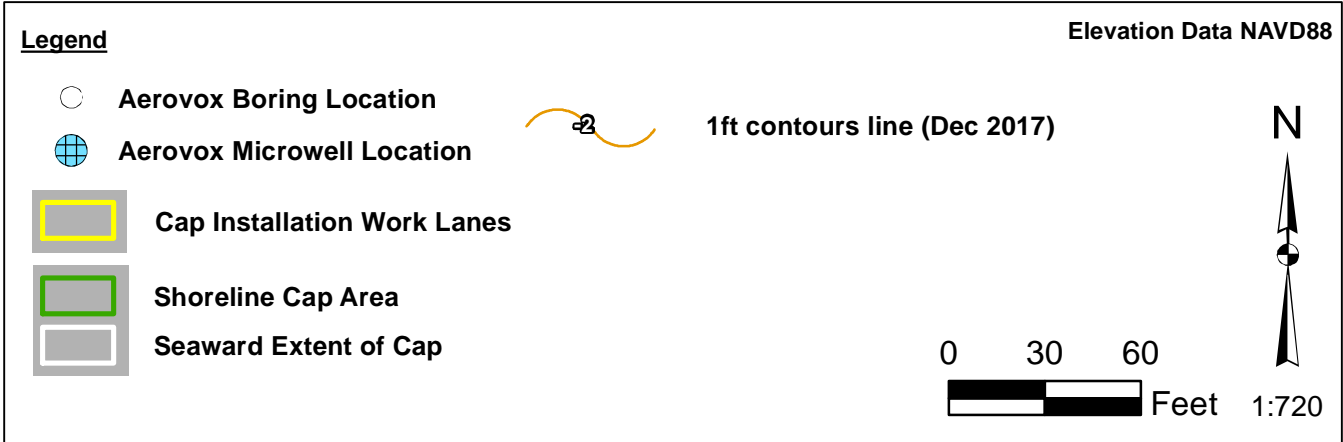
New Bedford Harbor Superfund Site

Date: 4/13/2018

Figure 24



Path: Y:\NBH\Projects\35BG\1001\20180201\1\MapGIS\Aerovox_Cap_Work_Lanes_borings_zones_with_microwell_locations_topo_bathy_20180417.mxd

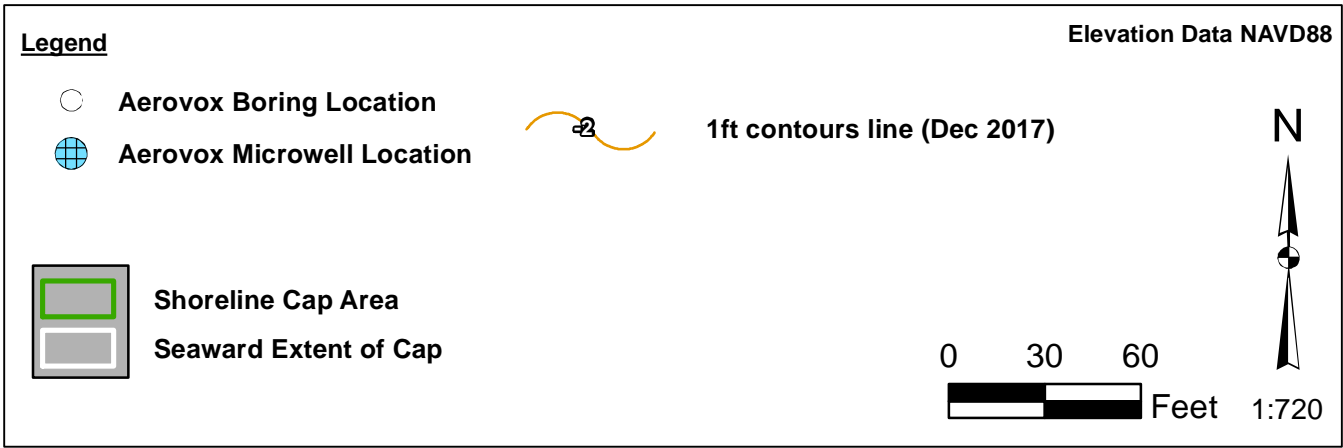
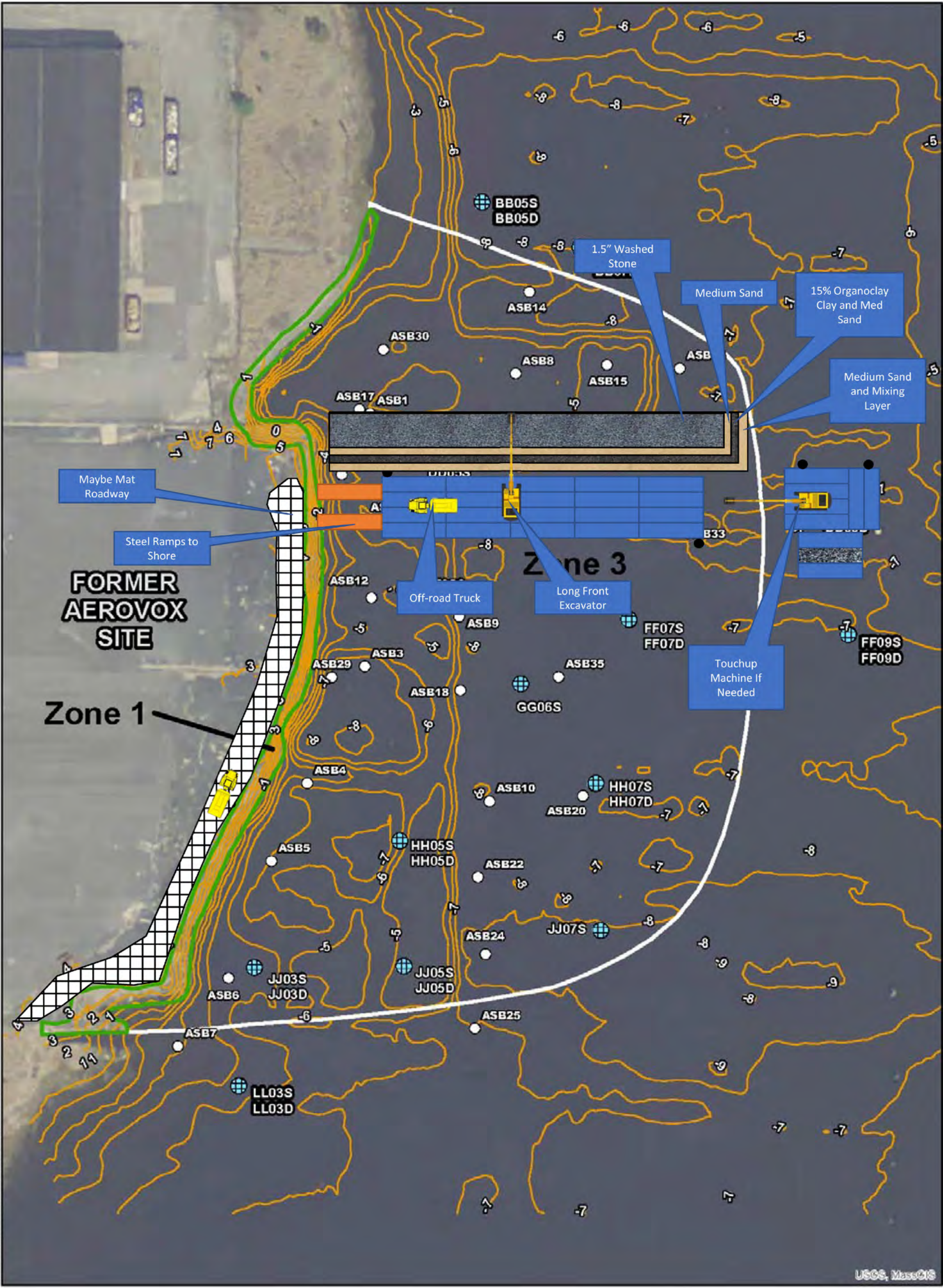


Cap Sequence Grid Pattern

New Bedford Harbor Superfund Site

Date: 4/17/2018

Figure 25



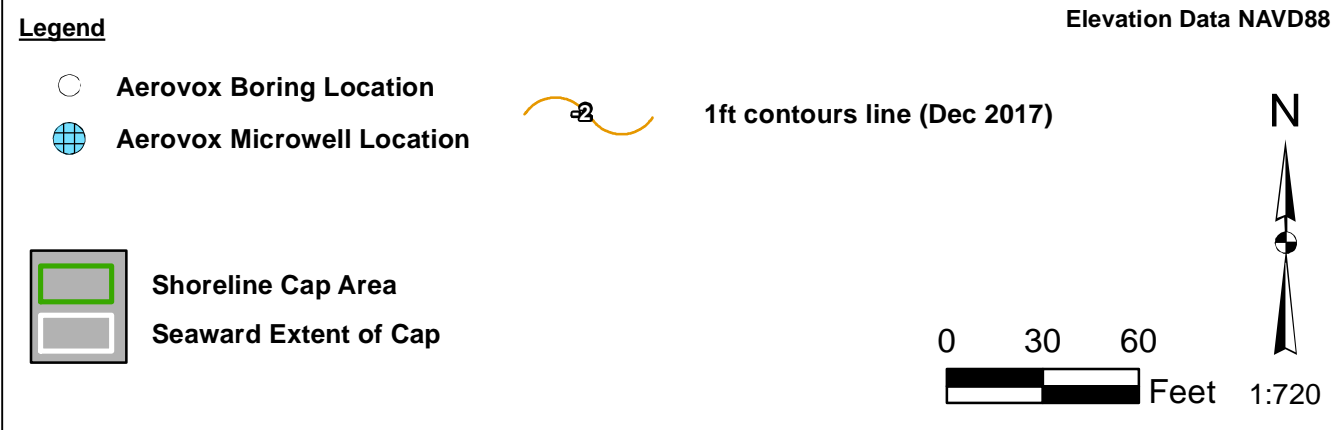
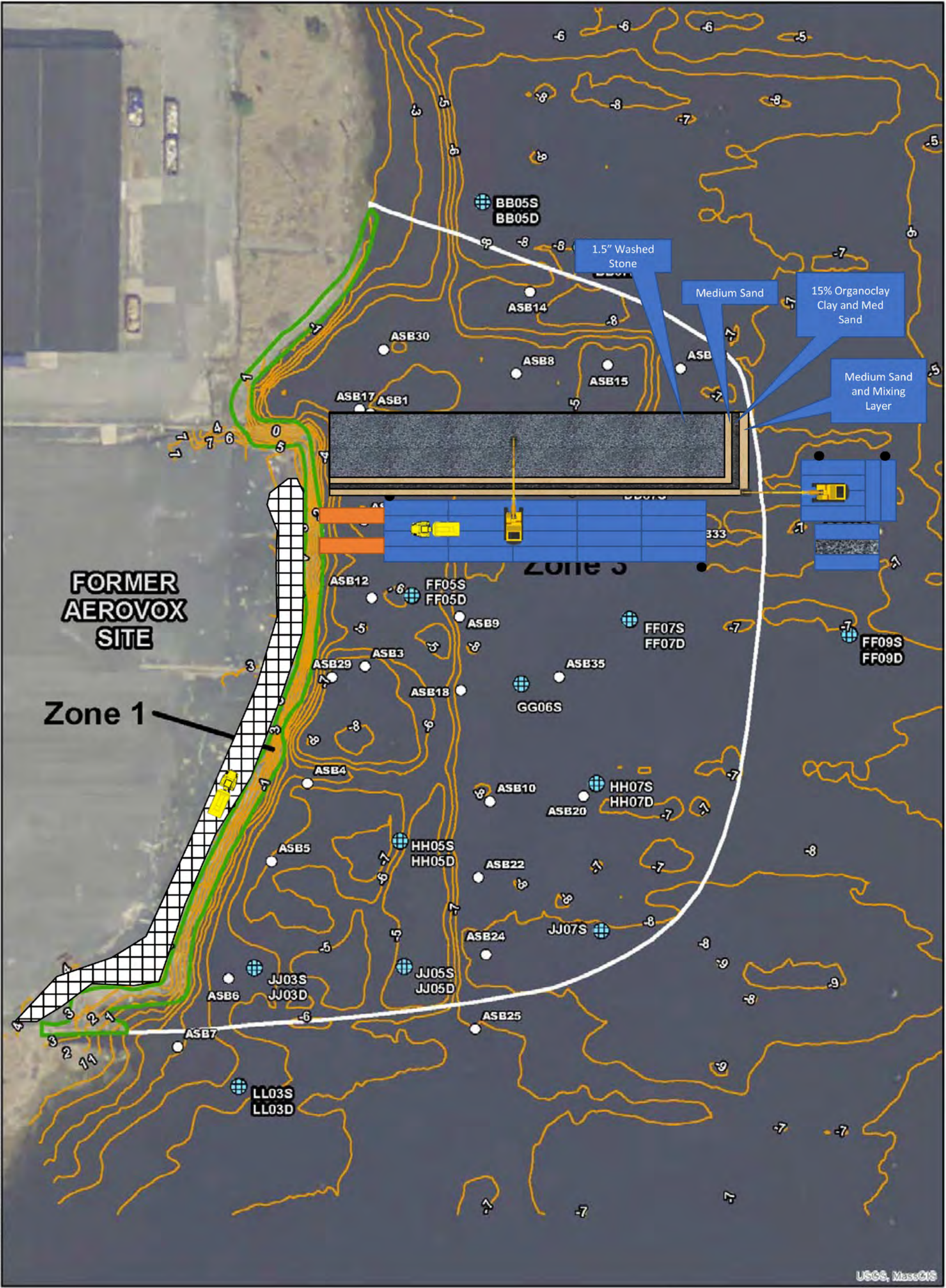
JACOBS

Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 26



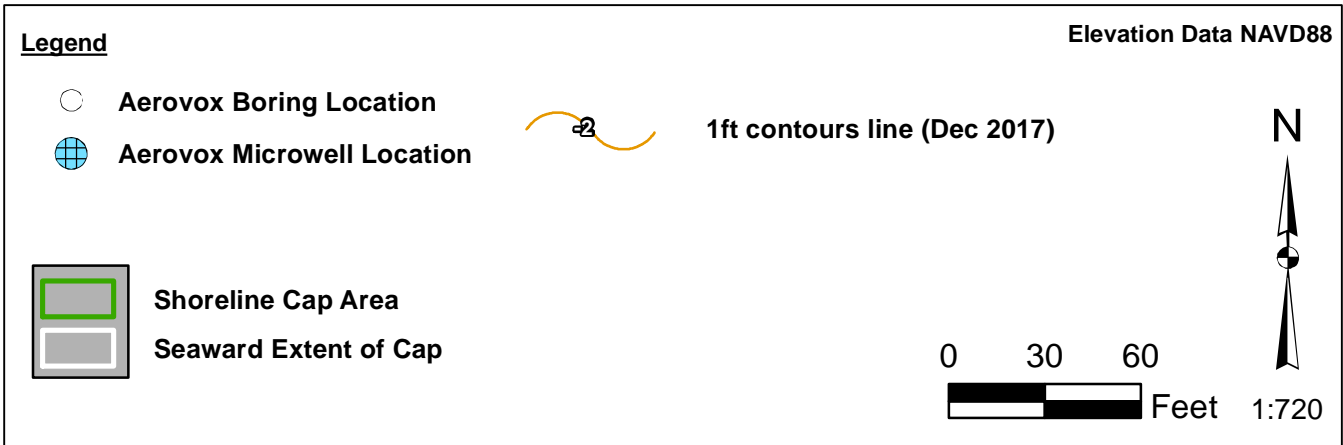
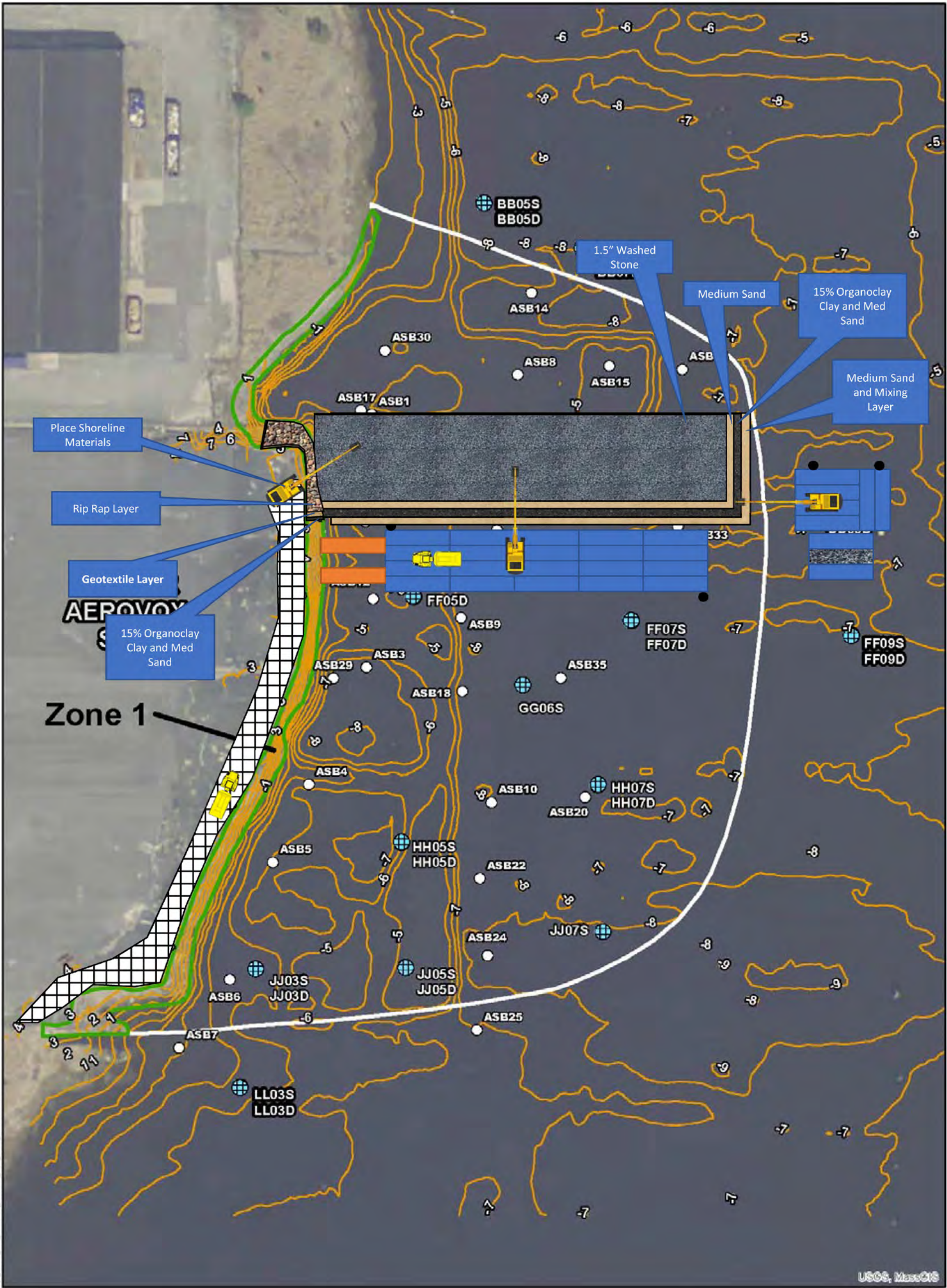
JACOBS

Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 27

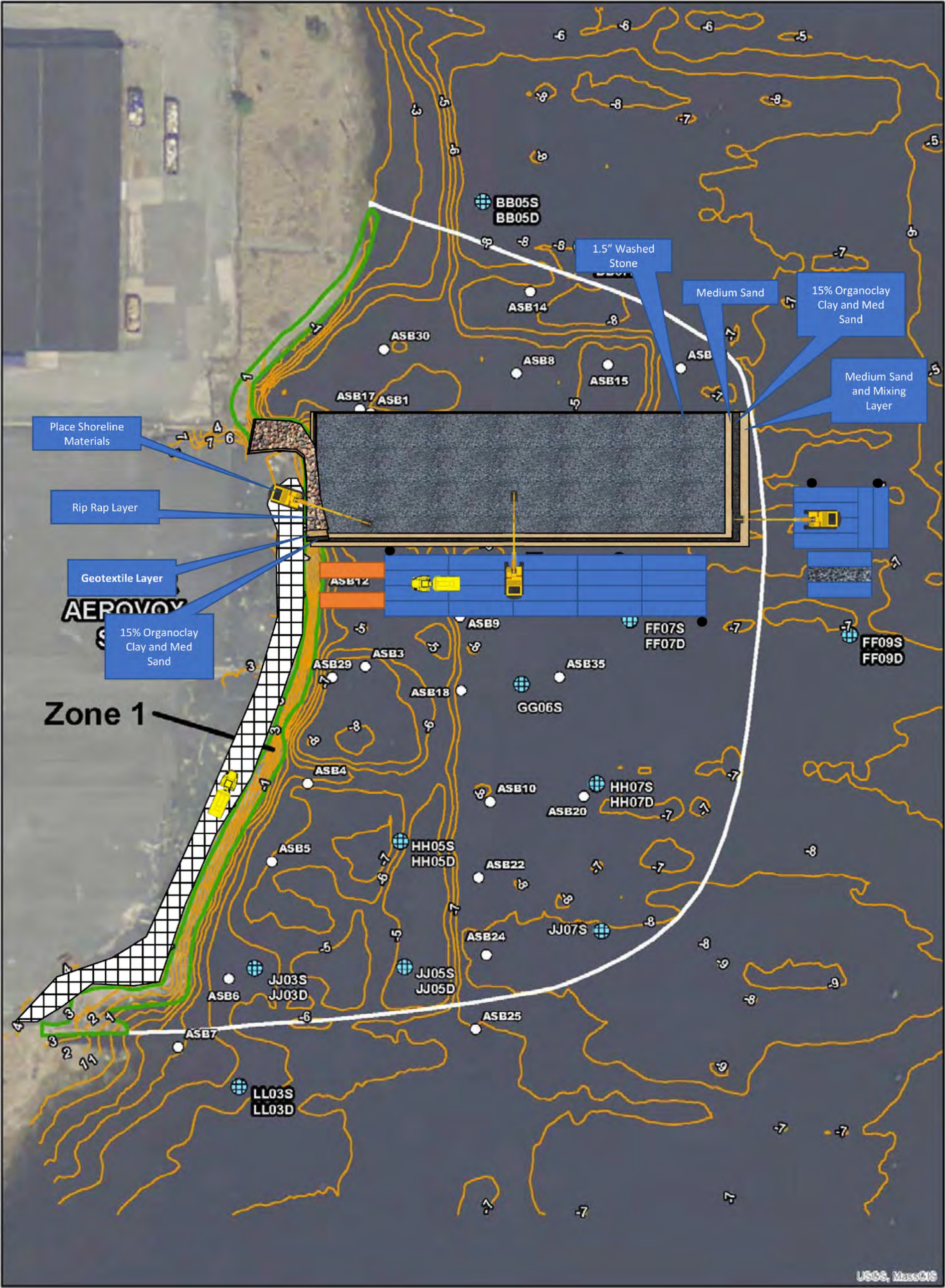


Aerovox Cap Constructability Sequence (typical)

New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 28



Legend

- Aerovox Boring Location
- Aerovox Microwell Location
- Shoreline Cap Area
- Seaward Extent of Cap



1ft contours line (Dec 2017)

Elevation Data NAVD88

N



0 30 60

Feet 1:720

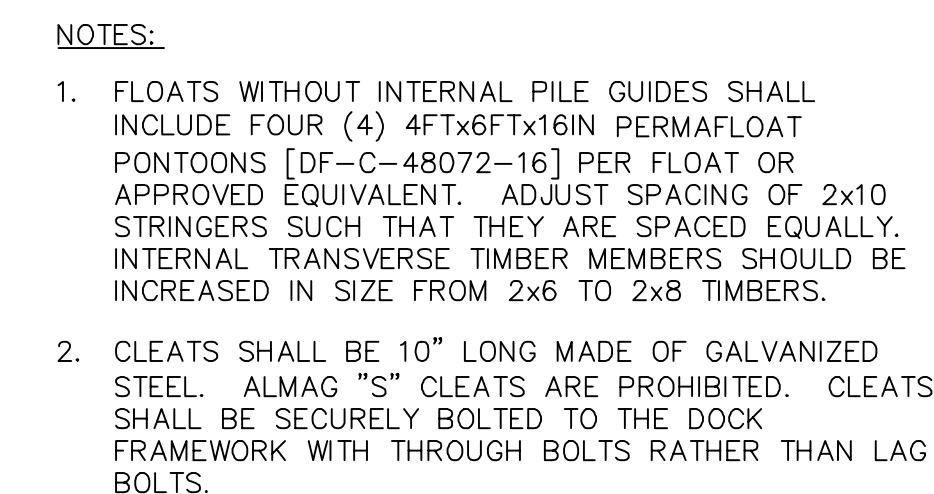
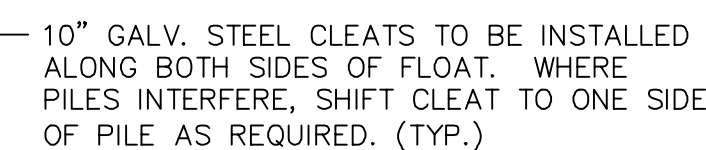
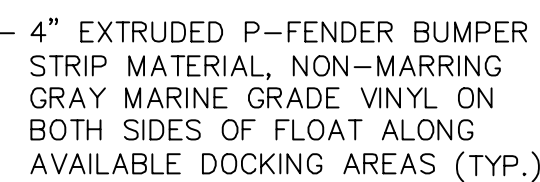
JACOBS

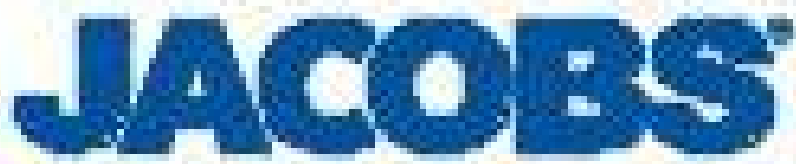
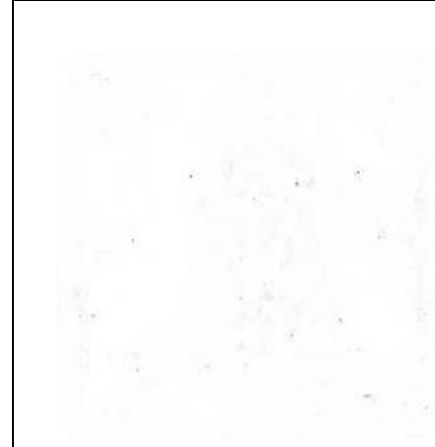
**Aerovox Cap
Constructability Sequence
(typical)**

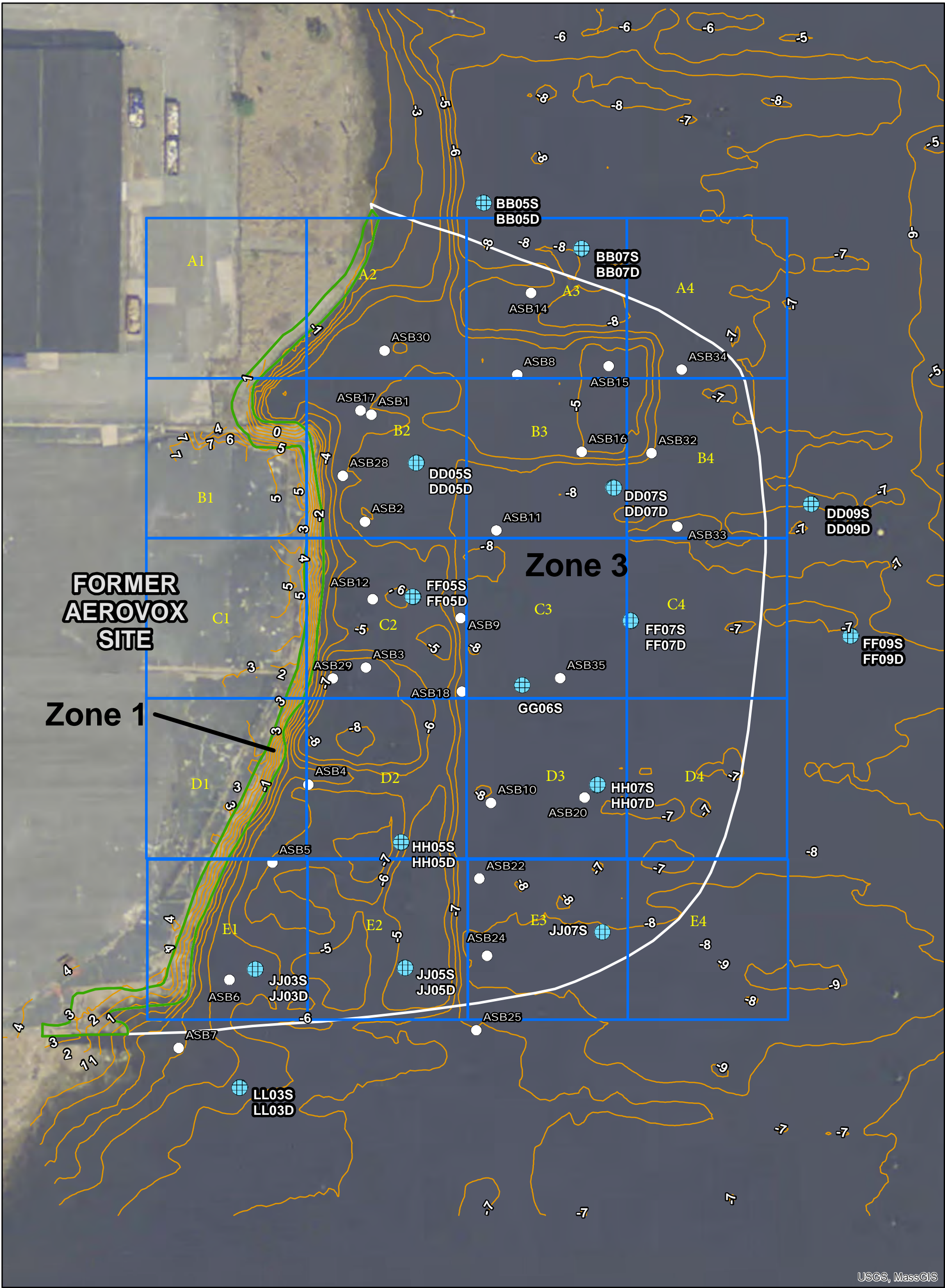
New Bedford Harbor Superfund Site

Date: 4/20/2018

Figure 29


$$1'' = 1' - 0''$$

$$1'' = 1' - 0''$$

$$1'' = 1' - Q''$$


| | | | | |
|---|----------|-----------------|-------------|------|
|  | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| 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: | | |
| | | — — | | |



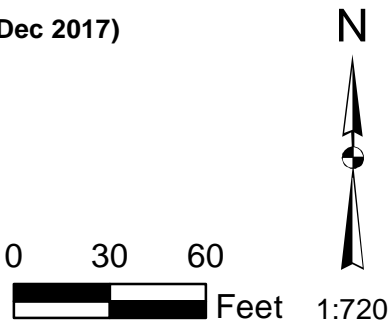
Path: Y:\NBH\Projects\358G\100120180201\MapGIS\Aerovox_100ft_Cap_Grid_borings_zones_with_microwell_locations_topo_bathy_20180417.mxd

Legend

- Aerovox Boring Location
- Aerovox Microwell Location
- 100 ft Cap Thickness Verification Grid
- Shoreline Cap Area
- Seaward Extent of Cap

Elevation Data NAVD88

1ft contours line (Dec 2017)



JACOBS

Cap Grid Sample Locations

New Bedford Harbor Superfund Site

Date: 4/17/2018

Figure 31



USGS, MassGIS

Legend

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

0 25 50
Feet 1:600



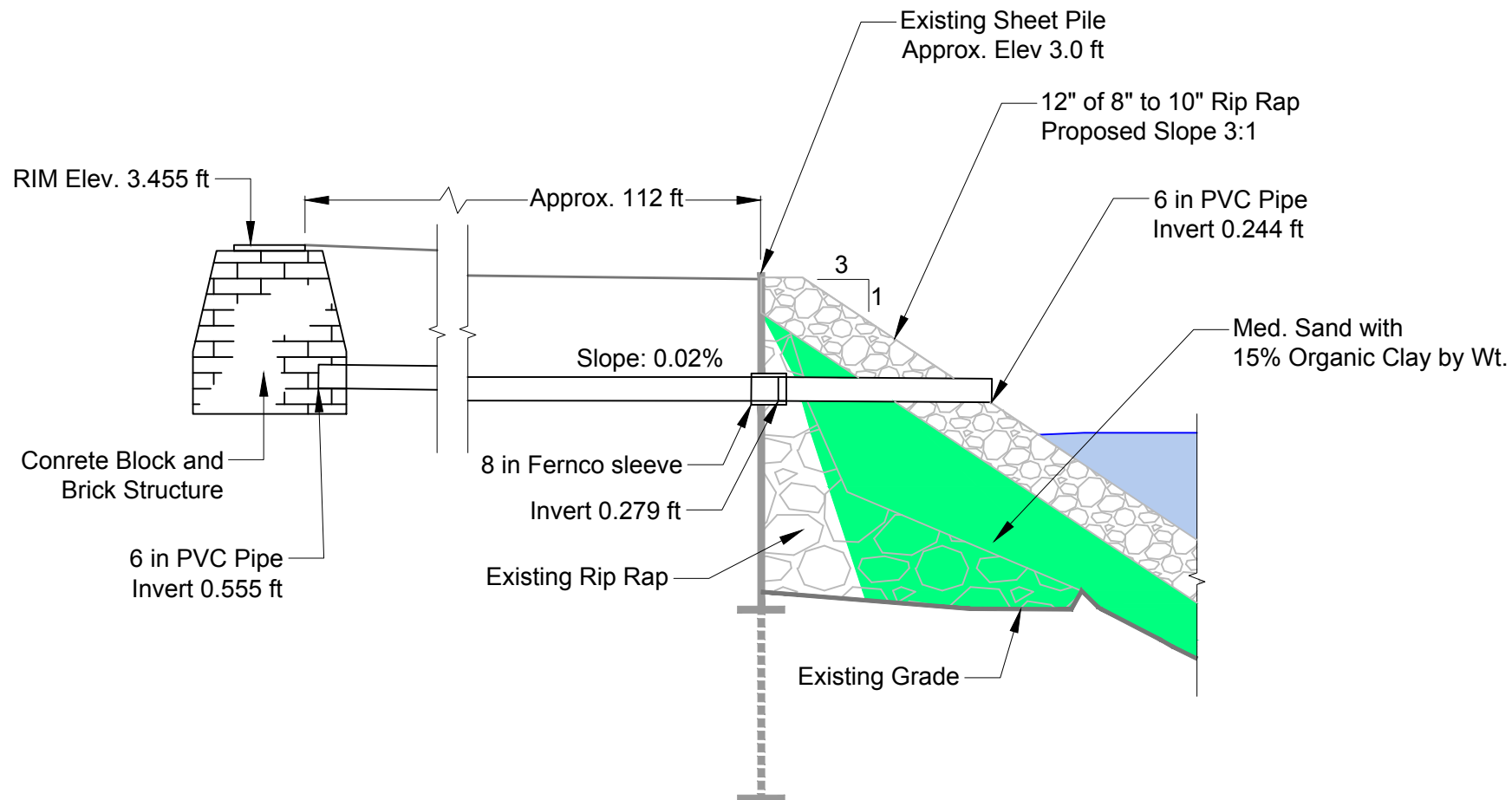
JACOBS®

**Drainage and
Outfall Locations
with Topographic
Elevations**

New Bedford Harbor Superfund Site

Date: 2/26/2018

Figure 32



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

Not To Scale

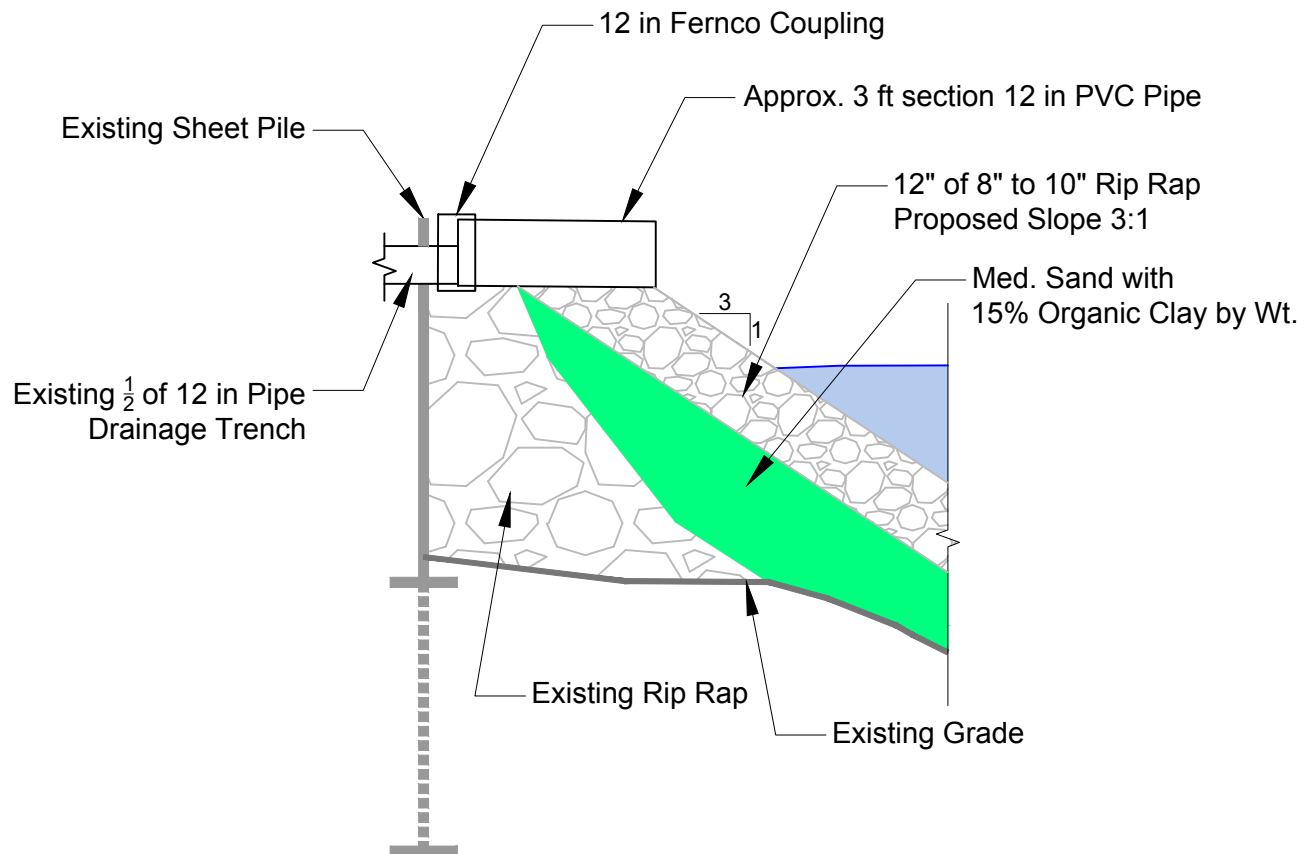
JACOBS

Catch Basin and Discharge Cross Section
New Bedford Harbor Superfund Site

Elevation Data: NAVD88

04/17/18

Figure 33



Not To Scale

JACOBS™

North and South Trench Drainage Detail

New Bedford Harbor Superfund Site

Elevation Data: NAVD88

04/17/18

Figure 34

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-DICHLOROETHENE | 1,4-DICHLOROETHENE | 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 | 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 | 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 | 200 | ND | 33 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0 | ND | ND | ND | 9.6J | ND | |
| AA-05-28-33 | 2.8-3.3 | 0.887 | - | - | ND | ND | ND | ND | ND | ND | 58 | ND | 23 | 31 | ND | ND | ND | ND | ND | ND | ND | ND | 34 | 2.4J | ND | 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 | 0 | ND | 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 | 0 | ND | 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 | 3000 | 150 | 180 | 370 | ND | 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 | 0 | ND | 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 | 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 | 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 | 0 | ND | 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 | 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 | 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 | 0 | ND | ND | ND | ND | ND | |
| DD-09-10-15 | 1.0-1.5 | 0.395 | - | - | 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 | 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 | 0 | ND | ND | ND | ND | | |
| FF-08-12-17 | 1.2-1.7 | 5.22 | - | - | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 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 | 0 | ND | 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 | 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 | 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 | 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 | 22J | 7.1J | 4.4J | 6.6J | ND | | |
| LL-02-17-22 | 1.7-2.2 | 0.0899 | - | - | ND | ND | ND | ND | ND | ND | 140 | ND | 160 | ND | ND | ND | ND | 20J | 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 | 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 | 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 | 0 | ND | ND | ND | 4.5J | ND | |
| LL-04-30-35 | 3.0-3.5 | 1.02 | 0.00295 | - | ND | ND | ND | ND | ND | ND | 120 | ND | 170 | ND | ND | ND | ND | 23J | ND | ND | ND | ND | 0 | ND | 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 | 4J | ND | ND | ND | ND | ND | |
| LL-06-15-20 | 1.5-2.0 | 14.4 | - | - | ND | ND | ND | ND | ND | ND | 44J | ND | 64 | ND | ND | ND | ND | 8.5J | ND | ND | ND | ND | 0 | ND | ND | ND | ND | ND | |
| LL-06-15-20-FD | 1.5-2.0 | 17.3 | - | - | ND | ND | ND | ND | ND | ND | 56J | ND | 86 | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0 | ND | ND | ND | ND | ND | |
| LL-06-30-35 | 3.0-3.5 | 5.11 | - | - | 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

| Well | Date | VOCs | | | | | | | | | | | | | | | | | | | | | | PCBs | |
|------------|------------|--------------------|--------------------|-----------------------|---------------------|--------------------|------------------------|------------------------|---------------------|---------------------|------------------|------------|------------------------|--------------|-----------------------------|--------------------------------|-------------------------|---------|--------------------------|--------------------------|----------------------|----------------|----------------|-----------|----------|
| | | 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 | 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 | 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 | 480J | ND | ND | ND | ND | ND | 480 | 2.8 | 14 | 15 | ND | 0.780 | 0.659 | |
| BB-07S dug | 11/1/2017 | 0.67J | 1.8 | ND | ND | 5.9 | 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 | 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 | 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 | 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 dug | 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 | ND | 88 | 10 | 8.9J | 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 dug | 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

| Well | Date | 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) |
| | | 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/cm³ = 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/cm³ = 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/cm³ = 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



**US Army Corps
of Engineers**
New England District

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**

Prepared by

**Battelle
141 Longwater Drive, Suite 202
Norwell, Massachusetts 02601**

December 2017

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Appendix A: Field Log Sheets

Appendix B: Laboratory Photos and Data Packages

Appendix C: Porewater and Surface Water Calculation Data

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 data¹.

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 PCB³ 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} cm²/s. Boundary layer thickness for passive samplers in the water column is typically in the range of 50 to 500 μ m, depending on the water flow conditions (Apell et al., 2015); in this survey, the value of 200 μ m (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_{owS}) and PED-water partition coefficients (K_{PEDS}).

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 11⁴. 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 $2,750 \pm 443$ 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 $8,420 \pm 8,810$ 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 12⁵. At five of the 22 sampling stations, the calculated flux had a slightly negative value (from -3.05 to -25.3 mg/m²/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/m²/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/m²/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/m²/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

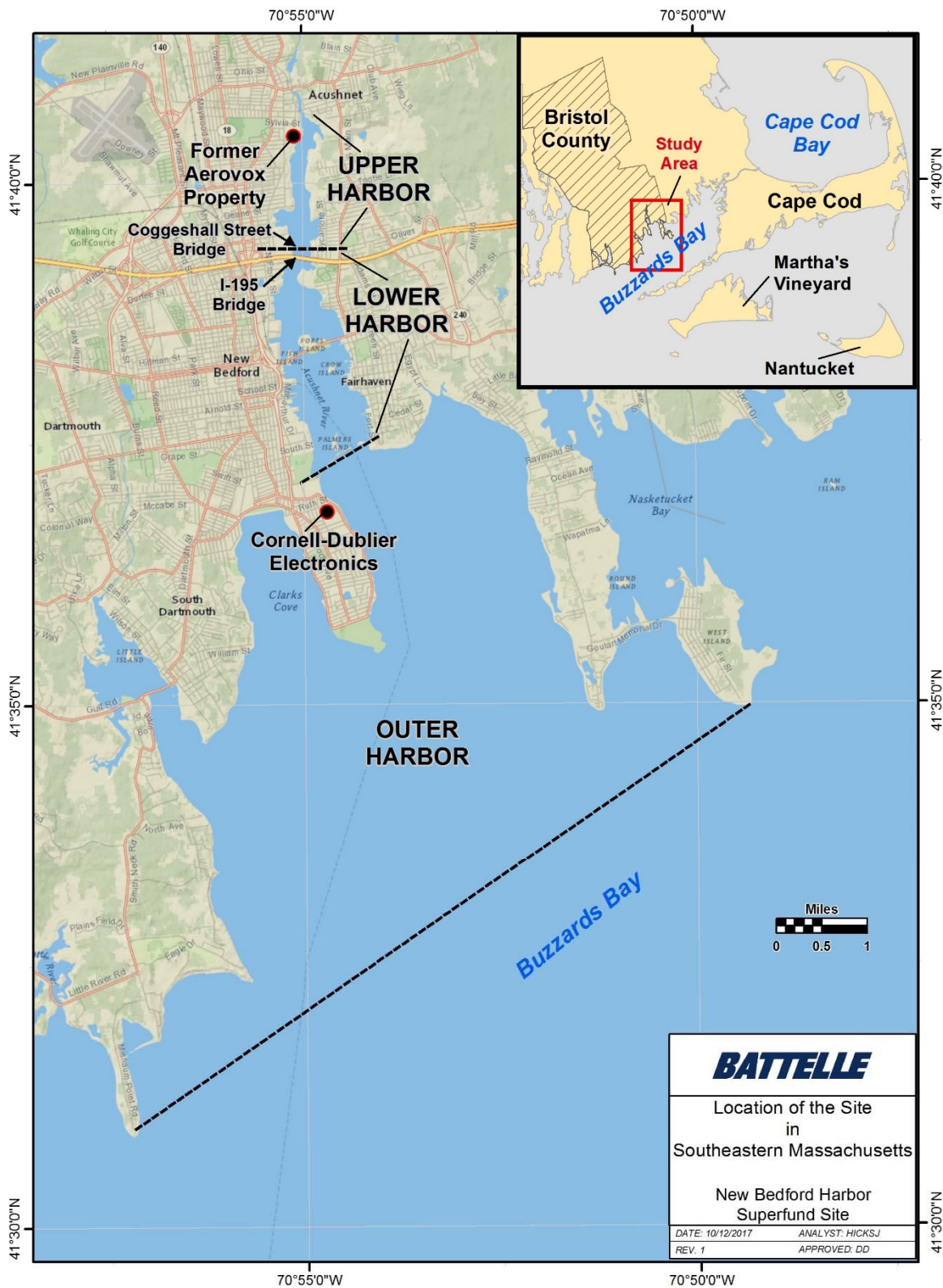


Figure 1. Location of the former Aerovox facility within the New Bedford Harbor.

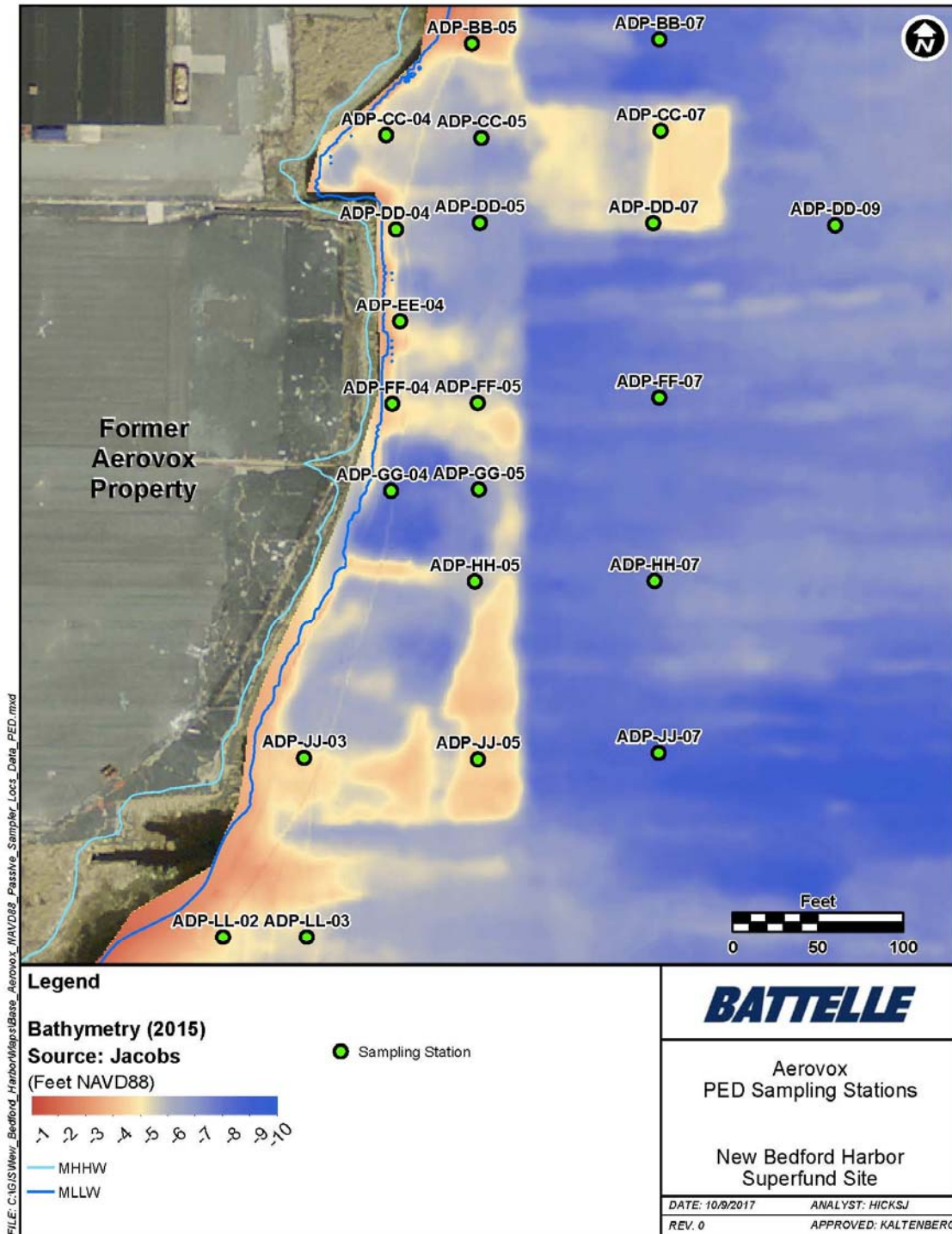


Figure 2. PED Deployment Locations.

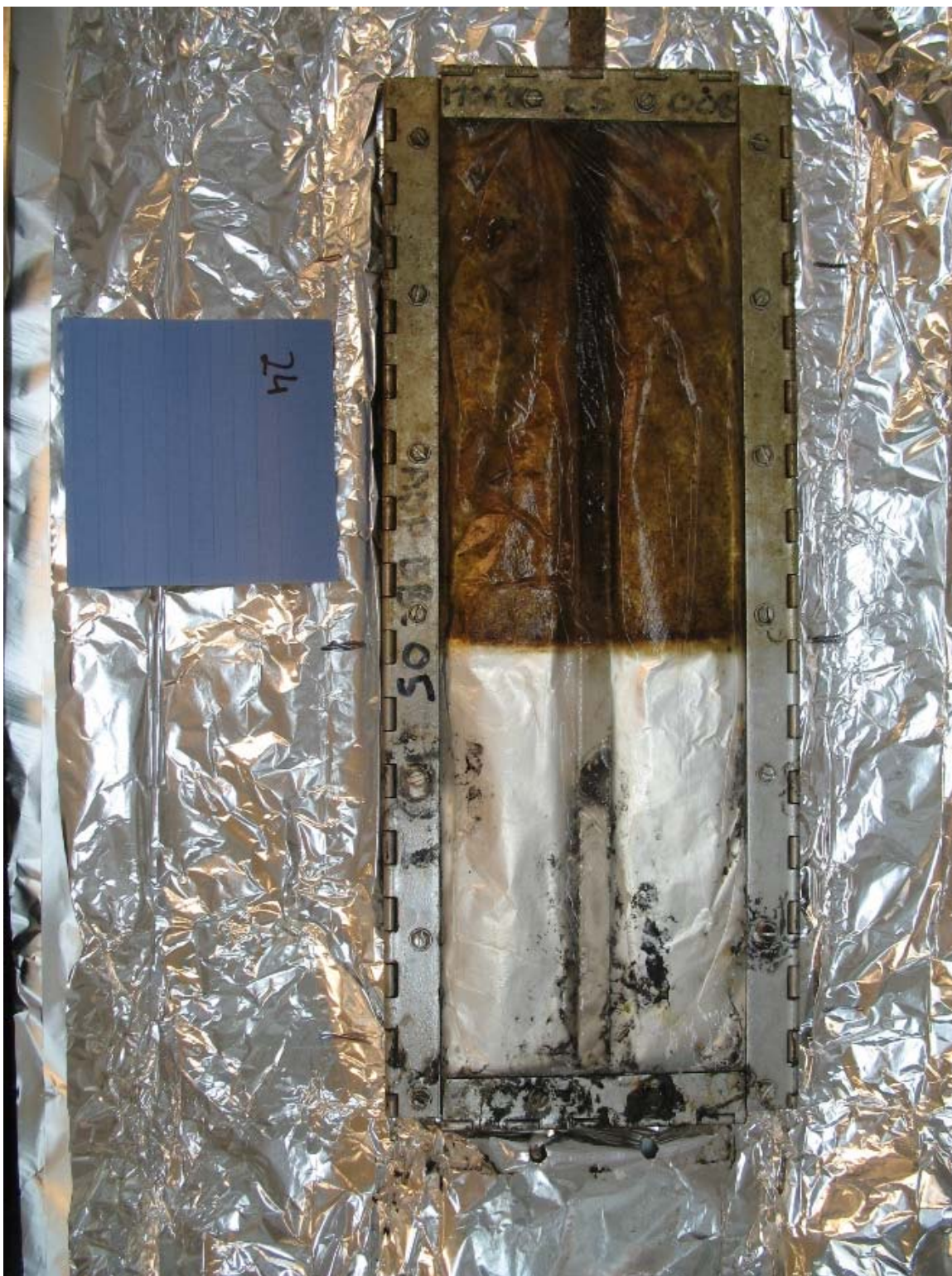


Figure 3. Laboratory Picture of PED Prior to Sectioning. Station ADP-BB-05. Heavy Biofouling Above the SWI.



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.

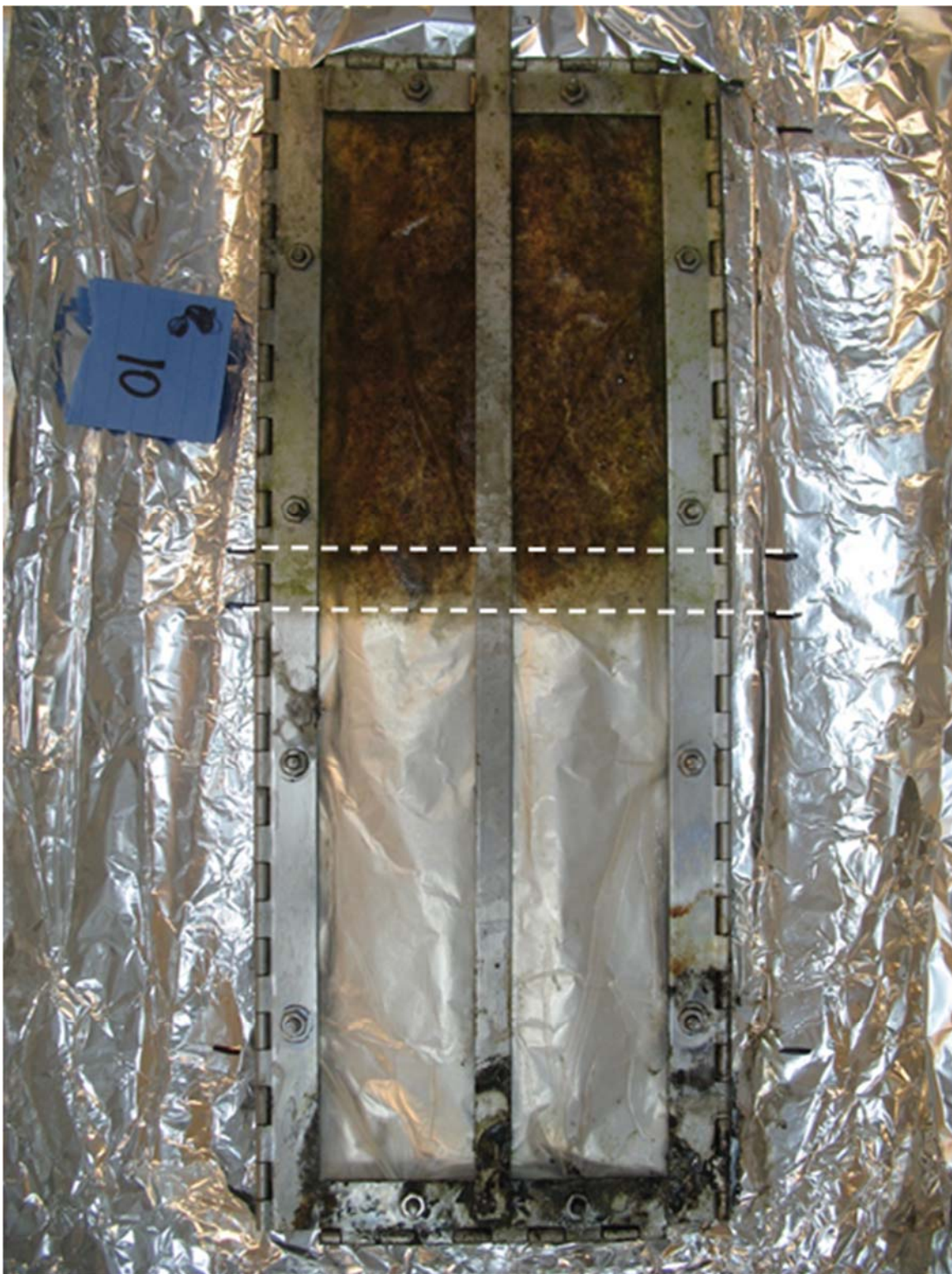


Figure 6. Laboratory Picture of PED Prior to Sectioning. Station ADP-FF-04. PED with Gradational Color Change Over the SWI. Section Between the Dashed Lines Was Not Included in the Surface Water or Porewater Samples Sectioned for Analysis.



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

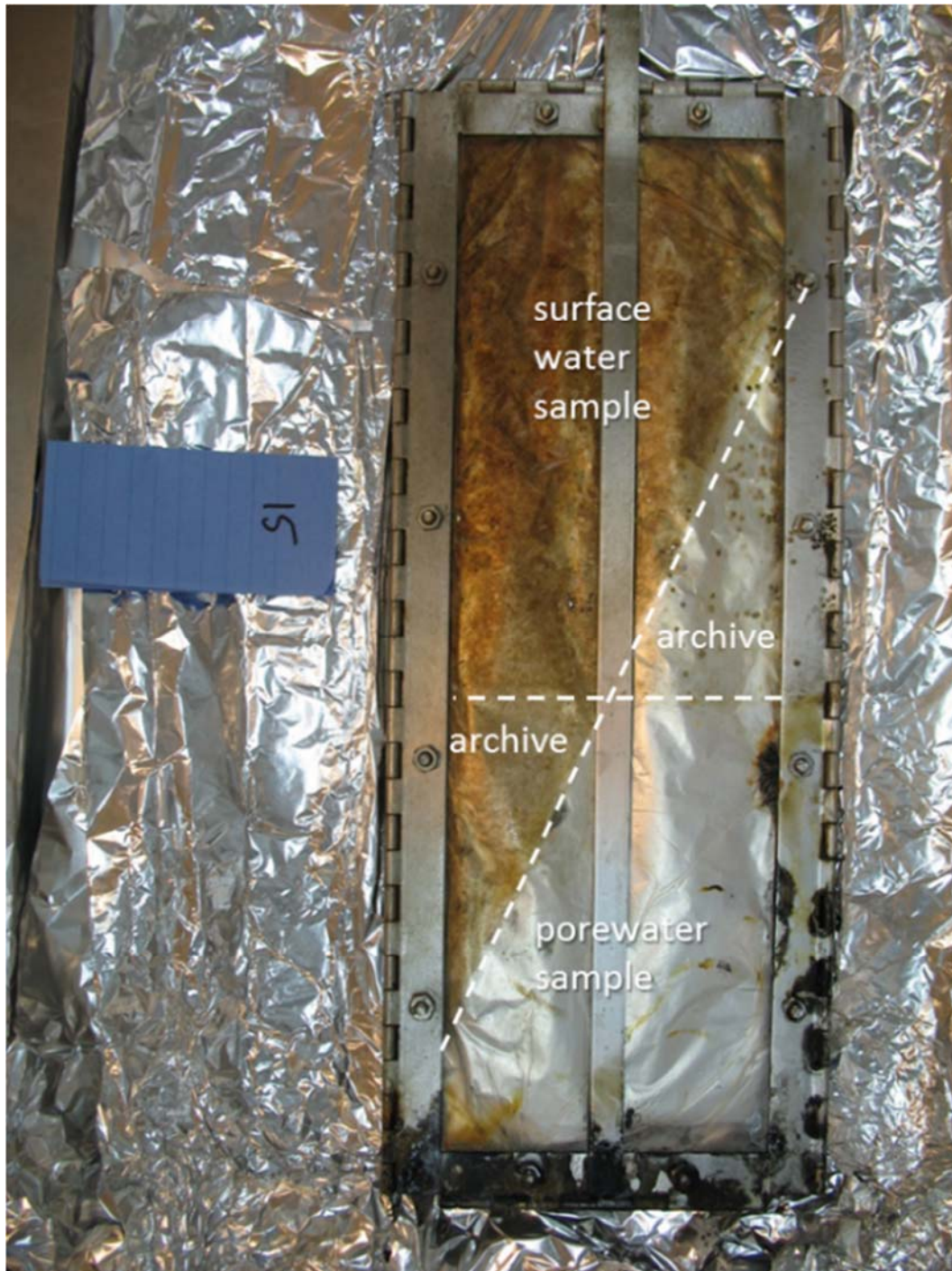


Figure 8. Laboratory Picture of PED Prior to Sectioning. Station ADP-DD-07. PED That Was Initially Inserted Vertically (Color Change Visible along the Horizontal Dashed Line) but Was Subsequently Tilted (New Interface Marked by the Diagonal Dashed Line). The Two Triangular Sections That Were Exposed 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.

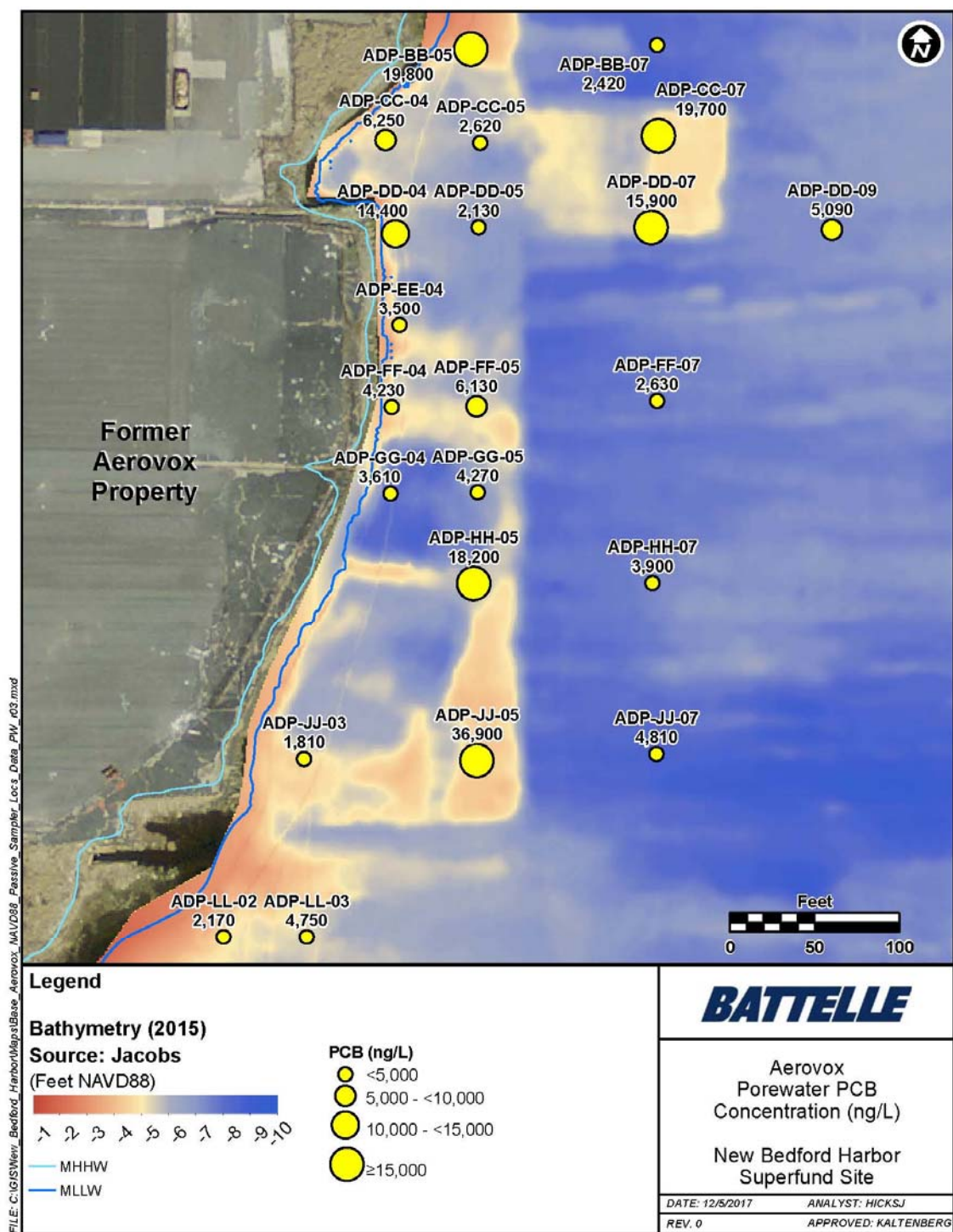


Figure 10. Total Dissolved PCB in the Top 6 Inches of Porewater near the Former Aerovox Facility.

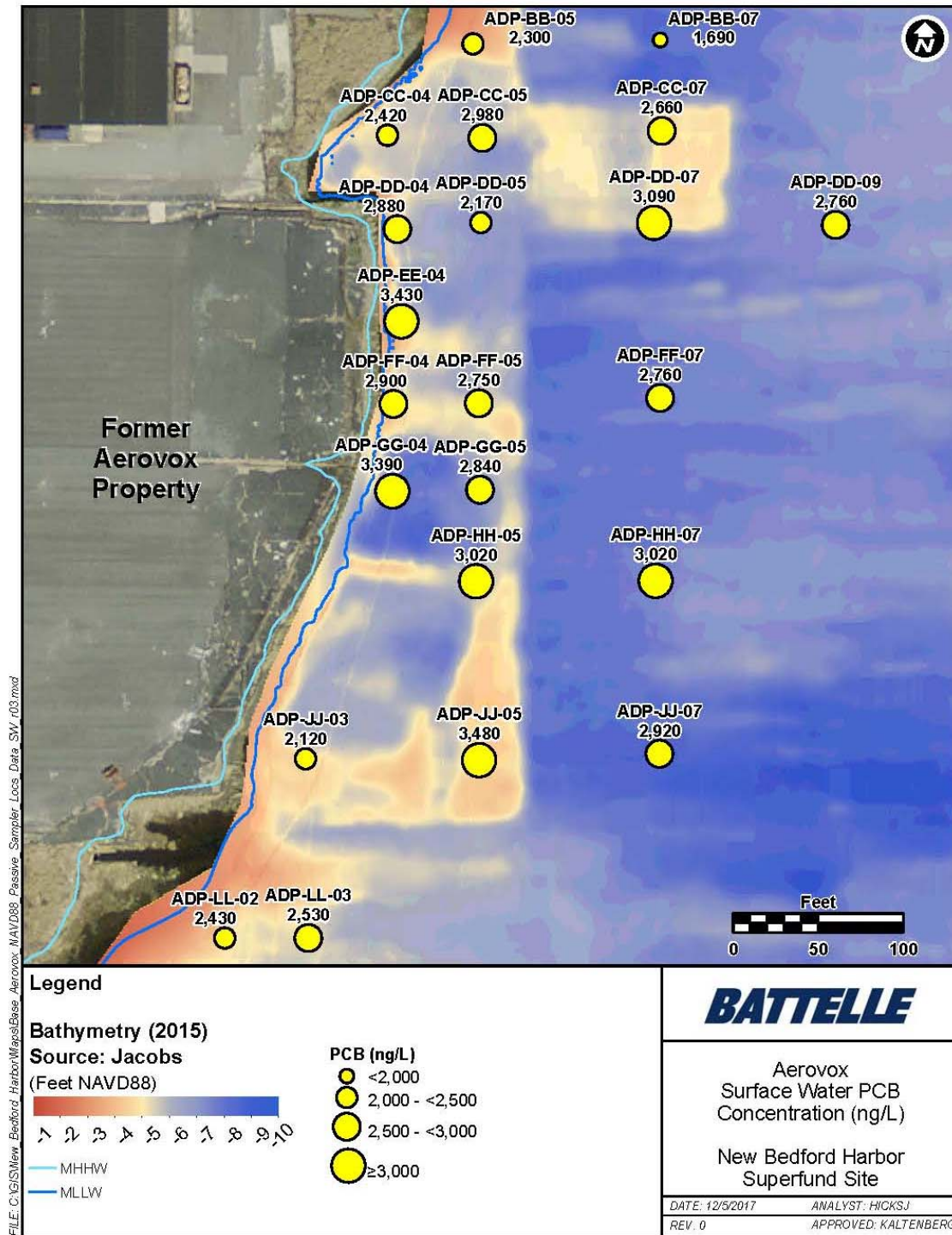


Figure 11. Total Dissolved PCB in the Bottom 6 Inches of Surface Water near the Former Aerovox Facility. Note: the Scale (Circle Size) is Different Than in Figure 9 to Better Represent Spatial Variability of the Data.

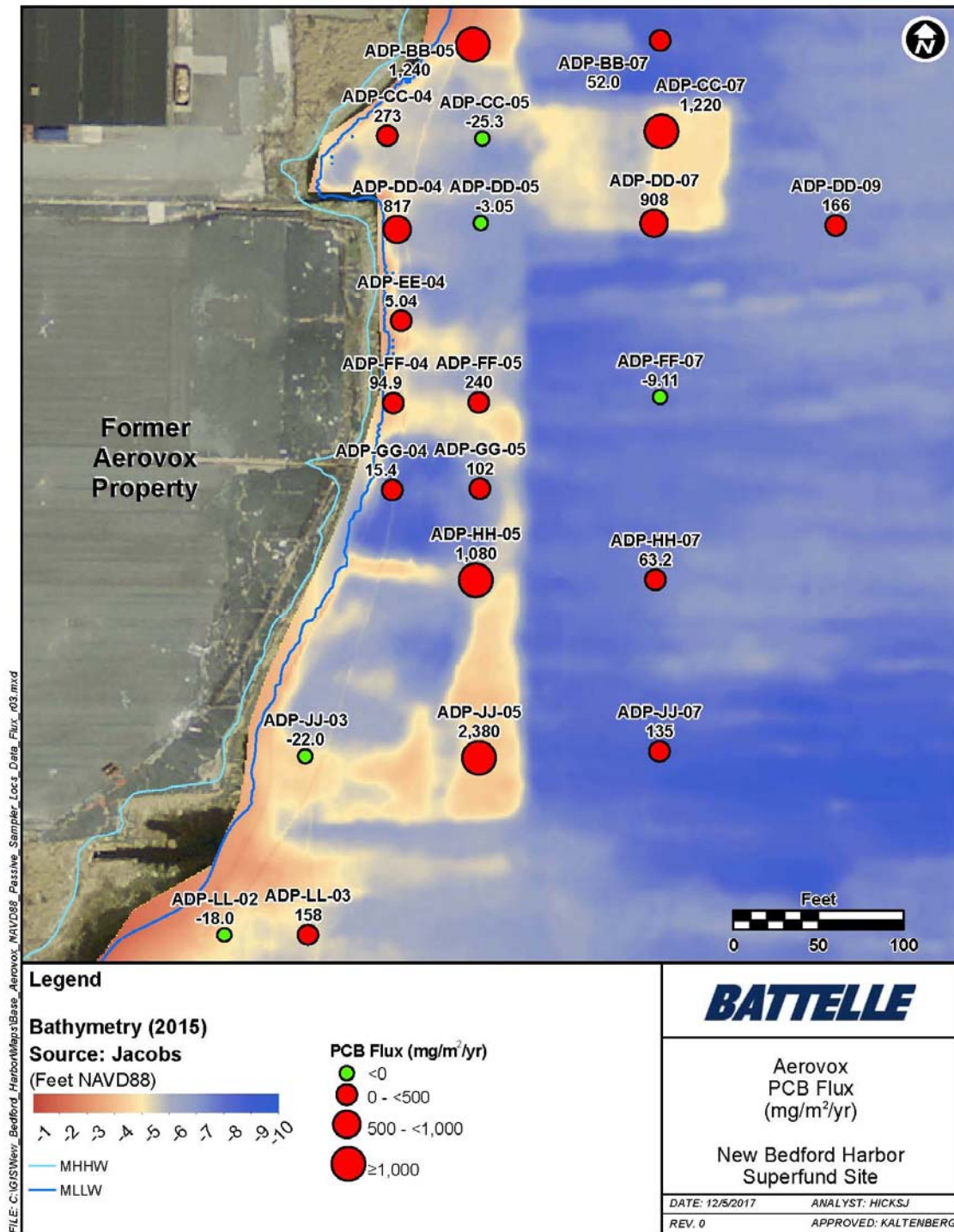


Figure 12. Diffusive Flux of Total Dissolved PCB Across the Sediment-Water Interface near the Former Aerovox Facility. Negative Flux Values Indicate Flux from Water Column Down into the Sediment; Positive Flux Values Indicate Flux from Porewater up into the Water Column.

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.): 2.74 | | | |
| PED ID(s): 170628AS012 | | Sample ID(s): 170628AS012 ^① | | | |
| P-176-ADP-LL-02 | | | | | |
| Comments / Observations: ① w/L PBL 11 July 2017 | | | | | |
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|---|--|--|--|--|--|
| RECOVERY | | Date: 11 July 2017 ^① 14 AUG 2017 | | Staff initials: PBL, MRF, CF ^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.): | |
| | | (3) | | 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/L PBL 11 July 2017 | | | | | |
| (3) NOT RECORDED | | | | | |
| PBL / 14 AUG 2017 | | | | | |
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|--|--|---------------------------------------|--|-------------------------------|--|
| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBL, CNF, MAF | |
| Vessel: Gale Force | | Buoy Number: 2 | | Station ID: ADP-LL-03 | |
| Recorder: PBL | | Time of Deployment (local): 0838 | | | |
| Northing: 2706596.257 | | Easting: 815503.329 | | 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): 17062845013 | | Sample ID(s): P-176-ADP-LL-03 | | | |
| Comments / Observations: | | | | | |
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|--------------------------------|--|----------------------------------|--|-------------------------|--|
| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: MAF/PBL | |
| Vessel: GALE FORCE | | Buoy Number: 2 | | Station ID: ADP-LL-03 | |
| Recorder: PBL | | 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): 17062845013 | | Sample ID(s): P-176-ADP-LL-03 | | | |
| Comments / Observations: | | | | | |
| ① NOT RECORDED PBL 14 Aug 2017 | | | | | |
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|---------------------------|--|--|--|-------------------------------|--|
| 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: | | | | | |
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|---------------------------|--|----------------------------------|--|------------------------------|--|
| 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: | | | | | |
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| DEPLOYMENT | | Date: 11 July 2017 | Staff initials: PBC, CNE, 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: | | | | |
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| 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 Recorded PBC 14 AUG 2017 | | | | |
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|--------------------------|-------------------------------|----------------------------------|-------------------------------|--|
| DEPLOYMENT | | Date: 11 July 2017 | Staff initials: PBC, MRF, CNF | |
| Vessel: GALE Force | | Buoy Number: 5 | Station ID: ADP-JJ-07 | |
| Recorder: PBL | | 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: | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | Staff initials: PBC | |
| Vessel: GALE Force | | Buoy Number: 5 | Station ID: ADP-JJ-07 | |
| Recorder: PBL | | 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: | | | | |
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| DEPLOYMENT | | Date: 11 July | | Staff initials: MRF, POC, CNF | |
| Vessel: GALE Force | | Buoy Number: 6 | | Station ID: ADP-HH-05 | |
| Recorder: POC | | Time of Deployment (local): 0955 | | | |
| Northing: 2706805.190 | | Easting: 815681.942 | | Elevation (ft.): 1.768 | |
| | | DGPS Accuracy (ft): H: 0.045 V: 0.074 | | | |
| Water depth (ft): 7.7 | | Predicted Tidal Height (ft.): 3.81 | | | |
| PED ID(s): 170628AS08 | | Sample ID(s): P-176-ADP-HH-05 | | | |
| Comments / Observations: | | | | | |
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|--------------------------------|--|--------------------------------|--|---------------------------|--|
| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: POC | |
| Vessel: GALE Force | | Buoy Number: 6 | | Station ID: ADP-HH-05 | |
| Recorder: POC | | 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): 170628AS08 | | Sample ID(s): P-176-ADP-HH-05 | | | |
| Comments / Observations: | | | | | |
| ① NOT RECORDED POC 14 AUG 2017 | | | | | |
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| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBC, MRF, CNF | |
| Vessel: Gale Force | | Buoy Number: 7 | | Station ID: ADP-HH-07 | |
| Recorder: PBC | | Time of Deployment (local): 1004 | | | |
| Northing: 2706805.449 | | Easting: 815787.504 | | Elevation (ft.): 2.235 | |
| | | DGPS Accuracy (ft): H: 0.047 V: 0.075 | | | |
| Water depth (ft): 9.5 | | Predicted Tidal Height (ft.): 3.85 | | | |
| PED ID(s): 170628AS007 | | Sample ID(s): P-176-ADP-HH-07 | | | |
| Comments / Observations: | | | | | |
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|---|--|----------------------------------|--|------------------------------|--|
| 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: 0 | | Elevation (ft.): | |
| | | | | DGPS Accuracy (ft): H: V: | |
| Water depth (ft): | | Predicted Tidal Height (ft.): | | | |
| | | | | | |
| PED ID(s): 170628AS007 | | Sample ID(s): P-176-ADP-HH-07 | | | |
| Comments / Observations: ① NOT RECORDED PBC 14 AUG 2017 | | | | | |
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|---------------------------|--|--|--|---------------------------|--|
| 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: | | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: PBL/MRF | |
| Vessel: GALE Force | | Buoy Number: 8 | | Station ID: ADP-GG-05 | |
| Recorder: PBL | | 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 PBL 14 AUG 2017 | | | | | |
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|--------------------------|--|--|--|-------------------------------|--|
| 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: | | | | | |
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|--|--|--------------------------------|--|---------------------------|--|
| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: PBC / MRF | |
| Vessel: GALE Force | | Buoy Number: 9 | | Station ID: ADP-GG-04 | |
| Recorder: PBL | | Time of Recovery (local): 0928 | | | |
| Northing: | | Easting: | | Elevation (ft.): | |
| | | | | ① | |
| 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 14 AUG 2017 | | | | | |
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|--------------------------|-------------------------------|----------------------------------|-------------------------------|--|
| 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-176-ADP-FF-04 | | |
| Comments / Observations: | | | | |
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|---|-------------------------------|--------------------------------|-------------------------|--|
| 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.): | | | |
| | | | | |
| PED ID(s): | | Sample ID(s): | | |
| 170628AS004 | | P-176-ADP-FF-04 | | |
| Comments / Observations: ① NOT RECORDED PBC 14 AUG 2017 | | | | |
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| 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: | | | | |
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| 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 14 AUG 2017 | | | | |
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| 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-176-ADP-FF-07 | | |
| Comments / Observations: | | | | |
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| RECOVERY | | Date: 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-176-ADP-FF-07 | | |
| Comments / Observations: ① SD 14 AUG 2017 (clarity) | | | | |
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|--------------------------|--|-----------------------------------|--|---------------------------------------|--|
| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBL, MRF, CNF | |
| Vessel: GALE FORCE | | Buoy Number: 14 | | Station ID: ADP-DD-09 | |
| Recorder: PBL | | Time of Deployment (local): 1119 | | | |
| Northing: 2707013.924 | | Easting: 815893.349 | | Elevation (ft.): 2.009 | |
| Water depth (ft): 9.1 | | Predicted Tidal Height (ft.): 3.5 | | DGPS Accuracy (ft): H: 0.062 V: 0.110 | |
| PED ID(s): 170628BS004 | | Sample ID(s): P-17G-ADP-DD-09 | | | |
| Comments / Observations: | | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: PBL/MRF | |
| Vessel: GALE Force | | Buoy Number: 14 | | Station ID: | |
| Recorder: PBL | | Time of Recovery (local): 094 0916 | | | |
| Northing: | | Easting: | | Elevation (ft.): | |
| Water depth (ft): | | Predicted Tidal Height (ft.): | | (2) | |
| PED ID(s): 170628BS004 | | Sample ID(s): P-17G-ADP-DD-09 | | | |
| Comments / Observations: ① PBL S/B 14 AUG 2017 | | | | | |
| ② NOT RECORDED 14 AUG 2017 | | | | | |

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|--------------------------|-------------------------------|----------------------------------|-------------------------------|--|
| 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 170628BS003 | | P-17G-ADP-DD-07 | | |
| Comments / Observations: | | | | |
| ① S/B PBC 11 July 2017 | | | | |

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| 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 | | | | |

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| DEPLOYMENT | | Date: 11 July 2017 | Staff initials: PBL, CNF, MRF | |
| Vessel: GALE FORCE | | Buoy Number: 16 | Station ID: ADP-DD-05 | |
| Recorder: PBL | | 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: | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | Staff initials: PBL/MRF | |
| Vessel: GALE FORCE | | Buoy Number: 16 | Station ID: ADP-DD-05 | |
| Recorder: PBL | | 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 PBL 14 AUG 2017 | | | | |
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| DEPLOYMENT | | Date: 11 July 2017 | Staff initials: PAX, CNF, MRF | |
| Vessel: GALE Force | | Buoy Number: 17 | Station ID: ADP-DD-04 | |
| Recorder: PAX | | 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: | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | Staff initials: PAX/MRF | |
| Vessel: GALE Force | | Buoy Number: 17 | Station ID: ADP-DD-04 | |
| Recorder: PAX | | 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 RELOADED PAX 14 AUG 2017 | | | | |
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| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBC, CNF, MRF | |
| Vessel: GALL FORCE | | Buoy Number: 19 | | Station ID: ADP-EE-04 | |
| Recorder: PBC | | Time of Deployment (local): 1210 | | | |
| Northing: 2706957.455 | | Easting: 815638.057 | | Elevation (ft.): 1.075 | |
| DGPS Accuracy (ft): H: 0.052 V: 0.079 | | | | | |
| Water depth (ft): 6.2 | | Predicted Tidal Height (ft.): 2.77 | | | |
| PED ID(s): 170628AS001 | | Sample ID(s): P-176-ADP-EE-04 | | | |
| Comments / Observations: | | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: PBC/MRF | |
| Vessel: GALL FORCE | | Buoy Number: 19 | | Station ID: ADP-EE-04 | |
| Recorder: PBC | | Time of Recovery (local): 0053 | | | |
| Northing: | | Easting: | | Elevation (ft.): | |
| | | | | DGPS Accuracy (ft): H: V: | |
| Water depth (ft): | | Predicted Tidal Height (ft.): | | | |
| PED ID(s): 170628AS001 | | Sample ID(s): P-176-ADP-EE-04 | | | |
| Comments / Observations: Potentially knocked over. Horizon present but no growth on horizon. | | | | | |
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| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBL, MRF, CNF | |
| Vessel: GALE FORCE | | Buoy Number: 20 | | Station ID: ADP-CC-04 | |
| Recorder: PBL | | Time of Deployment (local): 1219 | | | |
| Northing: 2707066.558 | | Easting: 815629.885 | | Elevation (ft.): 0.877 | |
| DGPS Accuracy (ft): H: 0.076 V: 0.151 | | | | | |
| 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: | | | | | |
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| RECOVERY | | Date: 14 AUG 2017 | | Staff initials: PBL/MRF | |
| Vessel: GALE FORCE | | Buoy Number: 20 | | Station ID: ADP-CC-04 | |
| Recorder: PBL | | 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 PBL 14 AUG 2017 | | | | | |

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| DEPLOYMENT | | Date: 11 July 2017 | Staff initials: PRC, CNF, MRF | |
| Vessel: GALE FORCE | | Buoy Number: 21 | Station ID: ADP-CC-05 | |
| Recorder: PRC | | Time of Deployment (local): 1228 | | |
| 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-176-ADP-CC-05 | | |
| Comments / Observations: | | | | |
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| RECOVERY | | Date: 14 AUGUST 2017 | Staff initials: PRC/MRF | |
| Vessel: GALE FORCE | | Buoy Number: 21 | Station ID: ADP-CC-05 | |
| Recorder: PRC | | 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-176-ADP-CC-05 | | |
| Comments / Observations: | | | | |
| ② PRC 14 AUG 2017 NOT RECORDED | | | | |
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| 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: | | | | |
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| 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): 0821 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 14 AUG 2017 | | | | |

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|--|--|---------------------------------------|--|-------------------------------|--|
| DEPLOYMENT | | Date: 11 July 2017 | | Staff initials: PBL, MRF, CNF | |
| Vessel: GALE FORCE | | Buoy Number: 23 | | Station ID: ADP-BB-07 | |
| Recorder: PDC | | 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: | | | | | |
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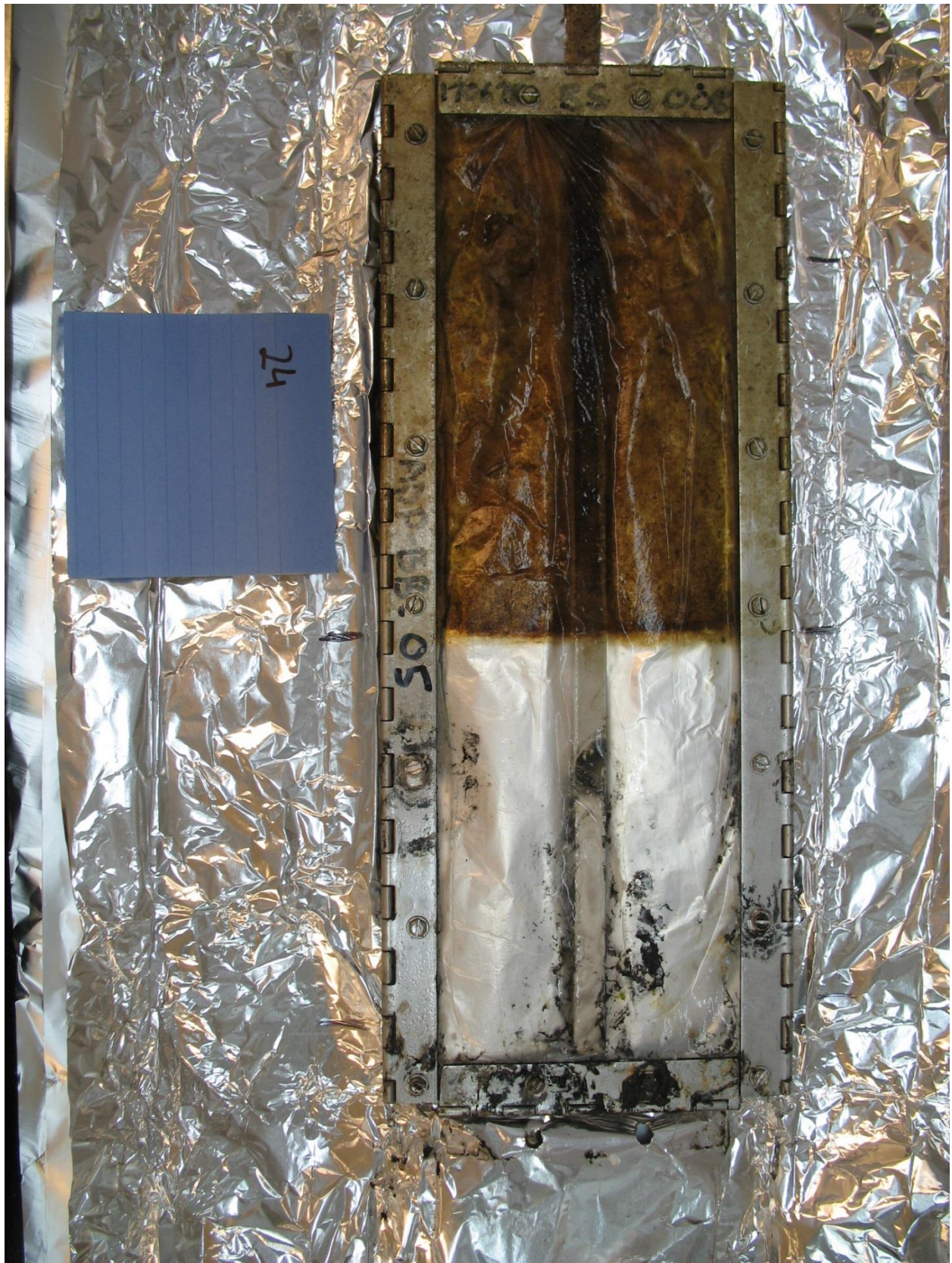
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| RECOVERY | | Date: 14 AUG | | Staff initials: PBL/MRF | |
| Vessel: GALE FORCE | | Buoy Number: 23 | | Station ID: ADP-BB-07 | |
| Recorder: PDC | | Time of Recovery (local): 0814 | | | |
| Northing: | | Easting: | | Elevation (ft.): | |
| | | | | (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 PDC 14 AUG 2017 | | | | | |
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|--------------------------|-------------------------------|----------------------------------|-------------------------------|--|
| 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: | Easting: | Elevation (ft.): | DGPS Accuracy (ft): | |
| 2707120.010 | 815680.164 | 0.207 | H: 0.041 V: 0.057 | |
| Water depth (ft): | Predicted Tidal Height (ft.): | | | |
| 4.1 | 1.86 | | | |
| PED ID(s): | | Sample ID(s): | | |
| 170628B008 | | P-17G-ADP-BB-05 | | |
| Comments / Observations: | | | | |
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| 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.): | | | |
| | | | | |
| PED ID(s): | | Sample ID(s): | | |
| 170628B008 | | P-17G-ADP-BB-05 | | |
| Comments / Observations: ① NOT RECORDED PBC 14 AUG 2017 | | | | |
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Appendix B:

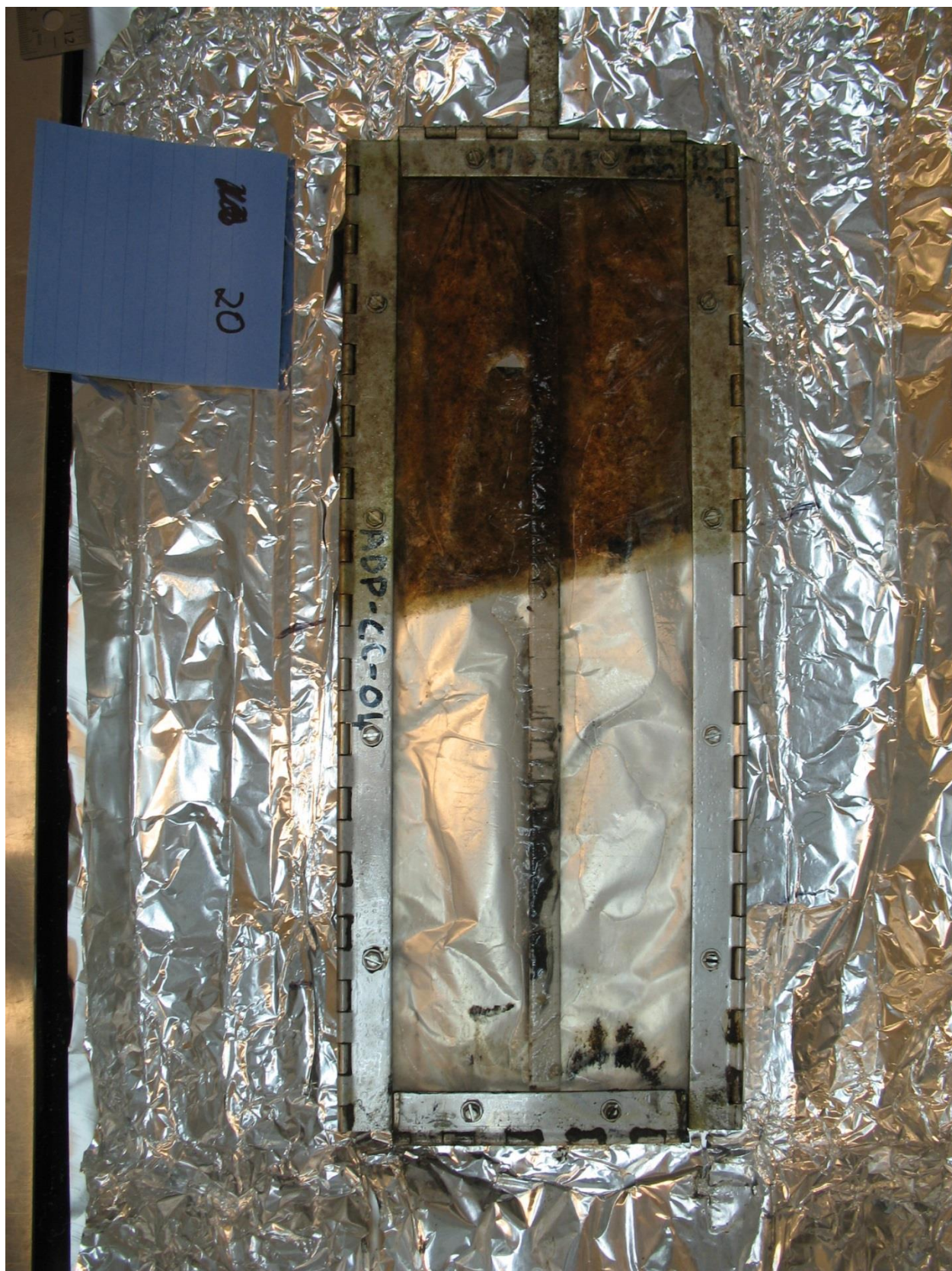
Laboratory Photos and Data Packages



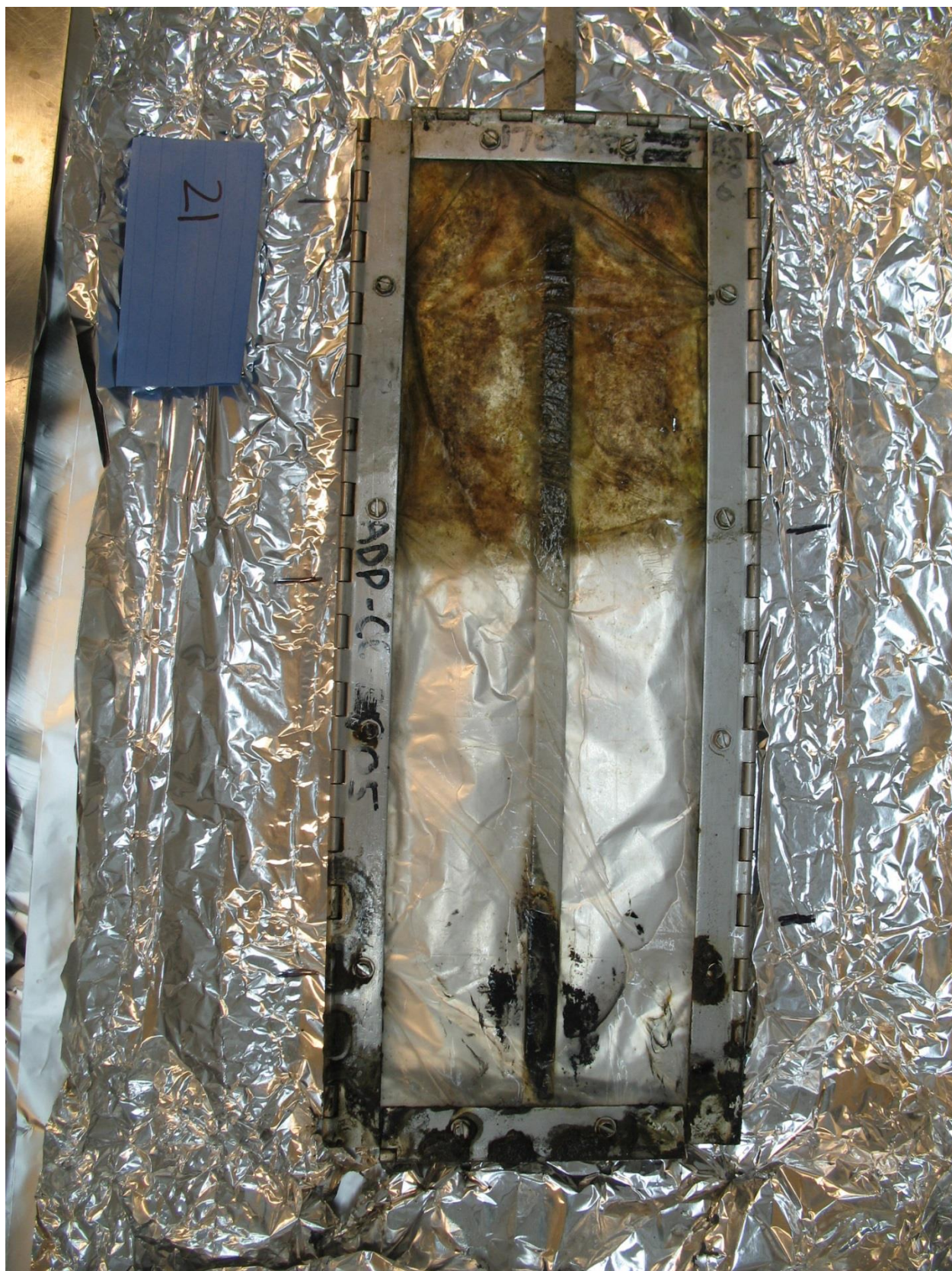
PED from Station ADP-BB-05, retrieved on 14-Aug-2017



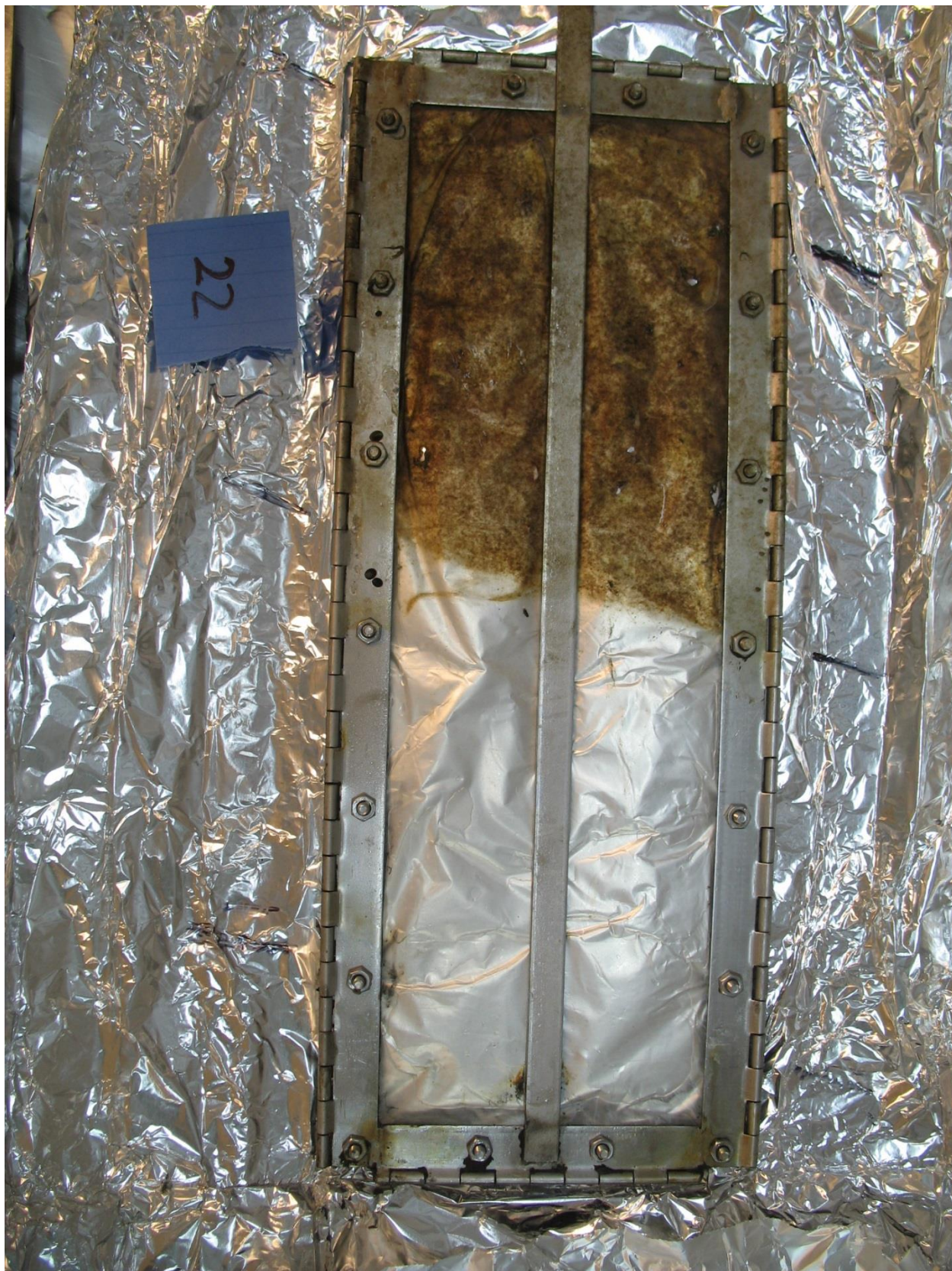
PED from Station ADP-BB-07, retrieved on 14-Aug-2017



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



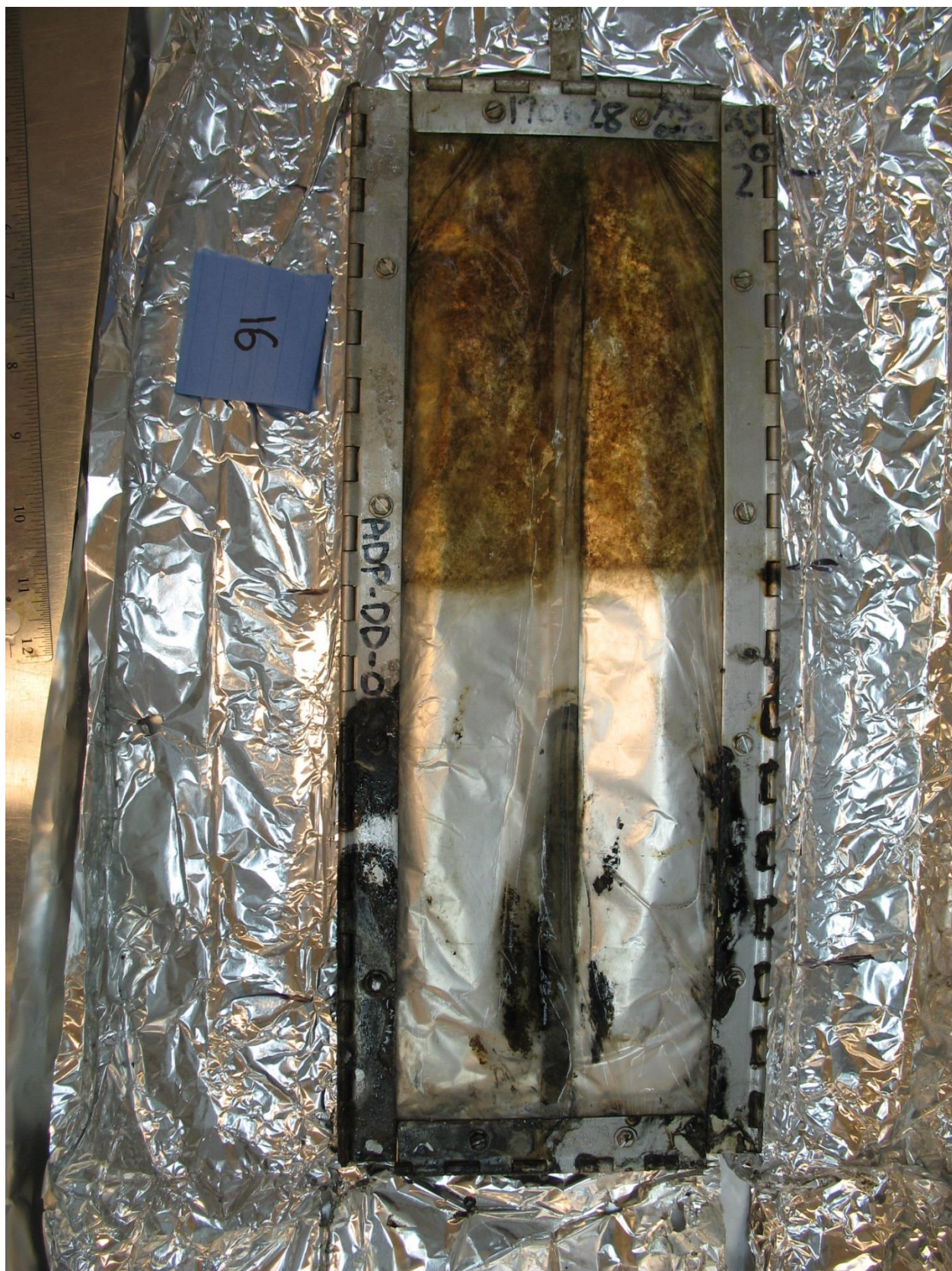
PED from Station ADP-CC-05, retrieved on 14-Aug-2017



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



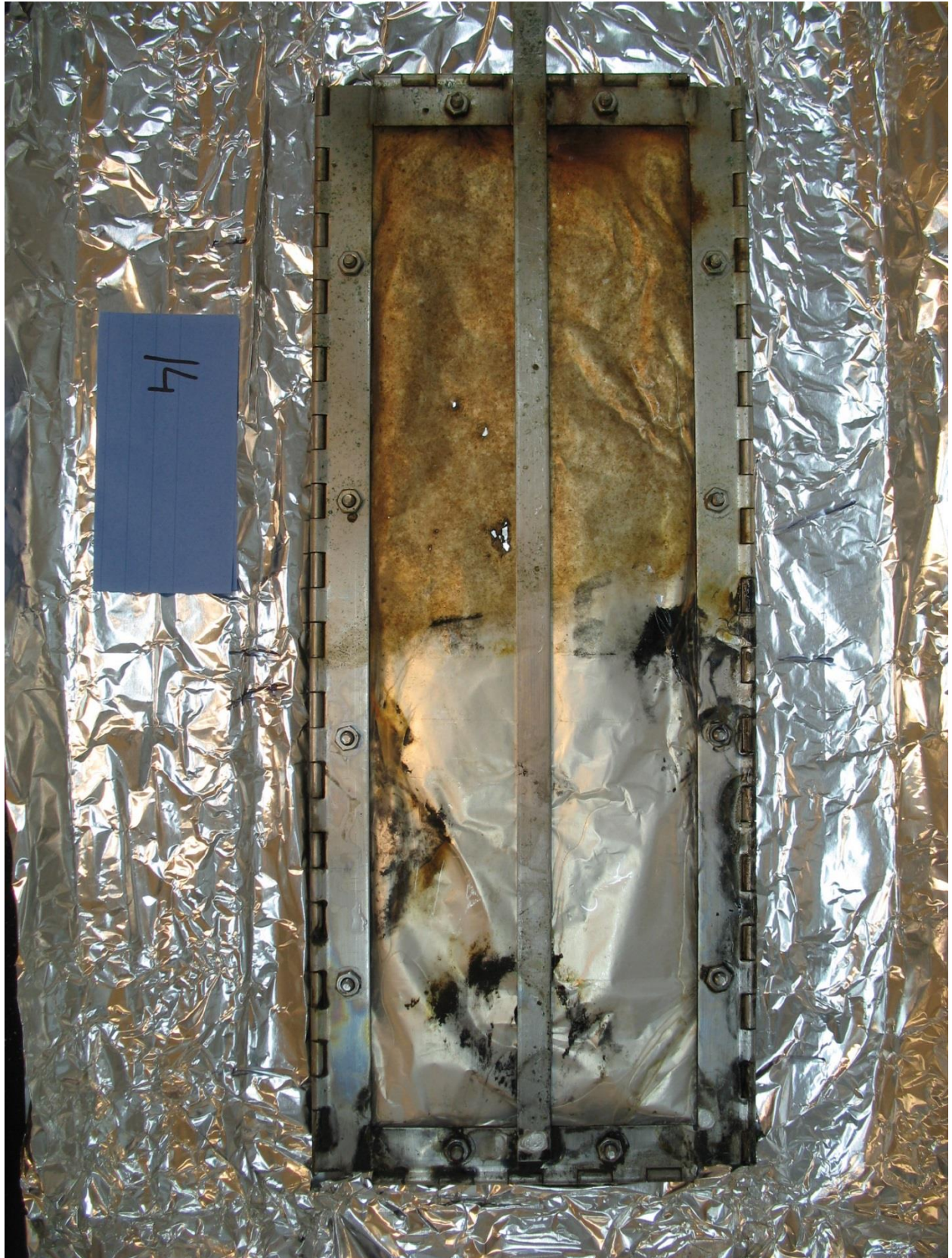
PED from Station ADP-DD-04, retrieved on 14-Aug-2017



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



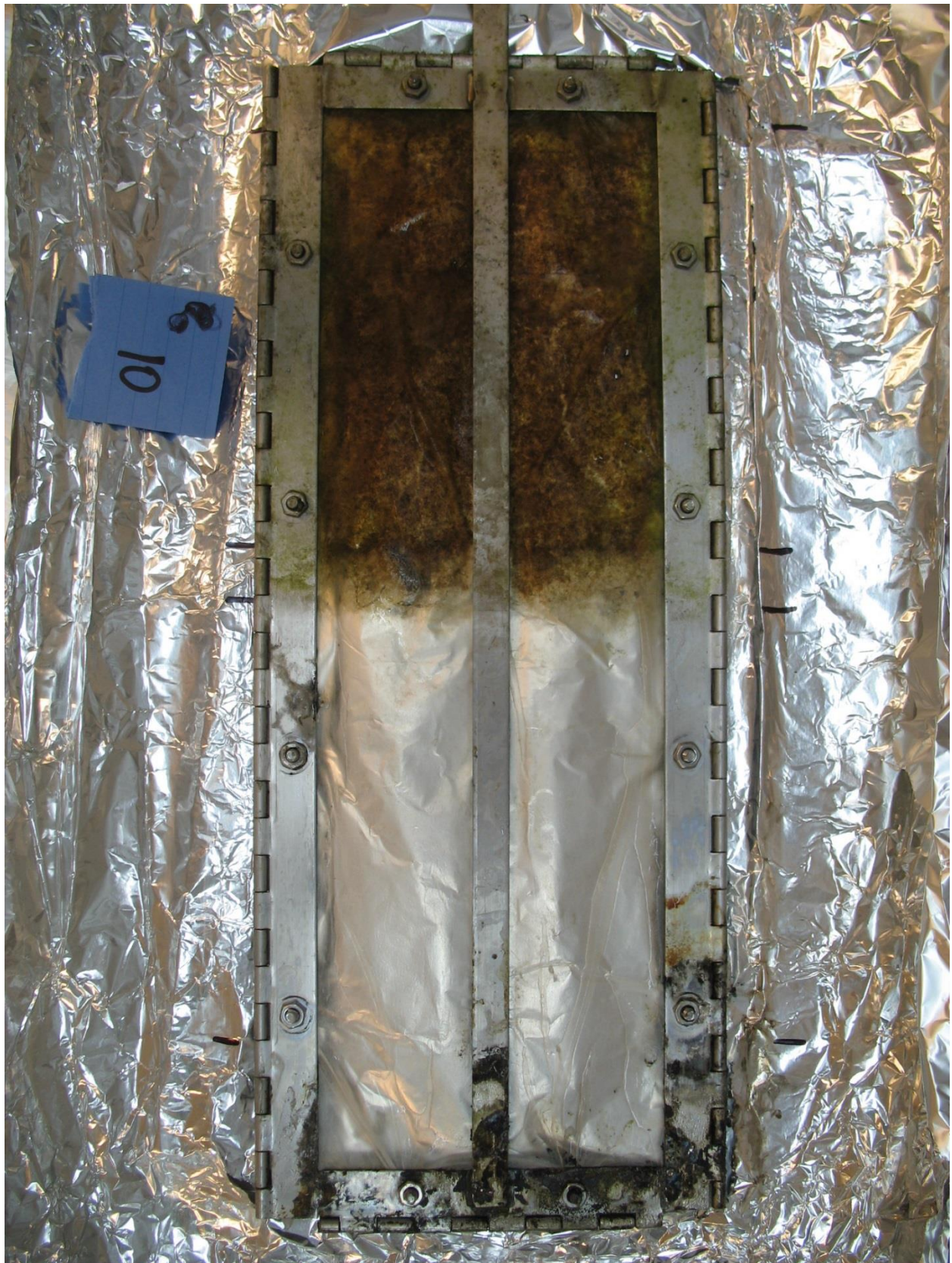
PED from Station ADP-DD-07, retrieved on 14-Aug-2017



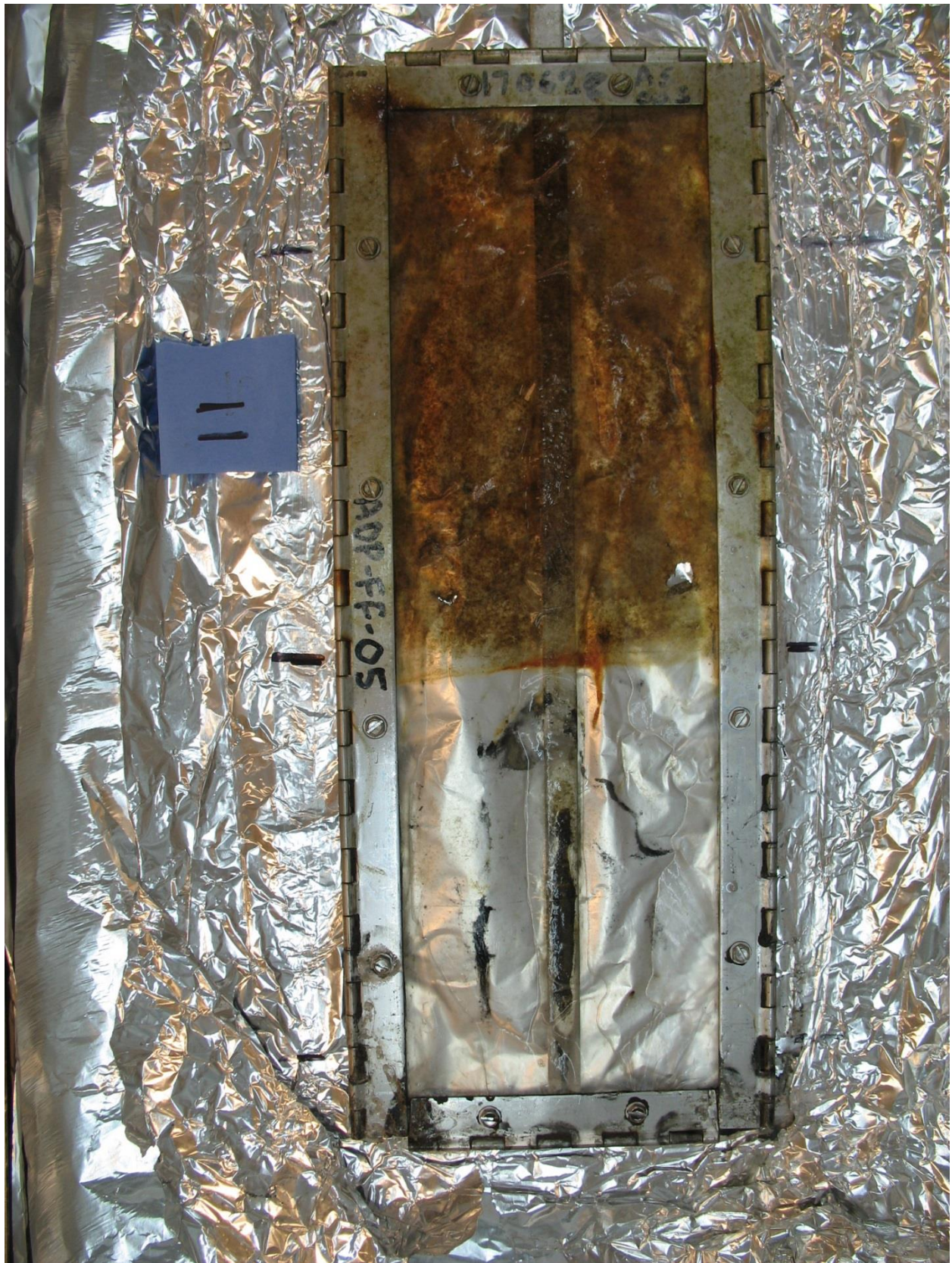
PED from Station ADP-DD-09, retrieved on 14-Aug-2017



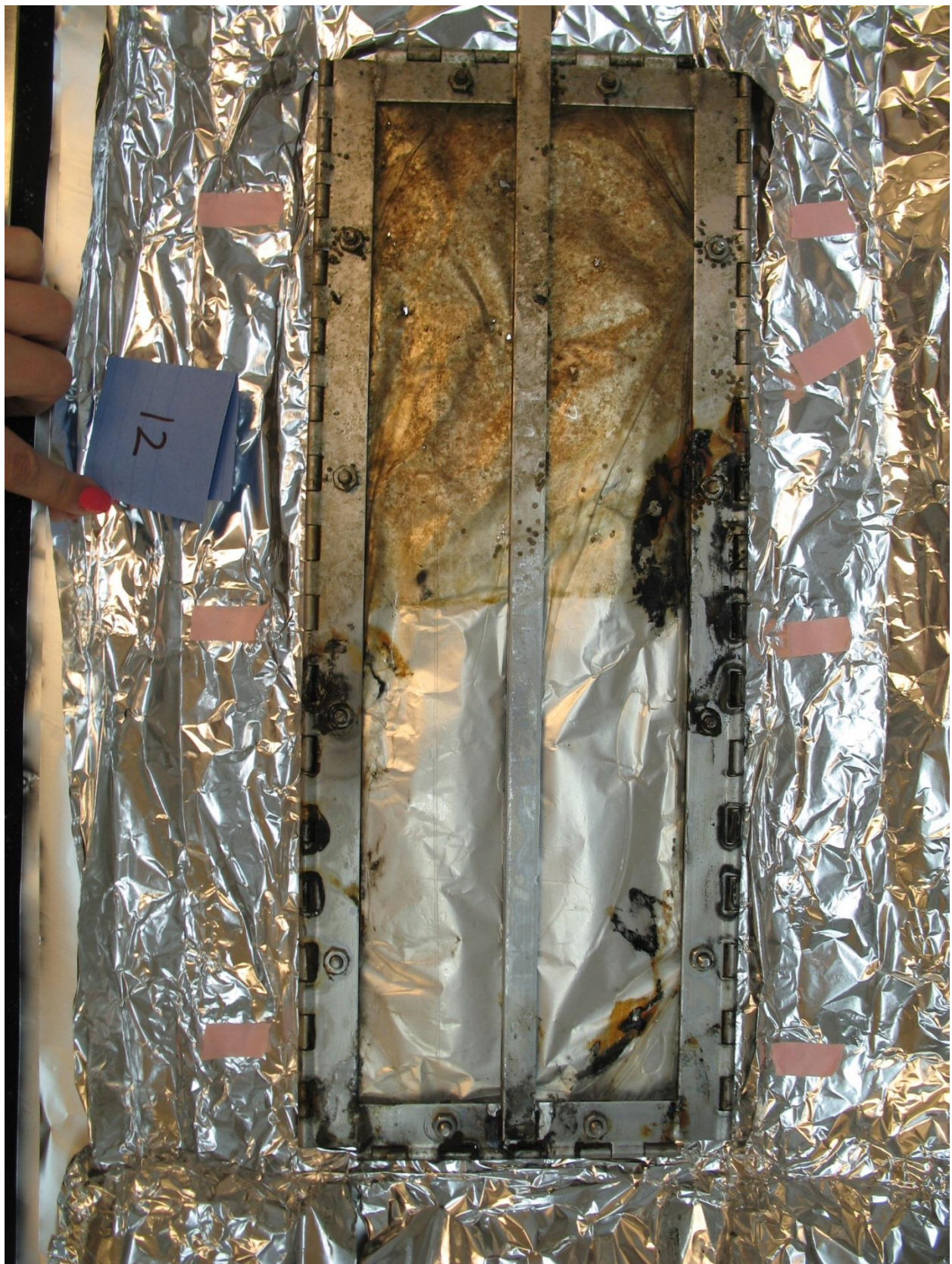
PED from Station ADP-EE-04, retrieved on 14-Aug-2017



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



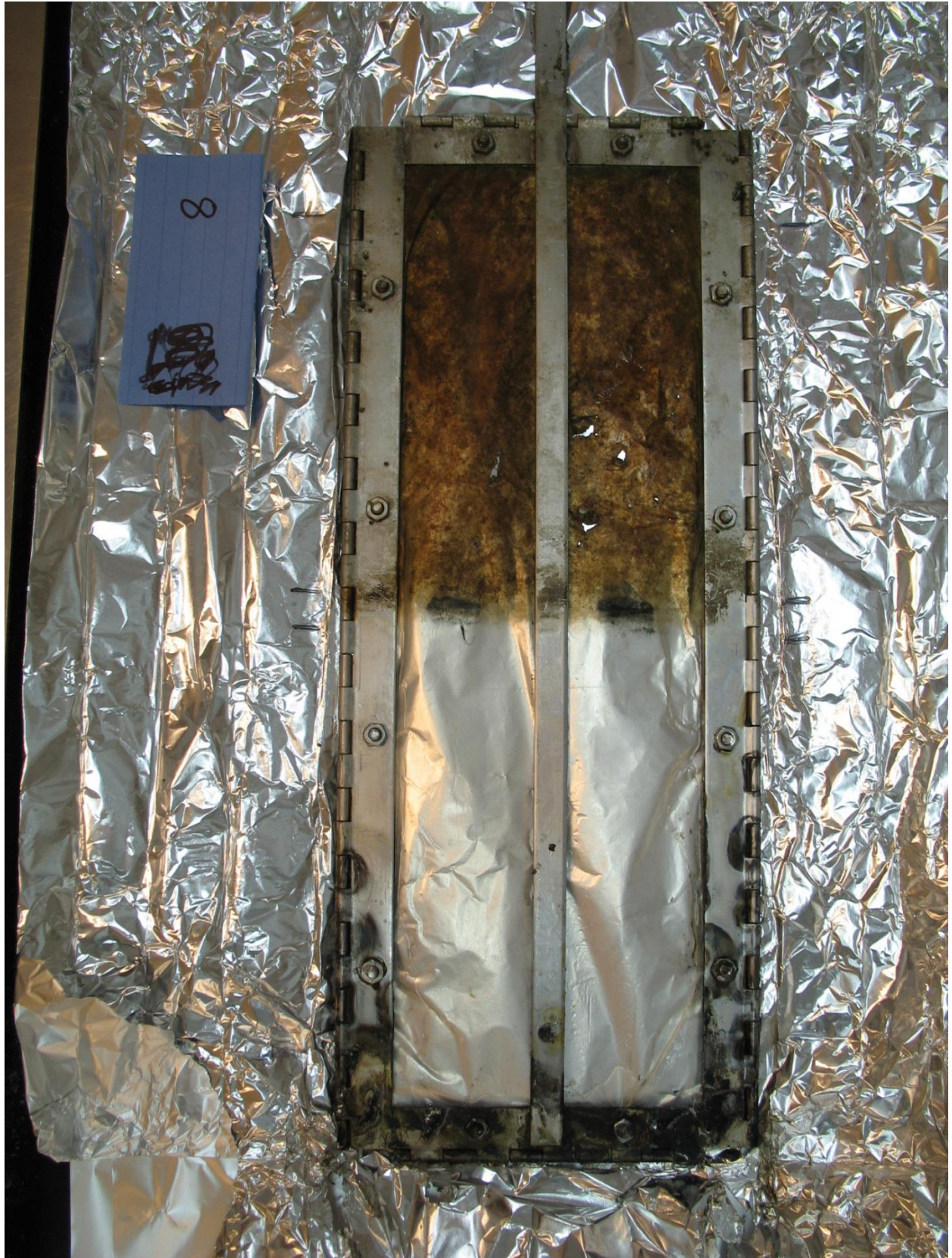
PED from Station ADP-FF-05, retrieved on 14-Aug-2017



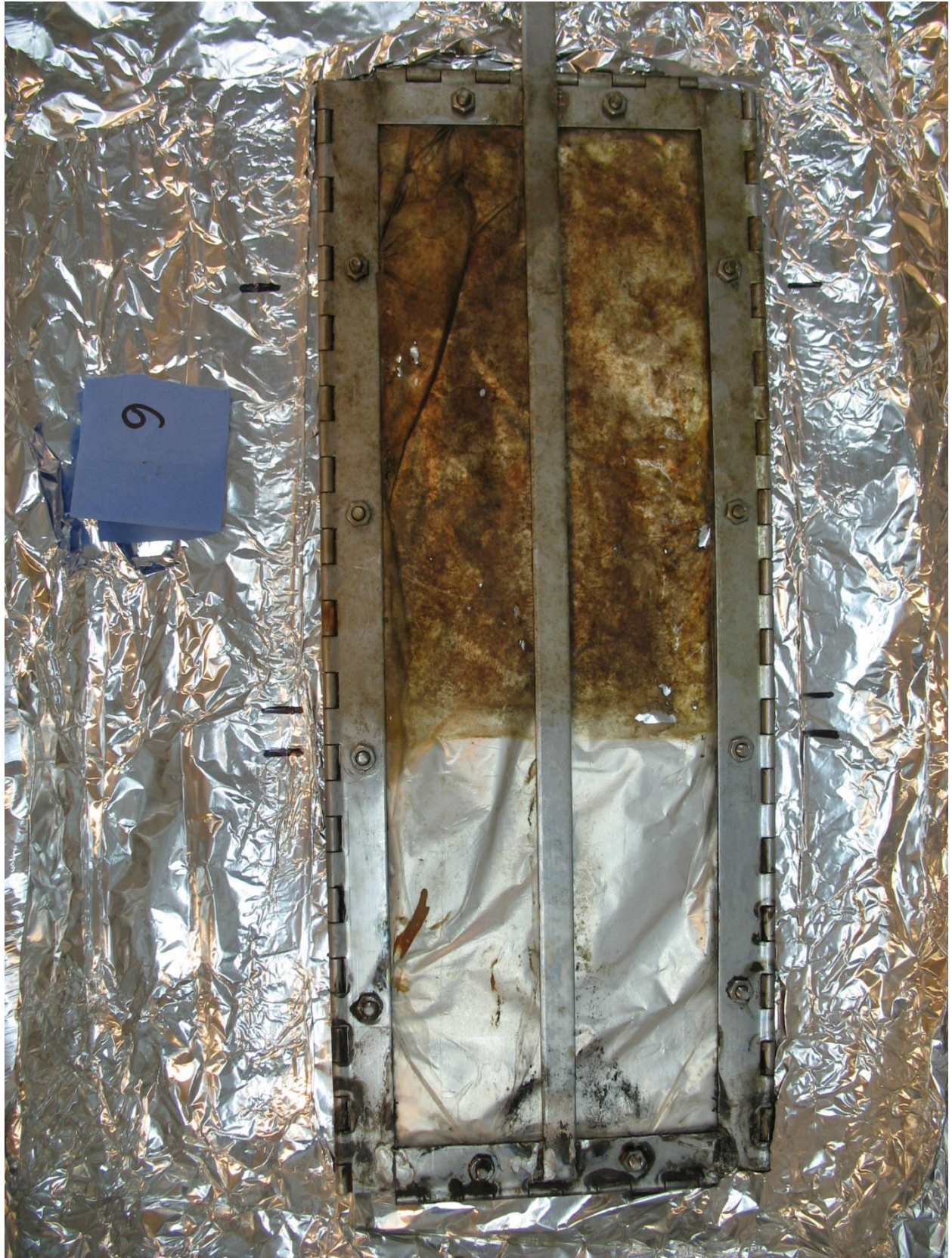
PED from Station ADP-FF-07, retrieved on 14-Aug-2017



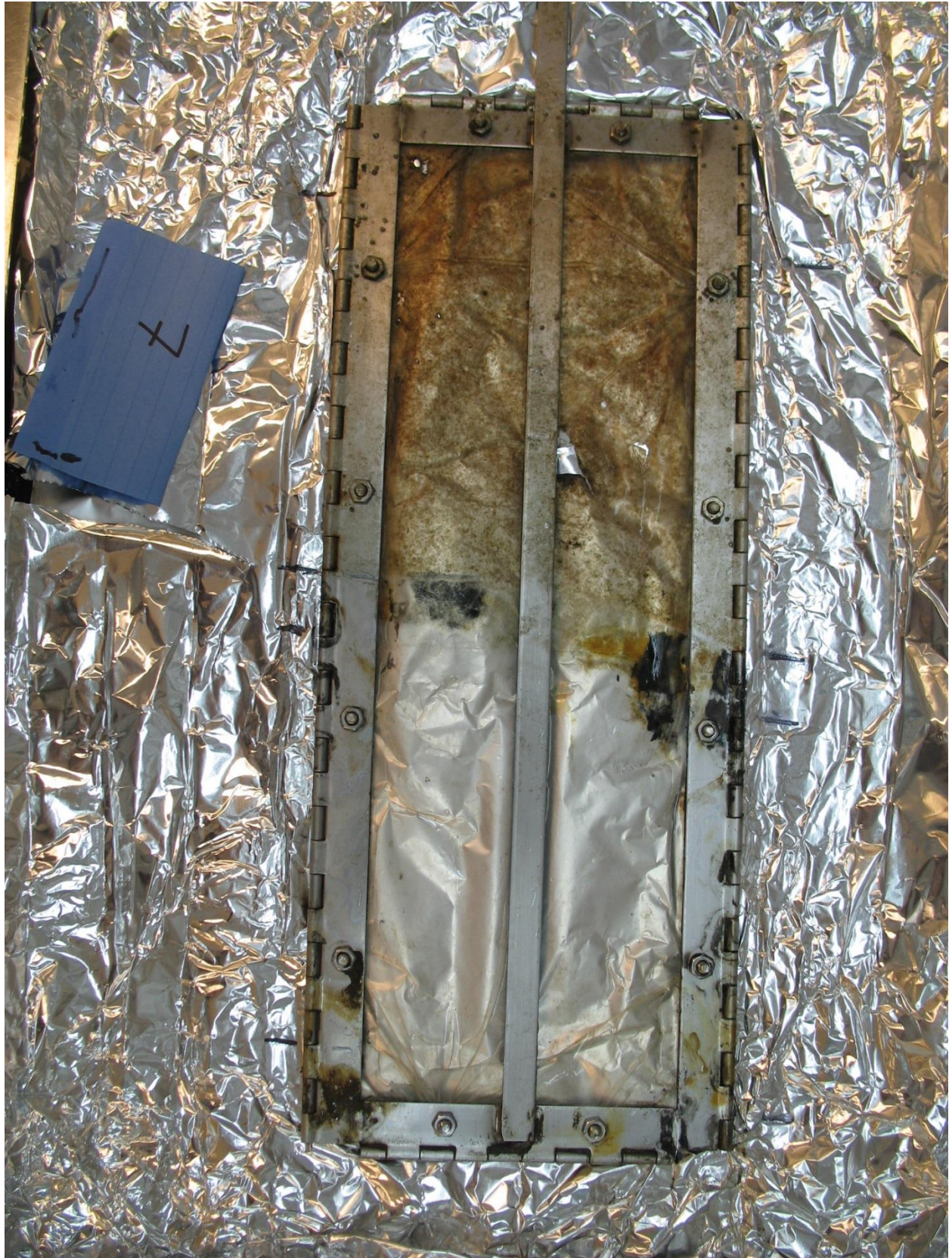
PED from Station ADP-GG-04, retrieved on 14-Aug-2017



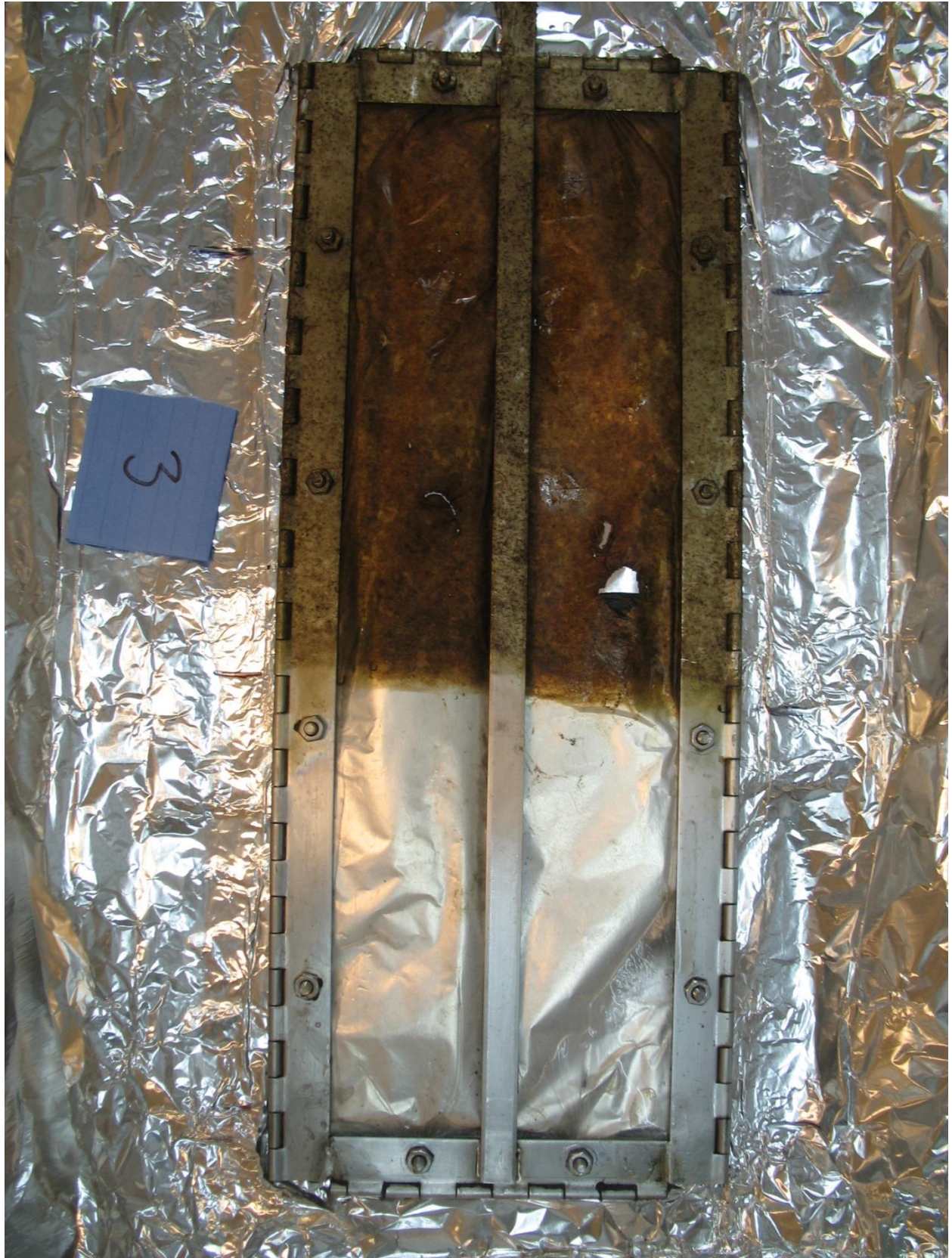
PED from Station ADP-GG-05, retrieved on 14-Aug-2017



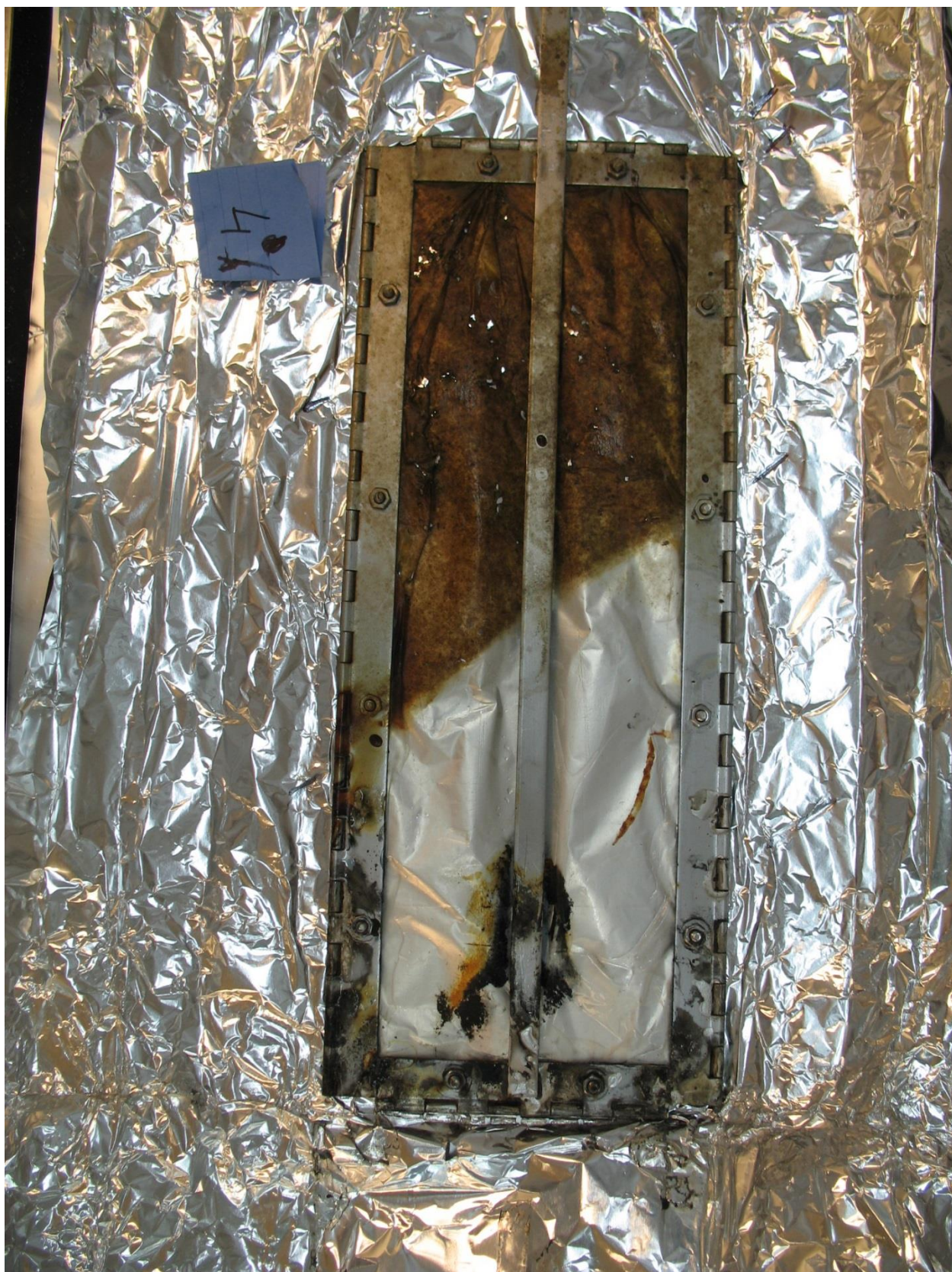
PED from Station ADP-HH-05, retrieved on 14-Aug-2017



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



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



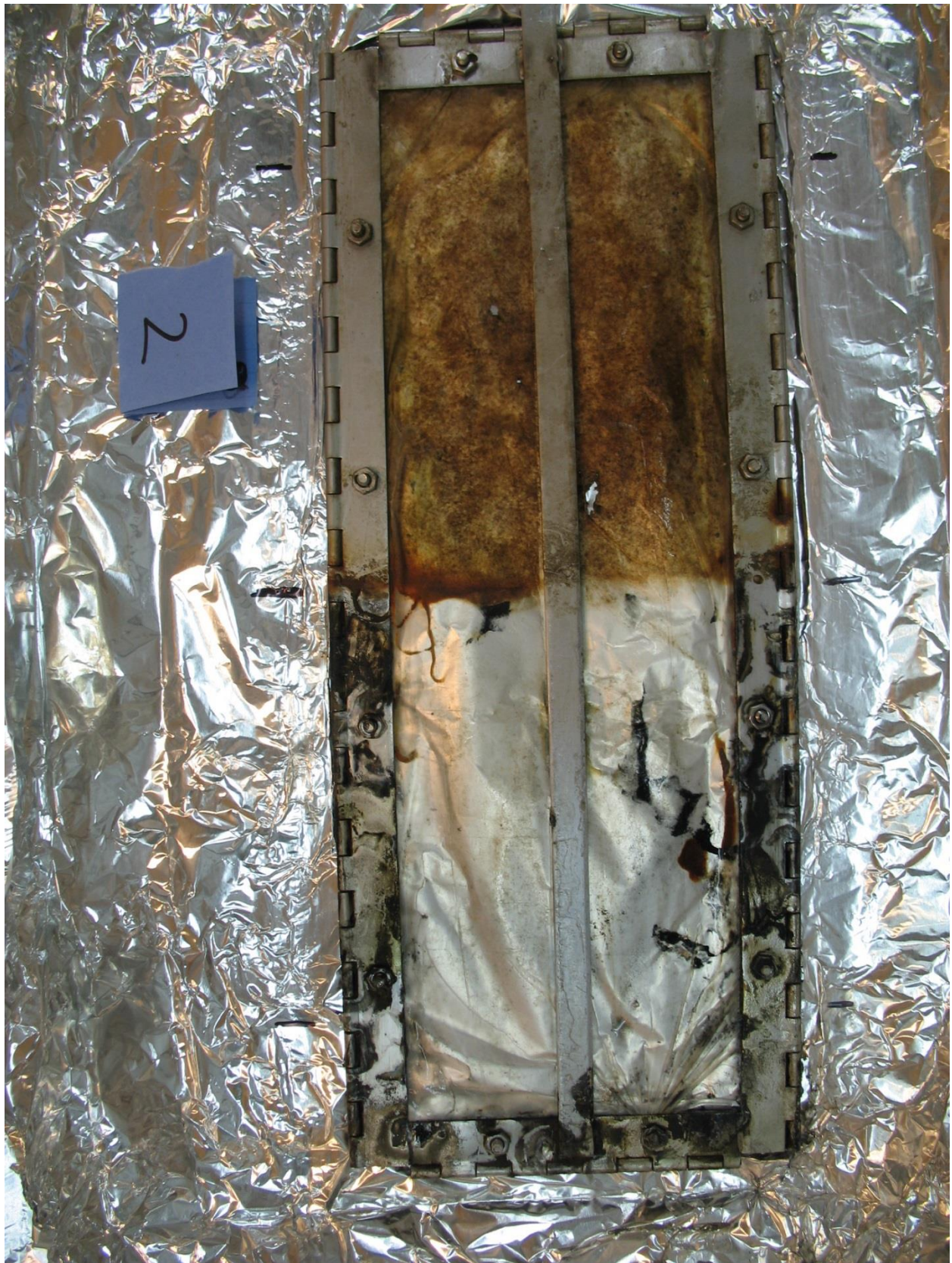
PED from Station ADP-JJ-05, retrieved on 14-Aug-2017



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


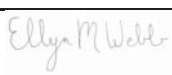

USACE/NAE New Bedford Harbor Task Order 10
Project No 100043429
PCB by GC/MS SIM
PED

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' |



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



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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



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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



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WORK/QUALITY ASSURANCE PROJECT PLAN

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: | <i>Alumina Cleanup of Environmental Sample Extracts</i> |
| | Deviations: | none |
| | Comments: | none |
| 2) | SOP No.-Rev: | 5-328-04 |
| | SOP Title: | <i>Removal (cleanup) of Sulfur from Environmental Sample Extracts</i> |
| | 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 laden 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 Spectroscopy 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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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 |
| <i>Extraction</i> | 32 | | | |
| <i>glassware</i> | 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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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 Spectroscopy in the Selected Ion Monitoring (SIM) Mode |
| Description: | PCB by GC/MS SIM |
| Matrix: | S - Solid Samples, like soil or sediment, prepared and analyzed 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 Substitution: | 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 | CI3(25) | CI3(25) | T | CI5(96) | CI3(34) | Yes | No |
| 20 | CI3(26) | CI3(26) | T | CI5(96) | CI3(34) | Yes | No |
| 21 | CI3(27) | CI3(27) | T | CI5(96) | CI3(34) | Yes | No |
| 22 | CI3(28) | CI3(28) | T | CI5(96) | CI3(34) | Yes | No |
| 23 | CI3(29) | CI3(29) | T | CI5(96) | CI3(34) | Yes | No |
| 24 | CI3(30) | CI3(30) | T | CI5(96) | CI3(34) | Yes | No |
| 25 | CI3(31) | CI3(31) | T | CI5(96) | CI3(34) | Yes | No |
| 26 | CI3(32) | CI3(32) | T | CI5(96) | CI3(34) | Yes | No |
| 27 | CI3(33) | CI3(33) | T | CI5(96) | CI3(34) | Yes | No |
| 28 | CI3(37) | CI3(37) | T | CI5(96) | CI3(34) | Yes | No |
| 29 | CI4(40) | CI4(40) | T | CI5(96) | CI3(34) | Yes | No |
| 30 | CI4(41) | CI4(41) | T | CI5(96) | CI3(34) | Yes | No |
| 31 | CI4(42) | CI4(42) | T | CI5(96) | CI3(34) | Yes | No |
| 32 | CI4(43) | CI4(43) | T | CI5(96) | CI3(34) | Yes | No |
| 33 | CI4(44) | CI4(44) | T | CI5(96) | CI3(34) | Yes | No |
| 34 | CI4(45) | CI4(45) | T | CI5(96) | CI3(34) | Yes | No |
| 35 | CI4(46) | CI4(46) | T | CI5(96) | CI3(34) | Yes | No |
| 36 | CI4(47) | CI4(47) | T | CI5(96) | CI3(34) | Yes | No |
| 37 | CI4(48) | CI4(48) | T | CI5(96) | CI3(34) | Yes | No |
| 38 | CI4(49) | CI4(49) | T | CI5(96) | CI3(34) | Yes | No |
| 39 | CI4(50) | CI4(50) | T | CI5(96) | CI3(34) | Yes | No |
| 40 | CI4(51) | CI4(51) | T | CI5(96) | CI3(34) | Yes | No |
| 41 | CI4(52) | CI4(52) | T | CI5(96) | CI3(34) | Yes | No |
| 42 | CI4(53) | CI4(53) | T | CI5(96) | CI3(34) | Yes | No |
| 43 | CI4(54) | CI4(54) | T | CI5(96) | CI3(34) | Yes | No |
| 44 | CI4(56) | CI4(56) | T | CI5(96) | CI3(34) | Yes | No |
| 45 | CI4(60) | CI4(60) | T | CI6(161) | CI6(152) | Yes | No |
| 46 | CI4(63) | CI4(63) | T | CI5(96) | CI3(34) | Yes | No |
| 47 | CI4(64) | CI4(64) | T | CI5(96) | CI3(34) | Yes | No |
| 48 | CI4(66) | CI4(66) | T | CI5(96) | CI3(34) | Yes | No |
| 49 | CI4(67) | CI4(67) | T | CI5(96) | CI3(34) | Yes | No |
| 50 | CI4(70) | CI4(70) | T | CI5(96) | CI3(34) | Yes | No |
| 51 | CI4(71) | CI4(71) | T | CI5(96) | CI3(34) | Yes | No |
| 52 | CI4(74) | CI4(74) | T | CI5(96) | CI3(34) | Yes | No |
| 53 | CI4(75) | CI4(75) | T | CI5(96) | CI3(34) | Yes | No |
| 54 | CI4(77) | CI4(77) | T | CI6(161) | CI6(152) | Yes | No |
| 55 | CI4(80) | CI4(80) | T | CI5(96) | CI3(34) | Yes | No |
| 56 | CI4(81) | CI4(81) | T | CI6(161) | CI6(152) | Yes | No |
| 57 | CI5(82) | CI5(82) | T | CI6(161) | CI6(152) | Yes | No |
| 58 | CI5(83) | CI5(83) | T | CI6(161) | CI6(152) | Yes | No |
| 59 | CI5(84) | CI5(84) | T | CI5(96) | CI3(34) | Yes | No |
| 60 | CI5(85) | CI5(85) | T | CI6(161) | CI6(152) | Yes | No |
| 61 | CI5(87) | CI5(87) | T | CI6(161) | CI6(152) | Yes | No |
| 62 | CI5(91) | CI5(91) | T | CI5(96) | CI3(34) | Yes | No |
| 63 | CI5(92) | CI5(92) | T | CI5(96) | CI3(34) | Yes | No |
| 64 | CI5(95) | CI5(95) | T | CI5(96) | CI3(34) | Yes | No |



It can be done

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 | CI5(97) | CI5(97) | T | CI6(161) | CI6(152) | Yes | No |
| 66 | CI5(99) | CI5(99) | T | CI6(161) | CI6(152) | Yes | No |
| 67 | CI5(100) | CI5(100) | T | CI5(96) | CI3(34) | Yes | No |
| 68 | CI5(101) | CI5(101) | T | CI5(96) | CI3(34) | Yes | No |
| 69 | CI5(104) | CI5(104) | T | CI5(96) | CI3(34) | Yes | No |
| 70 | CI5(105) | CI5(105) | T | CI6(161) | CI6(152) | Yes | No |
| 71 | CI5(110) | CI5(110) | T | CI6(161) | CI6(152) | Yes | No |
| 72 | CI5(114) | CI5(114) | T | CI6(161) | CI6(152) | Yes | No |
| 73 | CI5(115) | CI5(115) | T | CI6(161) | CI6(152) | Yes | No |
| 74 | CI5(118) | CI5(118) | T | CI6(161) | CI6(152) | Yes | No |
| 75 | CI5(123) | CI5(123) | T | CI6(161) | CI6(152) | Yes | No |
| 76 | CI5(124) | CI5(124) | T | CI6(161) | CI6(152) | Yes | No |
| 77 | CI5(125) | CI5(125) | T | CI6(161) | CI6(152) | Yes | No |
| 78 | CI5(126) | CI5(126) | T | CI6(161) | CI6(152) | Yes | No |
| 79 | CI5(127) | CI5(127) | T | CI6(161) | CI6(152) | Yes | No |
| 80 | CI6(128) | CI6(128) | T | CI6(161) | CI6(152) | Yes | No |
| 81 | CI6(130) | CI6(130) | T | CI6(161) | CI6(152) | Yes | No |
| 82 | CI6(131) | CI6(131) | T | CI6(161) | CI6(152) | Yes | No |
| 83 | CI6(134) | CI6(134) | T | CI6(161) | CI6(152) | Yes | No |
| 84 | CI6(135) | CI6(135) | T | CI6(161) | CI6(152) | Yes | No |
| 85 | CI6(136) | CI6(136) | T | CI6(161) | CI6(152) | Yes | No |
| 86 | CI6(137) | CI6(137) | T | CI6(161) | CI6(152) | Yes | No |
| 87 | CI6(138) | CI6(138) | T | CI6(161) | CI6(152) | Yes | No |
| 88 | CI6(139) | CI6(139) | T | CI6(161) | CI6(152) | Yes | No |
| 89 | CI6(140) | CI6(140) | T | CI6(161) | CI6(152) | Yes | No |
| 90 | CI6(141) | CI6(141) | T | CI6(161) | CI6(152) | Yes | No |
| 91 | CI6(144) | CI6(144) | T | CI6(161) | CI6(152) | Yes | No |
| 92 | CI6(146) | CI6(146) | T | CI6(161) | CI6(152) | Yes | No |
| 93 | CI6(149) | CI6(149) | T | CI6(161) | CI6(152) | Yes | No |
| 94 | CI6(151) | CI6(151) | T | CI6(161) | CI6(152) | Yes | No |
| 95 | CI6(153) | CI6(153) | T | CI6(161) | CI6(152) | Yes | No |
| 96 | CI6(154) | CI6(154) | T | CI6(161) | CI6(152) | Yes | No |
| 97 | CI6(155) | CI6(155) | T | CI5(96) | CI3(34) | Yes | No |
| 98 | CI6(156) | CI6(156) | T | CI6(161) | CI6(152) | Yes | No |
| 99 | CI6(157) | CI6(157) | T | CI6(161) | CI6(152) | Yes | No |
| 100 | CI6(158) | CI6(158) | T | CI6(161) | CI6(152) | Yes | No |
| 101 | CI6(163) | CI6(163) | T | CI6(161) | CI6(152) | Yes | No |
| 102 | CI6(164) | CI6(164) | T | CI6(161) | CI6(152) | Yes | No |
| 103 | CI6(166) | CI6(166) | T | CI6(161) | CI6(152) | Yes | No |
| 104 | CI6(167) | CI6(167) | T | CI6(161) | CI6(152) | Yes | No |
| 105 | CI6(169) | CI6(169) | T | CI6(161) | CI6(152) | Yes | No |
| 106 | CI7(170) | CI7(170) | T | CI6(161) | CI6(152) | Yes | No |
| 107 | CI7(171) | CI7(171) | T | CI6(161) | CI6(152) | Yes | No |
| 108 | CI7(172) | CI7(172) | T | CI6(161) | CI6(152) | Yes | No |
| 109 | CI7(173) | CI7(173) | T | CI6(161) | CI6(152) | Yes | No |
| 110 | CI7(174) | CI7(174) | T | CI6(161) | CI6(152) | Yes | No |



It can be done

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 | CI7(175) | CI7(175) | T | Cl6(161) | Cl6(152) | Yes | No |
| 112 | CI7(176) | CI7(176) | T | Cl6(161) | Cl6(152) | Yes | No |
| 113 | CI7(177) | CI7(177) | T | Cl6(161) | Cl6(152) | Yes | No |
| 114 | CI7(178) | CI7(178) | T | Cl6(161) | Cl6(152) | Yes | No |
| 115 | CI7(179) | CI7(179) | T | Cl6(161) | Cl6(152) | Yes | No |
| 116 | CI7(180) | CI7(180) | T | Cl6(161) | Cl6(152) | Yes | No |
| 117 | CI7(183) | CI7(183) | T | Cl6(161) | Cl6(152) | Yes | No |
| 118 | CI7(184) | CI7(184) | T | Cl6(161) | Cl6(152) | Yes | No |
| 119 | CI7(185) | CI7(185) | T | Cl6(161) | Cl6(152) | Yes | No |
| 120 | CI7(187) | CI7(187) | T | Cl6(161) | Cl6(152) | Yes | No |
| 121 | CI7(188) | CI7(188) | T | Cl6(161) | Cl6(152) | Yes | No |
| 122 | CI7(189) | CI7(189) | T | Cl6(161) | Cl6(152) | Yes | No |
| 123 | CI7(190) | CI7(190) | T | Cl6(161) | Cl6(152) | Yes | No |
| 124 | CI7(191) | CI7(191) | T | Cl6(161) | Cl6(152) | Yes | No |
| 125 | CI7(193) | CI7(193) | T | Cl6(161) | Cl6(152) | Yes | No |
| 126 | CI8(194) | CI8(194) | T | Cl6(161) | Cl6(152) | Yes | No |
| 127 | CI8(195) | CI8(195) | T | Cl6(161) | Cl6(152) | Yes | No |
| 128 | CI8(197) | CI8(197) | T | Cl6(161) | Cl6(152) | Yes | No |
| 129 | CI8(198) | CI8(198) | T | Cl6(161) | Cl6(152) | Yes | No |
| 130 | CI8(199) | CI8(199) | T | Cl6(161) | Cl6(152) | Yes | No |
| 131 | CI8(200) | CI8(200) | T | Cl6(161) | Cl6(152) | Yes | No |
| 132 | CI8(201) | CI8(201) | T | Cl6(161) | Cl6(152) | Yes | No |
| 133 | CI8(202) | CI8(202) | T | Cl6(161) | Cl6(152) | Yes | No |
| 134 | CI8(203) | CI8(203) | T | Cl6(161) | Cl6(152) | Yes | No |
| 135 | CI8(205) | CI8(205) | T | Cl6(161) | Cl6(152) | Yes | No |
| 136 | CI9(206) | CI9(206) | T | Cl6(161) | Cl6(152) | Yes | No |
| 137 | CI9(207) | CI9(207) | T | Cl6(161) | Cl6(152) | Yes | No |
| 138 | CI9(208) | CI9(208) | T | Cl6(161) | Cl6(152) | Yes | No |
| 139 | CI10(209) | CI10(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 | CI3(38) | CI3(38) | T | Cl5(96) | | No | No |
| 151 | CI4(78) | CI4(78) | T | Cl5(96) | | No | No |
| 152 | CI4(79) | CI4(79) | T | Cl5(96) | | No | No |
| 153 | CI7(186) | CI7(186) | T | Cl6(161) | | No | No |
| 1 | CI3(34) | CI3(34) | SIS | Cl5(96) | | No | No |
| 2 | CI6(152) | CI6(152) | SIS | Cl6(161) | | No | No |



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: | |
| CI1(1) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI1(3) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 2 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI2(4) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(5) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(6) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(7) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(8) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(9) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(11) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(12) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(13) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(15) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 3 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI3(16) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(17) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(18) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(19) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(22) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(24) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(25) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(26) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(27) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(28) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(29) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(30) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(31) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(32) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(33) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(37) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(38) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 4 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI4(40) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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 | |



It can be done

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: | |
| CI5(105) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(110) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(114) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(115) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(118) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(123) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(124) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(125) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(126) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(127) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 6 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI6(128) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(130) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(131) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(134) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(135) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(136) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(137) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(138) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(139) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(140) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(141) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(144) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(146) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(149) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(151) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(153) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(154) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(155) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(156) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(157) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(158) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(163) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(164) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(166) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(167) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(169) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 7 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI7(170) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(171) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(172) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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: | |
| CI7(173) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(174) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(175) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(176) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(177) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(178) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(179) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(180) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(183) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(184) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(185) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(187) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(188) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(189) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(190) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(191) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(193) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(186) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 8 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI8(194) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(195) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(197) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(198) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(199) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(200) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(201) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(202) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(203) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(205) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 9 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI9(206) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(207) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(208) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 10 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI10(209) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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) | |



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 | |



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 | 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 | |

ShpNo SHP-170822-02

It can be done

Battelle Project No: _____

Sample Receipt Form

Approved: ☐ Authorized: ☐Project Number: 100043429-17T6AVXClient: USACEReceived by: Schumitz, MattDate/Time Received: Monday, August 21, 2017 3:15 PMNo. of Shipping Containers: 1**SHIPMENT**Method of Delivery: Hand DeliveredTracking Number: naCOC 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: _____



It can be done

ShpNo SHP-170822-02Battelle Project No: 100043429

Sample Receipt Form Details

Approved: ☒ Authorized: ☐Project Number: 100043429-17T6AVXClient: USACEReceived by: Schumitz, MattDate/Time Received: Monday, August 21, 2017 3:15 PMNo. 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) | | | |



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

Chain-of-Custody

| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | | | | |
|--|--|---|-------------|---|--|--|--|-------------|--------|------------------|
| | | Sampler Information (print name): | | Preservative | | COC # | | | | |
| | | Phone: | | | | | | | | |
| Email: | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | | | | |
| Project Name: <u>NBH Acrovox</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | | | | |
| Project No: <u>10004342A-17TBVX</u> | | Time Zone: | | <u>PCR Log</u> [Grid for Analysis Results] | | [Grid for Results] | | | | |
| Sample Identification | | Sample Date | Sample Time | | | | | Sample Type | Matrix | Total # of Cont. |
| P-17G-ADP-GG05 SW | | 8/14/17 | | | | | | | PED | 1 |
| P-17G-ADP-GG05 PW | | | | | | | | | | 1 |
| P-17G-ADP-JJ07 SW | | | | | | | | | | 1 |
| P-17G-ADP-JJ07 PW | | | | | | | | | | 1 |
| P-17G-ADP-DD09 SW | | | | | | | | | | 1 |
| P-17G-ADP-DD09 PW | | | | | | | | | | 1 |
| P-17G-ADP-FF07 SW | | | | | | | | | | 1 |
| P-17G-ADP-FF07 PW | | | | | | | | | | 1 |
| P-17G-ADP-GG04 SW | | | | | | | | | | 1 |
| P-17G-ADP-GG04 PW | | | | | | | | | | 1 |
| P-17G-ADP-HH07 SW | | | | | | 1 | | | | |
| P-17G-ADP-HH07 PW | | | | | | 1 | | | | |
| P-17G-ADP-EE04 SW | | | | | | 1 | | | | |
| P-17G-ADP-EE04 PW | | | | | | 1 | | | | |
| P-17G-ADP-EE04 JW | | | | | | 1 | | | | |
| Receipt Temperature: (°C) | | Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | | | |
| Relinquished by (Print/Sign): <u>[Signature]</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>[Signature]</u> | | | | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | | | | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | | | | |
| Comments: | | | | | | | | | | |

Chain-of-Custody

| | | | | | | | |
|--|-------------|-----------------------------------|-------------|------------------------------------|------------------|---|--|
| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): | | Preservative | | COC # | |
| | | Phone: | | | | | |
| | | Email: | | Analysis | | Page# | |
| | | Turnaround Time (TAT) Requested: | | | | | |
| Project Name: <u>NBH Aerobics</u> | | Normal <input type="checkbox"/> | | Pub Cons | | | |
| Project No.: <u>100043429-17T6AVX</u> | | Priority <input type="checkbox"/> | | | | | |
| | | RUSH <input type="checkbox"/> | | | | | |
| Time Zone: | | | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | | |
| P-17G-ADP-CC04 PW | 8/14/17 | | | PAD | 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-CC04 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): <u>CSPM...</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schmitz</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |

BATTELLE

It can be done

Chain-of-Custody

| | | | | | | | |
|---|-------------|---|--------|------------------------------------|---|--|-------|
| Client Contact Information | | Project Manager: <u>Dahlu</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | | Email: | | | | | |
| Project Name: <u>NBA Aerovox</u> | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No.: <u>100043429-17T6AVX</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | | Time Zone: | | | | | |
| Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | | | |
| P-17G-ADP-LL03 SW | 8/14/17 | | PED | 1 | / | | K9624 |
| P-17G-ADP-LL03 PW | | | | 1 | / | | " 25 |
| P-17G-ADP-JF03 SW | | | | 1 | / | | 26 |
| P-17G-ADP-JF03 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): <u>CSM/ally</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schumate</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |



It can be done

Chain-of-Custody

| | | | | | | |
|--|---|------------------------------------|--|--------------------------|--------------------------------|--|
| Client Contact Information | Project Manager: <u>Danlu</u> | | Sampling Site: | | Site Information: | |
| | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | Email: | | | | | |
| Project Name: <u>NBH Aerovox</u> | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No.: <u>100043420-17T6 AUX</u> | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | |
| P-17G-ADP-DD07 PW | 8/14/17 | | | PED | 1 | |
| P-17G-ADP-LLD5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-LLD5 PW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 PW | ↓ | | | ↓ | 1 | |
| TB-D81417-D1 | ↓ | | | ↓ | 1 | |
| Receipt Temperature: (°C) | | | | | | |
| Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | |
| Relinquished by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/2017 3:15pm</u> | Received by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/17 3:15</u> | |
| 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: | | | | | | |



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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

| | |
|----------|--------|
| CI5(123) | 2.82 U |
| CI5(124) | 1.79 U |
| CI5(125) | 2.61 U |
| CI5(126) | 2.89 U |
| CI5(127) | 5.78 U |
| CI6(128) | 2.75 U |
| CI6(130) | 2.54 U |
| CI6(131) | 1.65 U |
| CI6(134) | 2.61 U |
| CI6(135) | 1.72 U |
| CI6(136) | 1.37 U |
| CI6(137) | 3.85 U |
| CI6(138) | 3.43 U |
| CI6(139) | 3.64 U |
| CI6(140) | 2.82 U |
| CI6(141) | 1.92 U |
| CI6(144) | 2.06 U |
| CI6(146) | 4.26 U |
| CI6(149) | 2.06 U |
| CI6(151) | 2.40 U |
| CI6(153) | 4.33 U |
| CI6(154) | 1.92 U |
| CI6(155) | 2.06 U |
| CI6(156) | 3.43 U |
| CI6(157) | 3.43 U |
| CI6(158) | 1.92 U |
| CI6(163) | 2.54 U |
| CI6(164) | 1.51 U |
| CI6(166) | 1.31 U |
| CI6(167) | 11.5 U |
| CI6(169) | 2.40 U |
| CI7(170) | 2.54 U |
| CI7(171) | 2.12 U |
| CI7(172) | 1.72 U |
| CI7(173) | 2.40 U |
| CI7(174) | 3.17 U |
| CI7(175) | 1.72 U |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

9/21/2017

S17-0367MS-Master_315(PRC):FINAL

Not Surrogate Corrected



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 |



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 |
| CI1(1) | 40.7 | 42.06 | 97 | | 35.7 | 38.21 | 93 | | 4.2 | |
| CI1(3) | 41.4 | 42.31 | 98 | | 37.9 | 38.44 | 99 | | 1.0 | |
| CI2(4) | 41.1 | 42.02 | 98 | | 36.1 | 38.17 | 95 | | 3.1 | |
| CI2(5) | 41.9 | 42.14 | 99 | | 38.8 | 38.28 | 101 | | 2.0 | |
| CI2(6) | 39.2 | 41.76 | 94 | | 35.2 | 37.94 | 93 | | 1.1 | |
| CI2(7) | 49.8 | 42.10 | 118 | | 42.4 | 38.24 | 111 | | 6.1 | |
| CI2(8) | 45.4 | 41.85 | 108 | | 40.0 | 38.02 | 105 | | 2.8 | |
| CI2(9) | 38.4 | 41.64 | 92 | | 36.5 | 37.82 | 97 | | 5.3 | |
| CI2(11) | 40.0 | 41.76 | 96 | | 36.7 | 37.94 | 97 | | 1.0 | |
| CI2(12) | 40.3 | 42.18 | 96 | | 38.3 | 38.32 | 100 | | 4.1 | |
| CI2(13) | 43.9 | 42.27 | 104 | | 42.4 | 38.40 | 110 | | 5.6 | |
| CI2(15) | 40.8 | 42.10 | 97 | | 37.4 | 38.24 | 98 | | 1.0 | |
| CI3(16) | 45.2 | 41.89 | 108 | | 40.9 | 38.05 | 107 | | 0.9 | |
| CI3(17) | 41.7 | 42.02 | 99 | | 37.1 | 38.17 | 97 | | 2.0 | |
| CI3(18) | 39.3 | 42.31 | 93 | | 35.0 | 38.44 | 91 | | 2.2 | |
| CI3(19) | 43.2 | 42.02 | 103 | | 38.0 | 38.17 | 100 | | 3.0 | |
| CI3(22) | 41.9 | 42.02 | 100 | | 38.5 | 38.17 | 101 | | 1.0 | |
| CI3(24) | 37.8 | 41.85 | 90 | | 34.9 | 38.02 | 92 | | 2.2 | |
| CI3(25) | 44.1 | 42.27 | 104 | | 41.2 | 38.40 | 107 | | 2.8 | |
| CI3(26) | 39.2 | 41.68 | 94 | | 35.5 | 37.86 | 94 | | 0.0 | |
| CI3(27) | 42.2 | 41.93 | 101 | | 38.2 | 38.09 | 100 | | 1.0 | |
| CI3(28) | 42.0 | 42.52 | 99 | | 39.3 | 38.63 | 102 | | 3.0 | |
| CI3(29) | 40.3 | 42.06 | 96 | | 37.4 | 38.21 | 98 | | 2.1 | |
| CI3(30) | 41.7 | 42.35 | 98 | | 37.4 | 38.47 | 97 | | 1.0 | |
| CI3(31) | 42.0 | 42.31 | 99 | | 39.2 | 38.44 | 102 | | 3.0 | |
| CI3(32) | 43.0 | 41.72 | 103 | | 39.2 | 37.90 | 103 | | 0.0 | |
| CI3(33) | 42.2 | 41.60 | 101 | | 40.2 | 37.79 | 106 | | 4.8 | |
| CI3(37) | 42.7 | 42.23 | 101 | | 40.4 | 38.36 | 105 | | 3.9 | |
| CI4(40) | 40.6 | 41.68 | 97 | | 34.5 | 37.86 | 91 | | 6.4 | |
| CI4(41) | 40.8 | 41.81 | 98 | | 37.4 | 37.98 | 98 | | 0.0 | |
| CI4(42) | 45.5 | 42.10 | 108 | | 40.8 | 38.24 | 107 | | 0.9 | |
| CI4(43) | 45.7 | 42.23 | 108 | | 42.4 | 38.36 | 111 | | 2.7 | |
| CI4(44) | 41.1 | 42.02 | 98 | | 38.6 | 38.17 | 101 | | 3.0 | |
| CI4(45) | 41.0 | 42.48 | 97 | | 37.9 | 38.59 | 98 | | 1.0 | |
| CI4(46) | 42.1 | 41.97 | 100 | | 39.3 | 38.13 | 103 | | 3.0 | |
| CI4(47) | 37.0 | 42.10 | 88 | | 35.8 | 38.24 | 94 | | 6.6 | |
| CI4(48) | 41.9 | 42.27 | 99 | | 35.6 | 38.40 | 93 | | 6.3 | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 |
| CI4(49) | 40.6 | 42.06 | 97 | | 40.0 | 38.21 | 105 | 7.9 | | |
| CI4(50) | 41.5 | 42.35 | 98 | | 37.9 | 38.47 | 99 | 1.0 | | |
| CI4(51) | 37.5 | 42.10 | 89 | | 33.2 | 38.24 | 87 | 2.3 | | |
| CI4(52) | 42.2 | 41.93 | 101 | | 38.2 | 38.09 | 100 | 1.0 | | |
| CI4(53) | 41.3 | 41.60 | 99 | | 37.2 | 37.79 | 98 | 1.0 | | |
| CI4(54) | 39.2 | 41.97 | 93 | | 35.1 | 38.13 | 92 | 1.1 | | |
| CI4(56) | 39.9 | 42.06 | 95 | | 38.5 | 38.21 | 101 | 6.1 | | |
| CI4(60) | 40.6 | 41.68 | 97 | | 36.4 | 37.86 | 96 | 1.0 | | |
| CI4(63) | 42.7 | 42.10 | 101 | | 39.0 | 38.24 | 102 | 1.0 | | |
| CI4(64) | 40.8 | 42.35 | 96 | | 38.5 | 38.47 | 100 | 4.1 | | |
| CI4(66) | 39.9 | 42.14 | 95 | | 39.6 | 38.28 | 103 | 8.1 | | |
| CI4(67) | 42.8 | 42.18 | 101 | | 41.0 | 38.32 | 107 | 5.8 | | |
| CI4(70) | 46.0 | 42.27 | 109 | | 42.9 | 38.40 | 112 | 2.7 | | |
| CI4(71) | 40.5 | 42.35 | 96 | | 38.0 | 38.47 | 99 | 3.1 | | |
| CI4(74) | 41.2 | 42.14 | 98 | | 39.1 | 38.28 | 102 | 4.0 | | |
| CI4(75) | 41.8 | 41.97 | 100 | | 37.0 | 38.13 | 97 | 3.0 | | |
| CI4(77) | 43.3 | 42.06 | 103 | | 41.0 | 38.21 | 107 | 3.8 | | |
| CI4(80) | 45.1 | 41.85 | 108 | | 41.6 | 38.02 | 109 | 0.9 | | |
| CI4(81) | 37.7 | 42.06 | 90 | | 35.5 | 38.21 | 93 | 3.3 | | |
| CI5(82) | 38.3 | 41.68 | 92 | | 36.9 | 37.86 | 97 | 5.3 | | |
| CI5(83) | 39.9 | 42.14 | 95 | | 37.6 | 38.28 | 98 | 3.1 | | |
| CI5(84) | 40.1 | 42.02 | 95 | | 30.6 | 38.17 | 80 | 17.1 | | |
| CI5(85) | 33.6 | 41.68 | 81 | | 29.9 | 37.86 | 79 | 2.5 | | |
| CI5(87) | 39.9 | 42.02 | 95 | | 37.5 | 38.17 | 98 | 3.1 | | |
| CI5(91) | 44.2 | 41.85 | 106 | | 41.0 | 38.02 | 108 | 1.9 | | |
| CI5(92) | 45.1 | 41.89 | 108 | | 41.5 | 38.05 | 109 | 0.9 | | |
| CI5(95) | 39.8 | 41.93 | 95 | | 36.6 | 38.09 | 96 | 1.0 | | |
| CI5(97) | 39.7 | 41.72 | 95 | | 36.7 | 37.90 | 97 | 2.1 | | |
| CI5(99) | 38.7 | 41.89 | 92 | | 35.4 | 38.05 | 93 | 1.1 | | |
| CI5(100) | 42.2 | 42.23 | 100 | | 38.5 | 38.36 | 100 | 0.0 | | |
| CI5(101) | 39.8 | 42.06 | 95 | | 37.4 | 38.21 | 98 | 3.1 | | |
| CI5(104) | 40.0 | 42.10 | 95 | | 37.0 | 38.24 | 97 | 2.1 | | |
| CI5(105) | 42.5 | 42.35 | 100 | | 38.6 | 38.47 | 100 | 0.0 | | |
| CI5(110) | 38.9 | 42.02 | 93 | | 35.2 | 38.17 | 92 | 1.1 | | |
| CI5(114) | 40.6 | 42.18 | 96 | | 38.9 | 38.32 | 102 | 6.1 | | |
| CI5(115) | 40.4 | 41.97 | 96 | | 39.7 | 38.13 | 104 | 8.0 | | |
| CI5(118) | 36.6 | 42.27 | 87 | | 34.6 | 38.40 | 90 | 3.4 | | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 |
| CI5(123) | 42.0 | 42.06 | 100 | | 38.4 | 38.21 | 100 | 0.0 | | |
| CI5(124) | 41.6 | 41.72 | 100 | | 38.7 | 37.90 | 102 | 2.0 | | |
| CI5(125) | 42.8 | 41.97 | 102 | | 39.7 | 38.13 | 104 | 1.9 | | |
| CI5(126) | 44.0 | 42.27 | 104 | | 42.5 | 38.40 | 111 | 6.5 | | |
| CI5(127) | 46.5 | 42.02 | 111 | | 44.5 | 38.17 | 117 | 5.3 | | |
| CI6(128) | 41.8 | 42.06 | 99 | | 38.8 | 38.21 | 102 | 3.0 | | |
| CI6(130) | 37.4 | 41.93 | 89 | | 40.8 | 38.09 | 107 | 18.4 | | |
| CI6(131) | 37.0 | 41.76 | 89 | | 34.4 | 37.94 | 91 | 2.2 | | |
| CI6(134) | 39.8 | 41.93 | 95 | | 35.8 | 38.09 | 94 | 1.1 | | |
| CI6(135) | 37.5 | 41.51 | 90 | | 35.3 | 37.71 | 94 | 4.3 | | |
| CI6(136) | 41.2 | 42.06 | 98 | | 38.3 | 38.21 | 100 | 2.0 | | |
| CI6(137) | 54.1 | 41.60 | 130 N | | 51.0 | 37.79 | 135 N | 3.8 | | |
| CI6(138) | 35.9 | 41.76 | 86 | | 38.4 | 37.94 | 101 | 16.0 | | |
| CI6(139) | 42.7 | 41.89 | 102 | | 39.9 | 38.05 | 105 | 2.9 | | |
| CI6(140) | 36.8 | 42.27 | 87 | | 33.7 | 38.40 | 88 | 1.1 | | |
| CI6(141) | 39.6 | 41.60 | 95 | | 34.8 | 37.79 | 92 | 3.2 | | |
| CI6(144) | 41.5 | 42.18 | 98 | | 37.8 | 38.32 | 99 | 1.0 | | |
| CI6(146) | 37.7 | 42.23 | 89 | | 35.5 | 38.36 | 93 | 4.4 | | |
| CI6(149) | 38.6 | 42.10 | 92 | | 38.2 | 38.24 | 100 | 8.3 | | |
| CI6(151) | 40.0 | 41.85 | 96 | | 35.0 | 38.02 | 92 | 4.3 | | |
| CI6(153) | 40.4 | 42.31 | 95 | | 36.4 | 38.44 | 95 | 0.0 | | |
| CI6(154) | 36.7 | 42.35 | 87 | | 34.9 | 38.47 | 91 | 4.5 | | |
| CI6(155) | 35.9 | 41.68 | 86 | | 34.0 | 37.86 | 90 | 4.5 | | |
| CI6(156) | 43.7 | 42.65 | 102 | | 41.9 | 38.74 | 108 | 5.7 | | |
| CI6(157) | 43.4 | 42.10 | 103 | | 39.6 | 38.24 | 104 | 1.0 | | |
| CI6(158) | 39.6 | 42.14 | 94 | | 37.0 | 38.28 | 97 | 3.1 | | |
| CI6(163) | 41.9 | 41.76 | 100 | | 34.4 | 37.94 | 91 | 9.4 | | |
| CI6(164) | 40.8 | 41.89 | 97 | | 34.1 | 38.05 | 90 | 7.5 | | |
| CI6(166) | 39.7 | 42.06 | 94 | | 36.1 | 38.21 | 94 | 0.0 | | |
| CI6(167) | 43.1 | 42.44 | 102 | | 40.7 | 38.55 | 106 | 3.8 | | |
| CI6(169) | 41.6 | 41.93 | 99 | | 43.6 | 38.09 | 114 | 14.1 | | |
| CI7(170) | 38.8 | 42.02 | 92 | | 40.1 | 38.17 | 105 | 13.2 | | |
| CI7(171) | 45.5 | 41.85 | 109 | | 42.3 | 38.02 | 111 | 1.8 | | |
| CI7(172) | 38.8 | 42.48 | 91 | | 36.6 | 38.59 | 95 | 4.3 | | |
| CI7(173) | 38.9 | 42.23 | 92 | | 35.5 | 38.36 | 93 | 1.1 | | |
| CI7(174) | 40.3 | 42.10 | 96 | | 36.7 | 38.24 | 96 | 0.0 | | |
| CI7(175) | 36.9 | 41.85 | 88 | | 34.8 | 38.02 | 92 | 4.4 | | |

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9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 |
| CI7(176) | 39.4 | 42.10 | 94 | | 35.0 | 38.24 | 92 | | 2.2 | |
| CI7(177) | 40.4 | 42.27 | 96 | | 37.2 | 38.40 | 97 | | 1.0 | |
| CI7(178) | 38.2 | 41.81 | 91 | | 32.9 | 37.98 | 87 | | 4.5 | |
| CI7(179) | 40.5 | 41.89 | 97 | | 35.8 | 38.05 | 94 | | 3.1 | |
| CI7(180) | 39.4 | 41.85 | 94 | | 36.0 | 38.02 | 95 | | 1.1 | |
| CI7(183) | 38.6 | 41.60 | 93 | | 34.9 | 37.79 | 92 | | 1.1 | |
| CI7(184) | 39.2 | 42.02 | 93 | | 35.9 | 38.17 | 94 | | 1.1 | |
| CI7(185) | 46.5 | 42.02 | 111 | | 43.1 | 38.17 | 113 | | 1.8 | |
| CI7(187) | 37.8 | 42.02 | 90 | | 35.5 | 38.17 | 93 | | 3.3 | |
| CI7(188) | 38.7 | 41.93 | 92 | | 34.9 | 38.09 | 92 | | 0.0 | |
| CI7(189) | 45.6 | 41.89 | 109 | | 41.4 | 38.05 | 109 | | 0.0 | |
| CI7(190) | 40.3 | 42.10 | 96 | | 38.6 | 38.24 | 101 | | 5.1 | |
| CI7(191) | 39.8 | 41.72 | 95 | | 36.4 | 37.90 | 96 | | 1.0 | |
| CI7(193) | 44.8 | 42.06 | 107 | | 42.4 | 38.21 | 111 | | 3.7 | |
| CI8(194) | 46.9 | 42.06 | 112 | | 45.4 | 38.21 | 119 | | 6.1 | |
| CI8(195) | 45.5 | 42.02 | 108 | | 40.8 | 38.17 | 107 | | 0.9 | |
| CI8(197) | 41.3 | 42.61 | 97 | | 35.8 | 38.70 | 93 | | 4.2 | |
| CI8(198) | 43.1 | 41.72 | 103 | | 40.0 | 37.90 | 106 | | 2.9 | |
| CI8(199) | 31.2 | 42.02 | 74 | | 29.7 | 38.17 | 78 | | 5.3 | |
| CI8(200) | 37.4 | 42.35 | 88 | | 34.6 | 38.47 | 90 | | 2.2 | |
| CI8(201) | 39.7 | 41.89 | 95 | | 35.3 | 38.05 | 93 | | 2.1 | |
| CI8(202) | 37.7 | 42.14 | 89 | | 34.4 | 38.28 | 90 | | 1.1 | |
| CI8(203) | 40.4 | 42.18 | 96 | | 36.8 | 38.32 | 96 | | 0.0 | |
| CI8(205) | 41.0 | 41.68 | 98 | | 38.9 | 37.86 | 103 | | 5.0 | |
| CI9(206) | 41.8 | 42.02 | 99 | | 38.2 | 38.17 | 100 | | 1.0 | |
| CI9(207) | 38.2 | 42.23 | 90 | | 34.8 | 38.36 | 91 | | 1.1 | |
| CI9(208) | 37.8 | 42.02 | 90 | | 35.6 | 38.17 | 93 | | 3.3 | |
| CI10(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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9/21/2017

S17-0367MS-Master_315(PRC):FINAL



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 | 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 |
| CI1(1) | 31.000 | 68.800 | 33.600 | 195.000 |
| CI1(3) | 22.100 | 47.100 | 26.600 | 91.500 |
| CI2(4) | 2110.000 D | 4330.000 D | 2280.000 D | 9920.000 D |
| CI2(5) | 3.220 U | 2.920 U | 3.220 U | 2.390 U |
| CI2(6) | 7240.000 D | 13900.000 D | 7730.000 D | 19100.000 D |
| CI2(7) | 117.000 | 170.000 | 117.000 | 493.000 D |
| CI2(8) | 7020.000 D | 16600.000 D | 7250.000 D | 20100.000 D |
| CI2(9) | 174.000 | 721.000 D | 204.000 | 1010.000 D |
| CI2(11) | 1200.000 D | 1920.000 D | 1320.000 D | 2070.000 D |
| CI2(12) | 3.090 J | 8.430 | 4.840 | 5.910 |
| CI2(13) | 3730.000 D | 8130.000 D | 4130.000 D | 8770.000 D |
| CI2(15) | 3510.000 D | 6920.000 D | 3880.000 D | 7470.000 D |
| CI3(16) | 288.000 | 1580.000 D | 321.000 | 1060.000 D |
| CI3(17) | 13100.000 D | 20800.000 D | 13500.000 D | 21900.000 D |
| CI3(18) | 25300.000 D | 38600.000 D | 26200.000 D | 45700.000 D |
| CI3(19) | 1560.000 D | 2660.000 D | 1660.000 D | 3560.000 D |
| CI3(22) | 2190.000 D | 3720.000 D | 2480.000 D | 2910.000 D |
| CI3(24) | 20.400 | 37.700 | 25.400 | 27.200 |
| CI3(25) | 29700.000 D | 41100.000 D | 30400.000 D | 39300.000 D |
| CI3(26) | 40000.000 D | 54800.000 D | 40200.000 D | 52500.000 D |
| CI3(27) | 3830.000 D | 6350.000 D | 4160.000 D | 8970.000 D |
| CI3(28) | 50300.000 D | 57400.000 D | 51000.000 D | 58400.000 D |
| CI3(29) | 10.100 | 11.500 | 12.100 | 6.510 |
| CI3(30) | 11.500 | 12.700 | 11.600 | 11.200 |
| CI3(31) | 48400.000 D | 55900.000 D | 51000.000 D | 59600.000 D |
| CI3(32) | 9000.000 D | 14400.000 D | 9360.000 D | 15900.000 D |
| CI3(33) | 1300.000 D | 2820.000 D | 1470.000 D | 1580.000 D |
| CI3(37) | 1230.000 D | 1630.000 D | 1260.000 D | 1100.000 D |
| CI4(40) | 2620.000 D | 3000.000 D | 2500.000 D | 2280.000 D |
| CI4(41) | 5.980 U | 5.420 U | 5.980 U | 15.200 |
| CI4(42) | 7120.000 D | 9600.000 D | 6930.000 D | 8540.000 D |
| CI4(43) | 786.000 D | 723.000 D | 743.000 D | 545.000 D |
| CI4(44) | 11600.000 D | 16800.000 D | 11400.000 D | 14400.000 D |
| CI4(45) | 844.000 D | 1330.000 D | 949.000 D | 1140.000 D |
| CI4(46) | 1190.000 D | 1880.000 D | 1230.000 D | 1770.000 D |
| CI4(47) | 18700.000 D | 22300.000 D | 18300.000 D | 19200.000 D |
| CI4(48) | 1140.000 D | 2740.000 D | 1650.000 D | 3610.000 D |
| CI4(49) | 57300.000 D | 73200.000 D | 58800.000 D | 70100.000 D |
| CI4(50) | 84.500 | 87.800 | 89.100 | 81.300 |
| CI4(51) | 3920.000 D | 5000.000 D | 3940.000 D | 4440.000 D |
| CI4(52) | 61600.000 D | 76900.000 D | 60700.000 D | 72200.000 D |
| CI4(53) | 9080.000 D | 12500.000 D | 9020.000 D | 12200.000 D |
| CI4(54) | 63.500 | 74.400 | 64.600 | 74.800 |
| CI4(56) | 818.000 D | 1040.000 D | 846.000 D | 697.000 D |
| CI4(60) | 467.000 D | 451.000 D | 482.000 D | 155.000 |
| CI4(63) | 259.000 | 618.000 D | 270.000 | 190.000 |
| CI4(64) | 5080.000 D | 8520.000 D | 5550.000 D | 7010.000 D |
| CI4(66) | 3370.000 D | 3320.000 D | 3310.000 D | 2400.000 D |
| CI4(67) | 1970.000 D | 1360.000 D | 2070.000 D | 1430.000 D |
| CI4(70) | 2840.000 D | 2500.000 D | 2740.000 D | 1840.000 D |

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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 |
| <hr/> | | | | |
| CI4(71) | 10300.000 D | 13600.000 D | 9730.000 D | 10700.000 D |
| CI4(74) | 4210.000 D | 2880.000 D | 4510.000 D | 2820.000 D |
| CI4(75) | 968.000 D | 1170.000 D | 1050.000 D | 888.000 D |
| CI4(77) | 247.000 | 261.000 | 253.000 | 196.000 |
| CI4(80) | 34.500 | 23.500 | 36.800 | 25.500 |
| CI4(81) | 17.900 | 14.300 | 17.700 | 17.100 |
| CI5(82) | 142.000 | 205.000 D | 121.000 | 122.000 |
| CI5(83) | 4540.000 D | 6160.000 D | 4250.000 D | 4340.000 D |
| CI5(84) | 2830.000 D | 4620.000 D | 2610.000 D | 3010.000 D |
| CI5(85) | 332.000 | 584.000 | 348.000 | 367.000 |
| CI5(87) | 513.000 | 743.000 D | 432.000 | 424.000 |
| CI5(91) | 6960.000 D | 9840.000 D | 6170.000 D | 7240.000 D |
| CI5(92) | 3550.000 D | 3940.000 D | 3600.000 D | 3100.000 D |
| CI5(95) | 13300.000 D | 17500.000 D | 12500.000 D | 13600.000 D |
| CI5(97) | 2990.000 D | 3620.000 D | 3000.000 D | 2700.000 D |
| CI5(99) | 9310.000 D | 10700.000 D | 7740.000 D | 7570.000 D |
| CI5(100) | 911.000 D | 1080.000 D | 787.000 D | 744.000 D |
| CI5(101) | 12400.000 D | 13000.000 D | 11300.000 D | 10200.000 D |
| CI5(104) | 22.200 | 19.000 | 18.300 | 15.900 |
| CI5(105) | 466.000 | 595.000 | 367.000 | 365.000 |
| CI5(110) | 13400.000 D | 17900.000 D | 12500.000 D | 13100.000 D |
| CI5(114) | 106.000 | 121.000 | 92.600 | 90.900 |
| CI5(115) | 94.500 | 150.000 | 77.200 | 105.000 |
| CI5(118) | 4890.000 D | 5380.000 D | 4550.000 D | 4130.000 D |
| CI5(123) | 655.000 D | 778.000 D | 581.000 | 564.000 |
| CI5(124) | 151.000 | 166.000 | 135.000 | 117.000 |
| CI5(125) | 68.000 | 53.200 | 49.300 | 58.500 |
| CI5(126) | 19.600 | 20.400 | 19.000 | 17.800 |
| CI5(127) | 79.200 | 31.600 | 143.000 | 16.500 |
| CI6(128) | 338.000 | 433.000 | 282.000 | 317.000 |
| CI6(130) | 152.000 | 193.000 | 139.000 | 147.000 |
| CI6(131) | 246.000 | 356.000 | 213.000 | 250.000 |
| CI6(134) | 532.000 | 785.000 D | 470.000 | 501.000 |
| CI6(135) | 1070.000 D | 1490.000 D | 1020.000 D | 1090.000 D |
| CI6(136) | 1390.000 D | 2000.000 D | 1340.000 D | 1480.000 D |
| CI6(137) | 146.000 | 197.000 | 124.000 | 136.000 |
| CI6(138) | 929.000 D | 1420.000 D | 865.000 D | 1200.000 D |
| CI6(139) | 140.000 | 174.000 | 116.000 | 132.000 |
| CI6(140) | 11.000 | 12.600 | 6.120 | 8.360 |
| CI6(141) | 182.000 | 252.000 | 153.000 | 167.000 |
| CI6(144) | 107.000 | 183.000 | 89.100 | 129.000 |
| CI6(146) | 952.000 D | 1270.000 D | 852.000 D | 957.000 D |
| CI6(149) | 9380.000 D | 12000.000 D | 7630.000 D | 9070.000 D |
| CI6(151) | 1250.000 D | 1700.000 D | 1220.000 D | 1320.000 D |
| CI6(153) | 6290.000 D | 7400.000 D | 5180.000 D | 6260.000 D |
| CI6(154) | 582.000 | 807.000 D | 469.000 | 552.000 |
| CI6(155) | 4.030 J | 3.980 J | 3.700 J | 3.220 J |
| CI6(156) | 258.000 | 344.000 | 219.000 | 245.000 |
| CI6(157) | 48.200 | 67.600 | 39.400 | 44.900 |
| CI6(158) | 385.000 | 477.000 | 334.000 | 362.000 |

Analyzed by Restucci Jr, Richard

Not Surrogate Corrected

9/27/2017 Main: Copy of S17-0367MS-Master_315(PRC)-Final UD update rev 1.xlsx



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 |
| CI6(163) | 2020.000 D | 2800.000 D | 1830.000 D | 2000.000 D |
| CI6(164) | 296.000 | 382.000 | 262.000 | 286.000 |
| CI6(166) | 37.200 | 43.500 | 31.400 | 34.300 |
| CI6(167) | 234.000 | 306.000 | 199.000 | 232.000 |
| CI6(169) | 3.310 U | 3.000 U | 3.310 U | 2.460 U |
| CI7(170) | 189.000 | 283.000 | 162.000 | 206.000 |
| CI7(171) | 61.400 | 95.500 | 55.900 | 70.600 |
| CI7(172) | 36.300 | 57.100 | 34.300 | 42.100 |
| CI7(173) | 6.240 | 7.560 | 4.250 J | 6.560 |
| CI7(174) | 116.000 | 171.000 | 103.000 | 125.000 |
| CI7(175) | 17.300 | 25.200 | 13.100 | 18.600 |
| CI7(176) | 27.100 | 40.500 | 24.500 | 28.100 |
| CI7(177) | 92.400 | 132.000 | 79.400 | 100.000 |
| CI7(178) | 112.000 | 160.000 | 89.200 | 115.000 |
| CI7(179) | 209.000 | 306.000 | 184.000 | 232.000 |
| CI7(180) | 358.000 | 521.000 | 312.000 | 388.000 |
| CI7(183) | 169.000 | 248.000 | 145.000 | 184.000 |
| CI7(184) | 1.990 U | 1.800 U | 1.990 U | 1.340 J |
| CI7(185) | 19.700 | 26.800 | 16.700 | 20.700 |
| CI7(187) | 587.000 | 941.000 D | 496.000 | 691.000 D |
| CI7(188) | 14.100 | 22.000 | 12.700 | 16.000 |
| CI7(189) | 13.000 | 21.600 | 9.710 | 15.100 |
| CI7(190) | 62.700 | 95.000 | 54.400 | 71.500 |
| CI7(191) | 13.800 | 19.600 | 10.900 | 16.100 |
| CI7(193) | 31.300 | 54.200 | 26.100 | 35.600 |
| CI8(194) | 42.300 | 87.300 | 33.300 | 55.800 |
| CI8(195) | 16.600 | 28.000 | 14.600 | 21.200 |
| CI8(197) | 3.980 J | 4.730 | 3.380 J | 3.620 |
| CI8(198) | 3.120 U | 2.830 U | 3.120 U | 2.320 U |
| CI8(199) | 44.900 | 77.800 | 41.000 | 56.200 |
| CI8(200) | 4.740 J | 7.400 | 4.670 J | 5.820 |
| CI8(201) | 8.360 | 11.900 | 5.680 | 8.710 |
| CI8(202) | 20.700 | 33.800 | 18.800 | 26.200 |
| CI8(203) | 57.700 | 106.000 | 47.700 | 77.000 |
| CI8(205) | 4.100 J | 5.330 | 2.840 J | 4.220 |
| CI9(206) | 18.400 | 41.800 | 15.400 | 29.700 |
| CI9(207) | 3.970 J | 6.020 | 3.150 J | 4.410 |
| CI9(208) | 7.940 | 14.600 | 6.210 | 9.400 |
| CI10(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 |
| CI3(38) | 31.000 | 58.500 | 36.800 | 52.500 |

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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 |
| CI4(78) | 47.000 | 34.400 | 66.300 | 21.700 |
| CI4(79) | 65.600 | 35.800 | 88.700 | 21.700 |
| CI7(186) | 167.000 | 73.100 | 335.000 | 26.500 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 172 N | 198 N | 192 N | 216 N |
| CI6(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 |
| CI1(1) | 19.800 | 769.000 D | 25.400 | 66.200 |
| CI1(3) | 17.100 | 143.000 | 21.900 | 52.700 |
| CI2(4) | 1870.000 D | 13600.000 D | 1830.000 D | 2930.000 D |
| CI2(5) | 2.280 U | 2.460 U | 2.920 U | 2.740 U |
| CI2(6) | 7150.000 D | 21600.000 D | 6020.000 D | 7370.000 D |
| CI2(7) | 96.700 | 699.000 D | 138.000 | 125.000 |
| CI2(8) | 6790.000 D | 24800.000 D | 5900.000 D | 7930.000 D |
| CI2(9) | 144.000 | 1230.000 D | 175.000 | 226.000 |
| CI2(11) | 1210.000 D | 2090.000 D | 1210.000 D | 1180.000 D |
| CI2(12) | 4.520 | 3.900 U | 2.600 J | 2.950 J |
| CI2(13) | 3770.000 D | 8220.000 D | 3770.000 D | 3670.000 D |
| CI2(15) | 3600.000 D | 7260.000 D | 3710.000 D | 3510.000 D |
| CI3(16) | 241.000 | 647.000 D | 293.000 | 704.000 D |
| CI3(17) | 13300.000 D | 23000.000 D | 12800.000 D | 12100.000 D |
| CI3(18) | 25600.000 D | 49800.000 D | 24300.000 D | 24500.000 D |
| CI3(19) | 1460.000 D | 4960.000 D | 1470.000 D | 1730.000 D |
| CI3(22) | 2340.000 D | 2000.000 D | 2090.000 D | 2250.000 D |
| CI3(24) | 22.800 | 17.000 | 22.800 | 24.900 |
| CI3(25) | 30300.000 D | 33900.000 D | 29100.000 D | 24600.000 D |
| CI3(26) | 39600.000 D | 48700.000 D | 38800.000 D | 33500.000 D |
| CI3(27) | 3710.000 D | 10200.000 D | 3680.000 D | 3750.000 D |
| CI3(28) | 50700.000 D | 54500.000 D | 49000.000 D | 41700.000 D |
| CI3(29) | 1.820 U | 6.010 | 9.660 | 12.000 |
| CI3(30) | 9.470 | 11.600 | 11.000 | 10.000 |
| CI3(31) | 50000.000 D | 57600.000 D | 47800.000 D | 41000.000 D |
| CI3(32) | 9020.000 D | 17000.000 D | 8650.000 D | 8320.000 D |
| CI3(33) | 1560.000 D | 1140.000 D | 1490.000 D | 1360.000 D |
| CI3(37) | 1140.000 D | 949.000 D | 1160.000 D | 996.000 D |
| CI4(40) | 2400.000 D | 2040.000 D | 2270.000 D | 1890.000 D |
| CI4(41) | 4.230 U | 4.560 U | 5.420 U | 5.100 U |
| CI4(42) | 7180.000 D | 4860.000 D | 5880.000 D | 5170.000 D |
| CI4(43) | 739.000 D | 802.000 D | 3310.000 D | 1660.000 D |
| CI4(44) | 11800.000 D | 9600.000 D | 10700.000 D | 9370.000 D |
| CI4(45) | 908.000 D | 697.000 D | 884.000 D | 842.000 D |
| CI4(46) | 1160.000 D | 1660.000 D | 1130.000 D | 1140.000 D |
| CI4(47) | 18100.000 D | 16200.000 D | 17300.000 D | 13400.000 D |
| CI4(48) | 2950.000 D | 1620.000 D | 2560.000 D | 2370.000 D |
| CI4(49) | 48400.000 D | 53300.000 D | 69800.000 D | 55800.000 D |
| CI4(50) | 66.000 | 90.000 | 82.800 | 67.100 |
| CI4(51) | 3540.000 D | 5190.000 D | 3530.000 D | 3180.000 D |
| CI4(52) | 49900.000 D | 59400.000 D | 66500.000 D | 54200.000 D |
| CI4(53) | 8800.000 D | 13900.000 D | 8340.000 D | 7540.000 D |
| CI4(54) | 46.600 | 126.000 | 56.100 | 64.800 |
| CI4(56) | 782.000 D | 537.000 D | 762.000 D | 627.000 D |
| CI4(60) | 178.000 | 123.000 | 216.000 | 177.000 |
| CI4(63) | 188.000 | 157.000 | 253.000 | 195.000 |
| CI4(64) | 6500.000 D | 3790.000 D | 5430.000 D | 4420.000 D |
| CI4(66) | 3110.000 D | 1990.000 D | 3220.000 D | 2440.000 D |
| CI4(67) | 1890.000 D | 1140.000 D | 1950.000 D | 1320.000 D |
| CI4(70) | 2580.000 D | 1550.000 D | 2610.000 D | 1890.000 D |

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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 |
| CI4(71) | 9390.000 D | 9990.000 D | 8820.000 D | 7520.000 D |
| CI4(74) | 3970.000 D | 2400.000 D | 4110.000 D | 2890.000 D |
| CI4(75) | 963.000 D | 831.000 D | 1010.000 D | 749.000 D |
| CI4(77) | 254.000 | 187.000 | 268.000 | 212.000 |
| CI4(80) | 30.100 | 27.900 | 35.300 | 34.500 |
| CI4(81) | 17.400 | 13.400 | 13.200 | 2.500 U |
| CI5(82) | 132.000 | 98.700 | 140.000 | 113.000 |
| CI5(83) | 3980.000 D | 3370.000 D | 4140.000 D | 3410.000 D |
| CI5(84) | 2430.000 D | 1930.000 D | 2430.000 D | 2480.000 D |
| CI5(85) | 403.000 | 283.000 | 367.000 | 355.000 |
| CI5(87) | 497.000 | 362.000 | 467.000 | 426.000 |
| CI5(91) | 6550.000 D | 4390.000 D | 5690.000 D | 4720.000 D |
| CI5(92) | 3390.000 D | 2630.000 D | 3370.000 D | 2370.000 D |
| CI5(95) | 12300.000 D | 9670.000 D | 11700.000 D | 9920.000 D |
| CI5(97) | 2920.000 D | 2060.000 D | 2930.000 D | 2310.000 D |
| CI5(99) | 7930.000 D | 5430.000 D | 7900.000 D | 6090.000 D |
| CI5(100) | 740.000 D | 665.000 D | 351.000 | 301.000 |
| CI5(101) | 10700.000 D | 7430.000 D | 10400.000 D | 7910.000 D |
| CI5(104) | 15.000 | 18.400 | 18.100 | 14.900 |
| CI5(105) | 412.000 | 302.000 | 415.000 | 359.000 |
| CI5(110) | 12400.000 D | 9400.000 D | 12300.000 D | 9880.000 D |
| CI5(114) | 82.300 | 67.800 | 92.400 | 78.400 |
| CI5(115) | 3.550 U | 85.800 | 4.550 U | 4.280 U |
| CI5(118) | 4430.000 D | 3180.000 D | 4570.000 D | 3760.000 D |
| CI5(123) | 639.000 | 452.000 | 638.000 | 519.000 |
| CI5(124) | 135.000 | 93.800 | 140.000 | 112.000 |
| CI5(125) | 41.600 | 46.100 | 3.260 U | 3.070 U |
| CI5(126) | 19.000 | 15.300 | 17.600 | 18.400 |
| CI5(127) | 95.000 | 68.500 | 113.000 | 75.000 |
| CI6(128) | 300.000 | 252.000 | 304.000 | 281.000 |
| CI6(130) | 132.000 | 115.000 | 142.000 | 128.000 |
| CI6(131) | 239.000 | 203.000 | 234.000 | 219.000 |
| CI6(134) | 518.000 | 402.000 | 504.000 | 451.000 |
| CI6(135) | 1010.000 D | 845.000 D | 1010.000 D | 877.000 D |
| CI6(136) | 1300.000 D | 1170.000 D | 1270.000 D | 1160.000 D |
| CI6(137) | 129.000 | 107.000 | 133.000 | 116.000 |
| CI6(138) | 851.000 D | 685.000 | 850.000 | 800.000 |
| CI6(139) | 122.000 | 104.000 | 126.000 | 118.000 |
| CI6(140) | 13.200 | 7.030 | 9.340 | 8.890 |
| CI6(141) | 159.000 | 129.000 | 168.000 | 150.000 |
| CI6(144) | 83.600 | 98.300 | 89.000 | 77.200 |
| CI6(146) | 825.000 D | 660.000 | 835.000 | 742.000 |
| CI6(149) | 7720.000 D | 6980.000 D | 7590.000 D | 6850.000 D |
| CI6(151) | 1110.000 D | 924.000 D | 1140.000 D | 992.000 D |
| CI6(153) | 4930.000 D | 4180.000 D | 5090.000 D | 4670.000 D |
| CI6(154) | 534.000 | 483.000 | 518.000 | 472.000 |
| CI6(155) | 3.140 J | 2.930 J | 3.720 J | 3.460 J |
| CI6(156) | 201.000 | 187.000 | 230.000 | 218.000 |
| CI6(157) | 37.900 | 39.000 | 40.900 | 40.700 |
| CI6(158) | 354.000 | 295.000 | 362.000 | 342.000 |

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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 |
| CI6(163) | 1780.000 D | 1520.000 D | 1780.000 D | 1650.000 D |
| CI6(164) | 291.000 | 225.000 | 276.000 | 257.000 |
| CI6(166) | 31.200 | 27.100 | 35.300 | 30.300 |
| CI6(167) | 191.000 | 181.000 | 215.000 | 208.000 |
| CI6(169) | 4.800 | 2.530 U | 3.000 U | 2.830 U |
| CI7(170) | 156.000 | 159.000 | 164.000 | 185.000 |
| CI7(171) | 52.300 | 54.600 | 57.100 | 61.700 |
| CI7(172) | 31.600 | 32.300 | 35.400 | 32.900 |
| CI7(173) | 8.200 | 5.630 | 5.080 | 4.480 |
| CI7(174) | 98.300 | 97.600 | 110.000 | 108.000 |
| CI7(175) | 15.600 | 12.100 | 15.500 | 14.400 |
| CI7(176) | 24.100 | 23.600 | 26.500 | 26.200 |
| CI7(177) | 85.200 | 77.700 | 85.300 | 89.100 |
| CI7(178) | 91.300 | 91.000 | 96.500 | 96.200 |
| CI7(179) | 193.000 | 182.000 | 199.000 | 193.000 |
| CI7(180) | 299.000 | 290.000 | 325.000 | 345.000 |
| CI7(183) | 144.000 | 142.000 | 155.000 | 161.000 |
| CI7(184) | 1.410 U | 1.520 U | 1.800 U | 1.700 U |
| CI7(185) | 19.700 | 14.900 | 19.800 | 17.600 |
| CI7(187) | 566.000 | 510.000 | 528.000 | 545.000 |
| CI7(188) | 11.700 | 12.800 | 12.600 | 13.000 |
| CI7(189) | 8.420 | 11.900 | 11.000 | 12.600 |
| CI7(190) | 49.700 | 54.700 | 59.400 | 62.900 |
| CI7(191) | 12.000 | 10.600 | 11.800 | 12.800 |
| CI7(193) | 33.800 | 35.000 | 26.900 | 27.400 |
| CI8(194) | 34.000 | 44.500 | 36.500 | 51.100 |
| CI8(195) | 14.500 | 17.500 | 14.900 | 20.300 |
| CI8(197) | 3.020 J | 2.950 J | 3.460 J | 3.410 J |
| CI8(198) | 2.210 U | 2.380 U | 2.830 U | 2.660 U |
| CI8(199) | 48.800 | 44.000 | 41.700 | 49.600 |
| CI8(200) | 6.160 | 5.020 | 4.120 J | 5.400 |
| CI8(201) | 6.930 | 6.960 | 8.860 | 7.190 |
| CI8(202) | 18.600 | 20.200 | 20.300 | 22.600 |
| CI8(203) | 45.600 | 62.800 | 52.700 | 63.500 |
| CI8(205) | 2.210 U | 4.370 | 2.830 U | 2.660 U |
| CI9(206) | 14.500 | 25.200 | 16.100 | 23.300 |
| CI9(207) | 3.860 | 3.170 J | 2.440 J | 3.970 J |
| CI9(208) | 6.810 | 8.900 | 6.410 | 9.520 |
| CI10(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 |
| CI3(38) | 21.900 | 71.700 | 28.200 | 82.800 |

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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 |
| CI4(78) | 57.700 | 55.900 | 54.700 | 67.900 |
| CI4(79) | 67.200 | 62.700 | 57.100 | 74.300 |
| CI7(186) | 196.000 | 144.000 | 252.000 | 169.000 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 182 N | 233 N | 182 N | 181 N |
| CI6(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 |
| CI1(1) | 32.000 | 156.000 | 28.700 | 92.100 |
| CI1(3) | 23.700 | 66.800 | 23.400 | 73.800 |
| CI2(4) | 2260.000 D | 5870.000 D | 2200.000 D | 5690.000 D |
| CI2(5) | 2.740 U | 2.670 U | 2.920 U | 2.590 U |
| CI2(6) | 8550.000 D | 10500.000 D | 6980.000 D | 13900.000 D |
| CI2(7) | 139.000 | 143.000 | 108.000 | 116.000 |
| CI2(8) | 9320.000 D | 15500.000 D | 6790.000 D | 14700.000 D |
| CI2(9) | 199.000 | 289.000 | 201.000 | 690.000 D |
| CI2(11) | 1480.000 D | 1460.000 D | 1370.000 D | 1720.000 D |
| CI2(12) | 2.820 J | 5.880 | 4.640 U | 807.000 D |
| CI2(13) | 4580.000 D | 4810.000 D | 4280.000 D | 4870.000 D |
| CI2(15) | 4420.000 D | 5360.000 D | 4220.000 D | 4060.000 D |
| CI3(16) | 776.000 D | 3040.000 D | 287.000 | 245.000 |
| CI3(17) | 15700.000 D | 15700.000 D | 14100.000 D | 18100.000 D |
| CI3(18) | 31100.000 D | 30100.000 D | 27800.000 D | 39400.000 D |
| CI3(19) | 1770.000 D | 2300.000 D | 1640.000 D | 3600.000 D |
| CI3(22) | 2710.000 D | 4130.000 D | 2470.000 D | 2000.000 D |
| CI3(24) | 23.400 | 60.600 | 19.000 | 21.400 |
| CI3(25) | 35800.000 D | 29700.000 D | 33000.000 D | 32600.000 D |
| CI3(26) | 49300.000 D | 42600.000 D | 43900.000 D | 46600.000 D |
| CI3(27) | 4460.000 D | 3860.000 D | 4160.000 D | 6910.000 D |
| CI3(28) | 59800.000 D | 50100.000 D | 55900.000 D | 51500.000 D |
| CI3(29) | 12.500 | 25.100 | 8.870 | 2.070 U |
| CI3(30) | 11.700 | 10.300 | 11.300 | 9.860 |
| CI3(31) | 59100.000 D | 51800.000 D | 53700.000 D | 53900.000 D |
| CI3(32) | 11300.000 D | 10500.000 D | 9800.000 D | 14700.000 D |
| CI3(33) | 1970.000 D | 4710.000 D | 1620.000 D | 216.000 |
| CI3(37) | 1440.000 D | 2240.000 D | 1400.000 D | 987.000 D |
| CI4(40) | 2560.000 D | 2380.000 D | 2900.000 D | 1980.000 D |
| CI4(41) | 5.100 U | 41.600 | 5.420 U | 4.810 U |
| CI4(42) | 7820.000 D | 7970.000 D | 6910.000 D | 5110.000 D |
| CI4(43) | 4830.000 D | 5400.000 D | 2510.000 D | 821.000 D |
| CI4(44) | 13100.000 D | 14300.000 D | 12600.000 D | 8580.000 D |
| CI4(45) | 1020.000 D | 1150.000 D | 971.000 D | 708.000 D |
| CI4(46) | 1360.000 D | 1430.000 D | 1270.000 D | 1610.000 D |
| CI4(47) | 20200.000 D | 16900.000 D | 20400.000 D | 16800.000 D |
| CI4(48) | 3580.000 D | 4470.000 D | 3700.000 D | 1230.000 D |
| CI4(49) | 65100.000 D | 53200.000 D | 54300.000 D | 74100.000 D |
| CI4(50) | 88.100 | 66.200 | 86.000 | 71.200 |
| CI4(51) | 4470.000 D | 3600.000 D | 4010.000 D | 4870.000 D |
| CI4(52) | 68800.000 D | 54000.000 D | 57000.000 D | 73900.000 D |
| CI4(53) | 11100.000 D | 9020.000 D | 9370.000 D | 12800.000 D |
| CI4(54) | 67.100 | 61.800 | 57.300 | 99.500 |
| CI4(56) | 937.000 D | 1500.000 D | 911.000 D | 547.000 D |
| CI4(60) | 201.000 | 651.000 D | 236.000 | 328.000 D |
| CI4(63) | 221.000 | 252.000 | 266.000 | 131.000 |
| CI4(64) | 5670.000 D | 5780.000 D | 5910.000 D | 3750.000 D |
| CI4(66) | 3710.000 D | 5220.000 D | 3760.000 D | 2030.000 D |
| CI4(67) | 1900.000 D | 1410.000 D | 2320.000 D | 1120.000 D |
| CI4(70) | 3110.000 D | 5300.000 D | 3050.000 D | 1540.000 D |

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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 |
| CI4(71) | 11500.000 D | 10100.000 D | 10600.000 D | 9000.000 D |
| CI4(74) | 4230.000 D | 4040.000 D | 4930.000 D | 2400.000 D |
| CI4(75) | 1070.000 D | 799.000 D | 1070.000 D | 851.000 D |
| CI4(77) | 239.000 | 315.000 | 286.000 | 164.000 |
| CI4(80) | 32.600 | 34.100 | 36.200 | 21.800 |
| CI4(81) | 9.770 | 15.000 | 2.660 U | 17.700 |
| CI5(82) | 151.000 | 441.000 | 138.000 | 94.700 |
| CI5(83) | 4120.000 D | 4730.000 D | 5250.000 D | 3770.000 D |
| CI5(84) | 2600.000 D | 3970.000 D | 2670.000 D | 2470.000 D |
| CI5(85) | 504.000 | 1290.000 D | 424.000 | 265.000 |
| CI5(87) | 556.000 | 2090.000 D | 576.000 D | 356.000 |
| CI5(91) | 6040.000 D | 7660.000 D | 6950.000 D | 4740.000 D |
| CI5(92) | 3010.000 D | 4150.000 D | 4350.000 D | 2460.000 D |
| CI5(95) | 13900.000 D | 16400.000 D | 14200.000 D | 8690.000 D |
| CI5(97) | 3010.000 D | 4530.000 D | 3640.000 D | 2150.000 D |
| CI5(99) | 8720.000 D | 11900.000 D | 10200.000 D | 6110.000 D |
| CI5(100) | 764.000 D | 780.000 D | 949.000 D | 709.000 D |
| CI5(101) | 11600.000 D | 16700.000 D | 13800.000 D | 6860.000 D |
| CI5(104) | 18.900 | 15.500 | 20.400 | 18.200 |
| CI5(105) | 462.000 | 1640.000 D | 477.000 | 302.000 |
| CI5(110) | 13800.000 D | 19200.000 D | 15400.000 D | 10800.000 D |
| CI5(114) | 88.400 | 164.000 | 112.000 | 61.400 |
| CI5(115) | 4.280 U | 4.160 U | 4.550 U | 455.000 |
| CI5(118) | 4690.000 D | 9560.000 D | 5840.000 D | 3580.000 D |
| CI5(123) | 593.000 | 1060.000 D | 738.000 | 460.000 |
| CI5(124) | 138.000 | 262.000 | 173.000 | 102.000 |
| CI5(125) | 3.070 U | 50.700 | 3.260 U | 44.000 |
| CI5(126) | 15.500 | 17.800 | 21.600 | 16.000 |
| CI5(127) | 114.000 | 87.900 | 84.500 | 42.800 |
| CI6(128) | 287.000 | 871.000 D | 354.000 | 276.000 |
| CI6(130) | 123.000 | 288.000 | 181.000 | 118.000 |
| CI6(131) | 200.000 | 306.000 | 287.000 | 231.000 |
| CI6(134) | 443.000 | 631.000 | 586.000 | 482.000 |
| CI6(135) | 986.000 D | 1340.000 D | 1280.000 D | 964.000 D |
| CI6(136) | 1280.000 D | 1690.000 D | 1620.000 D | 1270.000 D |
| CI6(137) | 124.000 | 312.000 | 158.000 | 121.000 |
| CI6(138) | 919.000 D | 3070.000 D | 1160.000 D | 836.000 D |
| CI6(139) | 107.000 | 170.000 | 158.000 | 117.000 |
| CI6(140) | 3.320 U | 19.800 | 9.270 | 12.700 |
| CI6(141) | 162.000 | 501.000 | 196.000 | 142.000 |
| CI6(144) | 77.900 | 176.000 | 110.000 | 62.000 |
| CI6(146) | 710.000 | 1260.000 D | 1110.000 D | 779.000 D |
| CI6(149) | 7930.000 D | 11000.000 D | 10300.000 D | 7230.000 D |
| CI6(151) | 1050.000 D | 1560.000 D | 1480.000 D | 1100.000 D |
| CI6(153) | 4750.000 D | 8810.000 D | 6570.000 D | 4950.000 D |
| CI6(154) | 450.000 | 543.000 | 613.000 | 547.000 |
| CI6(155) | 2.940 J | 3.450 J | 3.990 J | 3.390 J |
| CI6(156) | 211.000 | 530.000 | 285.000 | 198.000 |
| CI6(157) | 38.800 | 120.000 | 49.700 | 36.600 |
| CI6(158) | 317.000 | 615.000 | 451.000 | 293.000 |

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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 |
| CI6(163) | 1640.000 D | 2370.000 D | 2340.000 D | 1810.000 D |
| CI6(164) | 241.000 | 432.000 | 342.000 | 259.000 |
| CI6(166) | 27.200 | 44.200 | 41.900 | 30.600 |
| CI6(167) | 185.000 | 333.000 | 266.000 | 208.000 |
| CI6(169) | 2.830 U | 2.750 U | 3.000 U | 2.670 U |
| CI7(170) | 145.000 | 365.000 | 218.000 | 184.000 |
| CI7(171) | 48.300 | 116.000 | 71.000 | 61.900 |
| CI7(172) | 27.900 | 63.600 | 42.600 | 36.600 |
| CI7(173) | 3.990 J | 9.840 | 7.110 | 10.400 |
| CI7(174) | 91.400 | 240.000 | 135.000 | 103.000 |
| CI7(175) | 11.700 | 22.900 | 17.400 | 16.500 |
| CI7(176) | 22.000 | 45.800 | 30.600 | 28.500 |
| CI7(177) | 70.800 | 164.000 | 101.000 | 88.200 |
| CI7(178) | 80.900 | 126.000 | 122.000 | 105.000 |
| CI7(179) | 164.000 | 241.000 | 240.000 | 218.000 |
| CI7(180) | 263.000 | 607.000 | 400.000 | 370.000 |
| CI7(183) | 123.000 | 241.000 | 187.000 | 174.000 |
| CI7(184) | 1.700 U | 1.650 U | 1.800 U | 1.600 U |
| CI7(185) | 14.300 | 28.400 | 25.300 | 18.800 |
| CI7(187) | 437.000 | 656.000 | 648.000 | 681.000 |
| CI7(188) | 12.100 | 13.200 | 17.000 | 14.800 |
| CI7(189) | 9.010 | 21.800 | 14.000 | 14.800 |
| CI7(190) | 46.700 | 97.400 | 72.600 | 61.900 |
| CI7(191) | 10.100 | 21.200 | 15.600 | 15.200 |
| CI7(193) | 27.200 | 37.200 | 32.500 | 30.800 |
| CI8(194) | 31.700 | 84.300 | 48.200 | 54.400 |
| CI8(195) | 12.100 | 29.800 | 20.000 | 20.400 |
| CI8(197) | 2.580 J | 4.730 | 2.150 U | 5.080 |
| CI8(198) | 2.660 U | 2.590 U | 2.830 U | 2.520 U |
| CI8(199) | 33.600 | 76.000 | 53.300 | 66.200 |
| CI8(200) | 3.660 J | 7.720 | 5.910 | 7.280 |
| CI8(201) | 5.450 | 10.300 | 8.980 | 9.290 |
| CI8(202) | 16.100 | 25.500 | 26.000 | 23.900 |
| CI8(203) | 37.000 | 96.400 | 66.800 | 68.700 |
| CI8(205) | 2.660 U | 6.510 | 4.250 J | 4.960 |
| CI9(206) | 13.200 | 35.700 | 20.000 | 27.100 |
| CI9(207) | 2.080 J | 5.220 | 3.530 J | 5.820 |
| CI9(208) | 5.250 | 11.600 | 8.170 | 10.500 |
| CI10(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 |
| CI3(38) | 55.000 | 65.300 | 27.800 | 76.800 |

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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 |
| CI4(78) | 80.400 | 81.400 | 38.900 | 55.300 |
| CI4(79) | 99.200 | 80.600 | 57.300 | 59.400 |
| CI7(186) | 234.000 | 167.000 | 171.000 | 93.900 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 187 N | 164 N | 179 N | 176 N |
| CI6(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 |
| CI1(1) | 54.600 | 66.200 | 26.200 | 1790.000 D |
| CI1(3) | 31.500 | 34.400 | 18.700 | 753.000 D |
| CI2(4) | 2880.000 D | 2940.000 D | 2630.000 D | 104000.000 D |
| CI2(5) | 2.520 U | 2.670 U | 1.940 U | 23.300 UD |
| CI2(6) | 7510.000 D | 7380.000 D | 8850.000 D | 191000.000 D |
| CI2(7) | 103.000 | 137.000 | 80.800 | 1660.000 D |
| CI2(8) | 7800.000 D | 7550.000 D | 8660.000 D | 206000.000 D |
| CI2(9) | 187.000 | 186.000 | 140.000 | 3550.000 D |
| CI2(11) | 1460.000 D | 1460.000 D | 1330.000 D | 16100.000 D |
| CI2(12) | 4.210 | 3.300 J | 3.090 U | 14.300 D |
| CI2(13) | 4620.000 D | 4690.000 D | 4170.000 D | 54400.000 D |
| CI2(15) | 4450.000 D | 4310.000 D | 3820.000 D | 45400.000 D |
| CI3(16) | 926.000 D | 969.000 D | 161.000 | 2720.000 D |
| CI3(17) | 16200.000 D | 15800.000 D | 15900.000 D | 157000.000 D |
| CI3(18) | 32100.000 D | 32200.000 D | 32700.000 D | 364000.000 D |
| CI3(19) | 2140.000 D | 2190.000 D | 1920.000 D | 35300.000 D |
| CI3(22) | 2760.000 D | 2780.000 D | 1880.000 D | 12900.000 D |
| CI3(24) | 25.200 | 30.000 | 11.200 | 137.000 D |
| CI3(25) | 32800.000 D | 32300.000 D | 35600.000 D | 233000.000 D |
| CI3(26) | 47300.000 D | 47700.000 D | 49400.000 D | 377000.000 D |
| CI3(27) | 5460.000 D | 5550.000 D | 4880.000 D | 63600.000 D |
| CI3(28) | 53900.000 D | 53800.000 D | 56800.000 D | 322000.000 D |
| CI3(29) | 10.700 | 12.500 | 4.930 | 18.600 UD |
| CI3(30) | 32.600 D | 9.500 | 6.960 | 78.500 D |
| CI3(31) | 51500.000 D | 51500.000 D | 58000.000 D | 352000.000 D |
| CI3(32) | 12600.000 D | 12900.000 D | 12000.000 D | 126000.000 D |
| CI3(33) | 2000.000 D | 2070.000 D | 1280.000 D | 3520.000 D |
| CI3(37) | 1510.000 D | 1620.000 D | 1260.000 D | 1720.000 D |
| CI4(40) | 2440.000 D | 2730.000 D | 2920.000 D | 11600.000 D |
| CI4(41) | 14.300 | 14.000 | 3.610 U | 43.300 UD |
| CI4(42) | 6010.000 D | 6190.000 D | 5340.000 D | 26000.000 D |
| CI4(43) | 768.000 D | 838.000 D | 3030.000 D | 20900.000 D |
| CI4(44) | 12600.000 D | 13200.000 D | 12100.000 D | 57600.000 D |
| CI4(45) | 1020.000 D | 1010.000 D | 723.000 D | 2160.000 D |
| CI4(46) | 1540.000 D | 1600.000 D | 1390.000 D | 14100.000 D |
| CI4(47) | 19300.000 D | 21300.000 D | 22800.000 D | 71100.000 D |
| CI4(48) | 2080.000 D | 1820.000 D | 3980.000 D | 13200.000 D |
| CI4(49) | 79900.000 D | 86000.000 D | 79400.000 D | 468000.000 D |
| CI4(50) | 78.900 | 82.700 | 71.900 | 494.000 D |
| CI4(51) | 5360.000 D | 5610.000 D | 5120.000 D | 37300.000 D |
| CI4(52) | 83100.000 D | 87900.000 D | 83200.000 D | 543000.000 D |
| CI4(53) | 13300.000 D | 13600.000 D | 12800.000 D | 99300.000 D |
| CI4(54) | 99.400 | 102.000 | 54.900 | 753.000 D |
| CI4(56) | 1000.000 D | 1050.000 D | 622.000 D | 360.000 D |
| CI4(60) | 191.000 | 209.000 | 108.000 | 144.000 D |
| CI4(63) | 195.000 | 200.000 | 137.000 | 620.000 D |
| CI4(64) | 5010.000 D | 5140.000 D | 4130.000 D | 17000.000 D |
| CI4(66) | 4020.000 D | 4300.000 D | 2490.000 D | 906.000 D |
| CI4(67) | 1510.000 D | 1490.000 D | 1500.000 D | 586.000 D |
| CI4(70) | 3210.000 D | 3420.000 D | 2010.000 D | 618.000 D |

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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 |
| <hr/> | | | | |
| CI4(71) | 10400.000 D | 10900.000 D | 13200.000 D | 63600.000 D |
| CI4(74) | 3800.000 D | 3830.000 D | 3090.000 D | 658.000 D |
| CI4(75) | 1020.000 D | 1060.000 D | 1160.000 D | 1830.000 D |
| CI4(77) | 265.000 | 297.000 | 213.000 | 124.000 D |
| CI4(80) | 30.800 | 35.000 | 16.600 | 28.800 D |
| CI4(81) | 13.300 | 17.300 | 1.770 U | 21.200 UD |
| CI5(82) | 170.000 | 222.000 | 104.000 | 106.000 D |
| CI5(83) | 4450.000 D | 5060.000 D | 5310.000 D | 18500.000 D |
| CI5(84) | 2590.000 D | 3400.000 D | 2340.000 D | 11800.000 D |
| CI5(85) | 491.000 | 492.000 | 438.000 | 586.000 D |
| CI5(87) | 712.000 | 887.000 | 354.000 | 378.000 D |
| CI5(91) | 5660.000 D | 6200.000 D | 5690.000 D | 26200.000 D |
| CI5(92) | 3670.000 D | 3490.000 D | 3450.000 D | 16100.000 D |
| CI5(95) | 13400.000 D | 14800.000 D | 14000.000 D | 51400.000 D |
| CI5(97) | 3160.000 D | 3690.000 D | 2750.000 D | 3500.000 D |
| CI5(99) | 9190.000 D | 10800.000 D | 8310.000 D | 12000.000 D |
| CI5(100) | 311.000 | 361.000 | 1040.000 D | 1710.000 D |
| CI5(101) | 11800.000 D | 14200.000 D | 10800.000 D | 14300.000 D |
| CI5(104) | 20.100 | 22.600 | 22.600 | 120.000 D |
| CI5(105) | 653.000 | 840.000 | 318.000 | 226.000 D |
| CI5(110) | 12800.000 D | 15400.000 D | 12700.000 D | 36100.000 D |
| CI5(114) | 106.000 | 141.000 | 84.200 | 69.000 D |
| CI5(115) | 84.000 | 137.000 | 3.030 U | 36.400 UD |
| CI5(118) | 5560.000 D | 6840.000 D | 4130.000 D | 2780.000 D |
| CI5(123) | 648.000 | 768.000 | 526.000 | 620.000 D |
| CI5(124) | 155.000 | 199.000 | 115.000 | 88.100 D |
| CI5(125) | 64.000 | 66.000 | 2.180 U | 26.100 UD |
| CI5(126) | 16.400 | 21.800 | 17.000 | 28.900 UD |
| CI5(127) | 64.700 | 55.800 | 81.200 | 51.300 D |
| CI6(128) | 380.000 | 514.000 | 253.000 | 300.000 D |
| CI6(130) | 135.000 | 210.000 | 124.000 | 188.000 D |
| CI6(131) | 219.000 | 278.000 | 262.000 | 871.000 D |
| CI6(134) | 475.000 | 573.000 | 487.000 | 1550.000 D |
| CI6(135) | 906.000 | 1230.000 D | 1210.000 D | 3440.000 D |
| CI6(136) | 1380.000 D | 1570.000 D | 1720.000 D | 5770.000 D |
| CI6(137) | 153.000 | 224.000 | 119.000 | 134.000 D |
| CI6(138) | 1280.000 D | 2110.000 D | 687.000 | 970.000 D |
| CI6(139) | 128.000 | 159.000 | 130.000 | 304.000 D |
| CI6(140) | 10.300 | 14.500 | 6.560 | 28.200 UD |
| CI6(141) | 215.000 | 305.000 | 138.000 | 157.000 D |
| CI6(144) | 110.000 | 114.000 | 80.000 | 149.000 D |
| CI6(146) | 770.000 | 943.000 | 978.000 D | 2010.000 D |
| CI6(149) | 7320.000 D | 10100.000 D | 10200.000 D | 33100.000 D |
| CI6(151) | 1170.000 D | 1420.000 D | 1290.000 D | 3370.000 D |
| CI6(153) | 5300.000 D | 6710.000 D | 5290.000 D | 7540.000 D |
| CI6(154) | 504.000 | 607.000 | 693.000 | 2410.000 D |
| CI6(155) | 2.220 U | 3.400 J | 2.970 | 21.900 D |
| CI6(156) | 277.000 | 400.000 | 216.000 | 319.000 D |
| CI6(157) | 55.300 | 83.500 | 38.100 | 56.900 D |
| CI6(158) | 368.000 | 494.000 | 322.000 | 376.000 D |

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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 |
| CI6(163) | 1850.000 D | 2040.000 D | 2220.000 D | 5450.000 D |
| CI6(164) | 274.000 | 351.000 | 242.000 | 322.000 D |
| CI6(166) | 29.400 | 39.800 | 31.000 | 53.600 D |
| CI6(167) | 214.000 | 287.000 | 211.000 | 323.000 D |
| CI6(169) | 2.600 U | 2.750 U | 2.000 U | 24.000 UD |
| CI7(170) | 184.000 | 255.000 | 165.000 | 357.000 D |
| CI7(171) | 59.300 | 84.800 | 58.300 | 113.000 D |
| CI7(172) | 33.700 | 44.300 | 34.700 | 78.300 D |
| CI7(173) | 4.560 | 7.510 | 4.350 | 24.000 UD |
| CI7(174) | 113.000 | 156.000 | 103.000 | 234.000 D |
| CI7(175) | 14.200 | 19.800 | 15.800 | 58.300 D |
| CI7(176) | 24.600 | 33.500 | 26.400 | 85.400 D |
| CI7(177) | 84.000 | 120.000 | 79.400 | 134.000 D |
| CI7(178) | 90.600 | 114.000 | 116.000 | 384.000 D |
| CI7(179) | 178.000 | 225.000 | 227.000 | 778.000 D |
| CI7(180) | 319.000 | 445.000 | 330.000 | 918.000 D |
| CI7(183) | 144.000 | 200.000 | 169.000 | 515.000 D |
| CI7(184) | 1.480 J | 1.650 U | 1.200 U | 14.400 UD |
| CI7(185) | 17.500 | 22.200 | 19.200 | 41.500 D |
| CI7(187) | 485.000 | 614.000 | 613.000 | 2380.000 D |
| CI7(188) | 12.000 | 16.300 | 16.800 | 84.500 D |
| CI7(189) | 12.800 | 18.400 | 13.800 | 36.400 D |
| CI7(190) | 54.900 | 77.900 | 63.700 | 168.000 D |
| CI7(191) | 11.400 | 16.600 | 12.200 | 43.200 D |
| CI7(193) | 24.000 | 32.700 | 30.500 | 96.100 D |
| CI8(194) | 36.800 | 50.400 | 51.100 | 254.000 D |
| CI8(195) | 15.400 | 19.900 | 18.600 | 100.000 D |
| CI8(197) | 2.480 J | 3.510 J | 3.000 | 17.200 UD |
| CI8(198) | 2.450 U | 2.590 U | 1.890 U | 22.600 UD |
| CI8(199) | 39.800 | 51.100 | 52.300 | 180.000 D |
| CI8(200) | 4.720 | 4.910 | 5.550 | 22.600 UD |
| CI8(201) | 6.280 | 9.360 | 8.590 | 37.300 D |
| CI8(202) | 17.000 | 22.600 | 25.400 | 103.000 D |
| CI8(203) | 51.000 | 66.500 | 67.800 | 294.000 D |
| CI8(205) | 3.140 J | 4.860 | 3.970 | 22.600 UD |
| CI9(206) | 14.900 | 22.400 | 25.900 | 206.000 D |
| CI9(207) | 3.230 J | 4.170 | 3.730 | 29.100 D |
| CI9(208) | 6.040 | 7.850 | 8.950 | 74.300 D |
| CI10(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 |
| CI3(38) | 50.800 | 42.000 | 19.200 | 19.000 |

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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 |
| CI4(78) | 46.600 | 38.100 | 26.800 | 9.220 |
| CI4(79) | 47.200 | 37.700 | 35.500 | 9.260 |
| CI7(186) | 133.000 | 106.000 | 176.000 | 125.000 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|---------|
| CI3(34) | 190 N | 176 N | 169 N | 1305 ND |
| CI6(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 |
| <hr/> | | | | |
| CI1(1) | 197.000 | 36600.000 D | 34.600 | 151.000 |
| CI1(3) | 55.600 | 5440.000 D | 23.000 | 34.800 |
| CI2(4) | 2980.000 D | 98100.000 D | 2160.000 D | 5070.000 D |
| CI2(5) | 2.830 U | 1380.000 D | 2.330 U | 2.390 U |
| CI2(6) | 7100.000 D | 24100.000 D | 6360.000 D | 11100.000 D |
| CI2(7) | 151.000 | 5.300 U | 119.000 | 90.600 |
| CI2(8) | 8210.000 D | 64400.000 D | 6380.000 D | 10100.000 D |
| CI2(9) | 255.000 | 6190.000 D | 159.000 | 159.000 |
| CI2(11) | 1270.000 D | 2010.000 D | 1230.000 D | 1700.000 D |
| CI2(12) | 5.600 | 103.000 | 2.460 J | 3.800 U |
| CI2(13) | 4070.000 D | 7360.000 D | 3910.000 D | 7220.000 D |
| CI2(15) | 4600.000 D | 17700.000 D | 3850.000 D | 4630.000 D |
| CI3(16) | 905.000 D | 10500.000 D | 270.000 | 1210.000 D |
| CI3(17) | 13300.000 D | 29300.000 D | 13000.000 D | 17400.000 D |
| CI3(18) | 26200.000 D | 45800.000 D | 25600.000 D | 32600.000 D |
| CI3(19) | 1700.000 D | 11600.000 D | 1540.000 D | 2940.000 D |
| CI3(22) | 2580.000 D | 6750.000 D | 2310.000 D | 3460.000 D |
| CI3(24) | 31.100 | 233.000 | 19.600 | 22.300 |
| CI3(25) | 29000.000 D | 26800.000 D | 30300.000 D | 40200.000 D |
| CI3(26) | 39000.000 D | 36000.000 D | 40600.000 D | 63100.000 D |
| CI3(27) | 3970.000 D | 7940.000 D | 3910.000 D | 9660.000 D |
| CI3(28) | 45400.000 D | 51600.000 D | 50500.000 D | 56200.000 D |
| CI3(29) | 14.500 | 73.000 | 10.200 | 7.060 |
| CI3(30) | 12.600 | 21.600 | 8.460 | 8.930 |
| CI3(31) | 41400.000 D | 49200.000 D | 48500.000 D | 55600.000 D |
| CI3(32) | 9280.000 D | 14800.000 D | 9140.000 D | 15600.000 D |
| CI3(33) | 1810.000 D | 5340.000 D | 1690.000 D | 3390.000 D |
| CI3(37) | 1370.000 D | 2560.000 D | 1260.000 D | 1570.000 D |
| CI4(40) | 2180.000 D | 2760.000 D | 2240.000 D | 2910.000 D |
| CI4(41) | 5.250 U | 73.100 | 4.330 U | 4.440 U |
| CI4(42) | 6020.000 D | 6860.000 D | 5750.000 D | 10200.000 D |
| CI4(43) | 3550.000 D | 411.000 | 3390.000 D | 4050.000 D |
| CI4(44) | 11200.000 D | 12300.000 D | 11400.000 D | 18000.000 D |
| CI4(45) | 928.000 D | 1580.000 D | 338.000 | 1020.000 D |
| CI4(46) | 1160.000 D | 1580.000 D | 1150.000 D | 2070.000 D |
| CI4(47) | 16600.000 D | 19100.000 D | 17500.000 D | 25600.000 D |
| CI4(48) | 2840.000 D | 426.000 | 2490.000 D | 4480.000 D |
| CI4(49) | 55300.000 D | 54500.000 D | 74000.000 D | 84000.000 D |
| CI4(50) | 83.800 | 92.700 | 73.300 | 73.300 |
| CI4(51) | 3620.000 D | 4320.000 D | 3860.000 D | 7860.000 D |
| CI4(52) | 55900.000 D | 54600.000 D | 73100.000 D | 94200.000 D |
| CI4(53) | 8760.000 D | 9290.000 D | 9410.000 D | 16300.000 D |
| CI4(54) | 66.200 | 125.000 | 57.500 | 107.000 |
| CI4(56) | 1100.000 D | 1420.000 D | 880.000 D | 1240.000 D |
| CI4(60) | 212.000 | 264.000 | 185.000 | 577.000 D |
| CI4(63) | 541.000 D | 273.000 | 188.000 | 200.000 |
| CI4(64) | 5210.000 D | 6620.000 D | 4930.000 D | 7700.000 D |
| CI4(66) | 3840.000 D | 5270.000 D | 3590.000 D | 4380.000 D |
| CI4(67) | 1640.000 D | 1480.000 D | 1590.000 D | 1290.000 D |
| CI4(70) | 2780.000 D | 3980.000 D | 2950.000 D | 3410.000 D |

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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 |
| <hr/> | | | | |
| CI4(71) | 8790.000 D | 7910.000 D | 9980.000 D | 14200.000 D |
| CI4(74) | 3820.000 D | 4630.000 D | 3720.000 D | 3140.000 D |
| CI4(75) | 914.000 D | 380.000 | 351.000 | 1040.000 D |
| CI4(77) | 233.000 | 370.000 | 232.000 | 302.000 |
| CI4(80) | 143.000 D | 40.600 | 27.100 | 48.700 |
| CI4(81) | 11.100 | 20.500 | 11.200 | 14.800 |
| CI5(82) | 128.000 | 204.000 | 158.000 | 387.000 |
| CI5(83) | 3350.000 D | 3750.000 D | 3750.000 D | 5810.000 D |
| CI5(84) | 1730.000 D | 3470.000 D | 2250.000 D | 3610.000 D |
| CI5(85) | 378.000 | 716.000 | 512.000 | 1280.000 D |
| CI5(87) | 437.000 | 965.000 | 606.000 | 1930.000 D |
| CI5(91) | 4960.000 D | 6030.000 D | 5230.000 D | 9110.000 D |
| CI5(92) | 3020.000 D | 2850.000 D | 3400.000 D | 5070.000 D |
| CI5(95) | 11000.000 D | 11400.000 D | 12300.000 D | 19000.000 D |
| CI5(97) | 2480.000 D | 2990.000 D | 2910.000 D | 4640.000 D |
| CI5(99) | 6940.000 D | 9660.000 D | 7080.000 D | 13100.000 D |
| CI5(100) | 299.000 | 399.000 | 285.000 | 976.000 D |
| CI5(101) | 9210.000 D | 11900.000 D | 11100.000 D | 16600.000 D |
| CI5(104) | 16.700 | 20.400 | 16.700 | 19.000 |
| CI5(105) | 363.000 | 805.000 | 542.000 | 1650.000 D |
| CI5(110) | 11100.000 D | 13500.000 D | 12200.000 D | 20500.000 D |
| CI5(114) | 77.300 | 117.000 | 93.600 | 166.000 |
| CI5(115) | 4.410 U | 717.000 | 3.640 U | 3.730 U |
| CI5(118) | 3920.000 D | 6550.000 D | 4760.000 D | 10000.000 D |
| CI5(123) | 495.000 | 754.000 | 567.000 | 1150.000 D |
| CI5(124) | 112.000 | 172.000 | 145.000 | 258.000 |
| CI5(125) | 3.160 U | 55.800 | 2.610 U | 53.400 |
| CI5(126) | 14.000 | 20.600 | 16.200 | 22.200 |
| CI5(127) | 149.000 | 78.400 | 85.200 | 46.500 |
| CI6(128) | 246.000 | 440.000 | 308.000 | 918.000 D |
| CI6(130) | 110.000 | 210.000 | 116.000 | 286.000 |
| CI6(131) | 167.000 | 266.000 | 188.000 | 335.000 |
| CI6(134) | 372.000 | 552.000 | 413.000 | 701.000 |
| CI6(135) | 700.000 | 1180.000 | 809.000 | 1560.000 D |
| CI6(136) | 1020.000 D | 1260.000 D | 1140.000 D | 1980.000 D |
| CI6(137) | 101.000 | 207.000 | 132.000 | 307.000 |
| CI6(138) | 704.000 | 1490.000 D | 1040.000 D | 3060.000 D |
| CI6(139) | 84.800 | 152.000 | 98.300 | 186.000 |
| CI6(140) | 3.420 U | 14.400 | 8.340 | 21.400 |
| CI6(141) | 133.000 | 270.000 | 188.000 | 476.000 |
| CI6(144) | 68.600 | 97.000 | 80.900 | 180.000 |
| CI6(146) | 598.000 | 1170.000 | 653.000 | 1280.000 D |
| CI6(149) | 5670.000 D | 7730.000 D | 6360.000 D | 12200.000 D |
| CI6(151) | 870.000 D | 1220.000 D | 834.000 | 1760.000 D |
| CI6(153) | 3980.000 D | 6680.000 D | 4540.000 D | 9380.000 D |
| CI6(154) | 362.000 | 596.000 | 411.000 | 651.000 |
| CI6(155) | 3.080 J | 4.150 J | 2.720 J | 3.030 J |
| CI6(156) | 180.000 | 310.000 | 232.000 | 517.000 |
| CI6(157) | 31.500 | 65.000 | 46.800 | 122.000 |
| CI6(158) | 261.000 | 408.000 | 315.000 | 598.000 |

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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 |
| CI6(163) | 1340.000 D | 1720.000 D | 1590.000 D | 2700.000 D |
| CI6(164) | 197.000 | 337.000 | 247.000 | 452.000 |
| CI6(166) | 25.200 | 36.800 | 25.900 | 46.000 |
| CI6(167) | 158.000 | 259.000 | 185.000 | 336.000 |
| CI6(169) | 2.910 U | 3.430 U | 2.400 U | 2.460 U |
| CI7(170) | 126.000 | 219.000 | 148.000 | 327.000 |
| CI7(171) | 40.800 | 80.800 | 49.400 | 109.000 |
| CI7(172) | 25.300 | 48.900 | 29.100 | 54.300 |
| CI7(173) | 4.040 J | 12.000 | 4.180 | 8.500 |
| CI7(174) | 79.400 | 144.000 | 92.700 | 212.000 |
| CI7(175) | 10.100 | 21.400 | 13.100 | 22.500 |
| CI7(176) | 18.600 | 31.600 | 21.400 | 41.600 |
| CI7(177) | 61.400 | 116.000 | 72.900 | 157.000 |
| CI7(178) | 68.400 | 114.000 | 72.000 | 131.000 |
| CI7(179) | 141.000 | 227.000 | 154.000 | 257.000 |
| CI7(180) | 239.000 | 432.000 | 262.000 | 529.000 |
| CI7(183) | 109.000 | 195.000 | 120.000 | 236.000 |
| CI7(184) | 1.750 U | 2.060 U | 1.440 U | 1.480 U |
| CI7(185) | 13.600 | 19.900 | 14.700 | 29.400 |
| CI7(187) | 379.000 | 696.000 | 406.000 | 686.000 |
| CI7(188) | 9.190 | 15.900 | 9.900 | 15.400 |
| CI7(189) | 6.500 | 14.200 | 8.440 | 22.700 |
| CI7(190) | 40.800 | 65.800 | 45.400 | 88.000 |
| CI7(191) | 8.960 | 18.400 | 9.060 | 19.600 |
| CI7(193) | 17.000 | 31.700 | 25.700 | 39.000 |
| CI8(194) | 25.800 | 50.000 | 30.000 | 61.300 |
| CI8(195) | 10.700 | 23.600 | 11.000 | 22.600 |
| CI8(197) | 2.090 U | 2.460 U | 2.640 J | 4.300 |
| CI8(198) | 2.740 U | 3.230 U | 2.260 U | 2.320 U |
| CI8(199) | 28.000 | 64.600 | 29.600 | 54.900 |
| CI8(200) | 3.870 J | 8.430 | 3.310 J | 6.880 |
| CI8(201) | 4.650 | 11.800 | 4.730 | 10.300 |
| CI8(202) | 13.900 | 25.500 | 14.900 | 24.900 |
| CI8(203) | 34.200 | 72.800 | 36.900 | 76.200 |
| CI8(205) | 2.740 U | 6.490 | 2.260 U | 5.490 |
| CI9(206) | 10.800 | 24.600 | 10.400 | 23.900 |
| CI9(207) | 2.000 U | 6.600 | 2.050 J | 3.140 J |
| CI9(208) | 5.450 | 9.650 | 4.970 | 9.320 |
| CI10(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 |
| CI3(38) | 51.900 | 89.400 | 36.100 | 50.100 |

Analyzed by Restucci Jr, Richard

Not Surrogate Corrected

9/27/2017 Main: Copy of S17-0367MS-Master_315(PRC)-Final UD update rev 1.xlsx



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 |
| CI4(78) | 136.000 | 88.400 | 77.000 | 45.700 |
| CI4(79) | 109.000 | 83.600 | 89.700 | 36.500 |
| CI7(186) | 325.000 | 178.000 | 174.000 | 78.200 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 188 N | 179 N | 189 N | 169 N |
| CI6(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 | <p>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.</p> <p>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.</p> |
| Prep comments | K9600: Spilled about 1 mL of this sample (out of ~200 mL total). |

| | |
|-------------------|--|
| Analysis | <p>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.</p> |
| Analysis Comments | <ul style="list-style-type: none"> No ICC exists for PRC compounds. CI5(84) and CI5(92) co-elute, as do CI5(85) and CI5(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 |

| | | |
|---------------|--|---|
| | <p>samples to comply with the reporting criteria of the historical data.</p> <ul style="list-style-type: none"> 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 | No exceedances noted. |
| Samples >5X PB | 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. |
| $\leq 25\%$ 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. |
| $\leq 25\%$ difference individual; $\leq 15\%$ difference mean | No exceedances noted. |
| | No comments. |



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&LS CD. 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 |



It can be done

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

CI5(84) and CI5(92) co-elute, as do CI5(85) and CI5(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'

Supervisor Approval:

Robert Lizotte, Jr.
2017.09.21 16:18:09 -04'00'

PM Approval:



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: 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

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(-) 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 | |



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: 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



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: 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

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(-) 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 | |



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: 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



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 | |



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 | 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 | |



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: 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 | |



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: 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

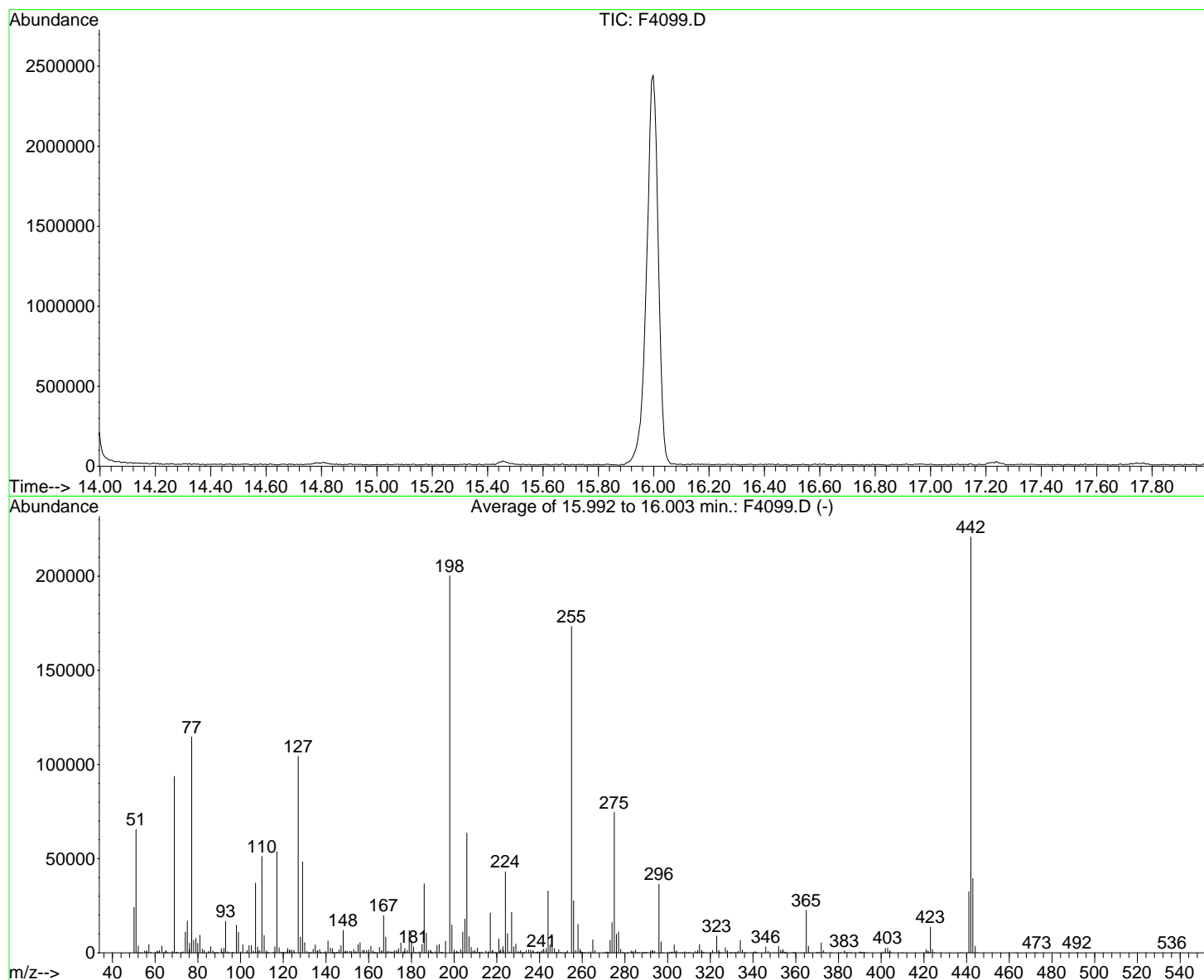
(-) 6864

| 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 < |
| 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 | |

RR
9/21/17

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

Vial: 1

Acq On : 15 Sep 2017 1:33 pm

Operator: LMG

Sample : JJ95

Inst : Inst. F

Misc : 5-315 DFTPP

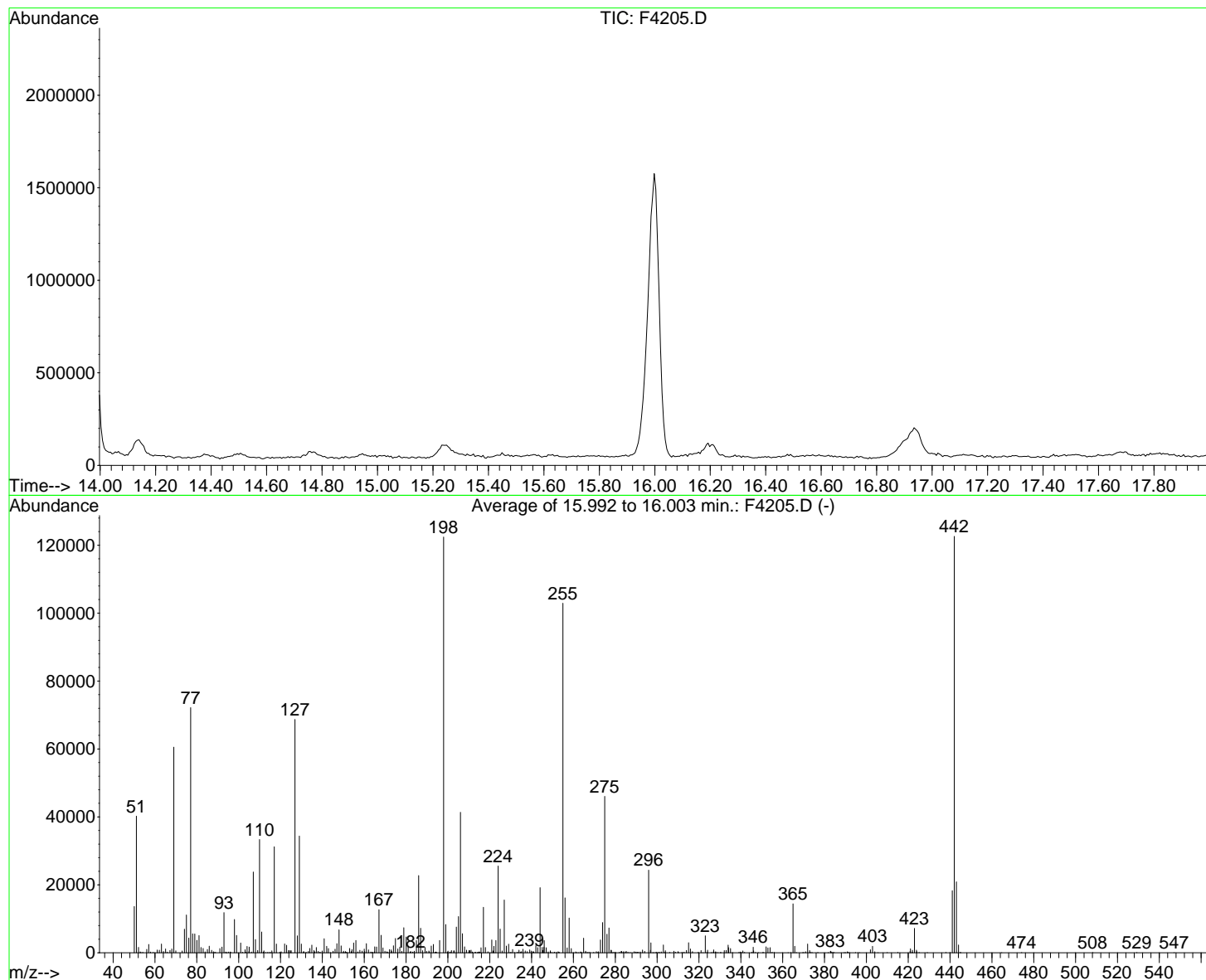
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\F\DATA\MF0909.M (RTE Integrator)

Title : PCB-QNF NBH

Standard Mult: NA



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

Vial: 1

Acq On : 15 Sep 2017 11:19 am

Operator: LMG

Sample : JJ95

Inst : Inst. W

Misc : 5-315 DFTPP

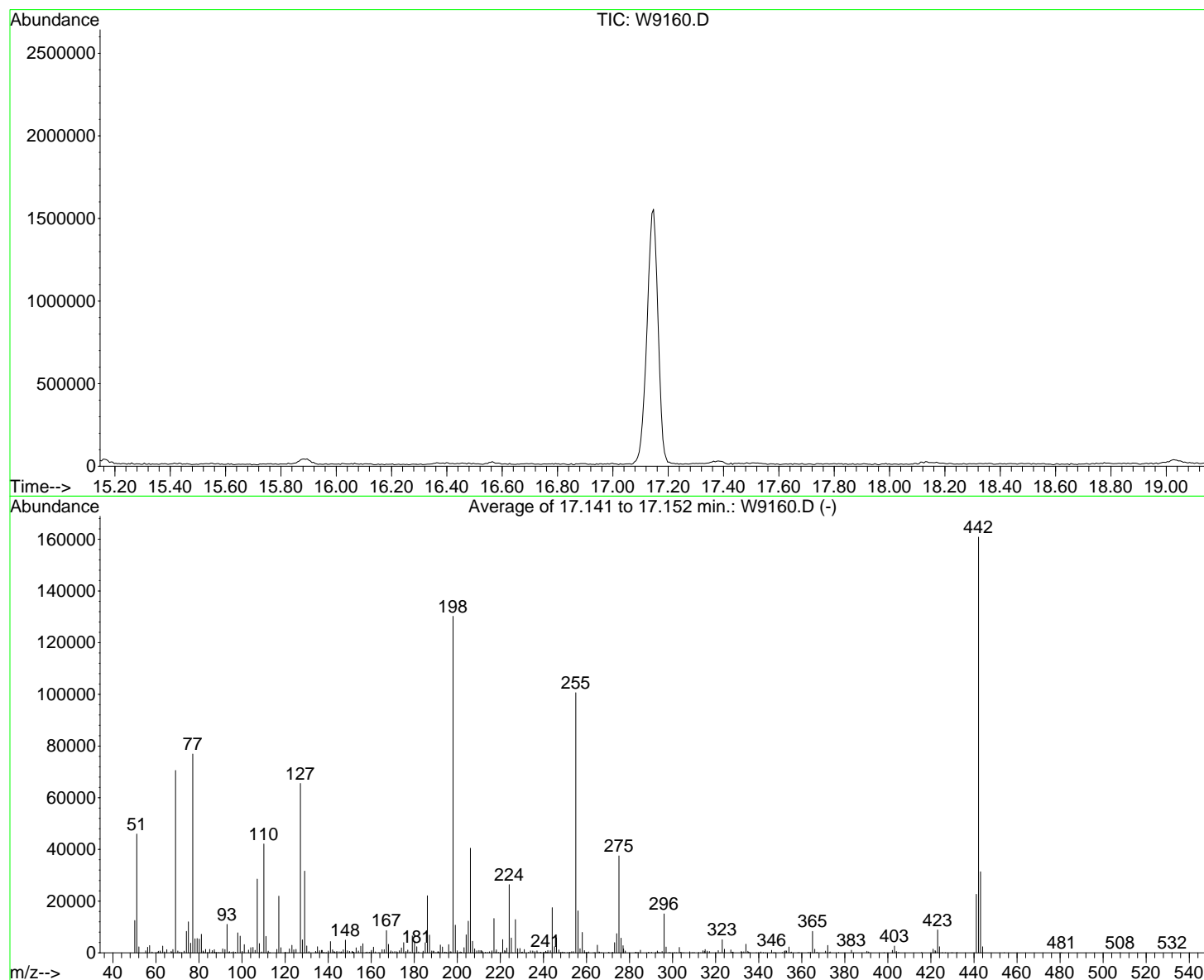
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\W\DATA\MW0399.M (RTE Integrator)

Title : PRC

Standard Mult: NA



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

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

Analyst Approval:



QC Chemist Approval:



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'

BATTELLE
It can be done

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



It can be done

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



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WORK/QUALITY ASSURANCE PROJECT PLAN

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



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WORK/QUALITY ASSURANCE PROJECT PLAN

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



It can be done

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 laden 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 Spectroscopy 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.



It can be done

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 |



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WORK/QUALITY ASSURANCE PROJECT PLAN

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 |
| <i>Extraction</i> | 32 | | | |
| <i>glassware</i> | 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



It can be done

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) | | |



It can be done

WORK/QUALITY ASSURANCE PROJECT PLAN

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 Spectroscopy in the Selected Ion Monitoring (SIM) Mode |
| Description: | PCB by GC/MS SIM |
| Matrix: | S - Solid Samples, like soil or sediment, prepared and analyzed 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 Substitution: | 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 |



It can be done

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: |
|-----|----------|--------------|------|----------|----------|---------|--------|
| 19 | CI3(25) | CI3(25) | T | CI5(96) | CI3(34) | Yes | No |
| 20 | CI3(26) | CI3(26) | T | CI5(96) | CI3(34) | Yes | No |
| 21 | CI3(27) | CI3(27) | T | CI5(96) | CI3(34) | Yes | No |
| 22 | CI3(28) | CI3(28) | T | CI5(96) | CI3(34) | Yes | No |
| 23 | CI3(29) | CI3(29) | T | CI5(96) | CI3(34) | Yes | No |
| 24 | CI3(30) | CI3(30) | T | CI5(96) | CI3(34) | Yes | No |
| 25 | CI3(31) | CI3(31) | T | CI5(96) | CI3(34) | Yes | No |
| 26 | CI3(32) | CI3(32) | T | CI5(96) | CI3(34) | Yes | No |
| 27 | CI3(33) | CI3(33) | T | CI5(96) | CI3(34) | Yes | No |
| 28 | CI3(37) | CI3(37) | T | CI5(96) | CI3(34) | Yes | No |
| 29 | CI4(40) | CI4(40) | T | CI5(96) | CI3(34) | Yes | No |
| 30 | CI4(41) | CI4(41) | T | CI5(96) | CI3(34) | Yes | No |
| 31 | CI4(42) | CI4(42) | T | CI5(96) | CI3(34) | Yes | No |
| 32 | CI4(43) | CI4(43) | T | CI5(96) | CI3(34) | Yes | No |
| 33 | CI4(44) | CI4(44) | T | CI5(96) | CI3(34) | Yes | No |
| 34 | CI4(45) | CI4(45) | T | CI5(96) | CI3(34) | Yes | No |
| 35 | CI4(46) | CI4(46) | T | CI5(96) | CI3(34) | Yes | No |
| 36 | CI4(47) | CI4(47) | T | CI5(96) | CI3(34) | Yes | No |
| 37 | CI4(48) | CI4(48) | T | CI5(96) | CI3(34) | Yes | No |
| 38 | CI4(49) | CI4(49) | T | CI5(96) | CI3(34) | Yes | No |
| 39 | CI4(50) | CI4(50) | T | CI5(96) | CI3(34) | Yes | No |
| 40 | CI4(51) | CI4(51) | T | CI5(96) | CI3(34) | Yes | No |
| 41 | CI4(52) | CI4(52) | T | CI5(96) | CI3(34) | Yes | No |
| 42 | CI4(53) | CI4(53) | T | CI5(96) | CI3(34) | Yes | No |
| 43 | CI4(54) | CI4(54) | T | CI5(96) | CI3(34) | Yes | No |
| 44 | CI4(56) | CI4(56) | T | CI5(96) | CI3(34) | Yes | No |
| 45 | CI4(60) | CI4(60) | T | CI6(161) | CI6(152) | Yes | No |
| 46 | CI4(63) | CI4(63) | T | CI5(96) | CI3(34) | Yes | No |
| 47 | CI4(64) | CI4(64) | T | CI5(96) | CI3(34) | Yes | No |
| 48 | CI4(66) | CI4(66) | T | CI5(96) | CI3(34) | Yes | No |
| 49 | CI4(67) | CI4(67) | T | CI5(96) | CI3(34) | Yes | No |
| 50 | CI4(70) | CI4(70) | T | CI5(96) | CI3(34) | Yes | No |
| 51 | CI4(71) | CI4(71) | T | CI5(96) | CI3(34) | Yes | No |
| 52 | CI4(74) | CI4(74) | T | CI5(96) | CI3(34) | Yes | No |
| 53 | CI4(75) | CI4(75) | T | CI5(96) | CI3(34) | Yes | No |
| 54 | CI4(77) | CI4(77) | T | CI6(161) | CI6(152) | Yes | No |
| 55 | CI4(80) | CI4(80) | T | CI5(96) | CI3(34) | Yes | No |
| 56 | CI4(81) | CI4(81) | T | CI6(161) | CI6(152) | Yes | No |
| 57 | CI5(82) | CI5(82) | T | CI6(161) | CI6(152) | Yes | No |
| 58 | CI5(83) | CI5(83) | T | CI6(161) | CI6(152) | Yes | No |
| 59 | CI5(84) | CI5(84) | T | CI5(96) | CI3(34) | Yes | No |
| 60 | CI5(85) | CI5(85) | T | CI6(161) | CI6(152) | Yes | No |
| 61 | CI5(87) | CI5(87) | T | CI6(161) | CI6(152) | Yes | No |
| 62 | CI5(91) | CI5(91) | T | CI5(96) | CI3(34) | Yes | No |
| 63 | CI5(92) | CI5(92) | T | CI5(96) | CI3(34) | Yes | No |
| 64 | CI5(95) | CI5(95) | T | CI5(96) | CI3(34) | Yes | No |



It can be done

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 | CI5(97) | CI5(97) | T | CI6(161) | CI6(152) | Yes | No |
| 66 | CI5(99) | CI5(99) | T | CI6(161) | CI6(152) | Yes | No |
| 67 | CI5(100) | CI5(100) | T | CI5(96) | CI3(34) | Yes | No |
| 68 | CI5(101) | CI5(101) | T | CI5(96) | CI3(34) | Yes | No |
| 69 | CI5(104) | CI5(104) | T | CI5(96) | CI3(34) | Yes | No |
| 70 | CI5(105) | CI5(105) | T | CI6(161) | CI6(152) | Yes | No |
| 71 | CI5(110) | CI5(110) | T | CI6(161) | CI6(152) | Yes | No |
| 72 | CI5(114) | CI5(114) | T | CI6(161) | CI6(152) | Yes | No |
| 73 | CI5(115) | CI5(115) | T | CI6(161) | CI6(152) | Yes | No |
| 74 | CI5(118) | CI5(118) | T | CI6(161) | CI6(152) | Yes | No |
| 75 | CI5(123) | CI5(123) | T | CI6(161) | CI6(152) | Yes | No |
| 76 | CI5(124) | CI5(124) | T | CI6(161) | CI6(152) | Yes | No |
| 77 | CI5(125) | CI5(125) | T | CI6(161) | CI6(152) | Yes | No |
| 78 | CI5(126) | CI5(126) | T | CI6(161) | CI6(152) | Yes | No |
| 79 | CI5(127) | CI5(127) | T | CI6(161) | CI6(152) | Yes | No |
| 80 | CI6(128) | CI6(128) | T | CI6(161) | CI6(152) | Yes | No |
| 81 | CI6(130) | CI6(130) | T | CI6(161) | CI6(152) | Yes | No |
| 82 | CI6(131) | CI6(131) | T | CI6(161) | CI6(152) | Yes | No |
| 83 | CI6(134) | CI6(134) | T | CI6(161) | CI6(152) | Yes | No |
| 84 | CI6(135) | CI6(135) | T | CI6(161) | CI6(152) | Yes | No |
| 85 | CI6(136) | CI6(136) | T | CI6(161) | CI6(152) | Yes | No |
| 86 | CI6(137) | CI6(137) | T | CI6(161) | CI6(152) | Yes | No |
| 87 | CI6(138) | CI6(138) | T | CI6(161) | CI6(152) | Yes | No |
| 88 | CI6(139) | CI6(139) | T | CI6(161) | CI6(152) | Yes | No |
| 89 | CI6(140) | CI6(140) | T | CI6(161) | CI6(152) | Yes | No |
| 90 | CI6(141) | CI6(141) | T | CI6(161) | CI6(152) | Yes | No |
| 91 | CI6(144) | CI6(144) | T | CI6(161) | CI6(152) | Yes | No |
| 92 | CI6(146) | CI6(146) | T | CI6(161) | CI6(152) | Yes | No |
| 93 | CI6(149) | CI6(149) | T | CI6(161) | CI6(152) | Yes | No |
| 94 | CI6(151) | CI6(151) | T | CI6(161) | CI6(152) | Yes | No |
| 95 | CI6(153) | CI6(153) | T | CI6(161) | CI6(152) | Yes | No |
| 96 | CI6(154) | CI6(154) | T | CI6(161) | CI6(152) | Yes | No |
| 97 | CI6(155) | CI6(155) | T | CI5(96) | CI3(34) | Yes | No |
| 98 | CI6(156) | CI6(156) | T | CI6(161) | CI6(152) | Yes | No |
| 99 | CI6(157) | CI6(157) | T | CI6(161) | CI6(152) | Yes | No |
| 100 | CI6(158) | CI6(158) | T | CI6(161) | CI6(152) | Yes | No |
| 101 | CI6(163) | CI6(163) | T | CI6(161) | CI6(152) | Yes | No |
| 102 | CI6(164) | CI6(164) | T | CI6(161) | CI6(152) | Yes | No |
| 103 | CI6(166) | CI6(166) | T | CI6(161) | CI6(152) | Yes | No |
| 104 | CI6(167) | CI6(167) | T | CI6(161) | CI6(152) | Yes | No |
| 105 | CI6(169) | CI6(169) | T | CI6(161) | CI6(152) | Yes | No |
| 106 | CI7(170) | CI7(170) | T | CI6(161) | CI6(152) | Yes | No |
| 107 | CI7(171) | CI7(171) | T | CI6(161) | CI6(152) | Yes | No |
| 108 | CI7(172) | CI7(172) | T | CI6(161) | CI6(152) | Yes | No |
| 109 | CI7(173) | CI7(173) | T | CI6(161) | CI6(152) | Yes | No |
| 110 | CI7(174) | CI7(174) | T | CI6(161) | CI6(152) | Yes | No |



It can be done

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 | CI7(175) | CI7(175) | T | Cl6(161) | Cl6(152) | Yes | No |
| 112 | CI7(176) | CI7(176) | T | Cl6(161) | Cl6(152) | Yes | No |
| 113 | CI7(177) | CI7(177) | T | Cl6(161) | Cl6(152) | Yes | No |
| 114 | CI7(178) | CI7(178) | T | Cl6(161) | Cl6(152) | Yes | No |
| 115 | CI7(179) | CI7(179) | T | Cl6(161) | Cl6(152) | Yes | No |
| 116 | CI7(180) | CI7(180) | T | Cl6(161) | Cl6(152) | Yes | No |
| 117 | CI7(183) | CI7(183) | T | Cl6(161) | Cl6(152) | Yes | No |
| 118 | CI7(184) | CI7(184) | T | Cl6(161) | Cl6(152) | Yes | No |
| 119 | CI7(185) | CI7(185) | T | Cl6(161) | Cl6(152) | Yes | No |
| 120 | CI7(187) | CI7(187) | T | Cl6(161) | Cl6(152) | Yes | No |
| 121 | CI7(188) | CI7(188) | T | Cl6(161) | Cl6(152) | Yes | No |
| 122 | CI7(189) | CI7(189) | T | Cl6(161) | Cl6(152) | Yes | No |
| 123 | CI7(190) | CI7(190) | T | Cl6(161) | Cl6(152) | Yes | No |
| 124 | CI7(191) | CI7(191) | T | Cl6(161) | Cl6(152) | Yes | No |
| 125 | CI7(193) | CI7(193) | T | Cl6(161) | Cl6(152) | Yes | No |
| 126 | CI8(194) | CI8(194) | T | Cl6(161) | Cl6(152) | Yes | No |
| 127 | CI8(195) | CI8(195) | T | Cl6(161) | Cl6(152) | Yes | No |
| 128 | CI8(197) | CI8(197) | T | Cl6(161) | Cl6(152) | Yes | No |
| 129 | CI8(198) | CI8(198) | T | Cl6(161) | Cl6(152) | Yes | No |
| 130 | CI8(199) | CI8(199) | T | Cl6(161) | Cl6(152) | Yes | No |
| 131 | CI8(200) | CI8(200) | T | Cl6(161) | Cl6(152) | Yes | No |
| 132 | CI8(201) | CI8(201) | T | Cl6(161) | Cl6(152) | Yes | No |
| 133 | CI8(202) | CI8(202) | T | Cl6(161) | Cl6(152) | Yes | No |
| 134 | CI8(203) | CI8(203) | T | Cl6(161) | Cl6(152) | Yes | No |
| 135 | CI8(205) | CI8(205) | T | Cl6(161) | Cl6(152) | Yes | No |
| 136 | CI9(206) | CI9(206) | T | Cl6(161) | Cl6(152) | Yes | No |
| 137 | CI9(207) | CI9(207) | T | Cl6(161) | Cl6(152) | Yes | No |
| 138 | CI9(208) | CI9(208) | T | Cl6(161) | Cl6(152) | Yes | No |
| 139 | CI10(209) | CI10(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 | CI3(38) | CI3(38) | T | Cl5(96) | | No | No |
| 151 | CI4(78) | CI4(78) | T | Cl5(96) | | No | No |
| 152 | CI4(79) | CI4(79) | T | Cl5(96) | | No | No |
| 153 | CI7(186) | CI7(186) | T | Cl6(161) | | No | No |
| 1 | CI3(34) | CI3(34) | SIS | Cl5(96) | | No | No |
| 2 | CI6(152) | CI6(152) | SIS | Cl6(161) | | No | No |



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: | |
| CI1(1) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI1(3) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 2 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI2(4) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(5) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(6) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(7) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(8) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(9) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(11) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(12) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(13) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(15) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 3 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI3(16) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(17) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(18) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(19) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(22) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(24) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(25) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(26) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(27) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(28) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(29) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(30) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(31) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(32) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(33) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(37) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(38) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 4 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI4(40) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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 | | |



It can be done

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: | |
| CI5(105) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(110) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(114) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(115) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(118) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(123) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(124) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(125) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(126) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(127) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 6 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI6(128) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(130) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(131) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(134) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(135) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(136) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(137) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(138) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(139) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(140) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(141) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(144) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(146) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(149) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(151) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(153) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(154) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(155) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(156) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(157) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(158) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(163) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(164) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(166) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(167) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(169) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | | LOC 7 | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI7(170) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(171) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(172) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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: | |
| CI7(173) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(174) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(175) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(176) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(177) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(178) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(179) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(180) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(183) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(184) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(185) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(187) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(188) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(189) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(190) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(191) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(193) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(186) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 8 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI8(194) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(195) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(197) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(198) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(199) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(200) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(201) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(202) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(203) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(205) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 9 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI9(206) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(207) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(208) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 10 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI10(209) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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

Degradation Check Criteria:

Degradation Check Name: 5-315

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



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 | |



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 | Results examined by project manager, task leader, or subcontractor lab manager. Reextraction, reanalysis, or justification documented. |
| | | n | |
| 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 | |



ShpNo SHP-170822-02

It can be done

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: _____



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-ACP-GG-05 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9599 | P-17G-ACP-G5-05 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9600 | P-17G-ACP-JJ-07 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9601 | P-17G-ACP-JJ-07 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9602 | P-17G-ACP-DD-09 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9603 | P-17G-ACP-DD-09 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9604 | P-17G-ACP-FF-07 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9605 | P-17G-ACP-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) | | | |



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

Chain-of-Custody

| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | | | | |
|--|--|---|-------------|---------------------------------------|--|--|--|-------------|--------|------------------|
| | | Sampler Information (print name): | | Preservative | | COC # | | | | |
| | | Phone: | | | | | | | | |
| Email: | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | | | | |
| Project Name: <u>NBH Acrovox</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | | | | |
| Project No: <u>10004342A-17TBVX</u> | | Time Zone: | | <u>PCR Log</u> [Grid for Analysis] | | [Grid for COC #] | | | | |
| Sample Identification | | Sample Date | Sample Time | | | | | Sample Type | Matrix | Total # of Cont. |
| P-17G-ADP-GG05 SW | | 8/14/17 | | | | | | | PED | 1 |
| P-17G-ADP-GG05 PW | | | | | | | | | | 1 |
| P-17G-ADP-JJ07 SW | | | | | | | | | | 1 |
| P-17G-ADP-JJ07 PW | | | | | | | | | | 1 |
| P-17G-ADP-DD09 SW | | | | | | | | | | 1 |
| P-17G-ADP-DD09 PW | | | | | | | | | | 1 |
| P-17G-ADP-FF07 SW | | | | | | | | | | 1 |
| P-17G-ADP-FF07 PW | | | | | | | | | | 1 |
| P-17G-ADP-GG04 SW | | | | | | | | | | 1 |
| P-17G-ADP-GG04 PW | | | | | | | | | | 1 |
| P-17G-ADP-HH07 SW | | | | | | 1 | | | | |
| P-17G-ADP-HH07 PW | | | | | | 1 | | | | |
| P-17G-ADP-EE04 SW | | | | | | 1 | | | | |
| P-17G-ADP-EE04 PW | | | | | | 1 | | | | |
| Receipt Temperature: (°C) | | Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | | | |
| Relinquished by (Print/Sign): <u>[Signature]</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>[Signature]</u> | | | | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | | | | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | | | | |
| Comments: | | | | | | | | | | |

Chain-of-Custody

| | | | | | | | |
|---|-------------|-----------------------------------|-------------|------------------------------------|------------------|---|--|
| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): | | Preservative | | COC # | |
| | | Phone: | | | | | |
| | | Email: | | Analysis | | Page# | |
| | | Turnaround Time (TAT) Requested: | | | | | |
| Project Name: <u>NBH Aerobics</u> | | Normal <input type="checkbox"/> | | Pub Cons | | | |
| Project No.: <u>100043429-17T6AVX</u> | | Priority <input type="checkbox"/> | | | | | |
| | | RUSH <input type="checkbox"/> | | | | | |
| Time Zone: | | | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | | |
| P-17G-ADP-CC04 PW | 8/14/17 | | | PAD | 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-CC04 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): <u>CSPMmy Kelly</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schmitz</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |

BATTELLE

It can be done

Chain-of-Custody

| | | | | | | | |
|--|-------------|---|--------|------------------------------------|---|--|-------|
| Client Contact Information | | Project Manager: <u>Dahlu</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | | Email: | | | | | |
| Project Name: <u>NBA AeroVox</u> | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No.: <u>100043429-17T6AVX</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | | Time Zone: | | | | | |
| Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | | | |
| P-17G-ADP-LL03 SW | 8/14/17 | | PED | 1 | / | | 19624 |
| P-17G-ADP-LL03 PW | | | | 1 | / | | " 25 |
| P-17G-ADP-JF03 SW | | | | 1 | / | | 26 |
| P-17G-ADP-JF03 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): <u>CSM</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schumate</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |



It can be done

Chain-of-Custody

| | | | | | | |
|--|---|------------------------------------|--|--------------------------|--------------------------------|--|
| Client Contact Information | Project Manager: <u>Danlu</u> | | Sampling Site: | | Site Information: | |
| | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | Email: | | | | | |
| Project Name: <u>NBH Aerovox</u> | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No.: <u>100043420-17T6 AUX</u> | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | |
| P-17G-ADP-DD07 PW | 8/14/17 | | | PED | 1 | |
| P-17G-ADP-LLD5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-LLD5 PW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 PW | ↓ | | | ↓ | 1 | |
| TB-D81417-D1 | ↓ | | | ↓ | 1 | |
| Receipt Temperature: (°C) | | | | | | |
| Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | |
| Relinquished by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/2017 3:15pm</u> | Received by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/17 3:15</u> | |
| 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: | | | | | | |



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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

| | |
|----------|--------|
| CI5(123) | 2.67 U |
| CI5(124) | 1.70 U |
| CI5(125) | 2.47 U |
| CI5(126) | 2.74 U |
| CI5(127) | 5.47 U |
| CI6(128) | 2.60 U |
| CI6(130) | 2.41 U |
| CI6(131) | 1.57 U |
| CI6(134) | 2.47 U |
| CI6(135) | 1.63 U |
| CI6(136) | 1.30 U |
| CI6(137) | 3.64 U |
| CI6(138) | 3.25 U |
| CI6(139) | 3.45 U |
| CI6(140) | 2.67 U |
| CI6(141) | 1.82 U |
| CI6(144) | 1.95 U |
| CI6(146) | 4.04 U |
| CI6(149) | 1.95 U |
| CI6(151) | 2.28 U |
| CI6(153) | 4.10 U |
| CI6(154) | 1.82 U |
| CI6(155) | 1.95 U |
| CI6(156) | 3.25 U |
| CI6(157) | 3.25 U |
| CI6(158) | 1.82 U |
| CI6(163) | 2.41 U |
| CI6(164) | 1.43 U |
| CI6(166) | 1.24 U |
| CI6(167) | 10.9 U |
| CI6(169) | 2.28 U |
| CI7(170) | 2.41 U |
| CI7(171) | 2.01 U |
| CI7(172) | 1.63 U |
| CI7(173) | 2.28 U |
| CI7(174) | 3.00 U |
| CI7(175) | 1.63 U |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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

| | |
|-----------|---------|
| CI7(176) | 1.43 U |
| CI7(177) | 1.95 U |
| CI7(178) | 2.87 U |
| CI7(179) | 1.95 U |
| CI7(180) | 3.51 U |
| CI7(183) | 1.70 U |
| CI7(184) | 1.37 U |
| CI7(185) | 2.14 U |
| CI7(187) | 0.976 U |
| CI7(188) | 1.57 U |
| CI7(189) | 2.28 U |
| CI7(190) | 2.21 U |
| CI7(191) | 2.80 U |
| CI7(193) | 1.37 U |
| CI8(194) | 4.17 U |
| CI8(195) | 1.76 U |
| CI8(197) | 1.63 U |
| CI8(198) | 2.14 U |
| CI8(199) | 3.18 U |
| CI8(200) | 2.14 U |
| CI8(201) | 1.63 U |
| CI8(202) | 1.43 U |
| CI8(203) | 2.08 U |
| CI8(205) | 2.14 U |
| CI9(206) | 3.38 U |
| CI9(207) | 1.57 U |
| CI9(208) | 1.70 U |
| CI10(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 |

Analyzed By Restucci Jr, Richard

9/21/2017

S17-0368MS-Master_315(PRC):FINAL

Not Surrogate Corrected



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 |



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 |
| CI1(1) | 34.6 | 44.69 | 77 | | 28.2 | 38.50 | 73 | 5.3 | | |
| CI1(3) | 34.3 | 44.96 | 76 | | 28.4 | 38.73 | 73 | 4.0 | | |
| CI2(4) | 36.3 | 44.64 | 81 | | 29.3 | 38.46 | 76 | 6.4 | | |
| CI2(5) | 38.2 | 44.78 | 85 | | 30.8 | 38.58 | 80 | 6.1 | | |
| CI2(6) | 33.4 | 44.38 | 75 | | 27.5 | 38.23 | 72 | 4.1 | | |
| CI2(7) | 33.3 | 44.73 | 74 | | 36.2 | 38.54 | 94 | 23.8 | | |
| CI2(8) | 39.0 | 44.46 | 88 | | 32.2 | 38.31 | 84 | 4.7 | | |
| CI2(9) | 35.9 | 44.24 | 81 | | 33.5 | 38.12 | 88 | 8.3 | | |
| CI2(11) | 37.0 | 44.38 | 83 | | 29.7 | 38.23 | 78 | 6.2 | | |
| CI2(12) | 35.9 | 44.82 | 80 | | 29.0 | 38.62 | 75 | 6.5 | | |
| CI2(13) | 39.3 | 44.91 | 88 | | 31.9 | 38.69 | 82 | 7.1 | | |
| CI2(15) | 38.3 | 44.73 | 86 | | 30.7 | 38.54 | 80 | 7.2 | | |
| CI3(16) | 43.1 | 44.51 | 97 | | 33.6 | 38.35 | 88 | 9.7 | | |
| CI3(17) | 39.3 | 44.64 | 88 | | 31.4 | 38.46 | 82 | 7.1 | | |
| CI3(18) | 37.3 | 44.96 | 83 | | 30.4 | 38.73 | 78 | 6.2 | | |
| CI3(19) | 39.1 | 44.64 | 88 | | 32.0 | 38.46 | 83 | 5.8 | | |
| CI3(22) | 38.9 | 44.64 | 87 | | 31.5 | 38.46 | 82 | 5.9 | | |
| CI3(24) | 36.6 | 44.46 | 82 | | 28.3 | 38.31 | 74 | 10.3 | | |
| CI3(25) | 40.7 | 44.91 | 91 | | 32.6 | 38.69 | 84 | 8.0 | | |
| CI3(26) | 39.8 | 44.29 | 90 | | 32.0 | 38.15 | 84 | 6.9 | | |
| CI3(27) | 39.3 | 44.55 | 88 | | 31.6 | 38.38 | 82 | 7.1 | | |
| CI3(28) | 39.2 | 45.18 | 87 | | 31.4 | 38.92 | 81 | 7.1 | | |
| CI3(29) | 38.9 | 44.69 | 87 | | 31.0 | 38.50 | 81 | 7.1 | | |
| CI3(30) | 38.7 | 45.00 | 86 | | 30.6 | 38.77 | 79 | 8.5 | | |
| CI3(31) | 40.5 | 44.96 | 90 | | 32.5 | 38.73 | 84 | 6.9 | | |
| CI3(32) | 40.2 | 44.33 | 91 | | 32.1 | 38.19 | 84 | 8.0 | | |
| CI3(33) | 39.0 | 44.20 | 88 | | 32.4 | 38.08 | 85 | 3.5 | | |
| CI3(37) | 38.2 | 44.87 | 85 | | 32.0 | 38.65 | 83 | 2.4 | | |
| CI4(40) | 34.9 | 44.29 | 79 | | 31.6 | 38.15 | 83 | 4.9 | | |
| CI4(41) | 39.3 | 44.42 | 88 | | 30.3 | 38.27 | 79 | 10.8 | | |
| CI4(42) | 42.8 | 44.73 | 96 | | 35.6 | 38.54 | 92 | 4.3 | | |
| CI4(43) | 43.5 | 44.87 | 97 | | 35.0 | 38.65 | 91 | 6.4 | | |
| CI4(44) | 40.4 | 44.64 | 91 | | 33.3 | 38.46 | 87 | 4.5 | | |
| CI4(45) | 41.2 | 45.13 | 91 | | 32.0 | 38.88 | 82 | 10.4 | | |
| CI4(46) | 40.0 | 44.60 | 90 | | 32.2 | 38.42 | 84 | 6.9 | | |
| CI4(47) | 44.8 | 44.73 | 100 | | 35.0 | 38.54 | 91 | 9.4 | | |
| CI4(48) | 39.8 | 44.91 | 89 | | 31.6 | 38.69 | 82 | 8.2 | | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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 |
| CI4(49) | 39.1 | 44.69 | 87 | | 31.8 | 38.50 | 83 | 4.7 | | |
| CI4(50) | 39.4 | 45.00 | 88 | | 33.1 | 38.77 | 85 | 3.5 | | |
| CI4(51) | 36.7 | 44.73 | 82 | | 28.6 | 38.54 | 74 | 10.3 | | |
| CI4(52) | 40.3 | 44.55 | 90 | | 32.0 | 38.38 | 83 | 8.1 | | |
| CI4(53) | 40.4 | 44.20 | 91 | | 33.2 | 38.08 | 87 | 4.5 | | |
| CI4(54) | 38.8 | 44.60 | 87 | | 30.7 | 38.42 | 80 | 8.4 | | |
| CI4(56) | 39.5 | 44.69 | 88 | | 31.6 | 38.50 | 82 | 7.1 | | |
| CI4(60) | 37.4 | 44.29 | 84 | | 30.2 | 38.15 | 79 | 6.1 | | |
| CI4(63) | 40.9 | 44.73 | 91 | | 32.8 | 38.54 | 85 | 6.8 | | |
| CI4(64) | 42.2 | 45.00 | 94 | | 33.6 | 38.77 | 87 | 7.7 | | |
| CI4(66) | 38.1 | 44.78 | 85 | | 31.6 | 38.58 | 82 | 3.6 | | |
| CI4(67) | 41.1 | 44.82 | 92 | | 34.1 | 38.62 | 88 | 4.4 | | |
| CI4(70) | 42.8 | 44.91 | 95 | | 34.2 | 38.69 | 88 | 7.7 | | |
| CI4(71) | 41.7 | 45.00 | 93 | | 33.8 | 38.77 | 87 | 6.7 | | |
| CI4(74) | 41.7 | 44.78 | 93 | | 33.6 | 38.58 | 87 | 6.7 | | |
| CI4(75) | 36.0 | 44.60 | 81 | | 29.0 | 38.42 | 75 | 7.7 | | |
| CI4(77) | 36.7 | 44.69 | 82 | | 29.7 | 38.50 | 77 | 6.3 | | |
| CI4(80) | 44.0 | 44.46 | 99 | | 34.8 | 38.31 | 91 | 8.4 | | |
| CI4(81) | 32.6 | 44.69 | 73 | | 26.9 | 38.50 | 70 | 4.2 | | |
| CI5(82) | 35.8 | 44.29 | 81 | | 30.3 | 38.15 | 79 | 2.5 | | |
| CI5(83) | 40.2 | 44.78 | 90 | | 31.3 | 38.58 | 81 | 10.5 | | |
| CI5(84) | 43.4 | 44.64 | 97 | | 42.5 | 38.46 | 111 | 13.5 | | |
| CI5(85) | 40.6 | 44.29 | 92 | | 27.3 | 38.15 | 72 | 24.4 | | |
| CI5(87) | 37.7 | 44.64 | 84 | | 30.7 | 38.46 | 80 | 4.9 | | |
| CI5(91) | 44.1 | 44.46 | 99 | | 35.7 | 38.31 | 93 | 6.3 | | |
| CI5(92) | 43.6 | 44.51 | 98 | | 34.9 | 38.35 | 91 | 7.4 | | |
| CI5(95) | 41.1 | 44.55 | 92 | | 32.8 | 38.38 | 85 | 7.9 | | |
| CI5(97) | 36.3 | 44.33 | 82 | | 28.4 | 38.19 | 74 | 10.3 | | |
| CI5(99) | 36.7 | 44.51 | 82 | | 28.7 | 38.35 | 75 | 8.9 | | |
| CI5(100) | 43.4 | 44.87 | 97 | | 34.5 | 38.65 | 89 | 8.6 | | |
| CI5(101) | 40.8 | 44.69 | 91 | | 32.5 | 38.50 | 84 | 8.0 | | |
| CI5(104) | 41.0 | 44.73 | 92 | | 30.9 | 38.54 | 80 | 14.0 | | |
| CI5(105) | 35.0 | 45.00 | 78 | | 29.9 | 38.77 | 77 | 1.3 | | |
| CI5(110) | 36.7 | 44.64 | 82 | | 29.4 | 38.46 | 76 | 7.6 | | |
| CI5(114) | 34.7 | 44.82 | 77 | | 28.3 | 38.62 | 73 | 5.3 | | |
| CI5(115) | 36.5 | 44.60 | 82 | | 27.9 | 38.42 | 73 | 11.6 | | |
| CI5(118) | 36.0 | 44.91 | 80 | | 27.9 | 38.69 | 72 | 10.5 | | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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 |
| CI5(123) | 37.2 | 44.69 | 83 | | 30.1 | 38.50 | 78 | | 6.2 | |
| CI5(124) | 39.1 | 44.33 | 88 | | 31.0 | 38.19 | 81 | | 8.3 | |
| CI5(125) | 40.1 | 44.60 | 90 | | 31.5 | 38.42 | 82 | | 9.3 | |
| CI5(126) | 38.8 | 44.91 | 86 | | 30.7 | 38.69 | 79 | | 8.5 | |
| CI5(127) | 42.0 | 44.64 | 94 | | 34.3 | 38.46 | 89 | | 5.5 | |
| CI6(128) | 36.9 | 44.69 | 83 | | 29.6 | 38.50 | 77 | | 7.5 | |
| CI6(130) | 40.1 | 44.55 | 90 | | 31.2 | 38.38 | 81 | | 10.5 | |
| CI6(131) | 37.1 | 44.38 | 84 | | 30.0 | 38.23 | 78 | | 7.4 | |
| CI6(134) | 37.2 | 44.55 | 84 | | 30.1 | 38.38 | 78 | | 7.4 | |
| CI6(135) | 34.8 | 44.11 | 79 | | 28.0 | 38.00 | 74 | | 6.5 | |
| CI6(136) | 40.4 | 44.69 | 90 | | 31.8 | 38.50 | 83 | | 8.1 | |
| CI6(137) | 52.5 | 44.20 | 119 | | 42.2 | 38.08 | 111 | | 7.0 | |
| CI6(138) | 39.2 | 44.38 | 88 | | 30.5 | 38.23 | 80 | | 9.5 | |
| CI6(139) | 40.1 | 44.51 | 90 | | 31.8 | 38.35 | 83 | | 8.1 | |
| CI6(140) | 34.2 | 44.91 | 76 | | 26.4 | 38.69 | 68 | | 11.1 | |
| CI6(141) | 38.0 | 44.20 | 86 | | 30.1 | 38.08 | 79 | | 8.5 | |
| CI6(144) | 37.9 | 44.82 | 85 | | 30.4 | 38.62 | 79 | | 7.3 | |
| CI6(146) | 36.4 | 44.87 | 81 | | 29.4 | 38.65 | 76 | | 6.4 | |
| CI6(149) | 38.9 | 44.73 | 87 | | 30.8 | 38.54 | 80 | | 8.4 | |
| CI6(151) | 37.5 | 44.46 | 84 | | 28.4 | 38.31 | 74 | | 12.7 | |
| CI6(153) | 37.4 | 44.96 | 83 | | 29.3 | 38.73 | 76 | | 8.8 | |
| CI6(154) | 35.3 | 45.00 | 78 | | 27.8 | 38.77 | 72 | | 8.0 | |
| CI6(155) | 36.5 | 44.29 | 82 | | 29.4 | 38.15 | 77 | | 6.3 | |
| CI6(156) | 39.0 | 45.31 | 86 | | 30.4 | 39.04 | 78 | | 9.8 | |
| CI6(157) | 39.0 | 44.73 | 87 | | 29.9 | 38.54 | 78 | | 10.9 | |
| CI6(158) | 35.2 | 44.78 | 79 | | 27.7 | 38.58 | 72 | | 9.3 | |
| CI6(163) | 33.8 | 44.38 | 76 | | 26.8 | 38.23 | 70 | | 8.2 | |
| CI6(164) | 38.9 | 44.51 | 87 | | 30.4 | 38.35 | 79 | | 9.6 | |
| CI6(166) | 38.1 | 44.69 | 85 | | 28.8 | 38.50 | 75 | | 12.5 | |
| CI6(167) | 39.6 | 45.09 | 88 | | 30.8 | 38.85 | 79 | | 10.8 | |
| CI6(169) | 36.8 | 44.55 | 83 | | 29.2 | 38.38 | 76 | | 8.8 | |
| CI7(170) | 36.8 | 44.64 | 82 | | 27.4 | 38.46 | 71 | | 14.4 | |
| CI7(171) | 42.0 | 44.46 | 94 | | 32.7 | 38.31 | 85 | | 10.1 | |
| CI7(172) | 38.6 | 45.13 | 86 | | 31.3 | 38.88 | 81 | | 6.0 | |
| CI7(173) | 35.4 | 44.87 | 79 | | 27.6 | 38.65 | 71 | | 10.7 | |
| CI7(174) | 36.3 | 44.73 | 81 | | 28.4 | 38.54 | 74 | | 9.0 | |
| CI7(175) | 35.5 | 44.46 | 80 | | 27.8 | 38.31 | 73 | | 9.2 | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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 |
| CI7(176) | 37.6 | 44.73 | 84 | | 30.0 | 38.54 | 78 | 7.4 | | |
| CI7(177) | 37.3 | 44.91 | 83 | | 29.6 | 38.69 | 77 | 7.5 | | |
| CI7(178) | 35.8 | 44.42 | 81 | | 27.4 | 38.27 | 72 | 11.8 | | |
| CI7(179) | 39.8 | 44.51 | 89 | | 30.4 | 38.35 | 79 | 11.9 | | |
| CI7(180) | 33.4 | 44.46 | 75 | | 25.3 | 38.31 | 66 | 12.8 | | |
| CI7(183) | 36.9 | 44.20 | 83 | | 28.5 | 38.08 | 75 | 10.1 | | |
| CI7(184) | 37.9 | 44.64 | 85 | | 29.0 | 38.46 | 75 | 12.5 | | |
| CI7(185) | 43.1 | 44.64 | 97 | | 33.8 | 38.46 | 88 | 9.7 | | |
| CI7(187) | 35.1 | 44.64 | 79 | | 27.5 | 38.46 | 72 | 9.3 | | |
| CI7(188) | 36.1 | 44.55 | 81 | | 28.5 | 38.38 | 74 | 9.0 | | |
| CI7(189) | 38.8 | 44.51 | 87 | | 30.7 | 38.35 | 80 | 8.4 | | |
| CI7(190) | 37.1 | 44.73 | 83 | | 29.2 | 38.54 | 76 | 8.8 | | |
| CI7(191) | 35.6 | 44.33 | 80 | | 27.9 | 38.19 | 73 | 9.2 | | |
| CI7(193) | 41.5 | 44.69 | 93 | | 32.3 | 38.50 | 84 | 10.2 | | |
| CI8(194) | 42.6 | 44.69 | 95 | | 34.7 | 38.50 | 90 | 5.4 | | |
| CI8(195) | 39.4 | 44.64 | 88 | | 31.7 | 38.46 | 82 | 7.1 | | |
| CI8(197) | 39.0 | 45.27 | 86 | | 30.2 | 39.00 | 77 | 11.0 | | |
| CI8(198) | 32.6 | 44.33 | 74 | | 25.1 | 38.19 | 66 | 11.4 | | |
| CI8(199) | 38.7 | 44.64 | 87 | | 29.3 | 38.46 | 76 | 13.5 | | |
| CI8(200) | 35.4 | 45.00 | 79 | | 27.5 | 38.77 | 71 | 10.7 | | |
| CI8(201) | 36.9 | 44.51 | 83 | | 29.9 | 38.35 | 78 | 6.2 | | |
| CI8(202) | 35.4 | 44.78 | 79 | | 27.5 | 38.58 | 71 | 10.7 | | |
| CI8(203) | 37.3 | 44.82 | 83 | | 28.4 | 38.62 | 74 | 11.5 | | |
| CI8(205) | 37.5 | 44.29 | 85 | | 29.7 | 38.15 | 78 | 8.6 | | |
| CI9(206) | 36.6 | 44.64 | 82 | | 28.1 | 38.46 | 73 | 11.6 | | |
| CI9(207) | 36.1 | 44.87 | 80 | | 28.5 | 38.65 | 74 | 7.8 | | |
| CI9(208) | 34.6 | 44.64 | 78 | | 26.8 | 38.46 | 70 | 10.8 | | |
| CI10(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 | | | | | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0368MS-Master_315(PRC):FINAL



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 |
| CI1(1) | 35.000 | 8800.000 D | 25.300 | 37.200 |
| CI1(3) | 21.600 | 1800.000 D | 18.000 | 26.500 |
| CI2(4) | 1970.000 D | 87000.000 D | 1430.000 D | 1700.000 D |
| CI2(5) | 2.210 U | 2.710 U | 2.050 U | 2.100 U |
| CI2(6) | 6360.000 D | 99800.000 D | 5160.000 D | 5430.000 D |
| CI2(7) | 77.200 | 2570.000 D | 85.700 | 91.400 |
| CI2(8) | 6290.000 D | 126000.000 D | 5090.000 D | 5660.000 D |
| CI2(9) | 405.000 D | 7440.000 D | 146.000 | 161.000 |
| CI2(11) | 1000.000 D | 8090.000 D | 820.000 D | 833.000 D |
| CI2(12) | 5.100 | 4.310 U | 3.260 U | 4.070 |
| CI2(13) | 3250.000 D | 27800.000 D | 2620.000 D | 2880.000 D |
| CI2(15) | 3510.000 D | 29400.000 D | 2910.000 D | 3050.000 D |
| CI3(16) | 512.000 D | 2300.000 D | 231.000 | 674.000 D |
| CI3(17) | 12300.000 D | 77400.000 D | 10000.000 D | 10100.000 D |
| CI3(18) | 24800.000 D | 178000.000 D | 20100.000 D | 19100.000 D |
| CI3(19) | 1430.000 D | 17800.000 D | 1090.000 D | 1160.000 D |
| CI3(22) | 1790.000 D | 6500.000 D | 1610.000 D | 1980.000 D |
| CI3(24) | 21.800 | 76.800 | 19.200 | 27.800 |
| CI3(25) | 25800.000 D | 100000.000 D | 22000.000 D | 19900.000 D |
| CI3(26) | 37100.000 D | 128000.000 D | 31700.000 D | 28800.000 D |
| CI3(27) | 3500.000 D | 23500.000 D | 2840.000 D | 2870.000 D |
| CI3(28) | 48300.000 D | 151000.000 D | 39300.000 D | 35600.000 D |
| CI3(29) | 9.060 | 6.980 | 9.340 | 10.700 |
| CI3(30) | 10.400 | 25.800 | 9.220 | 7.500 |
| CI3(31) | 45100.000 D | 157000.000 D | 37800.000 D | 34900.000 D |
| CI3(32) | 8630.000 D | 44600.000 D | 6820.000 D | 7020.000 D |
| CI3(33) | 1120.000 D | 3050.000 D | 1060.000 D | 1280.000 D |
| CI3(37) | 932.000 D | 1110.000 D | 740.000 D | 840.000 D |
| CI4(40) | 2040.000 D | 2930.000 D | 1520.000 D | 1610.000 D |
| CI4(41) | 4.100 U | 5.030 U | 3.800 U | 3.900 U |
| CI4(42) | 5930.000 D | 13300.000 D | 5190.000 D | 5170.000 D |
| CI4(43) | 664.000 D | 2350.000 D | 2470.000 D | 2240.000 D |
| CI4(44) | 9870.000 D | 26600.000 D | 8450.000 D | 8290.000 D |
| CI4(45) | 743.000 D | 2660.000 D | 670.000 D | 772.000 D |
| CI4(46) | 986.000 D | 3490.000 D | 842.000 D | 917.000 D |
| CI4(47) | 18000.000 D | 33200.000 D | 14000.000 D | 12900.000 D |
| CI4(48) | 1140.000 D | 1910.000 D | 1890.000 D | 1920.000 D |
| CI4(49) | 56100.000 D | 128000.000 D | 46400.000 D | 45900.000 D |
| CI4(50) | 74.800 | 149.000 | 63.500 | 53.900 |
| CI4(51) | 3340.000 D | 10500.000 D | 2670.000 D | 2540.000 D |
| CI4(52) | 63800.000 D | 152000.000 D | 53000.000 D | 46500.000 D |
| CI4(53) | 8260.000 D | 25400.000 D | 6840.000 D | 6240.000 D |
| CI4(54) | 49.400 | 114.000 | 45.100 | 47.300 |
| CI4(56) | 654.000 D | 614.000 D | 541.000 D | 610.000 D |
| CI4(60) | 362.000 D | 78.800 | 143.000 | 148.000 |
| CI4(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 |
| CI4(64) | 5080.000 D | 10200.000 D | 4660.000 D | 4860.000 D |
| CI4(66) | 2590.000 D | 1800.000 D | 2090.000 D | 2220.000 D |
| CI4(67) | 1430.000 D | 737.000 D | 1240.000 D | 1080.000 D |
| CI4(70) | 2060.000 D | 1250.000 D | 1740.000 D | 1700.000 D |
| CI4(71) | 8870.000 D | 19700.000 D | 7020.000 D | 6630.000 D |
| CI4(74) | 3300.000 D | 1560.000 D | 2700.000 D | 2540.000 D |
| CI4(75) | 848.000 D | 1060.000 D | 601.000 D | 576.000 D |
| CI4(77) | 188.000 | 168.000 | 155.000 | 194.000 |
| CI4(80) | 25.000 | 13.100 | 24.900 | 25.100 |
| CI4(81) | 12.900 | 2.470 U | 1.870 U | 11.800 |
| CI5(82) | 103.000 | 99.200 | 90.600 | 107.000 |
| CI5(83) | 3510.000 D | 5280.000 D | 2600.000 D | 2820.000 D |
| CI5(84) | 2860.000 D | 5270.000 D | 2760.000 D | 2230.000 D |
| CI5(85) | 403.000 | 531.000 | 279.000 | 350.000 |
| CI5(87) | 403.000 | 475.000 | 338.000 | 461.000 |
| CI5(91) | 5630.000 D | 9850.000 D | 4010.000 D | 4220.000 D |
| CI5(92) | 2680.000 D | 3790.000 D | 1860.000 D | 2250.000 D |
| CI5(95) | 10900.000 D | 19800.000 D | 8810.000 D | 8740.000 D |
| CI5(97) | 2260.000 D | 2130.000 D | 1810.000 D | 1840.000 D |
| CI5(99) | 6920.000 D | 6600.000 D | 5560.000 D | 5450.000 D |
| CI5(100) | 654.000 D | 933.000 D | 509.000 D | 503.000 D |
| CI5(101) | 9190.000 D | 8230.000 D | 7480.000 D | 7240.000 D |
| CI5(104) | 16.200 | 19.500 | 13.100 | 12.700 |
| CI5(105) | 344.000 | 332.000 | 274.000 | 390.000 |
| CI5(110) | 11000.000 D | 16100.000 D | 8620.000 D | 8950.000 D |
| CI5(114) | 65.600 | 70.400 | 54.300 | 64.000 |
| CI5(115) | 482.000 | 4.230 U | 3.200 U | 3.280 U |
| CI5(118) | 3700.000 D | 3020.000 D | 2880.000 D | 3260.000 D |
| CI5(123) | 462.000 D | 494.000 | 406.000 | 471.000 |
| CI5(124) | 106.000 | 85.900 | 86.000 | 96.900 |
| CI5(125) | 42.200 | 3.030 U | 2.290 U | 21.500 |
| CI5(126) | 14.200 | 14.400 | 11.100 | 13.600 |
| CI5(127) | 73.100 | 48.800 | 66.400 | 56.200 |
| CI6(128) | 249.000 | 300.000 | 186.000 | 251.000 |
| CI6(130) | 123.000 | 164.000 | 94.100 | 100.000 |
| CI6(131) | 205.000 | 347.000 | 150.000 | 192.000 |
| CI6(134) | 428.000 | 711.000 | 334.000 | 415.000 |
| CI6(135) | 770.000 D | 1220.000 D | 589.000 D | 688.000 D |
| CI6(136) | 1070.000 D | 1970.000 D | 813.000 D | 886.000 D |
| CI6(137) | 112.000 | 130.000 | 81.800 | 110.000 |
| CI6(138) | 749.000 D | 974.000 D | 570.000 D | 750.000 D |
| CI6(139) | 98.600 | 141.000 | 75.300 | 95.200 |
| CI6(140) | 8.200 | 11.900 | 7.830 | 2.540 U |
| CI6(141) | 138.000 | 165.000 | 106.000 | 144.000 |
| CI6(144) | 81.000 | 104.000 | 54.200 | 55.000 |
| CI6(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 |
| CI6(149) | 7160.000 D | 11800.000 D | 5120.000 D | 5880.000 D |
| CI6(151) | 912.000 D | 1440.000 D | 700.000 D | 785.000 D |
| CI6(153) | 4620.000 D | 5240.000 D | 3280.000 D | 4000.000 D |
| CI6(154) | 451.000 | 744.000 D | 327.000 | 421.000 |
| CI6(155) | 3.110 J | 3.670 J | 2.540 J | 2.800 J |
| CI6(156) | 170.000 | 227.000 | 128.000 | 178.000 |
| CI6(157) | 35.400 | 43.800 | 22.400 | 34.400 |
| CI6(158) | 280.000 | 311.000 | 210.000 | 282.000 |
| CI6(163) | 1330.000 D | 2120.000 D | 926.000 D | 1190.000 D |
| CI6(164) | 226.000 | 254.000 | 178.000 | 247.000 |
| CI6(166) | 26.300 | 34.100 | 20.100 | 25.800 |
| CI6(167) | 164.000 | 215.000 | 124.000 | 174.000 |
| CI6(169) | 2.280 U | 2.790 U | 2.110 U | 2.160 U |
| CI7(170) | 132.000 | 229.000 | 92.500 | 144.000 |
| CI7(171) | 47.700 | 79.800 | 34.300 | 48.100 |
| CI7(172) | 30.700 | 50.600 | 21.000 | 30.600 |
| CI7(173) | 6.000 | 8.360 | 5.590 | 5.500 |
| CI7(174) | 87.100 | 130.000 | 58.800 | 87.700 |
| CI7(175) | 14.800 | 22.800 | 10.100 | 12.800 |
| CI7(176) | 22.600 | 37.400 | 16.000 | 21.100 |
| CI7(177) | 70.200 | 103.000 | 52.700 | 72.800 |
| CI7(178) | 79.900 | 152.000 | 58.700 | 78.200 |
| CI7(179) | 167.000 | 321.000 | 124.000 | 170.000 |
| CI7(180) | 264.000 | 530.000 | 186.000 | 287.000 |
| CI7(183) | 134.000 | 248.000 | 94.800 | 136.000 |
| CI7(184) | 1.370 U | 1.680 U | 1.270 U | 1.300 U |
| CI7(185) | 14.400 | 22.900 | 10.700 | 14.400 |
| CI7(187) | 454.000 | 885.000 D | 347.000 | 505.000 |
| CI7(188) | 11.200 | 24.400 | 8.100 | 11.200 |
| CI7(189) | 9.760 | 21.800 | 6.050 | 9.120 |
| CI7(190) | 46.100 | 74.000 | 31.800 | 44.800 |
| CI7(191) | 11.200 | 19.600 | 8.630 | 11.300 |
| CI7(193) | 21.800 | 44.300 | 14.600 | 22.800 |
| CI8(194) | 32.100 | 85.100 | 23.300 | 39.000 |
| CI8(195) | 13.000 | 30.600 | 9.570 | 14.000 |
| CI8(197) | 3.010 J | 6.020 | 1.510 U | 3.030 J |
| CI8(198) | 2.140 U | 2.630 U | 1.990 U | 2.040 U |
| CI8(199) | 42.200 | 92.600 | 26.800 | 43.700 |
| CI8(200) | 5.340 | 9.810 | 4.710 | 5.530 |
| CI8(201) | 7.000 | 15.000 | 4.680 | 6.910 |
| CI8(202) | 16.500 | 39.000 | 11.700 | 18.200 |
| CI8(203) | 43.000 | 114.000 | 30.700 | 49.800 |
| CI8(205) | 3.880 | 6.540 | 1.990 U | 2.040 U |
| CI9(206) | 13.600 | 49.900 | 9.050 | 18.100 |
| CI9(207) | 3.330 | 9.120 | 1.450 U | 4.460 |
| CI9(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 |
| CI10(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 |
| CI3(38) | 37.400 | 49.100 | 43.900 | 103.000 |
| CI4(78) | 52.300 | 34.500 | 62.500 | 103.000 |
| CI4(79) | 56.600 | 34.100 | 70.500 | 69.400 |
| CI7(186) | 156.000 | 102.000 | 148.000 | 114.000 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 172 N | 252 N | 166 N | 158 N |
| CI6(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 |
| CI1(1) | 54.000 | 3340.000 D | 24.200 | 156.000 |
| CI1(3) | 27.000 | 193.000 | 17.300 | 68.900 |
| CI2(4) | 1940.000 D | 19700.000 D | 1850.000 D | 10500.000 D |
| CI2(5) | 2.100 U | 2.830 U | 2.170 U | 2.220 U |
| CI2(6) | 5610.000 D | 23000.000 D | 6140.000 D | 20500.000 D |
| CI2(7) | 108.000 | 240.000 | 89.200 | 520.000 D |
| CI2(8) | 5780.000 D | 24800.000 D | 6000.000 D | 21700.000 D |
| CI2(9) | 176.000 | 1490.000 D | 140.000 | 1050.000 D |
| CI2(11) | 909.000 D | 2220.000 D | 964.000 D | 1910.000 D |
| CI2(12) | 5.480 | 5.040 | 3.450 U | 3.530 U |
| CI2(13) | 2820.000 D | 9020.000 D | 3150.000 D | 7850.000 D |
| CI2(15) | 3550.000 D | 9190.000 D | 3370.000 D | 7240.000 D |
| CI3(16) | 684.000 D | 2020.000 D | 208.000 | 1130.000 D |
| CI3(17) | 10800.000 D | 26000.000 D | 11800.000 D | 21800.000 D |
| CI3(18) | 21000.000 D | 51000.000 D | 23200.000 D | 47700.000 D |
| CI3(19) | 1280.000 D | 5150.000 D | 1350.000 D | 3630.000 D |
| CI3(22) | 1990.000 D | 3980.000 D | 1760.000 D | 2580.000 D |
| CI3(24) | 24.600 | 37.600 | 17.500 | 28.700 |
| CI3(25) | 22500.000 D | 38900.000 D | 25000.000 D | 35100.000 D |
| CI3(26) | 32600.000 D | 60000.000 D | 36100.000 D | 49300.000 D |
| CI3(27) | 3120.000 D | 12400.000 D | 3440.000 D | 7990.000 D |
| CI3(28) | 50600.000 D | 64700.000 D | 44900.000 D | 55600.000 D |
| CI3(29) | 12.200 | 11.300 | 7.760 | 5.600 |
| CI3(30) | 9.220 | 14.200 | 8.610 | 11.200 |
| CI3(31) | 39400.000 D | 68800.000 D | 43700.000 D | 57900.000 D |
| CI3(32) | 7420.000 D | 17600.000 D | 8100.000 D | 15100.000 D |
| CI3(33) | 1430.000 D | 2920.000 D | 1120.000 D | 1570.000 D |
| CI3(37) | 1010.000 D | 1180.000 D | 838.000 D | 782.000 D |
| CI4(40) | 1780.000 D | 2290.000 D | 1900.000 D | 1830.000 D |
| CI4(41) | 3.900 U | 5.250 U | 4.030 U | 4.130 U |
| CI4(42) | 5450.000 D | 10400.000 D | 5730.000 D | 7380.000 D |
| CI4(43) | 1410.000 D | 3480.000 D | 2300.000 D | 2510.000 D |
| CI4(44) | 9250.000 D | 15800.000 D | 9760.000 D | 13100.000 D |
| CI4(45) | 774.000 D | 1310.000 D | 730.000 D | 1170.000 D |
| CI4(46) | 917.000 D | 1780.000 D | 1010.000 D | 1650.000 D |
| CI4(47) | 15000.000 D | 20200.000 D | 16700.000 D | 18000.000 D |
| CI4(48) | 2300.000 D | 2470.000 D | 3640.000 D | 3350.000 D |
| CI4(49) | 52700.000 D | 72300.000 D | 53700.000 D | 61300.000 D |
| CI4(50) | 68.400 | 82.600 | 63.000 | 67.800 |
| CI4(51) | 2940.000 D | 5010.000 D | 3350.000 D | 4050.000 D |
| CI4(52) | 56100.000 D | 85300.000 D | 59600.000 D | 68600.000 D |
| CI4(53) | 7110.000 D | 13400.000 D | 7830.000 D | 11000.000 D |
| CI4(54) | 48.400 | 92.800 | 46.000 | 62.200 |
| CI4(56) | 725.000 D | 807.000 D | 577.000 D | 522.000 D |
| CI4(60) | 174.000 | 138.000 | 138.000 | 98.300 |
| CI4(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 |
| CI4(64) | 5180.000 D | 5910.000 D | 5130.000 D | 6130.000 D |
| CI4(66) | 2870.000 D | 2500.000 D | 2420.000 D | 1770.000 D |
| CI4(67) | 1360.000 D | 806.000 D | 1480.000 D | 962.000 D |
| CI4(70) | 2280.000 D | 1760.000 D | 1920.000 D | 1280.000 D |
| CI4(71) | 7400.000 D | 9480.000 D | 8660.000 D | 10000.000 D |
| CI4(74) | 3250.000 D | 2130.000 D | 3240.000 D | 2020.000 D |
| CI4(75) | 700.000 D | 837.000 D | 667.000 D | 763.000 D |
| CI4(77) | 225.000 | 187.000 | 194.000 | 160.000 |
| CI4(80) | 27.100 | 32.800 | 21.100 | 17.000 |
| CI4(81) | 13.000 | 2.580 U | 1.980 U | 10.900 |
| CI5(82) | 122.000 | 173.000 | 96.400 | 102.000 |
| CI5(83) | 3140.000 D | 4120.000 D | 3610.000 D | 3540.000 D |
| CI5(84) | 2570.000 D | 5190.000 D | 2960.000 D | 3320.000 D |
| CI5(85) | 462.000 | 546.000 | 313.000 | 402.000 |
| CI5(87) | 493.000 | 794.000 | 425.000 | 450.000 |
| CI5(91) | 4870.000 D | 7300.000 D | 5440.000 D | 6210.000 D |
| CI5(92) | 2570.000 D | 3090.000 D | 2520.000 D | 2600.000 D |
| CI5(95) | 9480.000 D | 13700.000 D | 10600.000 D | 12100.000 D |
| CI5(97) | 2150.000 D | 2070.000 D | 2360.000 D | 1960.000 D |
| CI5(99) | 6280.000 D | 6360.000 D | 6670.000 D | 5990.000 D |
| CI5(100) | 587.000 D | 292.000 | 617.000 D | 608.000 D |
| CI5(101) | 8460.000 D | 7720.000 D | 9270.000 D | 7710.000 D |
| CI5(104) | 14.400 | 16.000 | 14.700 | 12.800 |
| CI5(105) | 413.000 | 487.000 | 355.000 | 347.000 |
| CI5(110) | 9820.000 D | 13200.000 D | 10700.000 D | 10900.000 D |
| CI5(114) | 70.600 | 66.200 | 76.300 | 63.300 |
| CI5(115) | 3.280 U | 4.410 U | 3.380 U | 3.460 U |
| CI5(118) | 3720.000 D | 3730.000 D | 3950.000 D | 3110.000 D |
| CI5(123) | 518.000 | 474.000 | 545.000 | 471.000 |
| CI5(124) | 112.000 | 102.000 | 113.000 | 94.600 |
| CI5(125) | 24.500 | 3.160 U | 29.400 | 2.490 U |
| CI5(126) | 12.400 | 11.600 | 16.100 | 14.800 |
| CI5(127) | 88.800 | 50.700 | 76.000 | 48.200 |
| CI6(128) | 244.000 | 365.000 | 250.000 | 262.000 |
| CI6(130) | 117.000 | 173.000 | 120.000 | 128.000 |
| CI6(131) | 191.000 | 260.000 | 208.000 | 225.000 |
| CI6(134) | 407.000 | 538.000 | 455.000 | 498.000 |
| CI6(135) | 681.000 D | 990.000 D | 796.000 D | 860.000 D |
| CI6(136) | 938.000 D | 1420.000 D | 1110.000 D | 1190.000 D |
| CI6(137) | 117.000 | 139.000 | 114.000 | 117.000 |
| CI6(138) | 767.000 D | 1310.000 D | 731.000 D | 750.000 D |
| CI6(139) | 92.000 | 110.000 | 101.000 | 113.000 |
| CI6(140) | 9.210 | 11.200 | 8.230 | 2.680 U |
| CI6(141) | 146.000 | 200.000 | 143.000 | 145.000 |
| CI6(144) | 60.500 | 80.800 | 61.400 | 64.300 |
| CI6(146) | 629.000 D | 866.000 | 712.000 D | 684.000 D |

Analyzed by Restucci Jr, Richard
9/22/2017

Not Surrogate Corrected

Main: S17-0368MS-Master_315(PRC)-Final UD update.xlsx



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 |
| CI6(149) | 5940.000 D | 8920.000 D | 6820.000 D | 7320.000 D |
| CI6(151) | 830.000 D | 1170.000 D | 909.000 D | 922.000 D |
| CI6(153) | 4040.000 D | 4960.000 D | 4580.000 D | 4370.000 D |
| CI6(154) | 397.000 | 555.000 | 456.000 | 516.000 |
| CI6(155) | 2.820 J | 3.390 J | 2.620 J | 2.570 J |
| CI6(156) | 170.000 | 227.000 | 180.000 | 181.000 |
| CI6(157) | 34.400 | 50.000 | 33.600 | 36.000 |
| CI6(158) | 279.000 | 335.000 | 305.000 | 304.000 |
| CI6(163) | 1200.000 D | 1680.000 D | 1360.000 D | 1400.000 D |
| CI6(164) | 228.000 | 234.000 | 244.000 | 242.000 |
| CI6(166) | 24.600 | 31.600 | 28.400 | 27.900 |
| CI6(167) | 157.000 | 192.000 | 174.000 | 181.000 |
| CI6(169) | 2.160 U | 2.910 U | 2.240 U | 2.290 U |
| CI7(170) | 123.000 | 186.000 | 137.000 | 158.000 |
| CI7(171) | 41.900 | 65.400 | 48.400 | 52.000 |
| CI7(172) | 28.600 | 37.600 | 32.800 | 31.900 |
| CI7(173) | 2.160 U | 8.280 | 5.090 | 6.120 |
| CI7(174) | 82.400 | 123.000 | 85.400 | 101.000 |
| CI7(175) | 12.700 | 17.400 | 12.500 | 15.500 |
| CI7(176) | 20.000 | 30.700 | 20.600 | 23.600 |
| CI7(177) | 65.800 | 96.800 | 71.400 | 78.600 |
| CI7(178) | 74.000 | 105.000 | 78.700 | 89.500 |
| CI7(179) | 152.000 | 208.000 | 174.000 | 191.000 |
| CI7(180) | 240.000 | 362.000 | 276.000 | 331.000 |
| CI7(183) | 121.000 | 172.000 | 131.000 | 150.000 |
| CI7(184) | 1.300 U | 1.750 U | 1.340 U | 1.380 U |
| CI7(185) | 12.600 | 19.600 | 15.600 | 17.400 |
| CI7(187) | 438.000 | 649.000 | 500.000 | 588.000 |
| CI7(188) | 9.430 | 14.900 | 11.600 | 13.700 |
| CI7(189) | 7.780 | 13.200 | 7.740 | 10.800 |
| CI7(190) | 39.100 | 56.700 | 46.100 | 49.600 |
| CI7(191) | 9.360 | 14.200 | 11.000 | 12.600 |
| CI7(193) | 19.300 | 28.100 | 21.600 | 28.400 |
| CI8(194) | 27.300 | 49.600 | 29.600 | 42.900 |
| CI8(195) | 12.300 | 20.500 | 10.900 | 16.800 |
| CI8(197) | 1.550 U | 2.090 U | 1.600 U | 1.640 U |
| CI8(198) | 2.040 U | 2.740 U | 2.110 U | 2.160 U |
| CI8(199) | 33.600 | 56.800 | 40.000 | 50.900 |
| CI8(200) | 4.580 | 7.140 | 5.110 | 5.790 |
| CI8(201) | 6.200 | 9.070 | 7.100 | 7.820 |
| CI8(202) | 15.200 | 22.500 | 17.900 | 21.800 |
| CI8(203) | 35.300 | 62.100 | 43.800 | 57.700 |
| CI8(205) | 2.040 U | 2.740 U | 2.110 U | 2.160 U |
| CI9(206) | 10.100 | 23.300 | 14.500 | 20.300 |
| CI9(207) | 3.330 | 5.450 | 1.540 U | 4.480 |
| CI9(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 |
| CI10(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 |
| CI3(38) | 33.600 | 68.900 | 28.900 | 81.400 |
| CI4(78) | 124.000 | 119.000 | 123.000 | 101.000 |
| CI4(79) | 89.400 | 63.300 | 77.500 | 66.500 |
| CI7(186) | 188.000 | 117.000 | 161.000 | 107.000 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 171 N | 185 N | 173 N | 191 N |
| CI6(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 |
| CI1(1) | 25.800 | 38.900 | 44.200 | 4320.000 D |
| CI1(3) | 17.600 | 30.100 | 24.400 | 1100.000 D |
| CI2(4) | 1610.000 D | 2220.000 D | 2190.000 D | 88900.000 D |
| CI2(5) | 2.460 U | 2.830 U | 2.170 U | 24.600 UD |
| CI2(6) | 4660.000 D | 5410.000 D | 6190.000 D | 95600.000 D |
| CI2(7) | 84.100 | 90.100 | 100.000 | 1990.000 D |
| CI2(8) | 4350.000 D | 5350.000 D | 6030.000 D | 113000.000 D |
| CI2(9) | 151.000 | 186.000 | 182.000 | 6280.000 D |
| CI2(11) | 823.000 D | 782.000 D | 918.000 D | 8440.000 D |
| CI2(12) | 3.900 U | 4.320 | 3.890 | 31.200 DJ |
| CI2(13) | 2610.000 D | 2320.000 D | 2990.000 D | 27100.000 D |
| CI2(15) | 2830.000 D | 2280.000 D | 3450.000 D | 23800.000 D |
| CI3(16) | 205.000 | 201.000 | 252.000 | 1310.000 D |
| CI3(17) | 9900.000 D | 8980.000 D | 10600.000 D | 84600.000 D |
| CI3(18) | 19400.000 D | 18900.000 D | 21800.000 D | 190000.000 D |
| CI3(19) | 1170.000 D | 1550.000 D | 1400.000 D | 23700.000 D |
| CI3(22) | 1490.000 D | 1030.000 D | 1720.000 D | 2840.000 D |
| CI3(24) | 16.200 | 13.800 | 19.800 | 133.000 D |
| CI3(25) | 20700.000 D | 14800.000 D | 21400.000 D | 99700.000 D |
| CI3(26) | 30100.000 D | 23600.000 D | 31800.000 D | 150000.000 D |
| CI3(27) | 2890.000 D | 3010.000 D | 3250.000 D | 27900.000 D |
| CI3(28) | 37400.000 D | 25400.000 D | 39000.000 D | 151000.000 D |
| CI3(29) | 8.250 | 6.390 | 8.330 | 19.600 UD |
| CI3(30) | 8.730 | 8.720 | 8.560 | 75.800 D |
| CI3(31) | 35500.000 D | 25900.000 D | 37200.000 D | 144000.000 D |
| CI3(32) | 6820.000 D | 6390.000 D | 7510.000 D | 57400.000 D |
| CI3(33) | 968.000 D | 818.000 D | 1030.000 D | 1830.000 D |
| CI3(37) | 764.000 D | 317.000 | 734.000 D | 1080.000 D |
| CI4(40) | 1720.000 D | 1130.000 D | 1420.000 D | 2900.000 D |
| CI4(41) | 4.560 U | 5.250 U | 4.030 U | 45.600 UD |
| CI4(42) | 4470.000 D | 2640.000 D | 4480.000 D | 11400.000 D |
| CI4(43) | 2580.000 D | 1140.000 D | 3270.000 D | 1100.000 D |
| CI4(44) | 7770.000 D | 4870.000 D | 8030.000 D | 18000.000 D |
| CI4(45) | 317.000 | 260.000 | 623.000 D | 1850.000 D |
| CI4(46) | 828.000 D | 444.000 | 912.000 D | 3440.000 D |
| CI4(47) | 14500.000 D | 9240.000 D | 13000.000 D | 36100.000 D |
| CI4(48) | 2020.000 D | 1600.000 D | 2550.000 D | 1440.000 D |
| CI4(49) | 53100.000 D | 34600.000 D | 49600.000 D | 138000.000 D |
| CI4(50) | 61.600 | 50.500 | 61.500 | 341.000 D |
| CI4(51) | 2840.000 D | 2620.000 D | 2780.000 D | 15100.000 D |
| CI4(52) | 52200.000 D | 37700.000 D | 51000.000 D | 184000.000 D |
| CI4(53) | 6920.000 D | 5750.000 D | 7020.000 D | 34200.000 D |
| CI4(54) | 48.000 | 68.100 | 48.700 | 540.000 D |
| CI4(56) | 522.000 D | 187.000 | 516.000 D | 441.000 D |
| CI4(60) | 146.000 | 85.200 | 124.000 | 197.000 D |
| CI4(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 |
| CI4(64) | 3840.000 D | 2190.000 D | 3840.000 D | 11400.000 D |
| CI4(66) | 2200.000 D | 1280.000 D | 1980.000 D | 1320.000 D |
| CI4(67) | 1270.000 D | 294.000 | 1040.000 D | 519.000 D |
| CI4(70) | 1720.000 D | 887.000 D | 1520.000 D | 915.000 D |
| CI4(71) | 7270.000 D | 5460.000 D | 6870.000 D | 23100.000 D |
| CI4(74) | 2810.000 D | 1280.000 D | 2330.000 D | 1190.000 D |
| CI4(75) | 680.000 D | 265.000 | 267.000 | 1150.000 D |
| CI4(77) | 151.000 | 92.800 | 144.000 | 152.000 D |
| CI4(80) | 24.300 | 14.400 | 20.600 | 34.000 DJ |
| CI4(81) | 2.240 U | 2.580 U | 8.030 | 22.400 UD |
| CI5(82) | 88.800 | 65.500 | 79.700 | 77.600 D |
| CI5(83) | 3170.000 D | 2150.000 D | 2540.000 D | 6330.000 D |
| CI5(84) | 2240.000 D | 1410.000 D | 1930.000 D | 3700.000 D |
| CI5(85) | 319.000 | 242.000 | 264.000 | 238.000 D |
| CI5(87) | 382.000 | 259.000 | 300.000 | 333.000 D |
| CI5(91) | 4330.000 D | 2730.000 D | 3760.000 D | 11900.000 D |
| CI5(92) | 2440.000 D | 1670.000 D | 1800.000 D | 2970.000 D |
| CI5(95) | 9070.000 D | 5430.000 D | 8100.000 D | 22500.000 D |
| CI5(97) | 1990.000 D | 1110.000 D | 1640.000 D | 1710.000 D |
| CI5(99) | 5870.000 D | 3610.000 D | 4730.000 D | 5540.000 D |
| CI5(100) | 296.000 | 244.000 | 220.000 | 1040.000 D |
| CI5(101) | 8120.000 D | 4200.000 D | 6000.000 D | 6940.000 D |
| CI5(104) | 15.400 | 14.600 | 12.500 | 70.600 D |
| CI5(105) | 312.000 | 218.000 | 234.000 | 258.000 D |
| CI5(110) | 8980.000 D | 5600.000 D | 7470.000 D | 14600.000 D |
| CI5(114) | 61.700 | 35.400 | 46.600 | 64.900 D |
| CI5(115) | 3.830 U | 4.410 U | 3.380 U | 89.100 D |
| CI5(118) | 3390.000 D | 2100.000 D | 2570.000 D | 2360.000 D |
| CI5(123) | 449.000 | 271.000 | 330.000 | 341.000 D |
| CI5(124) | 94.400 | 59.900 | 69.300 | 74.600 D |
| CI5(125) | 2.750 U | 16.300 | 14.300 | 47.200 D |
| CI5(126) | 11.900 | 10.000 | 10.300 | 30.400 UD |
| CI5(127) | 45.700 | 127.000 | 30.000 | 85.800 D |
| CI6(128) | 212.000 | 160.000 | 148.000 | 216.000 D |
| CI6(130) | 110.000 | 78.800 | 76.400 | 113.000 D |
| CI6(131) | 176.000 | 132.000 | 124.000 | 277.000 D |
| CI6(134) | 374.000 | 252.000 | 275.000 | 537.000 D |
| CI6(135) | 772.000 | 490.000 | 575.000 | 1150.000 D |
| CI6(136) | 949.000 D | 773.000 | 793.000 D | 2200.000 D |
| CI6(137) | 99.600 | 83.400 | 68.000 | 85.400 D |
| CI6(138) | 687.000 D | 544.000 | 620.000 | 714.000 D |
| CI6(139) | 85.200 | 63.000 | 57.200 | 108.000 D |
| CI6(140) | 2.970 U | 7.080 | 6.390 | 29.700 UD |
| CI6(141) | 124.000 | 97.100 | 85.100 | 116.000 D |
| CI6(144) | 55.900 | 38.400 | 40.200 | 76.800 D |
| CI6(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 |
| <hr/> | | | | |
| CI6(149) | 5770.000 D | 4420.000 D | 4730.000 D | 12000.000 D |
| CI6(151) | 789.000 D | 618.000 | 684.000 | 1300.000 D |
| CI6(153) | 4010.000 D | 2880.000 D | 2810.000 D | 3750.000 D |
| CI6(154) | 399.000 | 321.000 | 285.000 | 944.000 D |
| CI6(155) | 2.880 J | 3.440 J | 2.440 J | 22.400 DJ |
| CI6(156) | 155.000 | 121.000 | 103.000 | 147.000 D |
| CI6(157) | 30.700 | 26.500 | 19.800 | 48.600 D |
| CI6(158) | 248.000 | 172.000 | 166.000 | 223.000 D |
| CI6(163) | 1180.000 D | 869.000 D | 856.000 D | 1930.000 D |
| CI6(164) | 197.000 | 133.000 | 138.000 | 175.000 D |
| CI6(166) | 22.800 | 17.400 | 16.100 | 40.700 D |
| CI6(167) | 151.000 | 116.000 | 100.000 | 145.000 D |
| CI6(169) | 2.530 U | 2.910 U | 2.240 U | 25.300 UD |
| CI7(170) | 115.000 | 92.800 | 73.800 | 156.000 D |
| CI7(171) | 39.600 | 34.000 | 28.700 | 77.400 D |
| CI7(172) | 28.100 | 24.200 | 20.100 | 47.200 D |
| CI7(173) | 6.230 | 2.910 U | 5.310 | 25.300 UD |
| CI7(174) | 77.200 | 61.100 | 49.500 | 85.000 D |
| CI7(175) | 10.900 | 12.300 | 7.650 | 18.100 UD |
| CI7(176) | 19.300 | 15.700 | 12.800 | 27.300 DJ |
| CI7(177) | 61.200 | 50.400 | 41.800 | 77.200 D |
| CI7(178) | 70.100 | 57.100 | 50.500 | 139.000 D |
| CI7(179) | 148.000 | 121.000 | 103.000 | 263.000 D |
| CI7(180) | 227.000 | 194.000 | 144.000 | 273.000 D |
| CI7(183) | 115.000 | 97.400 | 75.900 | 156.000 D |
| CI7(184) | 1.520 U | 1.750 U | 1.340 U | 15.200 UD |
| CI7(185) | 12.800 | 11.900 | 9.690 | 29.000 DJ |
| CI7(187) | 431.000 | 359.000 | 290.000 | 798.000 D |
| CI7(188) | 10.300 | 8.380 | 7.830 | 44.700 D |
| CI7(189) | 9.180 | 9.000 | 5.320 | 8.540 DJ |
| CI7(190) | 42.200 | 34.600 | 27.100 | 70.000 D |
| CI7(191) | 9.500 | 9.180 | 7.810 | 34.000 DJ |
| CI7(193) | 18.100 | 17.600 | 13.200 | 56.600 D |
| CI8(194) | 29.700 | 31.200 | 20.400 | 71.000 D |
| CI8(195) | 12.300 | 13.700 | 8.380 | 36.200 DJ |
| CI8(197) | 1.810 U | 2.090 U | 1.600 U | 18.100 UD |
| CI8(198) | 2.380 U | 2.740 U | 2.110 U | 23.800 UD |
| CI8(199) | 35.100 | 33.200 | 21.500 | 66.300 D |
| CI8(200) | 2.380 U | 2.740 U | 2.110 U | 23.800 UD |
| CI8(201) | 6.640 | 7.110 | 4.580 | 18.100 UD |
| CI8(202) | 14.800 | 15.500 | 11.000 | 40.200 D |
| CI8(203) | 40.700 | 41.400 | 25.200 | 89.800 D |
| CI8(205) | 2.380 U | 2.740 U | 2.110 U | 23.800 UD |
| CI9(206) | 13.300 | 15.500 | 9.140 | 53.800 D |
| CI9(207) | 3.390 J | 2.000 U | 1.540 U | 17.400 UD |
| CI9(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 |
| CI10(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 |
| CI3(38) | 30.300 | 169.000 | 41.200 | 48.900 |
| CI4(78) | 135.000 | 97.900 | 53.100 | 32.500 |
| CI4(79) | 60.300 | 177.000 | 58.600 | 36.000 |
| CI7(186) | 106.000 | 293.000 | 71.200 | 183.000 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|--------|
| CI3(34) | 163 N | 154 N | 186 N | 998 ND |
| CI6(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 |
| CI1(1) | 21.800 | 90.800 | 23.300 | 57.600 |
| CI1(3) | 14.400 | 47.400 | 17.800 | 31.000 |
| CI2(4) | 1220.000 D | 2340.000 D | 1790.000 D | 2710.000 D |
| CI2(5) | 2.390 U | 2.740 U | 2.220 U | 2.520 U |
| CI2(6) | 3740.000 D | 5560.000 D | 6190.000 D | 6260.000 D |
| CI2(7) | 73.400 | 102.000 | 83.900 | 80.000 |
| CI2(8) | 3550.000 D | 5760.000 D | 5160.000 D | 6150.000 D |
| CI2(9) | 130.000 | 178.000 | 154.000 | 223.000 |
| CI2(11) | 678.000 D | 975.000 D | 967.000 D | 980.000 D |
| CI2(12) | 3.370 J | 4.280 | 3.260 J | 3.460 J |
| CI2(13) | 2100.000 D | 3180.000 D | 3010.000 D | 3130.000 D |
| CI2(15) | 2180.000 D | 3860.000 D | 3150.000 D | 2920.000 D |
| CI3(16) | 205.000 | 324.000 | 216.000 | 271.000 |
| CI3(17) | 7820.000 D | 11500.000 D | 11300.000 D | 10400.000 D |
| CI3(18) | 15400.000 D | 21100.000 D | 22700.000 D | 20500.000 D |
| CI3(19) | 915.000 D | 1290.000 D | 1330.000 D | 1550.000 D |
| CI3(22) | 1370.000 D | 2110.000 D | 1700.000 D | 1600.000 D |
| CI3(24) | 16.500 | 26.600 | 16.300 | 20.800 |
| CI3(25) | 17100.000 D | 23300.000 D | 24500.000 D | 18800.000 D |
| CI3(26) | 24600.000 D | 33900.000 D | 34800.000 D | 27600.000 D |
| CI3(27) | 2340.000 D | 3230.000 D | 3390.000 D | 3380.000 D |
| CI3(28) | 30600.000 D | 41000.000 D | 43800.000 D | 32500.000 D |
| CI3(29) | 8.010 | 9.020 | 8.310 | 7.260 |
| CI3(30) | 8.020 | 8.900 | 8.350 | 7.980 |
| CI3(31) | 29200.000 D | 41000.000 D | 42000.000 D | 31900.000 D |
| CI3(32) | 5060.000 D | 7810.000 D | 7910.000 D | 7450.000 D |
| CI3(33) | 841.000 D | 1260.000 D | 1010.000 D | 944.000 D |
| CI3(37) | 349.000 | 898.000 D | 830.000 D | 776.000 D |
| CI4(40) | 1210.000 D | 1760.000 D | 1690.000 D | 1480.000 D |
| CI4(41) | 4.440 U | 5.100 U | 4.130 U | 4.680 U |
| CI4(42) | 3990.000 D | 5320.000 D | 5100.000 D | 4050.000 D |
| CI4(43) | 501.000 D | 628.000 D | 629.000 D | 537.000 D |
| CI4(44) | 6870.000 D | 9430.000 D | 9300.000 D | 7370.000 D |
| CI4(45) | 317.000 | 815.000 D | 689.000 D | 698.000 D |
| CI4(46) | 412.000 | 974.000 D | 958.000 D | 1020.000 D |
| CI4(47) | 11800.000 D | 15400.000 D | 15600.000 D | 12200.000 D |
| CI4(48) | 949.000 D | 416.000 D | 492.000 D | 537.000 D |
| CI4(49) | 40900.000 D | 56600.000 D | 59100.000 D | 44600.000 D |
| CI4(50) | 54.200 | 58.700 | 61.100 | 55.900 |
| CI4(51) | 2230.000 D | 2830.000 D | 3130.000 D | 3000.000 D |
| CI4(52) | 41400.000 D | 54400.000 D | 54800.000 D | 46300.000 D |
| CI4(53) | 4860.000 D | 6020.000 D | 7840.000 D | 6350.000 D |
| CI4(54) | 40.700 | 49.900 | 47.700 | 56.200 |
| CI4(56) | 261.000 | 653.000 D | 573.000 D | 256.000 |
| CI4(60) | 141.000 | 166.000 | 135.000 | 281.000 D |
| CI4(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 |
| CI4(64) | 3590.000 D | 4990.000 D | 4280.000 D | 3500.000 D |
| CI4(66) | 1850.000 D | 2430.000 D | 2280.000 D | 2030.000 D |
| CI4(67) | 1090.000 D | 1150.000 D | 1370.000 D | 1010.000 D |
| CI4(70) | 1500.000 D | 1780.000 D | 1840.000 D | 1510.000 D |
| CI4(71) | 5340.000 D | 6420.000 D | 8180.000 D | 6180.000 D |
| CI4(74) | 2350.000 D | 2670.000 D | 2950.000 D | 2270.000 D |
| CI4(75) | 291.000 | 326.000 | 742.000 D | 287.000 |
| CI4(77) | 136.000 | 182.000 | 169.000 | 161.000 |
| CI4(80) | 24.000 | 31.300 | 22.300 | 21.000 |
| CI4(81) | 9.290 | 2.500 U | 10.900 | 2.300 U |
| CI5(82) | 70.000 | 114.000 | 79.900 | 148.000 |
| CI5(83) | 2320.000 D | 3470.000 D | 3090.000 D | 3060.000 D |
| CI5(84) | 1960.000 D | 2040.000 D | 2560.000 D | 2250.000 D |
| CI5(85) | 302.000 | 401.000 | 318.000 | 473.000 |
| CI5(87) | 296.000 | 473.000 | 363.000 | 646.000 |
| CI5(91) | 3610.000 D | 5100.000 D | 4520.000 D | 4050.000 D |
| CI5(92) | 1990.000 D | 3040.000 D | 2360.000 D | 2310.000 D |
| CI5(95) | 7560.000 D | 10100.000 D | 9650.000 D | 8180.000 D |
| CI5(97) | 2.890 U | 2150.000 D | 2060.000 D | 1950.000 D |
| CI5(99) | 4620.000 D | 6870.000 D | 6090.000 D | 6040.000 D |
| CI5(100) | 242.000 | 310.000 | 534.000 D | 276.000 |
| CI5(101) | 6230.000 D | 8490.000 D | 8120.000 D | 7360.000 D |
| CI5(104) | 12.700 | 14.200 | 13.800 | 14.700 |
| CI5(105) | 231.000 | 374.000 | 290.000 | 488.000 |
| CI5(110) | 7180.000 D | 10900.000 D | 9610.000 D | 8360.000 D |
| CI5(114) | 46.800 | 69.200 | 56.000 | 71.200 |
| CI5(115) | 3.730 U | 4.280 U | 3.460 U | 3.930 U |
| CI5(118) | 2500.000 D | 3810.000 D | 3310.000 D | 3590.000 D |
| CI5(123) | 348.000 | 506.000 | 458.000 | 474.000 |
| CI5(124) | 72.600 | 105.000 | 93.400 | 107.000 |
| CI5(125) | 2.680 U | 3.070 U | 17.100 | 2.820 U |
| CI5(126) | 9.760 | 17.400 | 13.900 | 14.000 |
| CI5(127) | 75.800 | 77.900 | 67.300 | 37.700 |
| CI6(128) | 157.000 | 293.000 | 198.000 | 279.000 |
| CI6(130) | 80.300 | 141.000 | 109.000 | 130.000 |
| CI6(131) | 130.000 | 221.000 | 170.000 | 193.000 |
| CI6(134) | 284.000 | 466.000 | 367.000 | 400.000 |
| CI6(135) | 579.000 | 861.000 D | 688.000 D | 446.000 D |
| CI6(136) | 888.000 | 1080.000 D | 951.000 D | 956.000 D |
| CI6(137) | 74.300 | 132.000 | 95.000 | 121.000 |
| CI6(138) | 531.000 | 933.000 D | 632.000 D | 868.000 D |
| CI6(139) | 69.600 | 112.000 | 86.100 | 96.700 |
| CI6(140) | 2.890 U | 3.320 U | 7.380 | 9.590 |
| CI6(141) | 90.100 | 162.000 | 119.000 | 171.000 |
| CI6(144) | 40.200 | 66.600 | 48.600 | 65.100 |
| CI6(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 |
| CI6(149) | 4430.000 D | 7900.000 D | 5800.000 D | 6210.000 D |
| CI6(151) | 728.000 | 982.000 D | 782.000 D | 824.000 D |
| CI6(153) | 2900.000 D | 5220.000 D | 3910.000 D | 4480.000 D |
| CI6(154) | 280.000 | 483.000 | 360.000 | 433.000 |
| CI6(155) | 2.630 J | 3.970 J | 2.570 J | 3.150 J |
| CI6(156) | 112.000 | 204.000 | 150.000 | 192.000 |
| CI6(157) | 21.600 | 40.100 | 24.900 | 34.400 |
| CI6(158) | 179.000 | 320.000 | 240.000 | 299.000 |
| CI6(163) | 865.000 D | 1540.000 D | 1160.000 D | 1220.000 D |
| CI6(164) | 154.000 | 249.000 | 200.000 | 225.000 |
| CI6(166) | 17.600 | 28.600 | 21.600 | 25.300 |
| CI6(167) | 107.000 | 200.000 | 146.000 | 173.000 |
| CI6(169) | 2.460 U | 2.830 U | 2.290 U | 2.600 U |
| CI7(170) | 83.000 | 183.000 | 115.000 | 142.000 |
| CI7(171) | 30.600 | 63.600 | 38.600 | 50.900 |
| CI7(172) | 18.900 | 39.200 | 24.000 | 27.400 |
| CI7(173) | 2.460 U | 6.870 | 5.480 | 6.470 |
| CI7(174) | 55.900 | 104.000 | 74.200 | 93.900 |
| CI7(175) | 7.500 | 15.900 | 11.800 | 12.400 |
| CI7(176) | 14.400 | 26.900 | 17.600 | 22.000 |
| CI7(177) | 46.400 | 92.700 | 59.300 | 71.500 |
| CI7(178) | 49.900 | 101.000 | 67.700 | 78.900 |
| CI7(179) | 108.000 | 202.000 | 139.000 | 165.000 |
| CI7(180) | 155.000 | 357.000 | 228.000 | 287.000 |
| CI7(183) | 82.600 | 163.000 | 109.000 | 137.000 |
| CI7(184) | 1.480 U | 1.700 U | 1.380 U | 1.560 U |
| CI7(185) | 11.500 | 17.400 | 12.200 | 15.400 |
| CI7(187) | 299.000 | 622.000 | 404.000 | 491.000 |
| CI7(188) | 8.170 | 14.500 | 8.770 | 12.400 |
| CI7(189) | 5.210 | 12.800 | 8.350 | 8.940 |
| CI7(190) | 28.700 | 58.200 | 38.600 | 47.700 |
| CI7(191) | 7.790 | 15.000 | 10.400 | 12.600 |
| CI7(193) | 17.700 | 28.300 | 17.500 | 22.700 |
| CI8(194) | 19.300 | 48.300 | 28.500 | 38.000 |
| CI8(195) | 9.120 | 19.100 | 11.400 | 15.400 |
| CI8(197) | 1.770 U | 2.030 U | 1.640 U | 1.860 U |
| CI8(198) | 2.320 U | 2.660 U | 2.160 U | 2.450 U |
| CI8(199) | 21.800 | 57.500 | 33.300 | 46.000 |
| CI8(200) | 2.320 U | 6.320 | 4.740 | 6.120 |
| CI8(201) | 4.740 | 9.680 | 6.420 | 7.560 |
| CI8(202) | 10.900 | 24.500 | 14.300 | 19.200 |
| CI8(203) | 26.700 | 62.600 | 34.900 | 50.500 |
| CI8(205) | 2.320 U | 2.660 U | 2.160 U | 2.450 U |
| CI9(206) | 8.860 | 22.900 | 11.600 | 18.200 |
| CI9(207) | 1.700 U | 4.720 | 1.570 U | 1.790 U |
| CI9(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 |
| CI10(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 |
| CI3(38) | 24.100 B | 85.800 | 38.600 | 90.500 |
| CI4(78) | 54.100 | 130.000 | 119.000 | 108.000 |
| CI4(79) | 61.000 | 95.300 | 90.800 | 63.500 |
| CI7(186) | 183.000 | 169.000 | 142.000 | 81.900 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 157 N | 166 N | 176 N | 161 N |
| CI6(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 |
| CI1(1) | 22.300 | 1160.000 D | 76.600 | 2260.000 D |
| CI1(3) | 16.500 | 102.000 | 35.900 | 885.000 D |
| CI2(4) | 1970.000 D | 57100.000 D | 3790.000 D | 43200.000 D |
| CI2(5) | 2.520 U | 2.670 U | 2.520 U | 3.010 U |
| CI2(6) | 7200.000 D | 91200.000 D | 8450.000 D | 68800.000 D |
| CI2(7) | 54.000 | 1070.000 D | 144.000 | 2170.000 D |
| CI2(8) | 6910.000 D | 100000.000 D | 8800.000 D | 90300.000 D |
| CI2(9) | 167.000 | 2740.000 D | 265.000 | 4290.000 D |
| CI2(11) | 1080.000 D | 7830.000 D | 1210.000 D | 7480.000 D |
| CI2(12) | 4.610 | 4.240 U | 5.060 | 8.880 |
| CI2(13) | 3490.000 D | 26500.000 D | 3690.000 D | 24900.000 D |
| CI2(15) | 3590.000 D | 21000.000 D | 3960.000 D | 26600.000 D |
| CI3(16) | 219.000 | 3120.000 D | 277.000 | 4050.000 D |
| CI3(17) | 14000.000 D | 80900.000 D | 15300.000 D | 79500.000 D |
| CI3(18) | 27200.000 D | 174000.000 D | 32100.000 D | 158000.000 D |
| CI3(19) | 1480.000 D | 18300.000 D | 2060.000 D | 14200.000 D |
| CI3(22) | 2090.000 D | 8400.000 D | 1910.000 D | 10200.000 D |
| CI3(24) | 19.100 | 23.400 | 24.800 | 88.000 |
| CI3(25) | 30400.000 D | 121000.000 D | 27400.000 D | 110000.000 D |
| CI3(26) | 44400.000 D | 184000.000 D | 40000.000 D | 135000.000 D |
| CI3(27) | 3840.000 D | 27000.000 D | 2.070 U | 19000.000 D |
| CI3(28) | 54600.000 D | 156000.000 D | 50800.000 D | 193000.000 D |
| CI3(29) | 7.820 | 2.130 U | 10.700 | 15.400 |
| CI3(30) | 8.360 | 12.600 | 10.800 | 23.200 |
| CI3(31) | 53100.000 D | 152000.000 D | 50200.000 D | 167000.000 D |
| CI3(32) | 9690.000 D | 54200.000 D | 10200.000 D | 44100.000 D |
| CI3(33) | 1250.000 D | 2520.000 D | 1460.000 D | 7930.000 D |
| CI3(37) | 1050.000 D | 1180.000 D | 990.000 D | 2310.000 D |
| CI4(40) | 2490.000 D | 3770.000 D | 1910.000 D | 3980.000 D |
| CI4(41) | 4.680 U | 4.950 U | 4.680 U | 16.200 |
| CI4(42) | 7050.000 D | 17900.000 D | 5640.000 D | 18700.000 D |
| CI4(43) | 273.000 | 1170.000 D | 707.000 D | 1240.000 D |
| CI4(44) | 11900.000 D | 43800.000 D | 10800.000 D | 37800.000 D |
| CI4(45) | 328.000 | 2120.000 D | 989.000 D | 4090.000 D |
| CI4(46) | 1160.000 D | 8400.000 D | 1150.000 D | 3840.000 D |
| CI4(47) | 22200.000 D | 45300.000 D | 18500.000 D | 43800.000 D |
| CI4(48) | 2140.000 D | 3790.000 D | 940.000 D | 2470.000 D |
| CI4(49) | 66400.000 D | 209000.000 D | 64400.000 D | 155000.000 D |
| CI4(50) | 69.700 | 102.000 | 73.500 | 146.000 |
| CI4(51) | 4140.000 D | 16600.000 D | 3680.000 D | 11500.000 D |
| CI4(52) | 74000.000 D | 264000.000 D | 66900.000 D | 187000.000 D |
| CI4(53) | 10000.000 D | 40700.000 D | 9340.000 D | 26800.000 D |
| CI4(54) | 50.500 | 87.900 | 55.500 | 91.700 |
| CI4(56) | 749.000 D | 421.000 D | 705.000 D | 1460.000 D |
| CI4(60) | 165.000 | 42.900 | 147.000 | 142.000 |
| CI4(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 |
| CI4(64) | 5290.000 D | 12100.000 D | 5370.000 D | 17700.000 D |
| CI4(66) | 3090.000 D | 1340.000 D | 2610.000 D | 4080.000 D |
| CI4(67) | 1780.000 D | 878.000 D | 1360.000 D | 1180.000 D |
| CI4(70) | 2460.000 D | 957.000 D | 2130.000 D | 3190.000 D |
| CI4(71) | 11400.000 D | 38000.000 D | 9640.000 D | 26400.000 D |
| CI4(74) | 3920.000 D | 1370.000 D | 2990.000 D | 3060.000 D |
| CI4(75) | 326.000 | 1220.000 D | 810.000 D | 1480.000 D |
| CI4(77) | 204.000 | 126.000 | 172.000 | 312.000 |
| CI4(80) | 25.700 | 9.440 | 21.700 | 15.200 |
| CI4(81) | 11.100 | 2.430 U | 10.500 | 17.600 |
| CI5(82) | 124.000 | 105.000 | 95.800 | 201.000 |
| CI5(83) | 4780.000 D | 9930.000 D | 3450.000 D | 8310.000 D |
| CI5(84) | 3460.000 D | 9930.000 D | 2860.000 D | 9840.000 D |
| CI5(85) | 304.000 | 567.000 | 377.000 | 902.000 |
| CI5(87) | 469.000 | 533.000 | 399.000 | 1010.000 |
| CI5(91) | 7330.000 D | 17600.000 D | 5280.000 D | 15000.000 D |
| CI5(92) | 2990.000 D | 10000.000 D | 2790.000 D | 5400.000 D |
| CI5(95) | 14000.000 D | 35000.000 D | 11800.000 D | 30800.000 D |
| CI5(97) | 2990.000 D | 2970.000 D | 2310.000 D | 4510.000 D |
| CI5(99) | 9340.000 D | 9540.000 D | 7020.000 D | 12000.000 D |
| CI5(100) | 336.000 | 1300.000 D | 271.000 | 1180.000 D |
| CI5(101) | 12300.000 D | 11100.000 D | 9360.000 D | 15000.000 D |
| CI5(104) | 18.000 | 17.000 | 15.300 | 18.100 |
| CI5(105) | 411.000 | 380.000 | 321.000 | 845.000 |
| CI5(110) | 14200.000 D | 26300.000 D | 11400.000 D | 3.190 U |
| CI5(114) | 82.700 | 75.300 | 63.400 | 115.000 |
| CI5(115) | 54.300 | 4.160 U | 3.930 U | 4.700 U |
| CI5(118) | 5070.000 D | 3970.000 D | 3540.000 D | 5960.000 D |
| CI5(123) | 631.000 | 574.000 | 461.000 | 868.000 |
| CI5(124) | 125.000 | 101.000 | 96.800 | 163.000 |
| CI5(125) | 55.000 | 2.980 U | 20.700 | 3.370 U |
| CI5(126) | 16.800 | 16.700 | 12.900 | 18.800 |
| CI5(127) | 38.600 | 80.600 | 91.000 | 35.300 |
| CI6(128) | 288.000 | 328.000 | 210.000 | 522.000 |
| CI6(130) | 151.000 | 166.000 | 107.000 | 239.000 |
| CI6(131) | 242.000 | 482.000 | 179.000 | 490.000 |
| CI6(134) | 527.000 | 1040.000 D | 399.000 | 1110.000 D |
| CI6(135) | 1080.000 D | 2100.000 D | 861.000 | 2070.000 D |
| CI6(136) | 1480.000 D | 3540.000 D | 1140.000 D | 3040.000 D |
| CI6(137) | 130.000 | 150.000 | 104.000 | 250.000 |
| CI6(138) | 1030.000 | 1260.000 D | 736.000 D | 2030.000 D |
| CI6(139) | 121.000 | 173.000 | 89.800 | 197.000 |
| CI6(140) | 8.220 | 3.220 U | 9.850 | 17.000 |
| CI6(141) | 164.000 | 179.000 | 131.000 | 351.000 |
| CI6(144) | 92.900 | 86.800 | 56.000 | 156.000 |
| CI6(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 |
| CI6(149) | 9550.000 D | 19300.000 D | 7210.000 D | 17700.000 D |
| CI6(151) | 1200.000 D | 2340.000 D | 915.000 D | 2440.000 D |
| CI6(153) | 5960.000 D | 7010.000 D | 4240.000 D | 8840.000 D |
| CI6(154) | 570.000 | 1200.000 D | 394.000 | 1030.000 |
| CI6(155) | 3.700 J | 3.160 J | 3.120 J | 3.590 J |
| CI6(156) | 207.000 | 246.000 | 154.000 | 439.000 |
| CI6(157) | 36.500 | 48.500 | 28.000 | 86.400 |
| CI6(158) | 332.000 | 361.000 | 243.000 | 531.000 |
| CI6(163) | 1740.000 D | 3460.000 D | 1280.000 D | 3900.000 D |
| CI6(164) | 272.000 | 298.000 | 201.000 | 400.000 |
| CI6(166) | 30.800 | 35.100 | 23.300 | 47.200 |
| CI6(167) | 198.000 | 240.000 | 145.000 | 325.000 |
| CI6(169) | 2.600 U | 2.750 U | 3.700 J | 3.100 U |
| CI7(170) | 153.000 | 242.000 | 116.000 | 429.000 |
| CI7(171) | 53.600 | 78.900 | 41.600 | 125.000 |
| CI7(172) | 37.600 | 56.400 | 30.100 | 83.500 |
| CI7(173) | 8.280 | 8.330 | 4.990 | 14.300 |
| CI7(174) | 100.000 | 147.000 | 79.200 | 243.000 |
| CI7(175) | 13.900 | 25.200 | 10.800 | 33.600 |
| CI7(176) | 25.100 | 37.500 | 18.000 | 54.200 |
| CI7(177) | 83.800 | 102.000 | 60.600 | 166.000 |
| CI7(178) | 98.200 | 198.000 | 72.100 | 213.000 |
| CI7(179) | 204.000 | 419.000 | 150.000 | 449.000 |
| CI7(180) | 316.000 | 604.000 | 233.000 | 4.780 U |
| CI7(183) | 155.000 | 275.000 | 113.000 | 373.000 |
| CI7(184) | 1.560 U | 1.650 U | 1.560 U | 1.860 U |
| CI7(185) | 17.300 | 23.000 | 14.000 | 34.200 |
| CI7(187) | 594.000 | 1220.000 D | 423.000 | 1360.000 D |
| CI7(188) | 13.500 | 31.700 | 9.930 | 29.700 |
| CI7(189) | 10.600 | 24.500 | 8.370 | 32.100 |
| CI7(190) | 52.300 | 81.900 | 38.400 | 115.000 |
| CI7(191) | 13.400 | 19.500 | 10.600 | 27.400 |
| CI7(193) | 25.200 | 55.900 | 19.200 | 71.500 |
| CI8(194) | 33.900 | 101.000 | 28.100 | 154.000 |
| CI8(195) | 15.200 | 31.200 | 11.600 | 52.400 |
| CI8(197) | 3.030 J | 6.260 | 1.860 U | 8.950 |
| CI8(198) | 2.450 U | 2.590 U | 2.450 U | 2.920 U |
| CI8(199) | 47.500 | 102.000 | 36.600 | 165.000 |
| CI8(200) | 4.890 | 9.820 | 5.140 | 17.100 |
| CI8(201) | 7.650 | 14.800 | 7.110 | 22.100 |
| CI8(202) | 18.200 | 42.300 | 16.000 | 55.900 |
| CI8(203) | 53.900 | 121.000 | 37.400 | 198.000 |
| CI8(205) | 3.870 | 7.820 | 2.450 U | 9.000 |
| CI9(206) | 16.800 | 56.200 | 13.700 | 101.000 |
| CI9(207) | 4.040 | 8.880 | 3.870 | 13.900 |
| CI9(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 |
| CI10(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 |
| CI3(38) | 26.400 | 35.800 | 25.800 B | 37.900 |
| CI4(78) | 37.000 | 28.400 | 43.700 | 21.300 |
| CI4(79) | 42.100 | 30.800 | 53.300 | 16.900 |
| CI7(186) | 80.300 | 186.000 | 218.000 | 81.600 |

Surrogate Recoveries (%)

| | | | | |
|----------|-------|-------|-------|-------|
| CI3(34) | 164 N | 180 N | 175 N | 248 N |
| CI6(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 | <p>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.</p> <p>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.</p> |
| Prep comments | <p>CM917LCSD: Spilled about 2 mL (out of ~200 mL total) of this sample</p> <p>K9622, K9631, K9635: Had to reactivate copper a second time and add more to samples.</p> <p>K9635, K9636: spilled ~3 mL of sample extract (out of ~200 mL total)</p> |

| | |
|-------------------|--|
| Analysis | <p>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.</p> |
| Analysis Comments | <ul style="list-style-type: none"> No ICC exists for PRC compounds. Cl5(84) and Cl5(92) co-elute, as do Cl5(85) and Cl5(115) however, |

| | | |
|---------------|---|------------------|
| | <p>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.</p> <ul style="list-style-type: none"> • 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 | <p>Twenty exceedances noted.</p> <p>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.</p> |

| | |
|--|---|
| 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. |
| $\leq 25\%$ 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. |
| $\leq 25\%$ difference individual; $\leq 15\%$ difference mean | No exceedances noted. |
| | No comments. |



It can be done

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 |



It can be done

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 9/19/17

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 9/19/17

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=mcinerney@battelle.org, c=US
2017.09.21 11:51:02 -0400

Supervisor Approval:

Kevin McInerney
cn=Kevin McInerney, o=Battelle, ou=Analytical Chemistry Services,
email=mcinerney@battelle.org, c=US
2017.09.21 11:51:14 -0400

PM Approval:



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 | 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 | > |



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: |
|-----------|---------|--------------|-------|---------|-------|-------|
| 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 | |



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: |
|------------------|--------------|---------------|--------------|--------------|--------------|--------------|
|------------------|--------------|---------------|--------------|--------------|--------------|--------------|



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 | |



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: |
|-----------|---------|--------------|-------|----------|-------|-------|
| 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 | |



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: |
|------------------|--------------|---------------|--------------|--------------|--------------|--------------|
|------------------|--------------|---------------|--------------|--------------|--------------|--------------|



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 | |



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 | |



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 | |



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 |
| SW0399.S | W9198.D | K9631-P(2) | SA | Cl6(161) | 6029 | < 9/21/17 |
| 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

Vial: 1

Acq On : 15 Sep 2017 1:33 pm

Operator: LMG

Sample : JJ95

Inst : Inst. F

Misc : 5-315 DFTPP

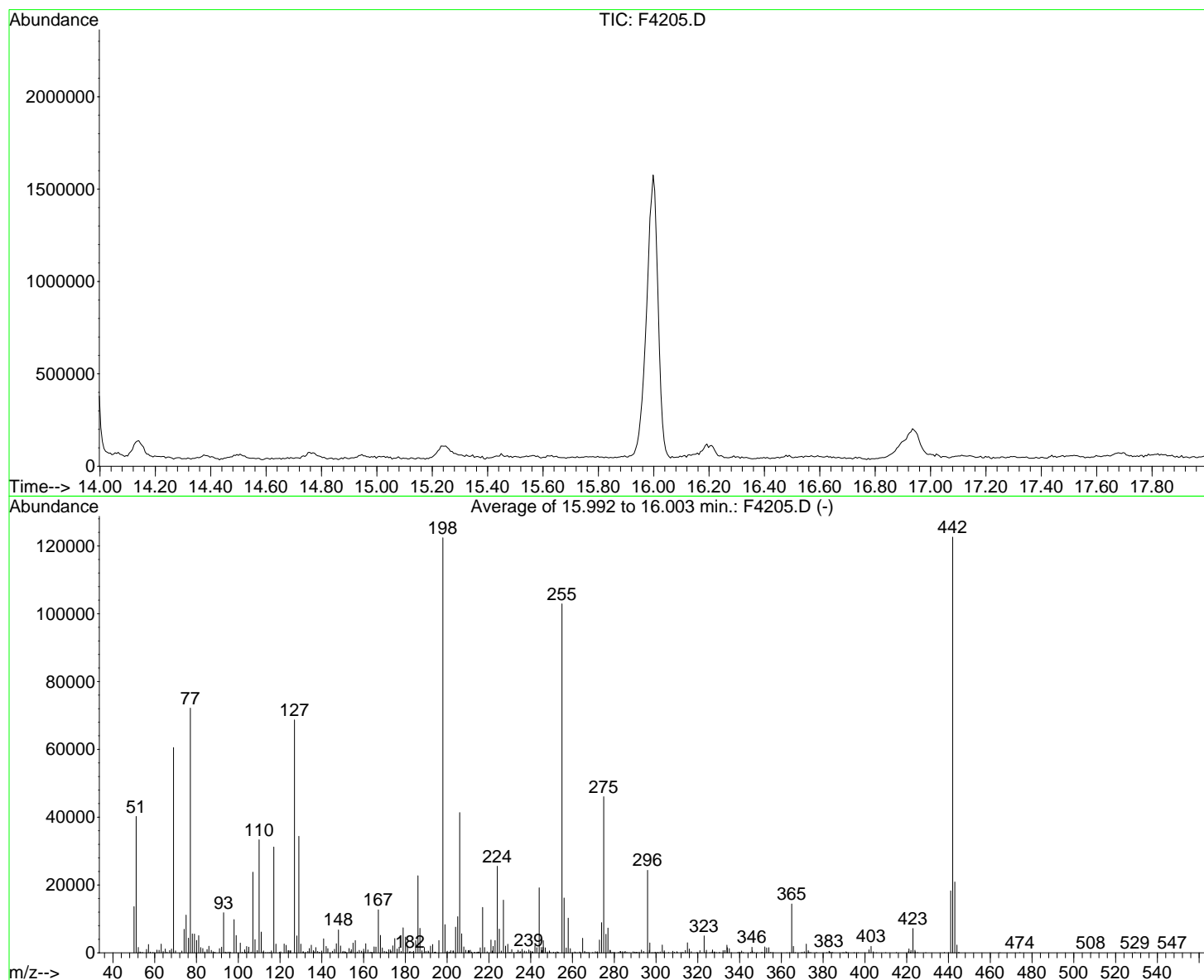
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\F\DATA\MF0909.M (RTE Integrator)

Title : PCB-QNF NBH

Standard Mult: NA



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

Vial: 1

Acq On : 14 Sep 2017 3:31 pm

Operator: MM

Sample : JJ95

Inst : Inst K

Misc : 5-315 TUNE

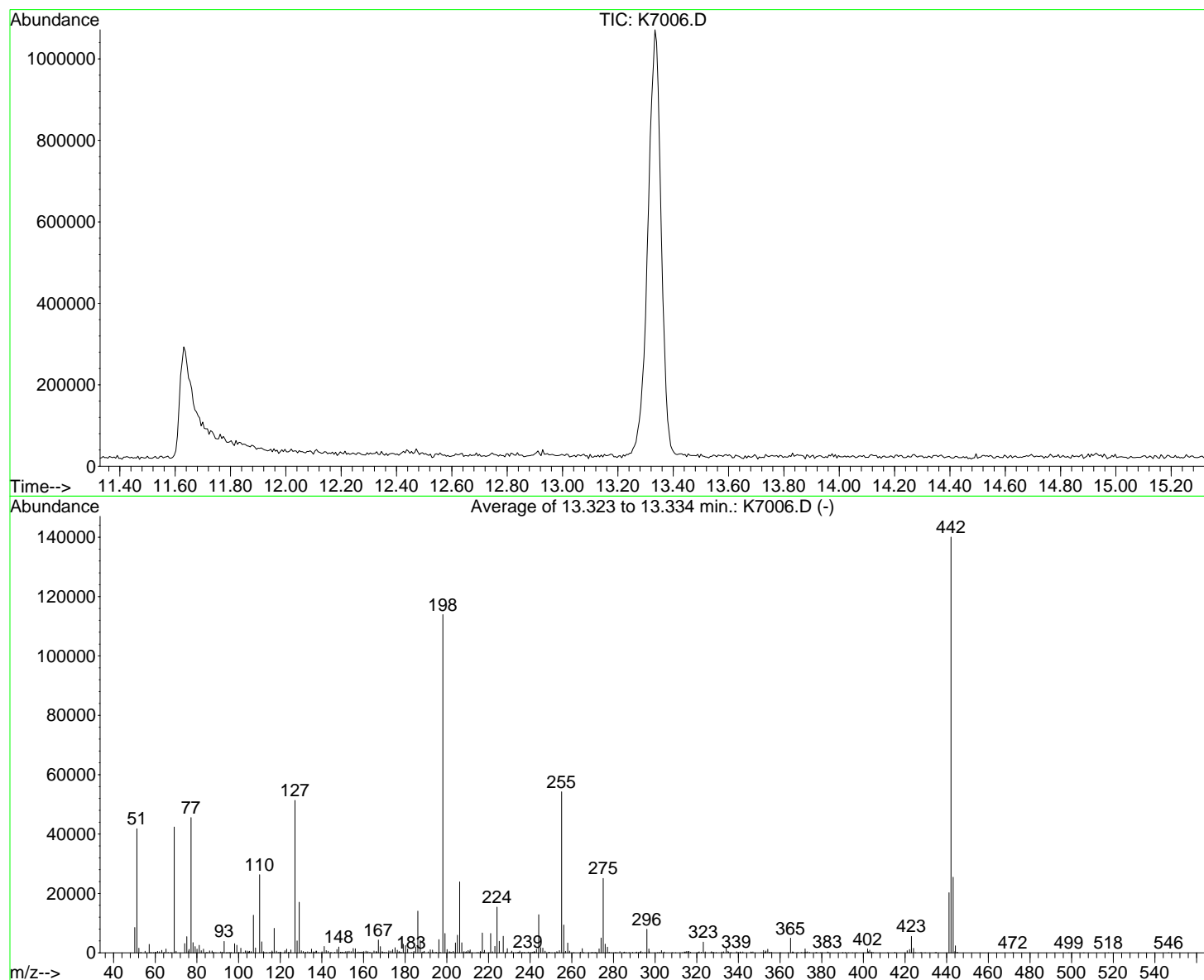
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\K\DATA\MK1084.M (RTE Integrator)

Title : PCB

Standard Mult: 1.000 ()



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

Vial: 2

Acq On : 18 Sep 2017 1:53 pm

Operator: LMG

Sample : JJ95

Inst : Inst K

Misc : 5-315 TUNE

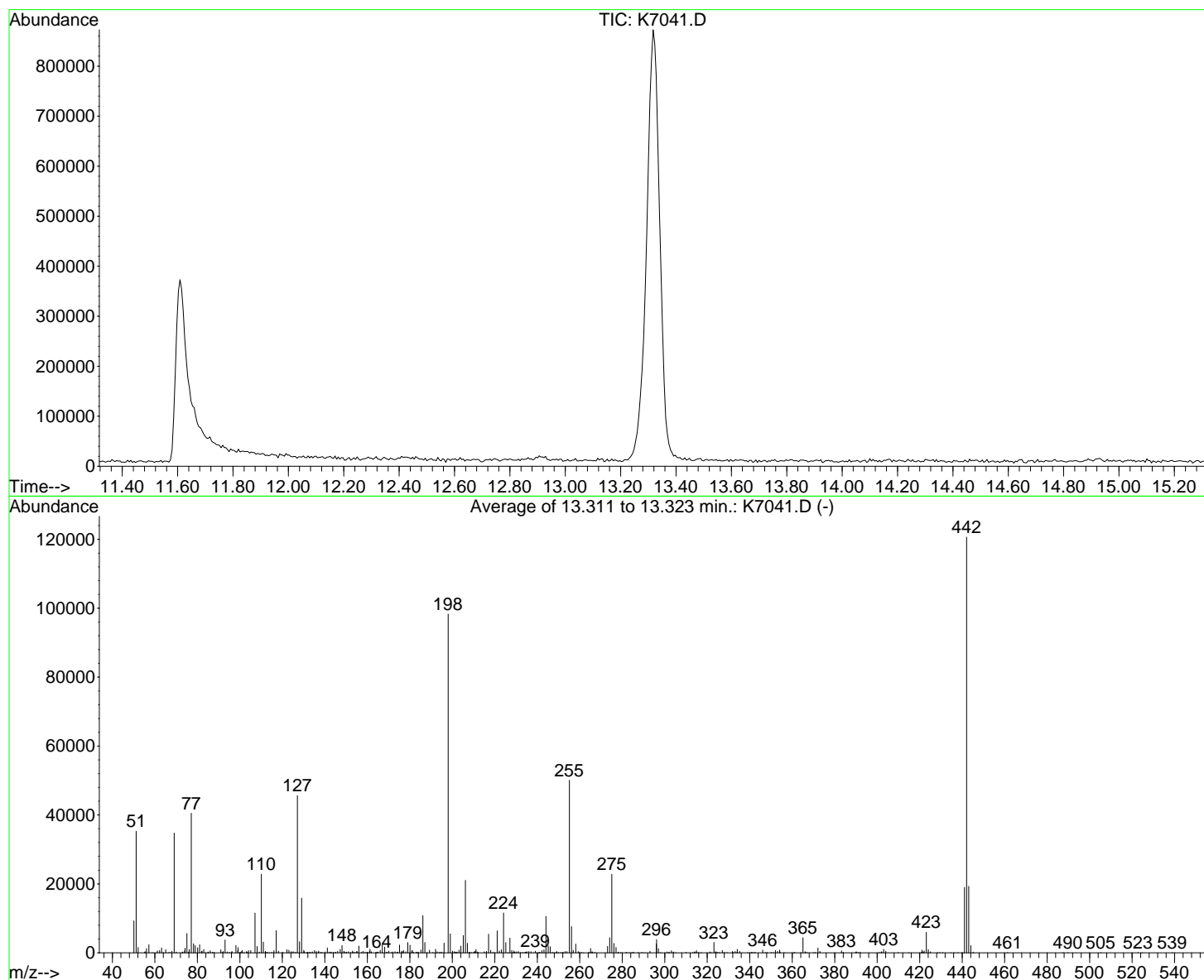
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\K\DATA\MK1084.M (RTE Integrator)

Title : PCB

Standard Mult: 1.000 ()

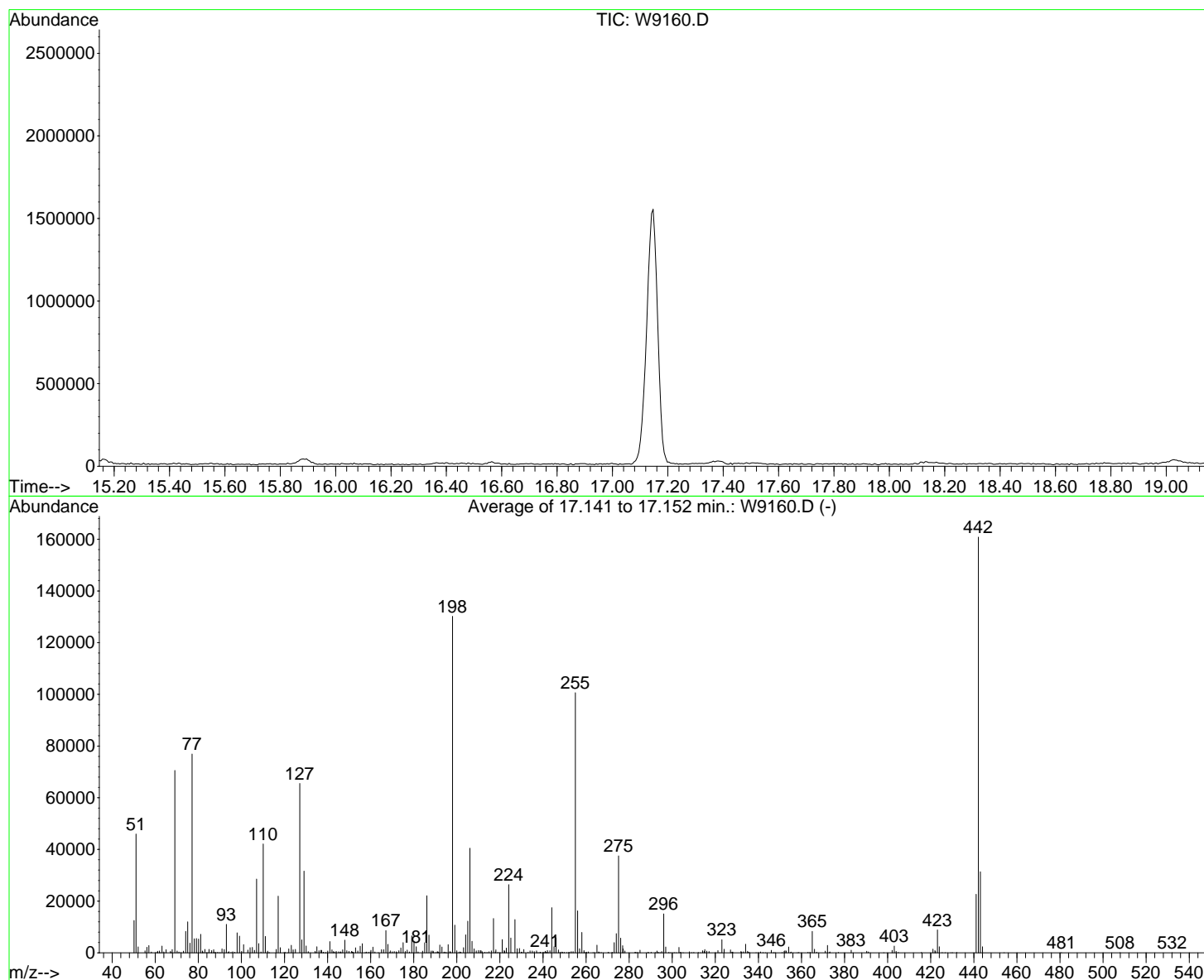


AutoFind: Scans 1440, 1441, 1442; Background Corrected with Scan 1422

| 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

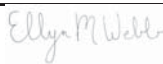
Submitted by:
Battelle Norwell Operations
141 Longwater Drive Suite 202
Norwell, MA 02061

Rich Restucci
2017.09.15 10:57:29
-04'00'

Analyst Approval:



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'

BATTELLE
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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 | <i>Work Plan</i> Laboratory Work Plan, Addendums To Work Plan, Memos From Project Manager, Special Instructions, Chain-of-Custody Reports. | 1 |
| 2 | <i>Tables</i> Analytical Data Tables, Qualifier Definitions. | 30 |
| 3 | <i>Miscellaneous Documentation</i> Case Narrative, Miscellaneous Documentation Form, Quality Control Summary, Example Calculations, Internal Standard Recovery Report, Retention Time Window Report. | 56 |
| 4 | <i>Sample Preparation Records</i> Sample Preparation Records, Dilution Worksheets, Standard Preparation Records, Certificates Of Analysis, GPC Check Report. | N/A |
| 5 | <i>Analytical Calibrations</i> Analytical Sequence, Analytical Method, Tune Report, Initial Calibration, Pesticide Degradation Report, RF Summary, Calibration Verifications, Independent Calibration Verification Check. | N/A |
| 6 | <i>Analytical Data</i> Raw Data Quantification Reports. | N/A |
| 7 | <i>Chromatograms</i> Sample And Standard Chromatograms. | N/A |
| 8 | <i>Unused Data</i> | 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



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WORK/QUALITY ASSURANCE PROJECT PLAN

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



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WORK/QUALITY ASSURANCE PROJECT PLAN

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 laden 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 Spectroscopy 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 |



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WORK/QUALITY ASSURANCE PROJECT PLAN

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 |
| <i>Extraction</i> | 32 | | | |
| <i>glassware</i> | 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



It can be done

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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WORK/QUALITY ASSURANCE PROJECT PLAN

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 Spectroscopy in the Selected Ion Monitoring (SIM) Mode |
| Description: | PCB by GC/MS SIM |
| Matrix: | S - Solid Samples, like soil or sediment, prepared and analyzed 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 Substitution: | 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 |



It can be done

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: |
|-----|----------|--------------|------|----------|----------|---------|--------|
| 19 | CI3(25) | CI3(25) | T | CI5(96) | CI3(34) | Yes | No |
| 20 | CI3(26) | CI3(26) | T | CI5(96) | CI3(34) | Yes | No |
| 21 | CI3(27) | CI3(27) | T | CI5(96) | CI3(34) | Yes | No |
| 22 | CI3(28) | CI3(28) | T | CI5(96) | CI3(34) | Yes | No |
| 23 | CI3(30) | CI3(30) | T | CI5(96) | CI3(34) | Yes | No |
| 24 | CI3(31) | CI3(31) | T | CI5(96) | CI3(34) | Yes | No |
| 25 | CI3(32) | CI3(32) | T | CI5(96) | CI3(34) | Yes | No |
| 26 | CI3(33) | CI3(33) | T | CI5(96) | CI3(34) | Yes | No |
| 27 | CI3(37) | CI3(37) | T | CI5(96) | CI3(34) | Yes | No |
| 28 | CI4(40) | CI4(40) | T | CI5(96) | CI3(34) | Yes | No |
| 29 | CI4(41) | CI4(41) | T | CI5(96) | CI3(34) | Yes | No |
| 30 | CI4(42) | CI4(42) | T | CI5(96) | CI3(34) | Yes | No |
| 31 | CI4(43) | CI4(43) | T | CI5(96) | CI3(34) | Yes | No |
| 32 | CI4(44) | CI4(44) | T | CI5(96) | CI3(34) | Yes | No |
| 33 | CI4(45) | CI4(45) | T | CI5(96) | CI3(34) | Yes | No |
| 34 | CI4(46) | CI4(46) | T | CI5(96) | CI3(34) | Yes | No |
| 35 | CI4(47) | CI4(47) | T | CI5(96) | CI3(34) | Yes | No |
| 36 | CI4(48) | CI4(48) | T | CI5(96) | CI3(34) | Yes | No |
| 37 | CI4(49) | CI4(49) | T | CI5(96) | CI3(34) | Yes | No |
| 38 | CI4(50) | CI4(50) | T | CI5(96) | CI3(34) | Yes | No |
| 39 | CI4(51) | CI4(51) | T | CI5(96) | CI3(34) | Yes | No |
| 40 | CI4(52) | CI4(52) | T | CI5(96) | CI3(34) | Yes | No |
| 41 | CI4(53) | CI4(53) | T | CI5(96) | CI3(34) | Yes | No |
| 42 | CI4(54) | CI4(54) | T | CI5(96) | CI3(34) | Yes | No |
| 43 | CI4(56) | CI4(56) | T | CI5(96) | CI3(34) | Yes | No |
| 44 | CI4(60) | CI4(60) | T | CI6(161) | CI6(152) | Yes | No |
| 45 | CI4(63) | CI4(63) | T | CI5(96) | CI3(34) | Yes | No |
| 46 | CI4(64) | CI4(64) | T | CI5(96) | CI3(34) | Yes | No |
| 47 | CI4(66) | CI4(66) | T | CI5(96) | CI3(34) | Yes | No |
| 48 | CI4(67) | CI4(67) | T | CI5(96) | CI3(34) | Yes | No |
| 49 | CI4(70) | CI4(70) | T | CI5(96) | CI3(34) | Yes | No |
| 50 | CI4(71) | CI4(71) | T | CI5(96) | CI3(34) | Yes | No |
| 51 | CI4(74) | CI4(74) | T | CI5(96) | CI3(34) | Yes | No |
| 52 | CI4(75) | CI4(75) | T | CI5(96) | CI3(34) | Yes | No |
| 53 | CI4(77) | CI4(77) | T | CI6(161) | CI6(152) | Yes | No |
| 54 | CI4(80) | CI4(80) | T | CI5(96) | CI3(34) | Yes | No |
| 55 | CI4(81) | CI4(81) | T | CI6(161) | CI6(152) | Yes | No |
| 56 | CI5(82) | CI5(82) | T | CI6(161) | CI6(152) | Yes | No |
| 57 | CI5(83) | CI5(83) | T | CI6(161) | CI6(152) | Yes | No |
| 58 | CI5(84) | CI5(84) | T | CI5(96) | CI3(34) | Yes | No |
| 59 | CI5(85) | CI5(85) | T | CI6(161) | CI6(152) | Yes | No |
| 60 | CI5(87) | CI5(87) | T | CI6(161) | CI6(152) | Yes | No |
| 61 | CI5(91) | CI5(91) | T | CI5(96) | CI3(34) | Yes | No |
| 62 | CI5(92) | CI5(92) | T | CI5(96) | CI3(34) | Yes | No |
| 63 | CI5(95) | CI5(95) | T | CI5(96) | CI3(34) | Yes | No |
| 64 | CI5(97) | CI5(97) | T | CI6(161) | CI6(152) | Yes | No |



It can be done

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 | CI5(99) | CI5(99) | T | CI6(161) | CI6(152) | Yes | No |
| 66 | CI5(100) | CI5(100) | T | CI5(96) | CI3(34) | Yes | No |
| 67 | CI5(101) | CI5(101) | T | CI5(96) | CI3(34) | Yes | No |
| 68 | CI5(104) | CI5(104) | T | CI5(96) | CI3(34) | Yes | No |
| 69 | CI5(105) | CI5(105) | T | CI6(161) | CI6(152) | Yes | No |
| 70 | CI5(110) | CI5(110) | T | CI6(161) | CI6(152) | Yes | No |
| 71 | CI5(114) | CI5(114) | T | CI6(161) | CI6(152) | Yes | No |
| 72 | CI5(115) | CI5(115) | T | CI6(161) | CI6(152) | Yes | No |
| 73 | CI5(118) | CI5(118) | T | CI6(161) | CI6(152) | Yes | No |
| 74 | CI5(123) | CI5(123) | T | CI6(161) | CI6(152) | Yes | No |
| 75 | CI5(124) | CI5(124) | T | CI6(161) | CI6(152) | Yes | No |
| 76 | CI5(125) | CI5(125) | T | CI6(161) | CI6(152) | Yes | No |
| 77 | CI5(126) | CI5(126) | T | CI6(161) | CI6(152) | Yes | No |
| 78 | CI5(127) | CI5(127) | T | CI6(161) | CI6(152) | Yes | No |
| 79 | CI6(128) | CI6(128) | T | CI6(161) | CI6(152) | Yes | No |
| 80 | CI6(130) | CI6(130) | T | CI6(161) | CI6(152) | Yes | No |
| 81 | CI6(131) | CI6(131) | T | CI6(161) | CI6(152) | Yes | No |
| 82 | CI6(134) | CI6(134) | T | CI6(161) | CI6(152) | Yes | No |
| 83 | CI6(135) | CI6(135) | T | CI6(161) | CI6(152) | Yes | No |
| 84 | CI6(136) | CI6(136) | T | CI6(161) | CI6(152) | Yes | No |
| 85 | CI6(137) | CI6(137) | T | CI6(161) | CI6(152) | Yes | No |
| 86 | CI6(138) | CI6(138) | T | CI6(161) | CI6(152) | Yes | No |
| 87 | CI6(139) | CI6(139) | T | CI6(161) | CI6(152) | Yes | No |
| 88 | CI6(140) | CI6(140) | T | CI6(161) | CI6(152) | Yes | No |
| 89 | CI6(141) | CI6(141) | T | CI6(161) | CI6(152) | Yes | No |
| 90 | CI6(144) | CI6(144) | T | CI6(161) | CI6(152) | Yes | No |
| 91 | CI6(146) | CI6(146) | T | CI6(161) | CI6(152) | Yes | No |
| 92 | CI6(149) | CI6(149) | T | CI6(161) | CI6(152) | Yes | No |
| 93 | CI6(151) | CI6(151) | T | CI6(161) | CI6(152) | Yes | No |
| 94 | CI6(153) | CI6(153) | T | CI6(161) | CI6(152) | Yes | No |
| 95 | CI6(154) | CI6(154) | T | CI6(161) | CI6(152) | Yes | No |
| 96 | CI6(155) | CI6(155) | T | CI5(96) | CI3(34) | Yes | No |
| 97 | CI6(156) | CI6(156) | T | CI6(161) | CI6(152) | Yes | No |
| 98 | CI6(157) | CI6(157) | T | CI6(161) | CI6(152) | Yes | No |
| 99 | CI6(158) | CI6(158) | T | CI6(161) | CI6(152) | Yes | No |
| 100 | CI6(163) | CI6(163) | T | CI6(161) | CI6(152) | Yes | No |
| 101 | CI6(164) | CI6(164) | T | CI6(161) | CI6(152) | Yes | No |
| 102 | CI6(166) | CI6(166) | T | CI6(161) | CI6(152) | Yes | No |
| 103 | CI6(167) | CI6(167) | T | CI6(161) | CI6(152) | Yes | No |
| 104 | CI6(169) | CI6(169) | T | CI6(161) | CI6(152) | Yes | No |
| 105 | CI7(170) | CI7(170) | T | CI6(161) | CI6(152) | Yes | No |
| 106 | CI7(171) | CI7(171) | T | CI6(161) | CI6(152) | Yes | No |
| 107 | CI7(172) | CI7(172) | T | CI6(161) | CI6(152) | Yes | No |
| 108 | CI7(173) | CI7(173) | T | CI6(161) | CI6(152) | Yes | No |
| 109 | CI7(174) | CI7(174) | T | CI6(161) | CI6(152) | Yes | No |
| 110 | CI7(175) | CI7(175) | T | CI6(161) | CI6(152) | Yes | No |



It can be done

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 | CI7(176) | CI7(176) | T | Cl6(161) | Cl6(152) | Yes | No |
| 112 | CI7(177) | CI7(177) | T | Cl6(161) | Cl6(152) | Yes | No |
| 113 | CI7(178) | CI7(178) | T | Cl6(161) | Cl6(152) | Yes | No |
| 114 | CI7(179) | CI7(179) | T | Cl6(161) | Cl6(152) | Yes | No |
| 115 | CI7(180) | CI7(180) | T | Cl6(161) | Cl6(152) | Yes | No |
| 116 | CI7(183) | CI7(183) | T | Cl6(161) | Cl6(152) | Yes | No |
| 117 | CI7(184) | CI7(184) | T | Cl6(161) | Cl6(152) | Yes | No |
| 118 | CI7(185) | CI7(185) | T | Cl6(161) | Cl6(152) | Yes | No |
| 119 | CI7(187) | CI7(187) | T | Cl6(161) | Cl6(152) | Yes | No |
| 120 | CI7(188) | CI7(188) | T | Cl6(161) | Cl6(152) | Yes | No |
| 121 | CI7(189) | CI7(189) | T | Cl6(161) | Cl6(152) | Yes | No |
| 122 | CI7(190) | CI7(190) | T | Cl6(161) | Cl6(152) | Yes | No |
| 123 | CI7(191) | CI7(191) | T | Cl6(161) | Cl6(152) | Yes | No |
| 124 | CI7(193) | CI7(193) | T | Cl6(161) | Cl6(152) | Yes | No |
| 125 | CI8(194) | CI8(194) | T | Cl6(161) | Cl6(152) | Yes | No |
| 126 | CI8(195) | CI8(195) | T | Cl6(161) | Cl6(152) | Yes | No |
| 127 | CI8(197) | CI8(197) | T | Cl6(161) | Cl6(152) | Yes | No |
| 128 | CI8(198) | CI8(198) | T | Cl6(161) | Cl6(152) | Yes | No |
| 129 | CI8(199) | CI8(199) | T | Cl6(161) | Cl6(152) | Yes | No |
| 130 | CI8(200) | CI8(200) | T | Cl6(161) | Cl6(152) | Yes | No |
| 131 | CI8(201) | CI8(201) | T | Cl6(161) | Cl6(152) | Yes | No |
| 132 | CI8(202) | CI8(202) | T | Cl6(161) | Cl6(152) | Yes | No |
| 133 | CI8(203) | CI8(203) | T | Cl6(161) | Cl6(152) | Yes | No |
| 134 | CI8(205) | CI8(205) | T | Cl6(161) | Cl6(152) | Yes | No |
| 135 | CI9(206) | CI9(206) | T | Cl6(161) | Cl6(152) | Yes | No |
| 136 | CI9(207) | CI9(207) | T | Cl6(161) | Cl6(152) | Yes | No |
| 137 | CI9(208) | CI9(208) | T | Cl6(161) | Cl6(152) | Yes | No |
| 138 | CI10(209) | CI10(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 | CI3(38) | CI3(38) | T | Cl5(96) | | No | No |
| 150 | CI4(78) | CI4(78) | T | Cl5(96) | | No | No |
| 151 | CI4(79) | CI4(79) | T | Cl5(96) | | No | No |
| 152 | CI7(186) | CI7(186) | T | Cl6(161) | | No | No |
| 1 | CI3(34) | CI3(34) | SIS | Cl5(96) | | No | No |
| 2 | CI6(152) | CI6(152) | SIS | Cl6(161) | | No | No |

Total Analytes: 154



It can be done

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: | |
| CI1(1) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI1(3) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | LOC 2 | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI2(4) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(5) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(6) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(7) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(8) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(9) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(11) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(12) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(13) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI2(15) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | LOC 3 | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI3(16) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(17) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(18) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(19) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(22) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(24) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(25) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(26) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(27) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(28) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(29) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(30) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(31) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(32) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(33) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(37) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI3(38) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: | LOC 4 | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI4(40) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI4(41) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI4(42) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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: |
| CI4(43) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(44) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(45) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(46) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(47) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(48) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(49) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(50) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(51) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(52) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(53) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(54) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(56) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(60) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(63) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(64) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(66) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(67) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(70) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(71) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(74) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(75) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(77) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(80) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(81) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(78) | | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | |
| CI4(79) | | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | |
| Compound: LOC 5 | | | | | | |
| Sum_Peak: | | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: |
| CI5(82) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(83) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(84) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(85) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(87) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(91) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(92) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(95) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(97) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(99) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(100) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(101) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(104) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(105) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |
| CI5(110) | | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | |



It can be done

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: | |
| CI5(114) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(115) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(118) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(123) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(124) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(125) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(126) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI5(127) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 6 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI6(128) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(130) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(131) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(134) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(135) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(136) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(137) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(138) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(139) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(140) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(141) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(144) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(146) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(149) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(151) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(153) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(154) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(155) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(156) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(157) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(158) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(163) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(164) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(166) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(167) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI6(169) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 7 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI7(170) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(171) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(172) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(173) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(174) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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: | |
| CI7(175) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(176) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(177) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(178) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(179) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(180) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(183) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(184) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(185) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(187) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(188) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(189) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(190) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(191) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(193) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI7(186) | 1.000 | No | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 8 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI8(194) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(195) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(197) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(198) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(199) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(200) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(201) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(202) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(203) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI8(205) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 9 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI9(206) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(207) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| CI9(208) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |
| Compound: LOC 10 | | | | | | |
| Sum_Peak: | Multiplier: | Include: | ND-Rule: | ND-Description: | Comment: | |
| CI10(209) | 1.000 | Yes | FIXED-ZERO | Replace a non-detect with 0 | | |



It can be done

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

Degradation Check Criteria:

Degradation Check Name: 5-315

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



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 | |



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 | 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 | |

ShpNo SHP-170822-02

It can be done

Battelle Project No: _____

Sample Receipt Form

Approved: ☐ Authorized: ☐Project Number: 100043429-17T6AVXClient: USACEReceived by: Schumitz, MattDate/Time Received: Monday, August 21, 2017 3:15 PMNo. of Shipping Containers: 1**SHIPMENT**Method of Delivery: Hand DeliveredTracking Number: naCOC 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: _____



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-ACP-GG-05 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9599 | P-17G-ACP-G5-05 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9600 | P-17G-ACP-JJ-07 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9601 | P-17G-ACP-JJ-07 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9602 | P-17G-ACP-DD-09 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9603 | P-17G-ACP-DD-09 PW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9604 | P-17G-ACP-FF-07 SW | 08/14/17 0:00 | 08/22/17 9:17 | 1 | PED | -20 | NA | NA | NA | F0114 (NA) | | | |
| K9605 | P-17G-ACP-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) | | | |



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



| | | | | | | | |
|--|--|---|--|------------------------------------|--|-------------------------------------|--|
| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | | Email: | | | | | |
| Project Name: <u>NBH Acvovox</u> | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No: <u>10004342A-17T6AVX</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | | Time Zone: | | Analysis | | Page# | |
| Sample Date | | Sample Time | | | | | |
| Sample Type | | Matrix | | Total # of Cont. | | | |
| P-17G-ADP-GG05 SW | | 8/14/17 | | PED | | K9598 | |
| P-17G-ADP-GG05 PW | | | | | | K9599 | |
| P-17G-ADP-JJ07 SW | | | | | | K9600 | |
| P-17G-ADP-JJ07 PW | | | | | | " 01 | |
| P-17G-ADP-DD09 SW | | | | | | 02 | |
| P-17G-ADP-DD09 PW | | | | | | 03 | |
| P-17G-ADP-FF07 SW | | | | | | 04 | |
| P-17G-ADP-FF07 PW | | | | | | 05 | |
| P-17G-ADP-GG04 SW | | | | | | 06 | |
| P-17G-ADP-GG04 PW | | | | | | 07 | |
| P-17G-ADP-HH07 SW | | | | | | 08 | |
| P-17G-ADP-HH07 PW | | | | | | 09 | |
| P-17G-ADP-EE04 SW | | | | | | 10 | |
| Receipt Temperature: (°C) | | Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | |
| Relinquished by (Print/Sign): <u>CSM</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>MS</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |

Chain-of-Custody

| | | | | | | | |
|---|-------------|-----------------------------------|-------------|------------------------------------|------------------|---|--|
| Client Contact Information | | Project Manager: <u>Dahlen</u> | | Sampling Site: | | Site Information: | |
| | | Sampler Information (print name): | | Preservative | | COC # | |
| | | Phone: | | | | | |
| | | Email: | | Analysis | | Page# | |
| | | Turnaround Time (TAT) Requested: | | | | | |
| Project Name: <u>NBH Aerobics</u> | | Normal <input type="checkbox"/> | | Pub Cons | | | |
| Project No.: <u>100043429-17T6AVX</u> | | Priority <input type="checkbox"/> | | | | | |
| | | RUSH <input type="checkbox"/> | | | | | |
| Time Zone: | | | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | | |
| P-17G-ADP-CC04 PW | 8/14/17 | | | PAD | 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-CC04 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): <u>CSPM Kelly</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schmitz</u> | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Relinquished by (Print/Sign): | | Company: | | Date/Time: | | Received by (Print/Sign): | |
| Comments: | | | | | | | |

BATTELLE

It can be done

Chain-of-Custody

| | | | | | | | | | | | | | |
|---|--|---|--|------------------------------------|--|--|--|--------------------------|--|--------------------------------|--|------------|--|
| Client Contact Information | | Project Manager: <u>Dahlu</u> | | Sampling Site: | | Site Information: | | | | | | | |
| | | Sampler Information (print name): Phone: | | Preservative | | COC # | | | | | | | |
| | | Email: | | | | | | | | | | | |
| Project Name: <u>NBA Aerovox</u> | | Turnaround Time (TAT) Requested: | | Analysis | | Page# | | | | | | | |
| Project No.: <u>100043429-17T6AVX</u> | | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | | | | | | | |
| Sample Identification | | Sample Date | | Sample Time | | Sample Type | | Matrix | | Total # of Cont. | | Time Zone: | |
| P-17G-ADP-LL03 SW | | 8/14/17 | | | | | | PED | | 1 | | | |
| P-17G-ADP-LL03 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-JF03 SW | | | | | | | | | | 1 | | | |
| P-17G-ADP-JF03 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-BB05 SW | | | | | | | | | | 1 | | | |
| P-17G-ADP-BB05 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-BB07 SW | | | | | | | | | | 1 | | | |
| P-17G-ADP-BB07 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-LL02 SW | | | | | | | | | | 1 | | | |
| P-17G-ADP-LL02 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-HH05 SW | | | | | | | | | | 1 | | | |
| P-17G-ADP-HH05 PW | | | | | | | | | | 1 | | | |
| P-17G-ADP-DD07 SW | | | | | | | | | | 1 | | | |
| Receipt Temperature: (°C) | | Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | | | | | | |
| Relinquished by (Print/Sign): <u>CSM/ally</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/2017 3:15pm</u> | | Received by (Print/Sign): <u>Matt Schumate</u> | | Company: <u>Battelle</u> | | Date/Time: <u>8/21/17 3:15</u> | | | |
| 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: | | | | | | | | | | | | | |



It can be done

Chain-of-Custody

| | | | | | | |
|--|---|------------------------------------|--|--------------------------|--------------------------------|--|
| Client Contact Information | Project Manager: <u>Danlu</u> | | Sampling Site: | | Site Information: | |
| | Sampler Information (print name): Phone: | | Preservative | | COC # | |
| | Email: | | | | | |
| Project Name: <u>NBH Aerovox</u> | Turnaround Time (TAT) Requested: | | Analysis | | Page# | |
| Project No.: <u>100043420-17T6 AUX</u> | Normal <input type="checkbox"/> Priority <input type="checkbox"/> RUSH <input type="checkbox"/> | | | | | |
| Sample Identification | Sample Date | Sample Time | Sample Type | Matrix | Total # of Cont. | |
| P-17G-ADP-DD07 PW | 8/14/17 | | | PED | 1 | |
| P-17G-ADP-LLD5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-LLD5 PW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 SW | ↓ | | | ↓ | 1 | |
| P-17G-ADP-FF-D5 PW | ↓ | | | ↓ | 1 | |
| TB-D81417-D1 | ↓ | | | ↓ | 1 | |
| Receipt Temperature: (°C) | | | | | | |
| Samples Intact: Yes - No | | Samples on Ice: Yes - No | | Receipt Comments: | | |
| Relinquished by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/2017 3:15pm</u> | Received by (Print/Sign): <u>[Signature]</u> | Company: <u>Battelle</u> | Date/Time: <u>8/21/17 3:15</u> | |
| 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: | | | | | | |



ShpNo SHP-170823-01

It can be done

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 ☒ UnknownInitial 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:



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

[illegible]



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

9/21/2017

S17-0369MS-Master_315(PRC):FINAL

Not Surrogate Corrected



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

| | |
|----------|---------|
| CI5(123) | 1.24 U |
| CI5(124) | 0.787 U |
| CI5(125) | 1.15 U |
| CI5(126) | 1.27 U |
| CI5(127) | 2.54 U |
| CI6(128) | 1.21 U |
| CI6(130) | 1.12 U |
| CI6(131) | 0.726 U |
| CI6(134) | 1.15 U |
| CI6(135) | 0.756 U |
| CI6(136) | 0.603 U |
| CI6(137) | 1.69 U |
| CI6(138) | 1.51 U |
| CI6(139) | 1.60 U |
| CI6(140) | 1.24 U |
| CI6(141) | 0.842 U |
| CI6(144) | 0.902 U |
| CI6(146) | 1.87 U |
| CI6(149) | 0.902 U |
| CI6(151) | 1.06 U |
| CI6(153) | 1.90 U |
| CI6(154) | 0.842 U |
| CI6(155) | 0.902 U |
| CI6(156) | 1.51 U |
| CI6(157) | 1.51 U |
| CI6(158) | 0.842 U |
| CI6(163) | 1.12 U |
| CI6(164) | 0.665 U |
| CI6(166) | 0.573 U |
| CI6(167) | 5.04 U |
| CI6(169) | 1.06 U |
| CI7(170) | 1.12 U |
| CI7(171) | 0.933 U |
| CI7(172) | 0.756 U |
| CI7(173) | 1.06 U |
| CI7(174) | 1.39 U |
| CI7(175) | 0.756 U |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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

| | |
|-----------|---------|
| CI7(176) | 0.665 U |
| CI7(177) | 0.902 U |
| CI7(178) | 1.33 U |
| CI7(179) | 0.902 U |
| CI7(180) | 1.63 U |
| CI7(183) | 0.787 U |
| CI7(184) | 0.634 U |
| CI7(185) | 0.994 U |
| CI7(187) | 0.452 U |
| CI7(188) | 0.726 U |
| CI7(189) | 1.06 U |
| CI7(190) | 1.02 U |
| CI7(191) | 1.30 U |
| CI7(193) | 0.634 U |
| CI8(194) | 1.93 U |
| CI8(195) | 0.817 U |
| CI8(197) | 0.756 U |
| CI8(198) | 0.994 U |
| CI8(199) | 1.48 U |
| CI8(200) | 0.994 U |
| CI8(201) | 0.756 U |
| CI8(202) | 0.665 U |
| CI8(203) | 0.963 U |
| CI8(205) | 0.994 U |
| CI9(206) | 1.57 U |
| CI9(207) | 0.726 U |
| CI9(208) | 0.787 U |
| CI10(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 |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |



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 |
| CI1(1) | 32.3 | 38.21 | 85 | | 24.7 | 45.50 | 54 | 44.6 | N | |
| CI1(3) | 33.2 | 38.44 | 86 | | 27.1 | 45.77 | 59 | 37.2 | N | |
| CI2(4) | 34.6 | 38.17 | 91 | | 28.0 | 45.45 | 62 | 37.9 | N | |
| CI2(5) | 33.8 | 38.28 | 88 | | 25.8 | 45.59 | 57 | 42.8 | N | |
| CI2(6) | 33.6 | 37.94 | 89 | | 25.7 | 45.18 | 57 | 43.8 | N | |
| CI2(7) | 40.9 | 38.24 | 107 | | 38.8 | 45.55 | 85 | 22.9 | | |
| CI2(8) | 45.4 | 38.02 | 119 | | 36.6 | 45.27 | 81 | 38.0 | N | |
| CI2(9) | 37.0 | 37.82 | 98 | | 24.7 | 45.05 | 55 | 56.2 | N | |
| CI2(11) | 37.8 | 37.94 | 100 | | 29.9 | 45.18 | 66 | 41.0 | N | |
| CI2(12) | 35.8 | 38.32 | 93 | | 29.0 | 45.64 | 64 | 36.9 | N | |
| CI2(13) | 41.8 | 38.40 | 109 | | 32.9 | 45.73 | 72 | 40.9 | N | |
| CI2(15) | 45.0 | 38.24 | 118 | | 34.6 | 45.55 | 76 | 43.3 | N | |
| CI3(16) | 42.0 | 38.05 | 110 | | 32.2 | 45.32 | 71 | 43.1 | N | |
| CI3(17) | 38.8 | 38.17 | 102 | | 30.6 | 45.45 | 67 | 41.4 | N | |
| CI3(18) | 35.3 | 38.44 | 92 | | 27.3 | 45.77 | 60 | 42.1 | N | |
| CI3(19) | 38.4 | 38.17 | 101 | | 29.2 | 45.45 | 64 | 44.8 | N | |
| CI3(22) | 39.0 | 38.17 | 102 | | 30.0 | 45.45 | 66 | 42.9 | N | |
| CI3(24) | 35.6 | 38.02 | 94 | | 27.9 | 45.27 | 62 | 41.0 | N | |
| CI3(25) | 39.3 | 38.40 | 102 | | 32.5 | 45.73 | 71 | 35.8 | N | |
| CI3(26) | 34.2 | 37.86 | 90 | | 26.7 | 45.09 | 59 | 41.6 | N | |
| CI3(27) | 36.2 | 38.09 | 95 | | 28.0 | 45.36 | 62 | 42.0 | N | |
| CI3(28) | 34.5 | 38.63 | 89 | | 28.2 | 46.00 | 61 | 37.3 | N | |
| CI3(29) | 37.3 | 38.21 | 98 | | 28.9 | 45.50 | 64 | 42.0 | N | |
| CI3(30) | 37.4 | 38.47 | 97 | | 28.7 | 45.82 | 63 | 42.5 | N | |
| CI3(31) | 35.2 | 38.44 | 92 | | 28.6 | 45.77 | 62 | 39.0 | N | |
| CI3(32) | 39.9 | 37.90 | 105 | | 31.2 | 45.14 | 69 | 41.4 | N | |
| CI3(33) | 43.2 | 37.79 | 114 | | 33.1 | 45.00 | 74 | 42.6 | N | |
| CI3(37) | 41.4 | 38.36 | 108 | | 34.7 | 45.68 | 76 | 34.8 | N | |
| CI4(40) | 36.6 | 37.86 | 97 | | 31.6 | 45.09 | 70 | 32.3 | N | |
| CI4(41) | 40.8 | 37.98 | 107 | | 33.0 | 45.23 | 73 | 37.8 | N | |
| CI4(42) | 39.0 | 38.24 | 102 | | 31.3 | 45.55 | 69 | 38.6 | N | |
| CI4(43) | 41.1 | 38.36 | 107 | | 31.8 | 45.68 | 70 | 41.8 | N | |
| CI4(44) | 36.8 | 38.17 | 96 | | 29.9 | 45.45 | 66 | 37.0 | N | |
| CI4(45) | 36.0 | 38.59 | 93 | | 27.9 | 45.95 | 61 | 41.6 | N | |
| CI4(46) | 37.4 | 38.13 | 98 | | 28.8 | 45.41 | 63 | 43.5 | N | |
| CI4(47) | 35.7 | 38.24 | 93 | | 27.8 | 45.55 | 61 | 41.6 | N | |
| CI4(48) | 34.2 | 38.40 | 89 | | 22.9 | 45.73 | 50 | 56.1 | N | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI4(49) | 44.1 | 38.21 | 115 | | 39.7 | 45.50 | 87 | 27.7 | | |
| CI4(50) | 36.0 | 38.47 | 94 | | 28.8 | 45.82 | 63 | 39.5 | N | |
| CI4(51) | 31.8 | 38.24 | 83 | | 25.0 | 45.55 | 55 | 40.6 | N | |
| CI4(52) | 42.5 | 38.09 | 112 | | 33.8 | 45.36 | 75 | 39.6 | N | |
| CI4(53) | 35.9 | 37.79 | 95 | | 28.6 | 45.00 | 64 | 39.0 | N | |
| CI4(54) | 33.7 | 38.13 | 88 | | 26.8 | 45.41 | 59 | 39.5 | N | |
| CI4(56) | 36.6 | 38.21 | 96 | | 29.6 | 45.50 | 65 | 38.5 | N | |
| CI4(60) | 37.8 | 37.86 | 100 | | 30.7 | 45.09 | 68 | 38.1 | N | |
| CI4(63) | 38.0 | 38.24 | 99 | | 30.0 | 45.55 | 66 | 40.0 | N | |
| CI4(64) | 35.3 | 38.47 | 92 | | 27.7 | 45.82 | 60 | 42.1 | N | |
| CI4(66) | 39.8 | 38.28 | 104 | | 30.9 | 45.59 | 68 | 41.9 | N | |
| CI4(67) | 39.4 | 38.32 | 103 | | 30.8 | 45.64 | 67 | 42.4 | N | |
| CI4(70) | 56.1 | 38.40 | 146 N | | 46.3 | 45.73 | 101 | 36.4 | N | |
| CI4(71) | 38.5 | 38.47 | 100 | | 31.1 | 45.82 | 68 | 38.1 | N | |
| CI4(74) | 37.6 | 38.28 | 98 | | 30.2 | 45.59 | 66 | 39.0 | N | |
| CI4(75) | 39.5 | 38.13 | 104 | | 32.1 | 45.41 | 71 | 37.7 | N | |
| CI4(77) | 44.8 | 38.21 | 117 | | 37.4 | 45.50 | 82 | 35.2 | N | |
| CI4(80) | 40.8 | 38.02 | 107 | | 33.3 | 45.27 | 74 | 36.5 | N | |
| CI4(81) | 37.1 | 38.21 | 97 | | 31.0 | 45.50 | 68 | 35.2 | N | |
| CI5(82) | 35.6 | 37.86 | 94 | | 26.7 | 45.09 | 59 | 45.8 | N | |
| CI5(83) | 32.6 | 38.28 | 85 | | 25.1 | 45.59 | 55 | 42.9 | N | |
| CI5(84) | 44.4 | 38.17 | 116 | | 30.9 | 45.45 | 68 | 52.2 | N | |
| CI5(85) | 34.6 | 37.86 | 91 | | 24.8 | 45.09 | 55 | 49.3 | N | |
| CI5(87) | 36.0 | 38.17 | 94 | | 27.6 | 45.45 | 61 | 42.6 | N | |
| CI5(91) | 40.6 | 38.02 | 107 | | 31.9 | 45.27 | 70 | 41.8 | N | |
| CI5(92) | 38.4 | 38.05 | 101 | | 30.9 | 45.32 | 68 | 39.1 | N | |
| CI5(95) | 35.6 | 38.09 | 93 | | 28.1 | 45.36 | 62 | 40.0 | N | |
| CI5(97) | 38.3 | 37.90 | 101 | | 30.4 | 45.14 | 67 | 40.5 | N | |
| CI5(99) | 33.4 | 38.05 | 88 | | 26.5 | 45.32 | 58 | 41.1 | N | |
| CI5(100) | 37.5 | 38.36 | 98 | | 30.7 | 45.68 | 67 | 37.6 | N | |
| CI5(101) | 35.3 | 38.21 | 92 | | 28.2 | 45.50 | 62 | 39.0 | N | |
| CI5(104) | 32.8 | 38.24 | 86 | | 25.9 | 45.55 | 57 | 40.6 | N | |
| CI5(105) | 39.7 | 38.47 | 103 | | 32.0 | 45.82 | 70 | 38.2 | N | |
| CI5(110) | 34.5 | 38.17 | 90 | | 27.3 | 45.45 | 60 | 40.0 | N | |
| CI5(114) | 36.3 | 38.32 | 95 | | 28.7 | 45.64 | 63 | 40.5 | N | |
| CI5(115) | 38.6 | 38.13 | 101 | | 34.9 | 45.41 | 77 | 27.0 | | |
| CI5(118) | 35.4 | 38.40 | 92 | | 28.8 | 45.73 | 63 | 37.4 | N | |

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Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI5(123) | 37.1 | 38.21 | 97 | | 30.0 | 45.50 | 66 | 38.0 | N | |
| CI5(124) | 35.8 | 37.90 | 94 | | 27.8 | 45.14 | 62 | 41.0 | N | |
| CI5(125) | 37.8 | 38.13 | 99 | | 28.8 | 45.41 | 63 | 44.4 | N | |
| CI5(126) | 41.2 | 38.40 | 107 | | 33.7 | 45.73 | 74 | 36.5 | N | |
| CI5(127) | 42.1 | 38.17 | 110 | | 33.0 | 45.45 | 73 | 40.4 | N | |
| CI6(128) | 36.0 | 38.21 | 94 | | 27.7 | 45.50 | 61 | 42.6 | N | |
| CI6(130) | 26.7 | 38.09 | 70 | | 20.4 | 45.36 | 45 | 43.5 | N | |
| CI6(131) | 33.0 | 37.94 | 87 | | 26.3 | 45.18 | 58 | 40.0 | N | |
| CI6(134) | 34.6 | 38.09 | 91 | | 27.2 | 45.36 | 60 | 41.1 | N | |
| CI6(135) | 35.3 | 37.71 | 94 | | 28.7 | 44.91 | 64 | 38.0 | N | |
| CI6(136) | 35.0 | 38.21 | 92 | | 27.6 | 45.50 | 61 | 40.5 | N | |
| CI6(137) | 46.4 | 37.79 | 123 | N | 36.7 | 45.00 | 82 | 40.0 | N | |
| CI6(138) | 31.5 | 37.94 | 83 | | 24.8 | 45.18 | 55 | 40.6 | N | |
| CI6(139) | 36.0 | 38.05 | 95 | | 27.7 | 45.32 | 61 | 43.6 | N | |
| CI6(140) | 32.0 | 38.40 | 83 | | 25.8 | 45.73 | 56 | 38.8 | N | |
| CI6(141) | 33.7 | 37.79 | 89 | | 27.3 | 45.00 | 61 | 37.3 | N | |
| CI6(144) | 38.5 | 38.32 | 100 | | 29.4 | 45.64 | 64 | 43.9 | N | |
| CI6(146) | 31.1 | 38.36 | 81 | | 24.9 | 45.68 | 55 | 38.2 | N | |
| CI6(149) | 38.2 | 38.24 | 100 | | 27.8 | 45.55 | 61 | 48.4 | N | |
| CI6(151) | 29.5 | 38.02 | 78 | | 23.4 | 45.27 | 52 | 40.0 | N | |
| CI6(153) | 33.5 | 38.44 | 87 | | 26.8 | 45.77 | 59 | 38.4 | N | |
| CI6(154) | 33.4 | 38.47 | 87 | | 26.1 | 45.82 | 57 | 41.7 | N | |
| CI6(155) | 32.2 | 37.86 | 85 | | 25.3 | 45.09 | 56 | 41.1 | N | |
| CI6(156) | 38.1 | 38.74 | 98 | | 29.2 | 46.14 | 63 | 43.5 | N | |
| CI6(157) | 39.2 | 38.24 | 103 | | 31.8 | 45.55 | 70 | 38.2 | N | |
| CI6(158) | 35.9 | 38.28 | 94 | | 27.8 | 45.59 | 61 | 42.6 | N | |
| CI6(163) | 35.8 | 37.94 | 94 | | 28.5 | 45.18 | 63 | 39.5 | N | |
| CI6(164) | 43.1 | 38.05 | 113 | | 29.8 | 45.32 | 66 | 52.5 | N | |
| CI6(166) | 33.3 | 38.21 | 87 | | 26.8 | 45.50 | 59 | 38.4 | N | |
| CI6(167) | 37.3 | 38.55 | 97 | | 30.4 | 45.91 | 66 | 38.0 | N | |
| CI6(169) | 38.3 | 38.09 | 101 | | 32.9 | 45.36 | 73 | 32.2 | N | |
| CI7(170) | 35.1 | 38.17 | 92 | | 26.9 | 45.45 | 59 | 43.7 | N | |
| CI7(171) | 37.7 | 38.02 | 99 | | 28.5 | 45.27 | 63 | 44.4 | N | |
| CI7(172) | 34.1 | 38.59 | 88 | | 26.2 | 45.95 | 57 | 42.8 | N | |
| CI7(173) | 33.7 | 38.36 | 88 | | 25.9 | 45.68 | 57 | 42.8 | N | |
| CI7(174) | 33.6 | 38.24 | 88 | | 26.2 | 45.55 | 58 | 41.1 | N | |
| CI7(175) | 29.1 | 38.02 | 77 | | 23.1 | 45.27 | 51 | 40.6 | N | |

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9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI7(176) | 33.3 | 38.24 | 87 | | 25.4 | 45.55 | 56 | 43.4 | N | |
| CI7(177) | 37.0 | 38.40 | 96 | | 27.4 | 45.73 | 60 | 46.2 | N | |
| CI7(178) | 30.4 | 37.98 | 80 | | 23.3 | 45.23 | 52 | 42.4 | N | |
| CI7(179) | 33.3 | 38.05 | 88 | | 25.7 | 45.32 | 57 | 42.8 | N | |
| CI7(180) | 27.9 | 38.02 | 73 | | 21.6 | 45.27 | 48 | 41.3 | N | |
| CI7(183) | 31.4 | 37.79 | 83 | | 24.9 | 45.00 | 55 | 40.6 | N | |
| CI7(184) | 32.7 | 38.17 | 86 | | 25.7 | 45.45 | 57 | 40.6 | N | |
| CI7(185) | 37.9 | 38.17 | 99 | | 28.6 | 45.45 | 63 | 44.4 | N | |
| CI7(187) | 33.8 | 38.17 | 89 | | 26.8 | 45.45 | 59 | 40.5 | N | |
| CI7(188) | 32.7 | 38.09 | 86 | | 24.6 | 45.36 | 54 | 45.7 | N | |
| CI7(189) | 35.1 | 38.05 | 92 | | 28.2 | 45.32 | 62 | 39.0 | N | |
| CI7(190) | 35.0 | 38.24 | 92 | | 27.1 | 45.55 | 59 | 43.7 | N | |
| CI7(191) | 31.7 | 37.90 | 84 | | 24.4 | 45.14 | 54 | 43.5 | N | |
| CI7(193) | 41.0 | 38.21 | 107 | | 31.2 | 45.50 | 69 | 43.2 | N | |
| CI8(194) | 36.7 | 38.21 | 96 | | 28.5 | 45.50 | 63 | 41.5 | N | |
| CI8(195) | 33.2 | 38.17 | 87 | | 26.7 | 45.45 | 59 | 38.4 | N | |
| CI8(197) | 32.4 | 38.70 | 84 | | 25.1 | 46.09 | 54 | 43.5 | N | |
| CI8(198) | 27.3 | 37.90 | 72 | | 21.6 | 45.14 | 48 | 40.0 | N | |
| CI8(199) | 44.2 | 38.17 | 116 | | 36.0 | 45.45 | 79 | 37.9 | N | |
| CI8(200) | 29.3 | 38.47 | 76 | | 22.6 | 45.82 | 49 | 43.2 | N | |
| CI8(201) | 30.6 | 38.05 | 80 | | 24.4 | 45.32 | 54 | 38.8 | N | |
| CI8(202) | 28.3 | 38.28 | 74 | | 23.1 | 45.59 | 51 | 36.8 | N | |
| CI8(203) | 30.1 | 38.32 | 79 | | 24.2 | 45.64 | 53 | 39.4 | N | |
| CI8(205) | 31.8 | 37.86 | 84 | | 25.5 | 45.09 | 57 | 38.3 | N | |
| CI9(206) | 30.5 | 38.17 | 80 | | 24.7 | 45.45 | 54 | 38.8 | N | |
| CI9(207) | 28.8 | 38.36 | 75 | | 22.1 | 45.68 | 48 | 43.9 | N | |
| CI9(208) | 27.2 | 38.17 | 71 | | 21.5 | 45.45 | 47 | 40.7 | N | |
| CI10(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 | | | | | |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 | | | | | |
| CI3(38) | U | | | | U | | | | | |
| CI4(78) | U | | | | U | | | | | |
| CI4(79) | U | | | | U | | | | | |
| CI7(186) | U | | | | U | | | | | |
| | | | | | | | | | | |
| Surrogate Recoveries (%) | | | | | | | | | | |
| CI3(34) | 106 | | | | 71 | | | | | |
| CI6(152) | 91 | | | | 58 | | | | | |



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 | |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

| | | | | | | | | | | |
|----------|------|---|------|---|--|------|---|--|-------|---|
| CI5(115) | 121 | | 3.64 | U | | 2.98 | U | | 3.64 | U |
| CI5(118) | 4380 | D | 3500 | D | | 3960 | D | | 4550 | D |
| CI5(123) | 549 | | 415 | | | 477 | | | 492 | |
| CI5(124) | 118 | | 90.0 | | | 98.4 | | | 95.6 | |
| CI5(125) | 37.2 | | 13.7 | | | 2.14 | U | | 2.61 | U |
| CI5(126) | 16.8 | | 15.4 | | | 15.3 | | | 13.9 | |
| CI5(127) | 125 | | 78.4 | | | 74.2 | | | 46.1 | |
| CI6(128) | 272 | | 252 | | | 238 | | | 301 | |
| CI6(130) | 88.3 | | 82.7 | | | 95.5 | | | 120 | |
| CI6(131) | 205 | | 169 | | | 178 | | | 260 | |
| CI6(134) | 431 | | 340 | | | 372 | | | 507 | |
| CI6(135) | 634 | | 533 | | | 552 | | | 716 | |
| CI6(136) | 1310 | D | 855 | | | 1250 | D | | 2250 | D |
| CI6(137) | 114 | | 99.5 | | | 102 | | | 124 | |
| CI6(138) | 948 | | 807 | | | 885 | | | 935 | |
| CI6(139) | 103 | | 84.2 | | | 86.4 | | | 108 | |
| CI6(140) | 10.8 | | 8.81 | | | 9.18 | | | 13.2 | |
| CI6(141) | 138 | | 125 | | | 129 | | | 153 | |
| CI6(144) | 109 | | 73.9 | | | 80.2 | | | 116 | |
| CI6(146) | 691 | | 572 | | | 608 | | | 757 | |
| CI6(149) | 8510 | D | 6920 | D | | 7200 | D | | 13500 | D |
| CI6(151) | 935 | | 723 | | | 825 | | | 1880 | D |
| CI6(153) | 5070 | D | 4380 | D | | 4640 | D | | 7260 | D |
| CI6(154) | 448 | | 385 | | | 408 | | | 584 | |
| CI6(155) | 3.55 | | 4.19 | | | 3.37 | | | 4.29 | |
| CI6(156) | 192 | | 168 | | | 171 | | | 212 | |
| CI6(157) | 37.1 | | 34.2 | | | 33.9 | | | 42.2 | |
| CI6(158) | 276 | | 267 | | | 276 | | | 316 | |
| CI6(163) | 1760 | D | 1540 | D | | 1700 | D | | 2920 | D |
| CI6(164) | 290 | | 248 | | | 237 | | | 281 | |
| CI6(166) | 27.3 | | 23.9 | | | 24.4 | | | 27.6 | |
| CI6(167) | 178 | | 156 | | | 156 | | | 182 | |
| CI6(169) | 6.84 | | 2.40 | U | | 1.97 | U | | 8.10 | |
| CI7(170) | 141 | | 132 | | | 127 | | | 177 | |
| CI7(171) | 45.0 | | 42.4 | | | 38.8 | | | 58.3 | |
| CI7(172) | 29.3 | | 27.1 | | | 25.9 | | | 34.8 | |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

| | | | | |
|-----------|--------|--------|--------|--------|
| CI7(173) | 4.25 | 4.08 | 4.09 | 5.43 |
| CI7(174) | 87.1 | 81.8 | 77.9 | 110 |
| CI7(175) | 13.4 | 12.9 | 10.8 | 17.3 |
| CI7(176) | 21.2 | 21.7 | 19.7 | 26.0 |
| CI7(177) | 73.0 | 69.4 | 63.5 | 89.7 |
| CI7(178) | 73.7 | 69.9 | 70.1 | 106 |
| CI7(179) | 153 | 138 | 139 | 205 |
| CI7(180) | 228 | 216 | 196 | 304 |
| CI7(183) | 126 | 113 | 111 | 162 |
| CI7(184) | 1.40 U | 2.97 J | 1.18 U | 1.44 U |
| CI7(185) | 15.7 | 13.6 | 12.8 | 16.3 |
| CI7(187) | 483 | 452 | 435 | 659 |
| CI7(188) | 11.5 | 11.3 | 9.79 | 15.7 |
| CI7(189) | 11.5 | 11.0 | 9.33 | 15.4 |
| CI7(190) | 46.1 | 41.7 | 41.7 | 57.4 |
| CI7(191) | 10.7 | 10.8 | 9.91 | 13.8 |
| CI7(193) | 19.5 | 20.2 | 26.0 | 34.3 |
| CI8(194) | 31.9 | 34.4 | 28.0 | 54.0 |
| CI8(195) | 12.8 | 13.5 | 10.2 | 18.5 |
| CI8(197) | 3.56 | 3.43 J | 3.08 | 4.26 |
| CI8(198) | 2.20 U | 2.26 U | 1.85 U | 2.26 U |
| CI8(199) | 50.4 | 49.3 | 45.0 | 83.3 |
| CI8(200) | 6.84 | 7.67 | 5.75 | 9.24 |
| CI8(201) | 7.97 | 8.11 | 6.68 | 9.07 |
| CI8(202) | 15.8 | 16.2 | 13.7 | 24.0 |
| CI8(203) | 38.6 | 42.0 | 34.9 | 62.3 |
| CI8(205) | 4.13 | 4.46 | 3.93 | 5.40 |
| CI9(206) | 13.1 | 15.8 | 11.1 | 27.6 |
| CI9(207) | 3.33 J | 2.66 J | 2.42 J | 4.16 |
| CI9(208) | 5.68 | 7.34 | 5.16 | 9.40 |
| CI10(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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Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI3(38) | 30.8 | 107 | 29.4 | 58.3 |
| CI4(78) | 66.2 | 93.6 | 55.7 | 46.4 |
| CI4(79) | 78.2 | 124 | 91.4 | 67.8 |
| CI7(186) | 270 | 197 | 173 | 132 |

Surrogate Recoveries (%)

| | | | | | | | | |
|----------|-----|---|-----|---|-----|---|-----|---|
| CI3(34) | 198 | N | 188 | N | 187 | N | 185 | N |
| CI6(152) | 80 | | 70 | | 73 | | 65 | |



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 |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

| | | | | | | | | |
|----------|-------|---|-------|---|-------|---|-------|---|
| CI5(115) | 1.06 | U | 1.15 | U | 1.07 | U | 1.13 | U |
| CI5(118) | 0.846 | U | 0.912 | U | 0.852 | U | 0.897 | U |
| CI5(123) | 0.825 | U | 0.890 | U | 0.832 | U | 0.875 | U |
| CI5(124) | 0.524 | U | 0.566 | U | 0.529 | U | 0.556 | U |
| CI5(125) | 0.764 | U | 0.825 | U | 0.770 | U | 0.810 | U |
| CI5(126) | 0.846 | U | 0.912 | U | 0.852 | U | 0.897 | U |
| CI5(127) | 1.69 | U | 1.82 | U | 1.70 | U | 1.79 | U |
| CI6(128) | 0.805 | U | 0.868 | U | 0.812 | U | 0.853 | U |
| CI6(130) | 0.744 | U | 0.803 | U | 0.750 | U | 0.789 | U |
| CI6(131) | 0.484 | U | 0.522 | U | 0.488 | U | 0.513 | U |
| CI6(134) | 0.764 | U | 0.825 | U | 0.770 | U | 0.810 | U |
| CI6(135) | 0.504 | U | 0.544 | U | 0.508 | U | 0.534 | U |
| CI6(136) | 0.402 | U | 0.434 | U | 0.405 | U | 0.426 | U |
| CI6(137) | 1.13 | U | 1.22 | U | 1.14 | U | 1.19 | U |
| CI6(138) | 1.00 | U | 1.08 | U | 1.01 | U | 1.06 | U |
| CI6(139) | 1.06 | U | 1.15 | U | 1.07 | U | 1.13 | U |
| CI6(140) | 0.825 | U | 0.890 | U | 0.832 | U | 0.875 | U |
| CI6(141) | 0.561 | U | 0.605 | U | 0.566 | U | 0.595 | U |
| CI6(144) | 0.602 | U | 0.649 | U | 0.607 | U | 0.638 | U |
| CI6(146) | 1.25 | U | 1.35 | U | 1.26 | U | 1.32 | U |
| CI6(149) | 0.602 | U | 0.649 | U | 0.607 | U | 0.638 | U |
| CI6(151) | 0.703 | U | 0.759 | U | 0.709 | U | 0.746 | U |
| CI6(153) | 1.27 | U | 1.37 | U | 1.28 | U | 1.34 | U |
| CI6(154) | 0.561 | U | 0.605 | U | 0.566 | U | 0.595 | U |
| CI6(155) | 0.602 | U | 0.649 | U | 0.607 | U | 0.638 | U |
| CI6(156) | 1.00 | U | 1.08 | U | 1.01 | U | 1.06 | U |
| CI6(157) | 1.00 | U | 1.08 | U | 1.01 | U | 1.06 | U |
| CI6(158) | 0.561 | U | 0.605 | U | 0.566 | U | 0.595 | U |
| CI6(163) | 0.744 | U | 0.803 | U | 0.750 | U | 0.789 | U |
| CI6(164) | 0.443 | U | 0.478 | U | 0.447 | U | 0.470 | U |
| CI6(166) | 0.382 | U | 0.412 | U | 0.385 | U | 0.405 | U |
| CI6(167) | 3.36 | U | 3.62 | U | 3.38 | U | 3.56 | U |
| CI6(169) | 0.703 | U | 0.759 | U | 0.709 | U | 0.746 | U |
| CI7(170) | 0.744 | U | 0.803 | U | 0.750 | U | 0.789 | U |
| CI7(171) | 0.622 | U | 0.671 | U | 0.627 | U | 0.660 | U |
| CI7(172) | 0.504 | U | 0.544 | U | 0.508 | U | 0.534 | U |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

| | | | | | | | | |
|-----------|-------|---|-------|---|-------|---|-------|---|
| CI7(173) | 0.703 | U | 0.759 | U | 0.709 | U | 0.746 | U |
| CI7(174) | 0.927 | U | 1.00 | U | 0.934 | U | 0.983 | U |
| CI7(175) | 0.504 | U | 0.544 | U | 0.508 | U | 0.534 | U |
| CI7(176) | 0.443 | U | 0.478 | U | 0.447 | U | 0.470 | U |
| CI7(177) | 0.602 | U | 0.649 | U | 0.607 | U | 0.638 | U |
| CI7(178) | 0.886 | U | 0.956 | U | 0.893 | U | 0.940 | U |
| CI7(179) | 0.602 | U | 0.649 | U | 0.607 | U | 0.638 | U |
| CI7(180) | 1.08 | U | 1.17 | U | 1.09 | U | 1.15 | U |
| CI7(183) | 0.524 | U | 0.566 | U | 0.529 | U | 0.556 | U |
| CI7(184) | 0.423 | U | 0.456 | U | 0.426 | U | 0.448 | U |
| CI7(185) | 0.663 | U | 0.715 | U | 0.668 | U | 0.703 | U |
| CI7(187) | 0.302 | U | 0.325 | U | 0.304 | U | 0.320 | U |
| CI7(188) | 0.484 | U | 0.522 | U | 0.488 | U | 0.513 | U |
| CI7(189) | 0.703 | U | 0.759 | U | 0.709 | U | 0.746 | U |
| CI7(190) | 0.683 | U | 0.737 | U | 0.688 | U | 0.724 | U |
| CI7(191) | 0.866 | U | 0.934 | U | 0.873 | U | 0.918 | U |
| CI7(193) | 0.423 | U | 0.456 | U | 0.426 | U | 0.448 | U |
| CI8(194) | 1.29 | U | 1.39 | U | 1.30 | U | 1.37 | U |
| CI8(195) | 0.545 | U | 0.588 | U | 0.549 | U | 0.578 | U |
| CI8(197) | 0.504 | U | 0.544 | U | 0.508 | U | 0.534 | U |
| CI8(198) | 0.663 | U | 0.715 | U | 0.668 | U | 0.703 | U |
| CI8(199) | 0.984 | U | 1.06 | U | 0.992 | U | 1.04 | U |
| CI8(200) | 0.663 | U | 0.715 | U | 0.668 | U | 0.703 | U |
| CI8(201) | 0.504 | U | 0.544 | U | 0.508 | U | 0.534 | U |
| CI8(202) | 0.443 | U | 0.478 | U | 0.447 | U | 0.470 | U |
| CI8(203) | 0.642 | U | 0.693 | U | 0.648 | U | 0.681 | U |
| CI8(205) | 0.663 | U | 0.715 | U | 0.668 | U | 0.703 | U |
| CI9(206) | 1.04 | U | 1.13 | U | 1.05 | U | 1.11 | U |
| CI9(207) | 0.484 | U | 0.522 | U | 0.488 | U | 0.513 | U |
| CI9(208) | 0.524 | U | 0.566 | U | 0.529 | U | 0.556 | U |
| CI10(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 | |

Analyzed By Restucci Jr, Richard

9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI3(38) | 938 D | 868 D | 842 D | 785 D |
| CI4(78) | 518 D | 520 D | 552 D | 402 D |
| CI4(79) | 538 D | 502 D | 545 D | 382 D |
| CI7(186) | 270 D | 324 D | 444 D | 236 D |

Surrogate Recoveries (%)

| | | | | |
|----------|-----|----|----|-----|
| CI3(34) | 101 | 93 | 95 | 103 |
| CI6(152) | 92 | 91 | 86 | 93 |

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9/21/2017

Not Surrogate Corrected

S17-0369MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |

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Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |

Analyzed By Restucci Jr, Richard

Not Surrogate Corrected

9/21/2017

S17-0369MS-Master_315(PRC):FINAL



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 |
| CI3(38) | 777 | D |
| CI4(78) | 417 | D |
| CI4(79) | 391 | D |
| CI7(186) | 236 | D |

Surrogate Recoveries (%)

| | |
|----------|----|
| CI3(34) | 95 |
| CI6(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 | <p>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.</p> <p>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.</p> |
| 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 | <ul style="list-style-type: none"> No ICC exists for PRC compounds. CI5(84) and CI5(92) co-elute, as do CI5(85) and CI5(115) however, historical data has reported these as two separate peaks. These peaks |

| | | |
|---------------|---|-------------------------|
| | <p>are integrated as two separate peaks in all ICAL, ICC, CCV, and field samples to comply with the reporting criteria of the historical data.</p> <ul style="list-style-type: none"> 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 | <p>Two recovery exceedances noted. 136 RPD exceedances.</p> <p>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.</p> <p>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.</p> |

| | |
|--------------------|---|
| Surrogate Recovery | Surrogate compounds were added prior to extraction. The surrogate recoveries are calculated to measure extraction efficiency. |
| 40-120% recovery | <p>Four exceedances noted.</p> <p>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.</p> |

| | |
|--|---|
| 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. |
| $\leq 25\%$ 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. |
| $\leq 25\%$ difference individual; $\leq 15\%$ 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. |



It can be done

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 significantly 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 |



It can be done

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

CI5(84) and CI5(92) co-elute, as do CI5(85) and CI5(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 -0400

Supervisor Approval:

PM Approval:

peven@battelle.org
2017.09.20 08:03:45 -04'00'



It can be done

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 | CI5(96) | 37206 |
| SF0901.S | F3824.D | JM68 | CS | CI5(96) | 42176 |
| SF0901.S | F3825.D | JM69 | CS | CI5(96) | 40968 |
| SF0901.S | F3826.D | JM70 | CS | CI5(96) | 44632 |
| SF0901.S | F3827.D | JM71 | CS | CI5(96) | 49667 |
| SF0901.S | F3828.D | JM72 | CS | CI5(96) | 52742 |

L3 40968

(+) 81936

(-) 20484

| SEQUENCE: | FILE: | LEVEL: | TYPE: | PEAK: | AREA: | FLAG: |
|-----------|---------|----------------|-------|---------|-------|-------|
| SF0901.S | F3829.D | JG69 ICC | ICC | CI5(96) | 47351 | |
| SF0907.S | F4020.D | JM70 | CCV | CI5(96) | 31999 | |
| SF0907.S | F4021.D | CM918PB-P(0) | PB | CI5(96) | 27824 | |
| SF0907.S | F4022.D | CM919LCS-P(0) | LCS | CI5(96) | 22746 | |
| SF0907.S | F4023.D | CM920LCSD-P(0) | LCSD | CI5(96) | 35229 | |
| SF0907.S | F4024.D | K9638-P(0) | SA | CI5(96) | 64654 | |
| SF0907.S | F4025.D | K9639-P(0) | SA | CI5(96) | 57225 | |
| SF0907.S | F4026.D | K9640-P(0) | SA | CI5(96) | 60027 | |
| SF0907.S | F4027.D | K9641-P(0) | SA | CI5(96) | 78004 | |
| SF0907.S | F4029.D | JM71 | CCV | CI5(96) | 22602 | |



It can be done

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 | |



It can be done

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



It can be done

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



It can be done

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 | |



It can be done

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

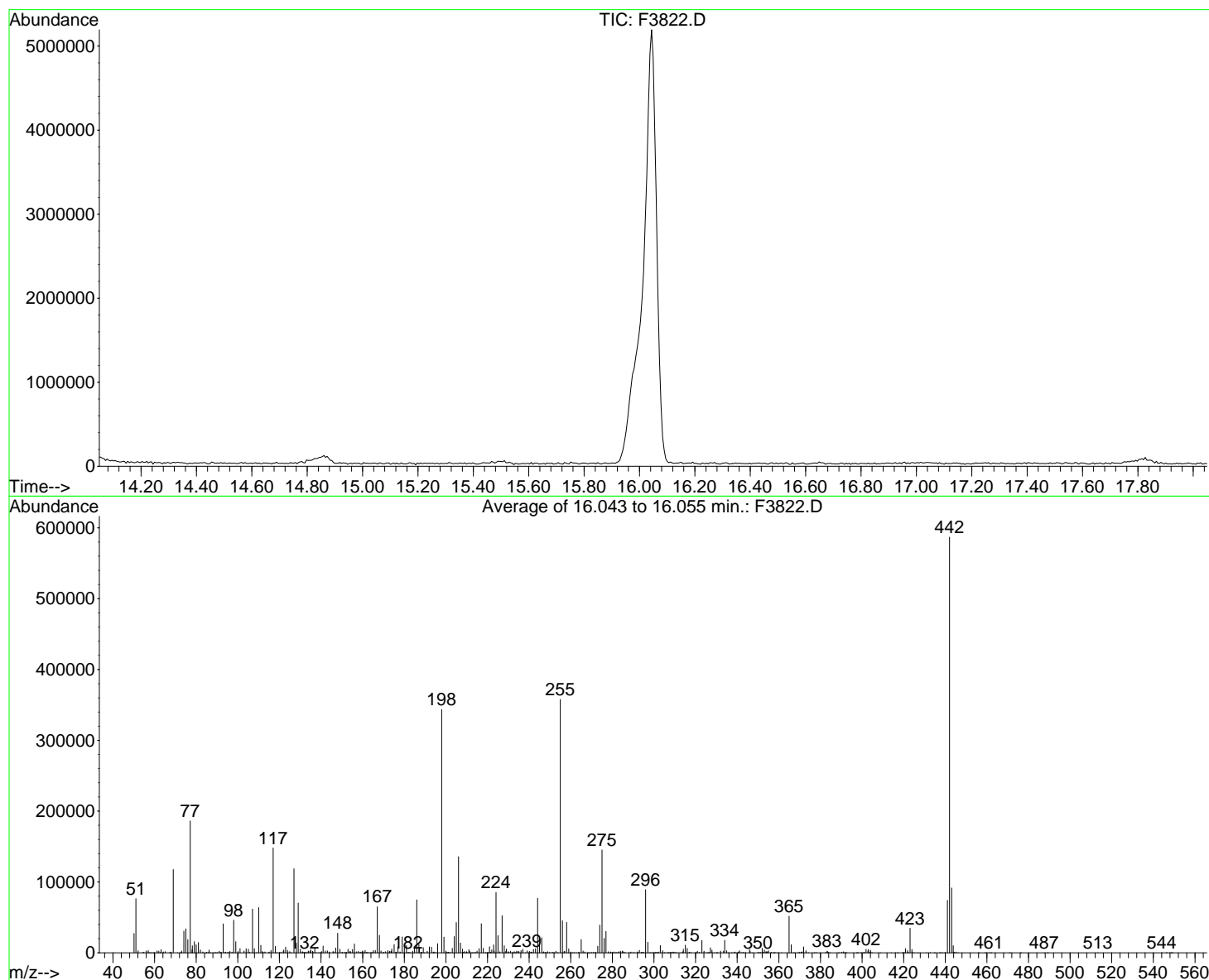
(+) 39312

(-) 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

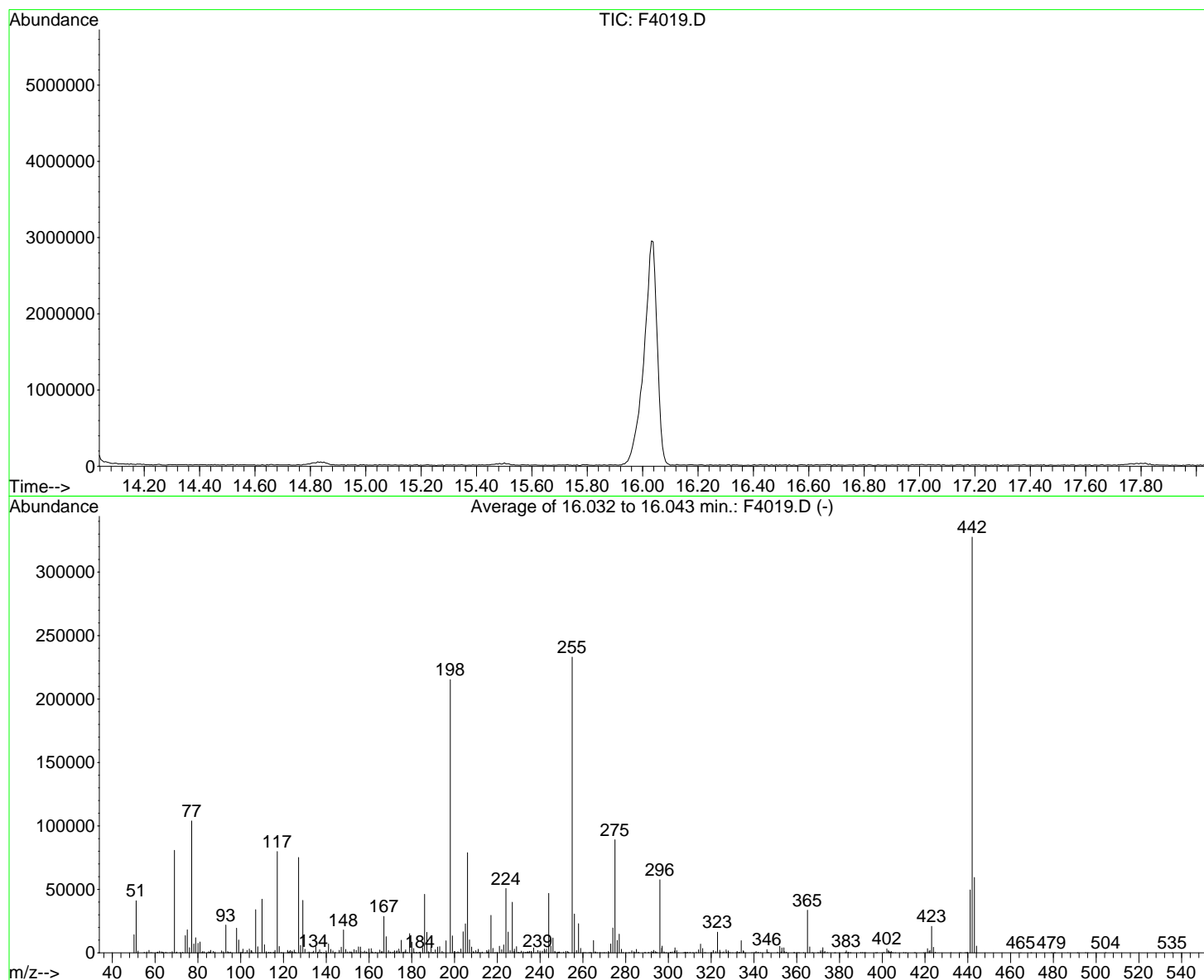


Spectrum Information: Average of 16.043 to 16.055 min.

| 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 |

Data File : G:\F\DATA\SF0908\F4099.D

Vial: 1

Acq On : 11 Sep 2017 5:27 pm

Operator: RR

Sample : JJ95

Inst : Inst. F

Misc : 5-315 DFTPP

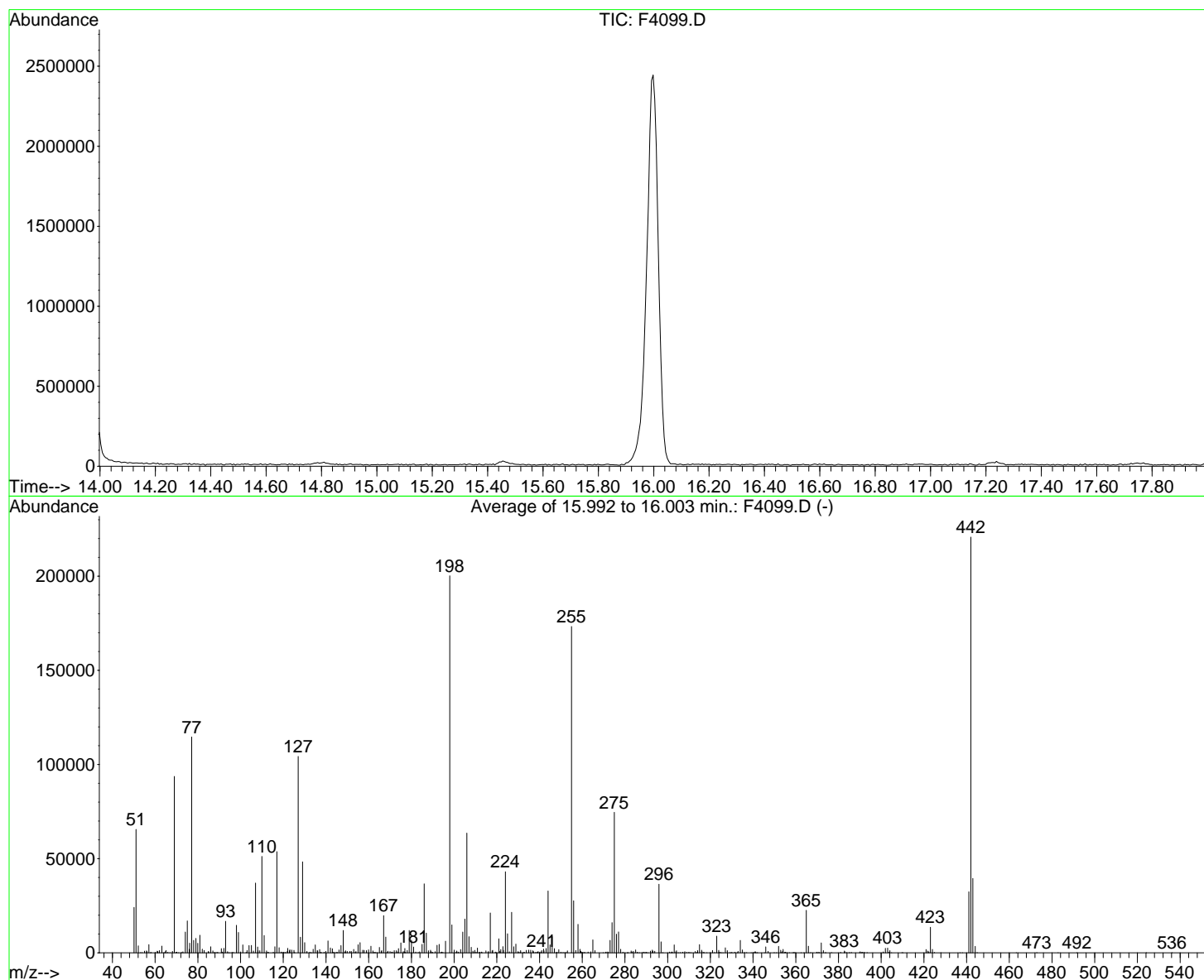
Multiplr: 1.00

MS Integration Params: rteint.p

Method : G:\F\DATA\MF0908.M (RTE Integrator)

Title : PCB-QNF NBH

Standard Mult: NA

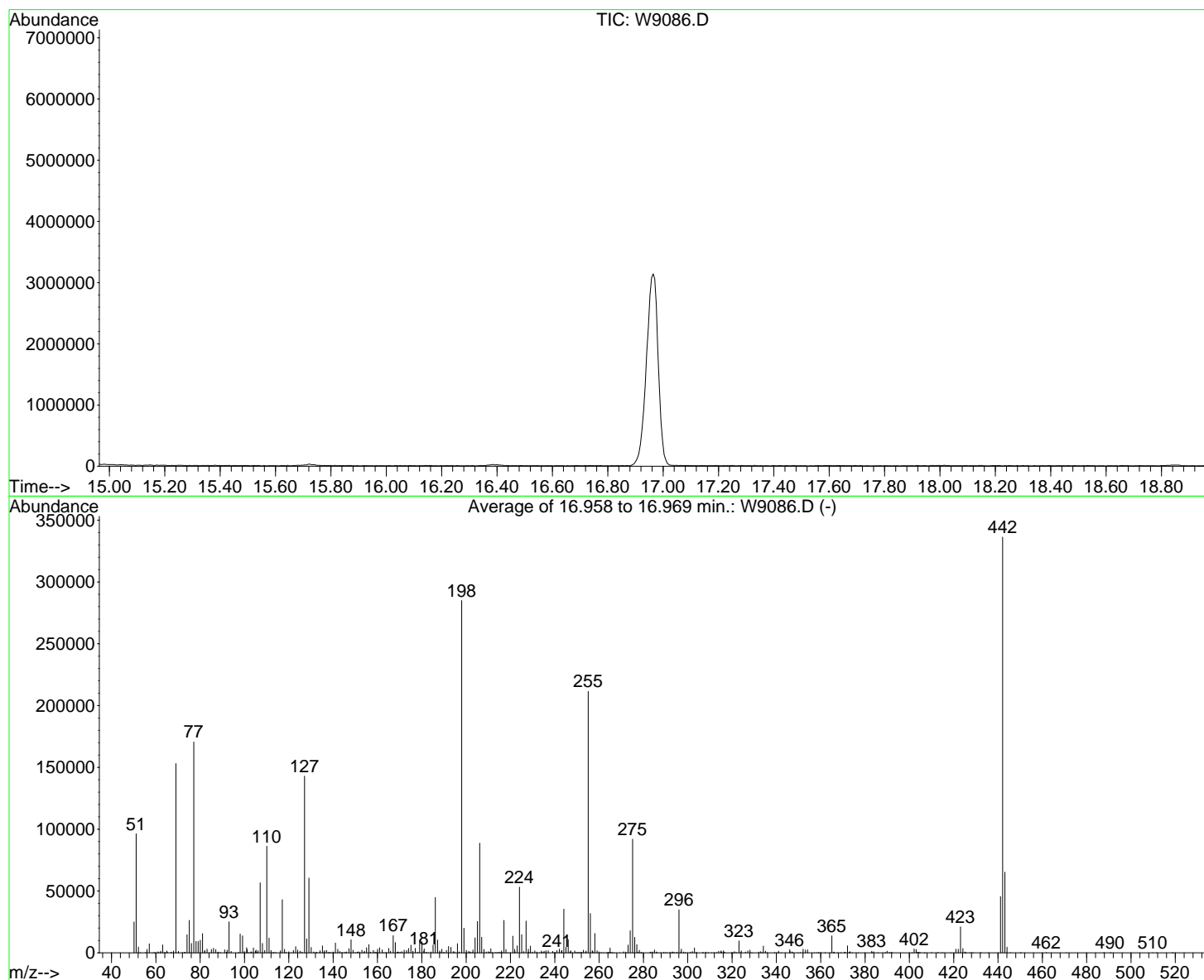


AutoFind: Scans 1909, 1910, 1911; Background Corrected with Scan 1893

| 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

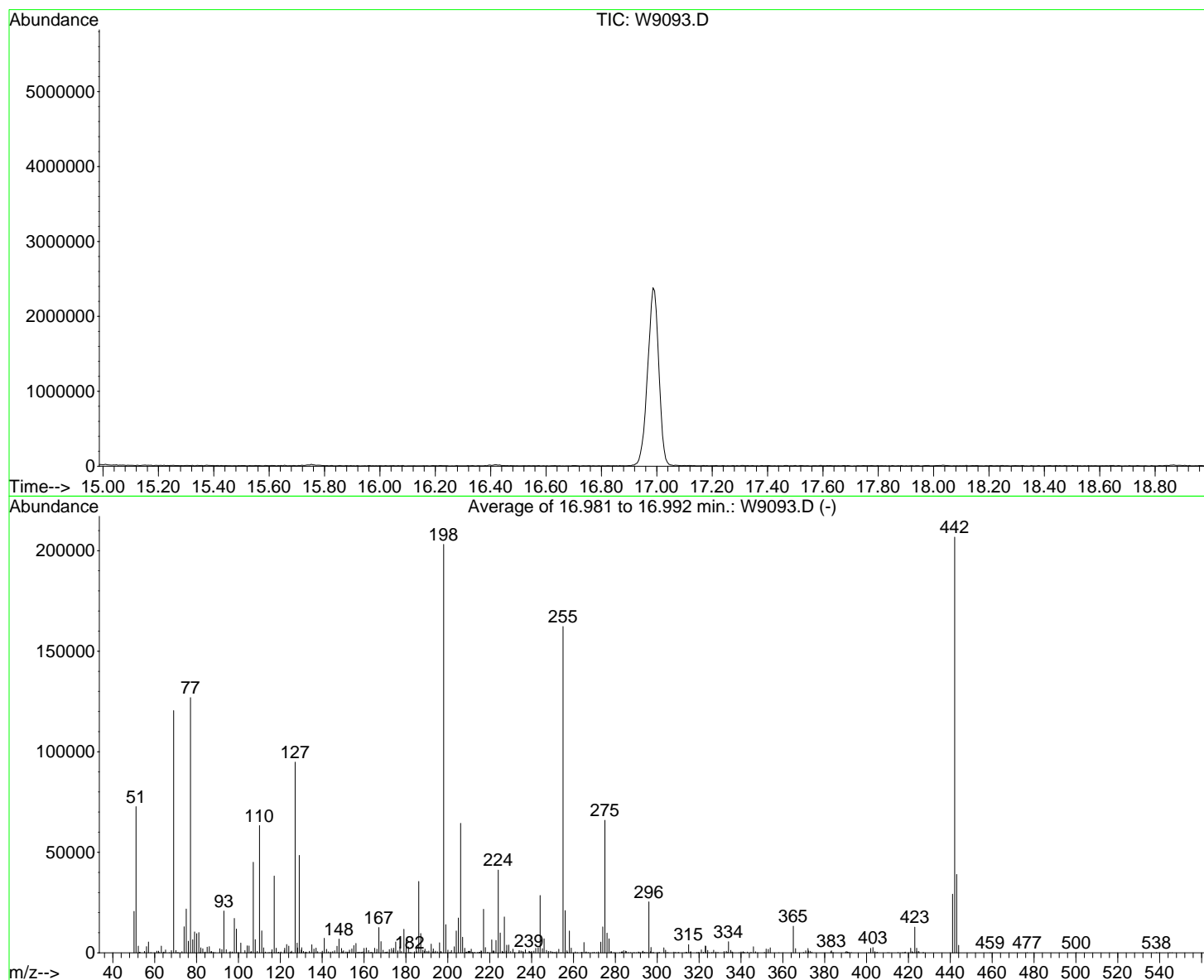


AutoFind: Scans 2078, 2079, 2080; Background Corrected with Scan 2060

| 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_{owS}) and K_{PEDS} .

- 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 | 0 |
| PCB-3 | 21.2 | 52.4 | 19.6 | 65.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-4 | 2080 | 2820 | 1880 | 14400 | 2.98 | 0 | 0 | 0 | 0 | 0 |
| PCB-5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-6 | 7150 | 7450 | 6140 | 25800 | 1.86 | 0 | 0 | 0 | 0 | 0 |
| PCB-7 | 116 | 144 | 94.4 | 195 | 1.3 | 0 | 0 | 0 | 0 | 0 |
| PCB-8 | 7060 | 8170 | 6080 | 25500 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-9 | 159 | 229 | 144 | 323 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-11 | 1190 | 1200 | 1040 | 2340 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-12 | 6.08 | 4.95 | 3.81 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-13 | 3660 | 3970 | 3180 | 10600 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-15 | 3690 | 3830 | 2960 | 8590 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-16 | 313 | 483 | 239 | 1340 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-17 | 13500 | 12400 | 11100 | 28800 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-18 | 26300 | 23400 | 22300 | 58400 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-19 | 1480 | 1540 | 1380 | 6500 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-22 | 2240 | 2460 | 1920 | 3420 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-24 | 24.8 | 33.6 | 18.9 | 23.9 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-25 | 29800 | 23500 | 24900 | 48600 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-26 | 40600 | 32700 | 33800 | 48700 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-27 | 3750 | 3640 | 3410 | 11100 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-28 | 50100 | 38400 | 41400 | 65900 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-29 | 10.9 | 12.3 | 8.8 | 5.36 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-30 | 10.9 | 10.8 | 9 | 12 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-31 | 51500 | 41100 | 41300 | 58900 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-32 | 9160 | 8420 | 7770 | 20600 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-33 | 1450 | 1600 | 1200 | 2500 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-37 | 1400 | 1080 | 1000 | 1320 | 0 | 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 | 0 |
| PCB-41 | 0 | 13.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-42 | 7020 | 5320 | 5840 | 10700 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-43 | 5200 | 4910 | 666 | 12400 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-44 | 11600 | 9700 | 9690 | 20000 | 4.8 | 0 | 0 | 0 | 0 | 0 |
| PCB-45 | 392 | 461 | 314 | 1260 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-46 | 1140 | 1090 | 1020 | 2290 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-47 | 18300 | 13100 | 15400 | 25300 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-48 | 3980 | 4080 | 2910 | 8500 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-49 | 71400 | 56000 | 97200 | 83600 | 1.87 | 0 | 0 | 0 | 0 | 0 |
| PCB-50 | 79 | 64.6 | 66.4 | 95.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-51 | 3590 | 2970 | 3400 | 8390 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-52 | 75000 | 53400 | 108000 | 84000 | 3.13 | 0 | 0 | 0 | 0 | 0 |
| PCB-53 | 8950 | 7180 | 8020 | 18400 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-54 | 52.5 | 55.9 | 46.8 | 92.8 | 0 | 0.734 | 0.562 | 0 | 0 | 0 |
| PCB-56 | 827 | 353 | 286 | 216 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-60 | 204 | 179 | 157 | 106 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-63 | 234 | 206 | 184 | 206 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-64 | 5260 | 4670 | 4380 | 7850 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-66 | 3200 | 2470 | 2630 | 2260 | 0 | 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 | 0 |
| PCB-71 | 9520 | 7210 | 8280 | 16700 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-74 | 4280 | 2820 | 3210 | 2290 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-75 | 913 | 376 | 868 | 349 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-77 | 259 | 200 | 206 | 125 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-80 | 32 | 31.4 | 25.7 | 19.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-81 | 16.6 | 11.2 | 8.94 | 10.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-82 | 120 | 105 | 101 | 98 | 0 | 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 | 0 |
| PCB-139 | 103 | 84.2 | 86.4 | 108 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-140 | 10.8 | 8.81 | 9.18 | 13.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-141 | 138 | 125 | 129 | 153 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-144 | 109 | 73.9 | 80.2 | 116 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-146 | 691 | 572 | 608 | 757 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-149 | 8510 | 6920 | 7200 | 13500 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-151 | 935 | 723 | 825 | 1880 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-153 | 5070 | 4380 | 4640 | 7260 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-154 | 448 | 385 | 408 | 584 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-155 | 3.55 | 4.19 | 3.37 | 4.29 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-156 | 192 | 168 | 171 | 212 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-157 | 37.1 | 34.2 | 33.9 | 42.2 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-158 | 276 | 267 | 276 | 316 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-163 | 1760 | 1540 | 1700 | 2920 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-164 | 290 | 248 | 237 | 281 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-166 | 27.3 | 23.9 | 24.4 | 27.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-167 | 178 | 156 | 156 | 182 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-169 | 6.84 | 0 | 0 | 8.1 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-170 | 141 | 132 | 127 | 177 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-171 | 45 | 42.4 | 38.8 | 58.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-172 | 29.3 | 27.1 | 25.9 | 34.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-173 | 4.25 | 4.08 | 4.09 | 5.43 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-174 | 87.1 | 81.8 | 77.9 | 110 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-175 | 13.4 | 12.9 | 10.8 | 17.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-176 | 21.2 | 21.7 | 19.7 | 26 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-177 | 73 | 69.4 | 63.5 | 89.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-178 | 73.7 | 69.9 | 70.1 | 106 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-179 | 153 | 138 | 139 | 205 | 0 | 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 | 0 |
| PCB-183 | 126 | 113 | 111 | 162 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-184 | 0 | 2.97 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-185 | 15.7 | 13.6 | 12.8 | 16.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-187 | 483 | 452 | 435 | 659 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-188 | 11.5 | 11.3 | 9.79 | 15.7 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-189 | 11.5 | 11 | 9.33 | 15.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-190 | 46.1 | 41.7 | 41.7 | 57.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-191 | 10.7 | 10.8 | 9.91 | 13.8 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-193 | 19.5 | 20.2 | 26 | 34.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-194 | 31.9 | 34.4 | 28 | 54 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-195 | 12.8 | 13.5 | 10.2 | 18.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-197 | 3.56 | 3.43 | 3.08 | 4.26 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-198 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-199 | 50.4 | 49.3 | 45 | 83.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-200 | 6.84 | 7.67 | 5.75 | 9.24 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-201 | 7.97 | 8.11 | 6.68 | 9.07 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-202 | 15.8 | 16.2 | 13.7 | 24 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-203 | 38.6 | 42 | 34.9 | 62.3 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-205 | 4.13 | 4.46 | 3.93 | 5.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-206 | 13.1 | 15.8 | 11.1 | 27.6 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-207 | 3.33 | 2.66 | 2.42 | 4.16 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-208 | 5.68 | 7.34 | 5.16 | 9.4 | 0 | 0 | 0 | 0 | 0 | 0 |
| PCB-209 | 4.62 | 5.74 | 4.1 | 6.48 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total PCB | 591634 | 475298 | 573553 | 885422 | 17 | 3 | 2 | 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 equilibration 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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 | equilibrium 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



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 Northing: 2707168.667 All measurements are ± 0.1 feet
Core Sample ID: _____ Easting: 815681.215 Penetration (ft.): 3.5
Date Collected/Initials: 11 Sept 2017 / MWF GPS Accuracy (ft.): H: 0.041 V: 0.059 Recovery (ft.): 3.3
Time: 0854 Water Depth (ft.): 2.5 Processed Date/Initials: 9/13/17 MWM
Collection Mechanism: Piston Core Water Surface Surveyed Elevation (ft NAVD 88): -0.598

| 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-AA-05-0.0-0.5 OIL-H-SOL NEGATIVE (Green) | 0.0-0.5 | | ML | SILT LOAM | 2.5Y3/1-2.5Y2.5/1 | SOFT | FINE SAND | PETROL | SLIGHT SKEIN |
| AS-AA-05-0.5-1.0 OIL-H-SOL NEGATIVE (Green) | 0.5-1.8 | | ML | SILTY CLAY LOAM | 2.5Y3/1 | FIRM | FINE SAND | H ₂ S | LITTLE CLAY SHELL |
| AS-AA-05-1.8-3.3 OIL-H-SOL NEGATIVE (Green) | 1.8-3.3 | | ML | SILTY CLAY LOAM | 2.5Y3/1 | FIRM | SILT | NONE | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-06Northing: 2707168.586All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815736.833Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MRFGPS Accuracy (ft.): H: 0.041 V: 0.060Recovery (ft.): 3.3Time: 09:07Water Depth (ft.): 7.2Processed Date/Initials: 9/11/17 MUMCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): -0.482

| 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-AA-06-0.0-0.5 RA-C004501 OR-H-S NEUTRAL (GREEN) | 0.0-0.4 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | SOFT | SILT | PEROX | SUGGY SILTY |
| AS-AA-06-0.4-0.6 RA-C004501 OR-H-S NEUTRAL (GREEN) | 0.4-0.6 | | OL/ML | SILT LOAM | 2.5Y 3/1 | SOFT | SILT | PEROX/H ₂ S | SUGGY SILTY |
| AS-AA-06-0.6-1.1 RA-C004502 OR-H-S NEUTRAL (GREEN) | 0.6-1.2 | | ML | SILT LOAM | 2.5Y 3/1 | SOFT | F.SAND | H ₂ S | FINE SILENT FRAGMENT |
| AS-AA-06-1.1-1.2 RA-C004503 OR-H-S NEUTRAL (GREEN) | 1.2-3.3 | | ML | SILT LOAM | 2.5Y 3/1 | FIRM | F.SAND | H ₂ S | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-36Northing: 2707086.670All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815830.120Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017 / MRFGPS Accuracy (ft.): H: 0.034 V: 0.059Recovery (ft.): 3.5Time: 0930Water Depth (ft.): 6.4

Processed Date/Initials: _____

Collection Mechanism: Piston CoreWater 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 CUTS-DIAPHRAGM TRIAXIAL SITE | 0.0-0.5 | | OL | ORGANIC SILT | 2.5Y 3S1 | Soft | SILT | Pure | |
| ASB-36 0.5-1.2 CUTS-DIAPHRAGM CONSOLIDATION | 0.5-1.2 | | ML/OL | SILT/CLAY | 2.5Y 3/1 | Soft | SILT | | |
| ASB-36 1.2-1.7 CUTS DIAPHRAGM TRIAXIAL SITE | 1.2-1.7 | | ML | SILT/CLAY LOAM | 2.5Y 3/1 | Firm | Fine SAND | | |
| ASB-36 1.7-2.4 CUTS DIAPHRAGM STRENGTH | 1.7-2.4 | | ML | SILT/CLAY LOAM | 2.5Y 3/1 | Firm | Fine SAND | | |

Comments:

Rep 1. Variable bottom

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
//// - Mixed Zone

Project #: 100043429

Vessel: *Gale Force*

Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: ASB-36

Northings: 2707085.791

All measurements are ± 0.1 feet

Core Sample ID:

Easting: 815829.

Penetration (ft.): 3.5

Date Collected/Initials: 11 Sept 2017/MRF

GPS Accuracy (ft.): H: 0.037 V: 0.070

Recovery (ft.): 3.5

Time: 00:09:36 09:39

Water Depth (ft.): 6.3

Processed Date/Initials:

Collection Mechanism: Piston Core

Water Surface Surveyed Elevation (ft NAVD 88): -0.018

[illegible]

Comments:

Rep 2. Variable bottom ① S/B PBL 11 Sept 17

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 / MUMFIS B Water Surface Elevation (feet NGVD 29) -0.34 ft
 Collection Method 4" LEXAL LINE C Length of Coring Assembly (feet) _____
 Date 9 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
 Elevation of Sediment Water Interface Relative to Core
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water
 H Depth (NGVD 29): B-A -6.64 ft

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|------------------------|------------|-------------|-------|------------------------------------|
| 0-0.5 | | OL | SANDY SILT | 2.5Y 2.5/1 | VERY SOFT | PEWEE | TAKE FINE SAND |
| 0.5-3.7 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | SOFT | - | |
| 3.7-5.0 | | SW | GRAVELLY MED SAND LOAM | 2.5Y 4/1 | LOOSE | - | LITTLE BROWN GRAVEL - W/ FINE SAND |
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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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

| 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 Brown GRASS - med FINE SAND |
| 6.8-10 | | RW | Recovery | | | | |
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1.8 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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

10-15 ft

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|--------------------|--------------|-------------|------|--|
| 10-13.8 | | SW | Grainy medium sand | 2-5/4 4/1 | Loose | - | LITTLE ROUNDED GRAIN - TRACE FINE SAND |
| 13.8-15 | | NO RECOVERY | | | | | |
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3.2 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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|-------------------|---------|-------------|------|---|
| 15-17.5 ft | | SW | GRAVELLY MED SAND | 2.5/4/1 | Loose | - | LITTLE REMAINS GRAVEL - TRACE FINE SAND |
| 17.5-20 | | REC | RECON | | | | |
| 20 ft | | BE | BECK | | | | NO TILL PRESENT AT THIS LOCATION |
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2.5 ft of Recon



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 Northing: 2706937.431 All measurements are ± 0.1 feet
Core Sample ID: _____ Easting: 815728.443
Date Collected/Initials: 11 Sept 2017/MRF GPS Accuracy (ft.): H: 0.049 V: 0.072 Penetration (ft.): 3.4
Time: 1023 Water Depth (ft.): 9.0 Recovery (ft.): 3.3
Collection Mechanism: Piston Core Processed Date/Initials: MM 9/18/17
Water Surface Surveyed Elevation (ft NAVD 88): 0.812

| 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 UNCONS. FINE TRAY | 0.0-0.5 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | Very Soft | SILT | Pearl | |
| ASB-37- 0.5-1.2 ORG. SILT- CLAY | 0.5-1.2 | | M/OL | SILT/CLAY | 2.5Y 3/1 | Soft | SILT | Mud | |
| ↓ OFFICE C#2 | 1.2+ | | SP | Shale LOAM | 2.5Y 3/1- 7.5YR 4/1 | Firm | MED SAND | None | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-37Northing: 2706936.887All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815726.481Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MAFGPS Accuracy (ft.): H: 0.051 V: 0.071Recovery (ft.): 3.5Time: 1033Water Depth (ft.): 9.1Processed Date/Initials: 9/18/17 MWHCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 1.329

| 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 UNKNOWN DRAINAGE THERMAL STRIKE | 1.2-1.7 | | SM | SANDY LOAM | 2.5Y 3/1 | FIRM | MED SAND | MOIST | |
| ASB-37 1.7-2.4 UNKNOWN COMPRESSION SUSPENDED | 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 (MOMIS) B Water Surface Elevation (feet NGVD 29) -0.620 ft
 Collection Method 4" LEVY LINE C Length of Coring Assembly (feet)
 Date 4 October 2007 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
 Elevation of Sediment Water Interface Relative to Core
 G Bottom (NGVD 29): F+E
 Elevation of Sediment Water Interface Relative to Water
 H Depth (NGVD 29): B-A -8.42 ft

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|--------------|------------|-------------|-------|---|
| 0.0-0.3 | | DL | SANDY SILT | 2.5Y 2.5/6 | VERY SOFT | PETEL | TRACE FINE SAND |
| 0.3-1.0 | | OL/ML | SILT LOAM | 2.5Y 3/6 | SOFT | - | TRACE FINE SAND |
| 1.0-4.7 | | SP | LOAMY MEDIUM | 7.5YR 4/6 | LOOSE | - | TRACE PLANKTONIC CORAL NO THICK MAMMIE DEPOSITS HERE |
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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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|-----------------|-----------|-------------|------|---|
| 5-9.4 | | SP | Loamy fine sand | 2.5/1 5/3 | Loose | - | White sand, little very fine sand, trace med sand |
| 9.4-10 | | FL | Recovery | | | | |
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4.4 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

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|---------------------|---------------|--|--|-------|
| Core Location ID | <u>ASB-37</u> | 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 _____ | | |

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|-----------------|------------|-------------|------|---|
| 10-12.4 | | SW | Loamy Med Silty | light grey | Loose | - | LITTLE ROMANUS CORIUM, LITTLE FINE SAND |
| 12.4-15 | | NO RECOVERY | | | | | |
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2.4 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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H 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 | light tan | loose | - | little coarse sand little fine sand |
| 16.9-17.5 | | GW | very coarse sand | light tan | loose | - | rounded coarse little med sand trace fine sand |
| 17.5-20 | | Mo | NEC | - | No TLL | Passant | |
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2.5 ft of Recovery



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/MVF 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 MVH
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 | Petroleum | |
| ASB-38- 0.5-1.2 ID CAS | 0.5-1.2 | | MC/OL | SILT LOAM | 2.5Y 3/1 | Soft | SILT | Mud | |
| ASB-38- 2.2-2.7 TRAP | 2.2-2.7 | | ML | SILT LOAM | 2.5Y 3/1 | Firm | Fine Sand | Mud | |
| ASB-38- 2.7-3.4 Unid. Lam. Structure | 2.7-3.4 | | ML | SILT LOAM | 2.5Y 3/1 | Firm | Fine Sand | Mud | |

Comments:

Rep 2.

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone

Project #: 100043429

Vessel: *Gale Force*

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: 815 627.00

Penetration (ft.): 3.5

Date Collected/Initials: 11 Sept 2017 / JRF

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

[illegible]

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" Lateral Core 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
 Elevation of Sediment Water Interface Relative to Core
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water
 H Depth (NGVD 29): B-A -6.40 ft

| 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 SAGG (TIL) MUD TUBE |
| 0.5-1.0 | | ML OL | SILT LOAM | 2.5Y 2/1 | SOFT | - | LITTLE FINE |
| 1.0-2.5 | | ML | SILTY CLAY LOAM | 2.5Y 2/1 | FIRM | H ₂ S | LITTLE CLAY SHALE |
| 2.5-4.1 | | SM | MED SANDY LOAM | 7.5YR 3/3 | LOOSE | H ₂ S | LITTLE MEDIUM SAND |
| 4.1-5.0 | | SW | COARSE MED SAND | 5Y 3/1 | LOOSE | H ₂ S | LITTLE MED, COARSE TILLY FINE SAND |
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5.0 ft of Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

Core Location ID MS-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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

5-10 ft

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|---------------------|-----------|-------------|------|--|
| 6.0-7.0 | | SW | LOAM MAY SAND | SY 2/1 | LOOSE | - | LITTLE MUD, COARSE SAND TRACE FINE SAND |
| 7.0-9.1 | | ll | ll | ll | ll | ll | ll |
| 9.1-10.0 | | NO | RECORDING | | | | |
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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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|-------------------|-------|-------------|------|---|
| 10-13.4 | | SW | Gravelly med sand | 5/4/1 | Loose | - | LITTLE RAINING CORREL LITTLE MED CORREL SAND |
| 13.4-15.0 | | Med Recam | | | | | VOC OPEN |
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Recam 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) _____
 Elevation of Sediment Water Interface Relative to Core _____
 G Bottom (NGVD 29): F+E _____
 Elevation of Sediment Water Interface Relative to Water _____
 H Depth (NGVD 29): B-A _____

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|-----------------|----------|-------------|------|---|
| 15-17.0 | | SW | Grassy MED SAND | SP 4/1 | Loose | VOC | LITTLE RAYON CHALK LITTLE MED SAND LITTLE COARSE SAND |
| 17.0-18.2 | | SP | MED SAND | 7.5% 4/1 | Loose | - | LITTLE FINE SAND -VAC LOOSE SAND |
| 18.2-20 | | NO | Recay | | | | |
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Recay 3.2 ft

Attachment 8 Sediment Core Log

Sediment Core Log

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|---------------------|---------------|---|--|-------|
| Core Location ID | <u>ASB-38</u> | 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) _____ | | |
| | | Elevation of Sediment Water Interface Relative to Core _____ | | |
| G | | Bottom (NGVD 29): F+E _____ | | |
| | | Elevation of Sediment Water Interface Relative to Water _____ | | |
| H | | Depth (NGVD 29): B-A _____ | | |

20-23 ft

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|---------------|-----------------|-------------|------|--|
| 20-22.3 | | SP | Loamy med. sh | 7.5-10.4 4/4 | Loose | — | Light med, coarse sand - trace fine sand |
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2.3 ft Recovery

Attachment 8 Sediment Core Log

Sediment Core Log

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|---------------------|---------------|--|--|-------|
| Core Location ID | <u>ASB-38</u> | 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 _____ | | |

| Elevation (NGVD) | Core Diagram | Lithology - USCS code | Type | Color | Consistency | Odor | Comments |
|------------------|--------------|-----------------------|---------------------|--------|-------------|------|--|
| 230-24.5 | | GC | very gray claystone | 5Y/6.5 | very stiff | None | Some foraminifera. MIN contains one small fossil |
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2.0 ft Recovery



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-09Northing: 2707123.245All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815842.026Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MAFGPS Accuracy (ft.): H: 0.039 V: 0.068Recovery (ft.): 3.3Time: 0918Water Depth (ft.): 7.6Processed Date/Initials: 9/14/17 MWMCollection Mechanism: Piston CoreWater 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 0.0-0.3 OIL-H-SOIL NEGATIVE (GREEN) | 0.0-0.3 | | OL | OLIGOMER SILT | 2.5Y 2.5/1 | VERY SOFT | FINE SAND | PELLETS | SILTY SILT |
| AS-BB-09 0.3-0.8 OIL-H-SOIL NEGATIVE (GREEN) | 0.3-0.8 | | ML/OL | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | H ₂ S | |
| AS-BB-09 0.8-1.3 OIL-H-SOIL NEGATIVE (GREEN) | 0.8-1.4 | | ML | SILT LOAM | 2.5Y 3/1 | FIRM | SILT | NOTIC | |
| AS-BB-09 1.4-3.3 OIL-H-SOIL NEGATIVE (GREEN) | 1.4-3.3 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | MED SAND | PLUMS | TRACE MEDIAN SAND |
| AS-BB-09 2.8-3.3 OIL-H-SOIL NEGATIVE (GREEN) | | | | | | | | | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-09Northing: 2707067.920All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815896.112Penetration (ft.): 3.5Date Collected/Initials: 11 SEPT 2017 / MAFGPS Accuracy (ft.): H: 0.038 V: 0.066Recovery (ft.): 3.4Time: 0951Water Depth (ft.): 7.4Processed Date/Initials: 9/12/17 MWMCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 0.242

| 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-H-SOIL NEGATIVE (BATCH) | 0.0-1 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | VERY SOFT | FINE SAND | PETROL | SMALL SHELL, TRACE GASIMPO SHELL |
| AS-CC09-1.0-1.5 OIL-H-SOIL NEGATIVE (BATCH) | 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-H-SOIL NEGATIVE (BATCH) | 1.0-3.4 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | FINE SAND | MOIST | TRACE CLAM SHELL |
| AS-CC09-2.9-3.4 OIL-H-SOIL NEGATIVE (BATCH) | | | | | | | | | |

Comments:

1ST ATTEMPT: No good
2ND ATTEMPT: no good

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-09Northing: 2707012.296All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815894.503Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MRFGPS Accuracy (ft.): H: 0.046 V: 0.070Recovery (ft.): 3.4Time: 1014Water Depth (ft.): 8.0Processed Date/Initials: 9/13/17 MWMCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 0.705

| 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-SOL NEGATIVE (GASPH) | 0.0-3 | | OL | OLIGATE SILT | 2.5Y 2.5/1 | VERY SOFT | FINE SAND | PETROL | |
| AS-DD-09-0.5-1.0 OIL-N-SOL NEGATIVE (GASPH) | 0.5-1.0 | | MY OL | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | NONE | |
| AS-DD-09-1.0-1.5 OIL-N-SOL NEGATIVE (GASPH) | 1.0-3.4 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | SILT | CLZS | LITTLE CLAY SHELL |
| AS-DD-09-2.9-3.4 OIL-N-SOL NEGATIVE (GASPH) | | | | | | | | | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\\\ - Mixed Zone



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-FF-08Northing: 2706915.104All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815841.236Penetration (ft.): 3.3Date Collected/Initials: 11 Sept 2017/MAFGPS Accuracy (ft.): H: 0.051 V: 0.075Recovery (ft.): 3.3Time: 1040Water Depth (ft.): 0 8.9 9.1Processed Date/Initials: 9/15/17 MWMCollection Mechanism: Piston CoreWater 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-FF08-0.0-0.3 | 0.0-0.3 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | VERY SOFT | FINE SAND | PETROL | SLIGHT STINK |
| OIL-N-SOL | 0.3-1.2 | | ML | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | H ₂ S | |
| NEGATIVE (GREEN) | 1.2-3.3 | | MC | SILT CLAY LOAM | 2.5Y 3/1 | FINE | SILT | H ₂ S | |
| AS-FF08 1.2-1.7 | | | | | | | | | |
| OIL-N-SOL | | | | | | | | | |
| NEGATIVE (GREEN) | | | | | | | | | |
| AS-FF08 2.8-3.3 | | | | | | | | | |
| OIL-N-SOL | | | | | | | | | |
| NEGATIVE (GREEN) | | | | | | | | | |

Comments:

O/S/B PRE 11/24/2017

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
//// - Mixed Zone



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-08Northing: 2706861.102All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815844.297Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017 / MWFGPS Accuracy (ft.): H: 0.086 V: 0.075Recovery (ft.): 3.4Time: 1059Water Depth (ft.): 9.2Processed Date/Initials: 8/14/17 MWMCollection Mechanism: Piston CoreWater 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-H-SOIL NEGATIVE (GREEN) | 0.0-0.3 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | VERY SOFT | SILT | PETROL | SLIGHT SHEEN |
| AS-GG08-1.4-1.9 OIL-H-SOIL NEGATIVE (GREEN) | 0.3-1.4 | | ML/OL | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | PETROL | SLIGHT SHEEN |
| AS-GG08-2.9-3.4 OIL-H-SOIL NEGATIVE (GREEN) | 1.4-3.4 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | SILT | H ₂ S | TRACE CLAY SHEEN |

Comments:

Visibly Contaminated Layer Legend

xxxx - Visibly Contaminated

\\ - Mixed Zone



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-07Northing: 2706752.479All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815787.279Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MAFGPS Accuracy (ft.): H: 6.054 V: 0.065Recovery (ft.): 3.3Time: 1108Water Depth (ft.): 8.8Processed Date/Initials: 9/13/17-MUMCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 1.411

| 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-II07-00-0.5 OIL-H-SOIL NEGATIVE (GREEN) | 0-1.2 | | ML | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | lt 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-II07-1.7 OIL-H-SOIL NEGATIVE (GREEN) | 1.6-3.0 | | ML | SILT LOAM | 2.5Y 3/1 | FIRM | SILT | None | |
| AS-II07-2.5-3.0 OIL-H-SOIL NEGATIVE (GREEN) | 3.0-3.3 | | PE | FIBROUS PEAT | 7.5YR 3/3 | SOFT/FIRM | DISC. FINE SAND | SEMI | FIBROUS PEAT, TRACE MISC. FRAGMENTS |

Comments:

1st ATTEMPT: NO GOOD

Visibly Contaminated Layer Legend

xxxx - Visibly Contaminated

\\\\\\ - Mixed Zone



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-07Northing: 2706702.590All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815793.865Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017/MREGPS Accuracy (ft.): H: 0.041 V: 0.075Recovery (ft.): 3.4Time: 1320Water Depth (ft.): 10.6Processed Date/Initials: 9/12/17 MWMCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 2.077

| 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 | 0.0-0.6 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | SOFT | SILT | PETROL | |
| OL-H-SIL MELANIN (USCSM) | 0.6-1.5 | | ML OL | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | H ₂ S | |
| AS-JJ07- 1.7-2.2 | 1.5-1.7 | | SW SM | MEDIUM SANDY LOAM | 2.5Y 3/1 | SOFT | MED SAND | MOIST | TRANSITION TO NATIVE |
| OL-H-SIL MELANIN (USCSM) | 1.7-3.4 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | FINE SAND | MOIST | |
| AS-JJ07- 2.9-3.4 | | | | | | | | | |
| OL-H-SIL MELANIN (USCSM) | | | | | | | | | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone

Project #: 100043429

Vessel: *Gale Force*

Chief Scientist: M. Fitzpatrick

Survey Name: Aerovox DNAPL Data Gap Sampling

Station ID: AS-KK-07

Northing: 2706648.100

All measurements are ± 0.1 feet

Core Sample ID:

Easting: 015788.174

Penetration (ft.): 3.5

Date Collected/Initials: 11 Sept 2017/MKF

GPS Accuracy (ft.): H: 0.040 V: 0.080

Recovery (ft.): 3.5

Time: 1333

Water Depth (ft.): 10.0

Processed Date/Initials: 9/12/17 MWM

Collection Mechanism: Piston Core

Water Surface Surveyed Elevation (ft NAVD 88): 1.797

| 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-H-SOL NEGATIVE (GROSS) | 0-0.4 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | SOFT | FINE SAND | PETROL | SLIGHT SHEEN |
| AS-KK07. 1.9-2.4 OIL-H-SOL NEGATIVE (GROSS) | 0.4-1.9 | | ML/OL | SILT CLAY | 2.5Y 3/1 | SOFT | FINE SAND | PETROL | |
| AS-KK07. 3.0-3.5 OIL-H-SOL NEGATIVE (GROSS) | 1.9-3.5 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | FINE SAND | H ₂ S | THREE CLAY SHELL TO 2.8 ft |

Comments:

Visibly Contaminated Layer Legend
 xxxx - Visibly Contaminated
 \\\ - Mixed Zone



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-02 Northing: 2706596.474 All measurements are ± 0.1 feet
Core Sample ID: _____ Easting: 815535.524
Date Collected/Initials: 11 Sept 2014/MAF GPS Accuracy (ft.): H: 0.041 V: 0.075 Penetration (ft.): 3.5
Time: 1415 Water Depth (ft.): 6.1 Recovery (ft.): 3.5
Processed Date/Initials: 9/13/17 MUM
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) | 0.0-0.4 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | Very Soft | Fine Sand | PETROL | LITTLE PUNKT FIBERS IN MATTY 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 ₂ S | |
| AS-LL02-2.3-2.8 OIL-M-SOIL NEGATIVE (GREEN) | 2.8-3.5 | | Pt | DEGRADED PUNKT FIBERS | 7.5YR 3/3 | Soft | - | CANDOR | |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone



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-04Northing: 2706593.597All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815631.777Penetration (ft.): 3.5Date Collected/Initials: 11 Sept 2017 / MRFGPS Accuracy (ft.): H: 0.043 V: 0.070Recovery (ft.): 3.5Time: 1406Water Depth (ft.): 7.5Processed Date/Initials: 9/11/17 MRFCollection Mechanism: Piston CoreWater 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-C005501 OR-N-SOL Mixture | 0.0-0.3 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | SOFT | SILT | NONE | SLIGHT SHEAR |
| AS-LL-04 1.0-1.5 RA-C005502 OR-N-SOL Mixture (brown) | 0.3-1.0 | | OL/ML | SILT LOAM | 2.5Y 3/1 | SOFT | FINE SAND | NONE | SLIGHT SHEAR |
| AS-LL-04 3.0-3.5 RA-C005503 OR-N-SOL Mixture (brown) | 1.0-3.5 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | FINE SAND | H ₂ S | TRACE SOLID H ₂ S |

Comments:

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\\\\\ - Mixed Zone



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-06Northing: 2706592.607All measurements are ± 0.1 feet

Core Sample ID: _____

Easting: 815736.771Penetration (ft.): 3.5Date Collected/Initials: 11 Sep 2017 / MWFGPS Accuracy (ft.): H: 0.039 V: 0.077Recovery (ft.): 3.5Time: 1343Water Depth (ft.): 8.2Processed Date/Initials: 9/12/17 MWFCollection Mechanism: Piston CoreWater Surface Surveyed Elevation (ft NAVD 88): 1.616

| 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 OIL-H-SOIL NEGATIVE (GASPH) | 0.0-0.7 | | OL | ORGANIC SILT | 2.5Y 2.5/1 | SOFT | SILT | PETROL | SUBLT SHELL |
| AS-LL06-0.5-1.5 OIL-H-SOIL NEGATIVE (GASPH) | 0.7-1.5 | | OL/ML | SILT LOAM | 2.5Y 3/1 | SOFT | MED SAND | PETROL | SUBLT SHELL LITTL GSPH SHELL |
| AS-LL06-1.5-2.0 OIL-H-SOIL NEGATIVE (GASPH) | 1.5-3.5 | | ML | SILTY CLAY LOAM | 2.5Y 3/1 | FIRM | FINE SAND | H ₂ S | LITTLE TO TRACE LUM SHELL FRAGMENTS |
| AS-LL06-3.0-3.5 OIL-H-SOIL NEGATIVE (GASPH) | | | | | | | | | |

Comments:

1ST ATTEMPT: NG
2ND ATTEMPT: NG

Visibly Contaminated Layer Legend
xxxx - Visibly Contaminated
\\ - Mixed Zone

Appendix C

Groundwater Sampling Field Records

New Shoshone Pump

10/23/17

3500 Zee

Mike Mann

ARMY Machine Springs

Older Pump at Sta Atkins Tailwater @
Alta C.

WEATHER: Fairly clear, cloudy; light rain
60; Humid in 70s. Light SE
wind; Heat to @ 1119; W
Time 1626

Pensator Mike Mann. May 5th 1940;
Pump water.

Take water samples @ Pump
Group Burt, YSI, Pensator Pump.

0800 Water from C Dam

0900 Pump @ Lower U-03.

U-35

WD 2.18 ft

TD 12.60 ft

U-30

WD 2.68 ft

TD 19.91 ft

Total Depth Water Column 5.45 ft

0930 Take to Sample U-035. Pensator

Pump water. Pump

0945 Hand Pump to Area C Dam

1015 Re-Bore of new Pensator Pump

Hand to Pump instructions per

Mike

Mike Mann

Date 10/23/17

3500 Zee

Mike Mann

ARMY Machine Springs

1030 Set up at LL-03 D

Flow = 1000 gpm - Pump 2.5 gal

| DO | mg/L | temp | min | DWP | inV | SPC | inV | PH | TEMP | OC | -1100 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|----|-------|
| 6.05 | 5.91 | 5.79 | 5.66 | 5.78 | 5.88 | 5.78 | 5.92 | 5.93 | 5.87 | | 1050 |
| 1034 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | 1055 |
| 9.1 | 6.4 | 56.5 | 46.4 | 39.4 | 35.2 | 30.1 | 27.9 | 25.3 | | | 1100 |
| 40.34 | 41.78 | 41.98 | 42.44 | 47.48 | 47.63 | 47.66 | 42.60 | 42.79 | | | 1105 |
| 7.12 | 7.23 | 7.26 | 7.30 | 7.31 | 7.29 | 7.27 | 7.26 | 7.25 | | | 1110 |
| 18.20 | 18.33 | 18.30 | 18.19 | 18.14 | 18.12 | 18.14 | 18.12 | 18.23 | | | 1115 |
| 19.22 | 19.33 | 19.30 | 19.19 | 19.14 | 19.12 | 19.14 | 19.12 | 19.23 | | | 1120 |
| 19.22 | 19.33 | 19.30 | 19.19 | 19.14 | 19.12 | 19.14 | 19.12 | 19.23 | | | 1125 |
| 19.22 | 19.33 | 19.30 | 19.19 | 19.14 | 19.12 | 19.14 | 19.12 | 19.23 | | | 1130 |
| 19.22 | 19.33 | 19.30 | 19.19 | 19.14 | 19.12 | 19.14 | 19.12 | 19.23 | | | 1135 |

New brook Hudson 10/23/17

35 B6200 Mike Morris

Arctic Microbial Sample

1145

1145 Collect Sample for ADP 4403 0 - 10/23/17

~~Sample from Arctic 1130 AM~~

RA - ~~Col 1101~~; WG, METAS, SW6010C;

FILTRON, 1 Solid Phase, 40C H₂O

RA - ~~Col 1101~~ WG, METAS, RSC 175;

3 40ml Vials: H₂O, 40C

EN - ~~Col 1101~~, Vials, SW6200B, 3 H₂O

DO Vials, 40C / H₂O

POL, E415.1, 3 40ml Vials

UPPERMANS

SILICA, SW6037, 1.250L

PURIFIC; ZINCUMM Micro - Purific

PHOSPH, E300, 1.250 L Purific

UPPERMANS E300.1 Purific

SAME BUTTLE

RA - W610C1, WG, PCB Contamination;

2 H₂O, 40C

1210 Set up of ADP 4403 S, Use New

Rings Tubing, B6200 106 40C

RINGS (See Page 1)

1245 Collect Sample ADP 4403 S 10/23/17

RA - Col 1101; WG, METAS, SW6010C;

1 Solid Phase, H₂O, 40C

METAS, RSC 175, 3 40ml Vials, H₂O / 40C

Mike

New brook Hudson 10/23/17

35 B6200 Mike Morris

Arctic Microbial Sample

| Time | Temp | pH | DO | Sp | ORP | Flow |
|------|-------|------|------|--------|------|-------|
| 1200 | 18.37 | 6.62 | 2.71 | 39.422 | -354 | 1.000 |
| 1215 | 17.94 | 6.78 | 6.02 | 43.470 | -399 | 1.900 |
| 1220 | 17.91 | 6.96 | 6.48 | 44.027 | -482 | 2.000 |
| 1225 | 17.99 | 7.13 | 6.54 | 44.388 | -530 | 1.700 |
| 1230 | 18.05 | 7.17 | 6.46 | 44.444 | -554 | 1.100 |
| 1235 | 18.11 | 7.14 | 6.37 | 44.428 | -572 | |

Mike

NEW BRIDGE MUSEUM 10/23/17

3506200 MICE MAMM

Accuracy MICROMETER SAMPLES

RA - CILICOL; WL; Vals; SW 520-6, —

3 BULK VALS 100/100 —

DOC, EHS.1, 3 KOL VALS W. ASSUMES —

SECTIONS, SW 9034, 1 2500L PASTIC, —

Zn ACETATE/BLACK/YUC —

AMMONS E300; 1 2500L PASTIC —

UNPRESSED —

ALUMINUM; E300; 1 2500L PASTIC —

(Same common as above) —

RA - CILICOL; WL; PCB CARTRIDGE, —

2 IL AMON, 40 C. —

1250 TOTAL PASTIC WGT = 3.5 gals. —

WL = 1.89 ft —

1315 AMON @ AM C Deck —

1400 PASTIC - SNIP SAMPLES TO TA - BULK TAILOR —

STANDARD —

1630 1400 TAILOR —

NEW BRIDGE MUSEUM 10/24/17

3106200 MICE MAMM

Accuracy MICROMETER SAMPLES

OLIVE ATTENDANCE AREA C TAILOR —

LOCATION: CHANG, CHANG & ZILKINSKY, —

PAIR, LING, STALL SE WINDS —

HIGH TIDE @ 1135, LOW TIDE @ —

1700 —

PERSONAL: MICE MAMM, MARY BETH LINDLEY, —

PATRICIA LINDLEY —

TASC: WATER SAMPLES & Accuracy SITEWORK —

EQUIPMENT: YSI, PERSISTENT PUMP, PASTIC —

BUTT, TUBAL, GLASSWARE: BURETTS —

0715 LEAVE AREA C DECK —

0740 AMON @ RAILWAY SITEWORK SET UP —

01 AOP JJ 03 —

JJ 03 8 D —

WD = 2.09 ft —

TD = 11.10 ft —

JJ 03 8 S —

WD = 2.19 ft —

TD = 7.65 ft 9.04 ft —

DROPS OF WATER COLUMN —

WELL WAS SITUATED ON 10/11/17. —

SWITCHES WERE OPEN PASTIC —

CIRCUIT BOARD ORIGINALLY PASTIC, —

0800 ATTENDANCE TO CUBA SEA MUSEUM —

MUSEUM —

New Orleans, LA 10/24/17

OUT at bottom of JJ-035
Eggs like about 1/2 of ground
on bottom Messing Brown w/
White w/ Tinges.

0825 291 up on JJ 030, Deer —
Well is *Taxus* *parvifolia* *Willd.*
Yale is *Pinus* *resinosa* *A.* —
Bottle Sp. (L. S. C.); De Cuyler —
Not *Pinus* Sp. only *Pinus* —
De Cuyler at page 65. —

0915 Current status in AOP 33 030 —
 CR-COP5402, W6, Y6, SW 82609, —
 3 total vias, H u / Y-c —
 Doc, E 4.5.1, 3 total vias. —
 missing —

SW 9034, 1250 ul —
 Plastic, Zr Antenna / 1600 / 400
 Antennas, E 300, 7 Airway E 300.
 MWM

10/24/17

| Wave | Temp | Plot | D ₀ | Sec | Off | Va |
|------|-------|------|----------------|------|--------|-------|
| | °C | | % light | μsec | mV | μV |
| 0830 | 18.90 | 6.56 | 31.3 | — | -91.2 | 90 |
| 0835 | 18.87 | 6.45 | 36.2 | — | -99.6 | 1,400 |
| 0840 | 18.93 | 6.43 | 50.2 | — | -119.5 | 1,300 |
| 0845 | 18.97 | 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 | 64.2 | — | -154.5 | 850 |
| 0905 | 19.14 | 6.43 | 70.2 | — | -166.0 | 850 |

[Signature]

New Bedford Harbor 10/25/17

3536200 Mike Morris

Acute Midwater Sampling

RA-CO05701; WL; Metres; _____

SW 6000; 15000 Plastic; _____

Heel/40C _____

Metres; RSK 175; 3 4000 Vials; _____

Heel/40C _____

RA-CO011201; WL; Vols; SW 82600; _____

3 4000 Vials; Heel/40C _____

DOL; E415.1; 3 4000 Vials _____

Unassumed 40C _____

SW 6000; SW 9037; 1 2500 _____

Plastic; 2 Unassumed; Heel/40C _____

Acute Midwater; E300.1; 1 2500 _____

Plastic Unassumed + Plastic _____

E300; 1 2500 Plastic Unassumed _____

RA-CO20001; WL; PCB Unassumed; _____

2 IL Amber; 40C _____

[Signature]

New Bedford Harbor 10/25/17

3536200 Mike Morris

Acute Midwater Sampling

| Time | Temp | pH | DO | SPC | ORP | Turb | Fun |
|--------|-------|------|------|--------|--------|------|-----------|
| BB-055 | °C | | mg/L | µS/cm | mV | ntu | ml |
| 1010 | 19.71 | 6.56 | 0.53 | 2444 | -80.4 | 40 | 36.8 |
| 1015 | 19.61 | 6.45 | 1.43 | 25804 | -112.0 | 10.7 | 1.000 |
| 1020 | 19.57 | 6.45 | 1.83 | 281846 | -118.7 | 27.8 | 9.71, 200 |
| 1025 | 19.58 | 6.41 | 1.15 | 27877 | - | 0.74 | 1.000 |
| 1030 | 19.69 | 6.54 | 2.78 | 36206 | -130.8 | 2.47 | 1.000 |
| 1035 | 19.73 | 6.60 | 2.40 | 37800 | -128.4 | 0.71 | 1.200 |
| 1040 | 19.72 | 6.50 | 2.32 | 37400 | -132.2 | 0.42 | 1.000 |

Filter Wt: 1.47g Filter: 3.0g

[Signature]

New Bedford Harbor 10/25/17
 3536200 Mike Morris
 Aqueous Micromer sampler

1000 Set up in ADP B5-USD
 1145 Collect sample in B5-USD
 ADP B5-USD 102517 11.1-13.1 ft
 RA-CO05702; WG; Methy; SWB2225;
 1 small Plastic; H2O2/40C
 Methy; RSK 175; 3 40ml Vials;
 HCl/40C
 RA-CO1202; WG; Vocs; SWB2225;
 3 40ml Vials; HCl/40C
 DOC; E4151; 3 40ml Vials
 Unpreserved
 SWB209; L25 SW9034; 1250ml
 Pres; ZnAcetate; HAcOH/40C
 Alkalis; E300; 1250ml Pres
 Unpreserved
 Alkalinity; E3101; 1250ml
 Pres; Unpreserved
 RA-CO20002; WG; PCBs; calibrations;
 2 1L Amies; 40C
 1200 Draw W Bait. Head in Area C. Vary
 Windy & Rainy
 1215 Arrive @ Area C Doc. more equipment
 to Lab. minus
 FW 18417 Not Sifted
 MWM

New Bedford Harbor 10/25/17
 3536200 Mike Morris
 Aqueous Micromer sampler

| Time | Temp | pH | DO | Spd | Sal | MV | Turb | Fluor |
|--------|-------|------|------|-------|--------|------|------|-------|
| BB0060 | or | | | | | | | |
| 1105 | 17.7 | 6.64 | 2.19 | 19.7% | -110.5 | 92.5 | | 1.000 |
| 1100 | 18.03 | 6.29 | 0.23 | 5.61% | -45.5 | 31.9 | | 1.000 |
| 1105 | 17.94 | 6.11 | 0.14 | 4.70% | -41.9 | 12.9 | | 1.000 |
| 1120 | 17.93 | 6.04 | 0.51 | 4.58% | -27.7 | 0.22 | | 1.000 |
| 1125 | 17.53 | 6.04 | 0.54 | 4.47% | -18.7 | 0.07 | | 1.000 |
| 1130 | 17.90 | 6.03 | 0.54 | 4.41% | -11.1 | 0.42 | | 1.000 |

W 207 ft. Puck 3.0 gal.

[Signature]

New Bedford Harbor

10/26/17

3506200

Mike Morris

Army Microwave Sprawl

Ode Miller at Sea. Attain Traction R

Area C

Weather: Cloudy, Possible Slight Rain

40s; Huddi in 40s; Waves Vague

dir of Shift: West, Huddi Tide

Q 1307, W Time: 1843

Perimeter: Mike Morris, May 2nd 1843

Perimeter: Mike Morris

Trail: Sample Microwave @ Army

SNAKE

Equipment: Portable Batt, YSI, Tundra

Meter, Peristaltic Pump, Tubing

Cable Level Meter, Cables, Chassis

0715 Leave Area C Done

0800 Arrive @ Army Site. Set up

on ADP DO OS Crash

DO OS S

W: 2.72 ft

TD: 13.64 ft

DO OS D

W: 2.15 ft

TD: 16.45 ft

Water Level: 8.90 ft

0810 Set up peristaltic pump at ADP DO OS

MWR

New Bedford Harbor

10/26/17

3506200

Mike Morris

Army Microwave Sprawl

| Time | Temp | pH | DO | SPC | ORP | Temp | Flow |
|---------|-------|------|-------|--------|--------|------|-------|
| DO OS S | °C | | mg/L | µS/cm | mV | °C | ml |
| 0815 | 17.44 | 6.50 | 0.05 | 26,689 | -281.3 | 32.5 | 1,400 |
| 0820 | 17.34 | 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 | 28,429 | -334.0 | 3.48 | 1,000 |
| 0835 | 17.23 | 6.51 | -0.11 | 29,498 | -335.9 | 1.81 | 1,000 |
| 0840 | 17.16 | 6.51 | -0.10 | 27,909 | -337.6 | 1.47 | 900 |

Pump 2.5 gal

4.29 ft

0910

D. Miller

MIKE MANN

Acute Myocardial Infarction

0820 Maria Silvana da Costa no Block 47 -
0845 Rosemarie Catherine Gail Spindler Tice —

ADP. DO JS S - Sinau Sinau onon

RA-CO 19801; RUPA; P. B.; unbecoming -

212 Angus, 40C

RA-0012301; WG, Tr ^{Sammlung} ~~Bibliothek~~; —

VOLs: 5w 5000b; 3 40ml vials

Нилус

Doc. E415.1, 3 40x Vials. —

مسند احمد

Summit, SW 9034 1 250 ml Plastic —

 $\text{Zn} + \text{Al}(\text{OH})_3 + \text{NaOH} / 40^\circ\text{C}$

Attorneys: £300 + Accounting, £300. —

1 250 and Pacific University

RA. COOLIDGE; WG. TA. BANCROFT; —

Metals: Siobhac, 1-500 ml. Asiac.

H₂O₃ / 4°C / Filtered

MATHS: 250, 175, 340

max. 14°C/4°C

Serial: ADP DD 05-S-10267 —

7142 Bedford Haven

15/24/17

3586-2000

MIKE MANN

Альберт Мичкович

| Time | τ_{LSP} | pH | DO | mg/L | Sec | ORP | Temp | Flow |
|----------|---------------------|------|------|------|-------|--------|------|-------|
| 00:05:00 | 16.80 | 6.02 | 0.16 | mg/L | 4.973 | -257.4 | 26.5 | 900 |
| 09:20 | 16.89 | 5.95 | 0.04 | | 5.012 | -257.9 | 21.9 | 1,000 |
| 09:25 | 16.89 | 5.91 | 0.10 | | 5.032 | -257.7 | 9.12 | 1,000 |
| 09:30 | 16.84 | 5.88 | 0.00 | | 5.095 | -258.0 | 8.91 | 1,000 |
| 09:35 | 16.68 | 5.86 | 0.04 | | 5.106 | -258.9 | 2.96 | 900 |
| 09:40 | 16.79 | 5.84 | 0.04 | | 5.135 | -259.0 | 0.64 | 1,000 |

100's WL = 2.00 ft, 30 gal pump

New Boston Harbor

10/26/17

35BL200

Mike Morris

Agriox Microbial Sample

0910 Setup on Wall ADP-DD-0510

0945 Blank Control Setup on

ADP-DD-0510 - Start Setup on

Sample ADP DD 0510 102417

RA-CO16802: WG; AUPH WBS;

PBS, Cytocines, 2 LL ABUS;

40C

RA-CO12302: WG; TA - Salmonella;

VOCs: SW8260B; 3 40ml VIALS;

HCL/40C

DEC: E415.1; 3 40ml VIALS;

UNPACSED

Surface; SW9031; 1 ZSOAL PASTE;

ZnAcetate; HACH/40C

Antibiotics, E30 + ACHLAWY, E310.1;

1 ZSOAL PASTE, UNPACSED

RA-CO06802: WG; TA - Buntington;

Mutants: SW6100C; 1 Sample Paste;

HACH/40C / FILTERS

PASTILITE, R50.175; 3 40ml VIALS;

HCL/40C

[Signature]

New Boston Harbor

10/26/17

35BL200

Mike Morris

Agriox Microbial Sample

| Time | Temp | pH | DO | SpC | DLP | ThS | Fluor |
|------|-------|-------|-------|-------------------------------|--------|--------|-------|
| 1025 | 1020 | 16.91 | 6.18 | 0.11 | 8.088 | -292.2 | 9.17 |
| 1025 | 17.4 | 6.18 | 0.09 | 7.951 | -271.6 | 12.2 | 1.100 |
| 1030 | 17.22 | 6.16 | 0.04 | 8.033 | -285.7 | 6.75 | 1.100 |
| 1035 | 17.19 | 6.18 | 0.00 | 8.534 | -293.8 | 5.31 | 1.000 |
| 1040 | 17.19 | 6.20 | 0.06 | 7.210 | -364.4 | 4.16 | 1.000 |
| 1045 | 17.16 | 6.21 | -0.03 | 6.108 | -309.9 | 34.7 | 1.000 |
| 1050 | 17.2 | 6.21 | 0.04 | 5.424 | -313.4 | 4.12 | 1.000 |
| 1055 | 16.84 | 6.19 | -0.02 | 4.111 | -317.4 | 6.67 | 1.000 |
| 1100 | 16.86 | 6.21 | 0.01 | 4.244 | -302.0 | 5.94 | 1.000 |
| 1120 | | | | WATER DEW = 4.501F WBS: 3-gal | | | |

[Signature]

11th Street Mass

10/20/17

3560 Zee

Mike Morris

Acme Microfilm Scanner

1001 Blue & Green of 5

FF-05 S

W. 2.74 ft

TO 12.04 ft

FF-05 D

W. 5.02 ft

TO 11.34 ft

Water Level 2.75 ft

11.5 Water Turbidity, Surface Water

Pull 3 ft. Turbidity 800

Water. Collected Sample on

NOF FF-05 S - 10/20/17

RA- CO 18803, WG, ALPINE LABS.

PCBS, CARBONATE, & IL ANALYSIS

in 400 & 400

RA- CO 13501, WG, TA - SANITARIUM

VOL: SW 82600B, 3 40 ml VIALS

HCE/400

DOC: E415.1; 3 40 ml VIALS

UNPRESERVED

SULFIDE, SW 9074, 1 250 ml Plastic

Zn ANALYSIS: NACOL/400

ANALYSIS: E300 + ALKALINITY: 1.310

1 250 ml Plastic, UNPRESERVED

WATER

11th Street Mass

10/20/17

3560 Zee

Mike Morris

Acme Microfilm Scanner

| Time | Temp | pH | DO | SpC | Wd | Time | Flow |
|-------|-------|------|------|-------|--------|------|-------|
| 11:30 | 17.54 | 5.96 | 0.24 | 8,531 | -11.4 | 96.4 | 1,000 |
| 11:35 | 17.27 | 5.96 | 0.51 | 9,509 | -91.4 | 10.3 | 900 |
| 11:40 | 17.36 | 5.95 | 0.19 | 8,900 | -112.8 | 7.59 | 800 |
| 11:45 | 17.49 | 5.95 | 0.17 | 8,753 | -117.3 | 5.09 | 700 |
| 11:50 | 17.43 | 5.95 | 0.14 | 8,674 | -119.0 | 2.20 | 600 |
| 11:55 | 17.40 | 5.95 | 0.24 | 8,573 | -117.7 | 1.62 | 500 |

12:15 Water Ozone: 2.16 ft Pure water: 2.0 gpd

[Signature]

1140 Biochem Huber

10/21/17

37°C Zou

Mike Morris

Acid-wash Microbial Samples

RA- CO2SC02, WG; TA Bimolecular —
Metals; Sulfuric; 1 Sample Plastic; —
HNO₃/40C / Filtration —
METHANOL, RSE 175; 3 Micro Vials; —
HCl/40C —

Delia

1130 SET UP ON ADP ^{Huber} FF-0510 —
3 Beams Pumping water, 1 hour —
Beams in Pumping water, 1 hour —
WATER 10 MINUTES —

1200 Collect sample on ADP FF-0510 —

Sample Name ADP FF-0510-102617 —

RA- CO2SC02, WG; ADP LABS; PCBs, Cholesterol —
2 in Amber, 40C —

RA- CO2SC02, WG; TA - Sulfuric, —
VOCs, Sulfuric, 3 Micro Vials; —
HCl/40C —

Doc; E415, 3 Micro Vials; —
Unprocessed —

MWH

New Biochem Huber

10/21/17

37°C Zou

Mike Morris

Acid-wash Microbial Samples

Sulfuric; Sulfuric; 1 250ml Plastic; —
Zn ACETATE; HNO₃/40C —
Alloys, E300 + ZACKARY, E300; —
1 250ml Plastic, Unprocessed —
RA- CO2SC02, WG; TA - Bimolecular; —
Metals, Sulfuric, Filtration; 1 Sample —
Plastic, HNO₃/40C / Filtration —
METHANOL, RSE 175; 3 Micro Vials; —
HCl/40C —

1220 Pick up gear and hand to ADP C. Dole —

1250 Arrive @ ADP C. Dole, Unload Equipment —

Stand in Lab Trailer —

1300 1900 175 Size —

Delia

49W Borehole Nelson

10/27/17

3586200

Mike Morris

Always Microbial Sample

Over Arrive on Site. ATTEND TRULICH @ —
 AISC

Weather Sunny, Wind in 40s, Night in 60s,
 Light west winds low tide @ 0013,
 High tide @ 1354.

Personal: Mike Morris, Mary Beth Whitall,
 Patricia Iversen

Tax: Microbial Sample @ Always Sample

Equipment: YSI, 2 Rustrak Pines Position

But, turbine sample unknown

0700 Leave AISC Deck

0700 Arrive @ JJ 075; Farm JJ 070

Phos 3, 5 ft Ristrak at Top;

Ristrak JJ 070

0735 Arrive @ ADP JJ 05

JJ 055

WC: 4.35 ft

TD: 16.73 ft

JJ 050

WC: 4.90 ft

TD: 21.54 ft

Water Column: 294 ft

0745 Sit up on wall ADP JJ 055

This is the MS(M) well

WCH

New Borehole Nelson

10/27/17

3586200

Mike Morris

Always Microbial Sample

| Time | Temp | pH | DO | SpC | ORP | Turns | Flow |
|--------|-------|------|------|--------|--------|-------|-------|
| JJ 055 | 14.78 | 6.60 | 0.47 | 10,500 | -88.4 | — | 4000 |
| 0750 | 14.76 | 6.62 | 0.25 | 10,300 | -105.4 | 276 | 1,500 |
| 0755 | 14.54 | 6.60 | 0.09 | 9,507 | -123.2 | 211 | 1,200 |
| 0800 | 14.30 | 6.56 | 0.98 | 8,440 | -125.7 | 130 | 1,200 |
| 0805 | 14.14 | 6.50 | 1.38 | 7,671 | -119.0 | 716 | 900 |
| 0810 | 14.27 | 6.47 | 1.24 | 7,147 | -121.3 | 559 | 800 |
| 0815 | 14.27 | 6.44 | 1.15 | 6,353 | -119.9 | 572 | 800 |
| 0820 | 14.07 | 6.45 | 1.07 | 6,207 | -121.2 | 347 | 800 |

0850 WCH 0611 9.71 ft

— Total Diver: 20 gels

Handwritten signature

24

New Bedford Harbor 10/27/17
35BL200 Mike Mann
Agony Microbial Sample

0800 Water is starting come out time
is A strong, sulfur, Sulfur
Under some gas bubbles
in water

0830 Collect sample in NDF JJ-055
This is an MS/MSO, NDF JJ-055 10/27/17

CA 0020101, WG. Appear LMS,
Pibb. Collection LIL Appear,
40C

RA 015101, WG. TA Sulfur,
Vols. Sulfur, 9 40ml Vols;
HUE/40C

DEC; E.415-1, 9 40ml Vols;
UHFASMS

Sulfur, L22^m Sulfur;
3 250ml PMSIL, Zulfur;
HACH/40C

Alloys, E.400 + Alloys E.310;
3 250ml PMSIL, UHFASMS

RA 0010101, WG. TA. PMSIL;
MMS Sulfur; 3 250ml
PMSIL, HUE/40C, PMSIL;
MMS, RSC-175, 2 40ml Vols;
HUE/40C

MMS

New Bedford Harbor 10/27/17
35BL200 Mike Mann
Agony Microbial

| Time | DOSD | Temperature °C | pH | DO | SpL | Alf | Turb | Flow |
|------|------|----------------|------|------|-------|-------|------|-------|
| 0900 | 0900 | 14.19 | 6.32 | 0.83 | 3.210 | -45.4 | 307 | 1 |
| 0905 | 0905 | 14.48 | 6.10 | 0.10 | 3.049 | -88.8 | 227 | 1,000 |
| 0910 | 0910 | 14.49 | 6.00 | 0.07 | 2.984 | -85.7 | 183 | 1,300 |
| 0915 | 0915 | 14.55 | 6.05 | 0.07 | 3.027 | -77.9 | 18.9 | 1,100 |
| 0920 | 0920 | 14.28 | 6.04 | 0.06 | 3.002 | -75.6 | 14.3 | 400 |
| 0925 | 0925 | 14.22 | 6.03 | 0.07 | 2.944 | -73.6 | 13.3 | 800 |
| 0930 | 0930 | 14.17 | 6.03 | 0.04 | 2.983 | -71.8 | 11.2 | 900 |
| 0935 | 0935 | 14.33 | 6.03 | 0.05 | 2.976 | -70.5 | 9.9 | 900 |
| 0940 | 0940 | 14.46 | 6.01 | 0.05 | 2.964 | -68.9 | 7.56 | 400 |

1010 Turn 0.414 4.56 1.14 0.00 3.0 0.0

[Signature]

Mike Bishop Martin

10/27/17

3:00 Zulu

Mike Morris

Acrony Milwaukee Springs

0850 SST W 2nd Pansmar Burn P
 Pansar ADP JJ 050

0945 Current Water Sample in ADP JJ 050
 Sample B ADP JJ 050 - 102717

RA CO 2002, WG; ALPH LMS;
 PCBE, COG BARS, 2 LL ALPHS;
 400

RA CO 1502, WG; TA SAUMMAN;
 VOL, SW 8200 B, 3 400 VMS
 HCE/400

DEC, E 415.1, 3 400 VMS,
 VHPRESSURE

SUBSEA, SW 9034, 1 2500 W PASTE
 ZN ALPH/NOON/400

ALPH; E 300 ALPHING, E 310.1;
 1 2500 W PASTE, WHPRESSURE

RA CO 10102, WG; TA SAUMMAN;
 MATHS, SW 6000; 1 5000 W PASTE
 HCE/400 - FILLING

MATHS, RSU 175, 3 400 VMS;
 HCE/400

1030 Arrive 2 HH 05 CUSH
 HH 055

WD 3750 TO 12 05 P
 MATH

Mike Bishop Martin

10/27/17

3:00 Zulu

Mike Morris

Acrony Milwaukee Springs

| Time | Temperature | Gal | Do | SpL | WV | Tub | Fuel |
|--------|-------------|------|-------|--------|--------|------|-------|
| HH 055 | | | | | | | |
| 1045 | 1540 | 6.02 | -0.31 | 24.722 | -334.2 | 901 | 1,300 |
| 1050 | 1634 | 6.60 | -4.02 | 26.672 | -348.2 | 113 | 600 |
| 1055 | 1498 | 6.81 | -1.46 | 26.918 | -340.3 | 280 | 300 |
| 1100 | 1469 | 6.94 | -1.53 | 29.032 | -344.5 | 799 | 600 |
| 1105 | 1490 | 7.07 | -1.43 | 24.959 | -344.0 | 3.07 | 400 |
| 1110 | 1449 | 7.23 | -1.24 | 26.713 | -353.3 | 370 | 400 |
| 1115 | 1432 | 7.29 | -1.01 | 29.570 | -352.5 | 1.53 | 400 |
| 1120 | 1412 | 7.27 | -0.24 | 29.112 | -351.9 | 246 | 300 |
| 1125 | 1400 | 7.34 | -0.82 | 29.130 | -351.1 | 300 | 400 |

Tape Power 2.00gh

Water WMS: 11.9 Vt

1505

New Bedford Harbor

11/27/17

351362ac

Mike Morris

Across Micromed Spenser

H1-050

WD 34711

TD 18-16 ft

Water Column = 6.01 ft

1031 SW of Pier at ADP H1-055

Tide gauge will be a Fine Dupont AD

This is a small, with 500 ml of

Tubing w/ a sensor and lots of bubbles -

1130 Began N collect sample ADP H1-050 102717

There is a duplicate small

RA-020103, WG, ADP H1-055

PCH, 200 ml, 2 IL ADP, 40C

~~RA-020104, WG, ED, ADP H1-055~~~~PCH, 200 ml, 2 IL ADP, 40C~~

RA-020105, WG, TA, ADP H1-055

VOCs, SW 200 ml, 3 400 ml Vials,

H2/H2C

DOL, E 400 ml, 3 400 ml Vials,

H2/H2C

SW 200 ml, SW 200 ml, 1 250 ml PCH,

Zn ADP H1-055/H2/H2C

ADP H1-055, E 300 ml ADP H1-055, E 300 ml

1 250 ml PCH, H2/H2C

MWM

New Bedford Harbor

11/27/17

351362ac

Mike Morris

Across

~~RA-020102, ED, WG, TA, ADP H1-055~~~~VOCs, SW 200 ml, 3 400 ml Vials,~~~~H2/H2C~~~~DOL, E 400 ml, 3 400 ml Vials,~~~~H2/H2C~~~~SW 200 ml, SW 200 ml, 1 250 ml PCH,~~~~Zn ADP H1-055/H2/H2C~~~~ADP H1-055, E 300 ml ADP H1-055, E 300 ml~~~~1 250 ml PCH, H2/H2C~~

RA-020103, WG, TA, ADP H1-055

METALS, SW 200 ml, 1 500 ml PCH,

H2/H2C, 40C (FILTERED)

METALS, PCH 175, 3 400 ml Vials,

H2/H2C

~~RA-020104, WG, ED, TA, ADP H1-055~~~~METALS, SW 200 ml, 500 ml PCH,~~~~H2/H2C, 40C (FILTERED)~~~~METALS, PCH 175, 3 400 ml Vials,~~~~H2/H2C~~

1140 Began PCH at H1-050

1215 Collect sample ADP H1-050 102717

RA-020105, WG, ADP H1-055

PCH, 200 ml, 2 IL ADP, 40C

40C

MWM

New Bedford Harbor 10/27/17
 35 Box 2000 Mike Manno
 Acropora Micrococcus Sp. 10/27/17

RA-6014505, W6, TA SAVANNAH
 Vols. SUBS 2600, 3 4000 VIALS
 HCL/40C

DEC. E 4151, 3 4000 VIALS
 UNFUSSED

SUBS 2600, 1 2500 ml PASTIL,
 20 ACROPORA, 1000 ml 40C

PHILIPS, 4300 ml ALKALINE, 1 300 ml,
 1 250 ml PASTIL, UNFUSSED

M-6009003, W6, TA SAVANNAH
 KETOS; SUBS 2600, 1 500 ml PASTIL,
 HCL/40C/FILTERED
 METABOLIC; RSC-175, 3 4000 VIALS,
 HCL/40C

1300 Due to late water volume we ordered
 to BAC the duration of APP. H1-055
 1 CROSS OUT ALL REFERENCES TO:
 FIELDS DURATION FOR H1-055 FROM THE
 LAB BOOK

1315 HENDON SPEC TO BAC C DEC.

1345 Arrive @ BAC C. DEC. TAKE COMPACT
 TO LAB TRUCK

1630 1st TIE SIZE

MWM

New Bedford Harbor 10/27/17
 35 Box 2000 Mike Manno
 Acropora Micrococcus Sp. 10/27/17

| TIME | TEMPERATURE | pH | DO | SPEC | ORP | TURB | FLUO |
|--------|-------------|------|-------|------|-------|------|-------|
| H1-055 | °C | | ug/L | AS/L | mV | ntu | ml |
| 1145 | 15.56 | 6.43 | -0.04 | 3.77 | -3200 | 4.54 | 1400 |
| 1150 | 15.51 | 6.31 | 0.00 | 3.66 | -3130 | 3.30 | 800 |
| 1155 | 15.36 | 6.22 | 0.03 | 3.60 | -3077 | 1.70 | 1.100 |
| 1200 | 15.47 | 6.14 | -0.10 | 3.53 | -3012 | 1.18 | 1.020 |
| 1205 | 15.41 | 6.14 | -0.13 | 3.48 | -2940 | 1.46 | 1.000 |
| 1210 | 15.33 | 6.13 | -0.12 | 3.46 | -2970 | 0.02 | 800 |

1235 WATER CHILL = 2.52 H Total Pumps = 2.5 gal

Mike Manno

12/3, 17

Mr. Morris

Adams Municipal Service

Chase Division on SFG ATTENDANCE RECORD

WEATHER: Sunny, Cool, Highs in the 50s,
lows in the 30s, moderate winds out
of the west. Low tide @ 1120,
High tide @ 1731.

Person - Mike Morris, may be ill with it,
better approach

The new well contains some heavy sediment —
 Evidence: Perforator parts up, turning over 0.0004/10.
 M274, Tubing Grass, water cooler —

0900 Leave Mt C. Dall. Hvd to Albany

0930 Anne & Cyrus D.D. of

Op. 015

WO 5874

TO 100 N

00 070

WD ~~5.47~~ 11 600 h_t —

70. 22.4

Water Content 6.72 %

0940 547 46 Full of AC. Dp 074 wrap -

16. Primary lipid growth -----

1015 COURT ST. N. W. D. C. 20007 —

MM

11. Dispersal in insects

10/3/17

35 Buz.

MIKE MORRIS

A change made with ~~SPRINT~~

| Time | Temperature °C | gH | DO | SpC | OXD | Turb | Flow |
|------|-------------------|------|-------|-------|--------|------|------|
| 0445 | 15.84 | 6.47 | 0.55 | 5.012 | -572 | 11.9 | — |
| 0450 | 15.48 | 6.34 | 0.04 | 5.003 | 490 | 2.57 | — |
| 0455 | 15.43 | 6.24 | 0.02 | 4.926 | -1150 | 1.38 | — |
| 0500 | 15.62 | 6.24 | -0.01 | 4.312 | -116.7 | 1.61 | — |
| 0505 | 15.47 | 6.15 | 0.00 | 3.874 | -1007 | 1.73 | — |
| 0510 | 15.55 | 6.08 | 0.00 | 3.740 | -104.4 | 2.00 | — |

WD-6237A

Dr. R

1140 BioGeo Lab

10/3/17

3536200

Mike Mon

Acidic Mineral Spring

RA CO20201, WG, ALPHA LABS, _____
PCHS, 1000000, 2 IL LABS, _____
40C _____

RA CO07001, WG, TA BUNCH, _____
PCHS, SW8002, 2 IL LABS, _____
40C _____

MALIS, SW6000, 1 SWAL PUSC, _____
H103/40C/FITNESS _____

MATHEUS, RSK 175, 3 40ml VIALS, _____
H101/40C _____

RA CO12501, WG, TA SAVANNAH, _____
VCL, SW82008, 3 40ml VIALS, _____
H101/40C _____

DOE, E4151, 3 40ml VIALS, _____
40C _____

SURFAC, SW9034, 1 20ml PUSC, _____
ZnN/MALIS/40C _____

ANALIS, E 300 + ALKALITY, E 310.1, _____
1 20ml PUSC, 40C _____

1030 Collect Spring ADF DO 07-D 10317 _____
401 ANALIS REACTION AT PUSC ADF 150 _____
Lot 300 This Spring is 40 _____
MS/MAD _____

MWM

1140 BioGeo Lab

10/3/17

3536200

Mike Mon

Acidic Mineral Spring

RA CO20202, WG, ALPHA LABS, _____
PCHS, 1000000, 4 IL LABS, _____
40C _____

RA CO07002, WG, TA BUNCH, _____
PCHS, MALIS, SW8002, _____
40C _____

MALIS, SW6000, 3 SWAL PUSC, _____
H103/40C/FITNESS _____

MATHEUS, RSK 175, 9 40ml VIALS, _____
H101/40C _____

RA CO12502, WG, TA SAVANNAH, _____
VCL, SW82008, 9 40ml VIALS, _____
H101/40C _____

DOE, E4151, 9 40ml VIALS, _____
40C _____

SURFAC, SW9034, 3 20ml PUSC, _____
ZnN/MALIS/40C _____

ANALIS, E 300 + ALKALITY, E 310.1, _____
3 20ml PUSC, 40C _____

1145 Final DWP at DWP 100 DO 070 _____
WD 6.77 ft _____

1200 Go to H1070 Put 5/2 Run _____
at 15 _____

1205 Run 0 ft 07 _____
MWM _____

Hei Borden Haden

10/31/17

3506200

Mika Monic

Arrow Michael Saffire

FF-075

WD 5.68 ft

TD 11.2 ft

FF-07D

WD 3.98 ft

TD 17.4 ft

1220 Set W on wall ADP-FF-075

LOTS of bubbles, water is murky

Dirty

1230 Wall with dry Delco 2 LIT Arrowhead

Get Vals, PCBs if possible

1245 Collect same ADP-FF-075 10/31/17

RA-CG20203, WG, ARBUTUS

PCB; WAT GROW; 2 IL ARBUTUS

40C (INSUFFICIENT Vals for 2 ARBUTUS)

RA-CG4201, WG, TA BULLHORN

PLH Moulds, SW 8081 3 Mould

Vals HCL/40C

MATHE SW 8081, 1200 Sand

PLASTIC, HCL/40C (FILLING)

MATHE, ASK-175 3 Mould Vals

HCL/40C

RA-CG13701, WG, TA SWANHEAD

Vals, SW 8200 R, 3 Mould Vals

MWA

Hei Borden Haden

10/31/17

3506200

Mika Monic

Arrow Michael Saffire

Time

Turb

SpL

ADP

DO

Q1

Temperature

FF-075

1225

1250

1

207

2003

-2087

-254

Tus

1226

Wall Leds Dry, will get peroxide stain - Vals, PCBs

[Large handwritten signature/initials across the page]

New Brown Hutton 10/31/17
 3536200 Mike Mann
 Army Midway Station

112/4°C
 Dec; 141.1, 3 40 ml Vials, 4°C
 Station, SW 90.1; 1 250 ml Plastic, 4°C
 ZNA 110.1/4°C
 Atmos, E 30 + Airway, E 30.1, 1 250 ml Plastic, 4°C
 Water was dry Met ground Vials 0
 Collect Sulfur, Atmos + Airway
 130 Collect Sulfur + Airway - FF-07-D 10317
 Fuel is Sulfur and some Buffers are present
 RA CO20204: W.C., Alpha Vials
 PCBs, Cartridges, 1 IL Ammon (H.C.)
 ground Vials in 2 Ammon, 4°C
 RA CO20204: CO08202; TA Bimolecular
 PCBs, Ammon; SW 80.2, 2 IL Ammon, 4°C
 Metes, SW 60.1; 1 250 ml Plastic, 4°C
 H.C., 4°C (FETTER)
 Metes, RSH 171, 3 40 ml Vials, 4°C
 112/4°C
 M.H.M.

New Brown Hutton 10/31/17
 3536200 Mike Mann
 Army Midway Station

RA CO13702; W.C., TA Bimolecular
 Vials, SW 82.1; 3 40 ml Vials, 4°C
 H.C., 4°C
 Dec, E 41.1, 3 40 ml Vials, 4°C
 Sulfur, SW 90.1; 1 250 ml Plastic, 4°C
 ZNA 110.1/4°C
 Atmos, E 30 + Airway, E 30.1, 1 250 ml Plastic, 4°C
 1400 Windy Get Very Strong out of Southwest
 W.C. Run up Sides 100 to 100 C
 Deck
 1430 Run up Run C Deck, W.C. Run up
 i Transport 17 to 1000 Run
 1700 1 90.1 P.W. Sulfur

[Signature]

Location Arroyo Date 10/31/19 ⁷

Project / Client USACE

Equip Cal. by others -

pg 103

100000/min

| | DO | dt | ORP | Cond. | Turb. | Temp |
|------------------|-------------|------|------|--------------|-------|-----------|
| <u>Time</u> | <u>mg/L</u> | | | <u>µS/cm</u> | | <u>°C</u> |
| 10 ⁰⁹ | 0.29 | 5.91 | 52.2 | 4437 | 3.80 | 15.19 |
| 10 ⁰⁵ | 0.07 | 5.90 | 43.5 | 4463 | 2.23 | 15.29 |
| 10 ¹⁰ | 0.08 | 5.90 | 40.2 | 4493 | 2.59 | 15.25 |
| 10 ¹⁵ | 0.12 | 5.90 | 35.2 | 4289 | 3.01 | 15.30 |
| 10 ²⁰ | 0.04 | 5.90 | 35.4 | 4190 | 1.62 | 15.44 |
| 10 ²⁵ | 0.09 | 5.89 | 31.4 | 4145 | 1.80 | 15.55 |
| 10 ³⁰ | .08 | 5.88 | 20.4 | 4095 | 1.78 | 15.41 |

Sample @ 10³⁰ / 12⁰⁰

sample with MS / USD + pull

sample @ 100000/min -

* Tubing -

glues

1 film

location

per long by hand

measure

per 1/

in mm

anyway

by hand

for

Put in the Rain

8

Location

Hemlock - NBH

Date

10/31/17

Project / Client

USACE

203

| FF-07 - Deep - pump - 1000 ft/min | | | | | | |
|---|-------|------|-------|------|--------------------|--------|
| Time | Turb | pH | GER | mg/L | uS/cm ³ | Turb. |
| | | | ORP | DO | Cond. | |
| 12 ²³ | 16.15 | 6.60 | 44.5 | 0.63 | 10377 | 31.3 |
| 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 | 16.13 | 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 | 12308 | |
| * turned boat - was pushed away - removed tubing out of screen | | | | | | |

Location

Hemlock NBH

Date

12 30 3 9

Project / Client

USACE

16.16 5.99 -27.5 0.15 11764

pumped sample @ 145.

pumpin split Alpha TA Pen.

TA Savat.

- package / ship by others.

- CEC by others

P. Quilley 10/31/17

sup. pumpin

Agency: Michael Smith

LOCATION: Mosby Cdwg. Loc. 140116, SB,

Afternoon film by Sch. and

High Time to Own: Less Than \$150

Pusat: Miki Manis May Bataw

TASK: Menemukan sumber & dasar ilmiah.

Explain why phosphate buffers work well

Math, Tisha GLASSMAN, Cecen

Portland Cement

07 is lower than 2 Rock

0740 Anne E H1-07

HH-075

W0 3.02 N

10. 16 58

Hi of n

W.D. 4.18/4

70. 21.5%

Water Content: 8.75 %

074: Sit we at NO? DO 075 - A bit of

Wm. Samuel Dr. Schenck, Carl Gustav

104 MDA 1 5000 10000, 10000

Plus de 1400 ans

M. v. l. s.

Miss

35 Bc 2cc ✓

Mika Monis

Account of the ...

Day 20 will be a dry, full, but a few clouds.

Total Pwider 20.7 g/L

۱۳۰۰

[Signature]

New Ecosys Nitrin 11/1/17
3566222 Mike Morris
Newly Measured Station

0930 Collect water same run
ADP HI-07-5 11017
R1 WZ 201, WL, ADP 11017
PCH: CUBICUS, 2 IL 11017
40C
R1 COOLZ 201, WL, TA-BUILDING
PCH: MOCUS, SW 9082;
2 IL 11017, 40C
MCHS, SW 6010C, 1500 ml PUSHA,
H105/40C/FILTRUM
MELHUS, RSIC 175; 3 400 ml VIALS,
H105/40C
R1- COI4701, WL, TA-BUILDING
VOL, SW 8260B; 3 400 ml VIALS
H105/40C
DOC: E4151; 3 400 ml VIALS,
40C
SULFON, SW 9030; 1250 ml PUSHA -
ZMA/MADH/40C
MCHS: E300 + ALUMINUM - E301,
1250 ml PUSHA, 40C
0935 Set W at ADP HI-07-5 11017
Water is fairly clear, BUT SLOW AT
F, 11017
MCH

New Ecosys Nitrin 11/1/17
3566222 Mike Morris
Newly Measured Station

| Time | Temperature | pH | DO | SpL | OLF | Turb | Fluor |
|--------|-------------|------|-------|--------|------|------|--------|
| HI 070 | °C | | mg/L | µS/cm | mV | ntu | µl/min |
| 0840 | 11.48 | 6.33 | 0.50 | 12,683 | -77 | 12.4 | 450 |
| 0845 | 14.09 | 5.92 | -0.28 | 3,256 | -602 | 3.71 | 220 |
| 0850 | 14.00 | 5.90 | -0.01 | 3,280 | -616 | 4.33 | 240 |
| 0855 | 14.44 | 5.89 | 0.00 | 3,281 | -650 | 3.12 | 250 |
| 0900 | 14.55 | 5.89 | -0.62 | 2,596 | -672 | 1.31 | 240 |
| 0905 | 14.35 | 5.88 | -0.54 | 3,209 | -678 | 5.84 | 250 |
| 0910 | 14.46 | 5.87 | -0.03 | 3,335 | -691 | 4.02 | |

Pure 300g

WL: 5.82 ft

[Signature]

New Bedford Harbor

11/1/17

35 BLZuc

Mike Mann

Acoustic Microphone Sample

D915 Collect Water Tank ACP H1-070 11-01-17
 WUC Collect A Field Duplicate of
 THIS WATER

RA- CO20502, WUC, ALPHALAB
 PCHS, ANALYSIS, 2 IL ANAL
 40C

RA CO09202, WUC, TA BULLHORN
 PCHS, ANALYSIS, SW8032, 2 IL ANAL
 40C

METALS, SW80100, 1 SOLID PULSIC
 HWC/40C/FILTR
 METALS, RSK-175, 3 40ml VIALS
 HWC/40C

RA CO14702, WUC, TA SANDWICH
 VOLS, SW82608, 3 40ml VIALS
 HWC/40C

DOC, E415, 3 40ml VIALS
 40C

SULFIDE, SW9034, 1 250ml PULSIC
 ZNA/NaOH/40C

ANALYSIS E300 + ANALYSIS E301
 1 250ml PULSIC, 40C

RA- CO20503, WUC, ALPHALAB
 PCHS, ANALYSIS, 2 IL ANAL, 40C
 MWA

New Bedford Harbor

11/1/17

35 BLZuc

Mike Mann

Acoustic Microphone Sample

RA CO09203, WUC, TA BULLHORN
 PCHS, ANALYSIS, SW8032, 2 IL ANAL
 40C

METALS, SW80100, 1 SOLID PULSIC
 HWC/40C/FILTR

METALS, RSK-175, 3 40ml VIALS
 HWC/40C

RA CO14703, WUC, TA SANDWICH
 VOLS, SW82608, 3 40ml VIALS
 HWC/40C

DOC, E415, 3 40ml VIALS
 40C

SULFIDE, SW9034, 1 250ml PULSIC
 ZNA/NaOH/40C

ANALYSIS E300 + ANALYSIS E301
 1 250ml PULSIC, 40C

1020 SAT WOT JJ-07
 JJ-07-S

WD 6.51H

TD 16.91H

JJ-07D
 WD- 3.97H

TD- 13.50H
 WATER COLUMN = 7.19H
 MWA

New Bedford Harbor

11/1/17

35 B6200

Mike Morris

Agony Midway Sparrow

1030 SET W ON WALL JJ-075 WARM AM

DISTANT SOUTHERN OCEAN BUBBLES IN

AFR A FEW MINUTES

1100 COLLECT SPECIES ADP JJ-075 11/1/17

RA-002504, WB: ALPINE W

PCH, CARBON, 2 IL ANTS

40C

RA-00301, WB, TA BIRCH

PCH, PROCLIN, SW6002,

2 IL ANTS, 40C

MAGNET SW6002, 1 SW and PCH

H105/40C

MAGNET RA-175, 3 YOUNG VINS,

H105/40C

RA-0015301, WB: TA SPERMATOPHYTES

VCH, SW6200B, 3 YOUNG VINS,

H105/40C

DEC. E 4151, 3 YOUNG VINS,

40C

SOUTHERN SW9004, 1 250 ml PCH,

ZnA/MAGNET/40C

ANTHUS E 300 + ALKALINE E 301,

1 250 ml PCH, 40C

MWM

New Bedford Harbor

11/1/17

35 B6200

Mike Morris

Agony Midway Sparrow

| Time | Temperature | Wind | Dir | SpC | CRP | Turb | Wind | Wind |
|--------|-------------|------|------|--------|-------|------|------|------|
| JJ-075 | °C | mi/h | mi/h | mi/h | mi/h | mi/h | mi/h | mi/h |
| 1035 | 15.80 | 6.53 | 0.89 | 19.483 | -43.5 | 93.9 | 300 | 150 |
| 1040 | 16.27 | 6.41 | 0.40 | 26.107 | -51.3 | 95.1 | 150 | 150 |
| 1045 | 15.53 | 6.50 | 2.44 | 26.074 | -74 | 8.07 | 150 | 150 |

DAILY TO AIRPORT

PCH 1.5 gpd

WD 11.67M

Henry McMichael Smith

113- Attention to District 33 of D. State of N. —
Protruding from 1 ft. of sediment above the main strata

1225 Avenue R Cuisin 66:7

3000 :

no. 3974

17.70

Bb of D.

4581

To 23 5/15

Walter Cramer. 2051

1230 SET UP on BB-DTS. in the Energy Line, —

10 Small. per 1000

13.5 Collection within the AOP BGC's 11017 -

PLA CO2c50% L26 ALPINE LABS

Ref. UN 674145 212 Amst.

455

RA CASH, WC, TA BULLINGHAM

Pch, Alucos. SUGOKI, ZIL ALUM. -

402

MATHEMATICS: 150 and 100

4 Nov, 4°C | Faint

Plutonium 239 175, 3 General Vines

Pa / Vice

MWM

Miss Mowbray

Arthur MacArthur Sawhill

| Time | Transducer | RF | DC | SPC | DMF | Units | Flow |
|-------|------------|-----|------|--------|-------|-------|------|
| 08:00 | 602 | 603 | 0.35 | 20,056 | -41.6 | 9.43 | 250 |
| 12:45 | 608 | 644 | 0.47 | 21,560 | -39.6 | 7.20 | 250 |
| 12:50 | 600 | 603 | 0.43 | 22,556 | -46.3 | 7.10 | 250 |
| 12:55 | 605 | 642 | 0.41 | 22,963 | -58.7 | 4.90 | 250 |
| 13:00 | 606 | 640 | 0.40 | 23,571 | -65.2 | 0.41 | 250 |
| 13:05 | 607 | 639 | 0.35 | 23,122 | -73.2 | 3.31 | 250 |
| 13:10 | 600 | 635 | 0.22 | 23,274 | -79.4 | 0.41 | 250 |

Take Price: 35 qd

32

356

New Boston Maine

11/1/17

35BG200

Mike Morris

Arroyo Millenium Sample

RA C011401; WG. TA Savannah

Vol, SW 82603, 3 40ml Vials.

HCl/40C

DIC, F415, 3 40ml Vials.

40C

Sulfuric, SW 9034, 1 250ml Plastic;

ZnA/NacOH/40C

Alloys E300 + Alkylating E310.1;

1 250ml Plastic, 40C

-THIS IS A FIELD DUPLICATION

RA-C020506; WG, ALPINE LABS,

PCBs, Congeners, 2 IL Mgmt.

40C

RA-C005902; WG, TA Burlington;

PCBs, Alkylating, SW 8082; 2 IL Mgmt.

40C

METALS, SW 60106; 1 500ml Plastic;

HCl/40C / Filtrate

METALS, RSK 175, 3 40ml Vials.

HCl/40C

RA C011402; WG, TA Savannah

Vol, SW 82603; 3 40ml Vials.

HCl/40C

DIC, F415, 3 40ml Vials, 40C

Mgmt

New Boston Maine

11/1/17

35BG200

Mike Morris

Arroyo Millenium Sample

Sulfuric, SW 9034; 1 250ml Plastic;

ZnA/NacOH/40C

Alloys E300 + Alkylating E310.1;

1 250ml Plastic, 40C

1340 341 W on B&B 070, Water Glen;

Not Sample, Good Production

1415 Collect with sample. NOB B&B 070 11/1/17

RA-C020507; WG, ALPINE LABS,

PCBs, Congeners, 2 IL Mgmt.

40C

RA-C005903; WG, TA Burlington;

PCBs, Metals, SW 8082; 2 IL Mgmt.

40C

METALS SW 60106; 1 500ml Plastic;

HCl/40C / Filtrate

METALS, RSK 175, 3 40ml Vials.

HCl/40C

RA-C011403; WG, TA Savannah

Vol, SW 82603; 3 40ml Vials.

HCl/40C

DIC, F415, 3 40ml Vials.

40C

Sulfuric, SW 9034; 1 250ml Plastic;

ZnA/NacOH/40C

New Bedford Mass

11/1/77

3536200

Mike Morris

Recovery Microbial Sampling

APRILS E 300 + ALLANBY E 300

1250 ml FORTIC 40C

1525 Anne & C-6-06 S

WD = 5.23 ft

TD = 17.14 ft

Water Cont: 7.76 ft

1530 SUE W ON ADP-66-06 S - 5000 ml

GLASSING IN WATER TIGHT CLOSURE

W/ AFTER A WHILE, GOOD FLOW

GOOD PRODUCTION WILL

1605 COLLECT WATER SAMPLE FOR ADP-66-06 S 11047

RA-CD20508; WG; ADP-66-06 S

PCH; CONTAINERS 2 IL AMBROS

40C

RA C008001; WG; ADP-66-06 S T/A BURLINGTON

PCH; RECOVERY SWS 50327

2 IL AMBROS 40C

METALS SW 6000, 1 Small PITSOR;

HNO₃/40C/FILTERING

METALS; RSE 174, 3 40 ml VIALS

HCl/40C

RA-C014101; WG; T/A; SAMPLING

VOL; SW 82608, 3 40 ml VIALS

HCl/40C

MURK

New Bedford Mass

11/1/77

3536200

Mike Morris

Recovery Microbial Sampling

| Time | Temp | GL | TD | Sp | OLP | Turns | Flow |
|------|-------|------|-------|-------|-------|-------|------|
| 1345 | 15.21 | 6.31 | -0.95 | 6.159 | -70.7 | 0.0 | 500 |
| 1350 | 15.19 | 6.10 | 0.04 | 5.430 | -54.1 | 4.20 | 400 |
| 1355 | 15.17 | 6.00 | 0.04 | 5.347 | -44.9 | 4.74 | 250 |
| 1400 | 15.16 | 6.05 | 0.05 | 5.328 | -39.8 | 3.13 | 200 |
| 1405 | 15.13 | 6.03 | 0.07 | 5.246 | -34.7 | 4.57 | 250 |
| 1410 | 15.13 | 6.02 | 0.05 | 5.264 | -30.7 | 1.03 | 250 |

Water Cont: 4.12 ft - TOTAL PULS: 2 Super

1434

[Signature]

New Bedford Mass

11/2/17

3556200

Mike Morris

Alcove Microwave Station

Clear Antenna on Site. Antenna Tailored to Antenna C

Weather: Partly Cloudy. Warmest Temp Yesterday

Wind: in the SWS. Mints in the WWS.

Maximum Wind: out of the SW at

11:00 PM @ 0648, Low Tide @ 1244

Presence: Mike Morris, Mary Beth Weidert

Task: Sample of Microwave @ Alcove Station

Equipment: Yagi, Tracking Mount, Antenna Base,

Water Level Meter, GPS, Tachometer, Yagi Antenna

0705 Water Level C Read

0731 Antenna @ FF-09 Center

FF-09S

WD = 2.58 ft

TD = 16.91 ft

FF-09D

WD = 2.23 ft

TD = 22.24 ft

Water Column = 10.19 ft

0740 Set up at WWS. Antenna @ FF-09 S

Water is fairly calm: smooth

Signs of Antenna Station to Left of Antenna

Flow: Flow Meter Capable to

4100 PPM

MM

New Bedford Mass

11/2/17

3556200

Mike Morris

Alcove Microwave Station

| Time | Water Level | glt | DO | SQC | Alt | Turb | Flow |
|------|----------------------|------|-------|--------|-------|------|---------------------|
| 0755 | 16.24 | 6.48 | -2.53 | 5.485 | -14.0 | 86.2 | 100 |
| 0800 | 16.19 | 6.64 | -3.71 | 7.106 | -21.7 | 72.1 | 100 |
| 0805 | 16.29 | 6.65 | -3.49 | 7.485 | -24.5 | 10.2 | 150 |
| 0810 | 16.47 | 6.65 | -3.98 | 10.232 | -34.2 | 3.04 | 150 |
| 0815 | 16.50 | 6.64 | -4.51 | 10.884 | -37.7 | 1.21 | 150 |
| 0820 | 16.72 | 6.64 | -5.32 | 12.002 | -36.7 | 1.59 | 150 |
| 0825 | 16.73 | 6.63 | -5.91 | 12.977 | -37.0 | 1.04 | 150 |
| 0830 | 16.74 | 6.63 | -6.30 | 13.015 | -37.1 | 0.24 | 150 |
| 0835 | 16.80 | 6.64 | -6.75 | 13.441 | -37.4 | 0.02 | 150 |
| 1010 | Water Output 4.58 ft | | | | | | Total Power 1.5 gal |

File 2

New Bedford Area

11/2/17

35 BUC200

Mike Monks

Nancy Michael Sample

0430 Collect water sample in ADP FF-245 110217

RA-CO20001, WG, ALPHA LABS

PCH: CO20001; 2 IL AMB

4°C

RA-CO2301, WG, TA BULKWATER

PCH: AROMATIC SW8032, 2 IL AMB

9°C

METALS: SW8032, 1500 ml PASTE

HNO₃/4°C/FERROS

METALS: ESC-175, 3 40 ml VIALS

HCl/4°C

RA-CO13801, WG, TA SAUGHAM

VOL: SW82600, 3 40 ml VIALS

HCl/4°C

DOC: E415.1, 3 40 ml VIALS

4°C

SULFIDE: SW7034, 1 250 ml PASTE

ZnA/NaOH/4°C

METALS: E300 + ALKALINITY-E310.1

1 250 ml PASTE; 4°C

0455 Set up on FF-690 BULK PASTE

Water is v in can: 00-1135

Good Flow, No Bubbles

MWM

New Bedford Area

11/2/17

35 BUC200

Mike Monks

Nancy Michael Sample

| Time | Temperature | pH | DO | SGC | ORP | Turb | Fluor |
|--------|-------------|------|-------|-------|--------|------|-------|
| FF-690 | °C | | mg/L | µS/cm | mV | NTU | µM/L |
| 0900 | 15.52 | 6.18 | -0.27 | 2,138 | -323.4 | 5.90 | 4550 |
| 0905 | 15.55 | 6.00 | -0.00 | 2,130 | -322.0 | 1.57 | 250 |
| 0910 | 15.59 | 6.01 | -0.17 | 2,124 | -320.4 | 0.06 | 250 |
| 0915 | 15.59 | 5.98 | -0.13 | 2,130 | -320.0 | 0.06 | 250 |
| 0920 | 15.63 | 5.97 | -0.12 | 2,131 | -314.6 | 0.02 | 250 |
| 0925 | 15.66 | 5.95 | -0.10 | 2,124 | -314.7 | 0.02 | 250 |

Water 412 µ Total Phos = 3.0 µg/L

WIC

D. L. D.

New Dredge Numb

11/2/17

35 Feb 2000

Mike Morris

Acute Microbial Sample

0930 Coeur Water Sample N.D. FF-090 11047

RA-CO 20002, WG, ALPHA LABS

PCBs, Congeners, 2 IL AMBIS

40C

RA-CO 8302, WG, TA BURLINGTON

PCBs, Ambis, SW 8032, 2 IL AMBIS

40C

METALS: SW 6000, 1 500 ml PLASTIC

1 1/2 HUS/40C/FILTERED

METALS: PSR-175, 3 400 ml VIALS

40C

RA-CO 13802, WG, TA SAVANNAH

VOCs, SW 8260B, 3 400 ml VIALS

HCL/40C

DEC: E 415.1, 3 400 ml VIALS

40C

SULFUR: SW 9004, 1 250 ml PLASTIC

ZnA/NaOH/40C

AMBIS E 300 + ALKALINITY E 310.1

1 250 ml PLASTIC, 40C

Will Coeur A Field Duplicate on this site

RA-CO 20002, WG, ALPHA LABS

PCBs, Congeners, 2 IL AMBIS

40C

MW

New Dredge Numb

11/2/17

35 Feb 2000

Mike Morris

Acute Microbial Sample

RA-CO 8303, WG, TA BURLINGTON

PCBs, Ambis, SW 8032, 2 IL AMBIS

40C

METALS: SW 6000, 1 500 ml PLASTIC

1 1/2 HUS/40C/FILTERED

METALS: PSR-175, 3 400 ml VIALS

40C

RA-CO 13803, WG, TA SAVANNAH

VOCs, SW 8260B, 3 400 ml VIALS

HCL/40C

DEC: E 415.1, 3 400 ml VIALS

40C

SULFUR: SW 9004, 1 250 ml PLASTIC

ZnA/NaOH/40C

AMBIS E 300 + ALKALINITY E 310.1

1 250 ml PLASTIC, 40C

1020 MAW BTH: 547 W/TH DD-09

DD-095

WD 303 ft

TD 1643 ft

DD-090

WD 401 ft

TD 2240 ft

WATER 1000 7.21 ft

MW

100

New Bedford Harbor

11/2/17

3500Zur

Mike Marks

Activity Microbial Sample

1115 Collect water sample NDE DD JRS 1100Z

RA Co Zoway, WC: ALPHI VAS

PCH, Coliforms; 2 ILAMEN

40C

RA - Co Zoway, TA BULLMAN

PCH, ALPHI, SW8082;

2 ILAMEN; 40C

METALS, SW6000; 1500 ml PASTE

HAC/40C/FILTRATION

METALS; RSK 175; 3 400 ml VIALS;

HAC/40C

RA - Co Zoway, WC: TA BULLMAN

VOL: SW8260B; 3 400 ml VIALS;

HAC/40C

DOC, CHIS.1; 3 400 ml VIALS;

40C

SULFIDE, SW9034; 1250 ml PASTE;

ZNA/MOBT/40C

ALUMINUM E300 + ALKALINITY (300 ml)

1250 ml PASTE; 40C

1120 SET WAT FF-CAD; BACON PASTE

WAT IS LHM; 10 COAT; GMD

FLW

MUM

New Bedford Harbor

11/2/17

3500Zur

Mike Marks

Activity Microbial Sample

| Time | Temperature | pH | DO | SpC | ORP | Temp | Flow |
|------|-------------|------|-------|-------|-------|------|--------|
| DD | OK | | mg/L | µS/cm | mV | with | ml/min |
| 1030 | 16.92 | 6.93 | -2.88 | 7.64 | -2883 | 14.2 | 200 |
| 1035 | 17.02 | 6.87 | -1.78 | 7.852 | -3354 | 10.2 | 200 |
| 1040 | 16.91 | 6.79 | -2.20 | 8.465 | -3554 | 8.71 | 200 |
| 1045 | 16.92 | 6.77 | -2.30 | 8.776 | -3020 | 6.40 | 200 |
| 1050 | 17.17 | 6.74 | -2.94 | 9.876 | -3085 | 4.47 | 200 |
| 1055 | 17.23 | 6.73 | -3.30 | 9.071 | -3766 | 1.35 | |
| 1100 | | | | | | | |

with Goes Day with A Few Miles (in 1000 ft)

Sample

WAT DOW. 9.91 ft

TOM PULVER 15 gpd

J. L. L.

New Bedford Mass

11/21/7

3500 Zoo

Mike Morris

Amesbury Mich. Will Smith

1200 Collect with same for ADP-DD 0920 110017

RA CO 20005, WC, ALAM LABS. —

40C, PAB, COLUMBIA, 2 11 MB —

RA CO 7202, WC, IN BUREAU —

PAB, AMESBURY, SW 8082; —

2 11 MB, 40C —

MASS. SW 8082, 1 250 MB PASTE; —

40C, 40C, 40C —

MATHEW, PAB-175, 3 40 MB VMS —

40C —

RA CO 12702, WC, IN BUREAU —

VMS, 3 40 MB VMS, 3 40 MB VMS —

40C, 40C —

DO C, PAB-175, 3 40 MB VMS —

40C —

SW 8082, SW 8082, 1 250 MB PASTE —

2 11 MB, 40C —

ALUMS, E30 + ALKALINITY-E 301, —

1 250 MB PASTE, 40C —

1230 LIME AMESBURY STATION CO 1100 MB C DAK —

1315 AMESBURY STATION CO 1100 MB C DAK —

TAKEN IN VMS TRAIL —

1530 19417 THE GYRE —

Will Smith

New Bedford Mass

11/21/7

3500 Zoo

Mike Morris

Amesbury Mich. Will Smith

| Time | Temperature | pH | DO | SpC | ORP | Turb | Fluor |
|---------|-------------|------|------|--------|-------|------|-------|
| DD-0920 | °C | | mg/L | μS/cm | mV | ntu | μl/ml |
| 1125 | 16.41 | 7.30 | 1.55 | 41,114 | -2644 | 0.39 | 300 |
| 1130 | 16.42 | 7.25 | 1.70 | 40,274 | -2600 | 1.19 | 300 |
| 1135 | 16.47 | 7.21 | 1.68 | 39,994 | -2550 | 0.45 | 200 |
| 1140 | 16.44 | 7.13 | 1.46 | 39,809 | -2576 | 0.51 | 200 |
| 1145 | 16.68 | 7.05 | 1.58 | 37,743 | -2474 | 0.34 | 250 |
| 1150 | 16.74 | 7.03 | 1.57 | 39,052 | -2400 | 0.27 | 250 |
| 1155 | 16.78 | 6.97 | 1.54 | 37,564 | -2320 | 0.15 | 250 |

1225 Water D.O. = 4.37 mg/l — WMS D.O. = 4.0 mg/l

Will Smith

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.

DRAFT

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 of 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 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

DRAFT

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 mi² 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 Harbor¹ (ERDC, 2014) and about 2.8% of the upper harbor tidal prism².

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 of 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.

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: $2 \times 3 \text{ ft} \times 187 \text{ acres} = 48.8 \text{ ft}^3$. $30 \text{ cfs} \times 12.5 \text{ hours} = 1.35 \text{ million ft}^3$
 $1.35/48.8 = 2.8\%$

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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 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 years 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.

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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

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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 frost³, 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 °).

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$$t = C\sqrt{AFDD_{max}}.$$

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.

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- 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

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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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US Army (2002) EM 1110-2-1612 Ice Engineering
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

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Figure 2. Satellite photo of New Bedford Harbor

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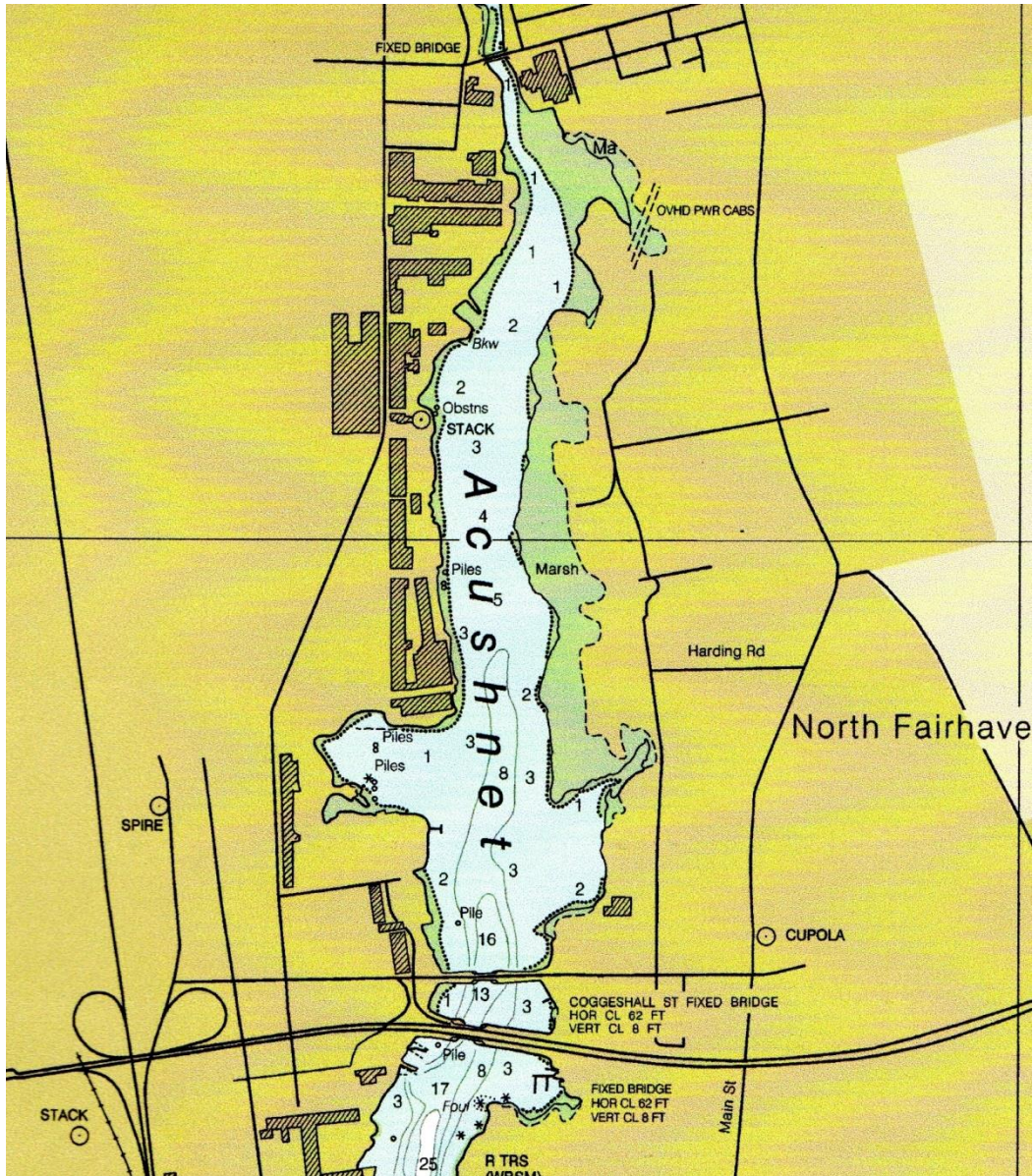
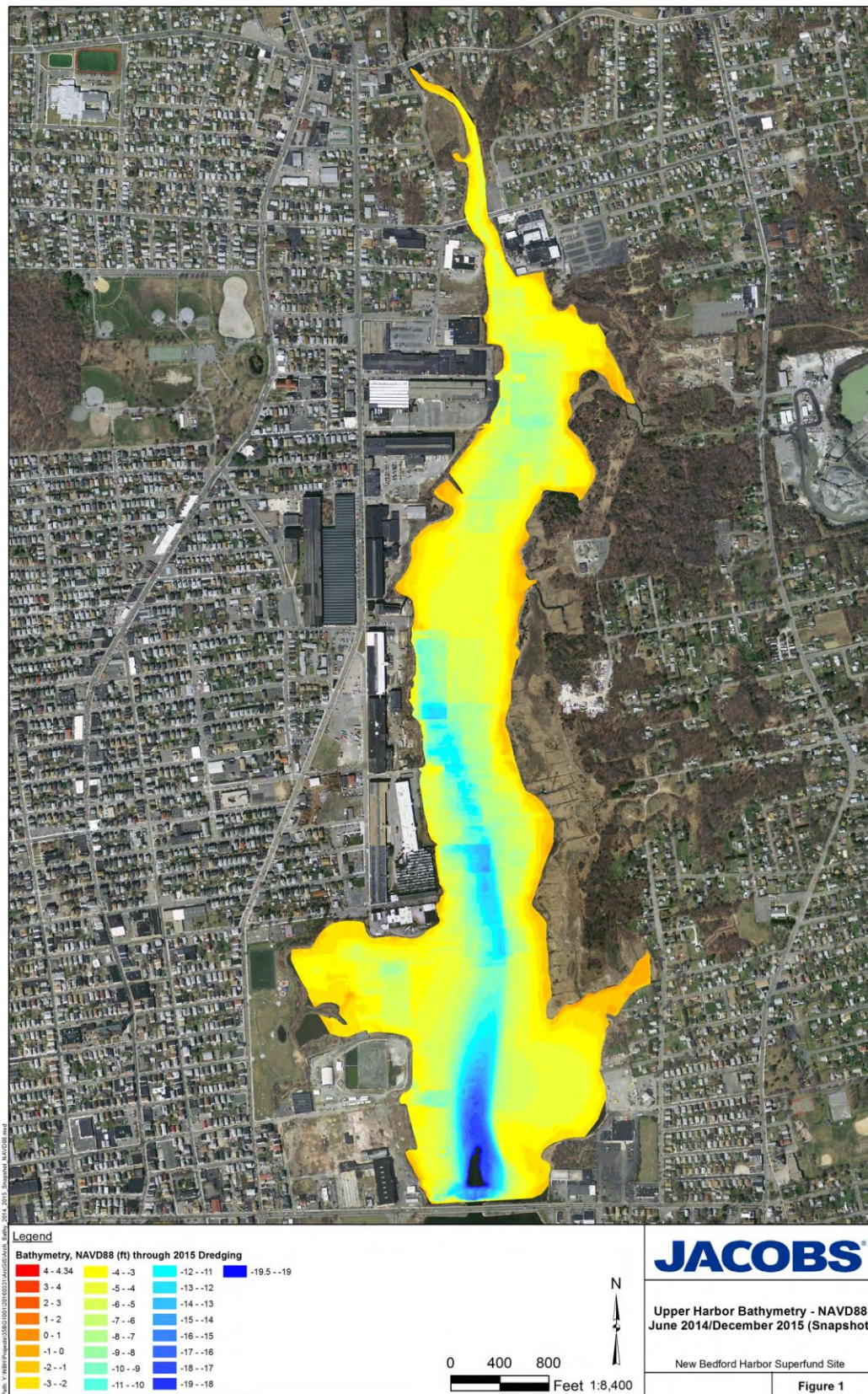


Fig. 3. NOAA Chart of New Bedford Upper Harbor. Soundings in ft at mean low tide (0.1 ft NAD 1983).

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FFig. 4 New Bedford Upper Harbor bathymetry 2014-2015. Bed elevations in ft NAVD 1988.

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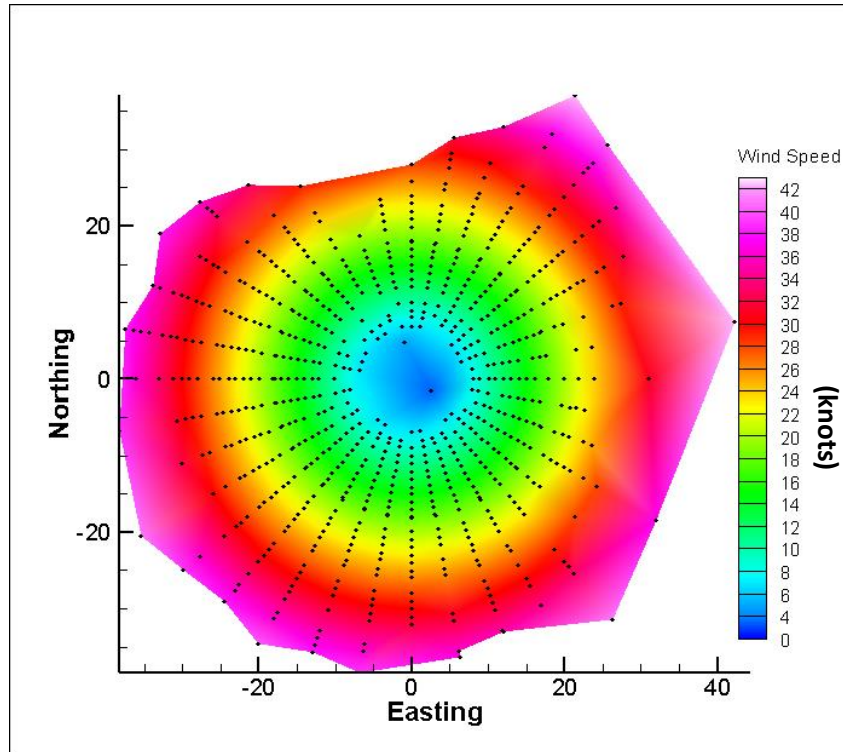


Figure 5. Fasted 2-minute winds, New Bedford Airport, 1998-2017
Open water season: mid-March -mid-December. Each dot represents one day.

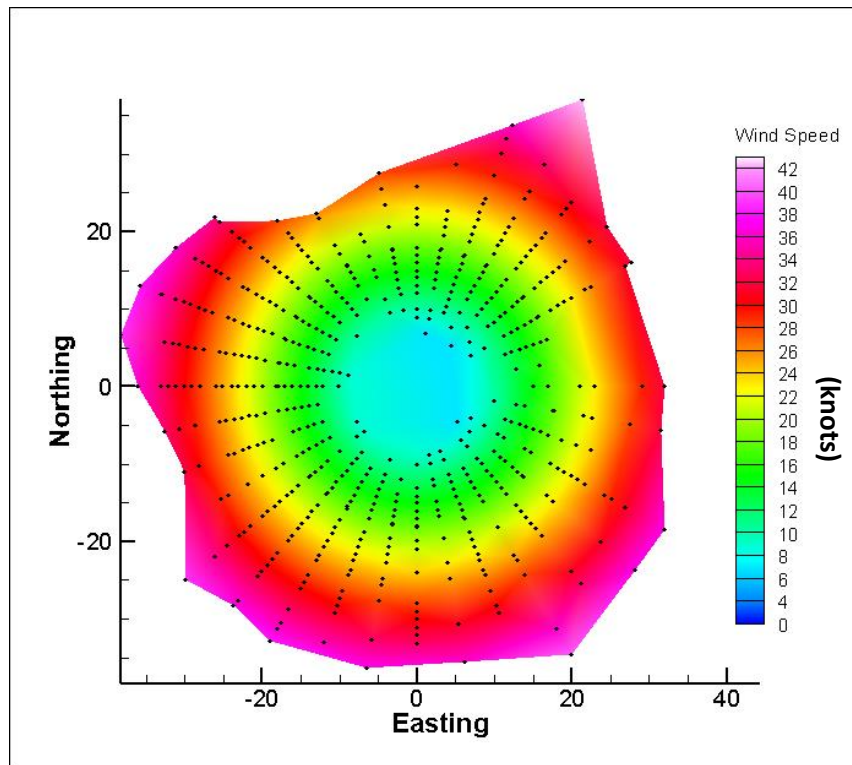
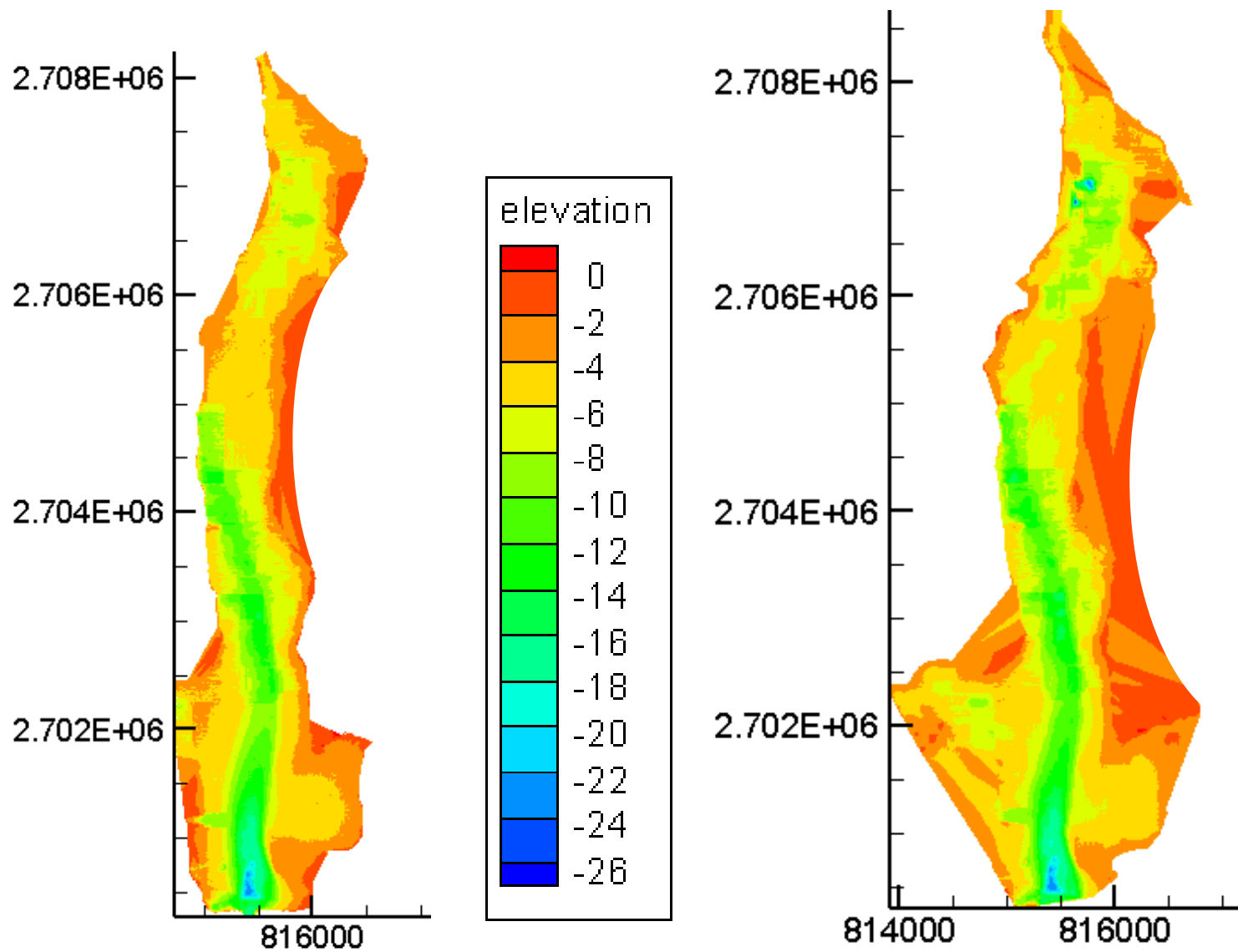


Figure 6. Fasted 2-minute winds, New Bedford Airport, 1998-2017
Winter season: mid-December -mid-March. Each dot represents one day.

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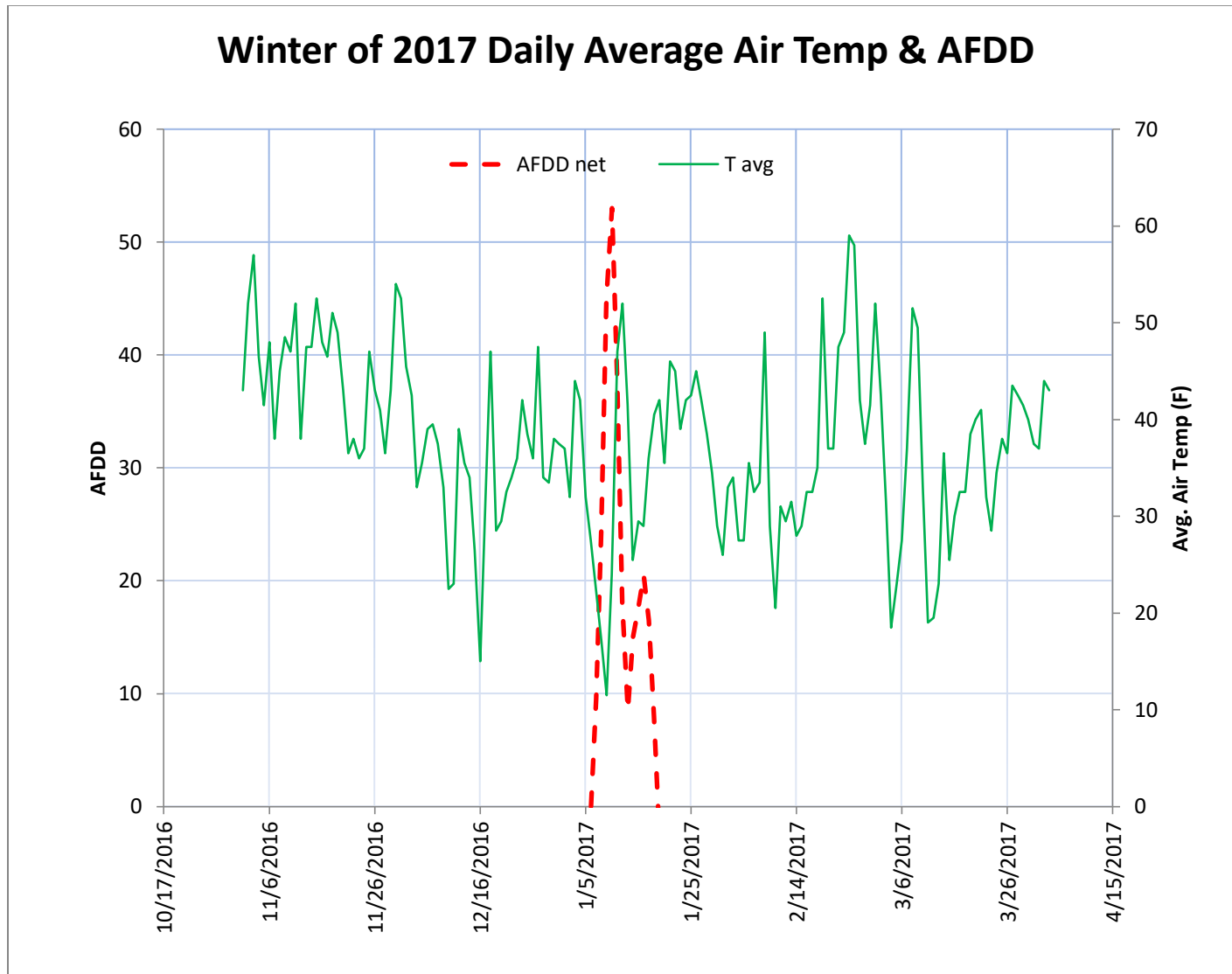


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Figure 6. Bathymetry of New Bedford Upper Harbor, existing conditions (left) and predicted after remediation (right).

Data source: Jacobs Field Services

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Figure 8. Winter of 2017 daily average air temperature and accumulated freezing degree days, New Bedford, MA Airport.

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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.

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Fig. 10. Northern part of Upper Harbor showing industrial Aerovox Site on West side and eastern shoreline near Lawson Ave., Fairhaven, 3/20/2017.



Fig. 11. Cove near Sycamore St. Fairhaven showing residual shore ice floated by rising tide 2/17/2017.

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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).

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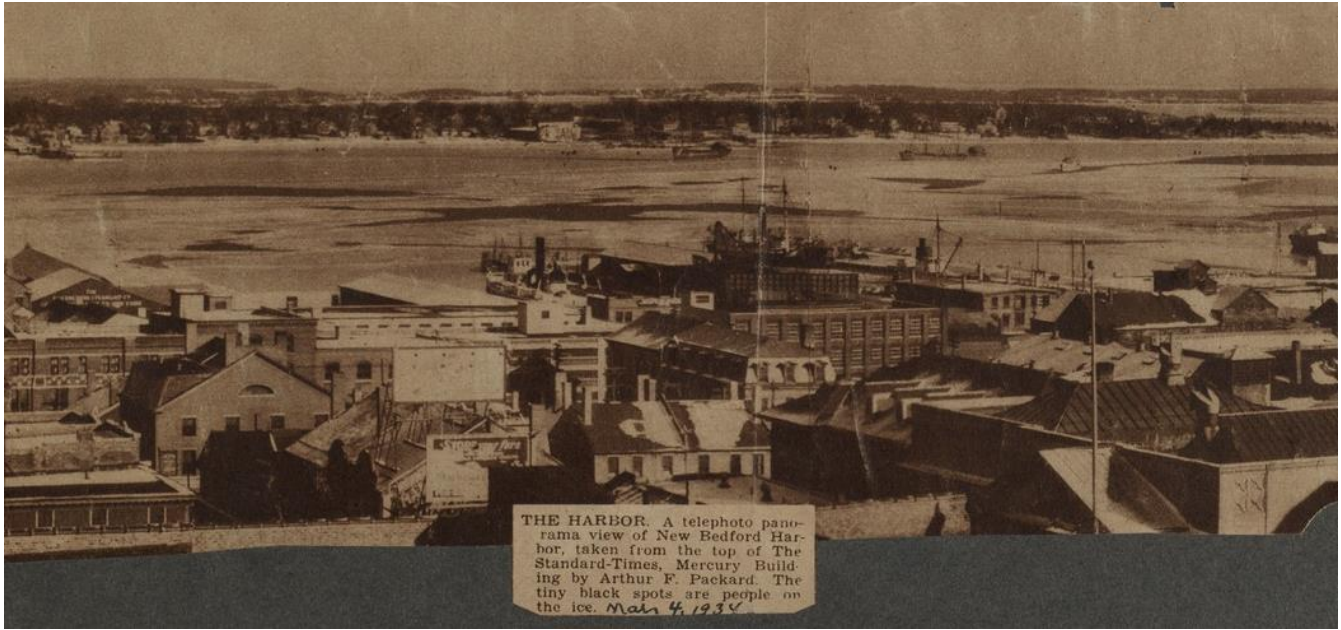


Figure 16 Lower Harbor ice-covered March 4, 1936. (New Bedford Standard Times).

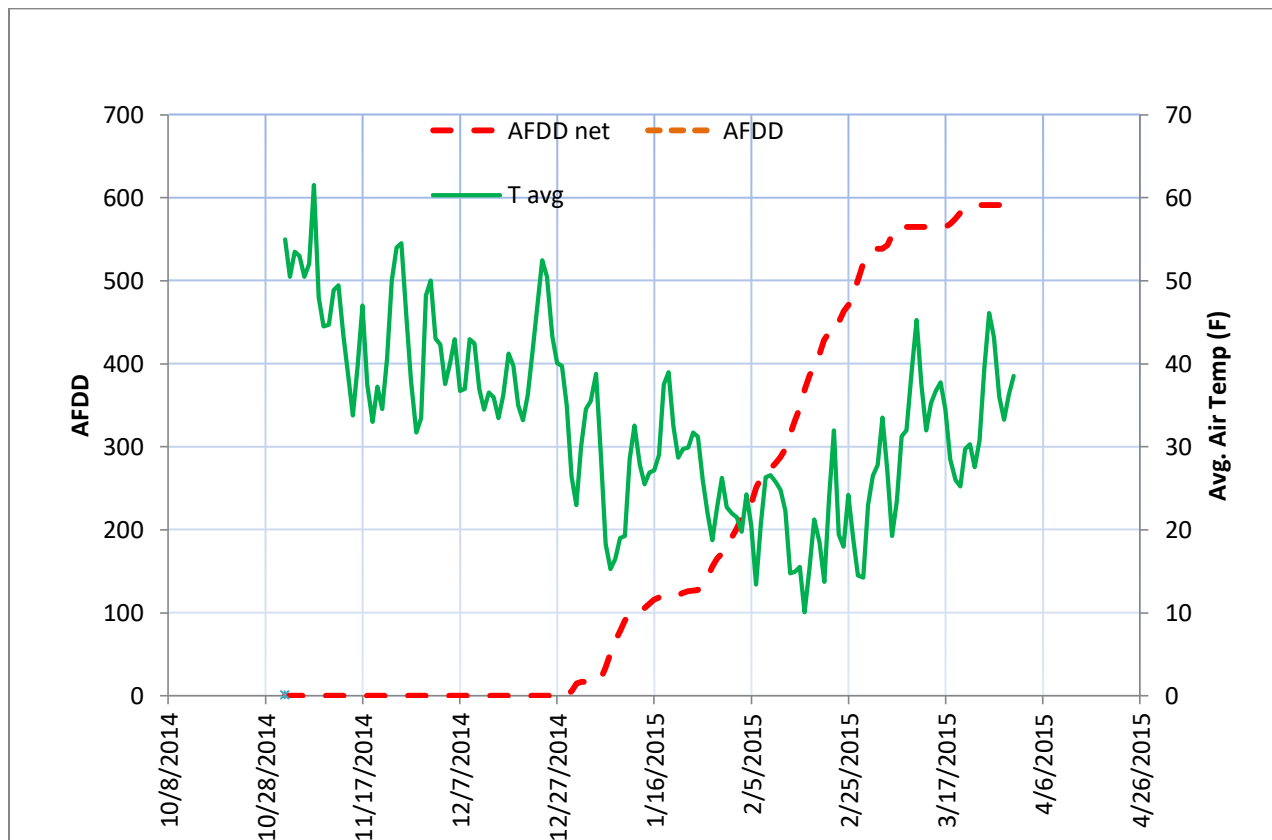


Fig. 17. Daily average air temperature and accumulated freezing degree days for the cold winter of 2015. New Bedford, MA Airport .

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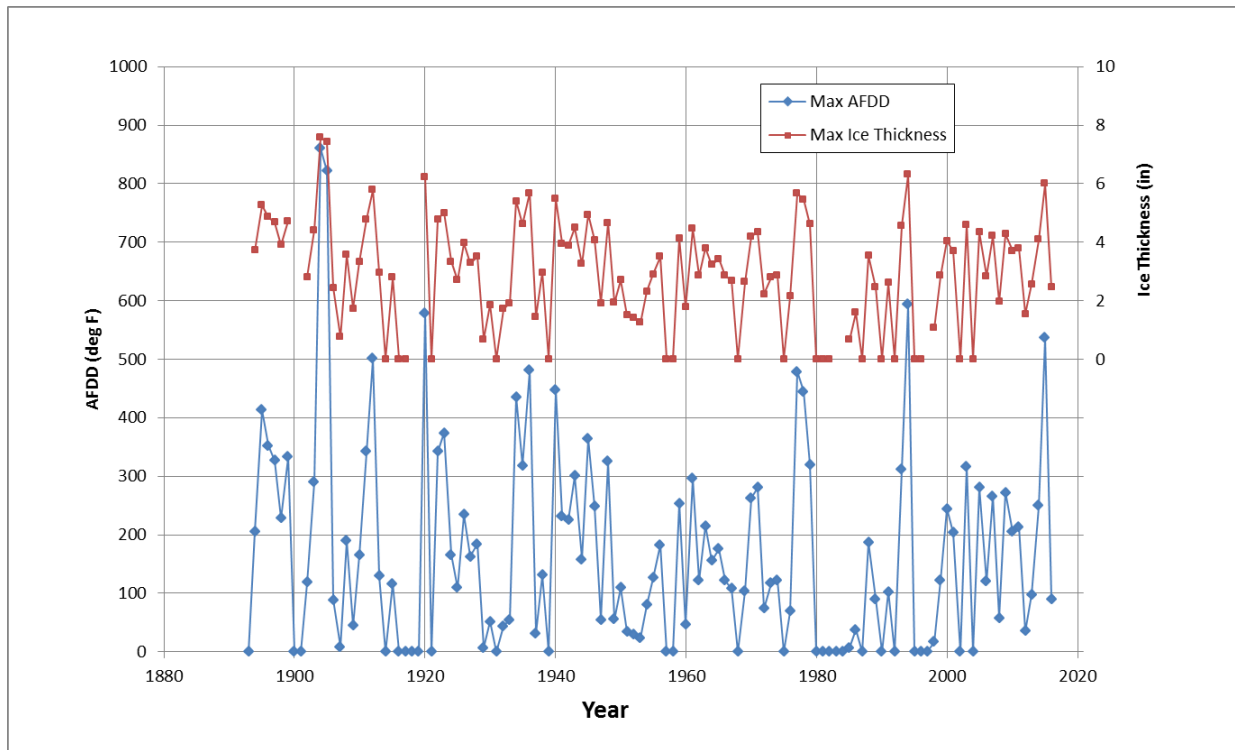


Fig. 18. Maximum accumulated freezing degree days and calculated ice thickness ,
New Bedford, MA 1893-2017

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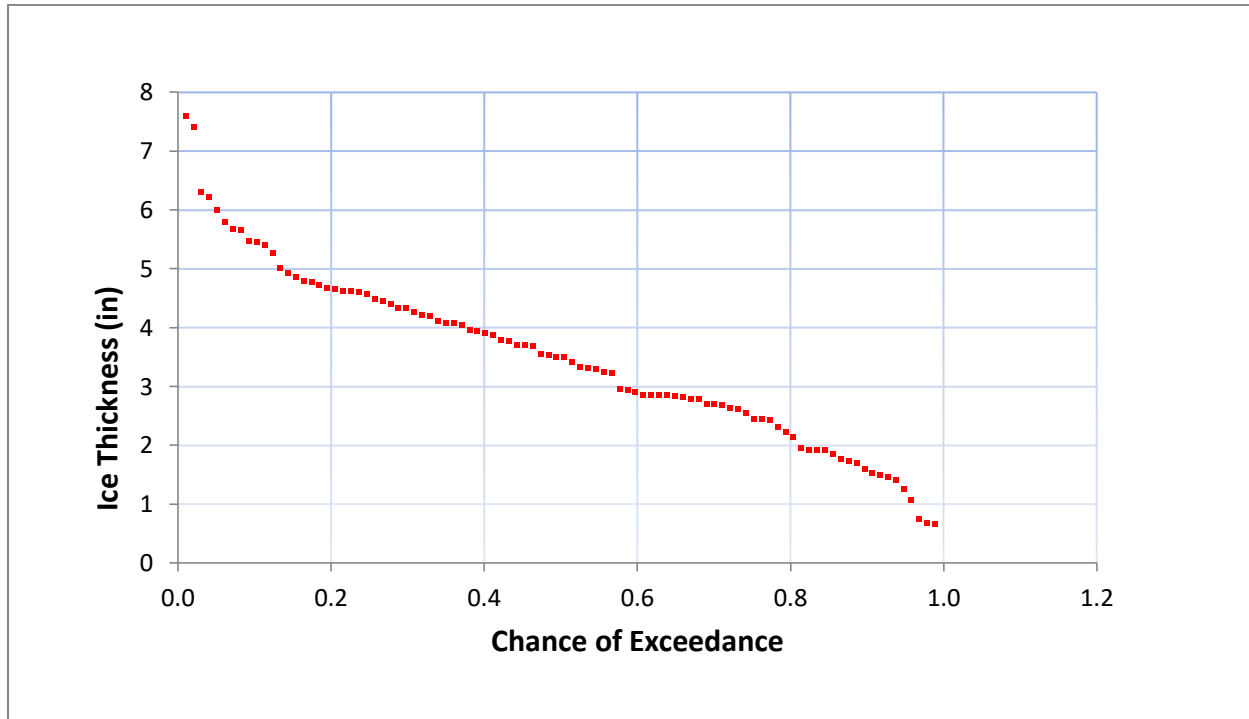


Fig. 19. Probability distributions ice thickness calculated from maximum accumulated freezing degree days winters of 1893-2017. New Bedford, MA

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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Project manager: Steve Fox
Authors: Changsheng Lu

Jacobs
103 Sawyer Street
New Bedford, MA 02746
508-996-5462
508-996-6742
www.jacobs.com

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Acronyms and Abbreviations

| | |
|----------------------|--|
| 3-D | three-dimensional |
| AFCEE | Air Force Center for Engineering and the Environment |
| Aerovox Inc. | Aerovox Incorporated |
| 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 (ft²) (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 bathymetry. 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 ($1.0\text{E-}07$ 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 (ft³/day). For the average low tidal level condition (0.2 ft. msl), the groundwater discharge flux rate to the harbor is 3368.68 ft³/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 (K_d), 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 K_d 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 (R_f) is defined as:

$$R_f = 1 + K_d \frac{\rho_b}{n_e} \quad (1)$$

Where: ρ_b = bulk density of the soil (grams per cubic centimeter [g/cm³]),
 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 K_d 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, K_d , 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 K_d 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 (K_{oc}) of PCB compounds (U.S. Department of Energy 2017). For PCBs, the K_d s were calculated based on relationship:

$$K_d = K_{oc} * foc \quad (3)$$

[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 K_d 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 K_d 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 K_{oc} among the three PCBs, it has the lowest K_d 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 K_{oc} (thus K_d) values. PCB-1254 has a much higher K_{oc} (thus larger K_d) 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 K_d s, 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 K_d , PCB solubility, and the water flux rate. A higher K_d 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 (K_d , 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 K_d s were modeled. The PCB Aroclor with the lowest K_d (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 ft³/day under average tidal conditions. The current condition model predicts 203 ft³/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 ft³/day for the original model and 169.3 ft³/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 K_d 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.

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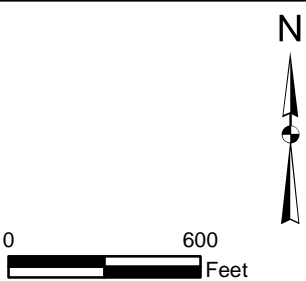
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Figures



Legend



JACOBS™

**Upper Harbor Showing
Former Aerovox Property
Location**

New Bedford Harbor Superfund Site

NAME: jpiccuito Date: 4/6/2018

Figure 1-1



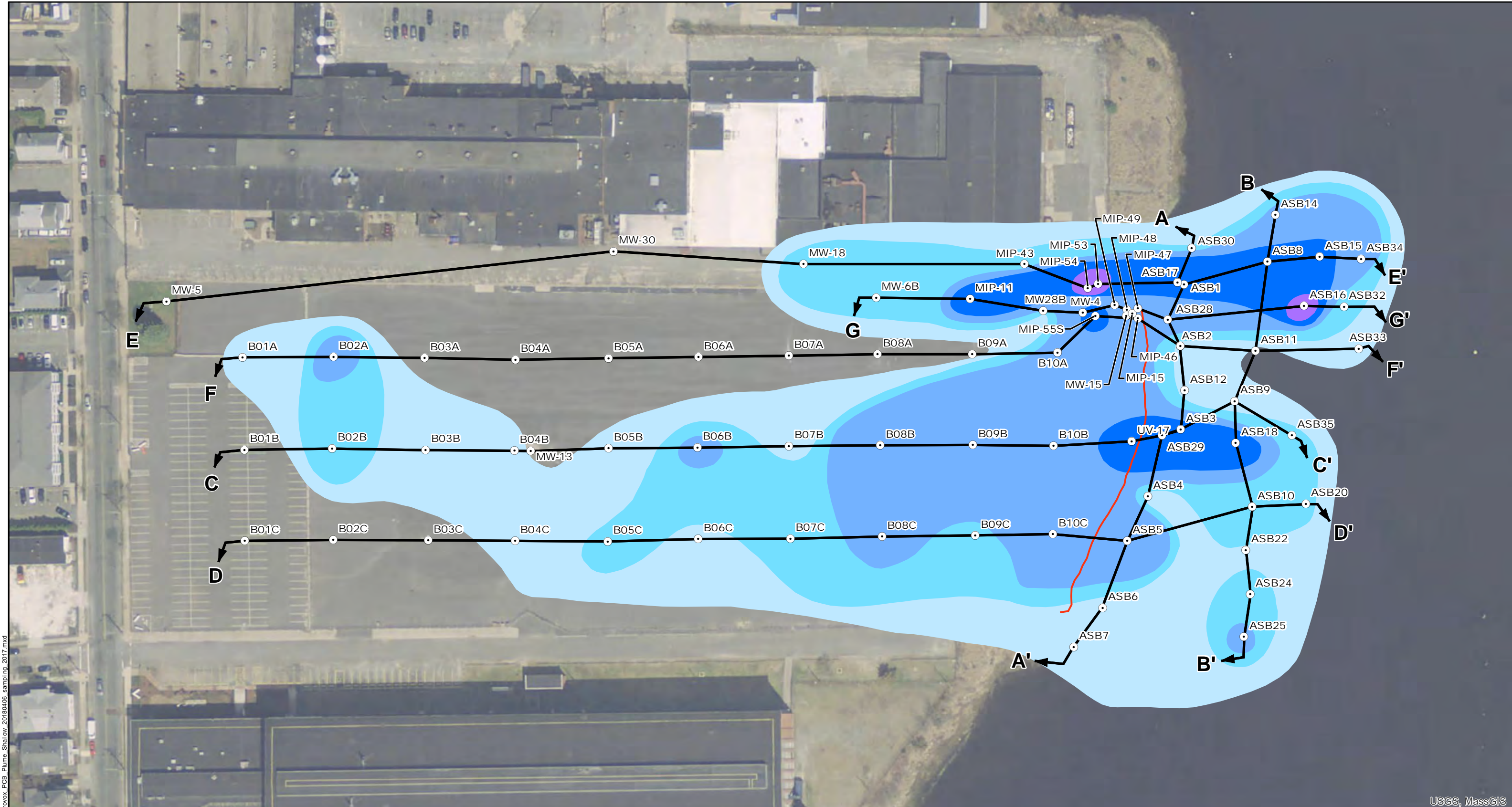
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Aerovox Site and
Nearby New Bedford Harbor

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 1 Aerovox Site.cdr

Figure 2-1



Path: Y:\NBH\Projects\38BG\1001\20180406\Aerovox_PCB_Plane_Shallow_20180406_sampling_2017.mxd

USGS, MassGIS

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

0 50 100 Feet

1:1,200

JACOBS

PCB Distribution for Former Aerovox Site Area Shallow Soils/Sediments

New Bedford Harbor Superfund Site

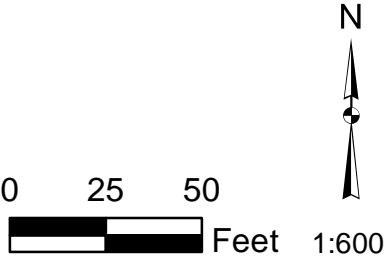
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Figure 2-2



Legend

- Aerovox Boring Location
- DNAPL Data Gap Sediment Location



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**Aerovox DNAPL Data Gap
Sampling Locations**

New Bedford Harbor Superfund Site

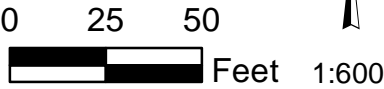
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Figure 2-3



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- Aerovox Boring Location
- Aerovox New Boring Location



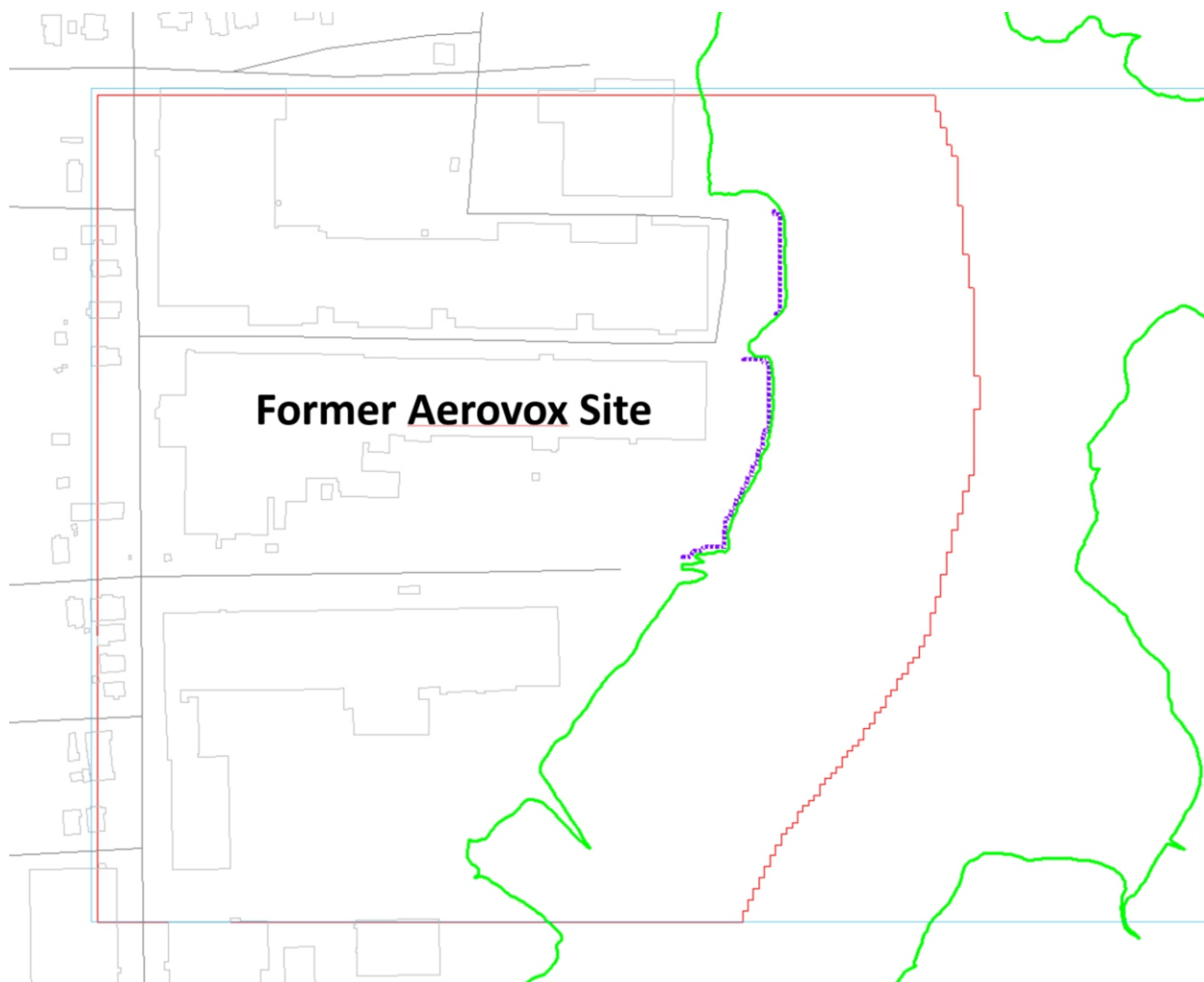
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Aerovox Borehole Locations

New Bedford Harbor Superfund Site

Date: 4/6/2018

Figure 2-4



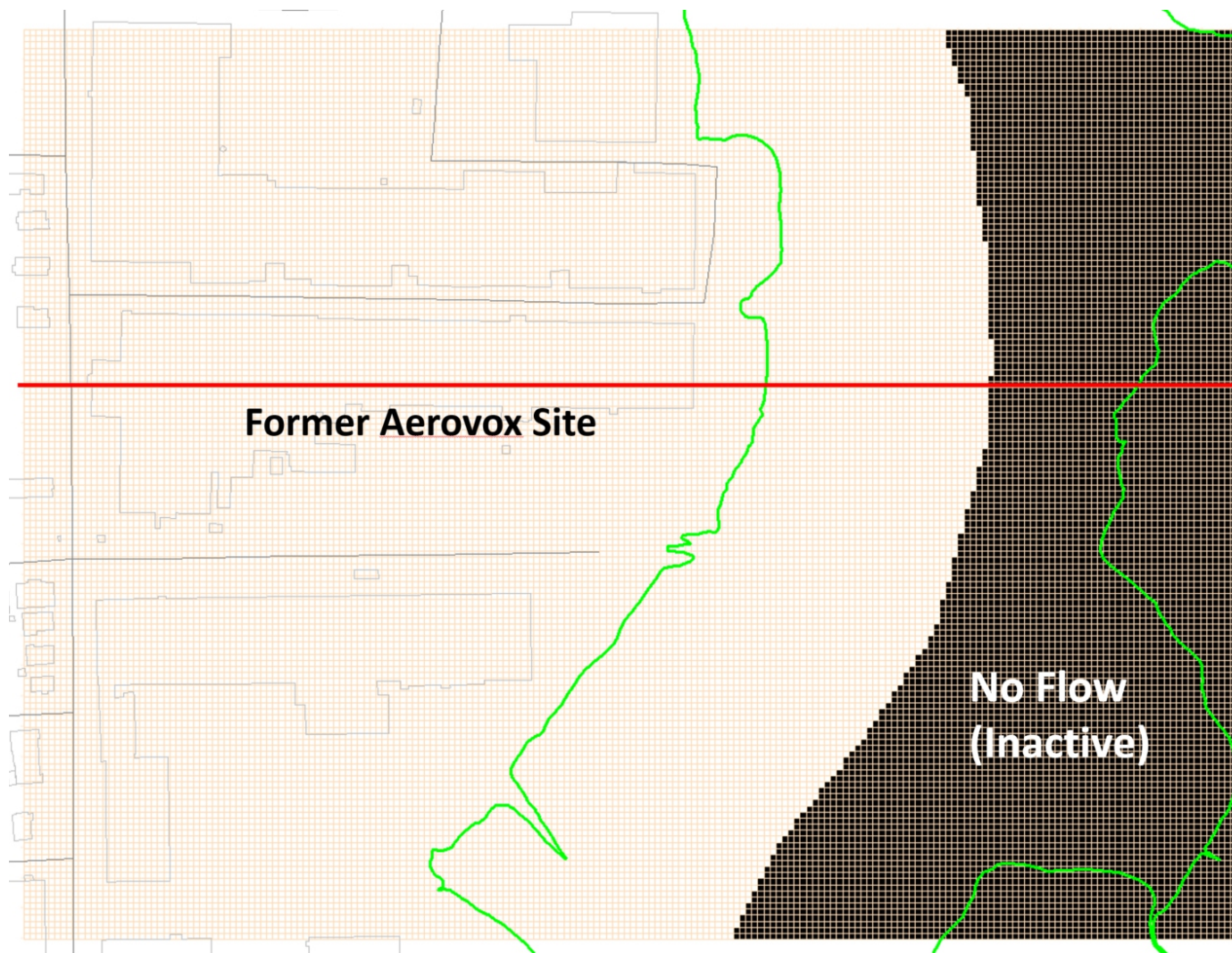
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**Aerovox and Harbor
Model Domain**

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-1 Model Domain.cdr

Figure 3-1



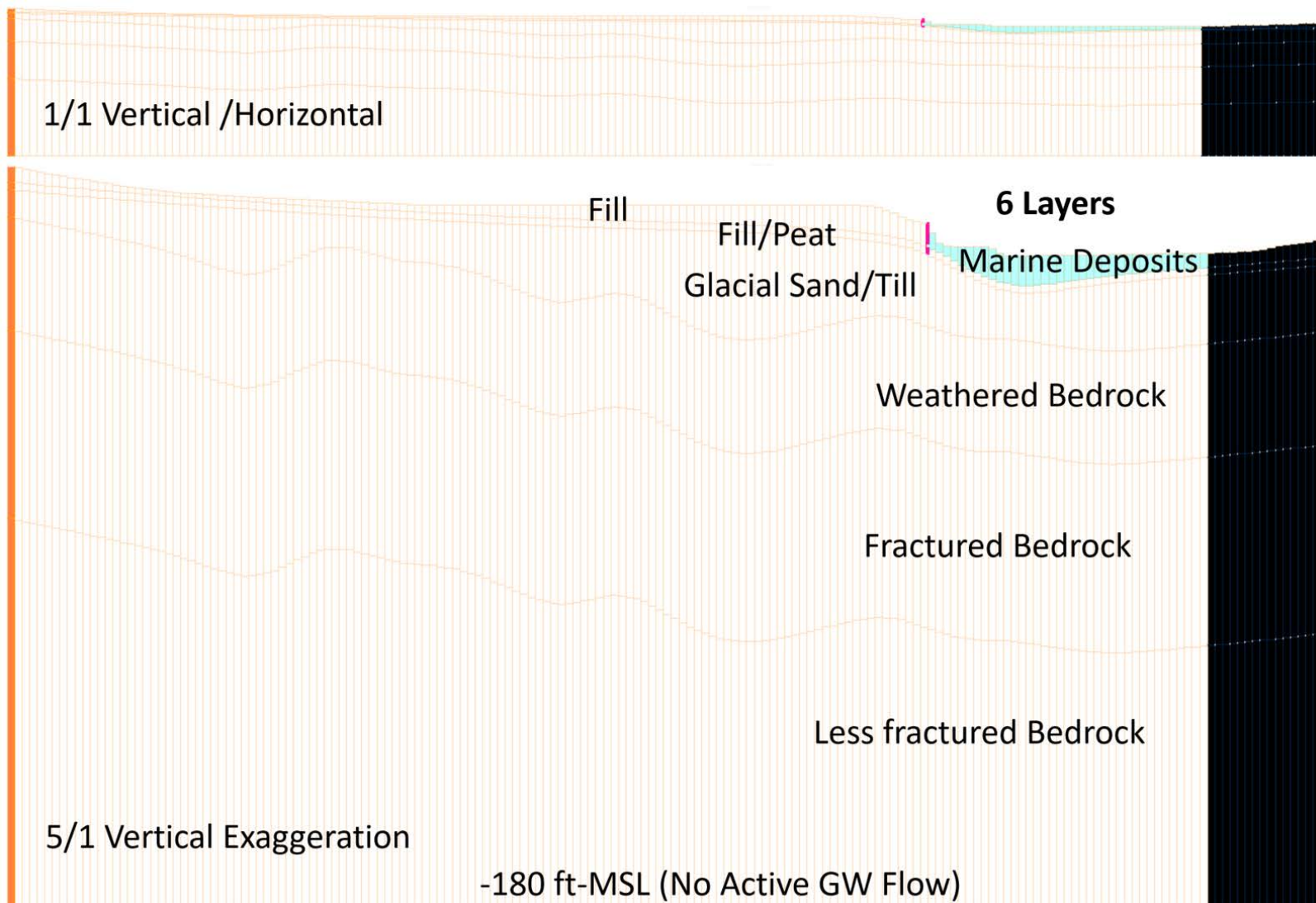
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Aerovox and Harbor
Model Grid

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-2 Model Grid.cdr

Figure 3-2



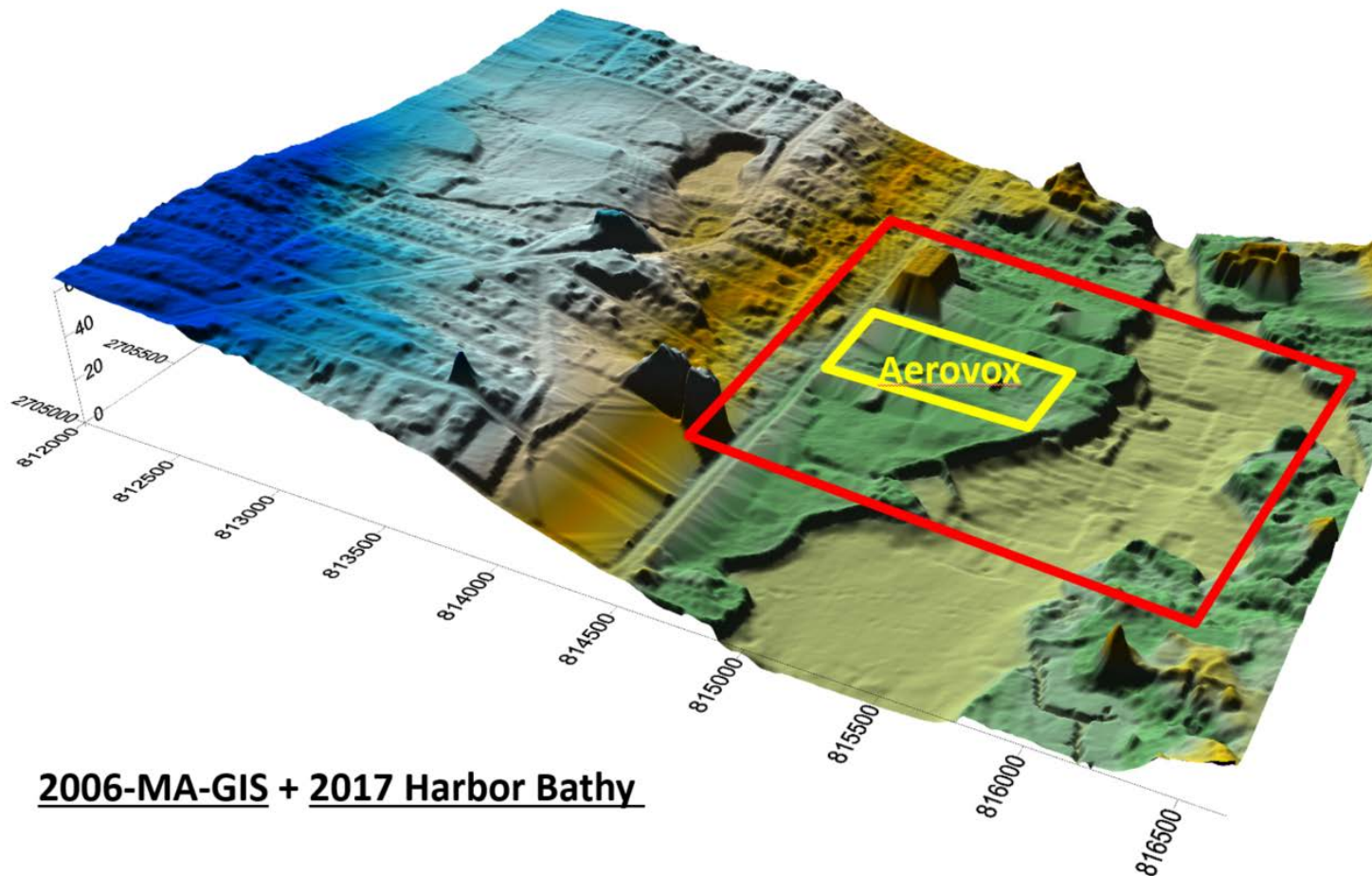
JACOBS®

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)



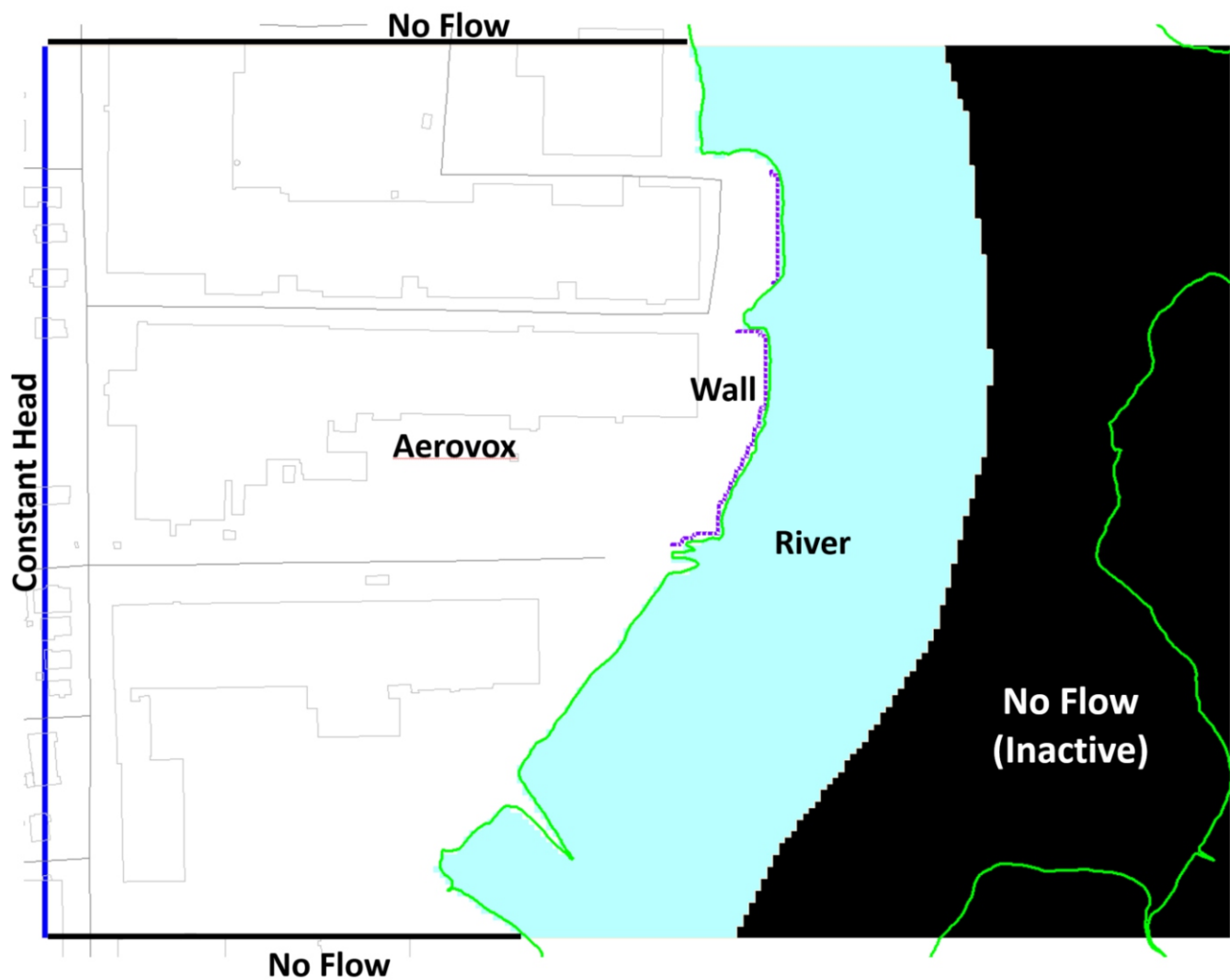
2006-MA-GIS + 2017 Harbor Bathy

JACOBS®

Aerovox and Harbor Model Topographic
Representation

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

Figure 3-4



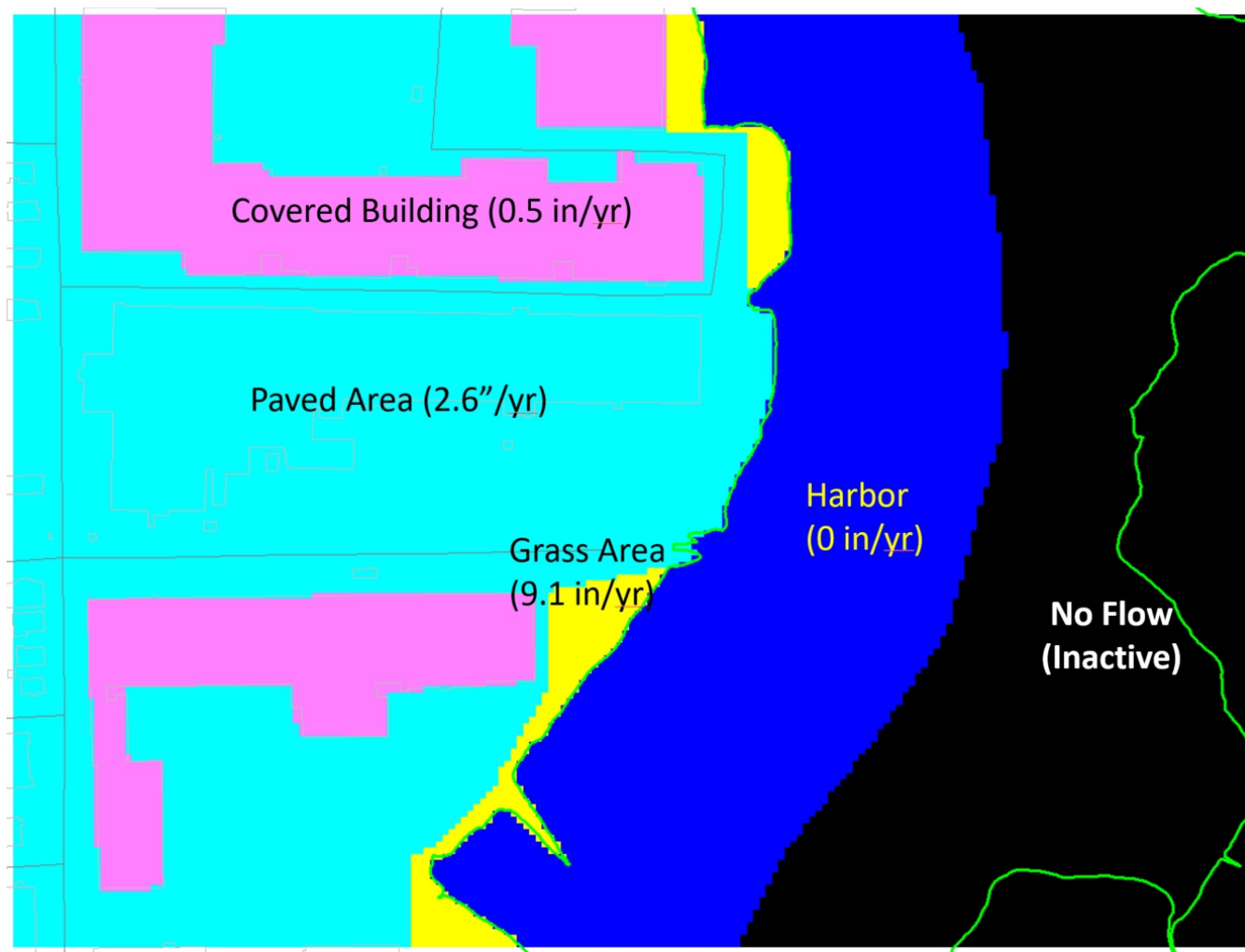
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Aerovox and Harbor
Model Boundary Condition

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-5 Model Boundary.cdr

Figure 3-5



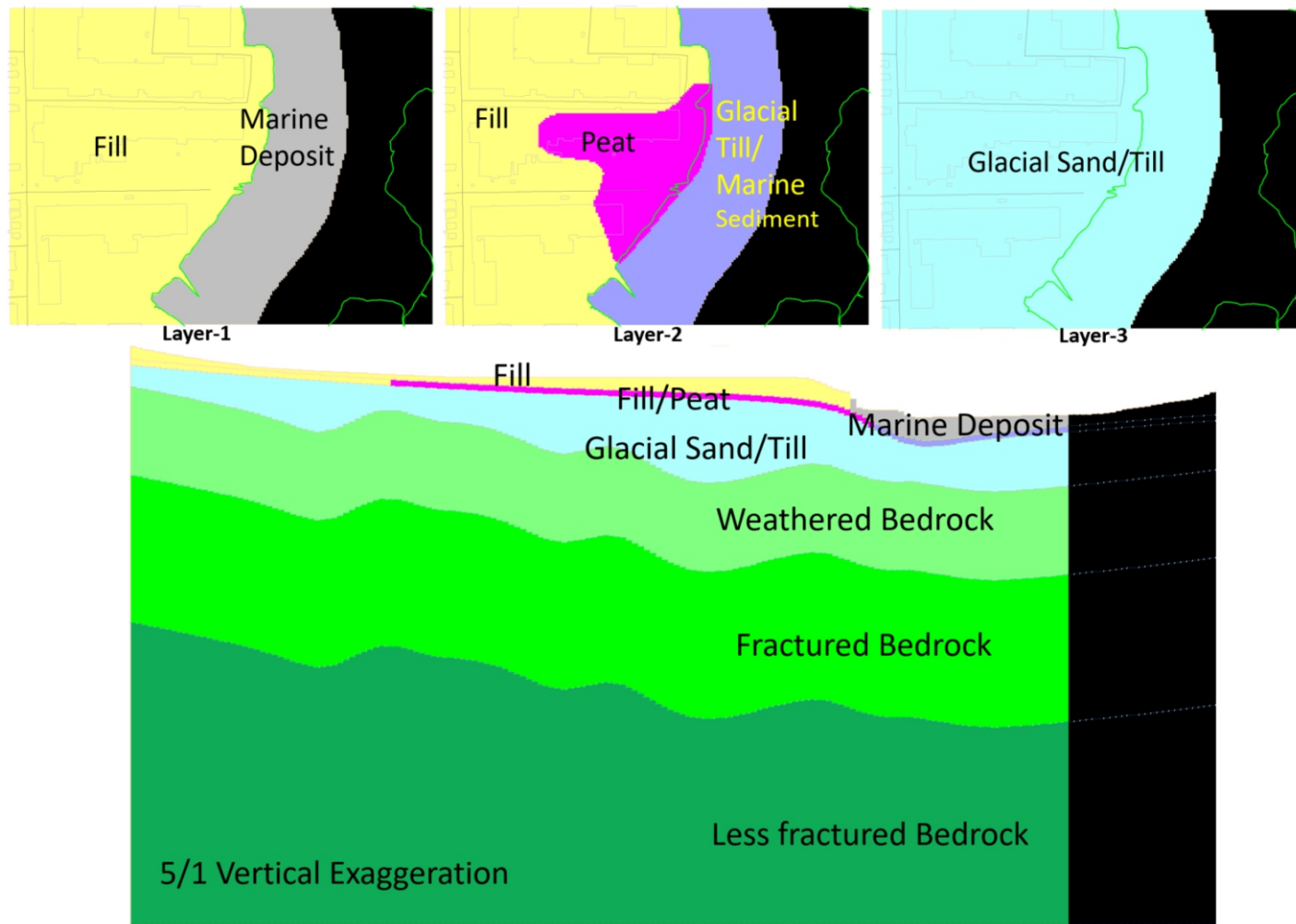
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Aerovox and Harbor
Model Recharge Distribution

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-6 Model Recharge.cdr

Figure 3-6



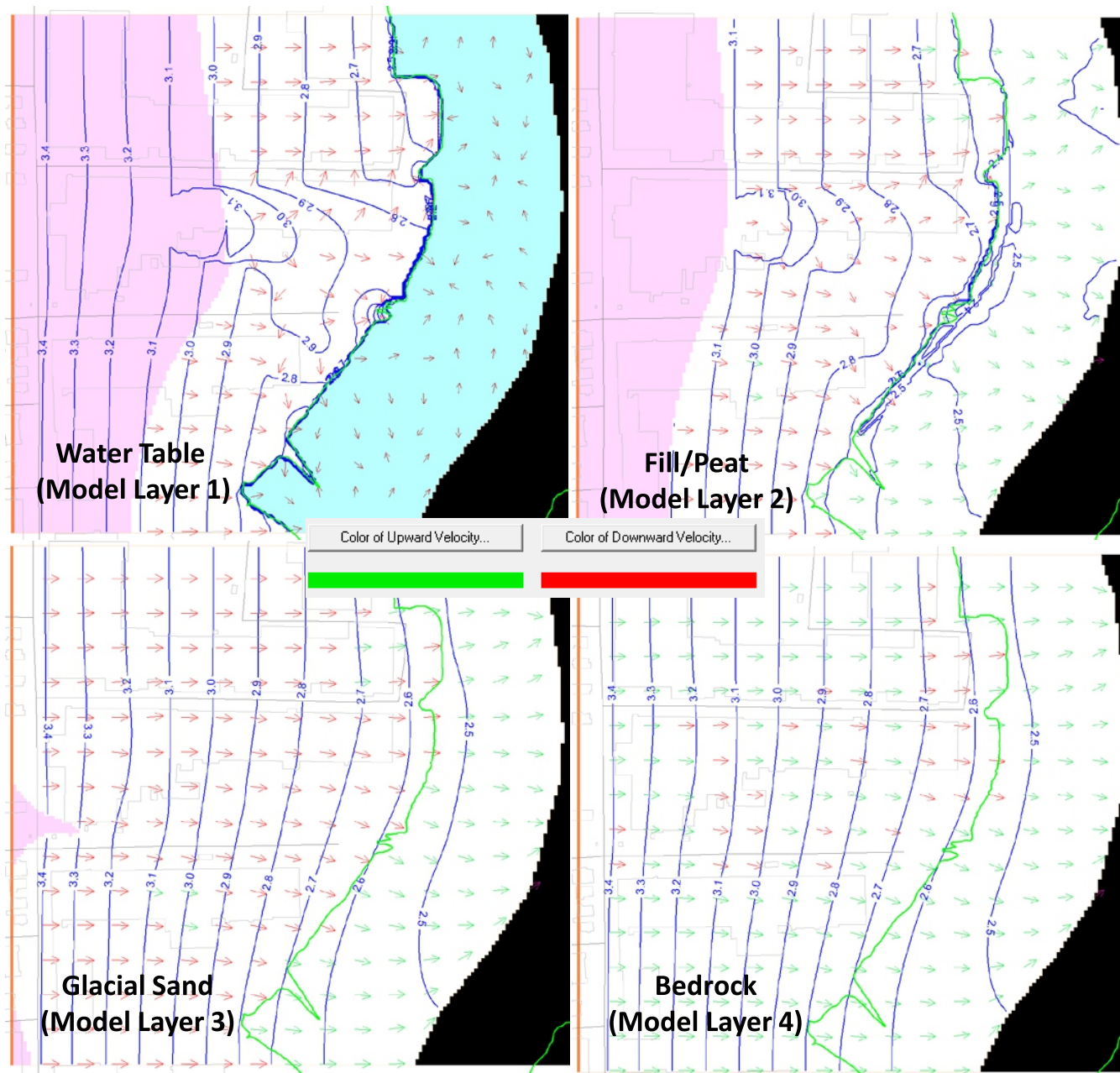
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Aerovox and Harbor
Model Property Zone Distribution

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 3-7 Model Properties.cdr

Figure 3-7



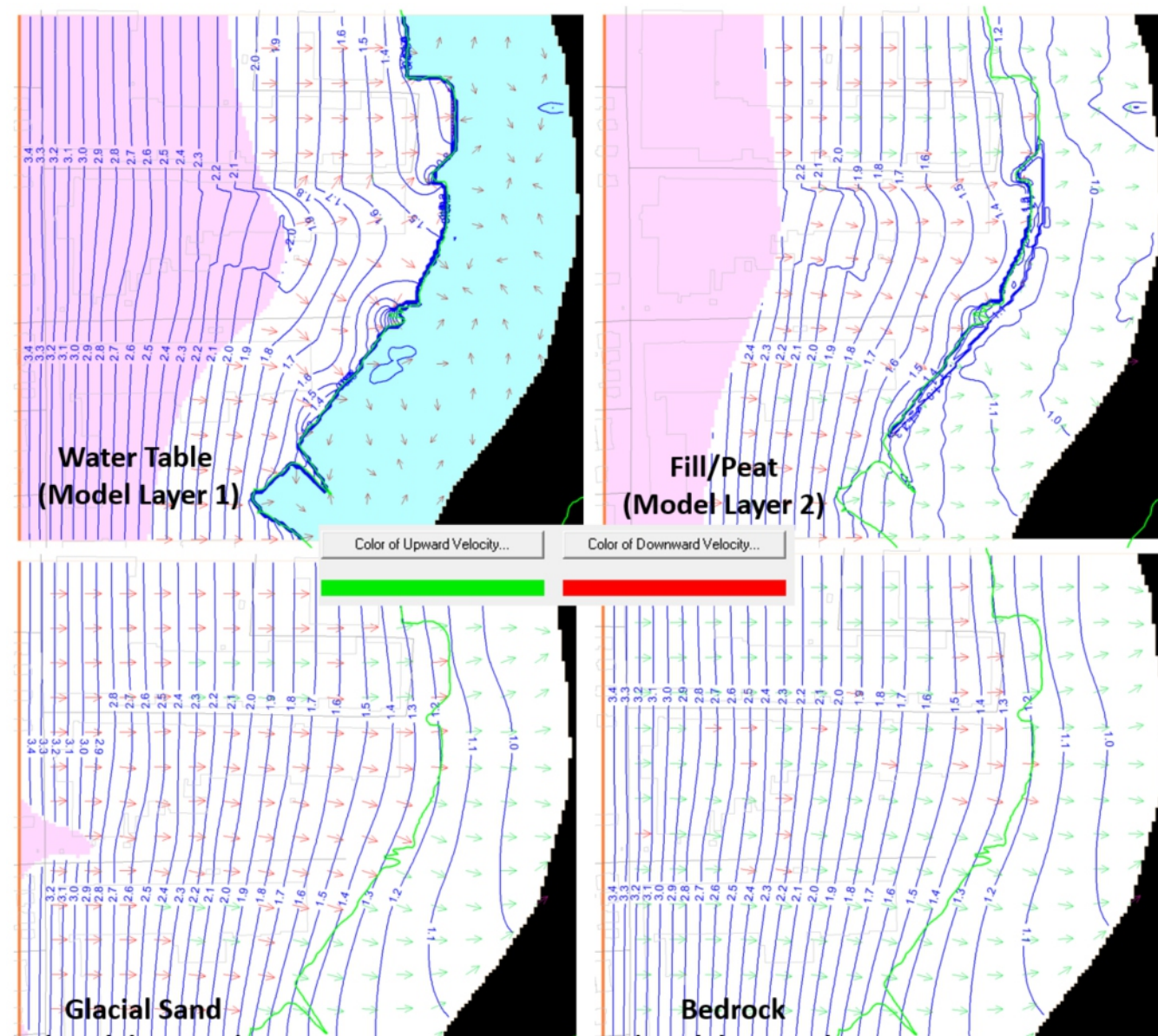
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Modeled Water Levels and
Flow Field (Average Tidal Condition)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

06/07/18 dmf
Figure 4-1 Modeled WL Avg.cdr

Figure 4-1



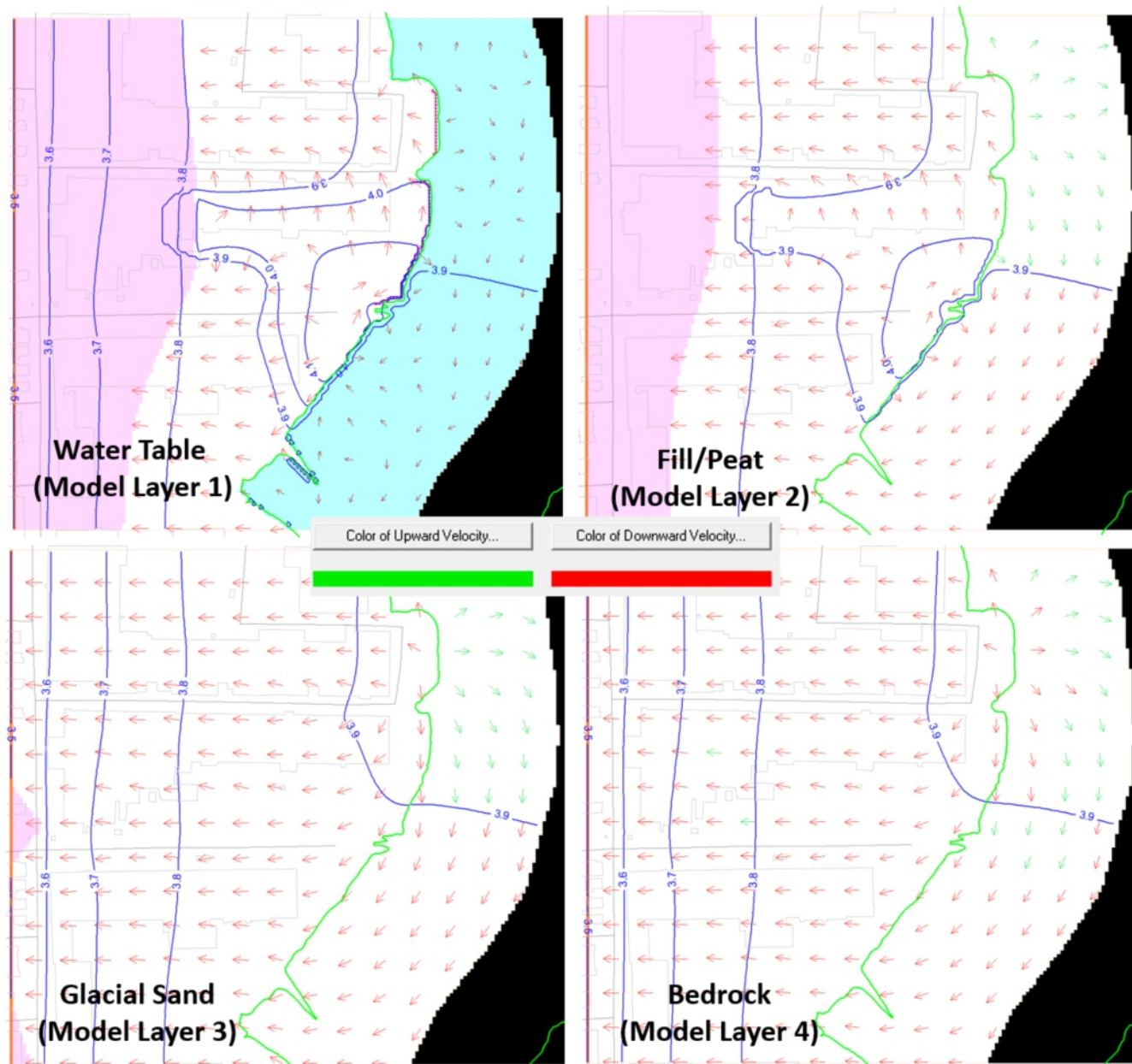
JACOBS

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



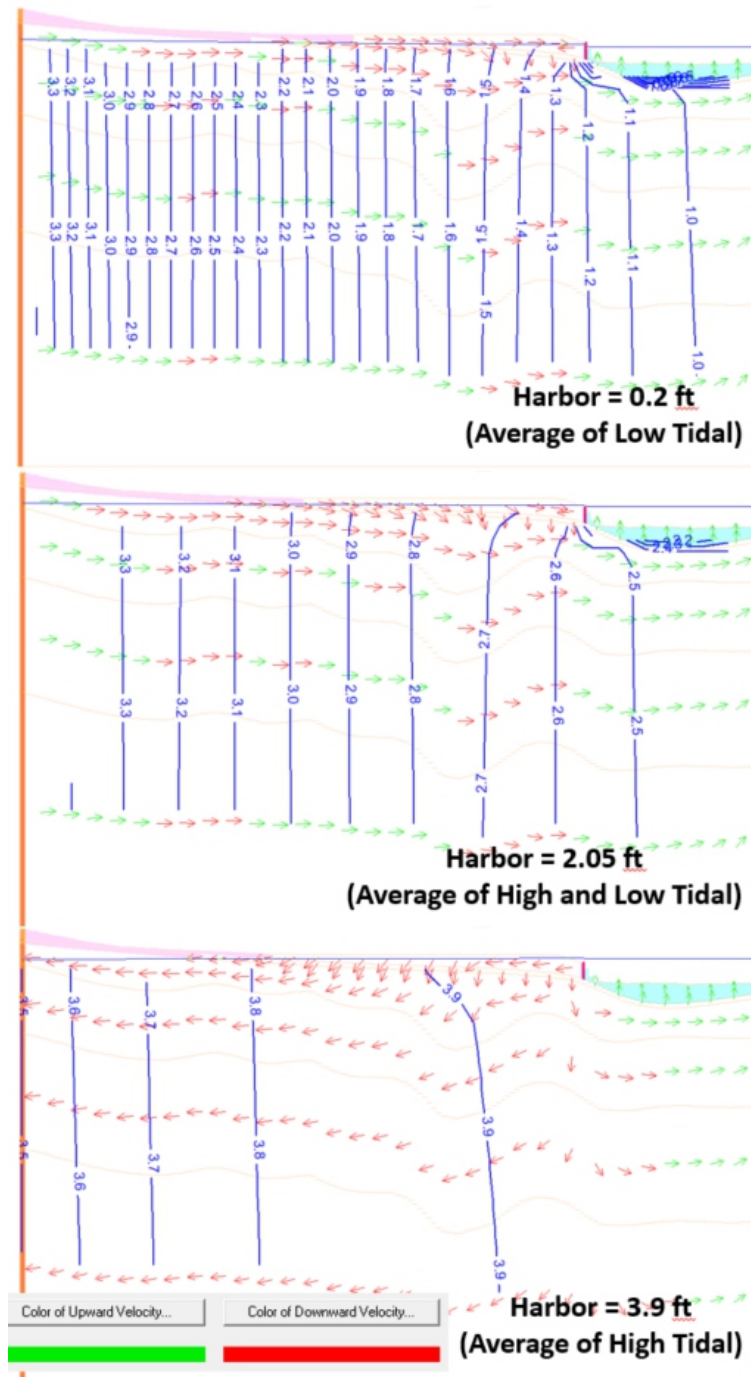
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Modeled Water Levels and
Flow Field (High Tidal Condition)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 4-3 Modeled WL High.cdr

Figure 4-3



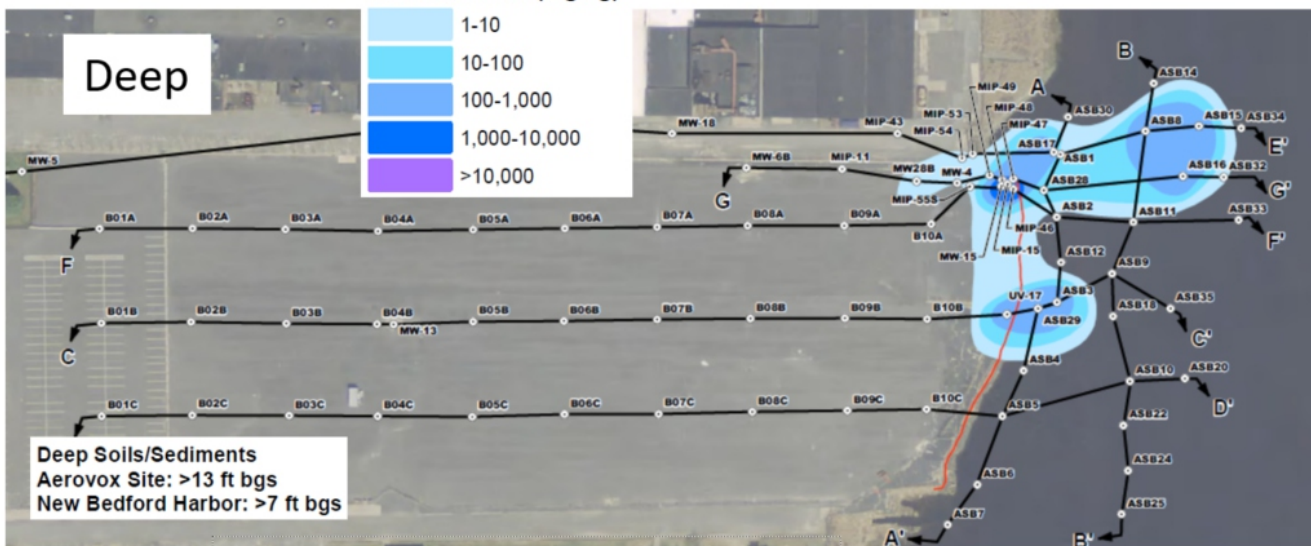
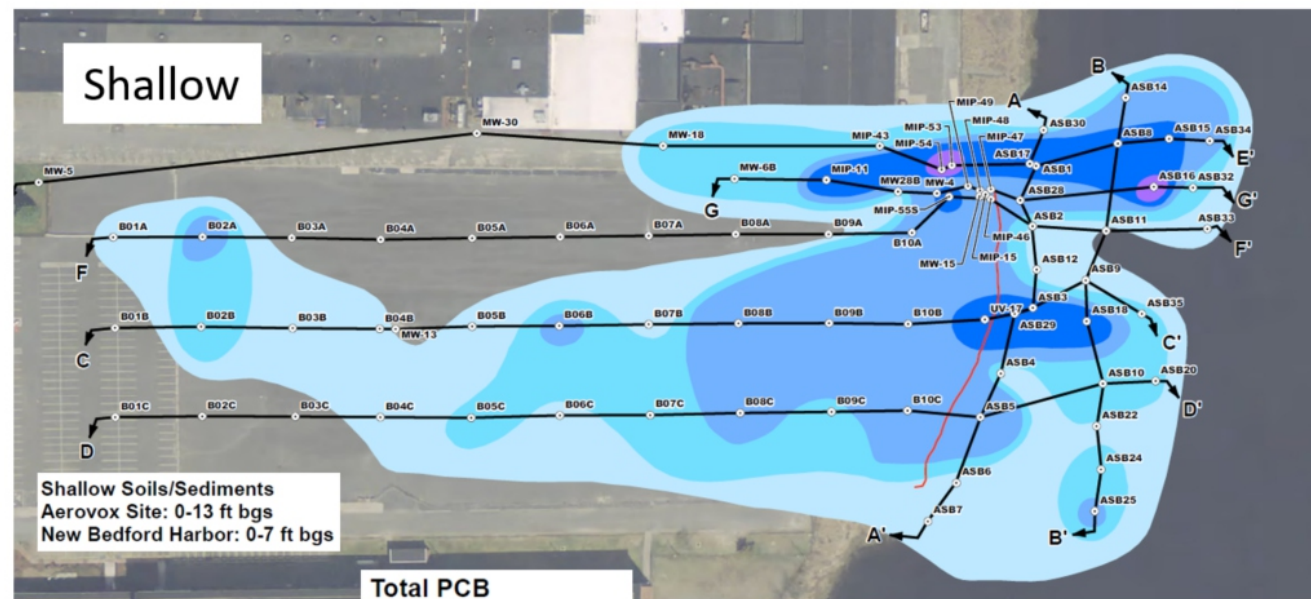
JACOBS™

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



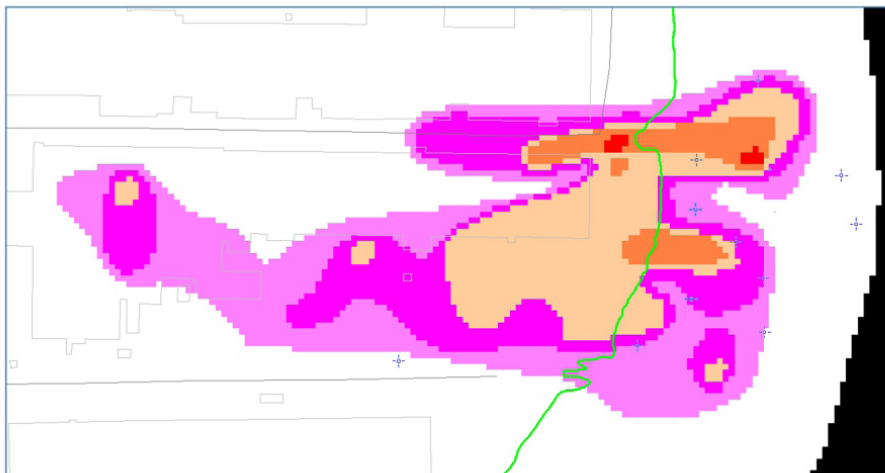
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PCB Soil and Sediment Contamination Distribution

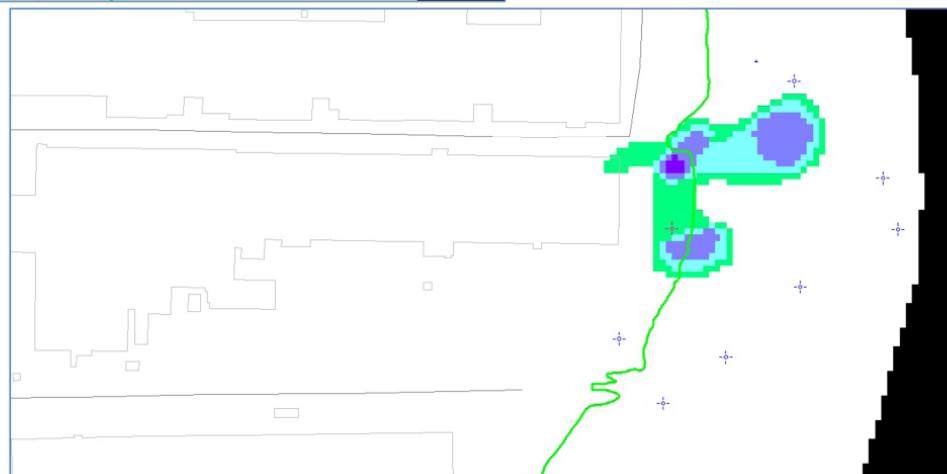
New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 5-1 PCB Contamination.cdr

Figure 5-1

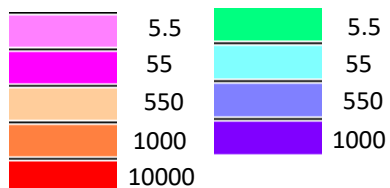


Shallow Zone



Deep Zone

PCB Concentration (mg/kg)



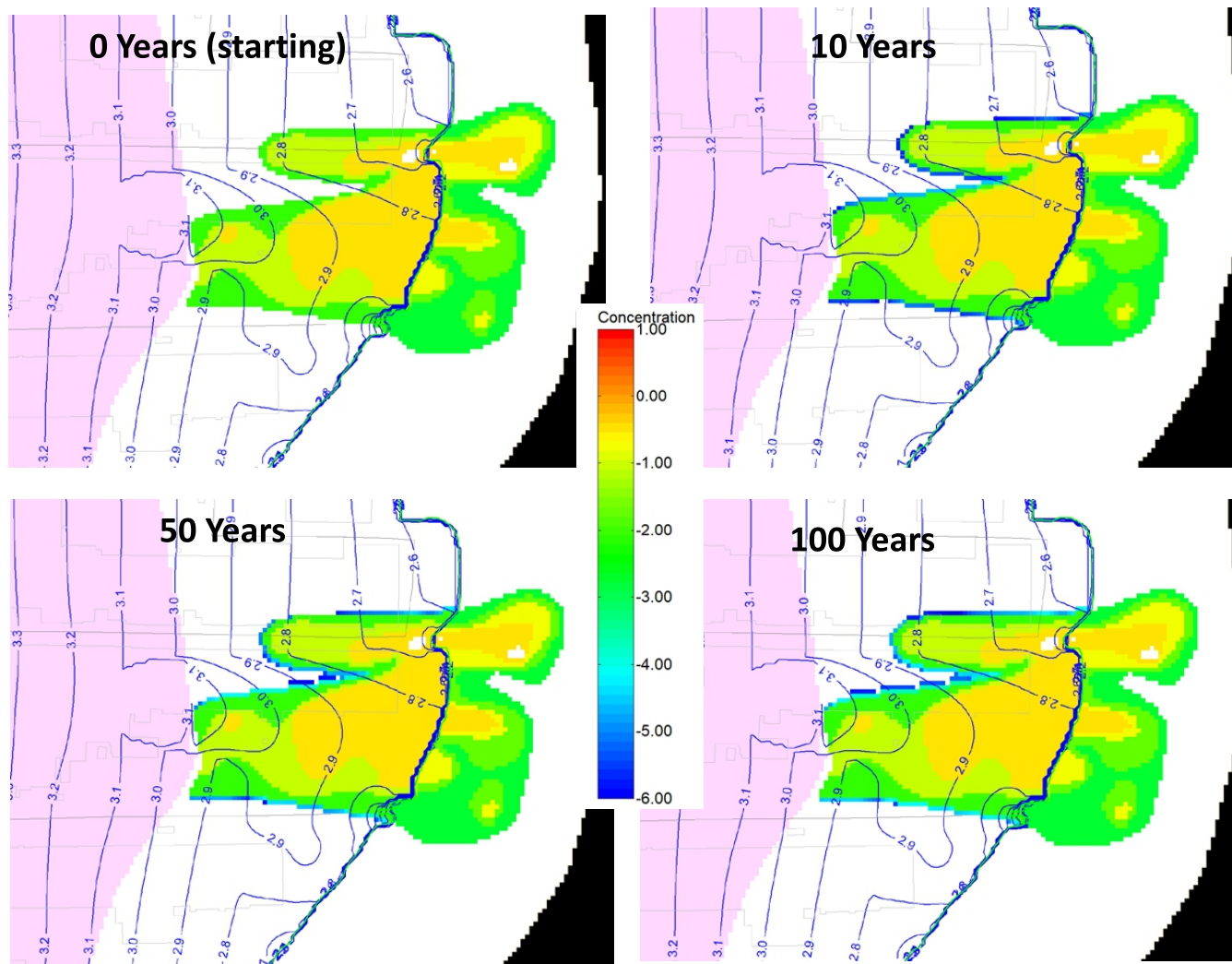
JACOBS

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



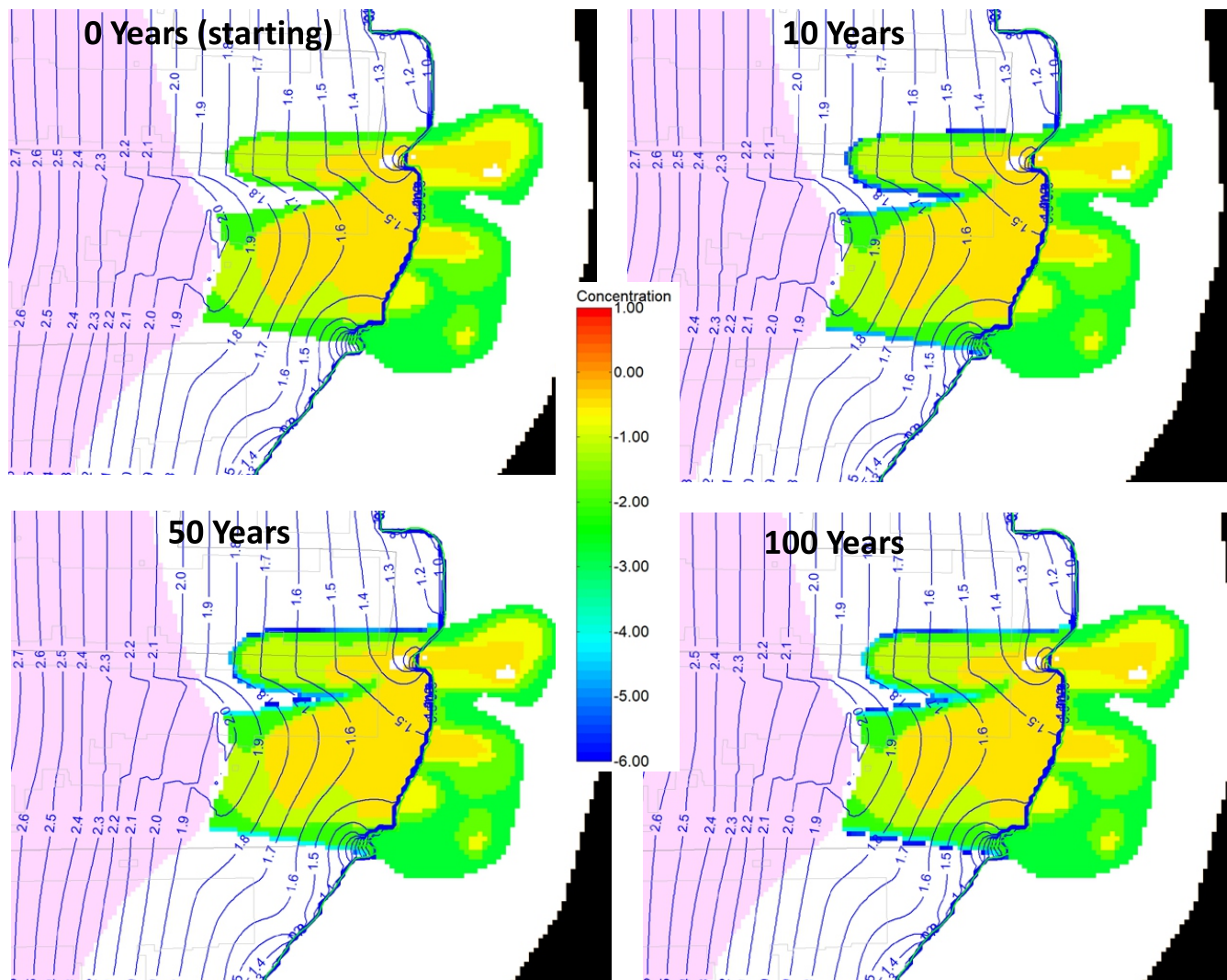
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Model Predicted PCB
Plume Changes with Time
(Mean Tidal Level)

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

06/07/18 dmf
Figure 5-3 Predicted PCB Mean.cdr

Figure 5-3



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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



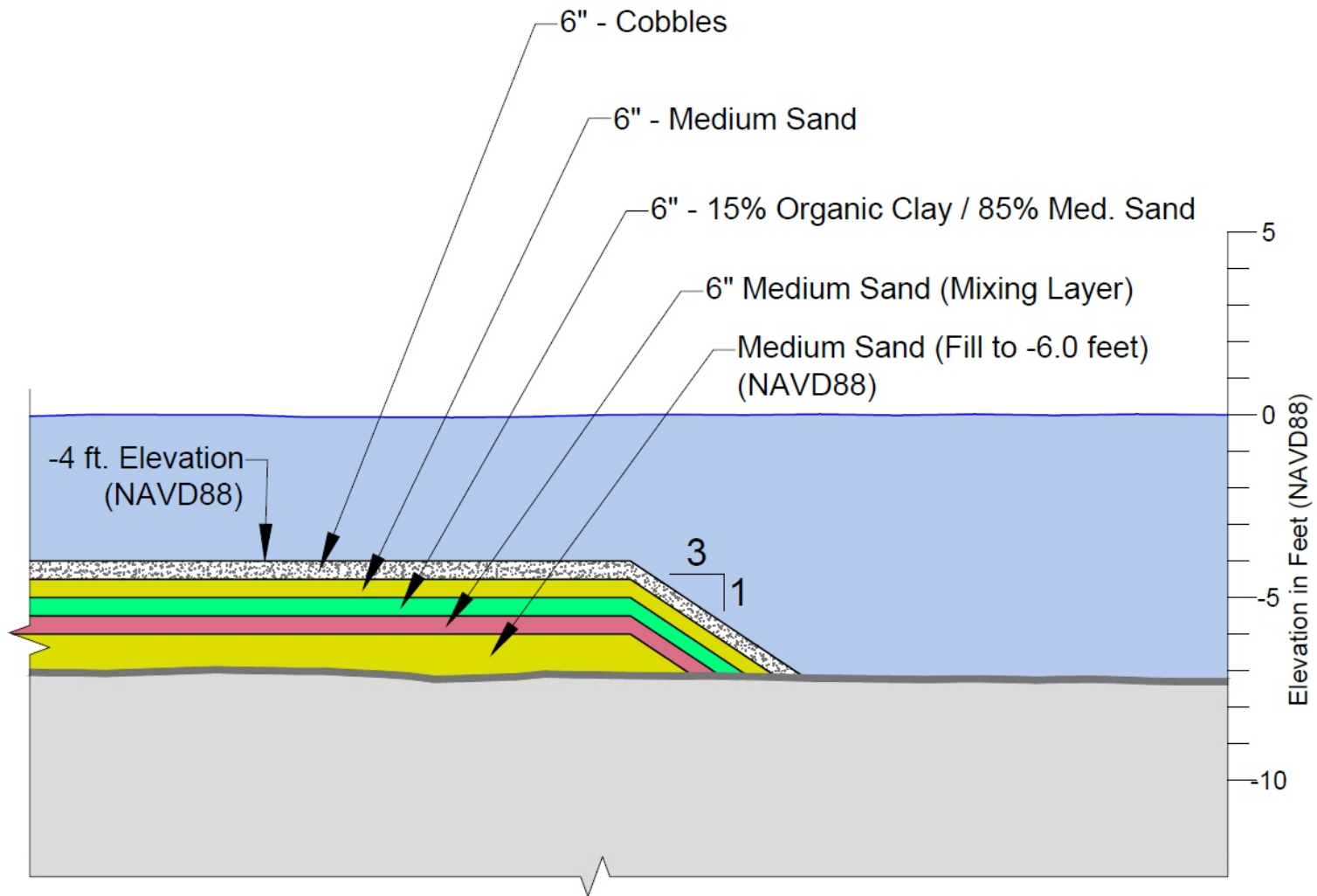
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Preliminary Interim Cap Area

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-1 Preliminary Interim Cap.cdr

Figure 6-1



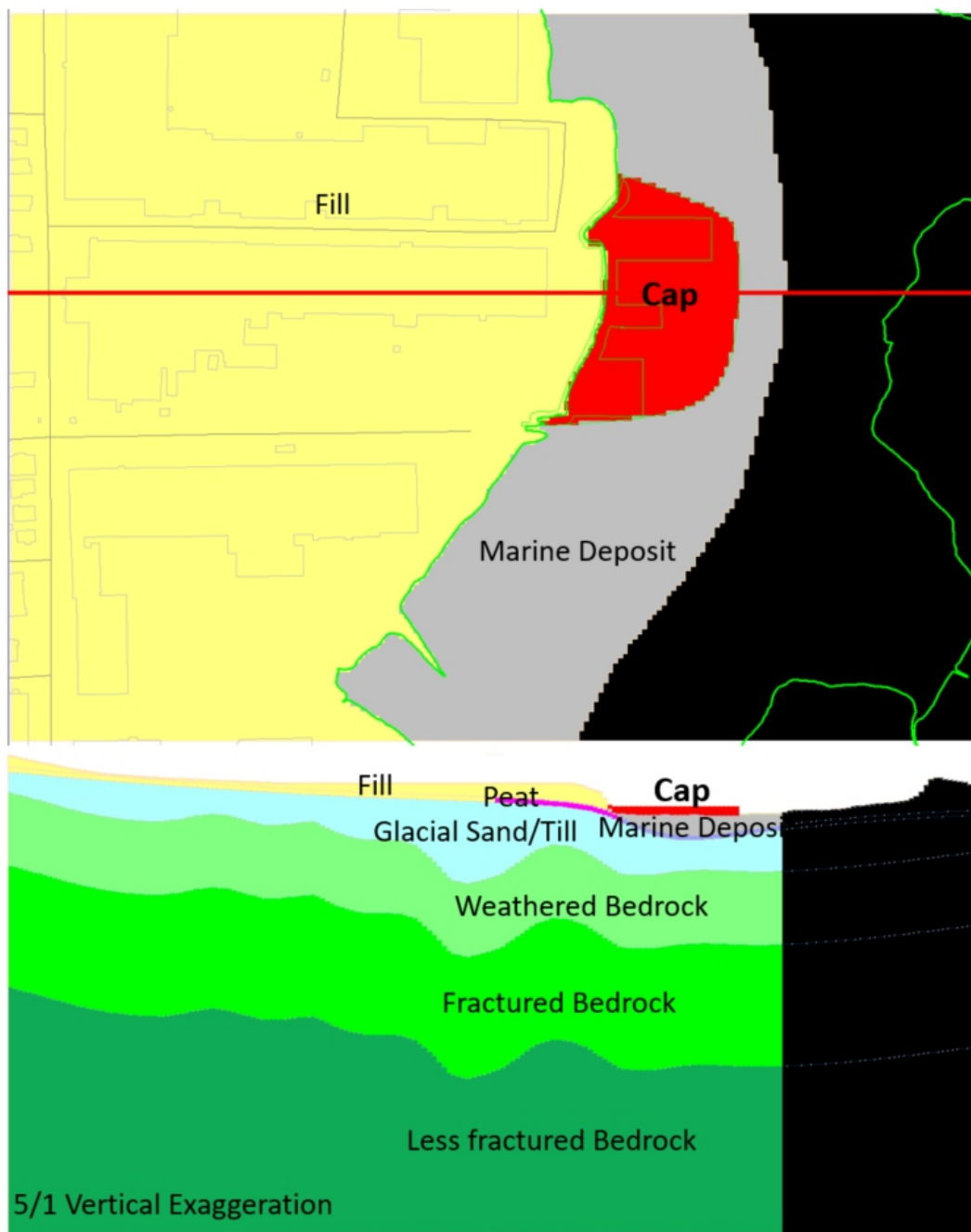
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Interim Cap Layers

New Bedford Harbor Superfund Site
New Bedford, Massachusetts

04/05/18 dmf
Figure 6-2 Interim Cap Layers.cdr

Figure 6-2



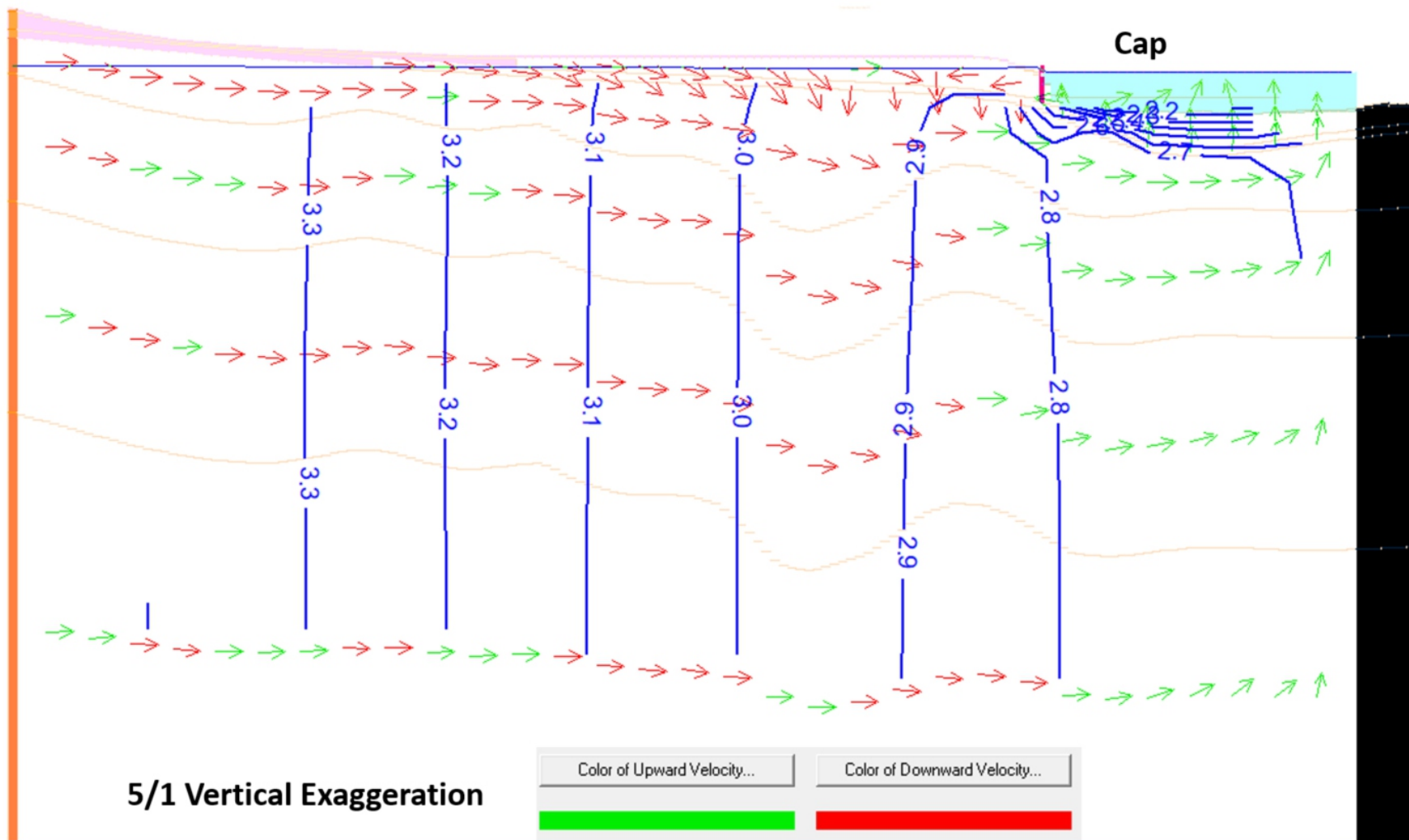
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Cap Representation in the Future Condition Model

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

ft² = 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/cm³) | 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/cm³ = 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

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.

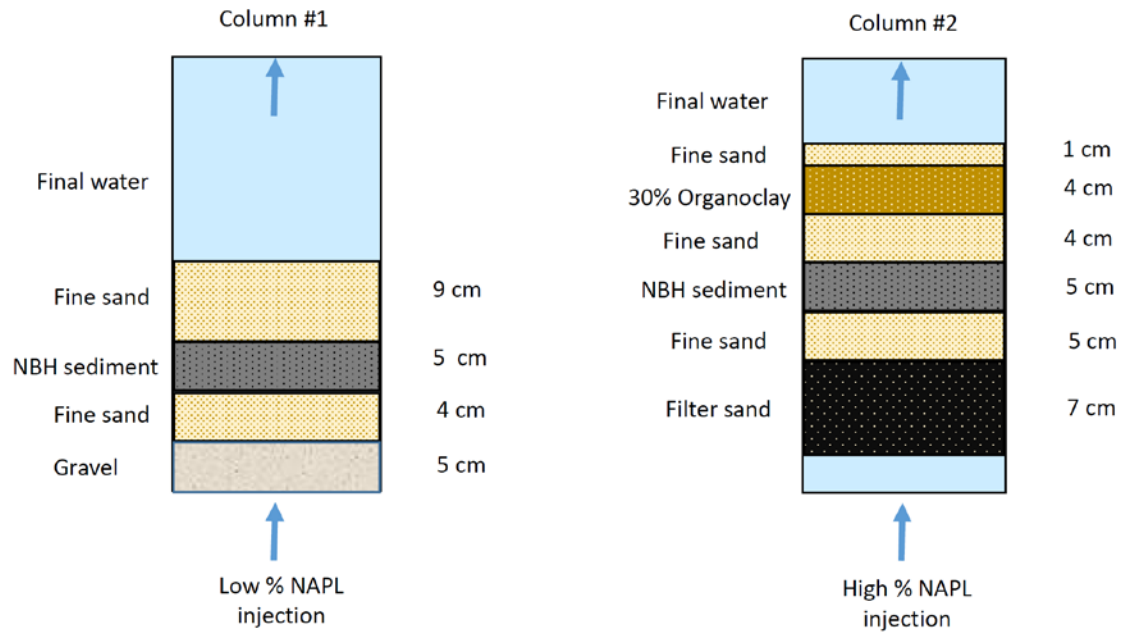


Figure 1. Schematics of laboratory test columns profiles.

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

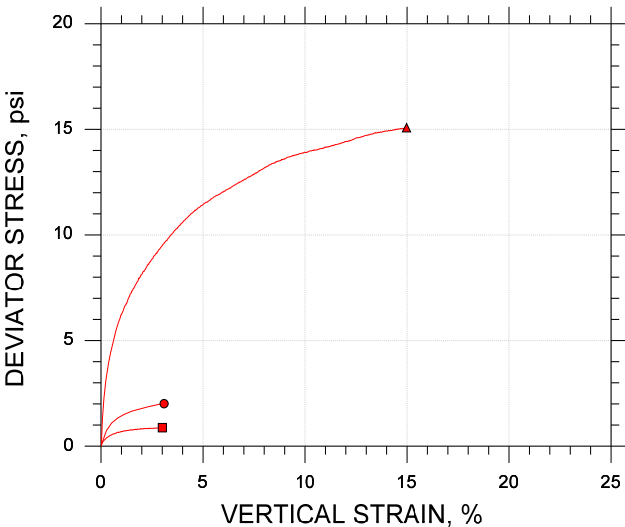
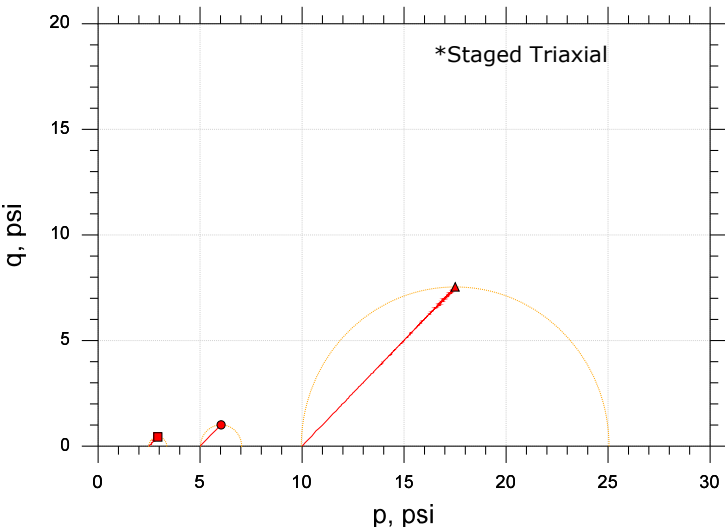
Appendix G

Physical Analysis and Geotechnical Laboratory Reports

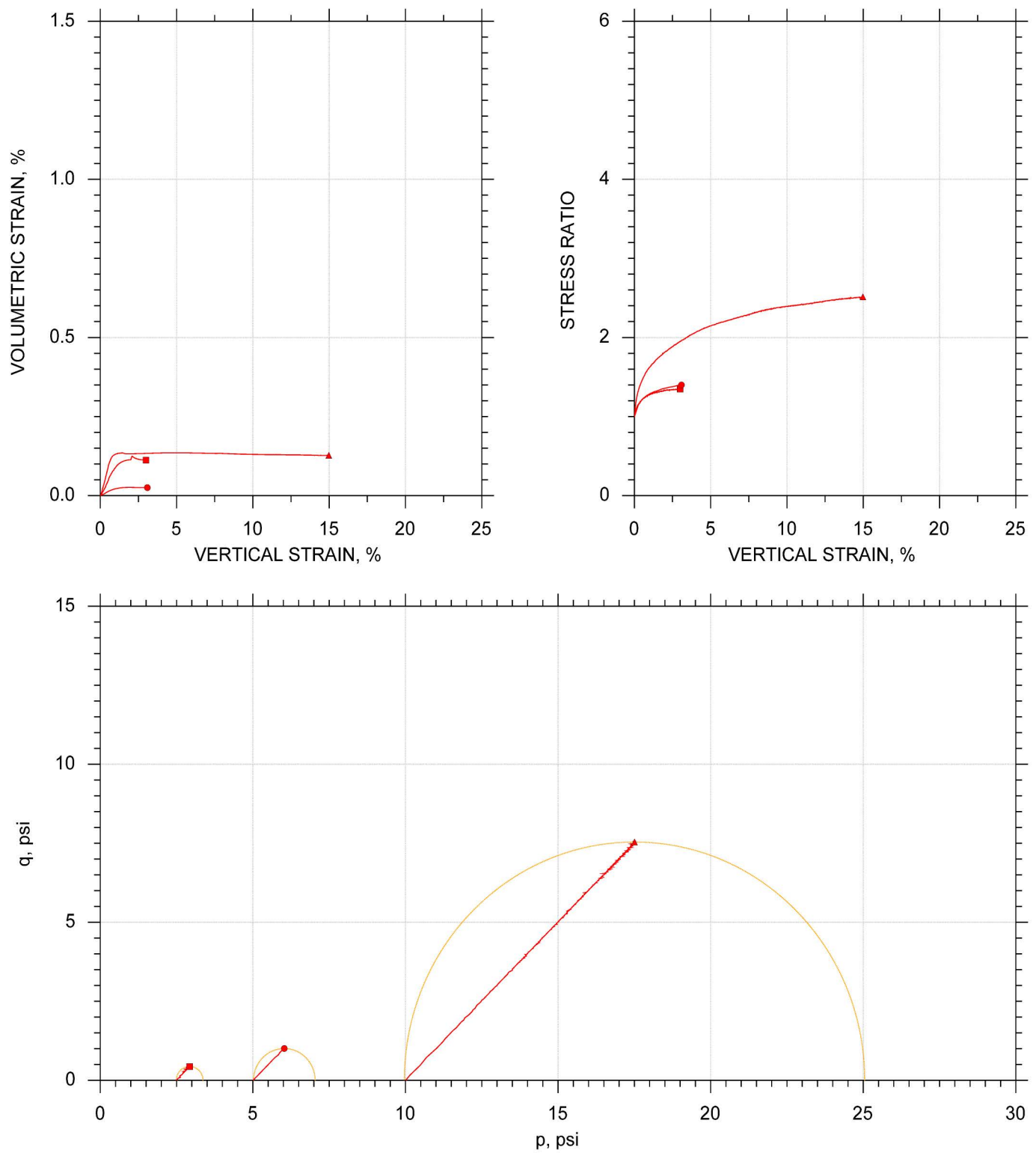


| | |
|-----------------------------------|---------------------------------|
| Client: Jacobs Engineering Group | |
| Project Name: New Bedford Harbor | |
| Project Location: New Bedford, MA | |
| Project Number: GTX-306296 | |
| Tested By: md | Checked By: njh |
| Boring ID: --- | |
| Preparation: 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), in ² | | 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: | | | | |

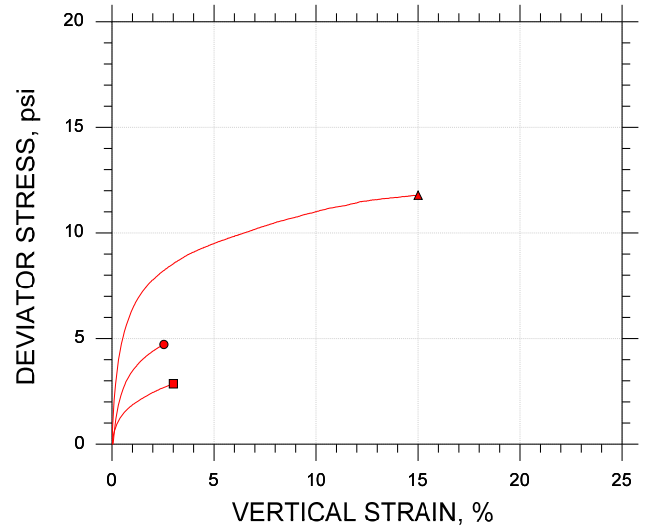
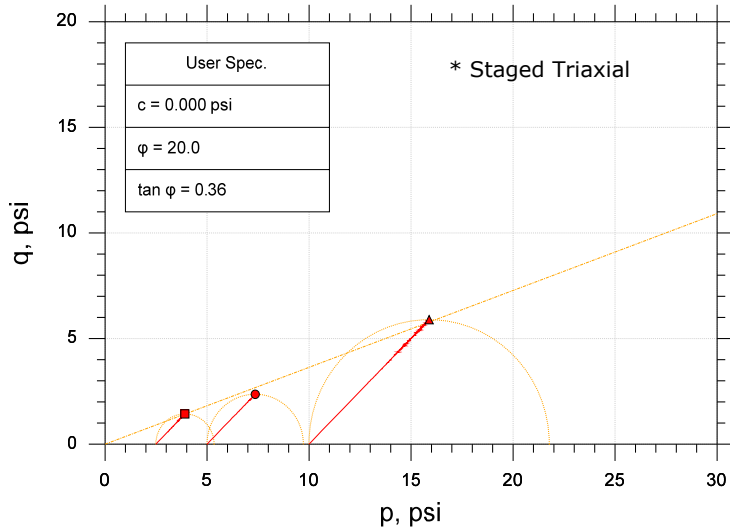
[illegible]

| | | |
|--|---------------------------|-------------------------|
| 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 | | |



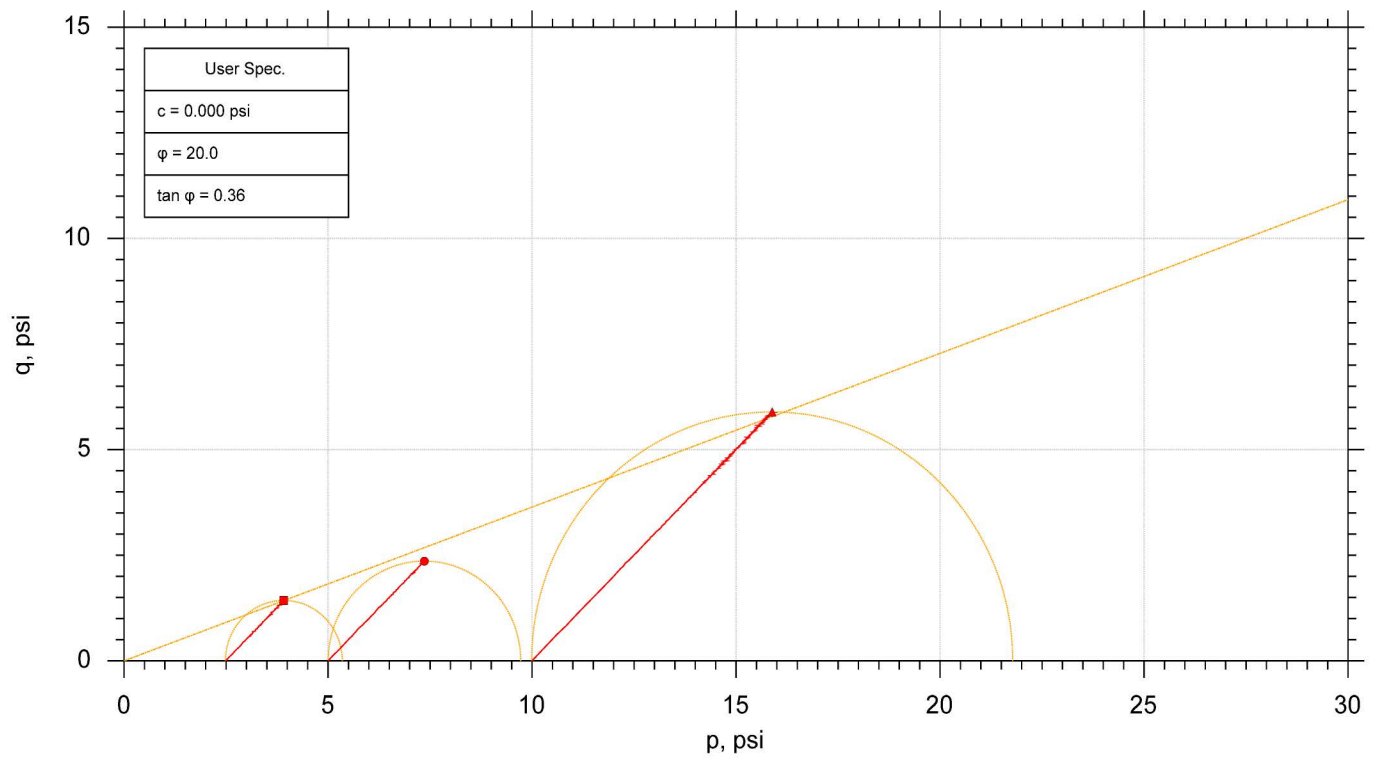
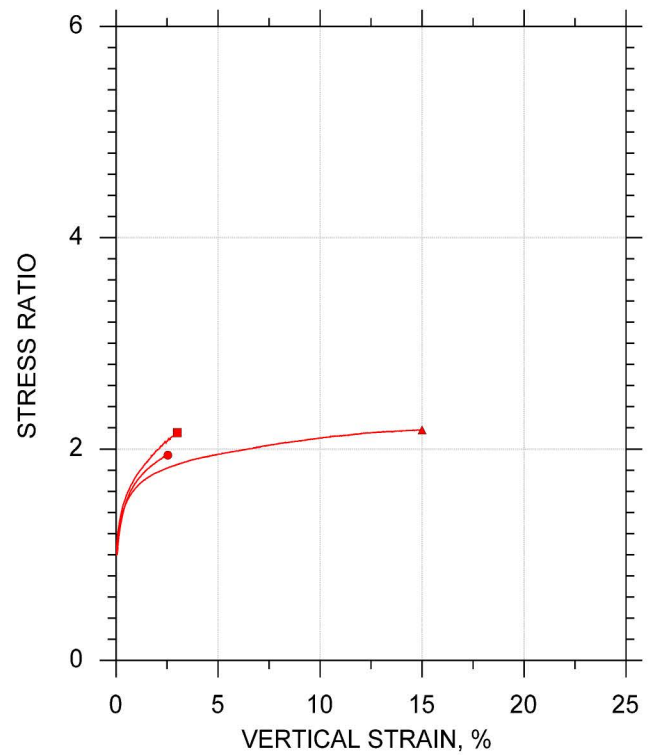
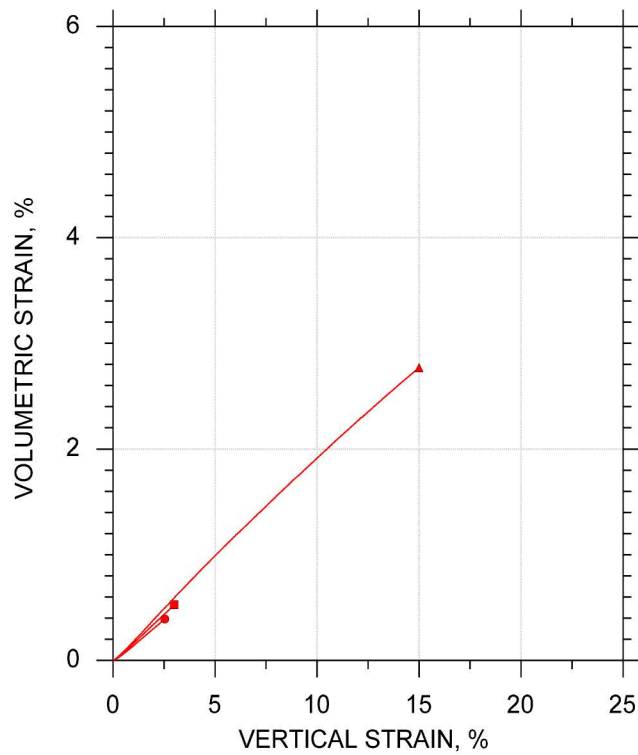
| | |
|------------------------------------|---------------------------------|
| Client: Jacobs Engineering Group | |
| Project Name: New Bedford Harbor | |
| Project Location: New Bedford, MA | |
| Project Number: GTX-306296 | |
| Tested By: md | Checked By: njh |
| Boring ID: --- | |
| Preparation: intact | |
| Description: Moist, dark gray silt | |
| Classification: --- | |
| Group Symbol: --- | |
| Liquid Limit: --- | Plastic Limit: --- |
| Plasticity Index: --- | Estimated Specific Gravity: 2.7 |

CONSOLIDATED DRAINED TRIAXIAL TEST

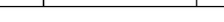


| | | | | |
|--|--|------------|------------|--------|
| Symbol | ■ | ● | ▲ | |
| Sample ID | RA-C002303 | RA-C002303 | RA-C002303 | |
| Depth, ft | 1.2-1.7 | 1.2-1.7 | 1.2-1.7 | |
| Test Number | CD-5-1 | CD-5-2 | CD-5-3 | |
| Initial | Height, in | 5.200 | 4.914 | 4.757 |
| | Diameter, in | 2.500 | 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), in ² | | 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: | | | | |

CONSOLIDATED DRAINED TRIAXIAL TEST

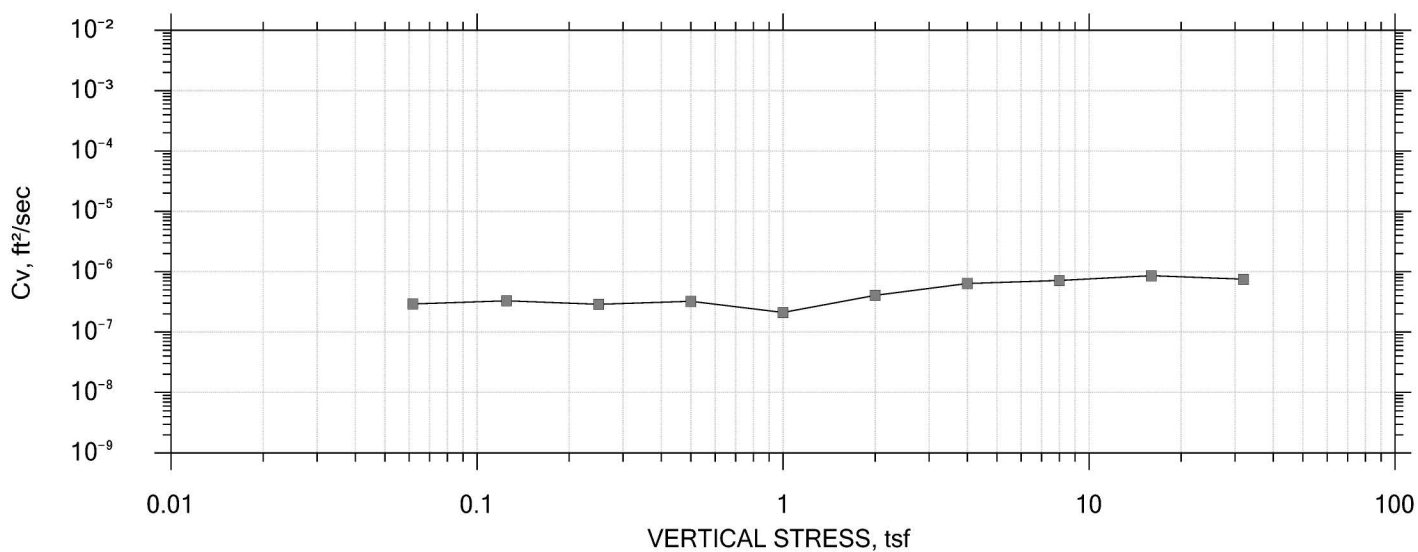
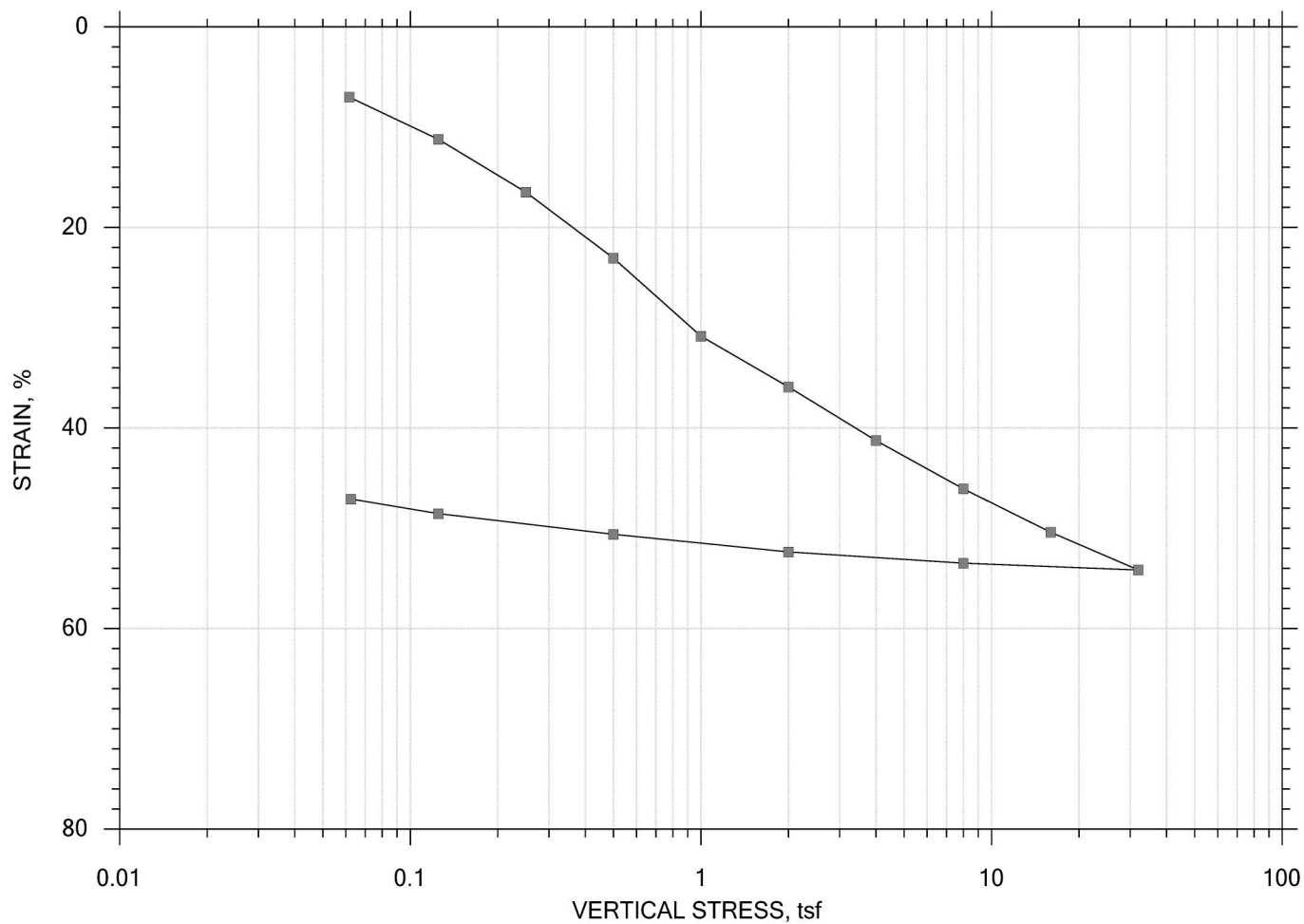



| | Sample No. | Test No. | Depth | Tested By | Test Date | Checked By | Check Date | Test File |
|---|------------|----------|---------|-----------|-----------|------------|------------|--------------------|
| ■ | RA-C002303 | CD-5-1 | 1.2-1.7 | md | 10/30/17 | njh | 11/20/17 | 306296-CD-5-1n.dat |
| ● | 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 |
| | | | | | | | | |

| | | | |
|--|--|---------------------------|-------------------------|
|  | | | |
| | 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

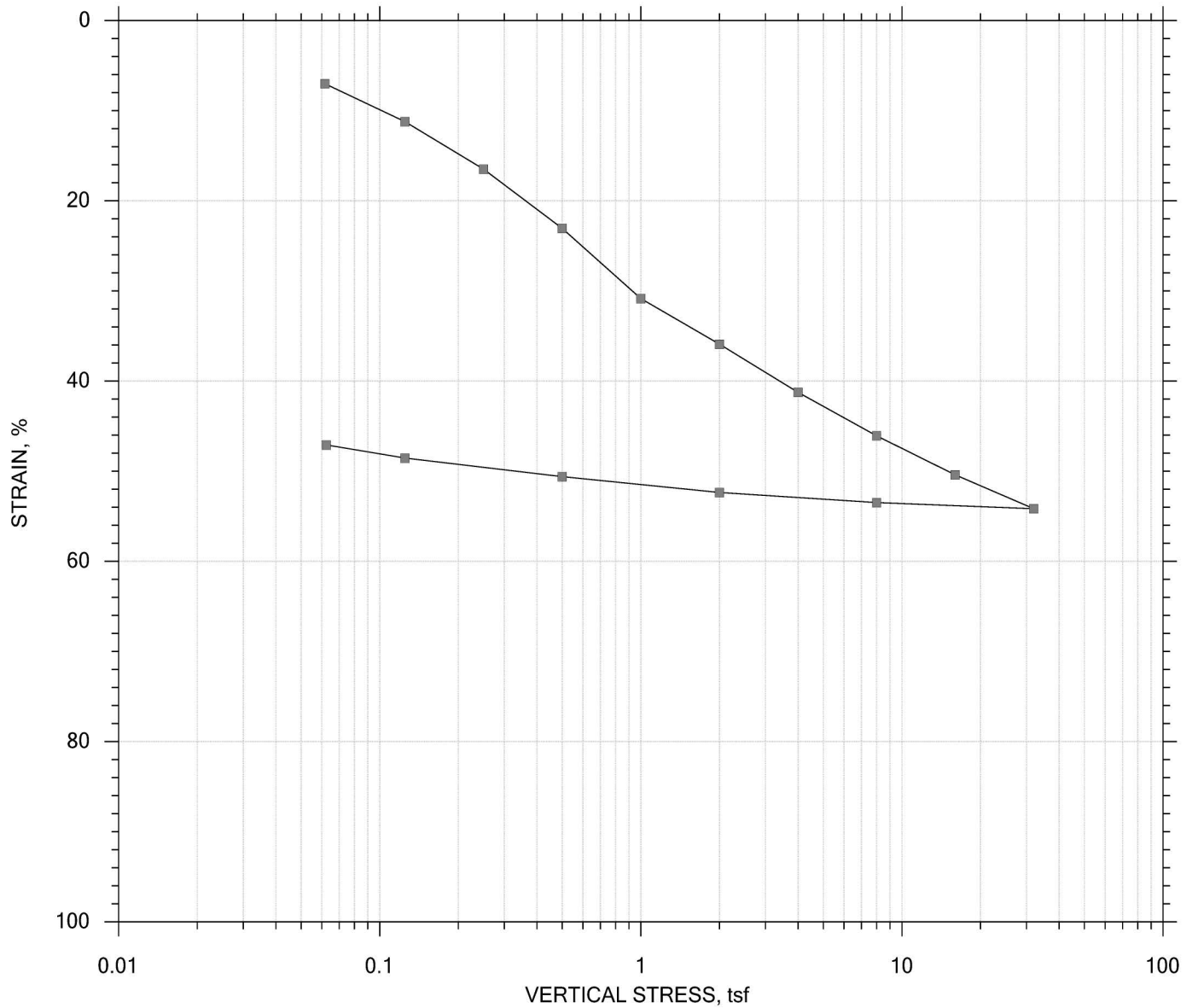
SUMMARY REPORT




| | | | |
|--|--|---------------------------|-------------------------|
|  | 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 | | | |

| | | | |
|--|--|---------------------------|-------------------------|
|  | 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

| Container ID | Before Consolidation | | After Consolidation | |
|------------------------------|----------------------|---------------|---------------------|-----------|
| | Trimmings | Specimen+Ring | Specimen+Ring | Trimmings |
| | 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 ft ² /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 |

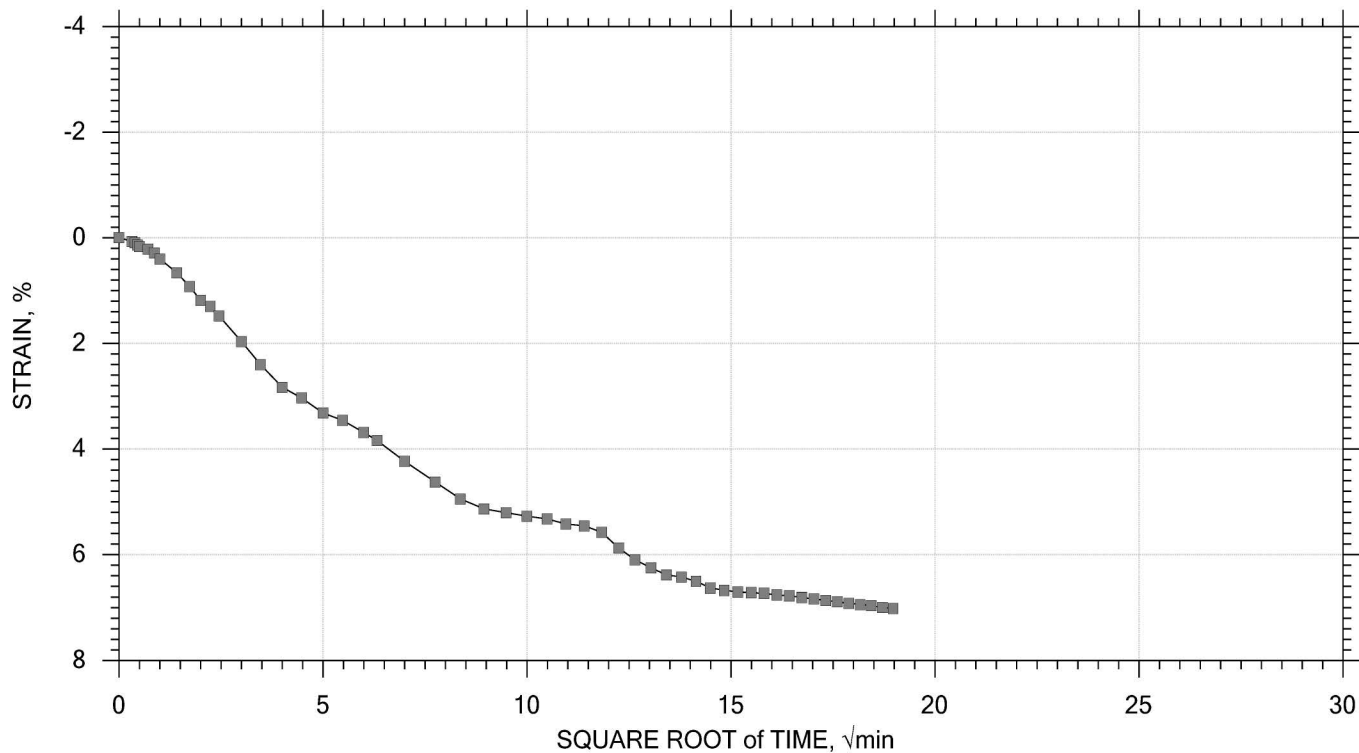
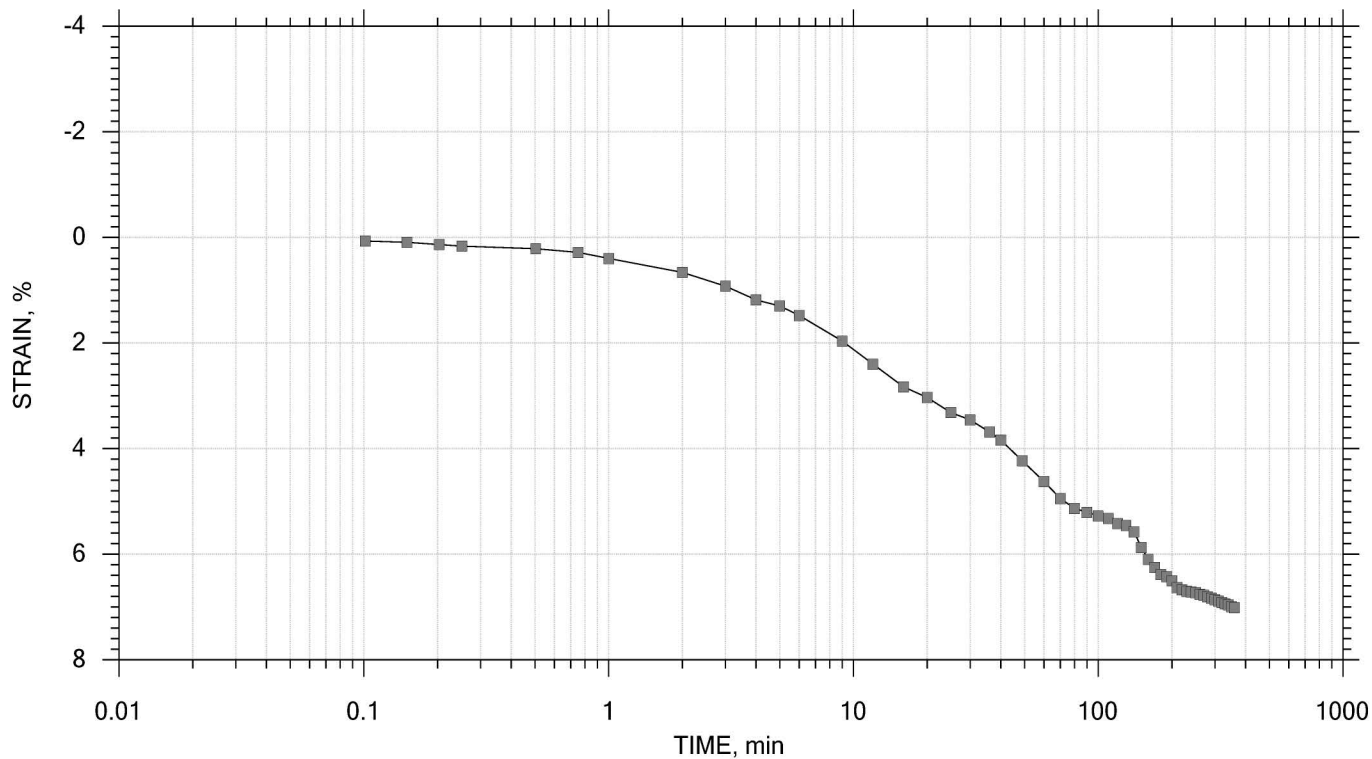
| | Applied Stress tsf | Final Displacement in | Void Ratio | Strain at End % | Log T50 min | Cv ft ² /sec | Mv 1/tsf | k ft/day | Ca % |
|----|--------------------------|-----------------------------|---------------|-----------------------|-------------------|----------------------------|-------------|-------------|-----------|
| 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



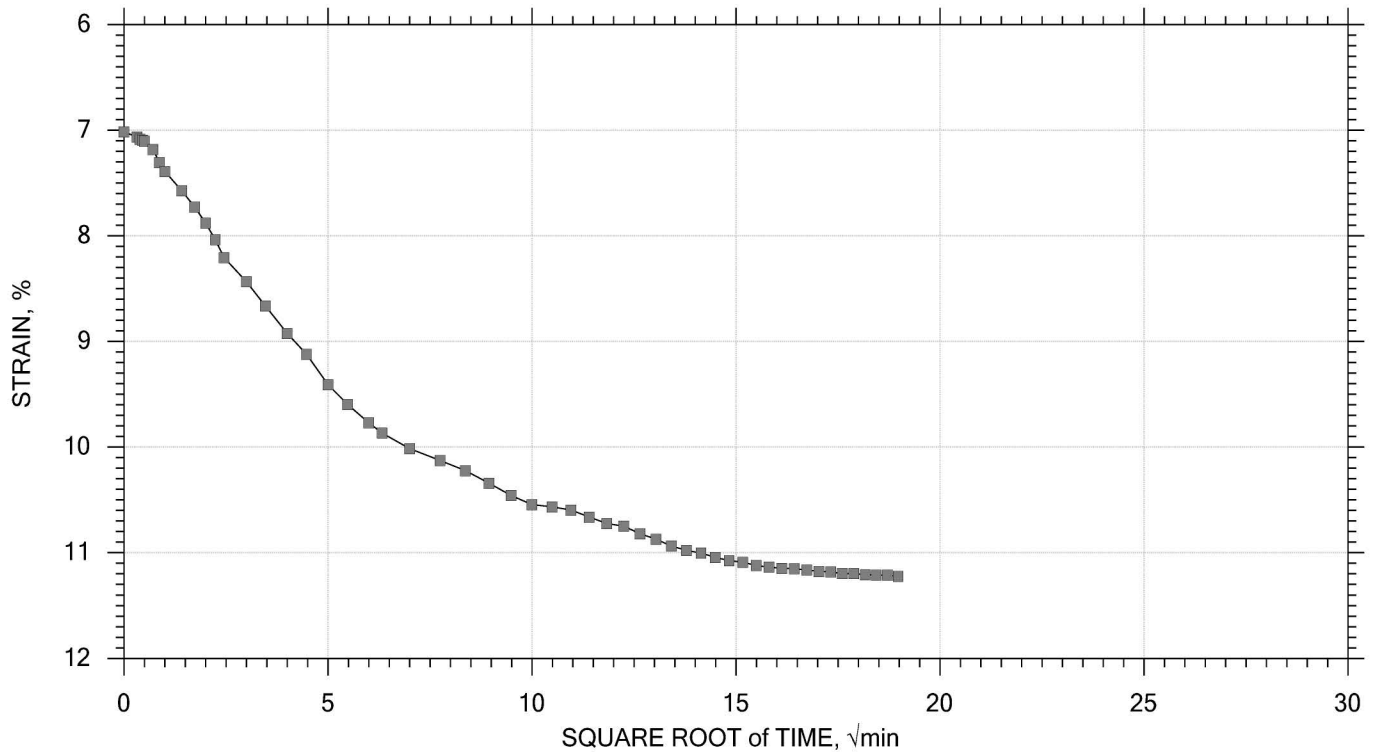
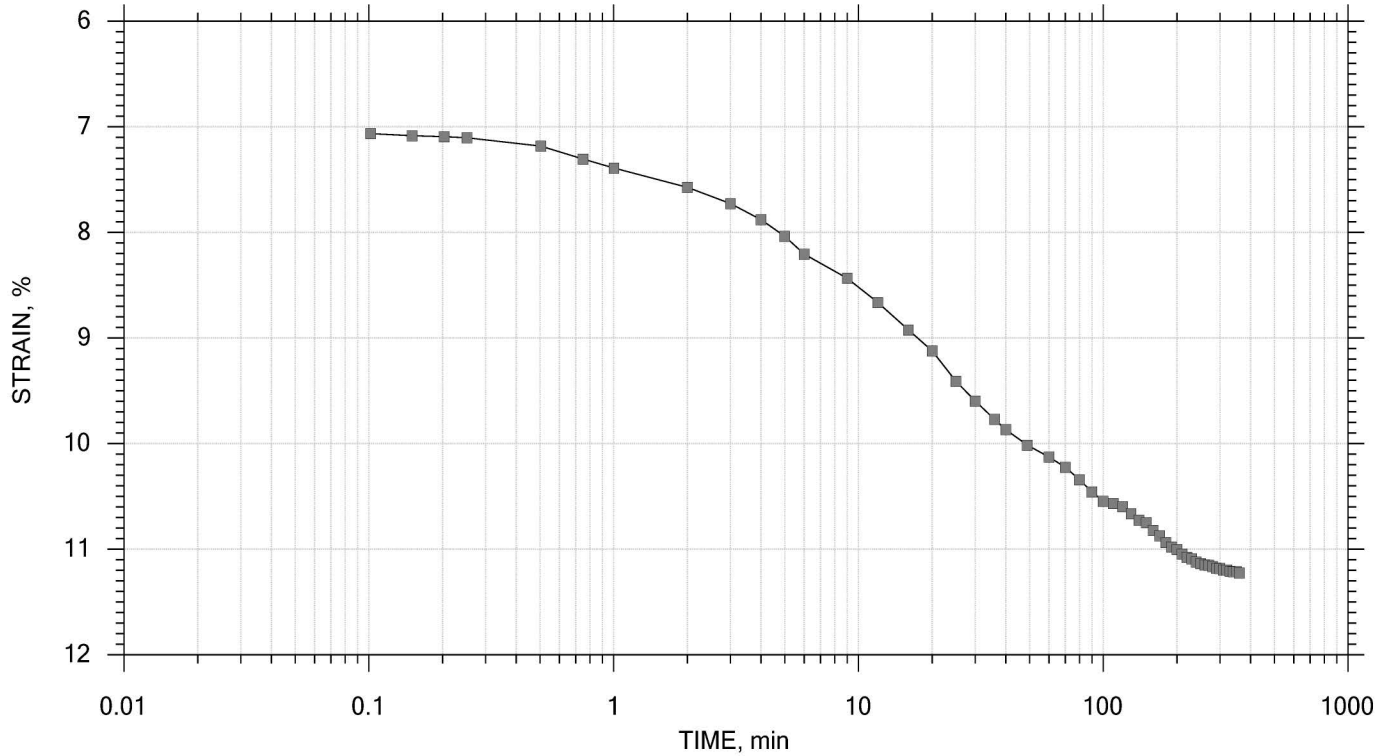
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



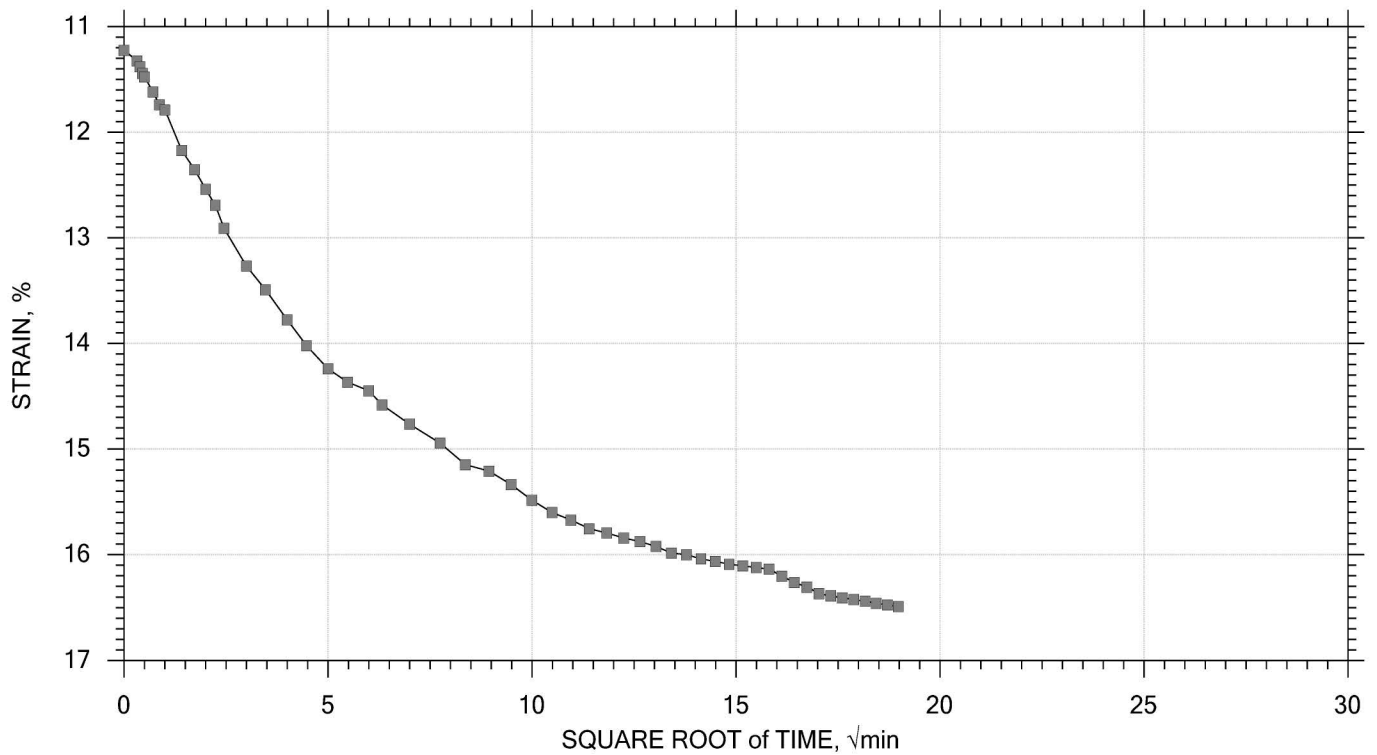
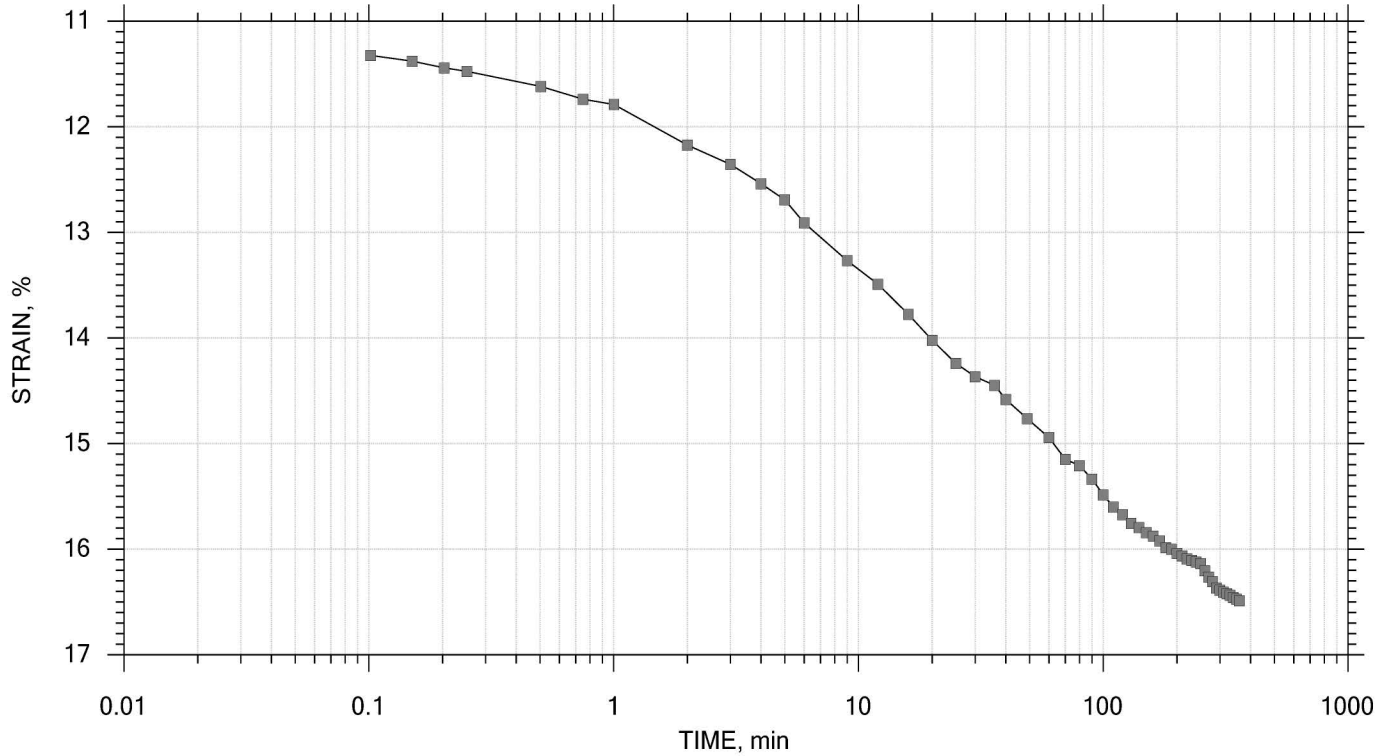
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



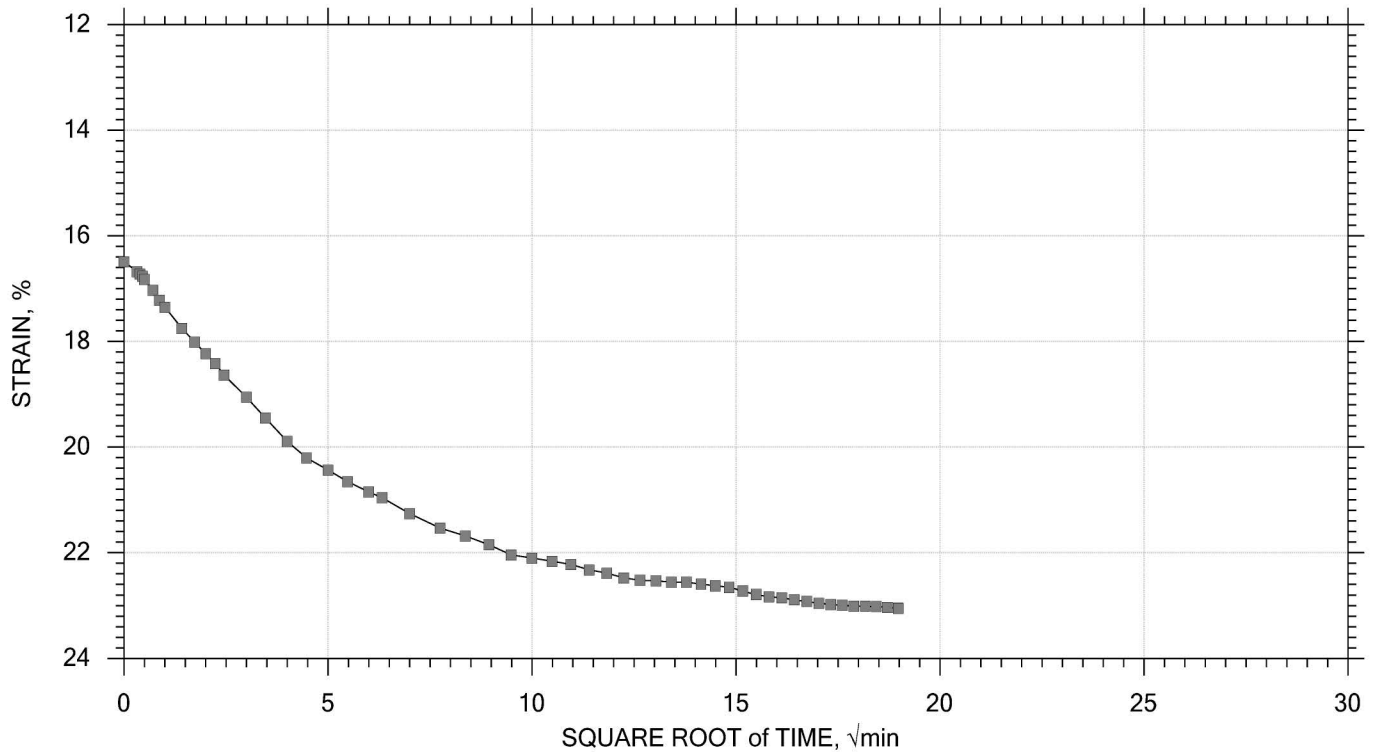
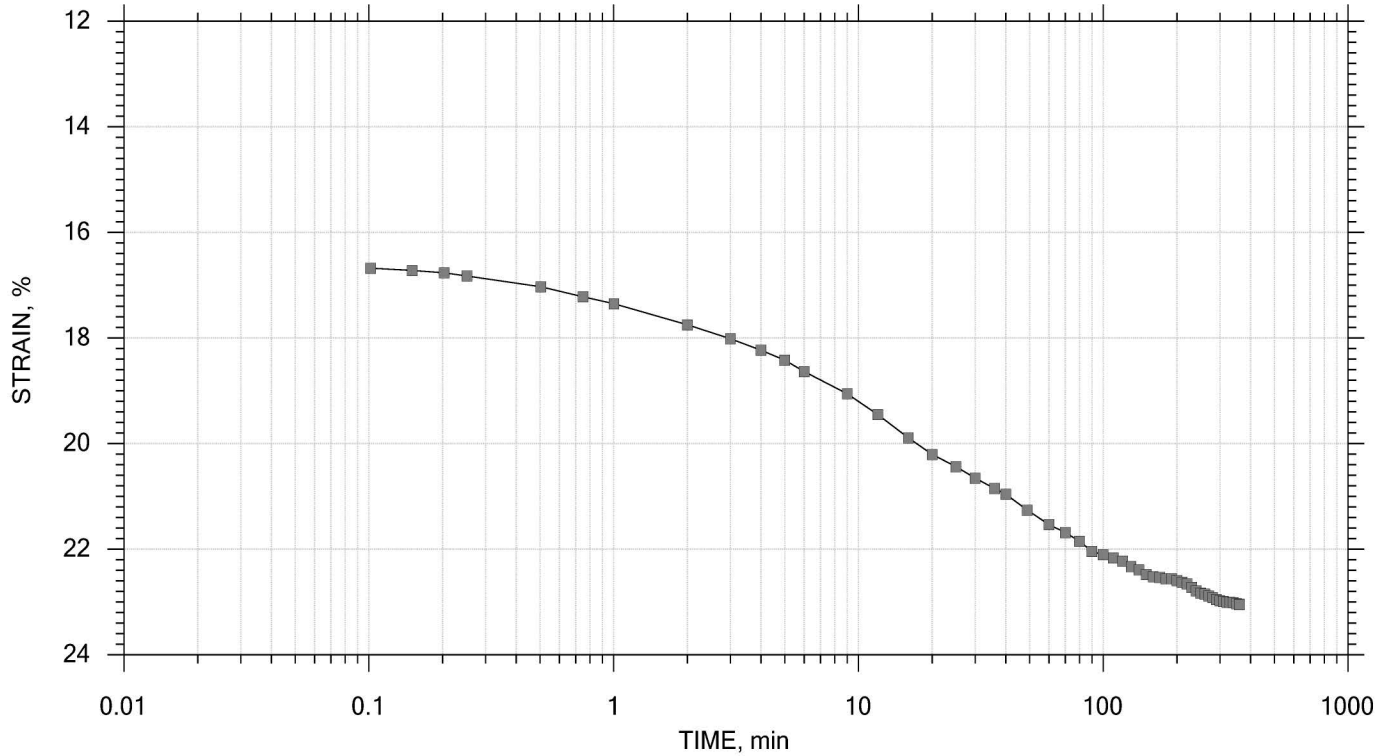
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



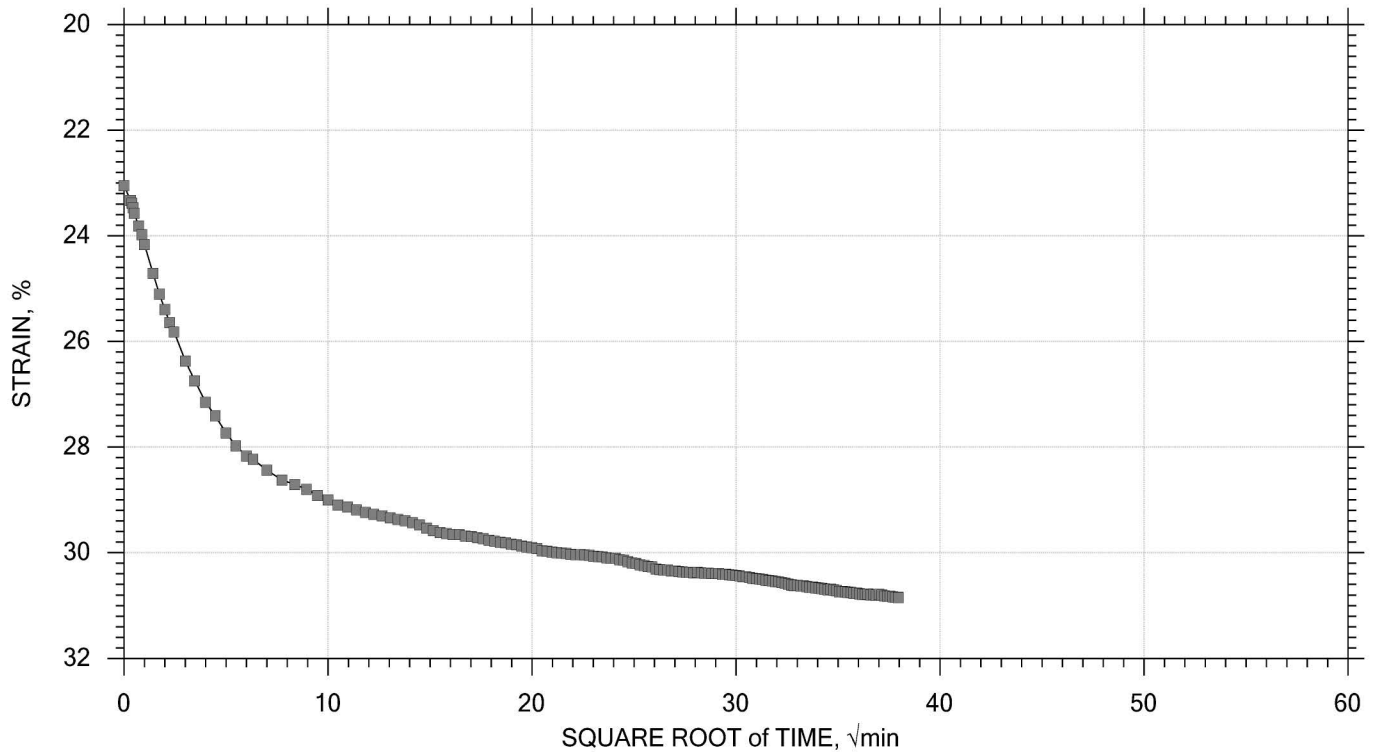
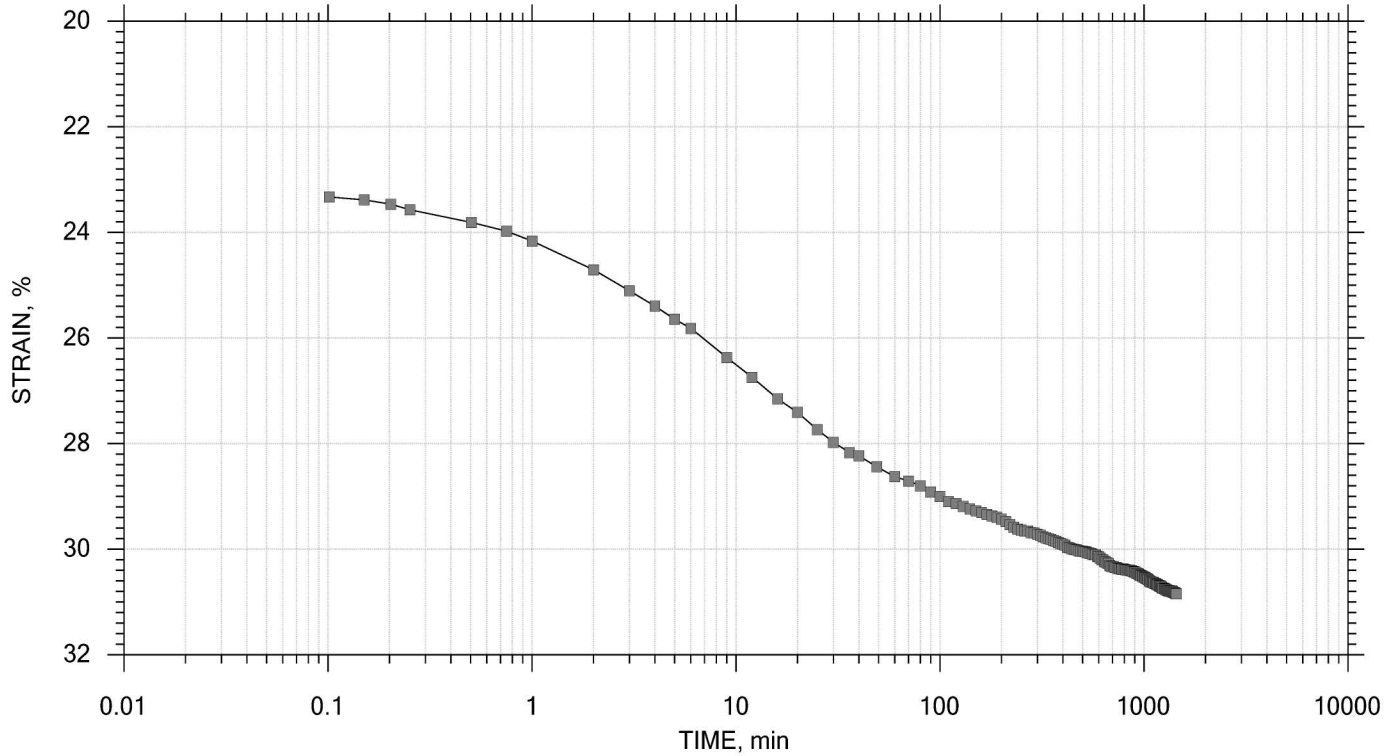
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



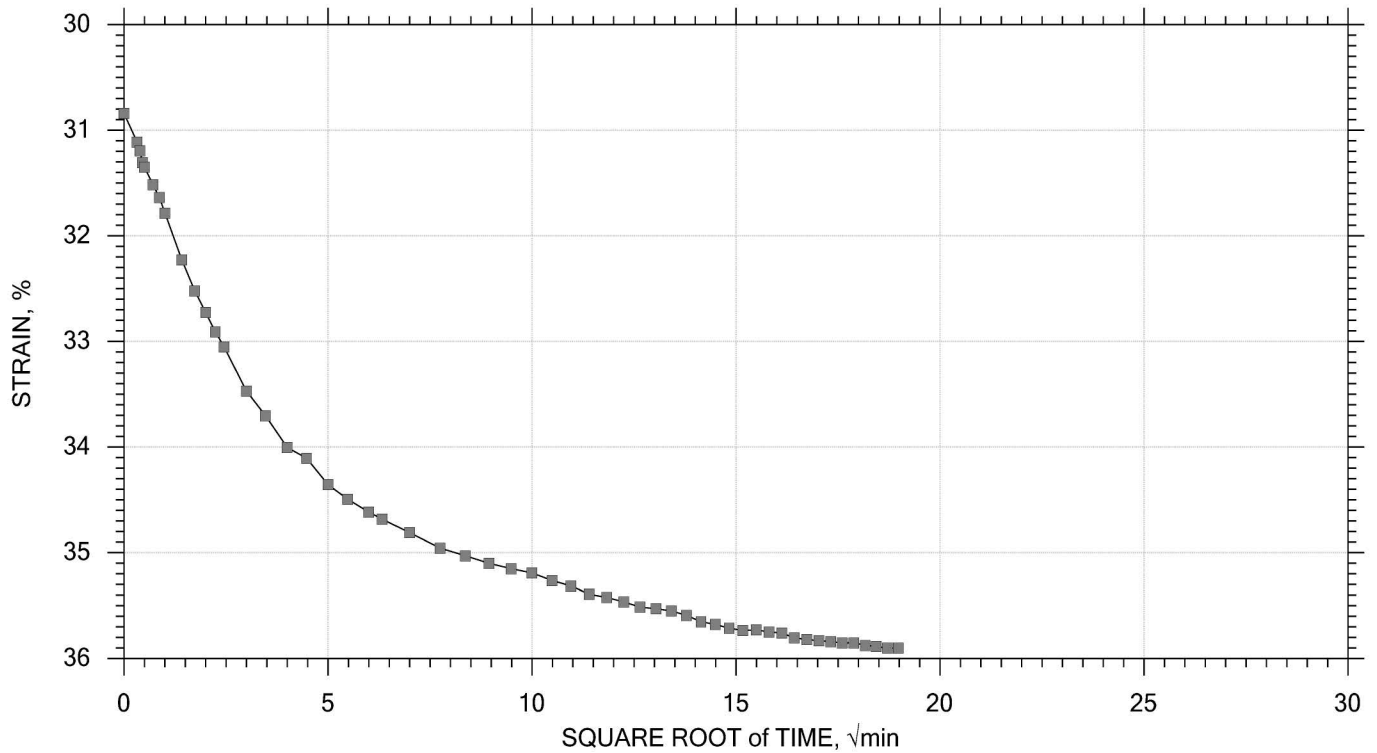
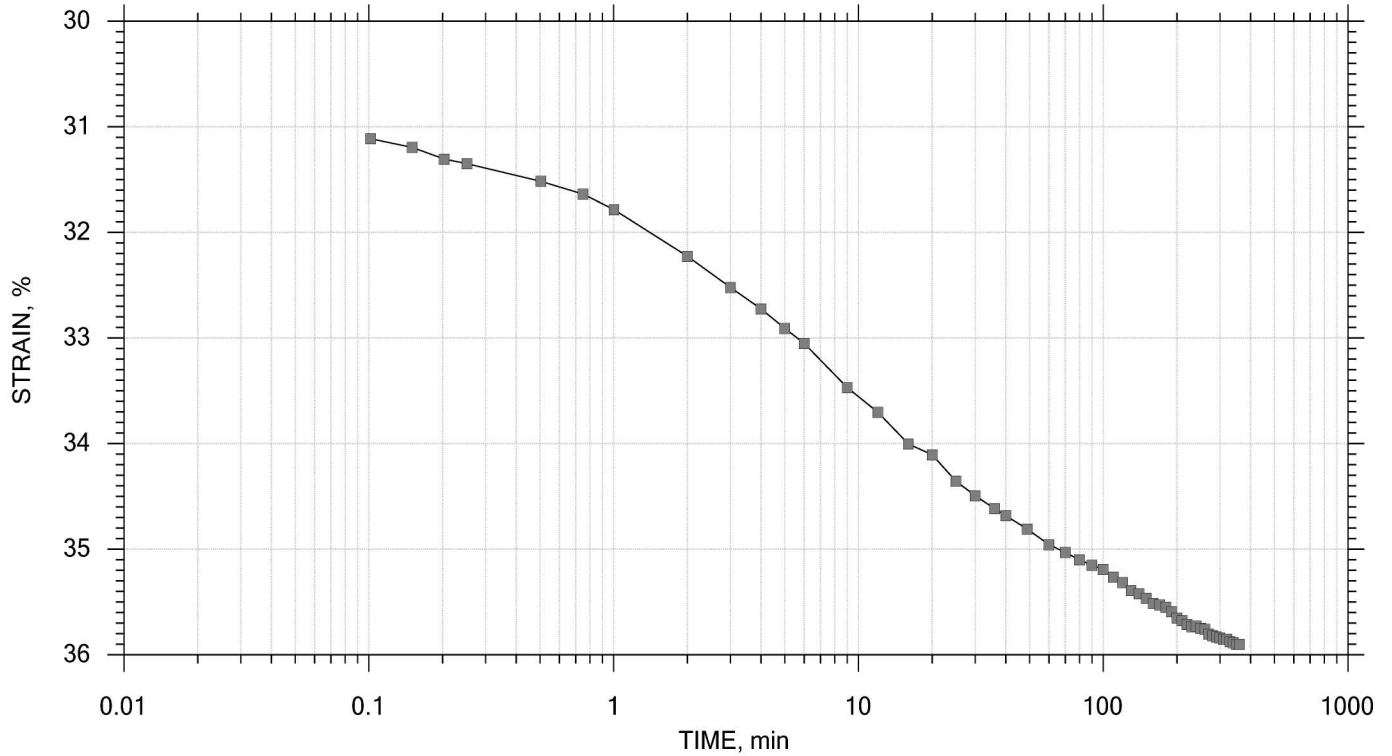
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



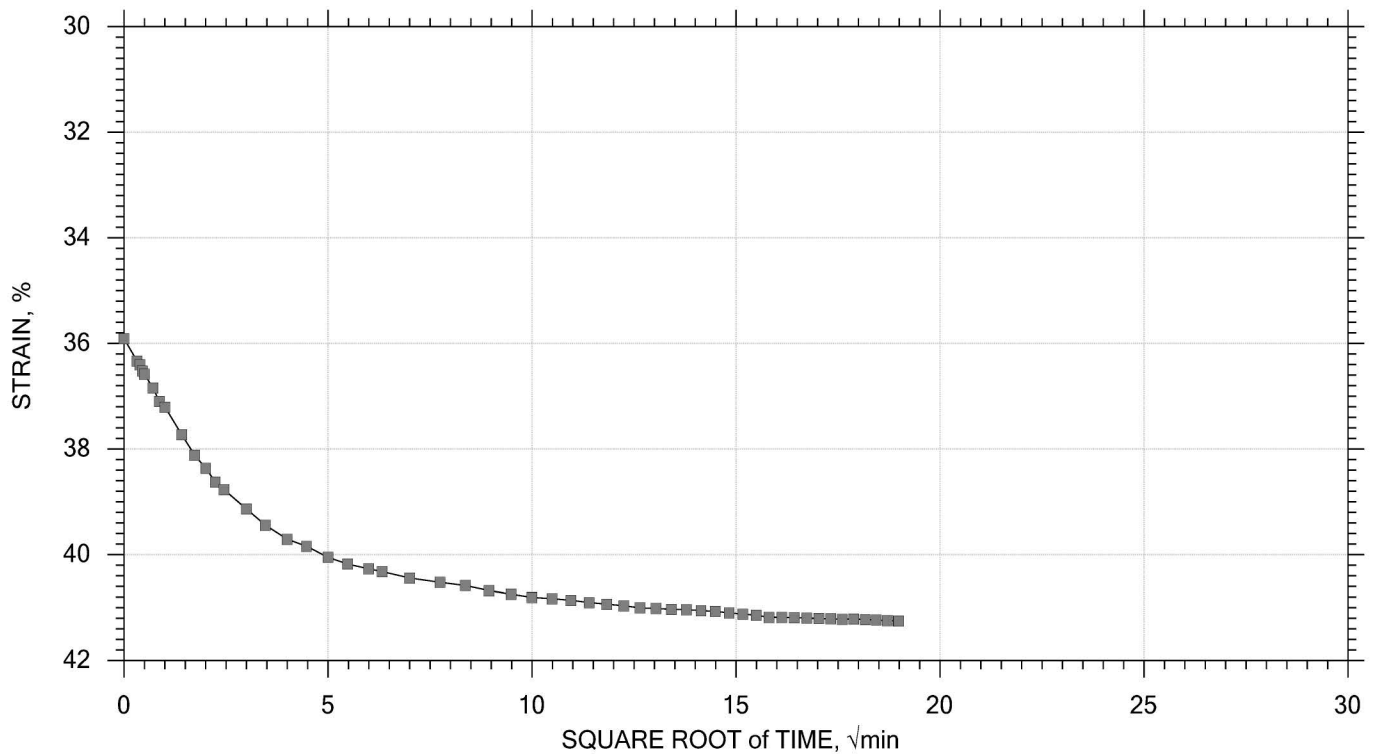
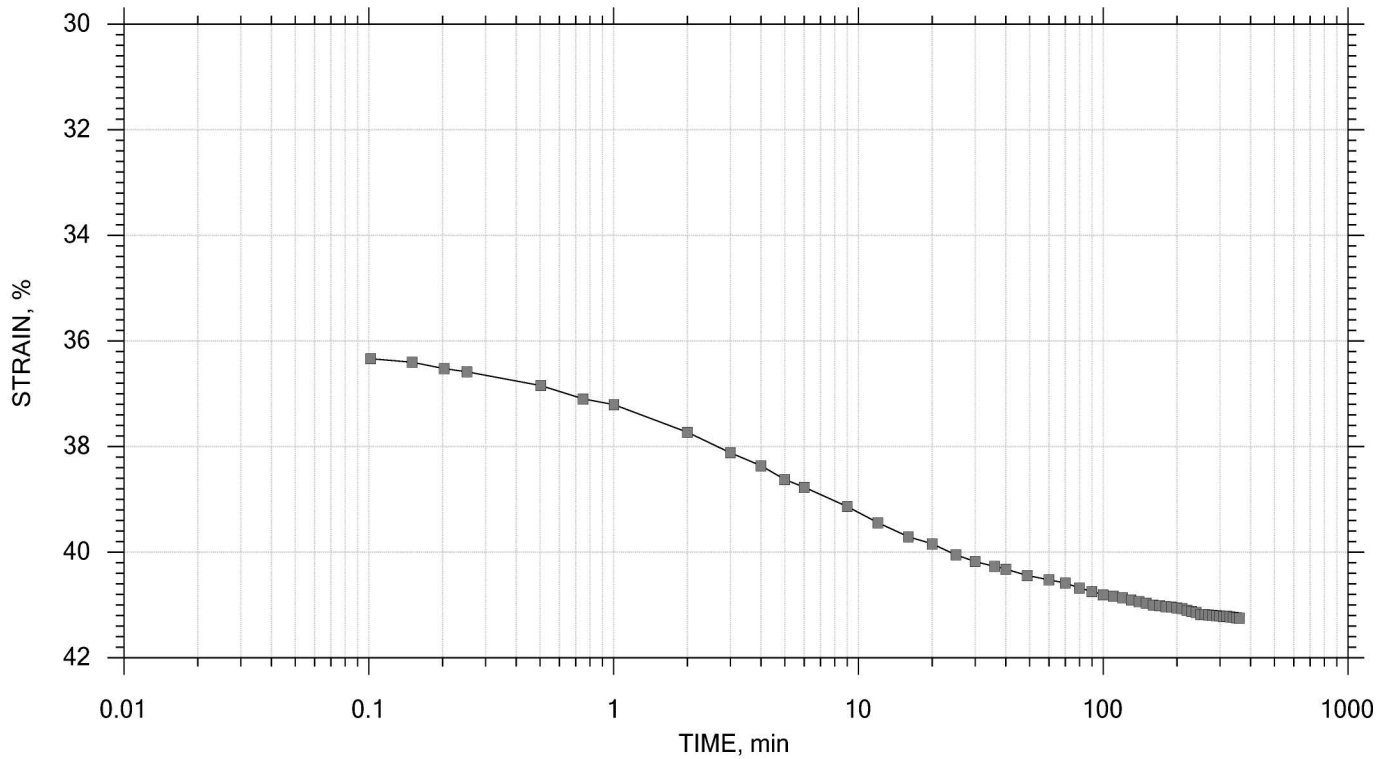
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



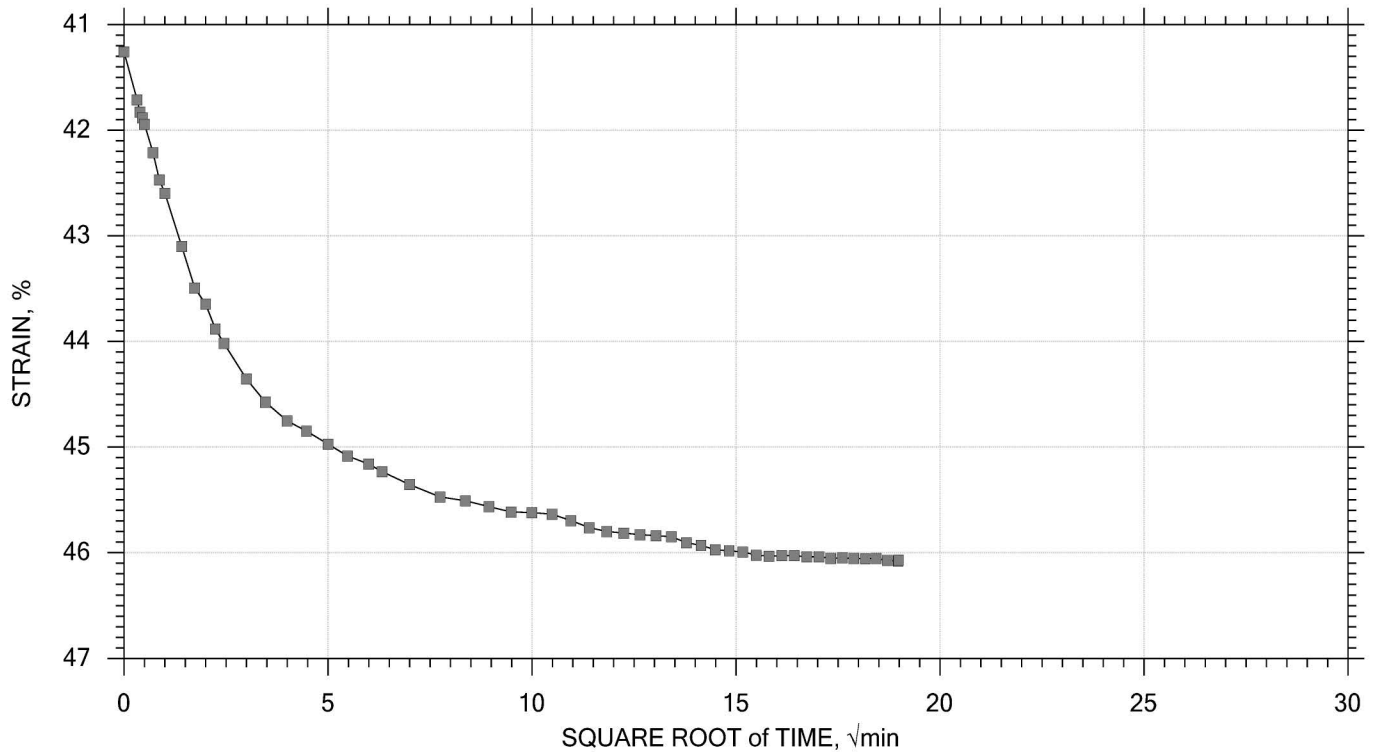
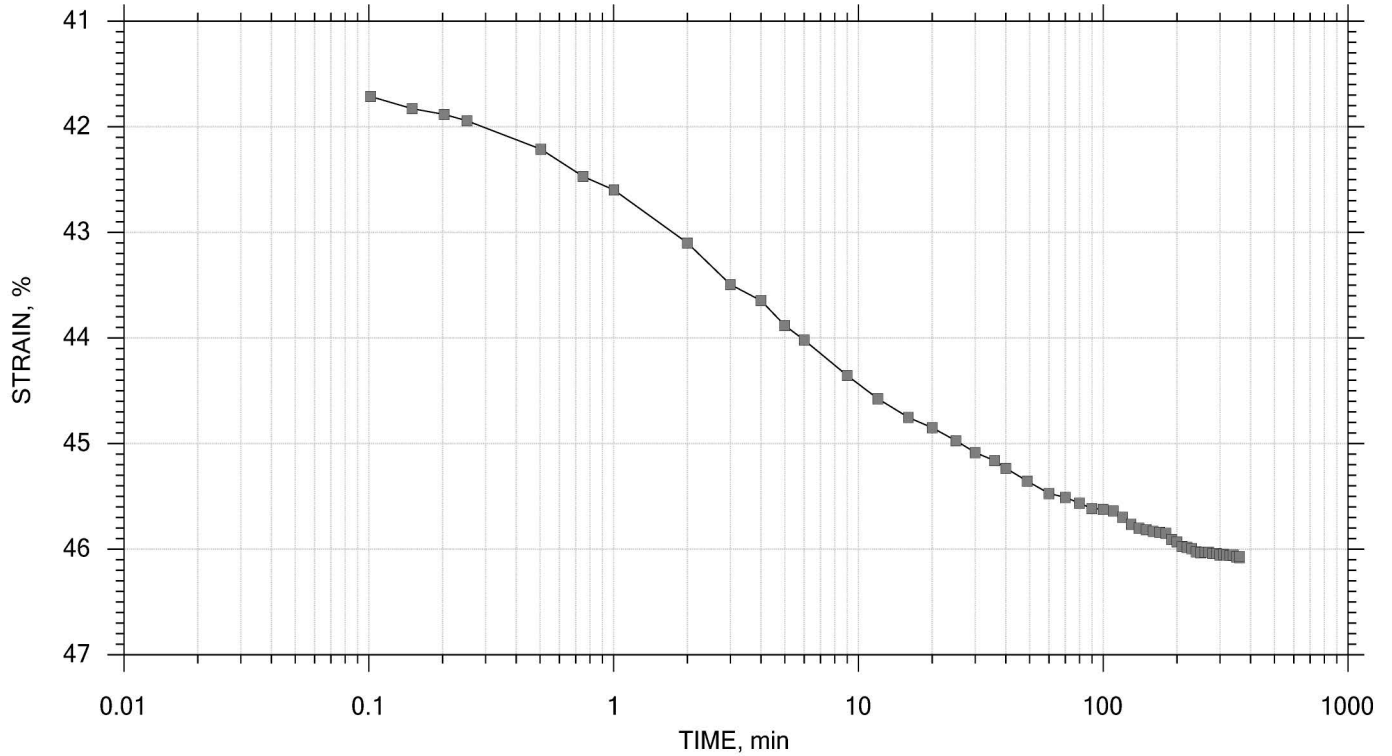
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



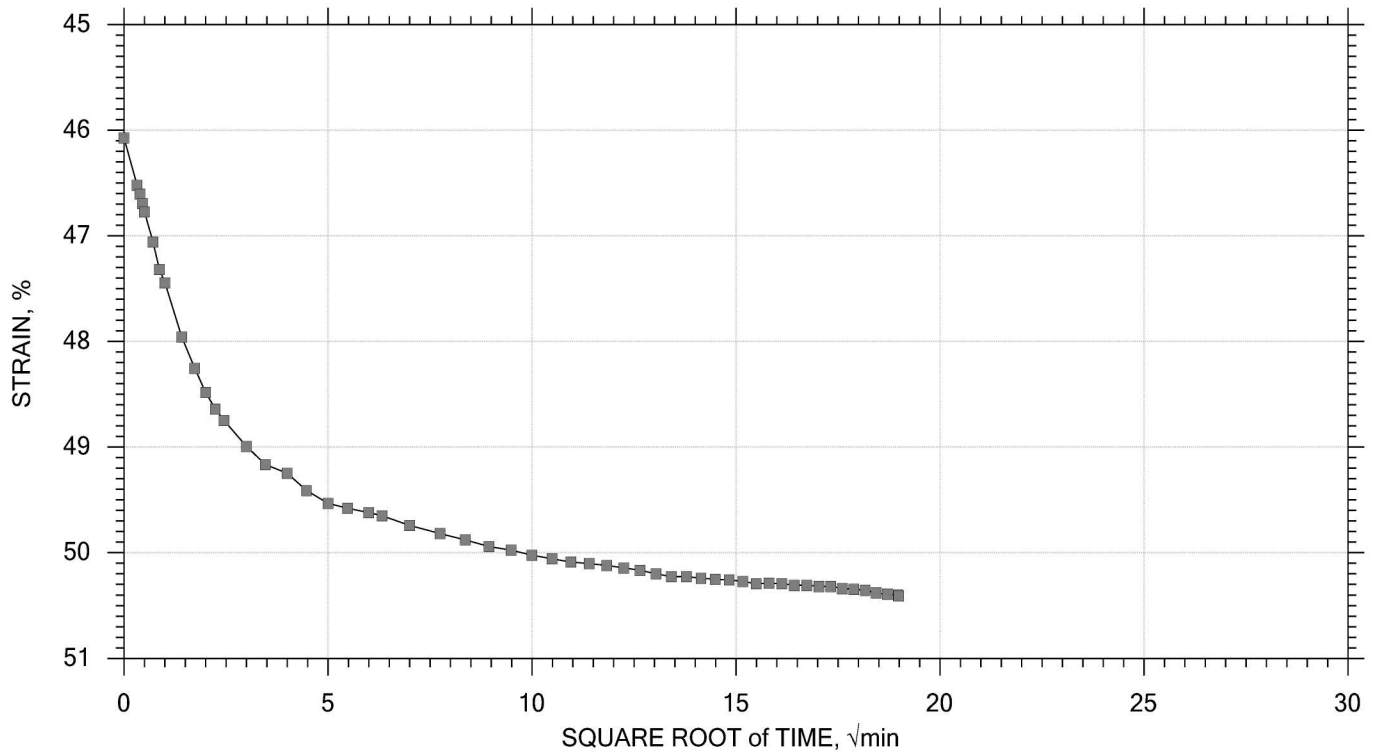
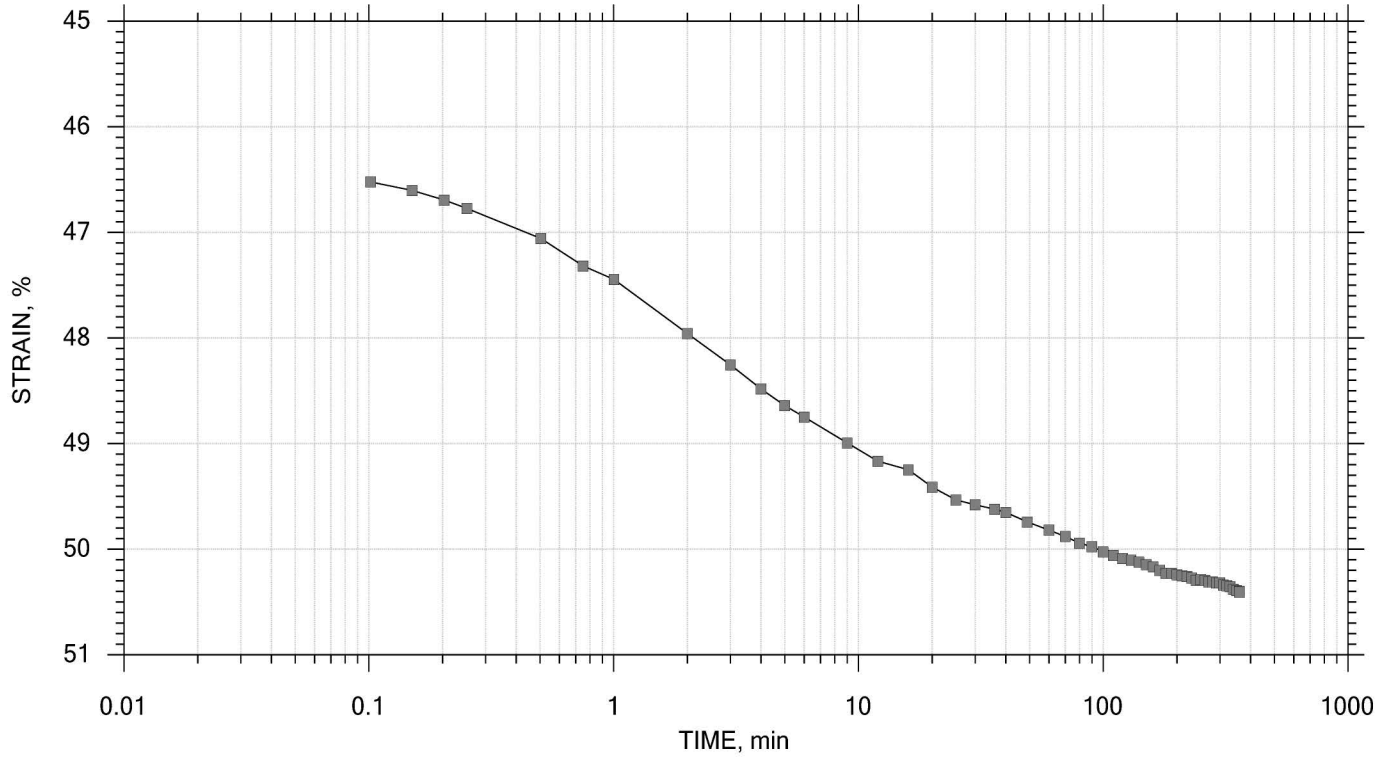
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



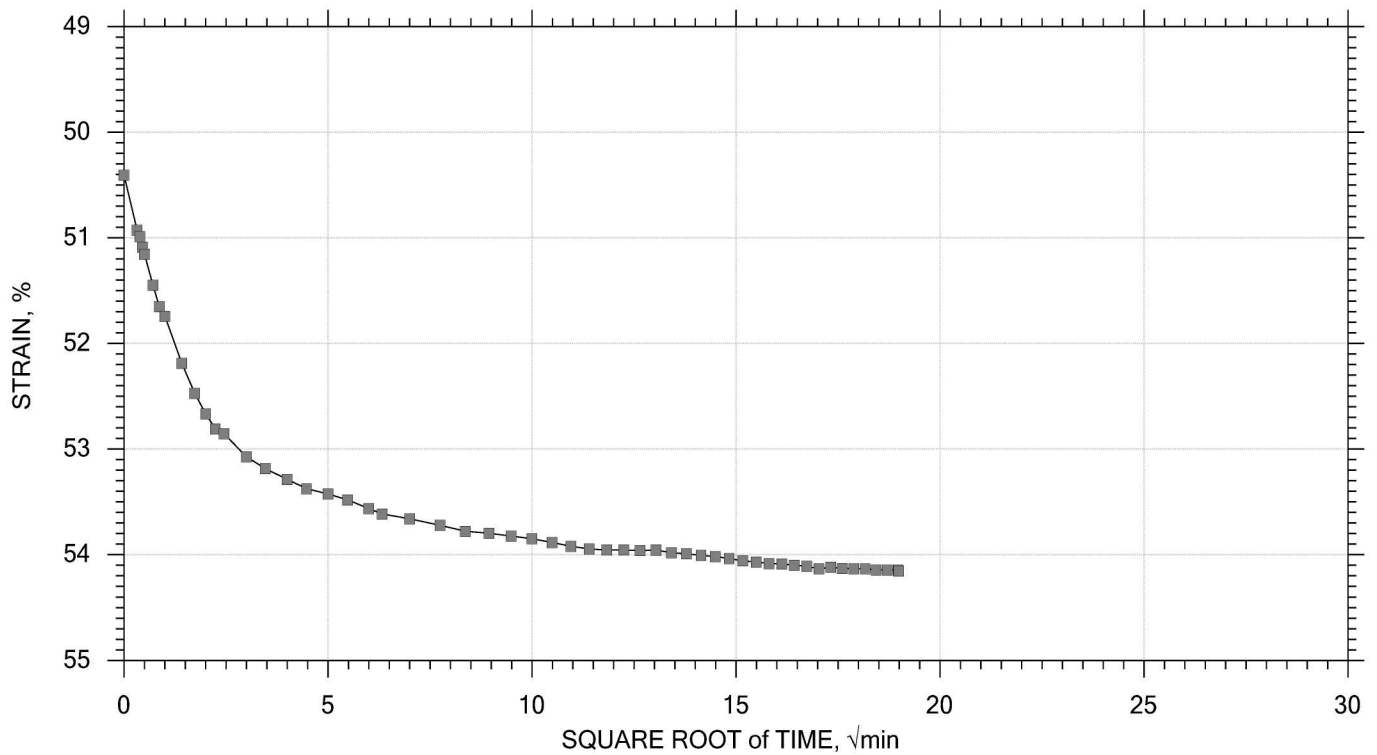
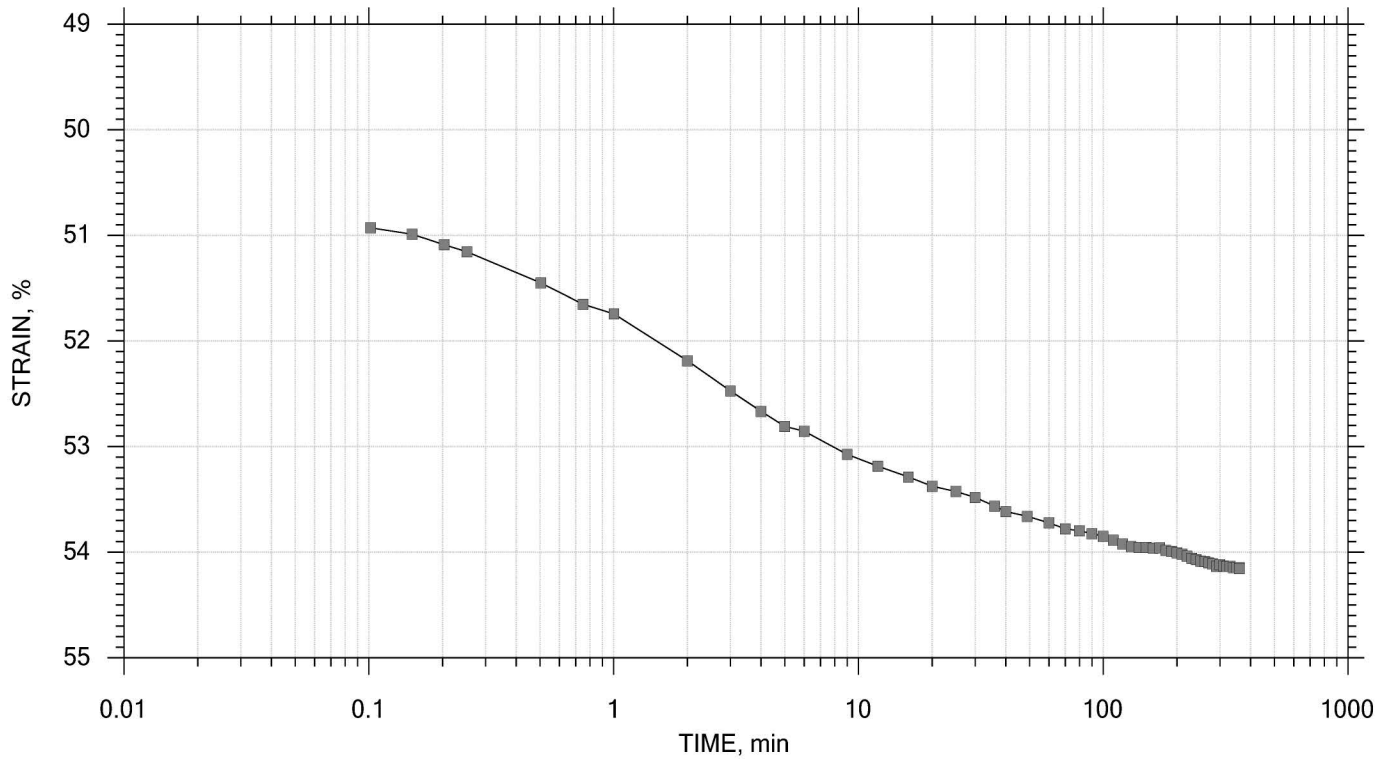
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | Test No.: IP-3A |
| | Depth: 0.5-1.2 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



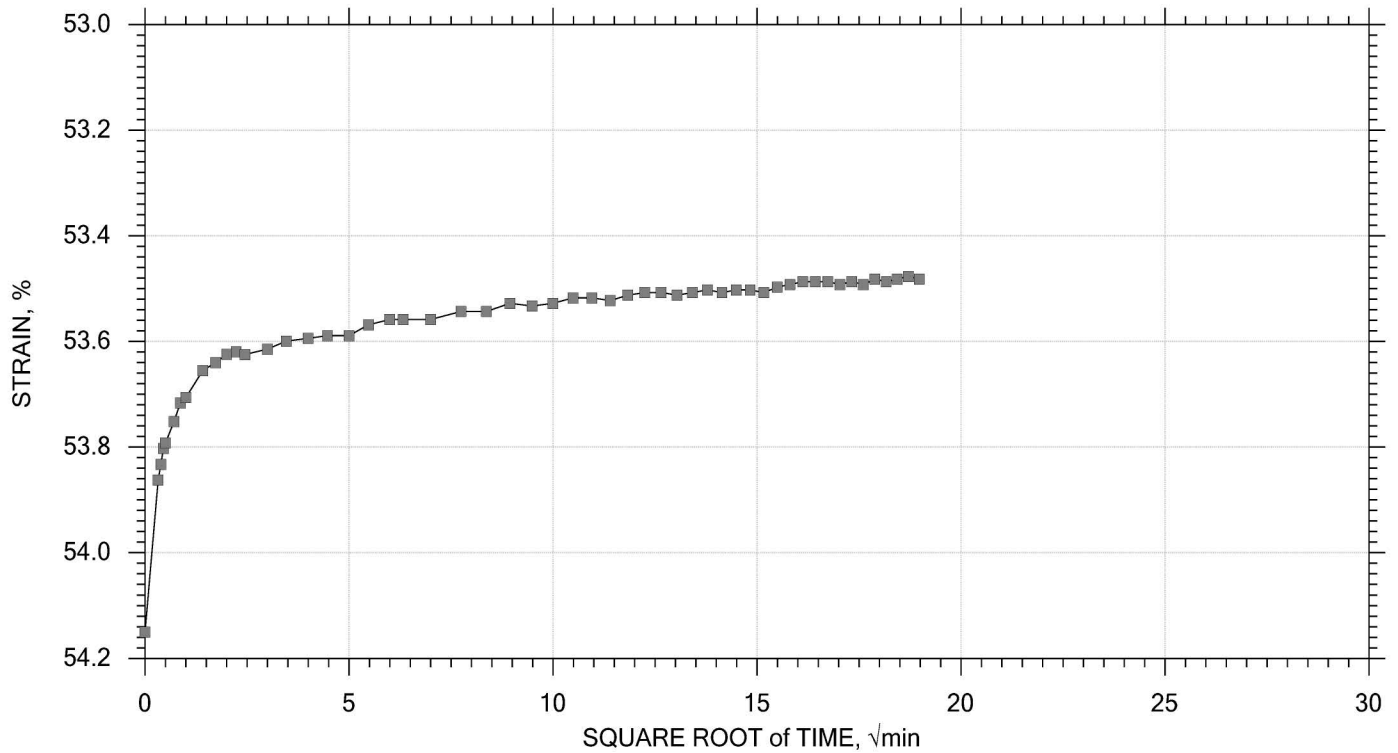
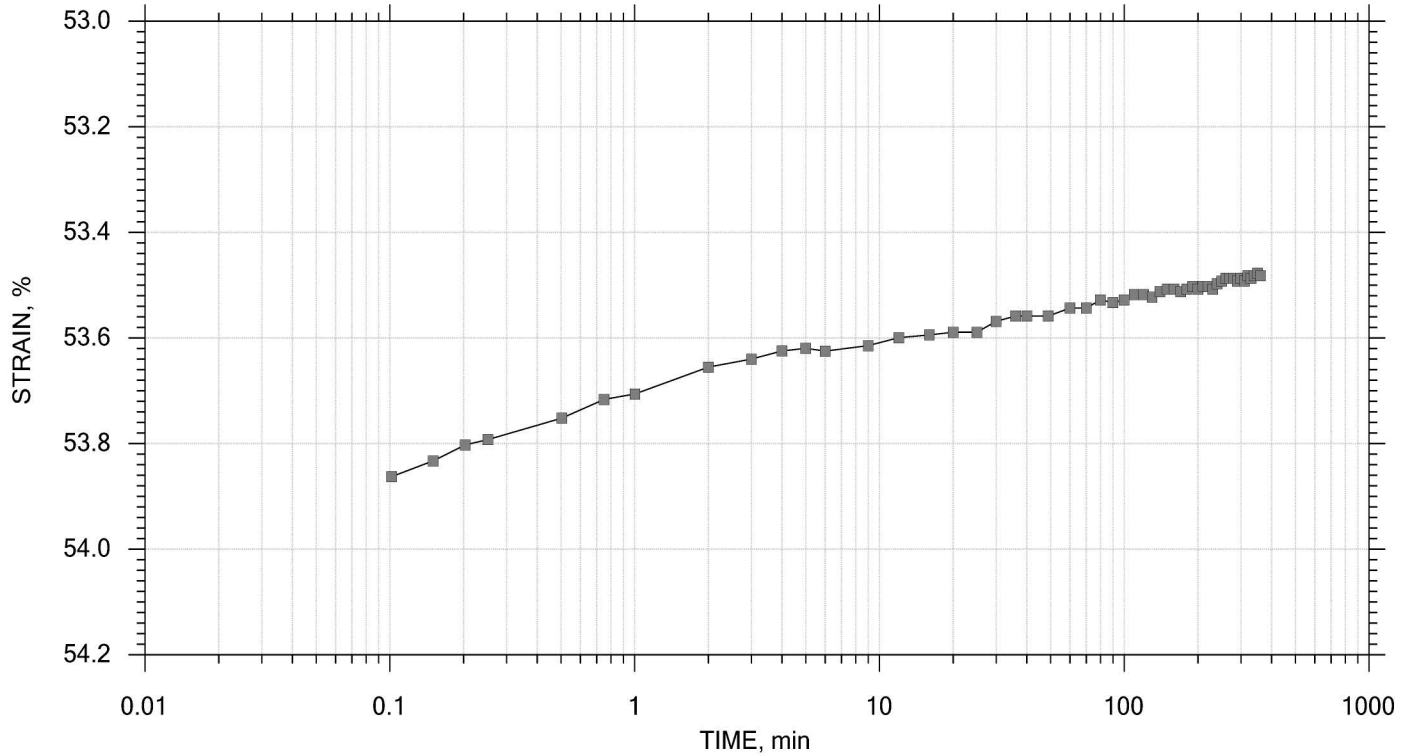
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | Test No.: IP-3A |
| | Depth: 0.5-1.2 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



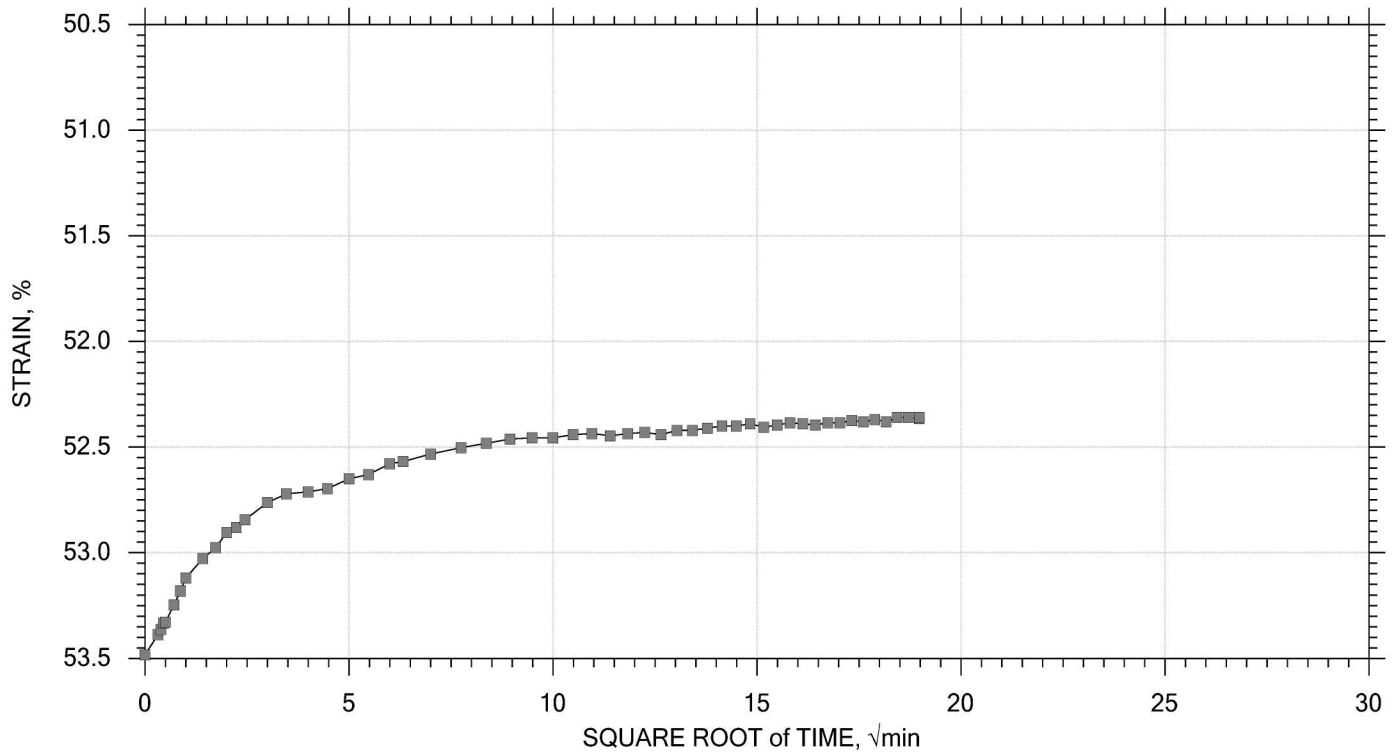
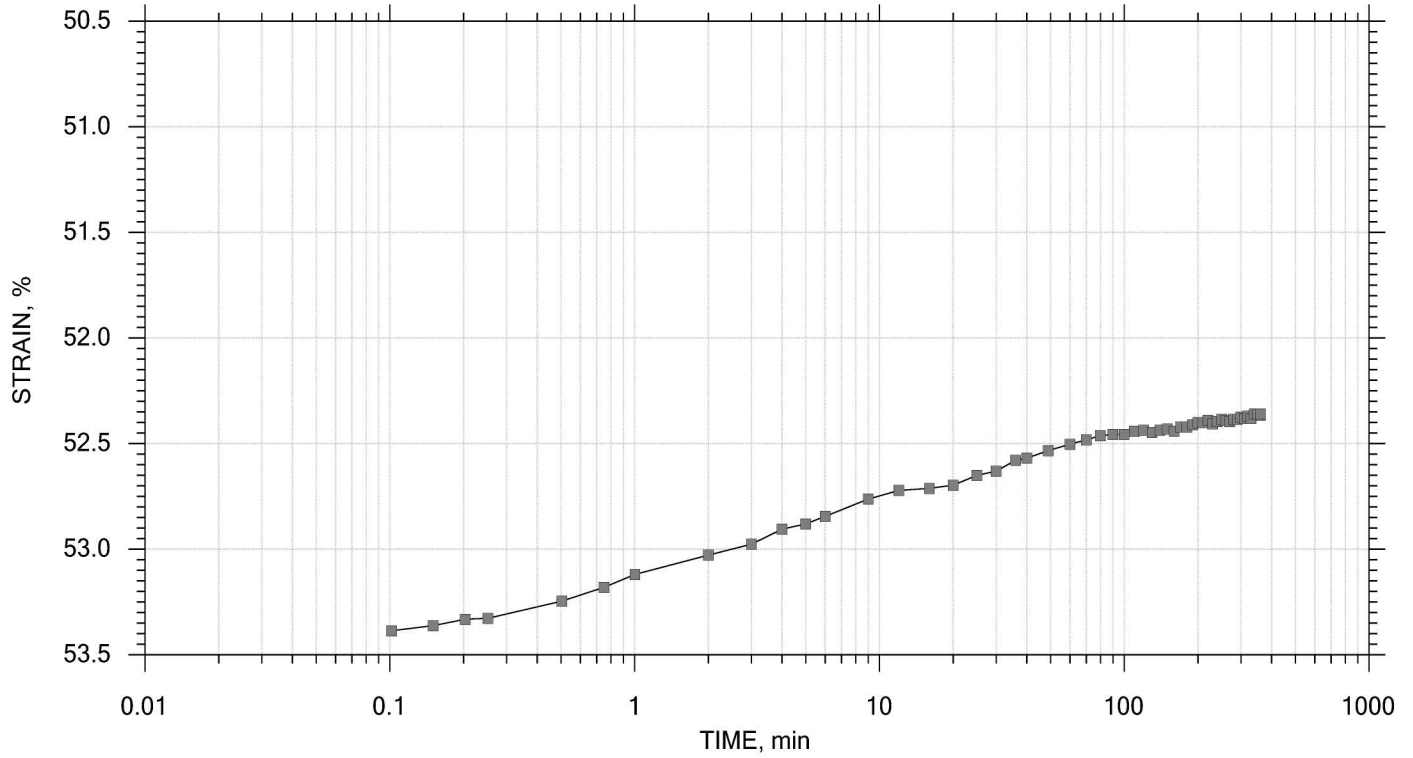
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | Test No.: IP-3A |
| | Depth: 0.5-1.2 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



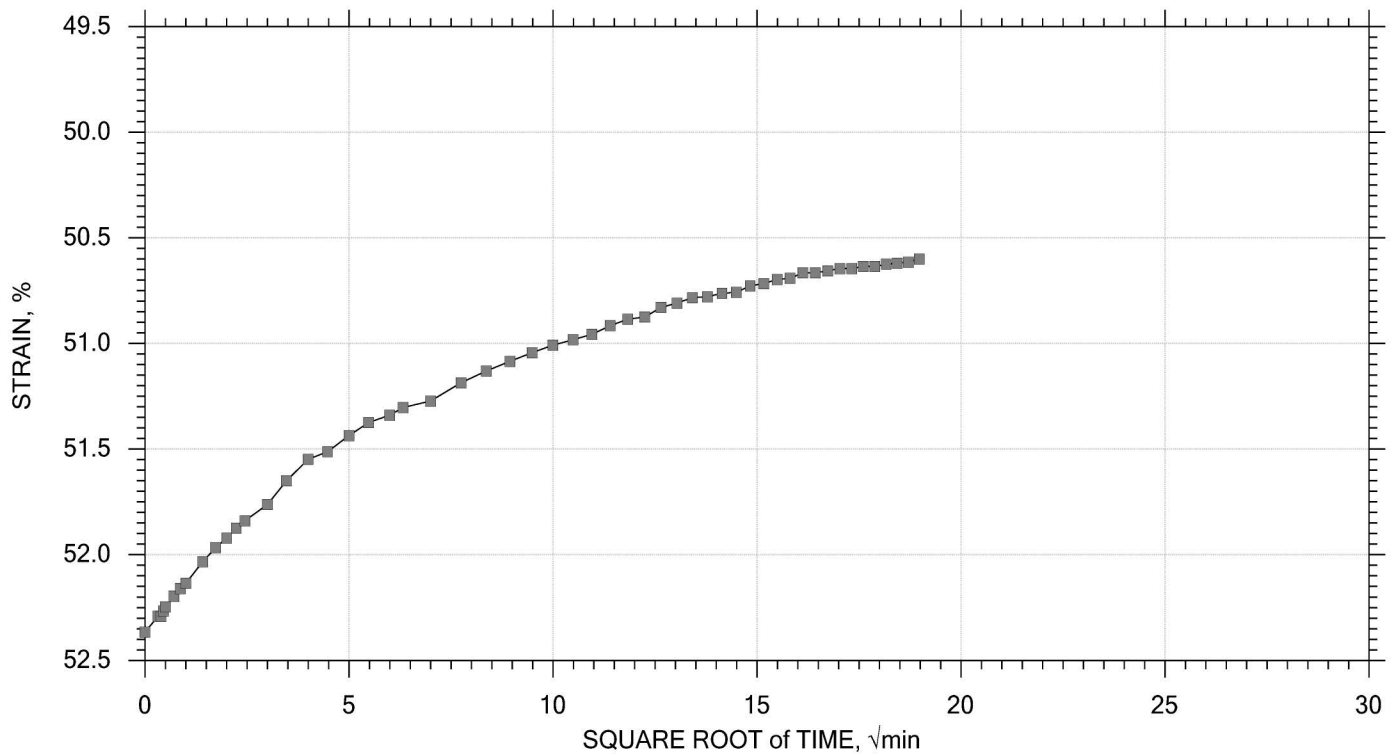
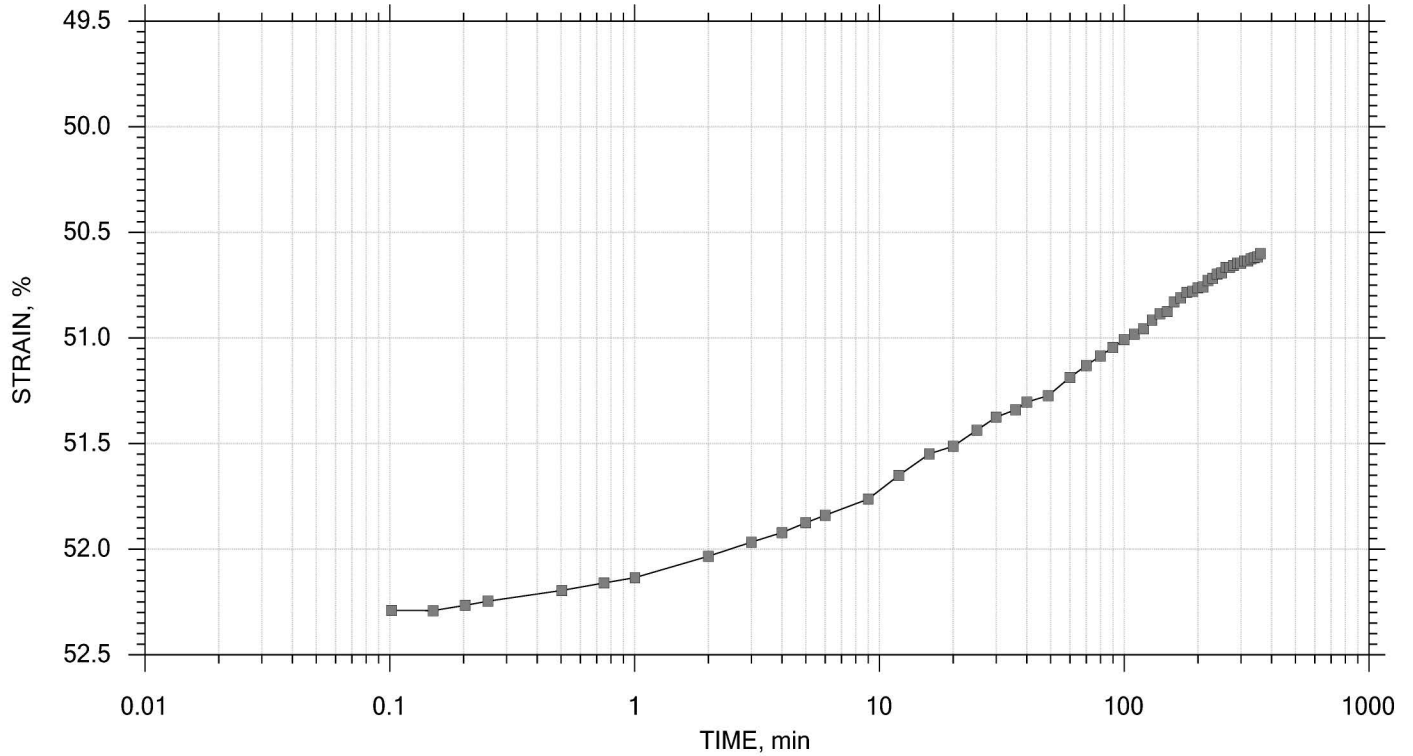
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



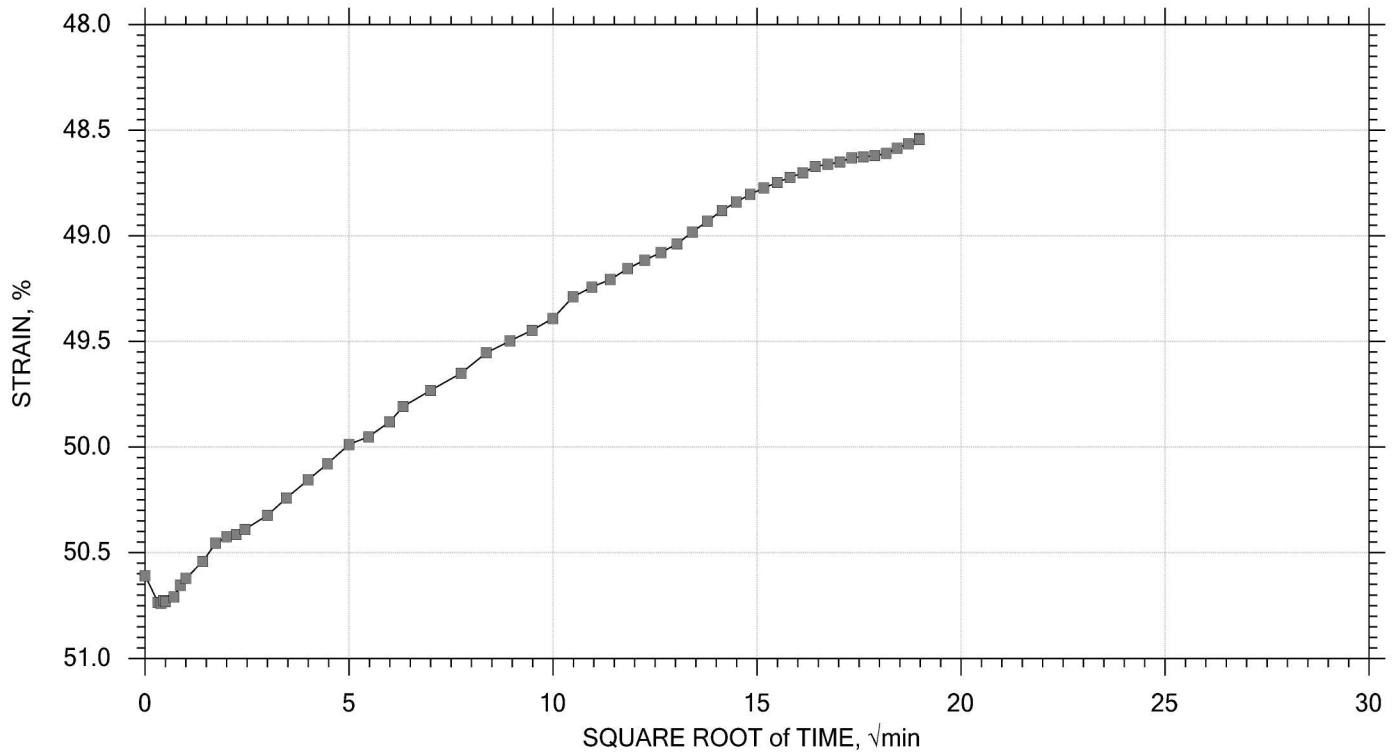
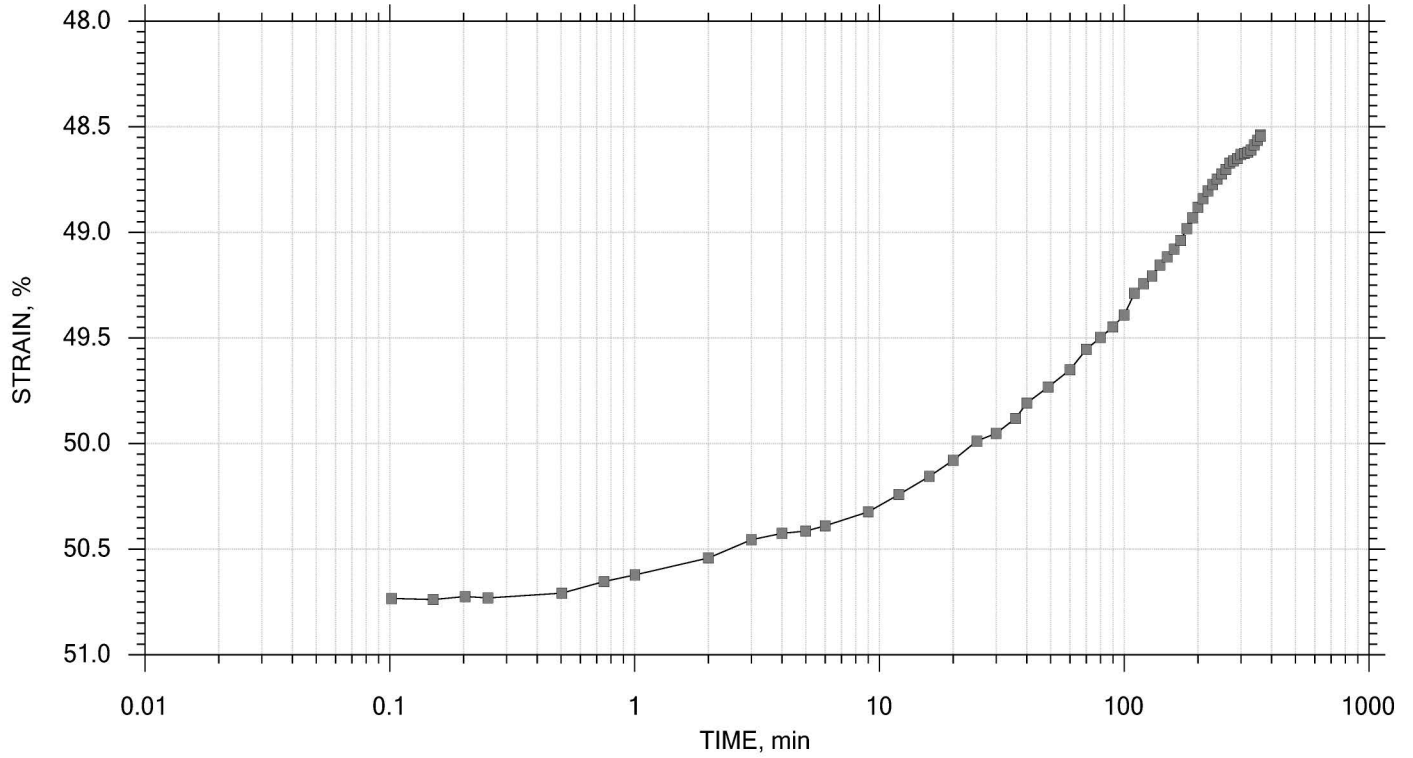
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | 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



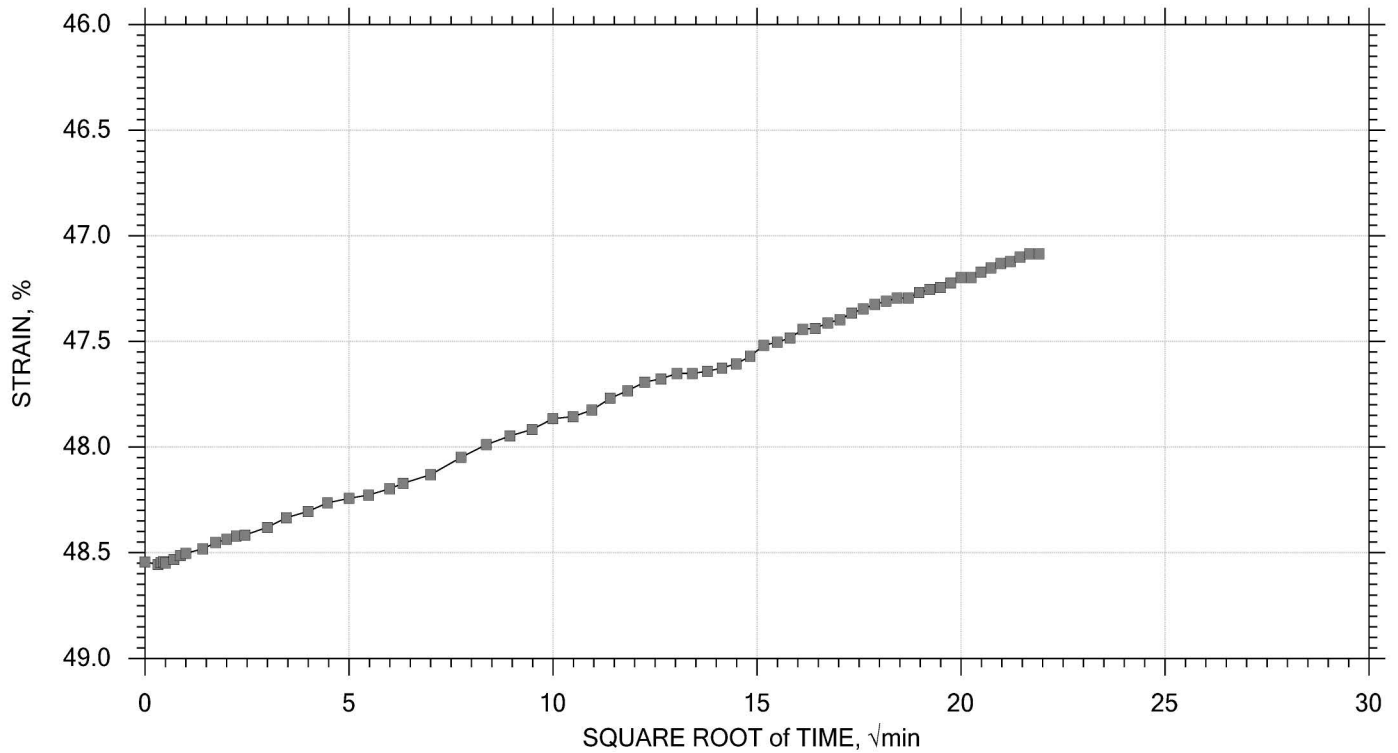
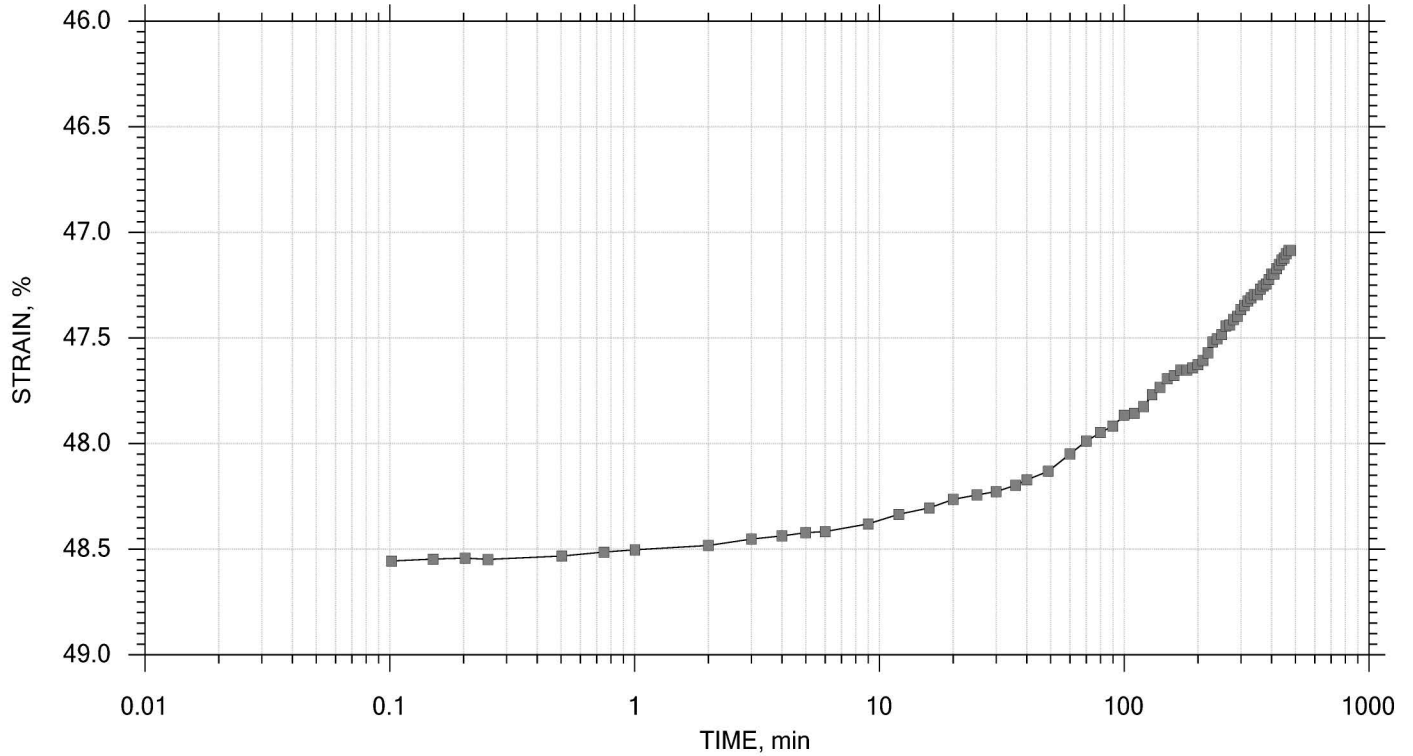
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002302 | Test Date: 11/20/17 | Test No.: IP-3A |
| | Depth: 0.5-1.2 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

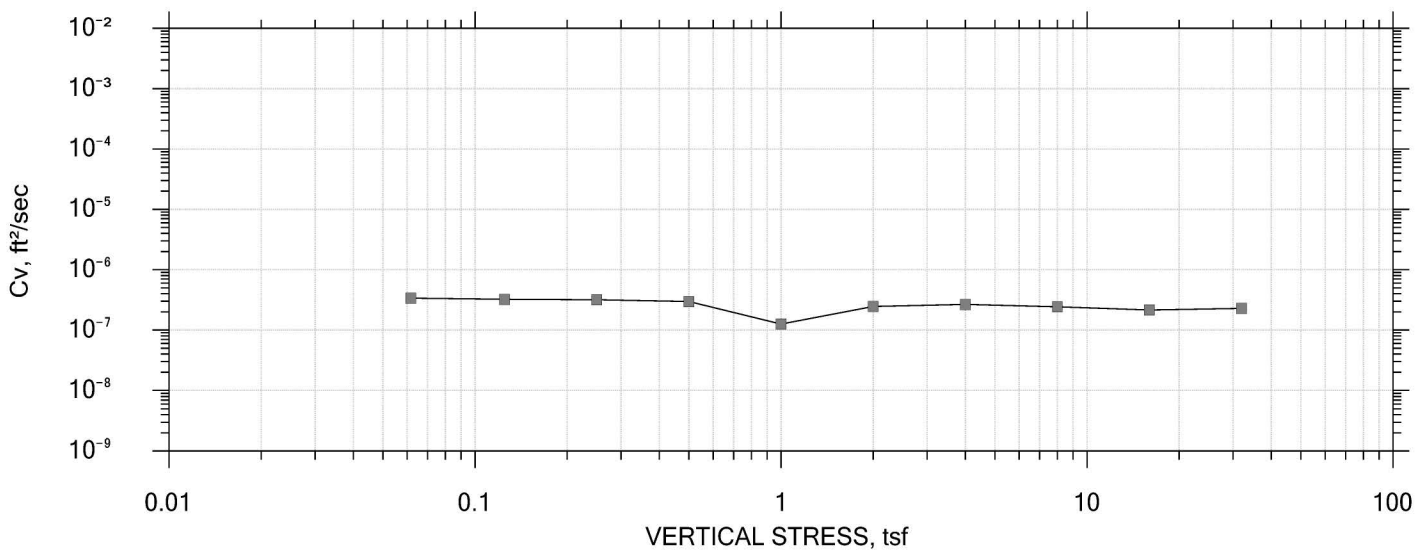
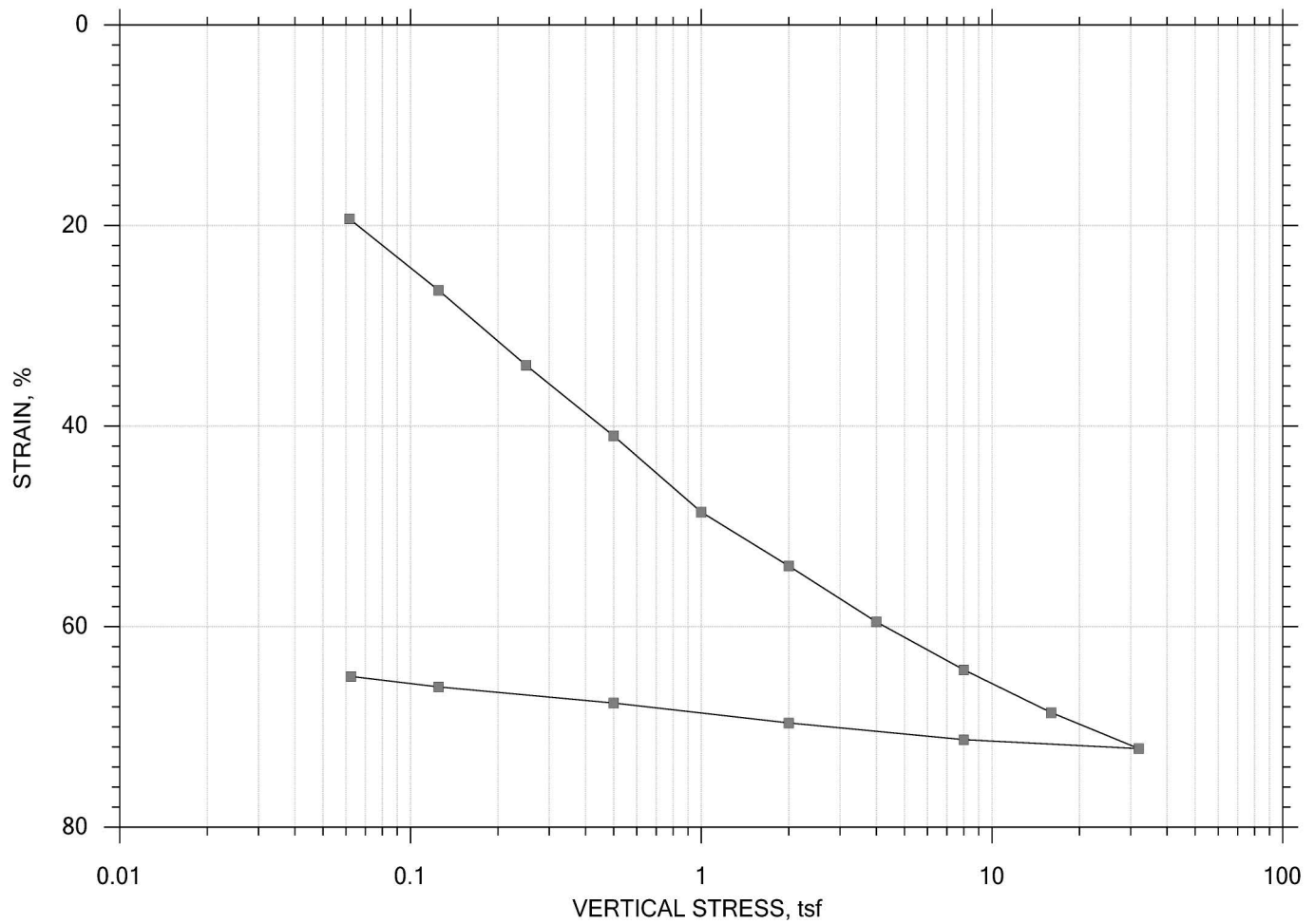
Stress: 0.0625 tsf




| | | | |
|--|--|---------------------------|-------------------------|
|  | 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

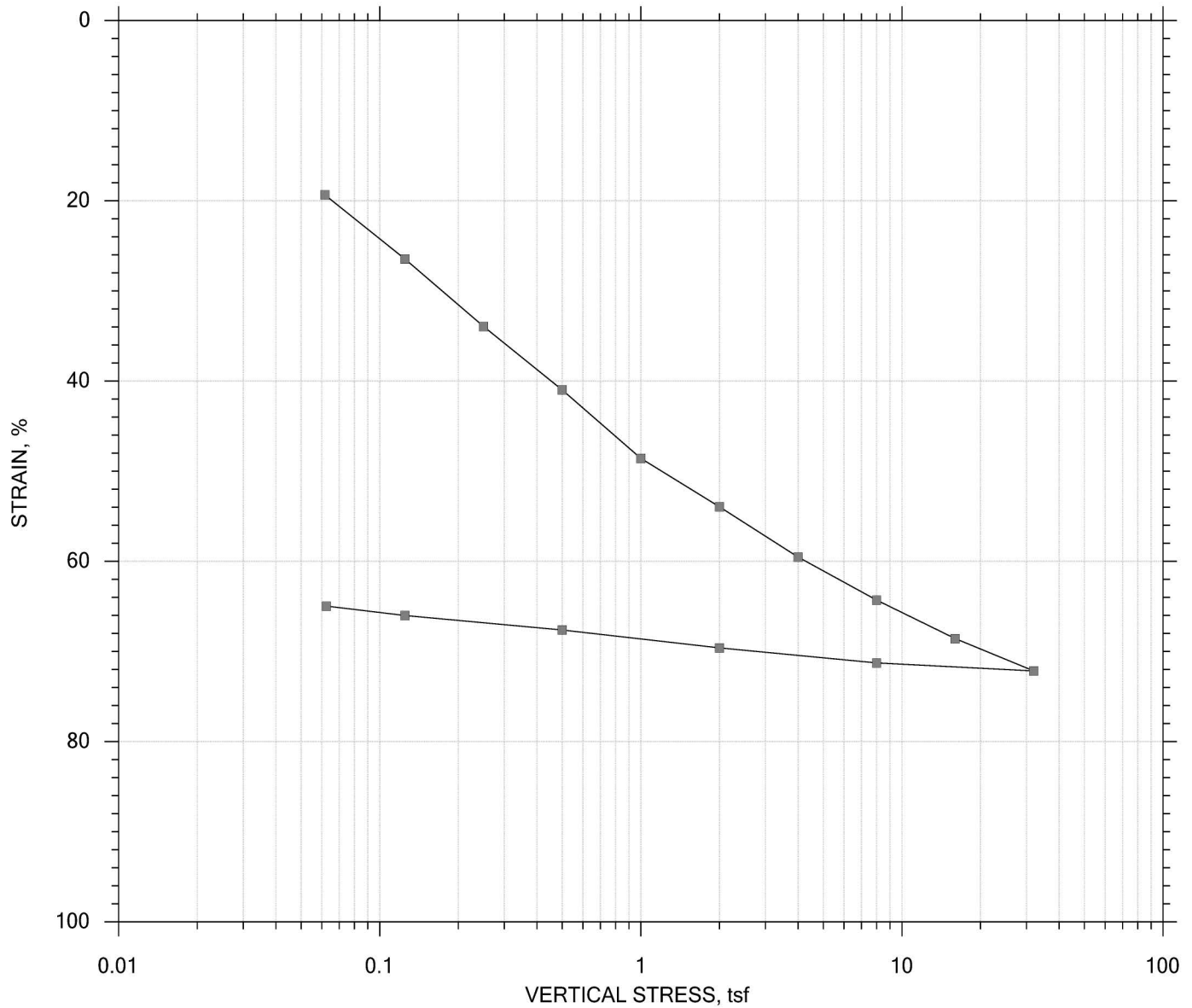
SUMMARY REPORT




| | | | |
|--|--|---------------------------|-------------------------|
|  | 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 | | | |

| | | | |
|--|--|---------------------------|-------------------------|
|  | 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
 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

Estimated Specific Gravity: 2.53
 Initial Void Ratio: 5.01
 Final Void Ratio: 1.10

Liquid Limit: ---
 Plastic Limit: ---
 Plasticity Index: ---

Specimen Diameter: 2.50 in
 Initial Height: 1.00 in
 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 ft ² /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 |

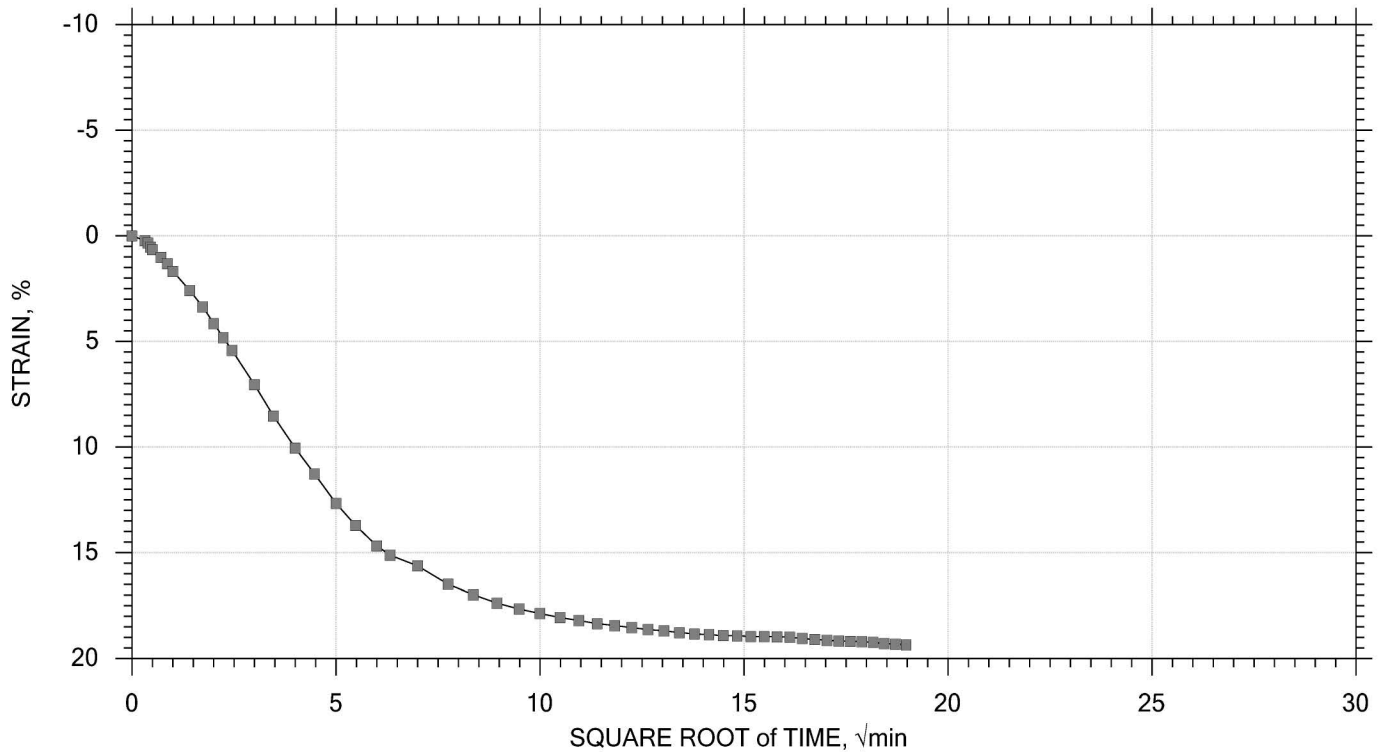
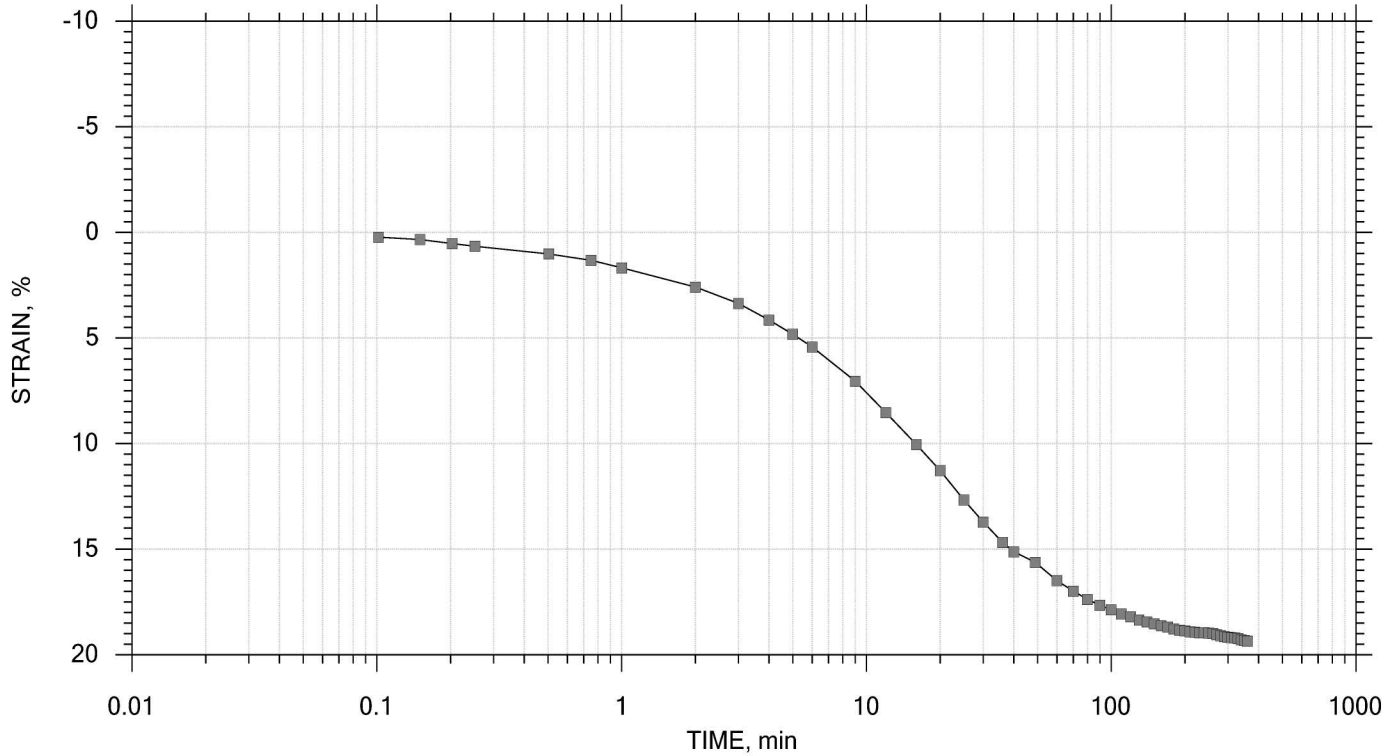
| | Applied Stress tsf | Final Displacement in | Void Ratio | Strain at End % | Log T50 min | Cv ft ² /sec | Mv 1/tsf | k ft/day | Ca % |
|----|--------------------------|-----------------------------|---------------|-----------------------|-------------------|----------------------------|-------------|-------------|-----------|
| 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



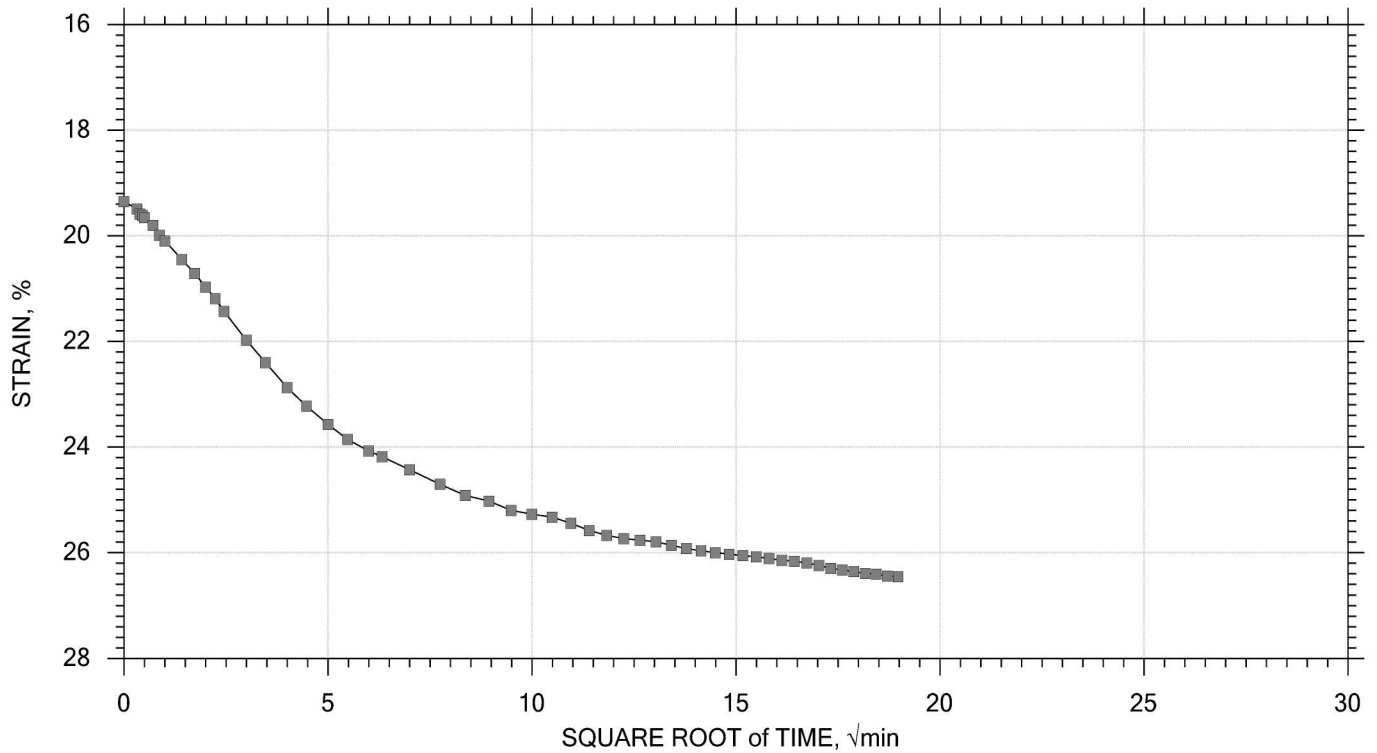
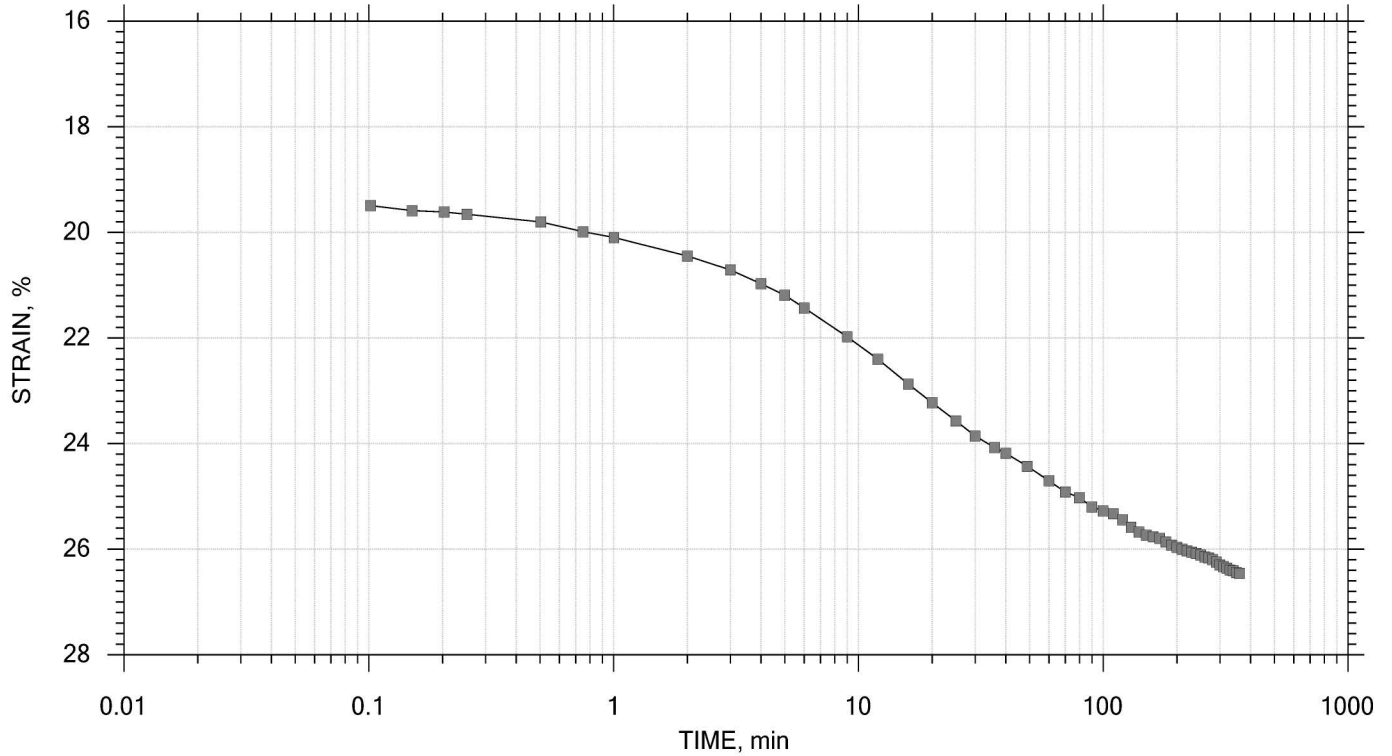
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



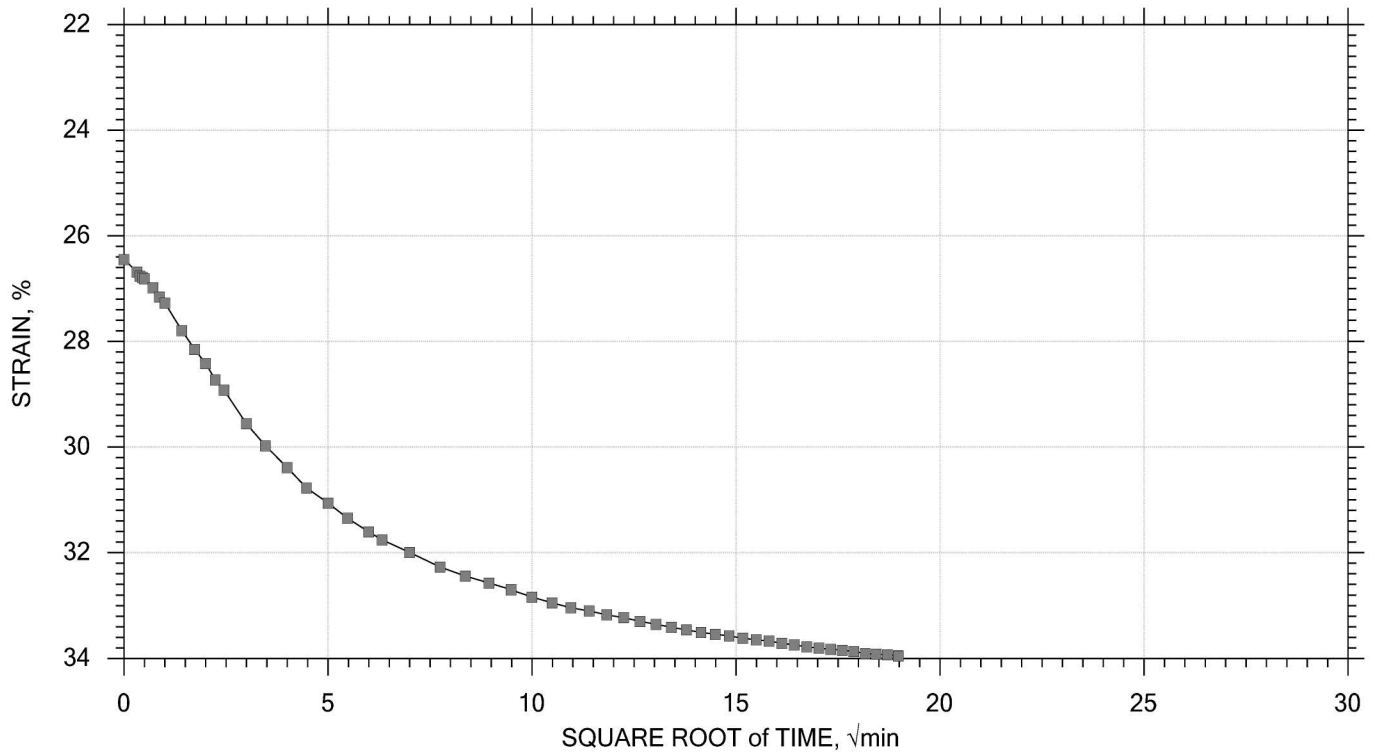
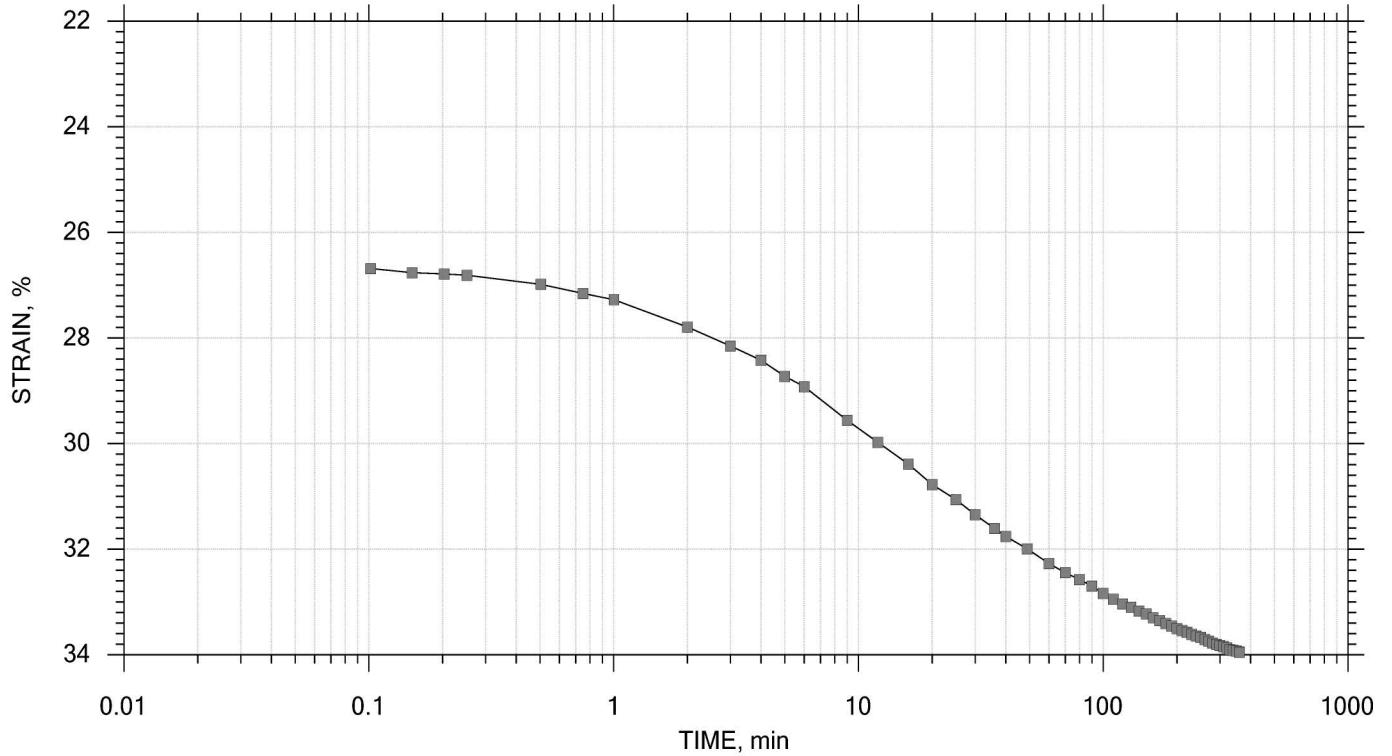
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | 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



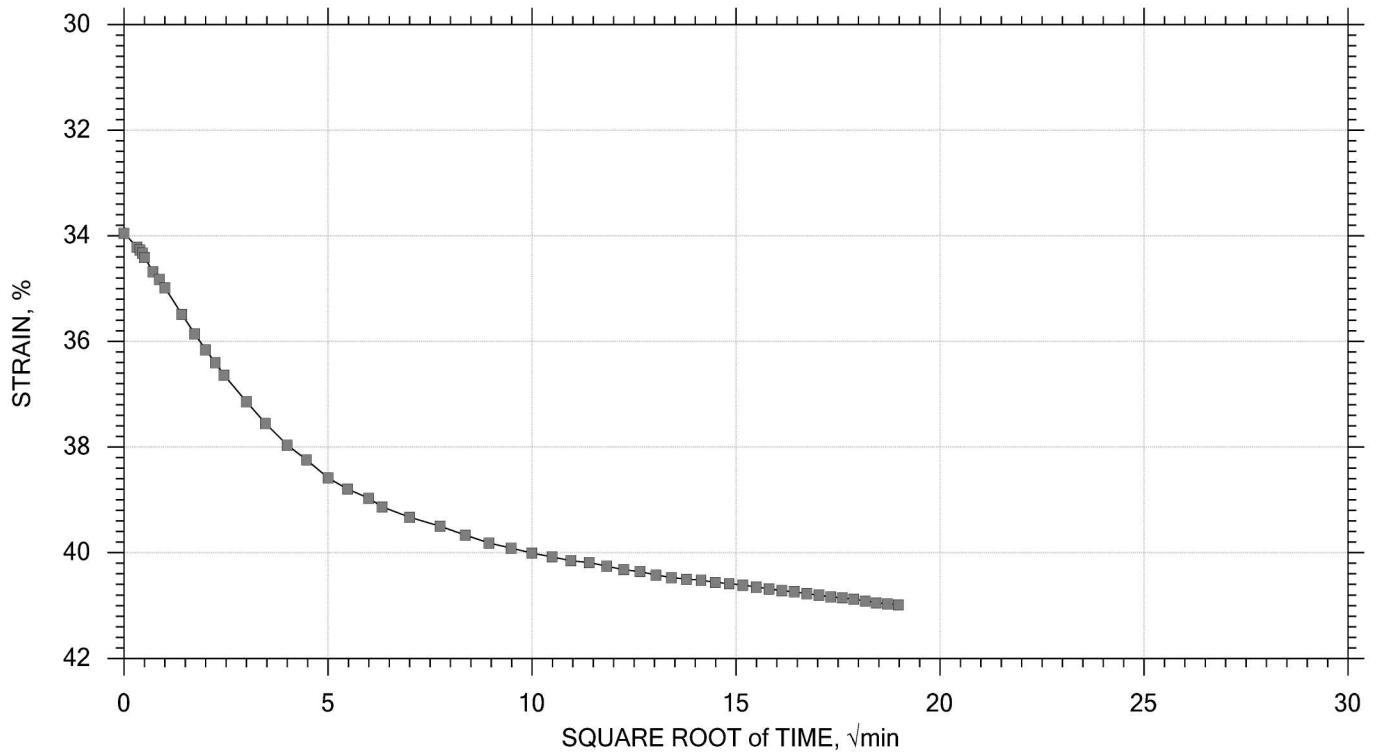
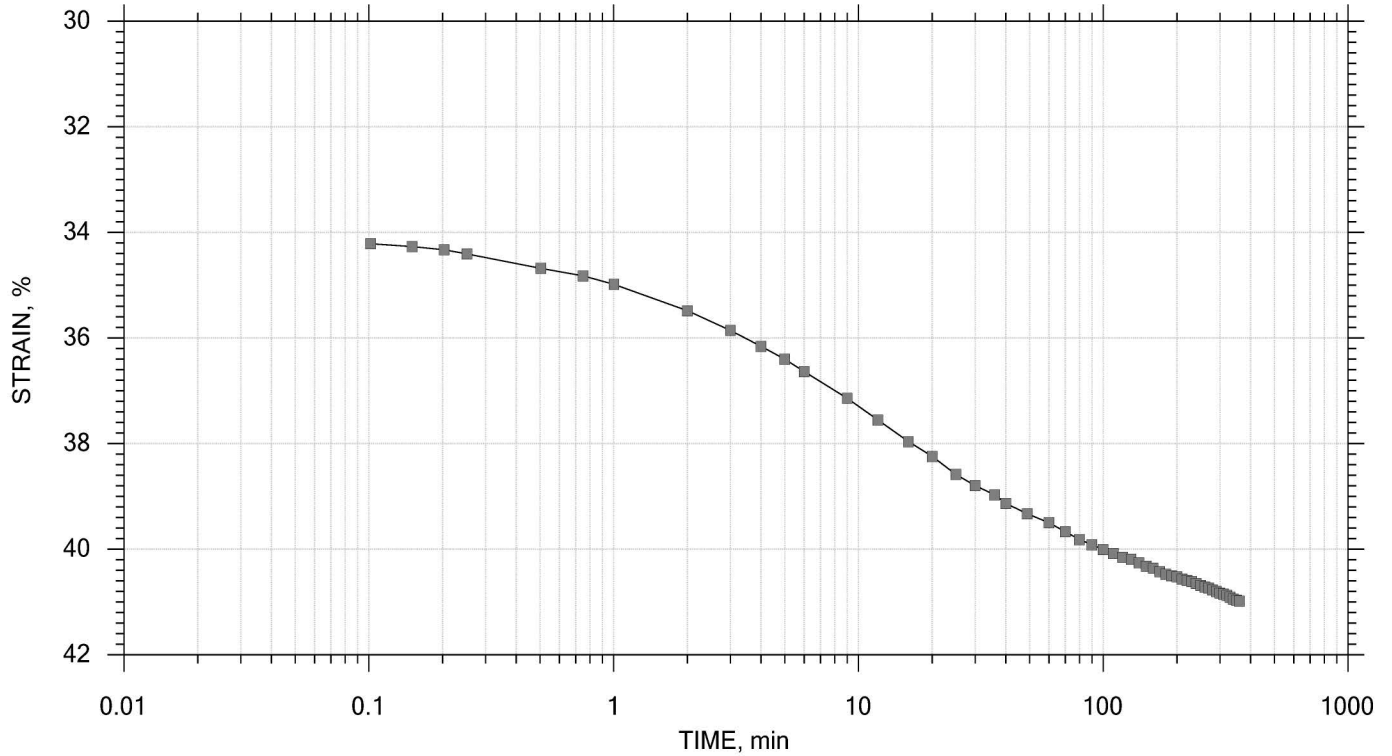
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



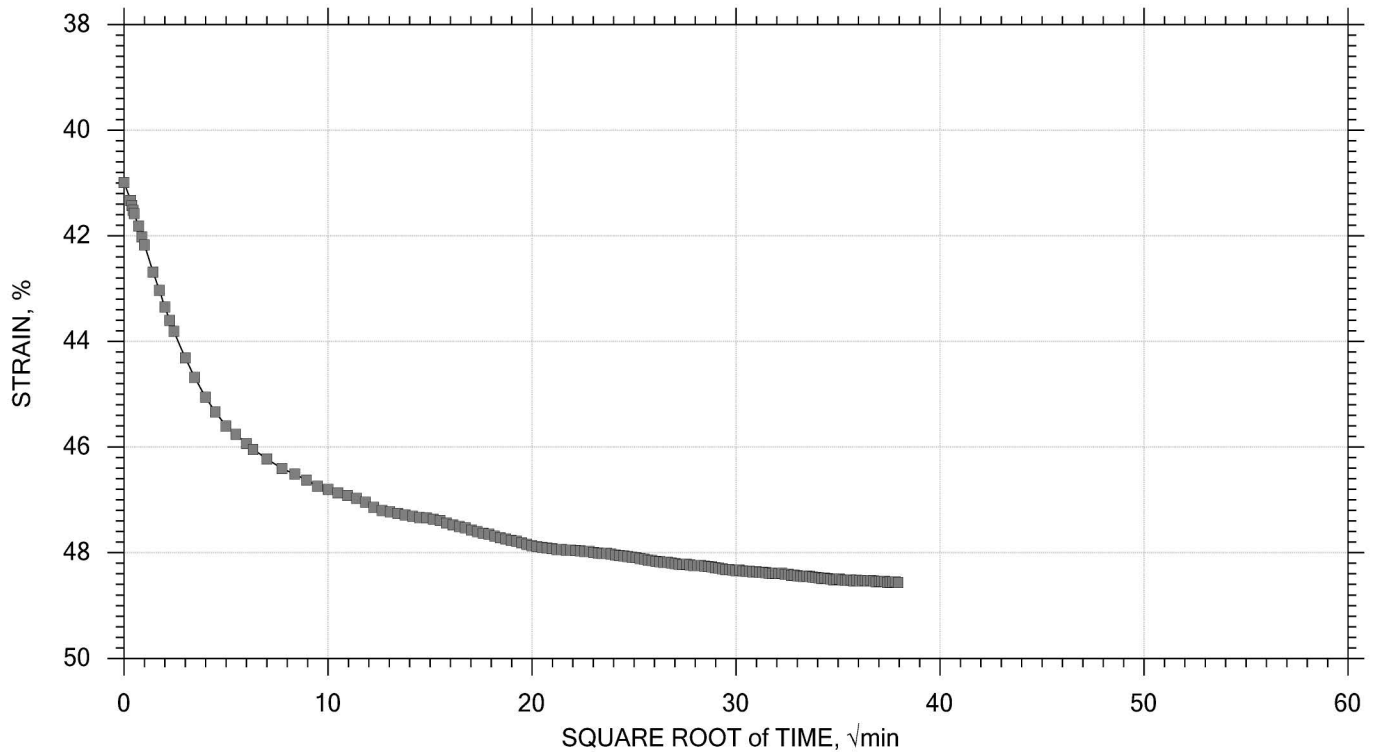
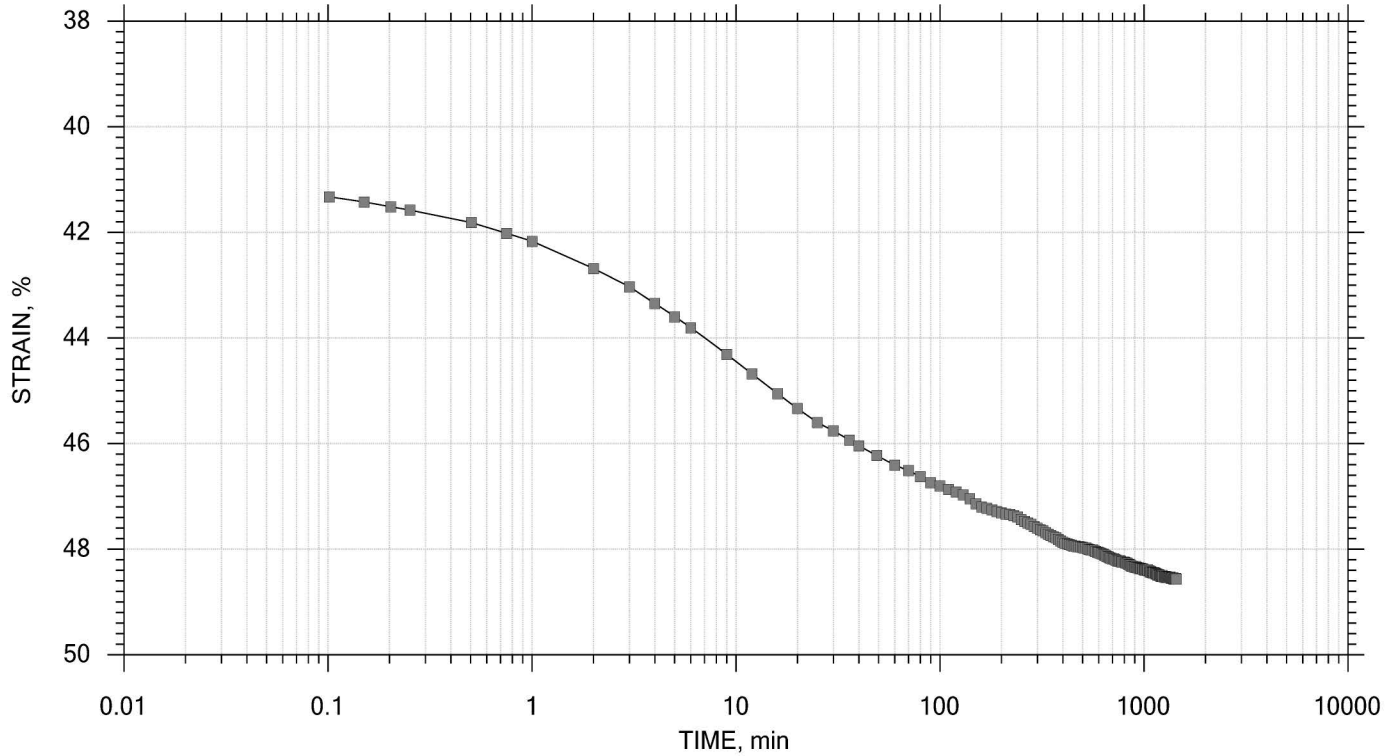
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



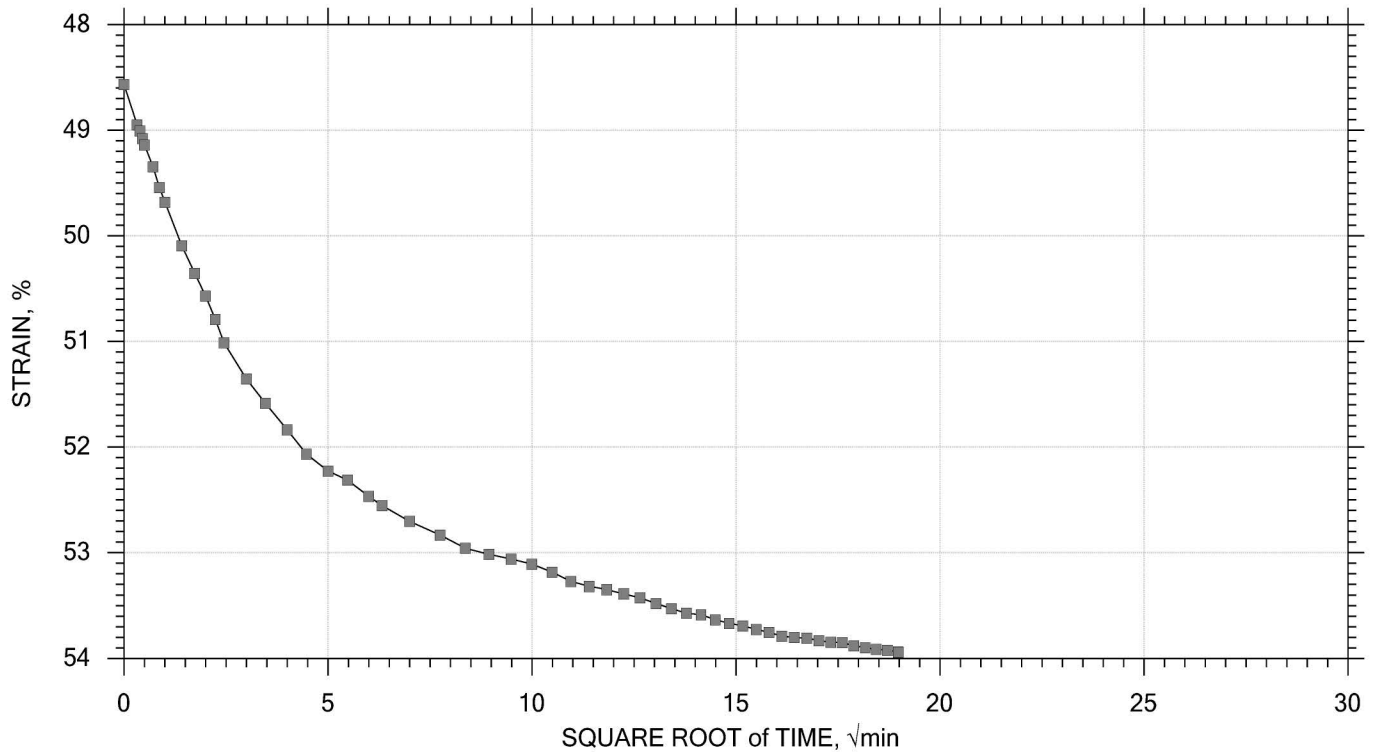
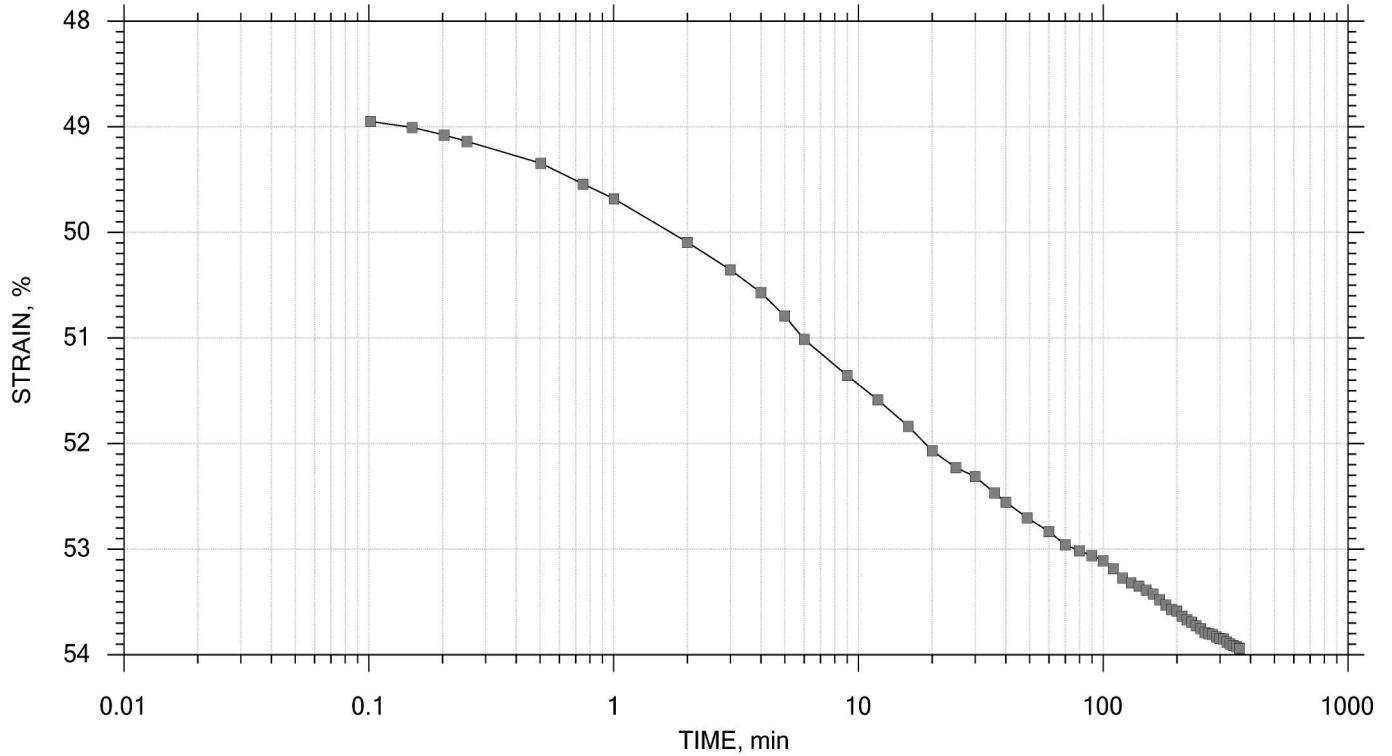
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



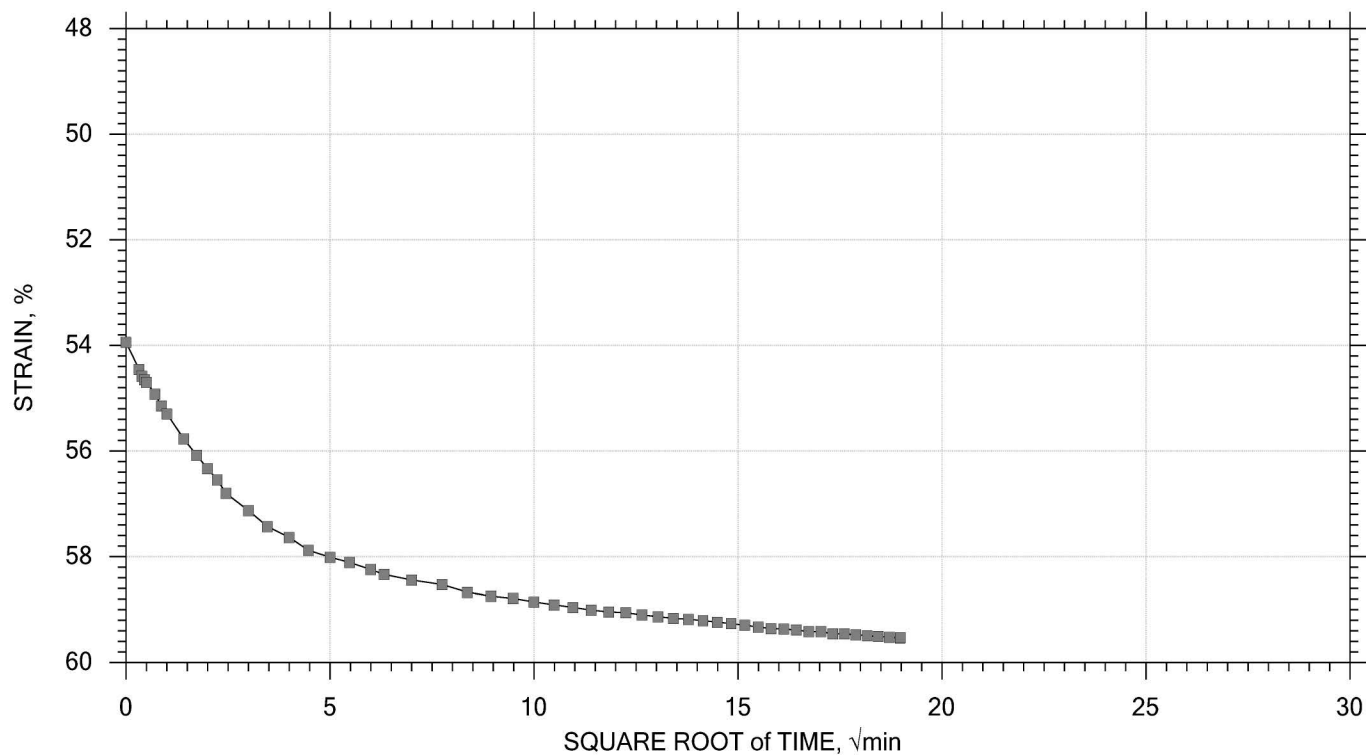
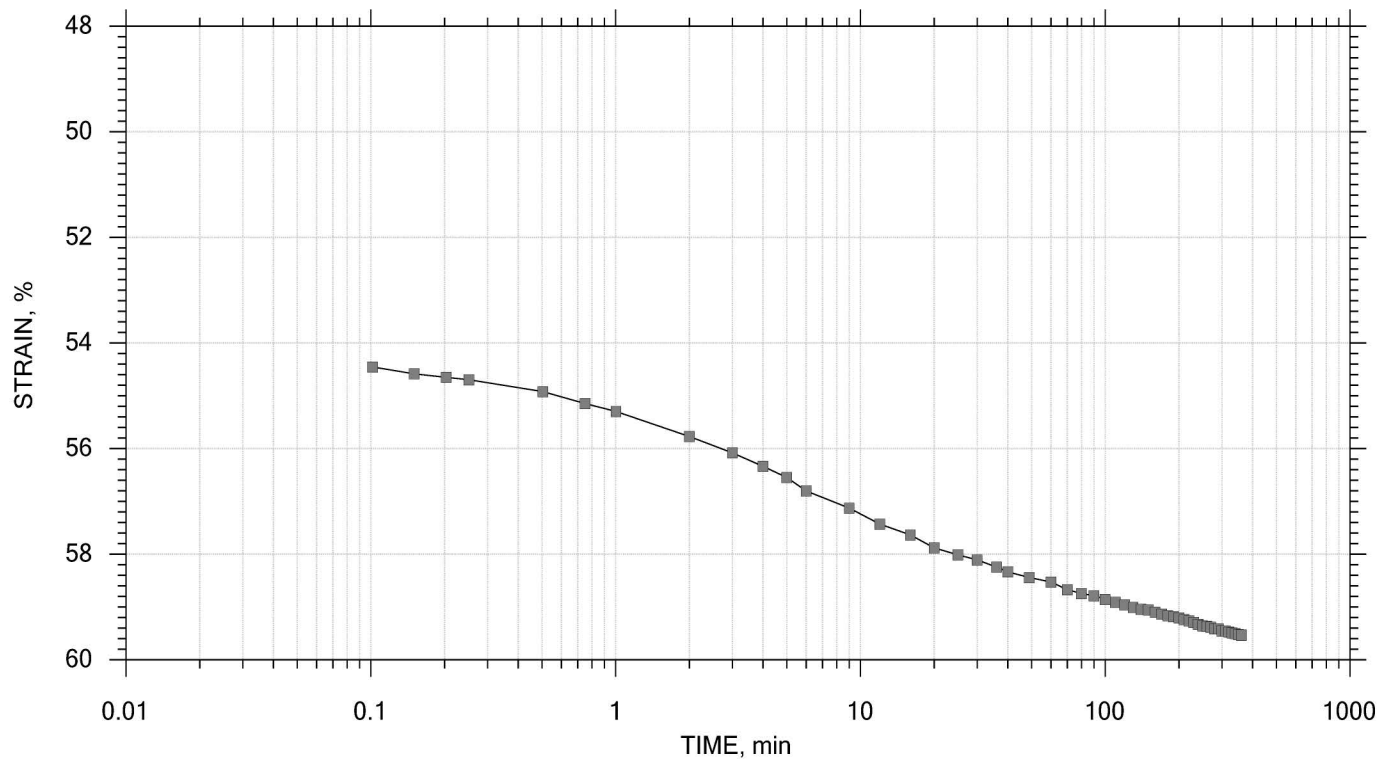
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



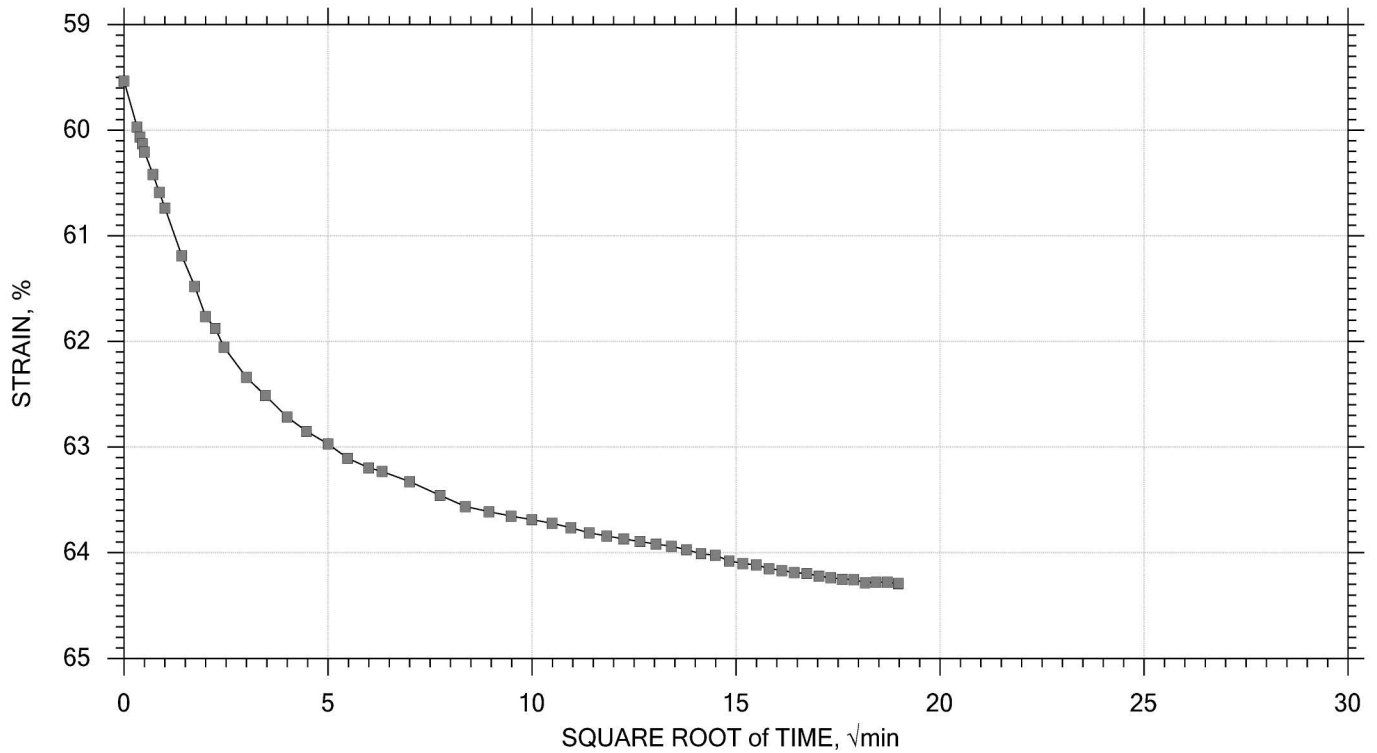
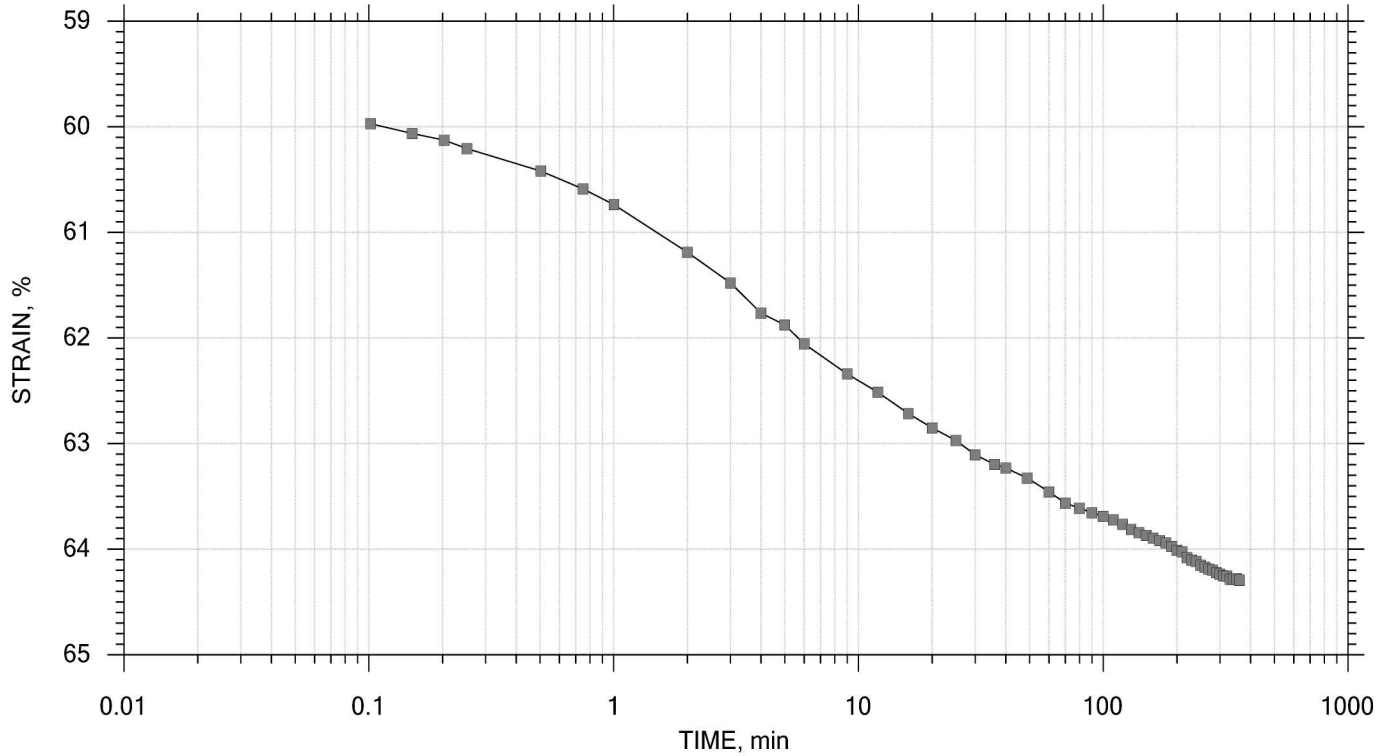
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



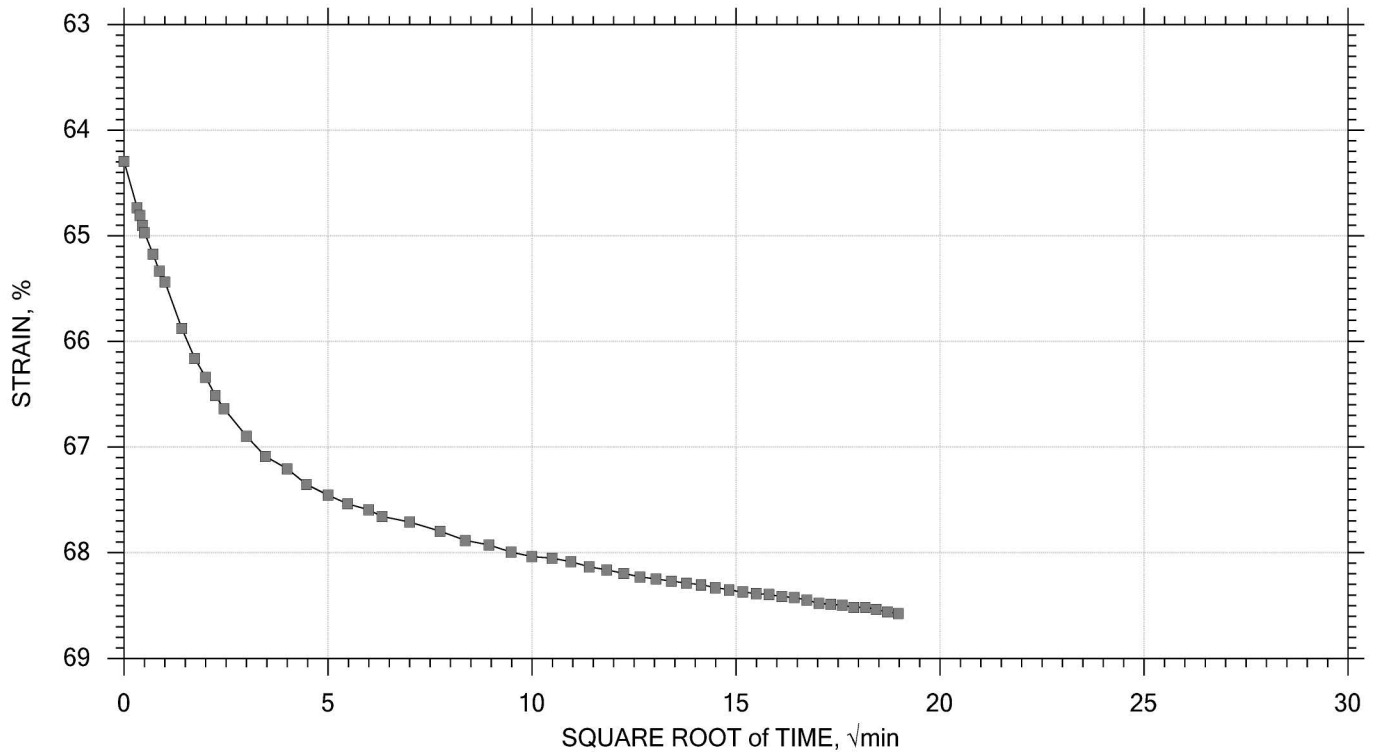
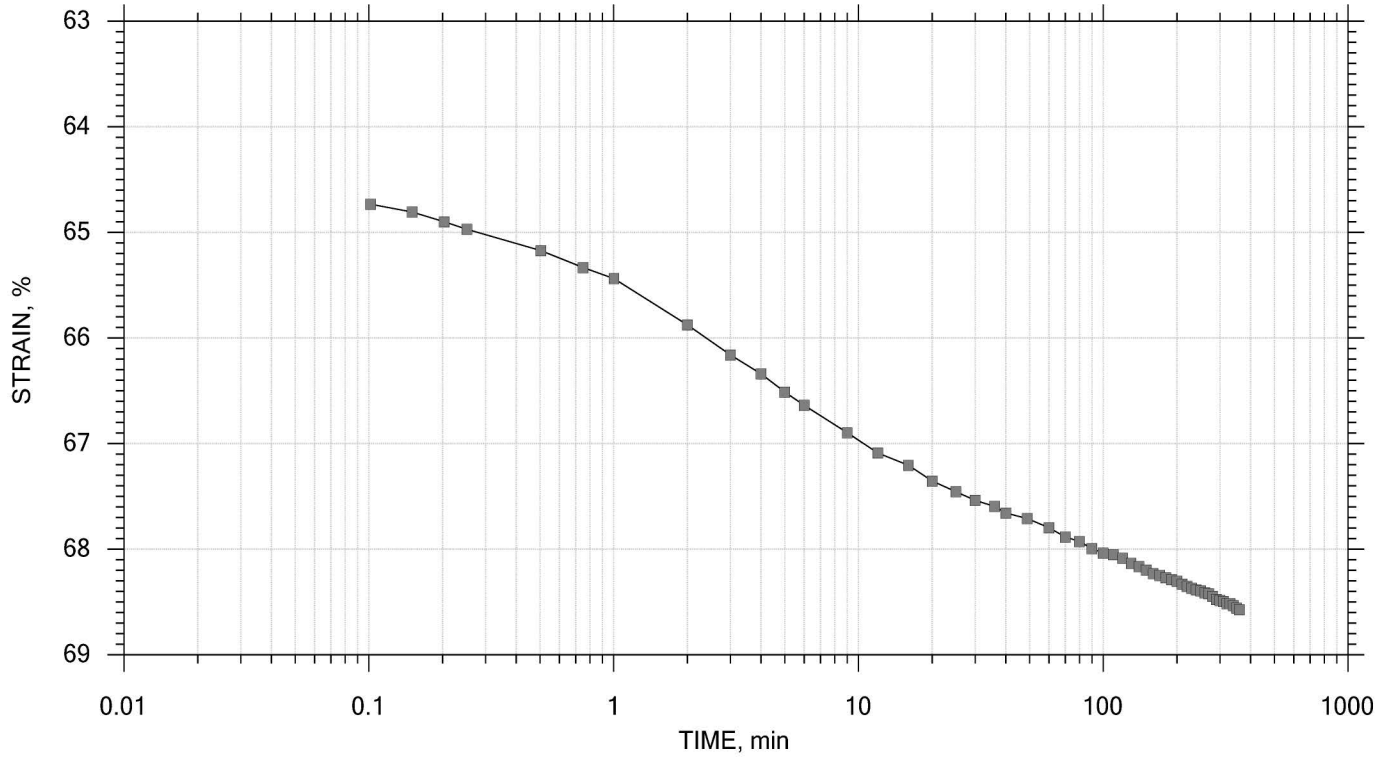
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



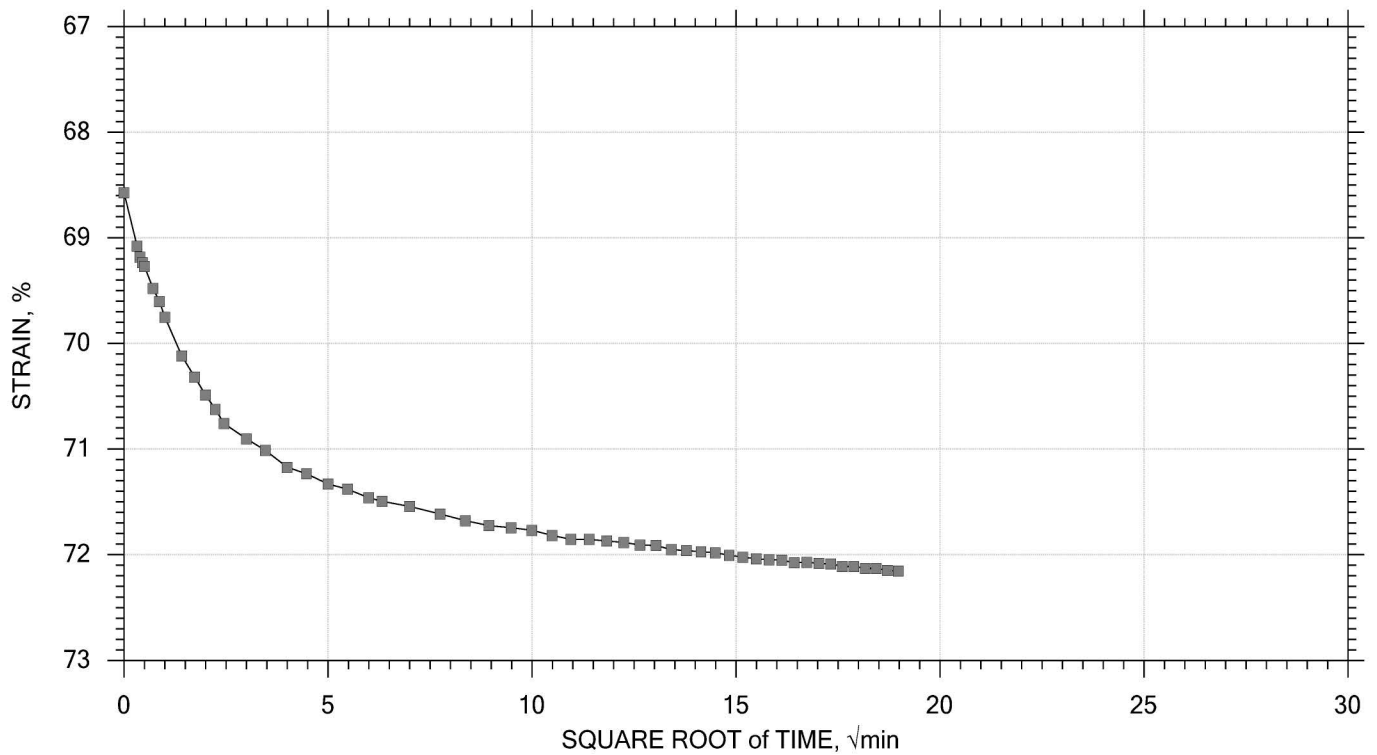
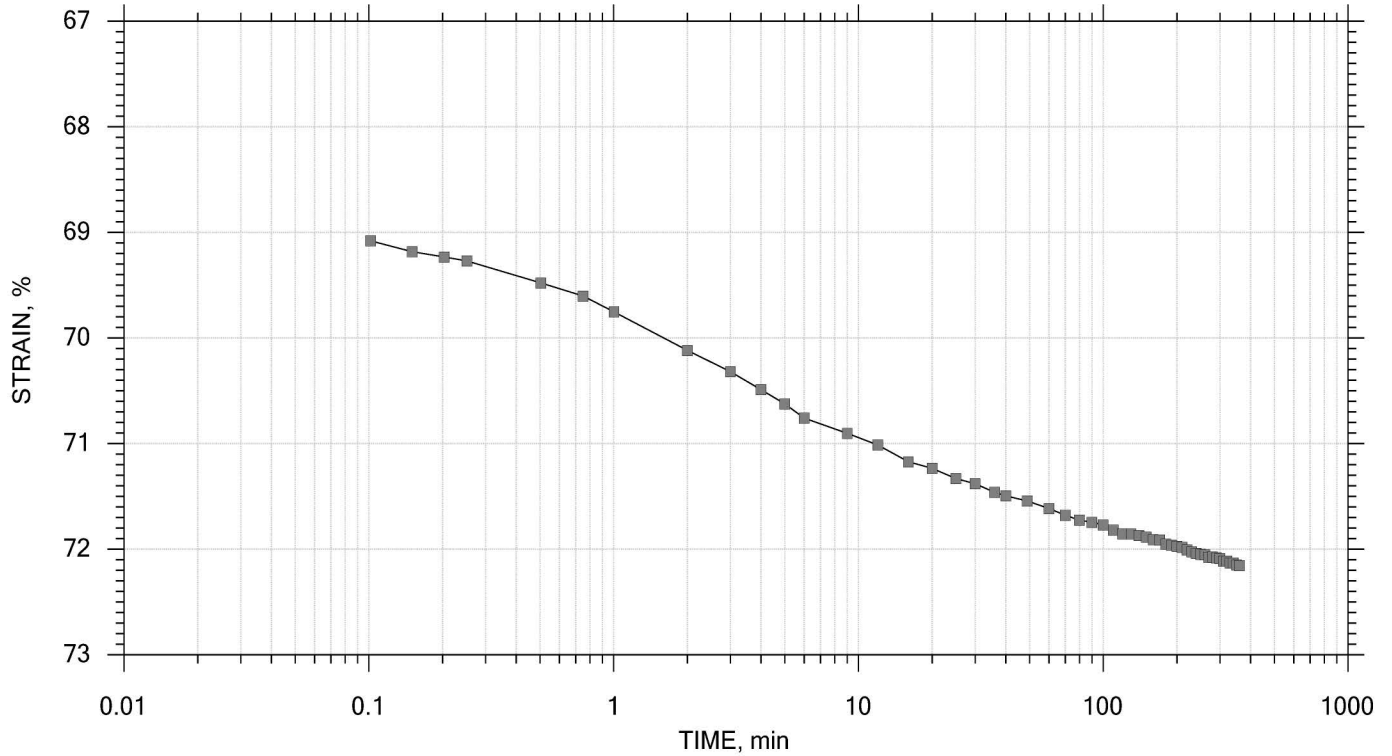
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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



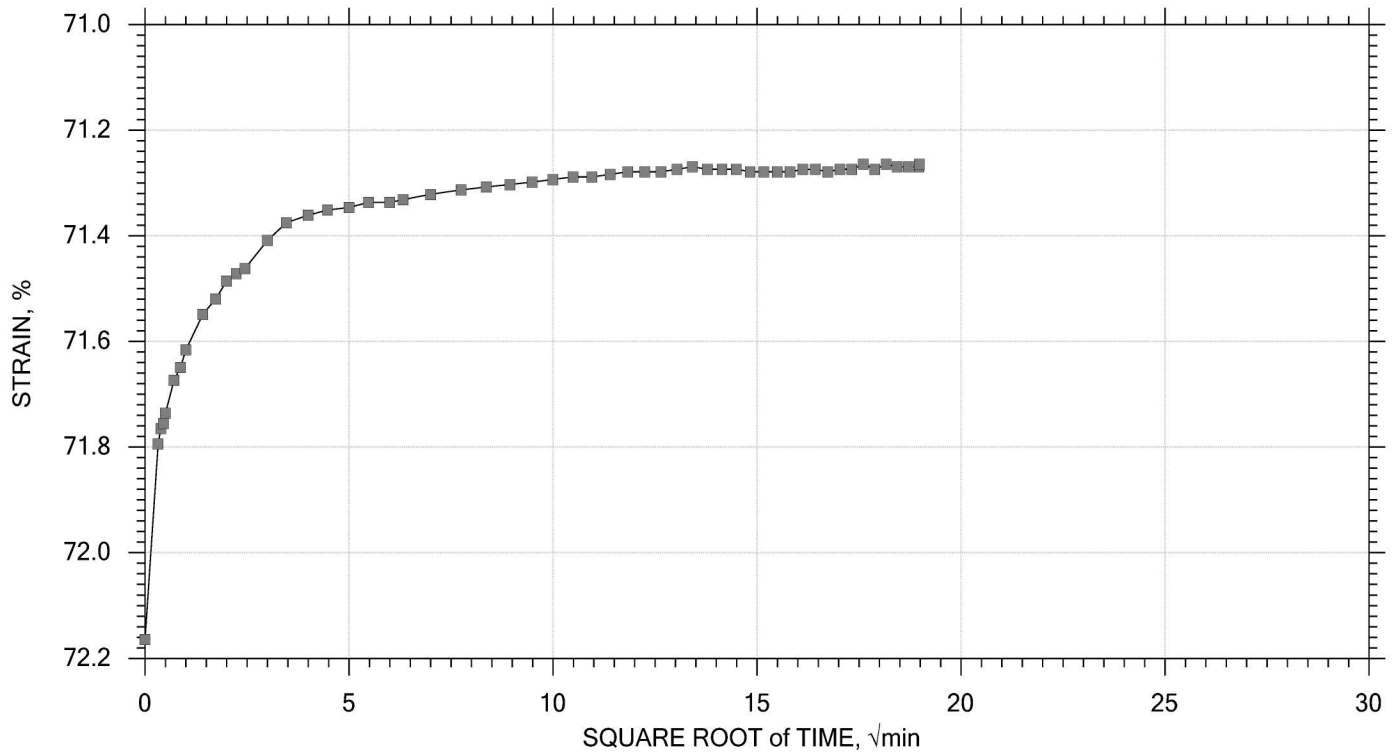
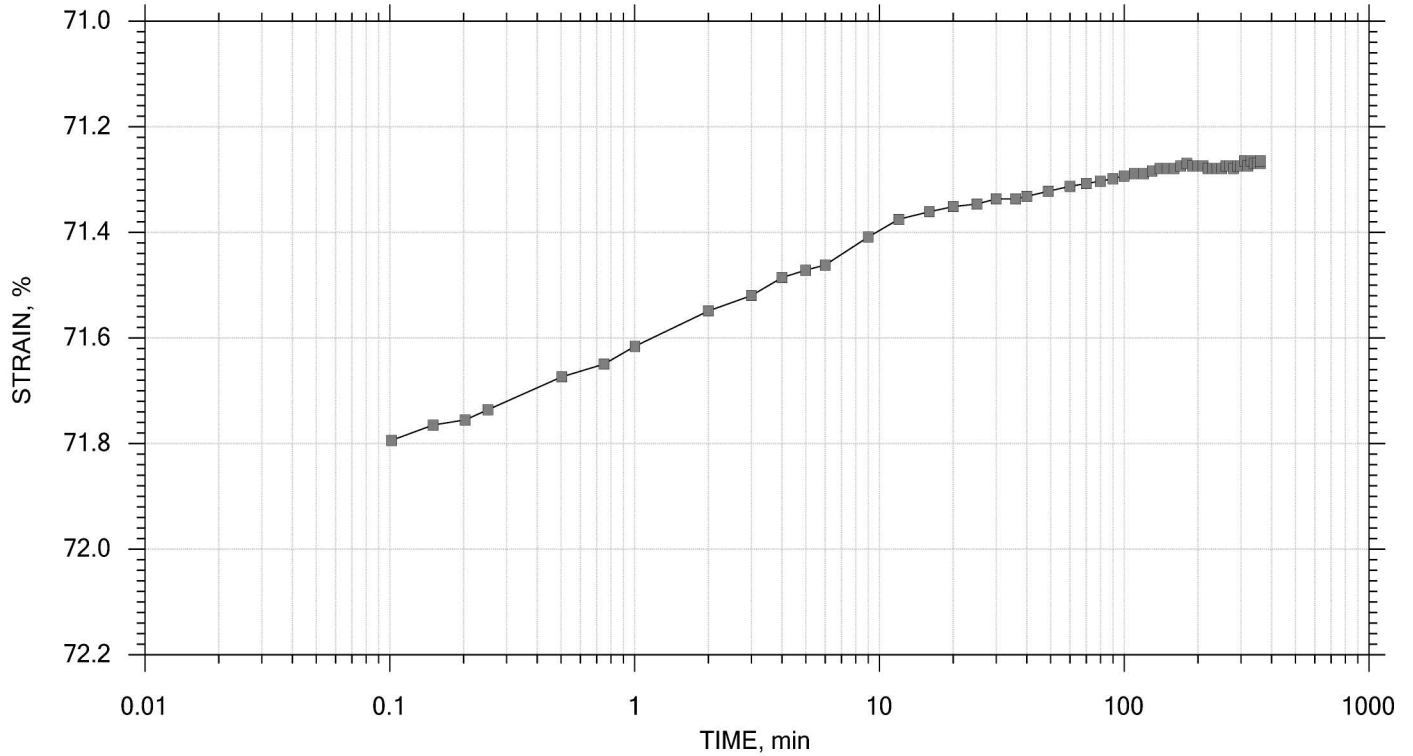
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | 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



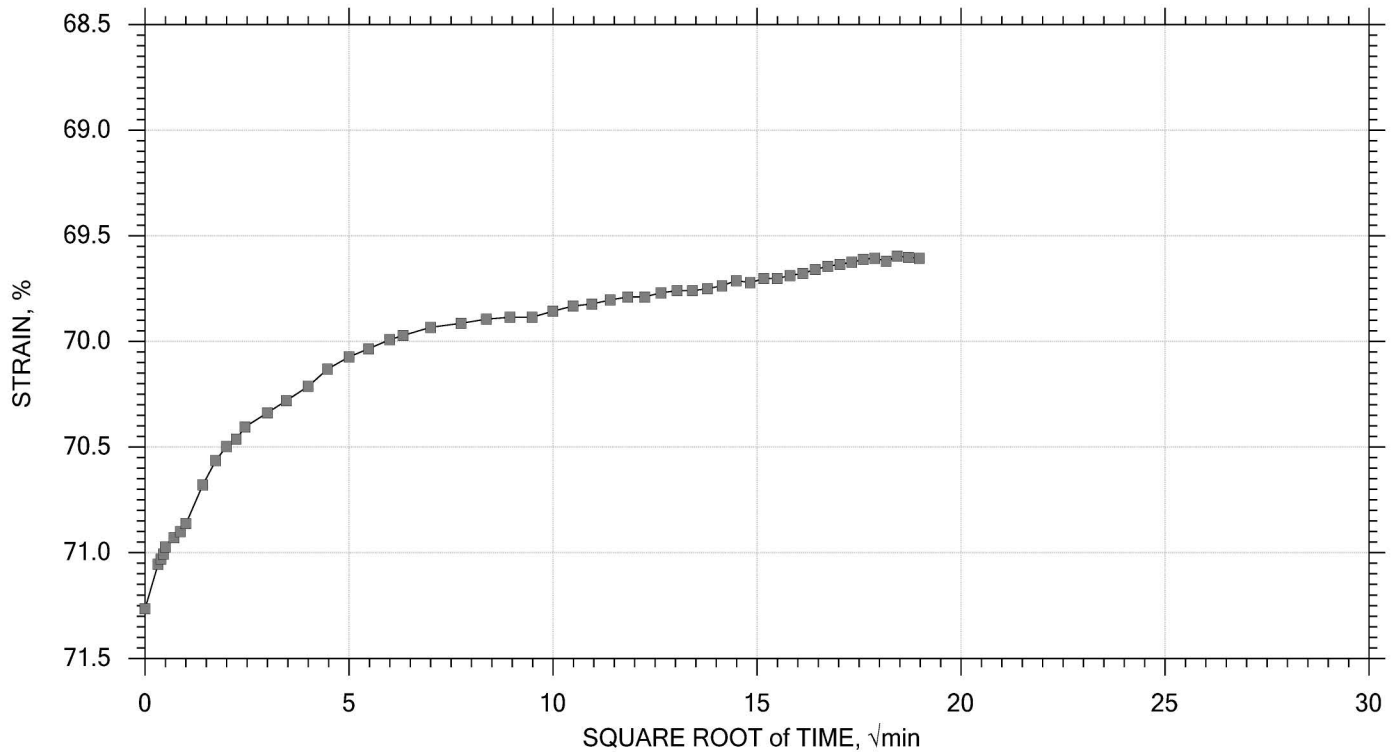
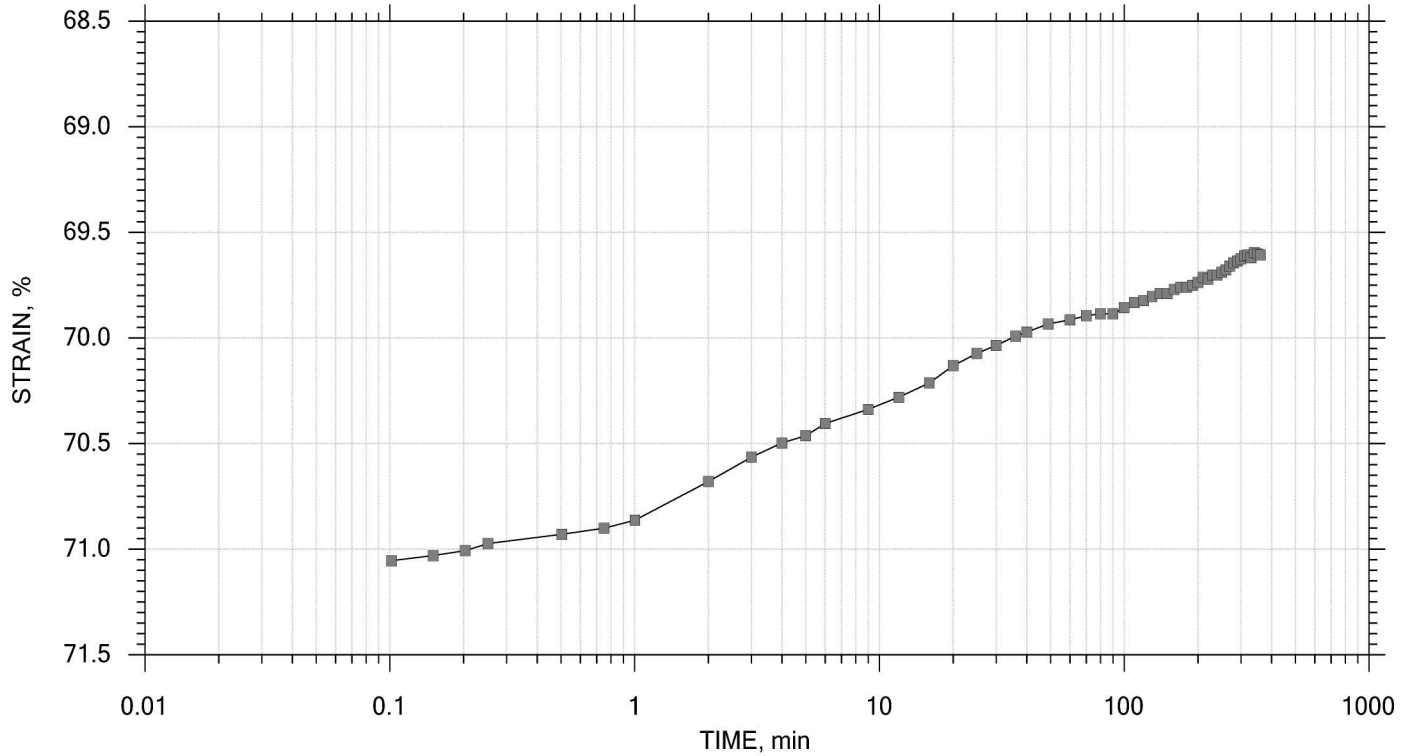
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | 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



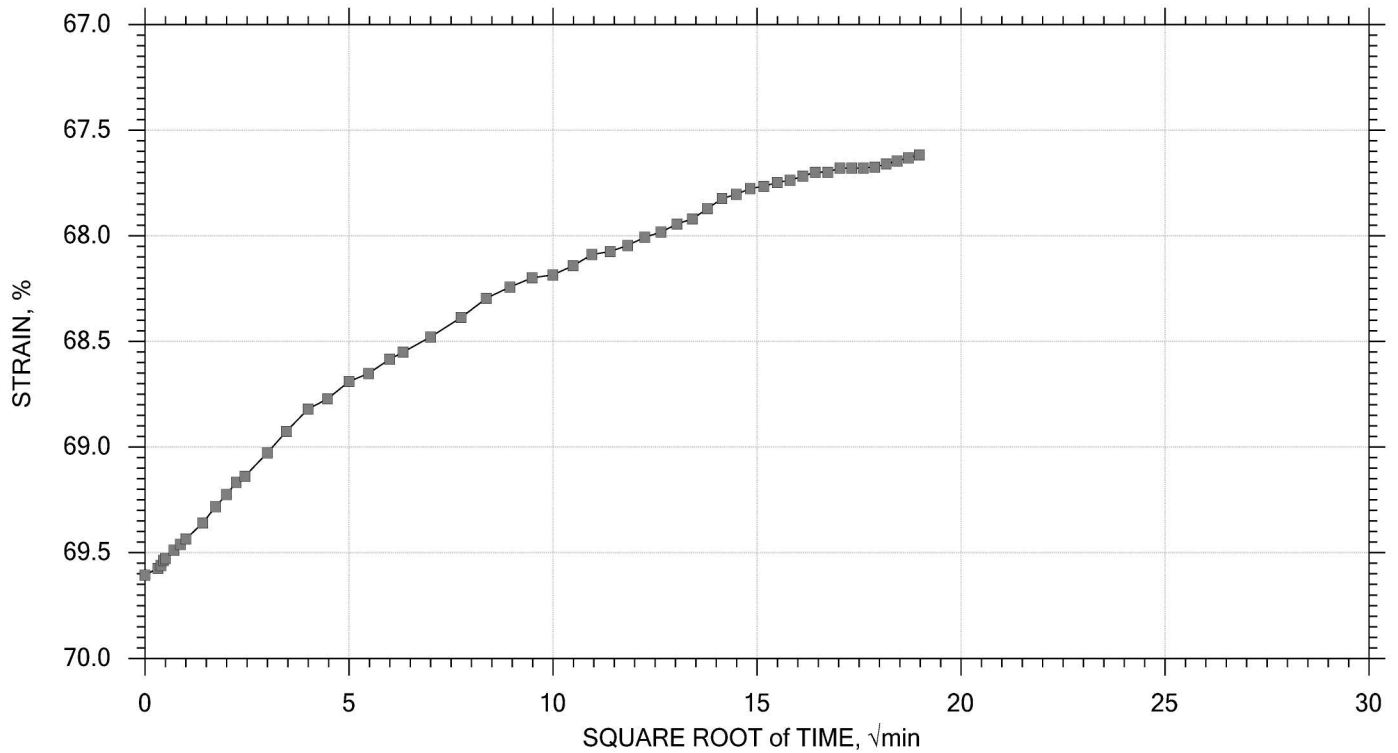
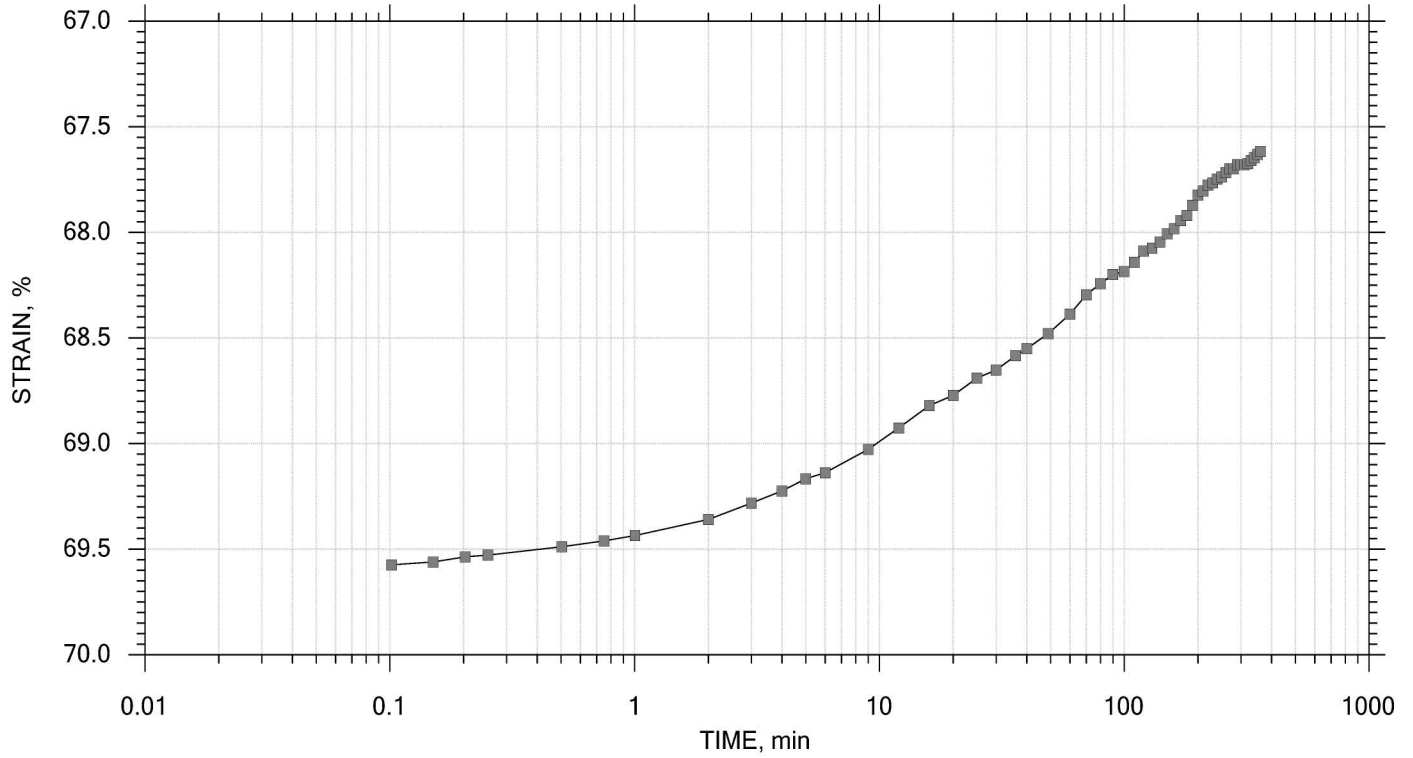
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | 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



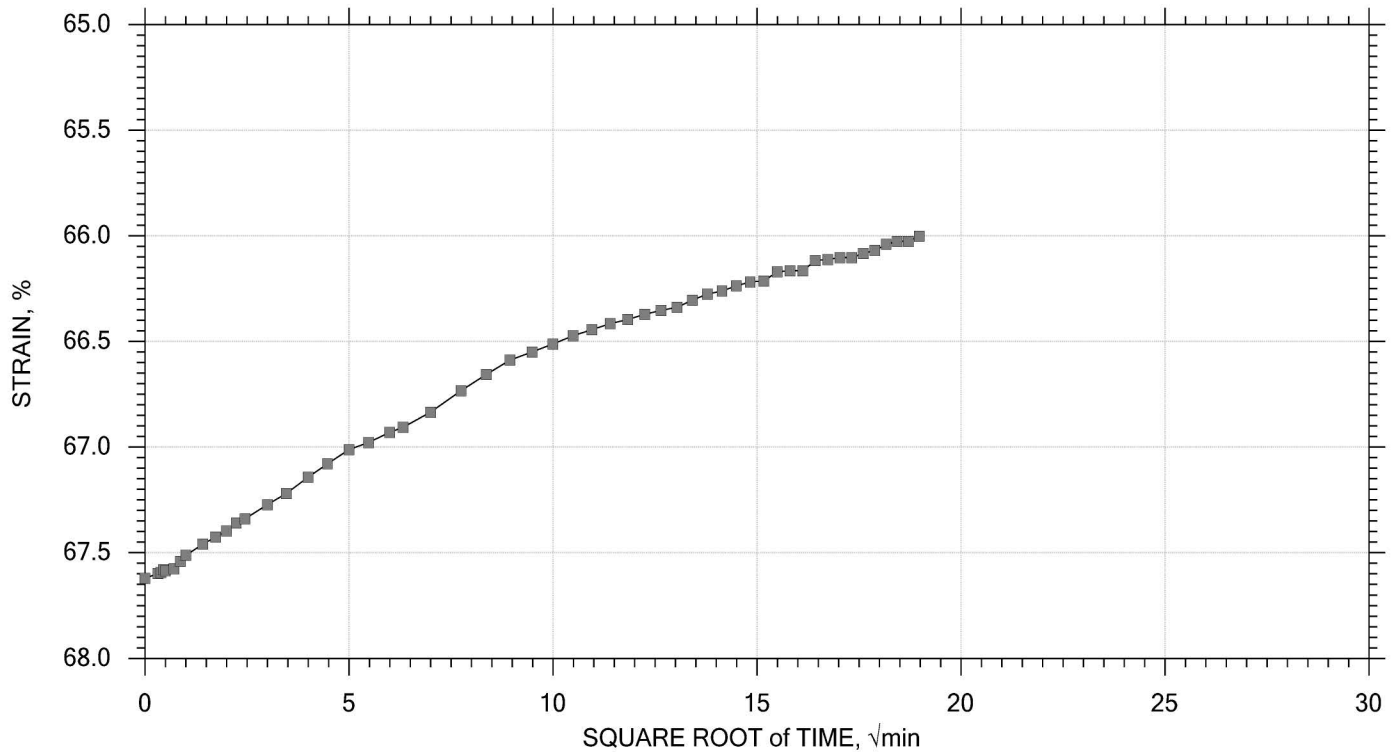
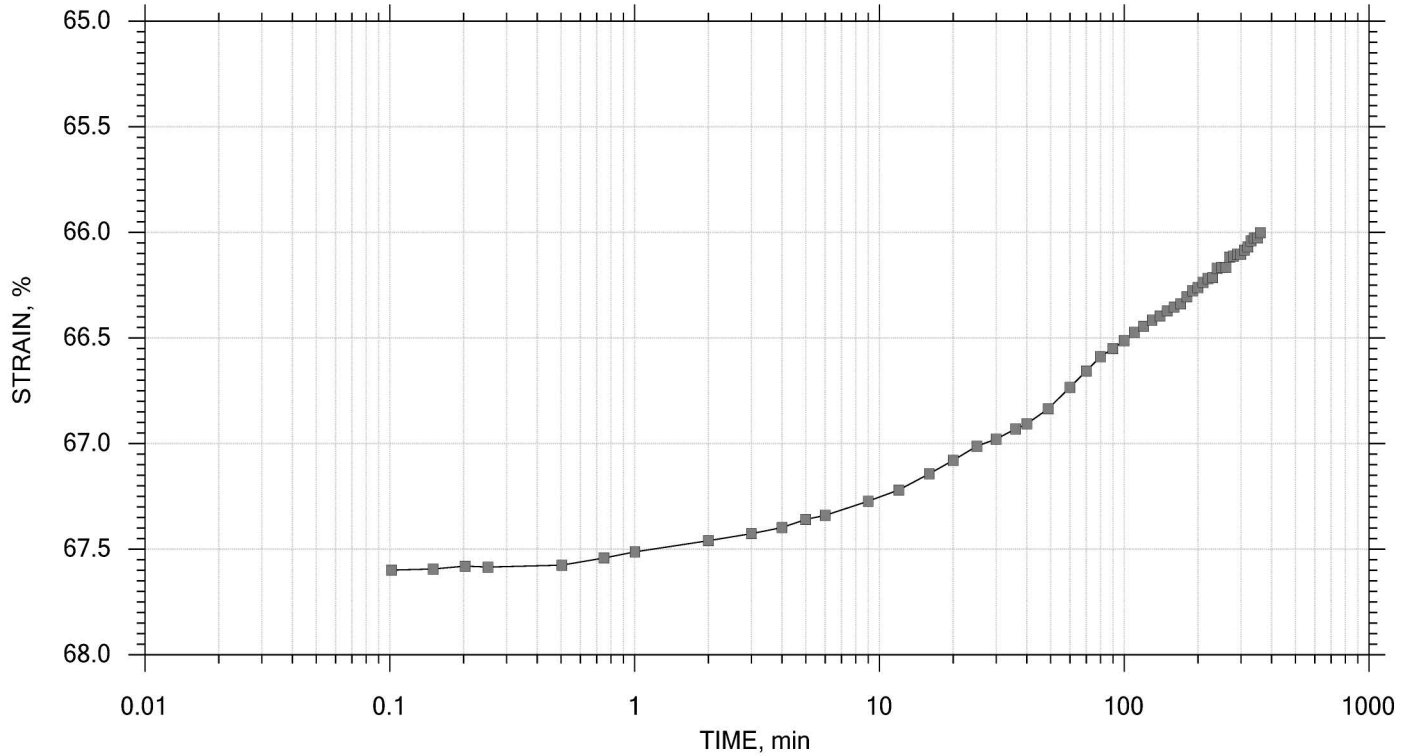
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | 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



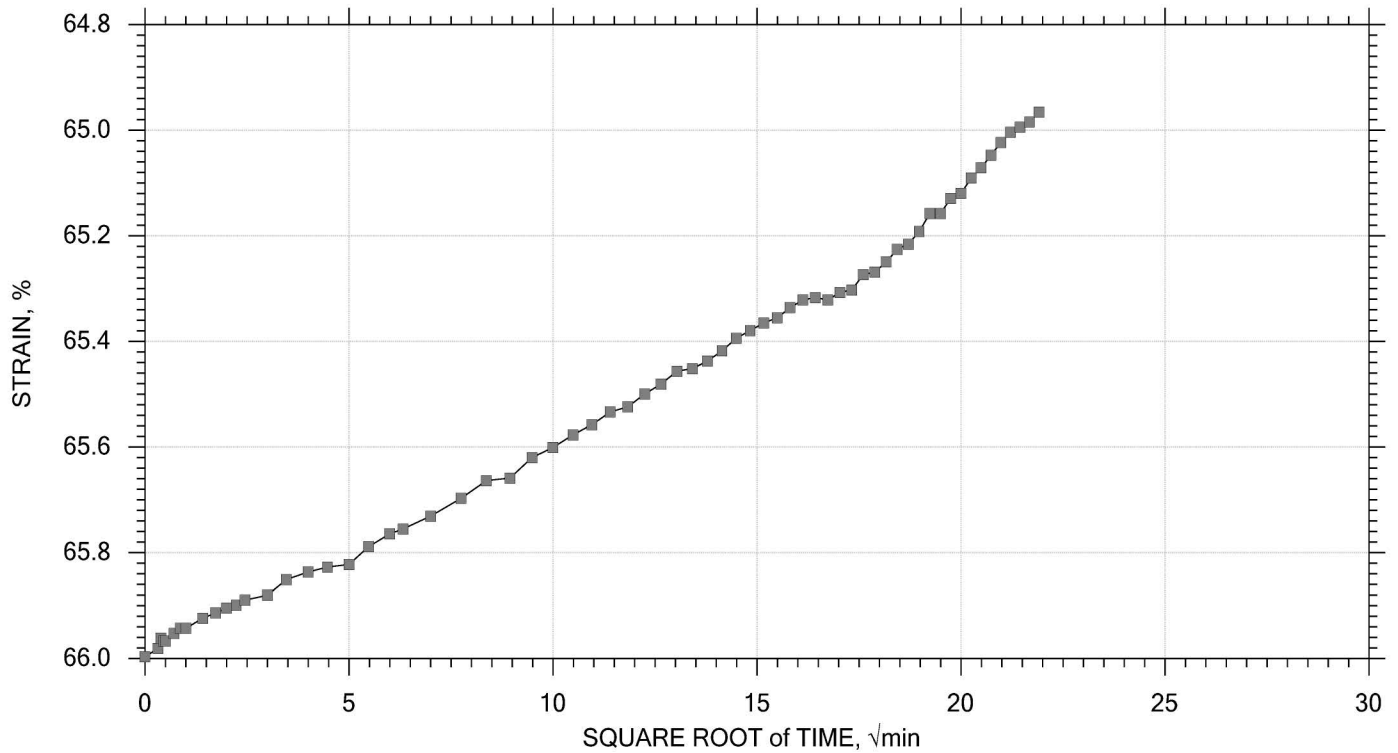
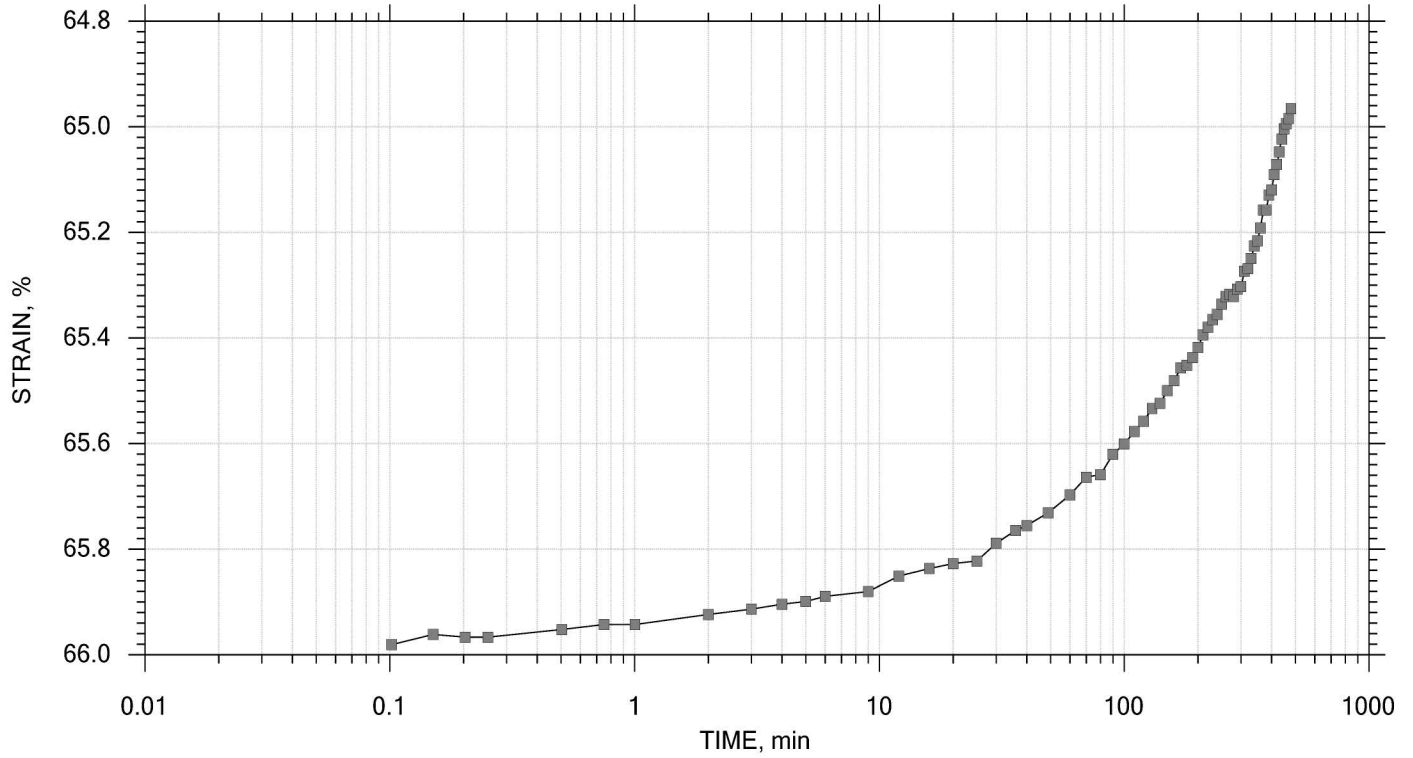
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002401 | Test Date: 11/13/17 | Test No.: IP-2 |
| | Depth: 0.0-0.5 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

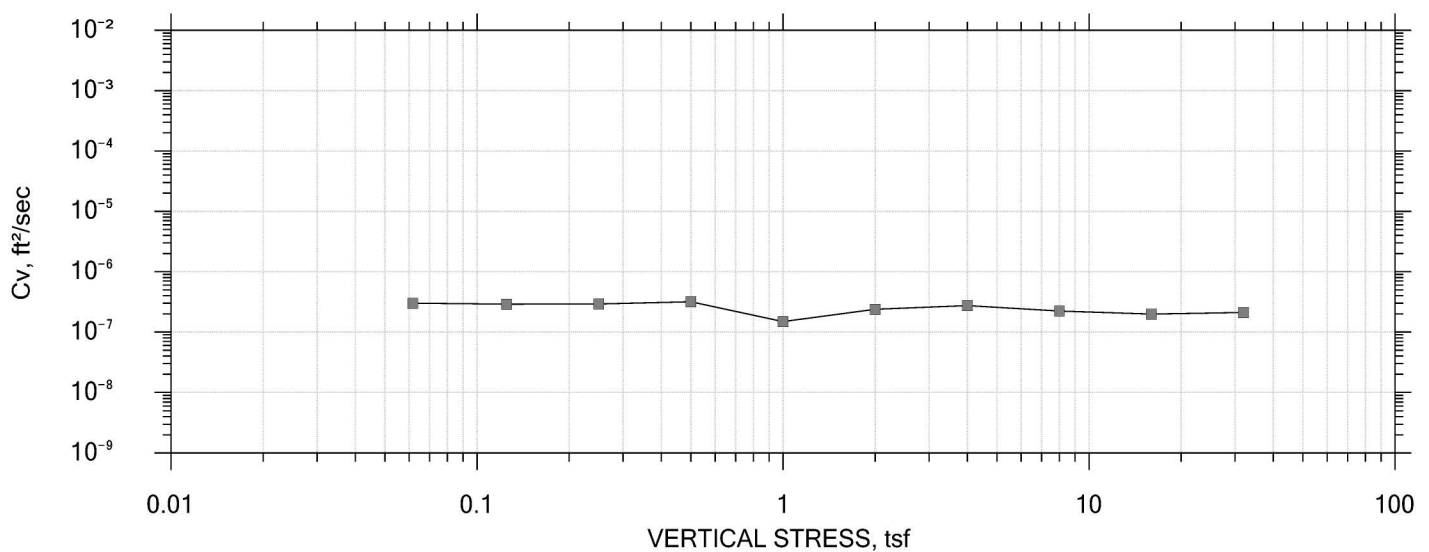
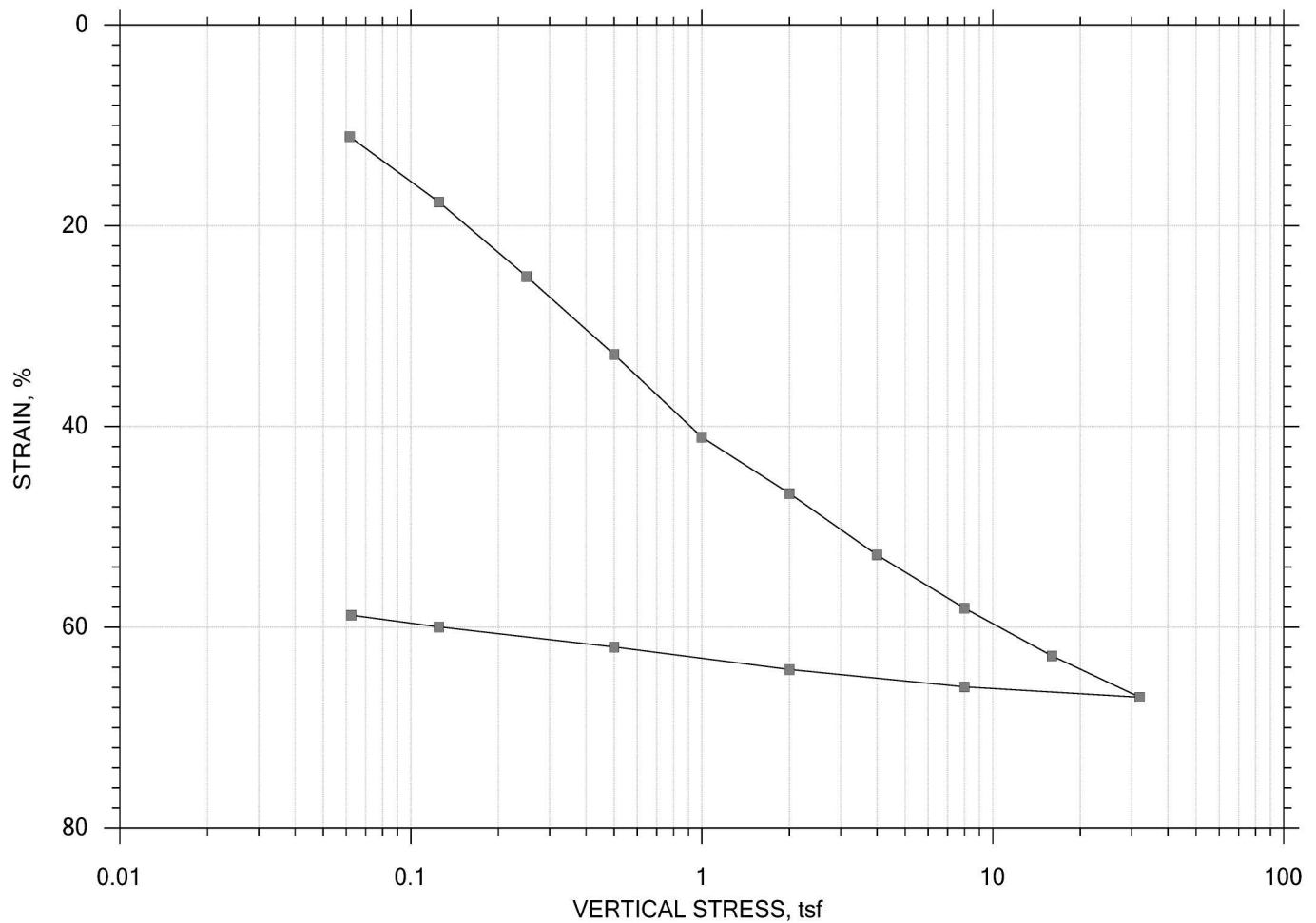
Stress: 0.0625 tsf




| | | | |
|--|--|---------------------------|-------------------------|
|  | 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

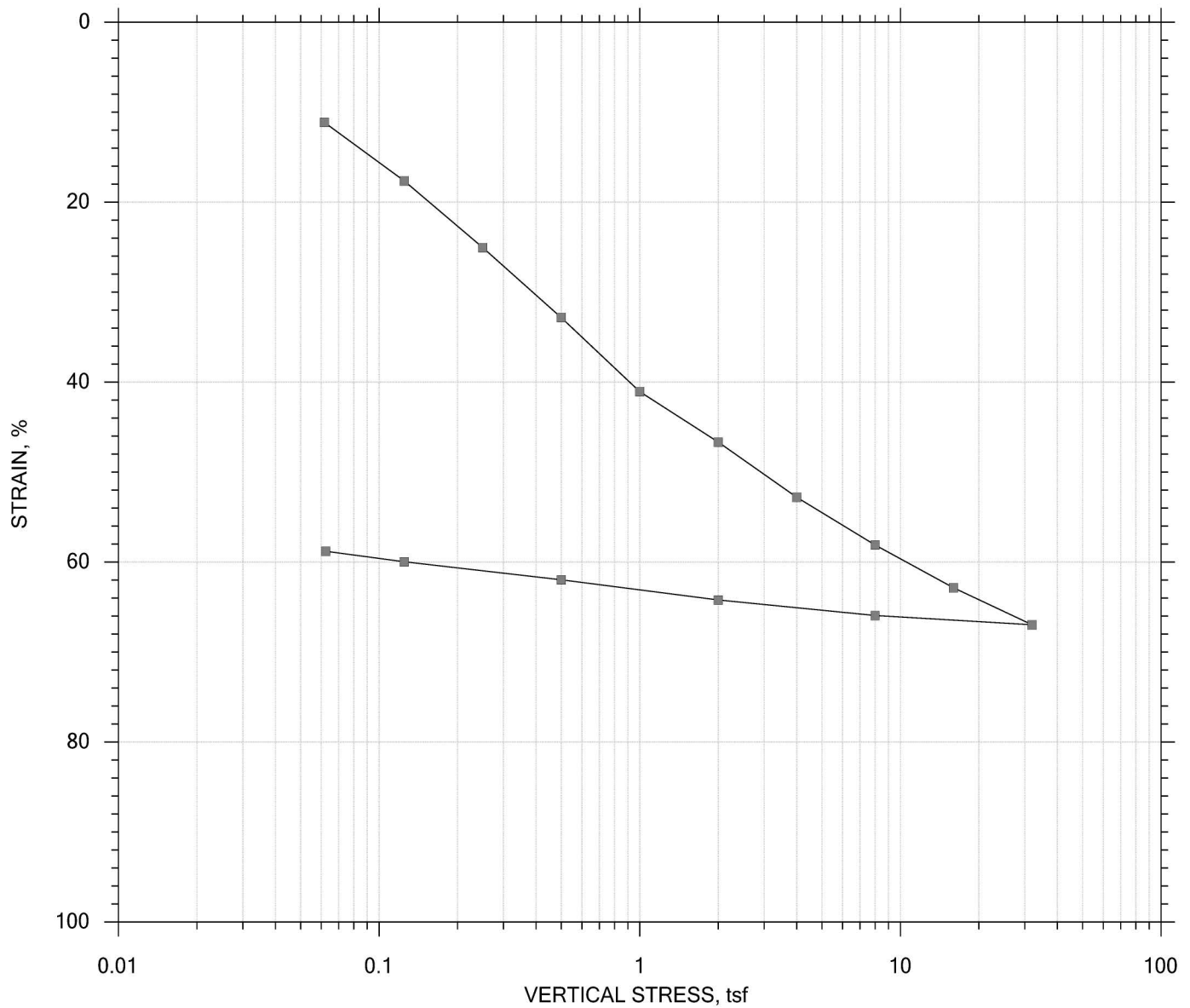
SUMMARY REPORT




| | | | |
|--|--|---------------------------|-------------------------|
|  | 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 | | | |

| | | | | |
|--|--|--|---------------------------|-------------------------|
|  | 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 ft ² /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 |

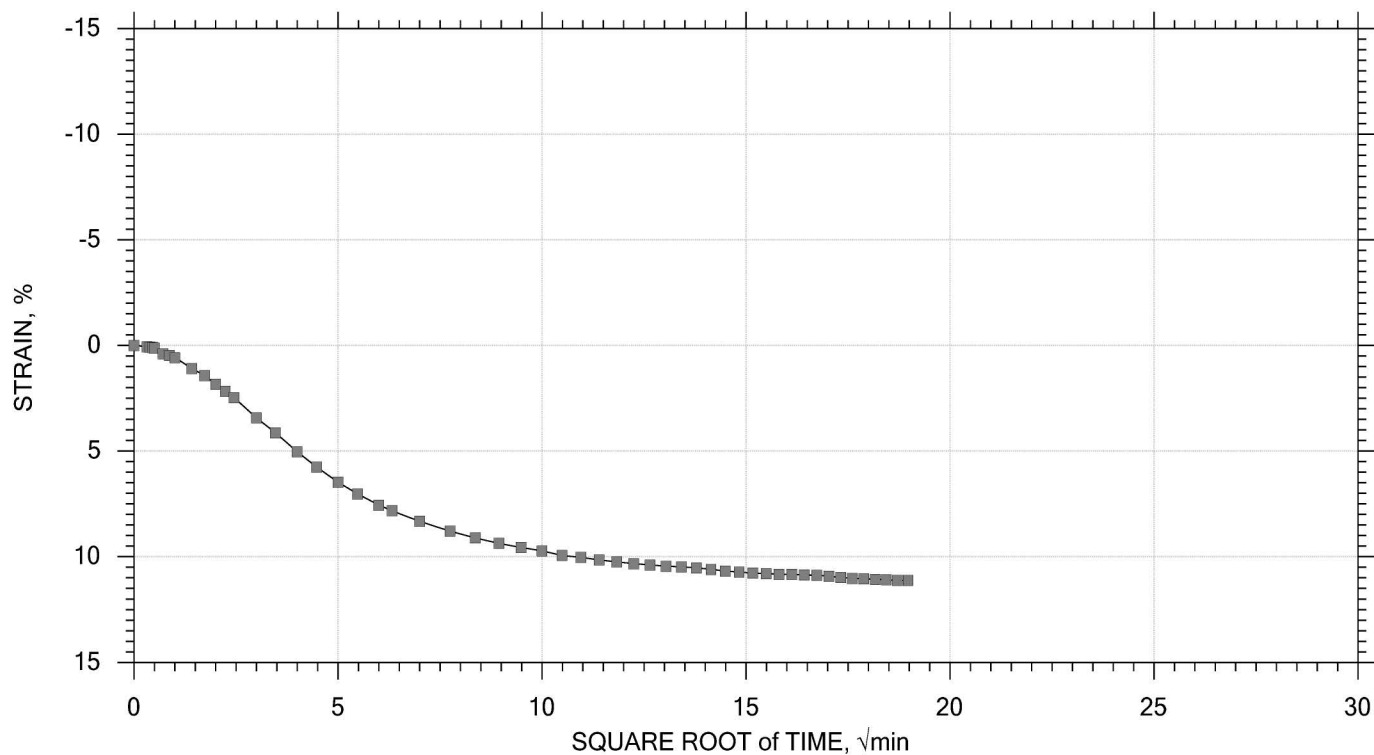
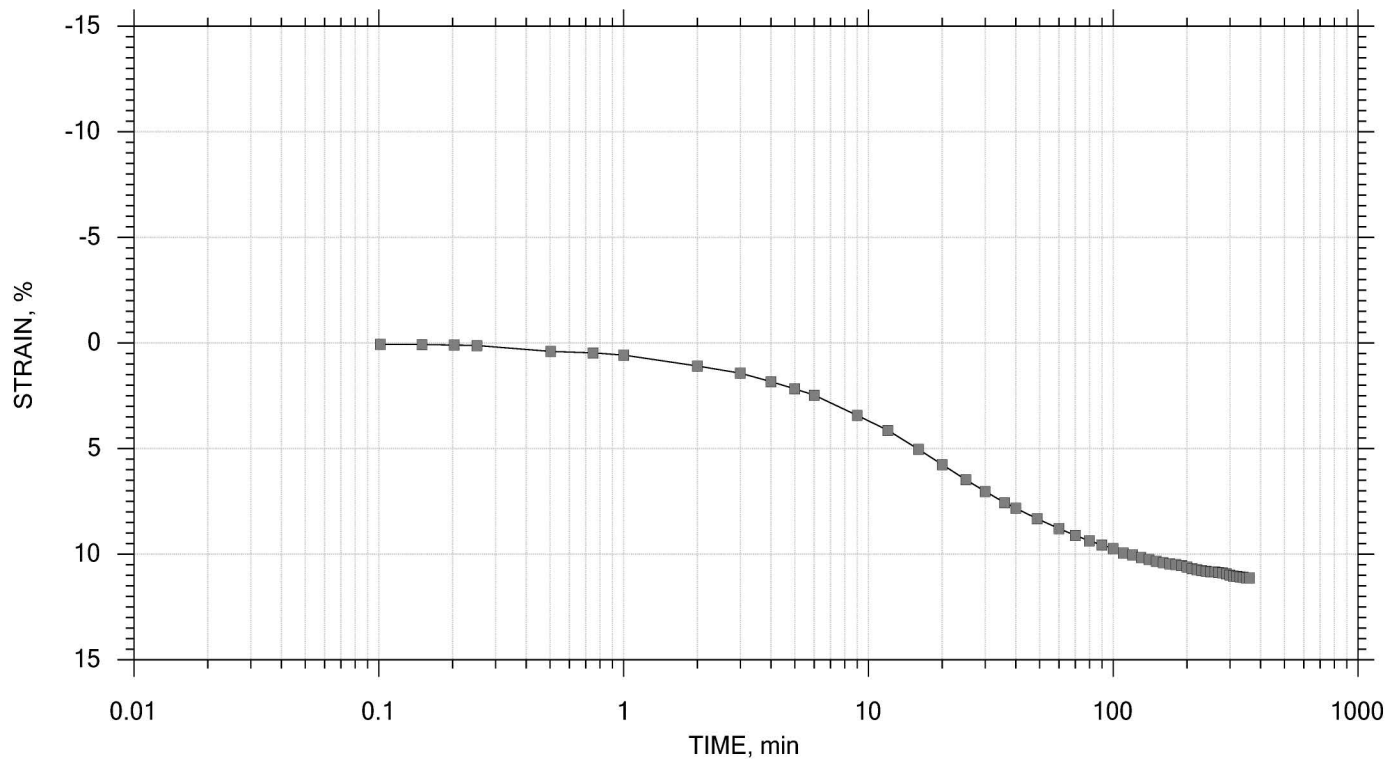
| | Applied Stress tsf | Final Displacement in | Void Ratio | Strain at End % | Log T50 min | Cv ft ² /sec | Mv 1/tsf | k ft/day | Ca % |
|----|--------------------------|-----------------------------|---------------|-----------------------|-------------------|----------------------------|-------------|-------------|-----------|
| 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



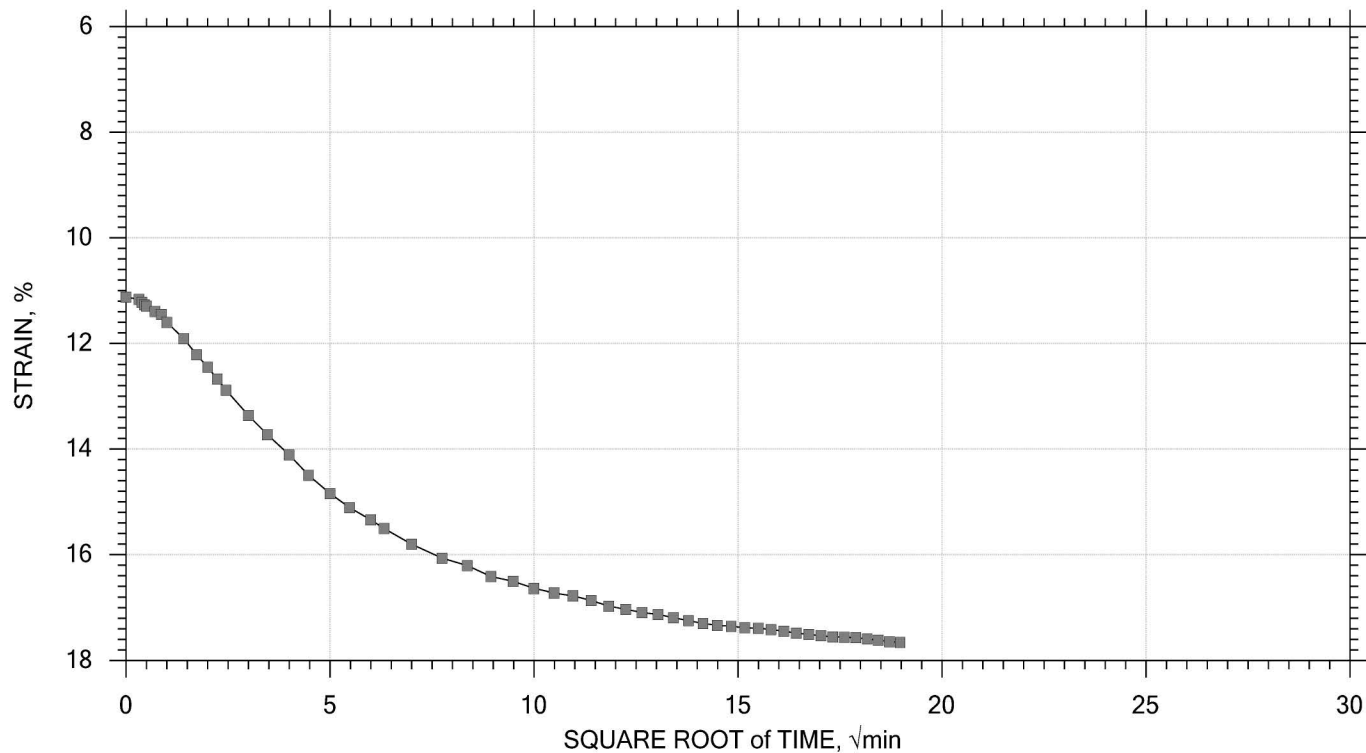
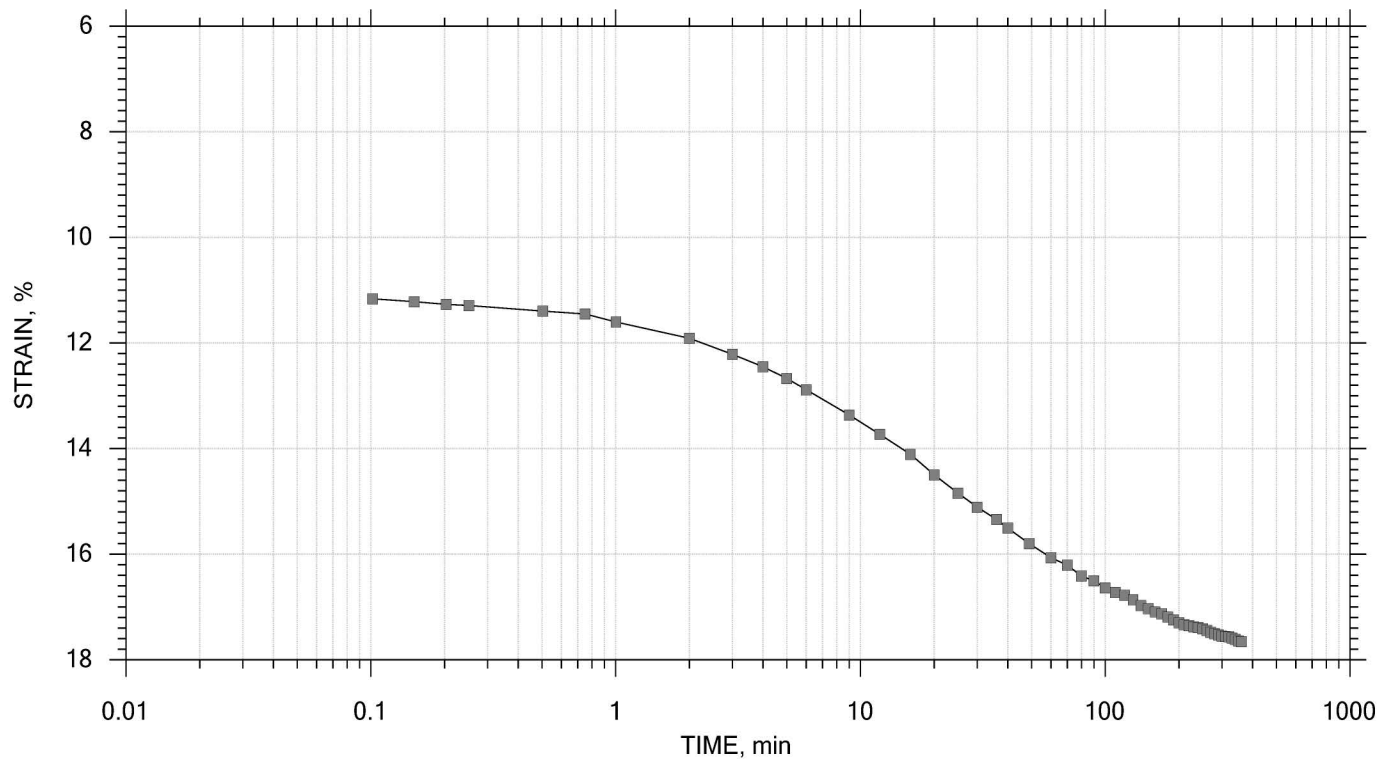
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | 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



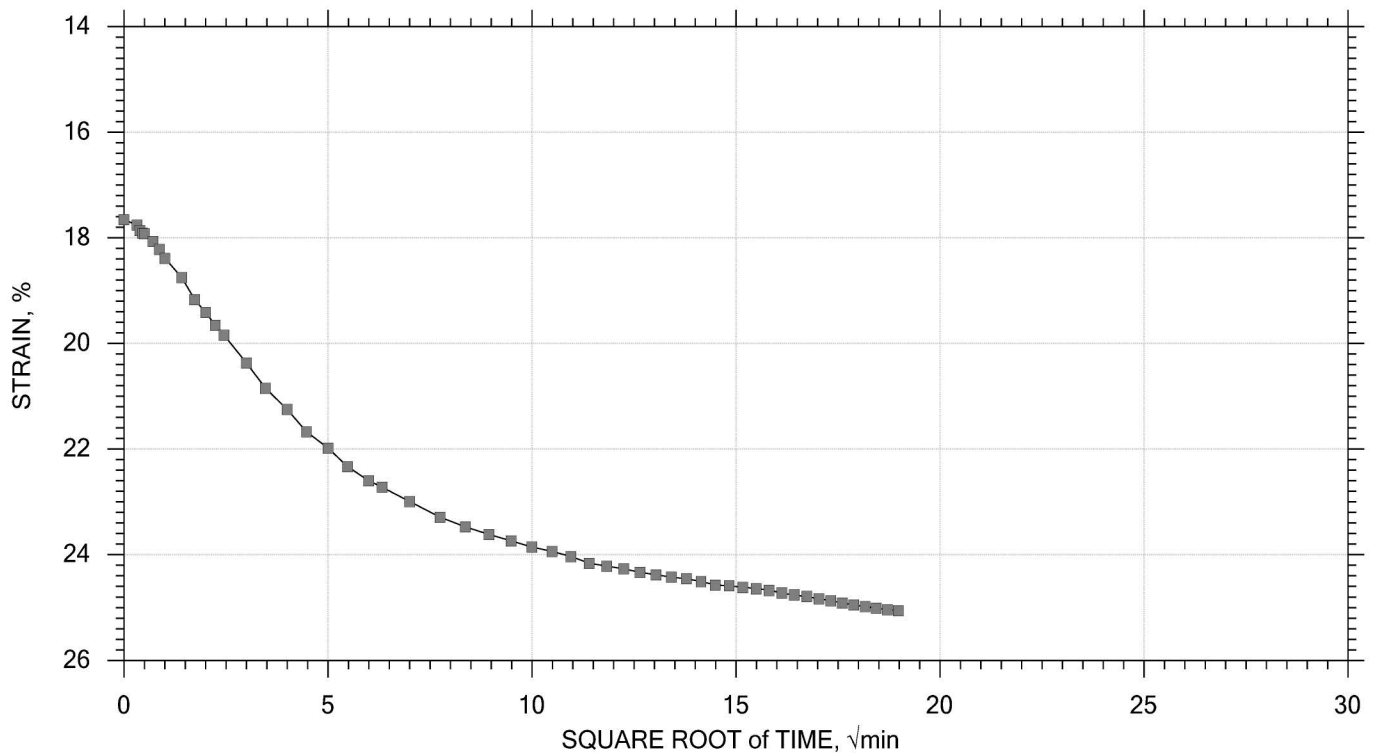
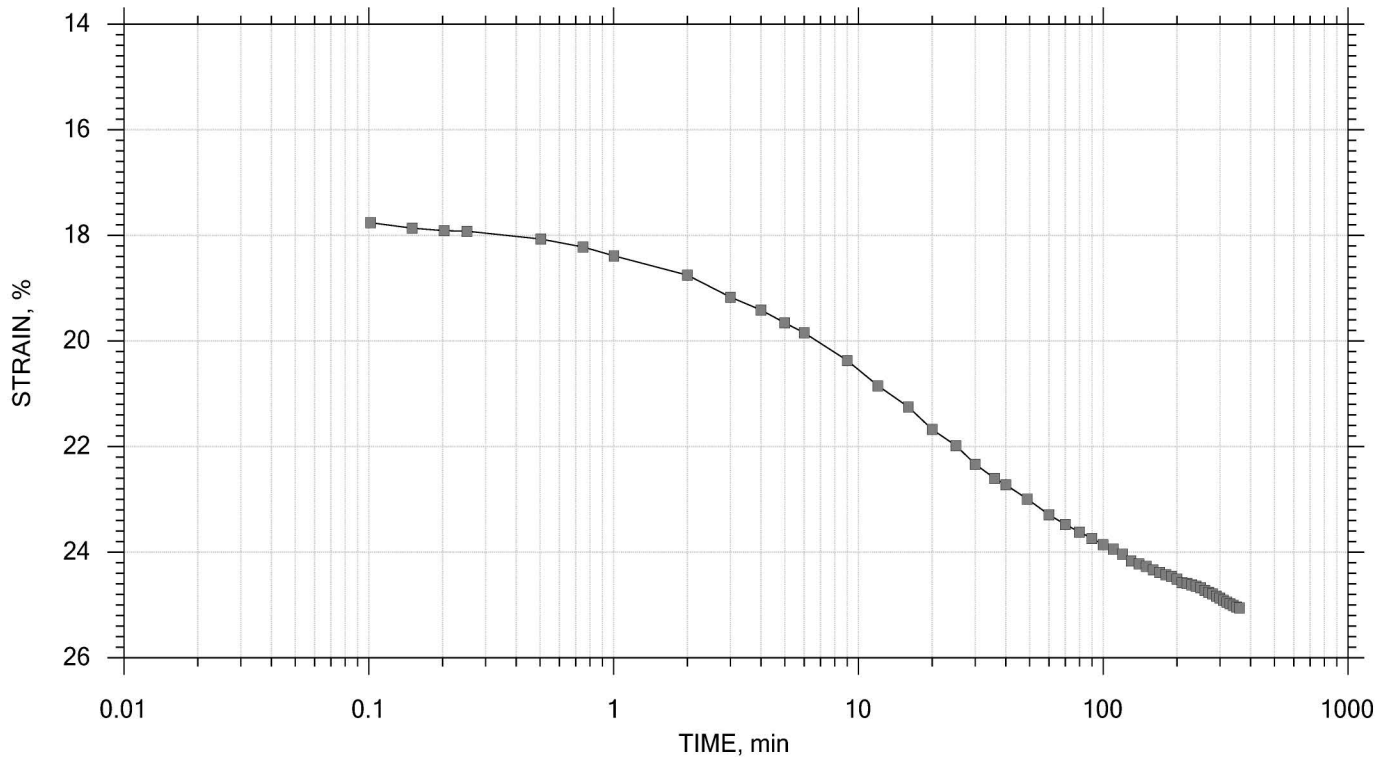
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|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | 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



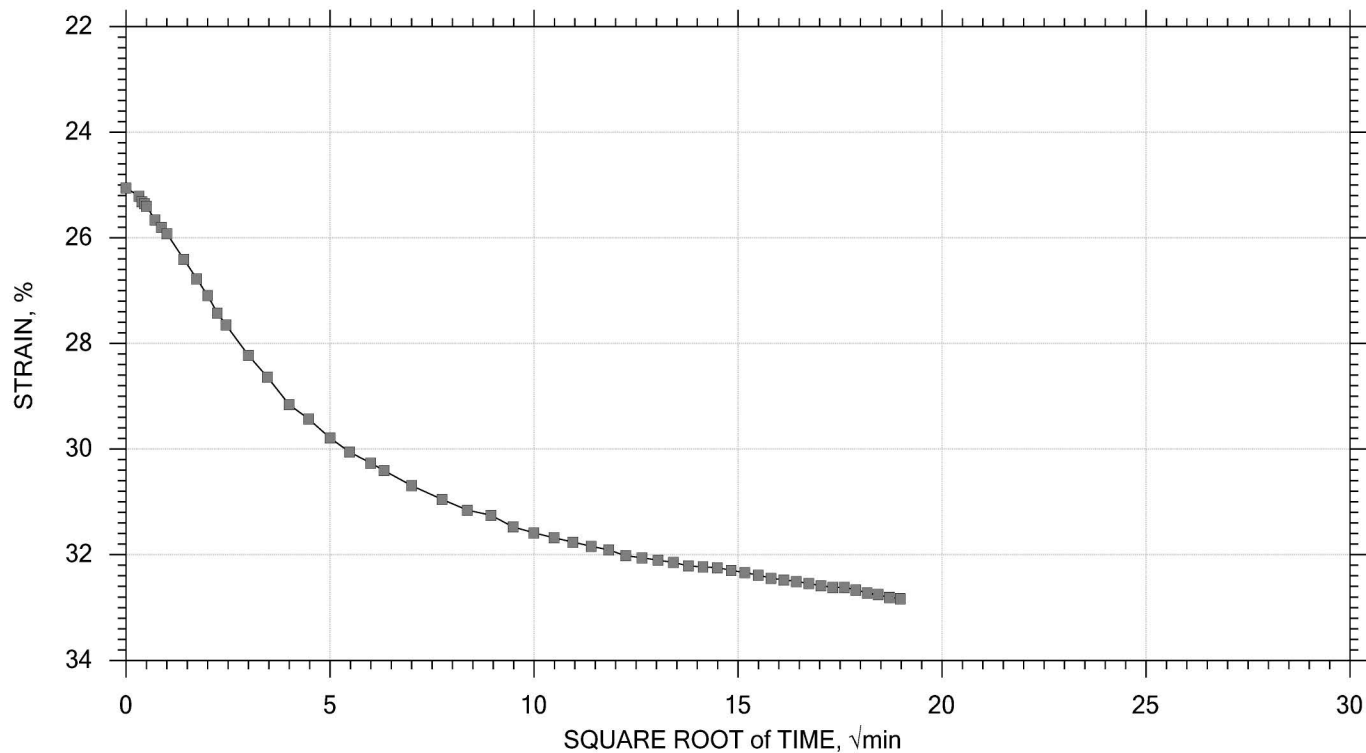
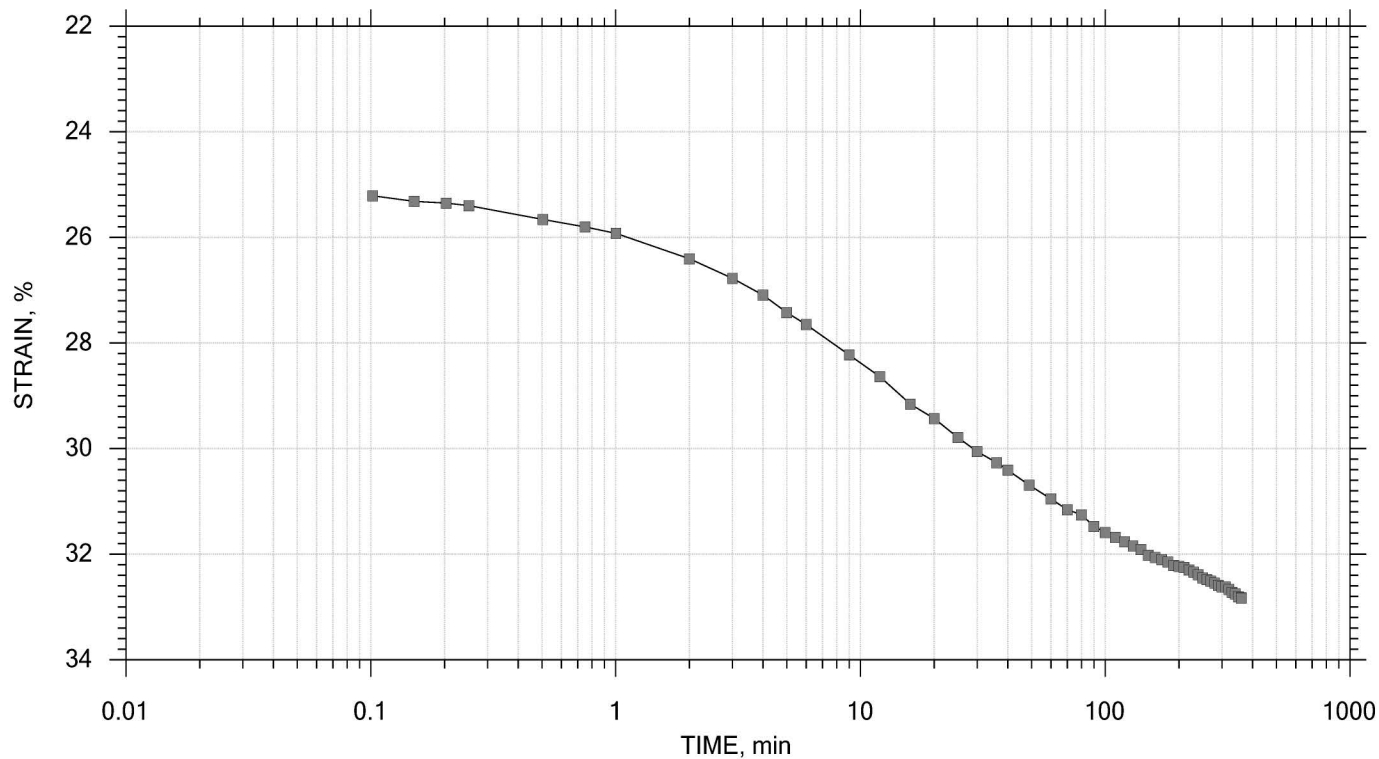
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



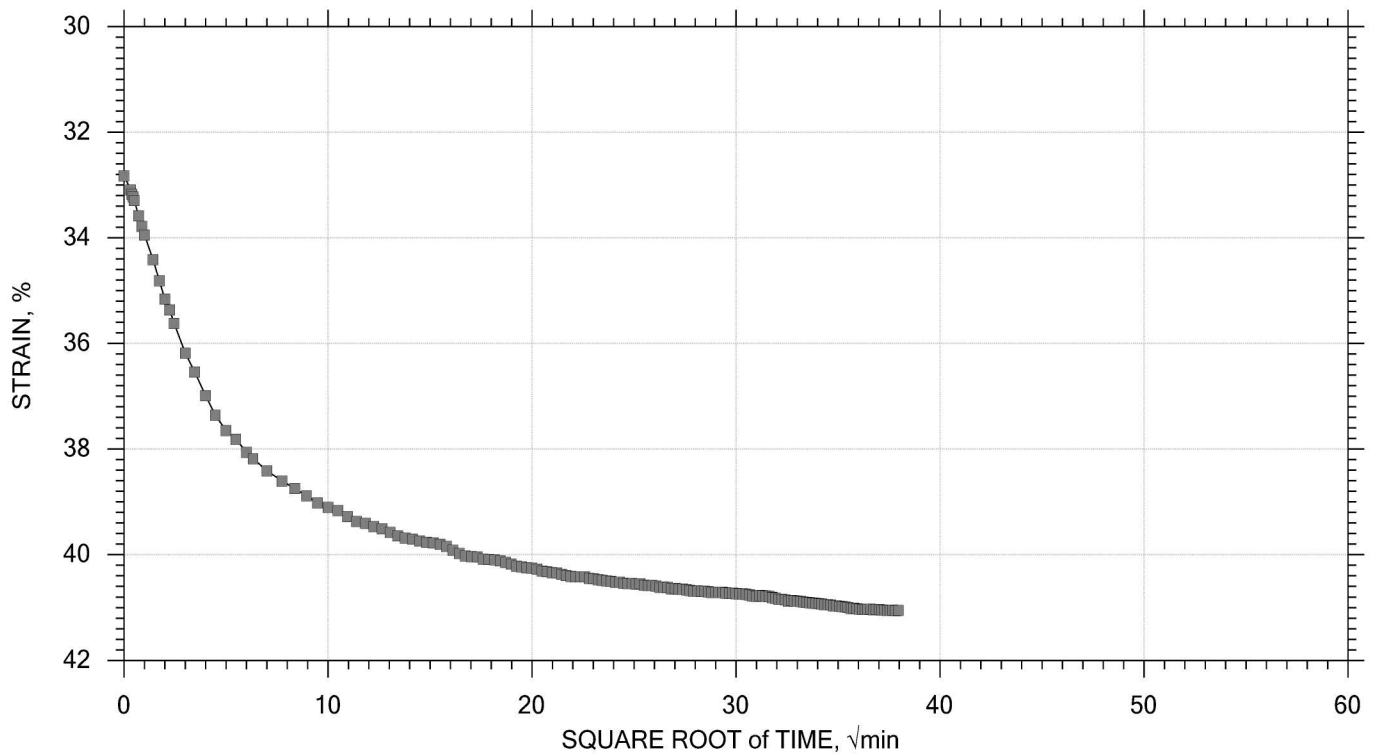
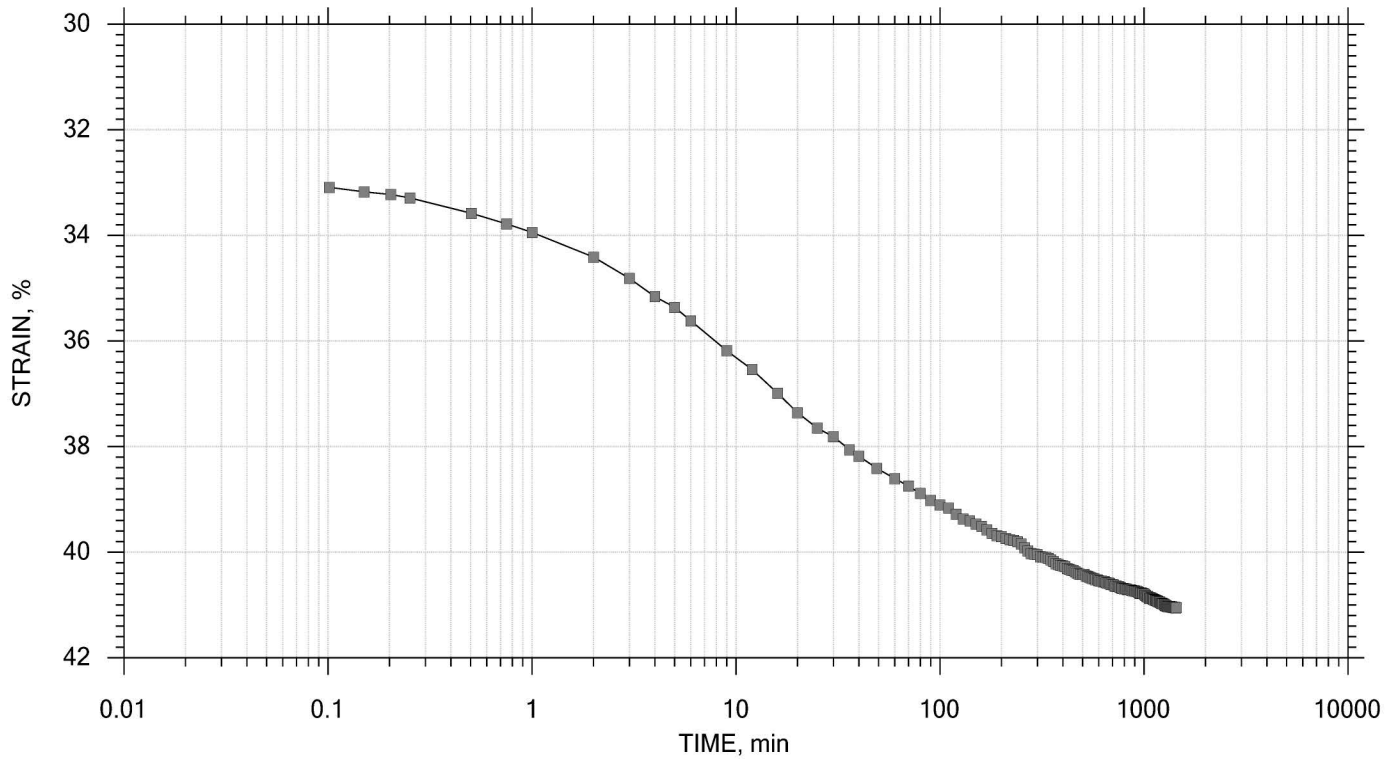
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



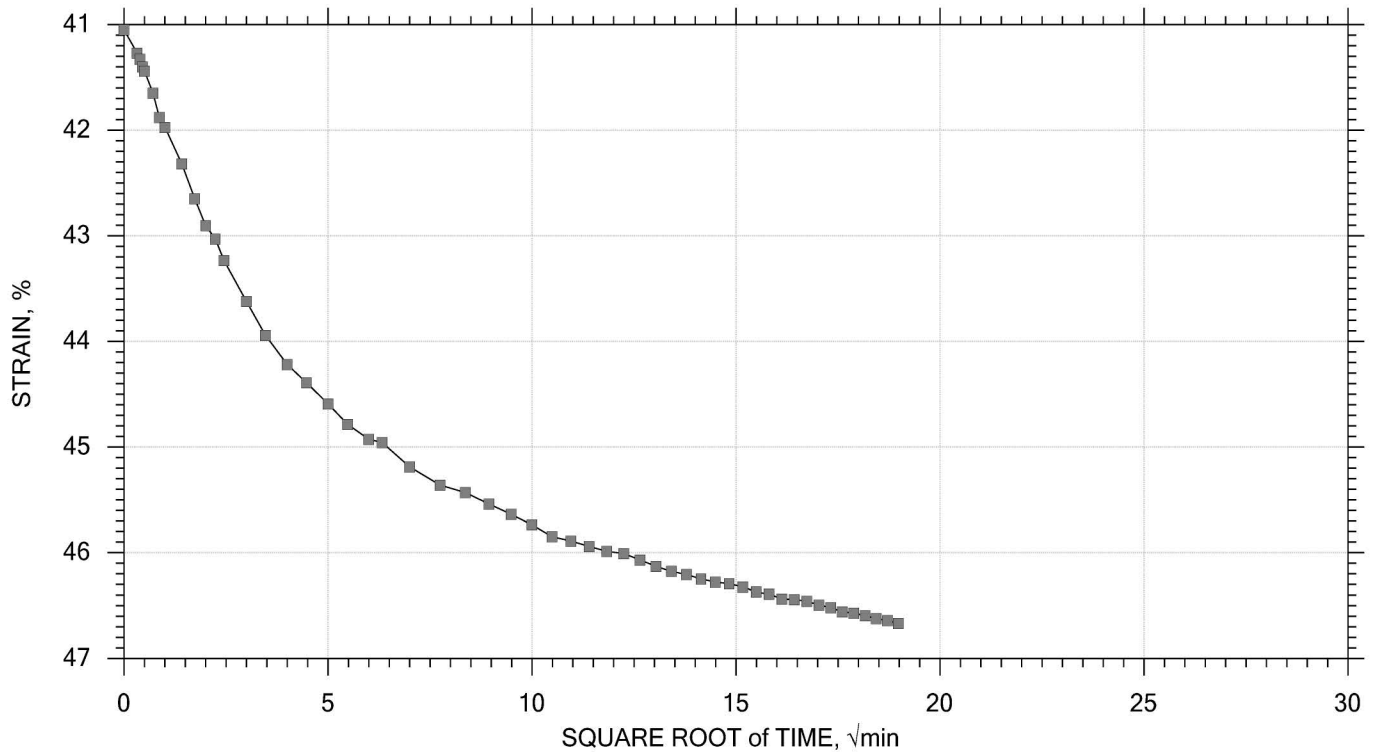
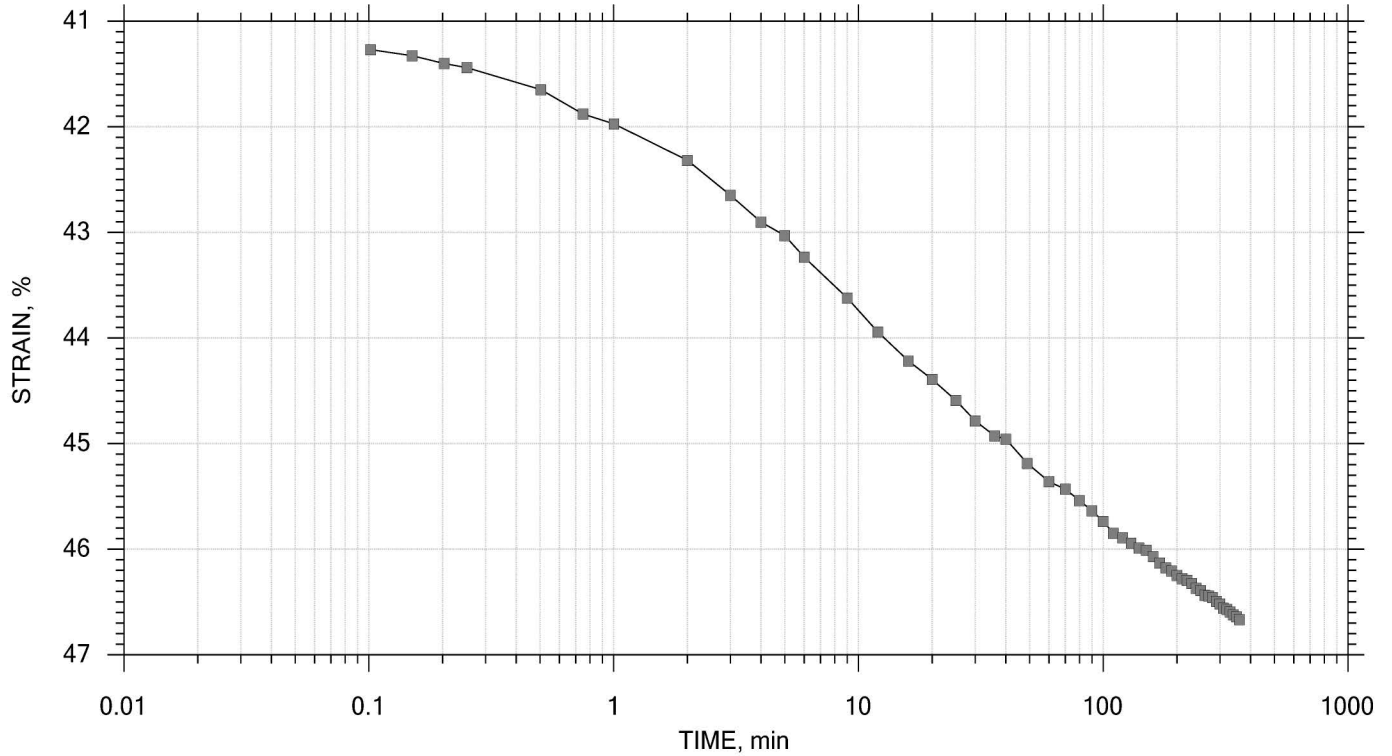
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



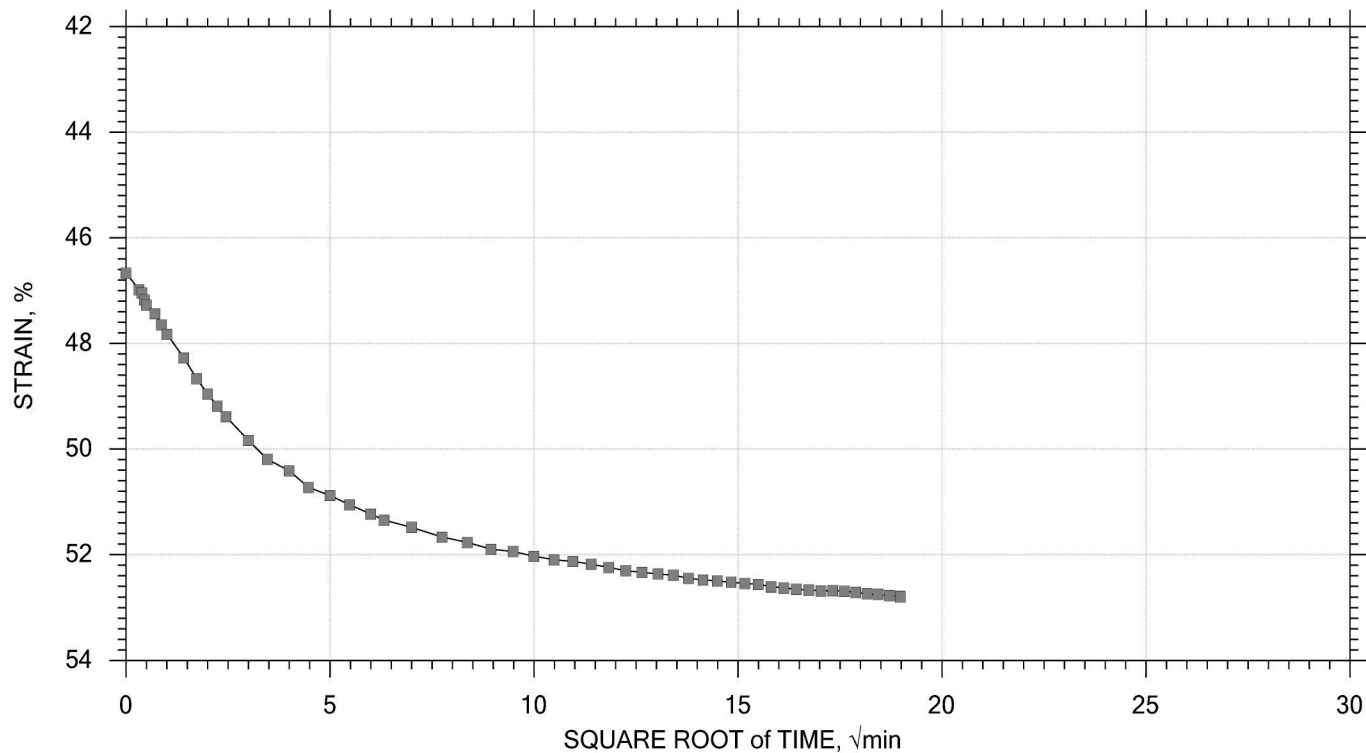
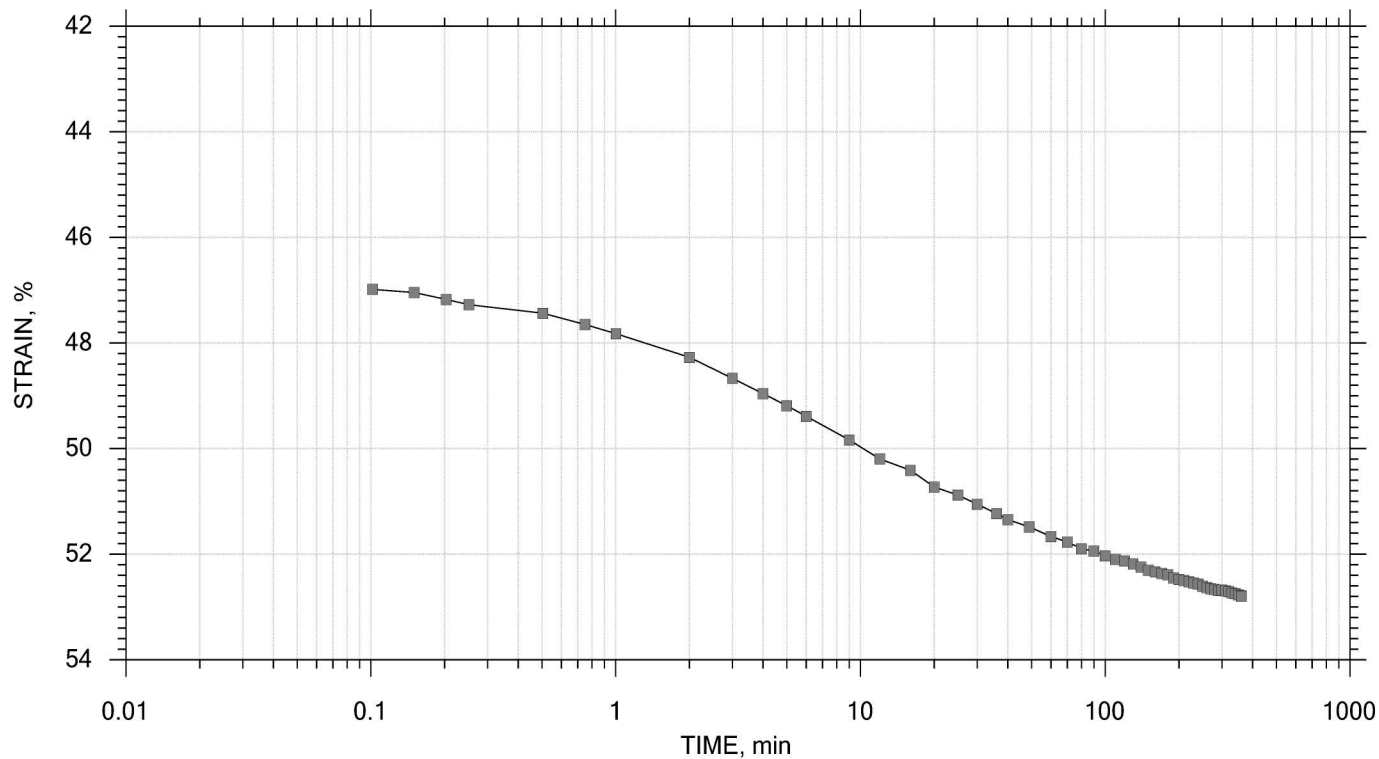
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



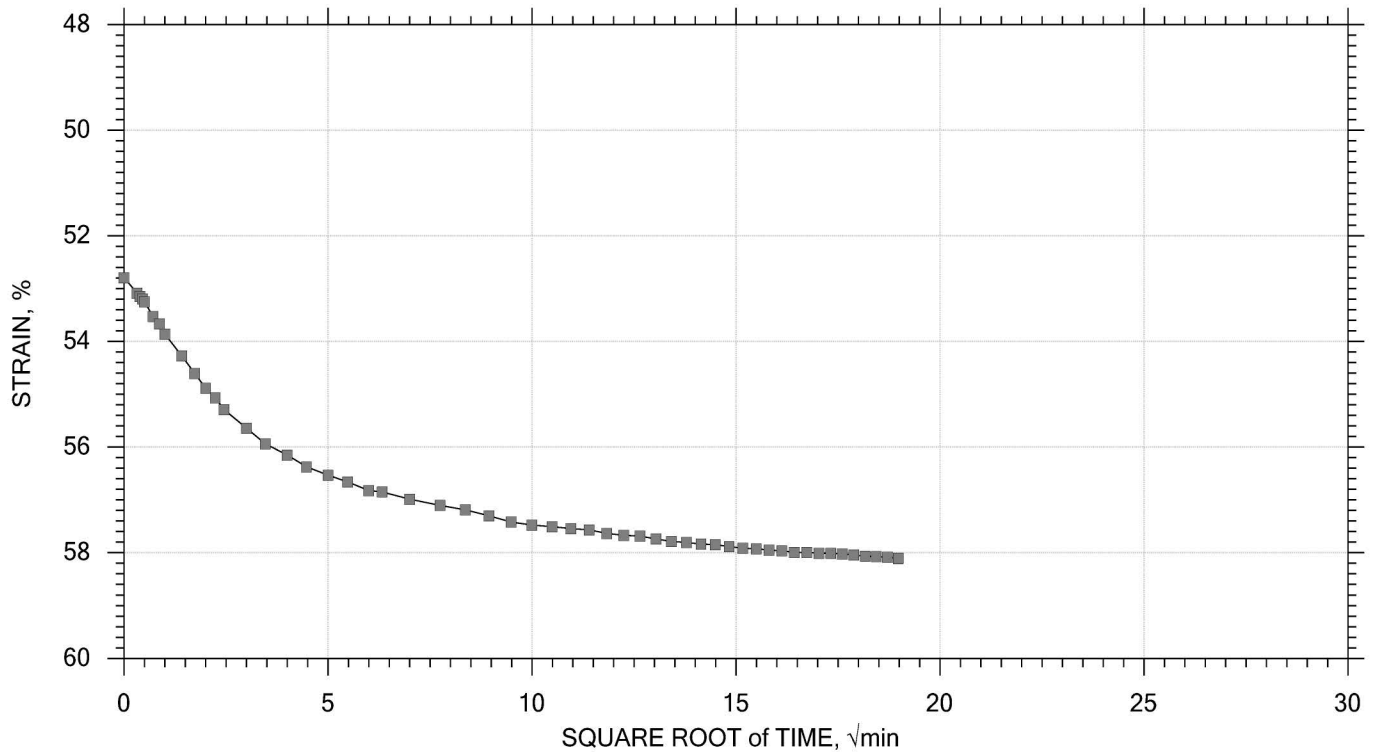
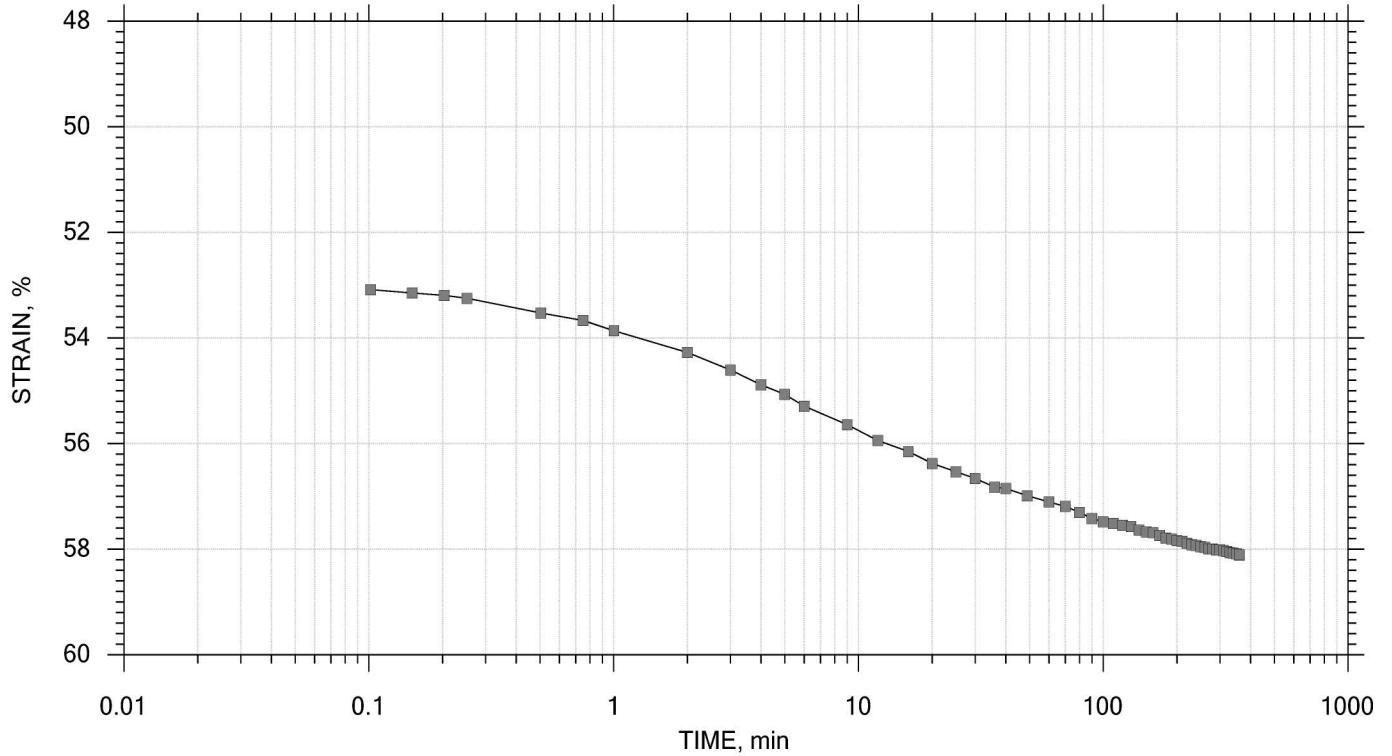
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



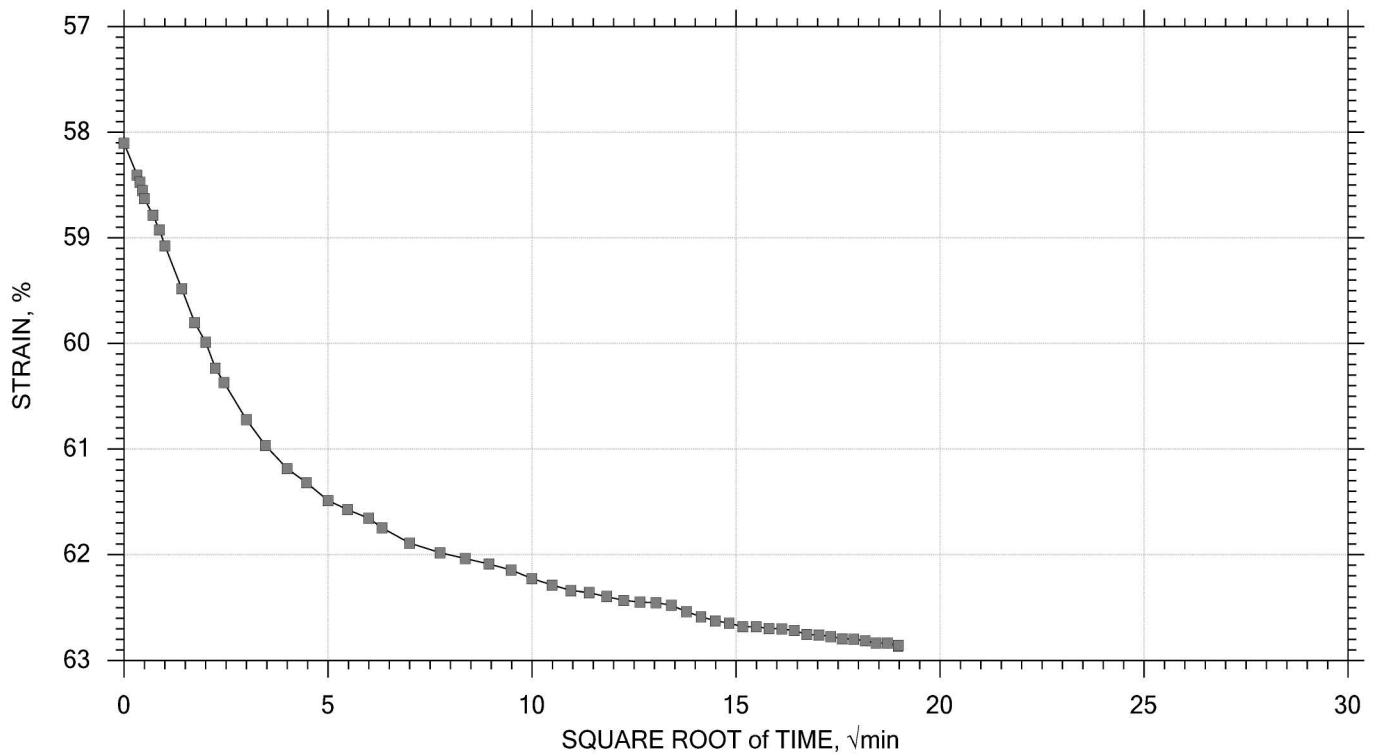
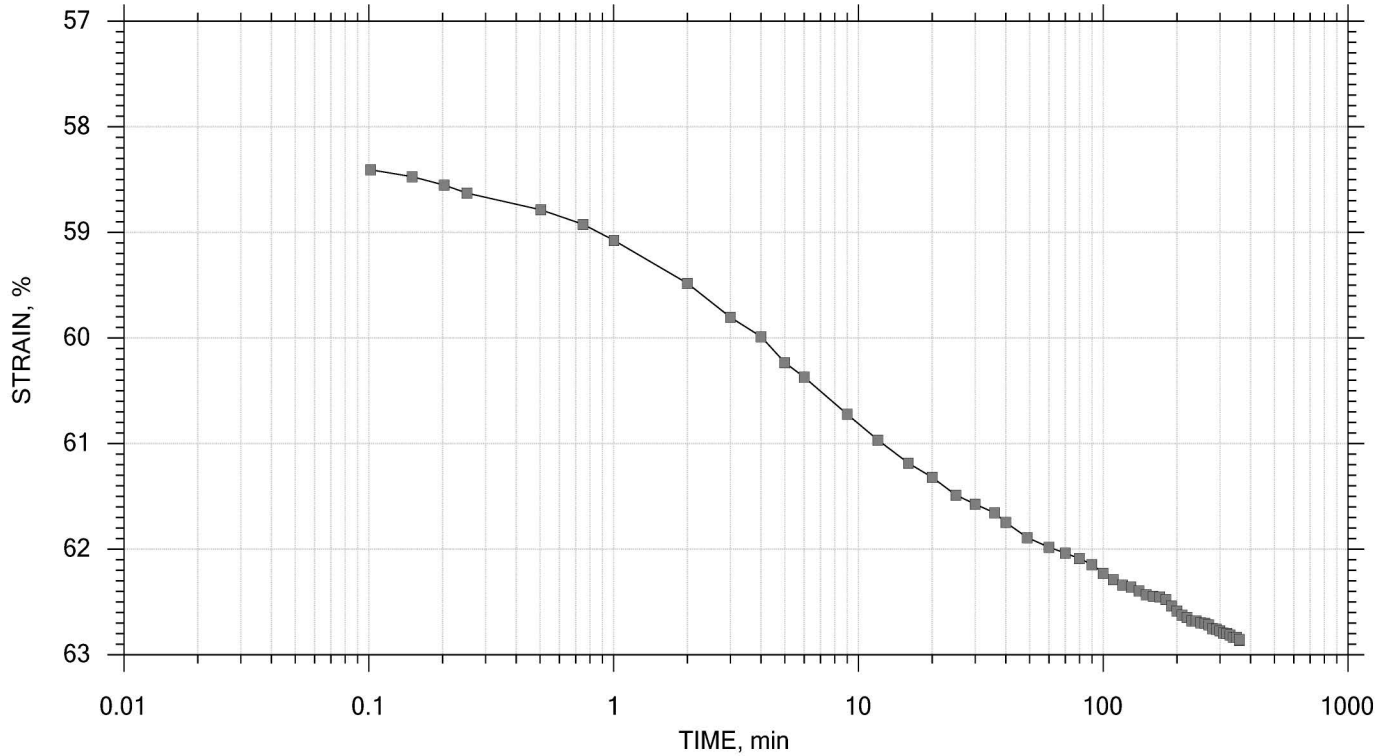
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



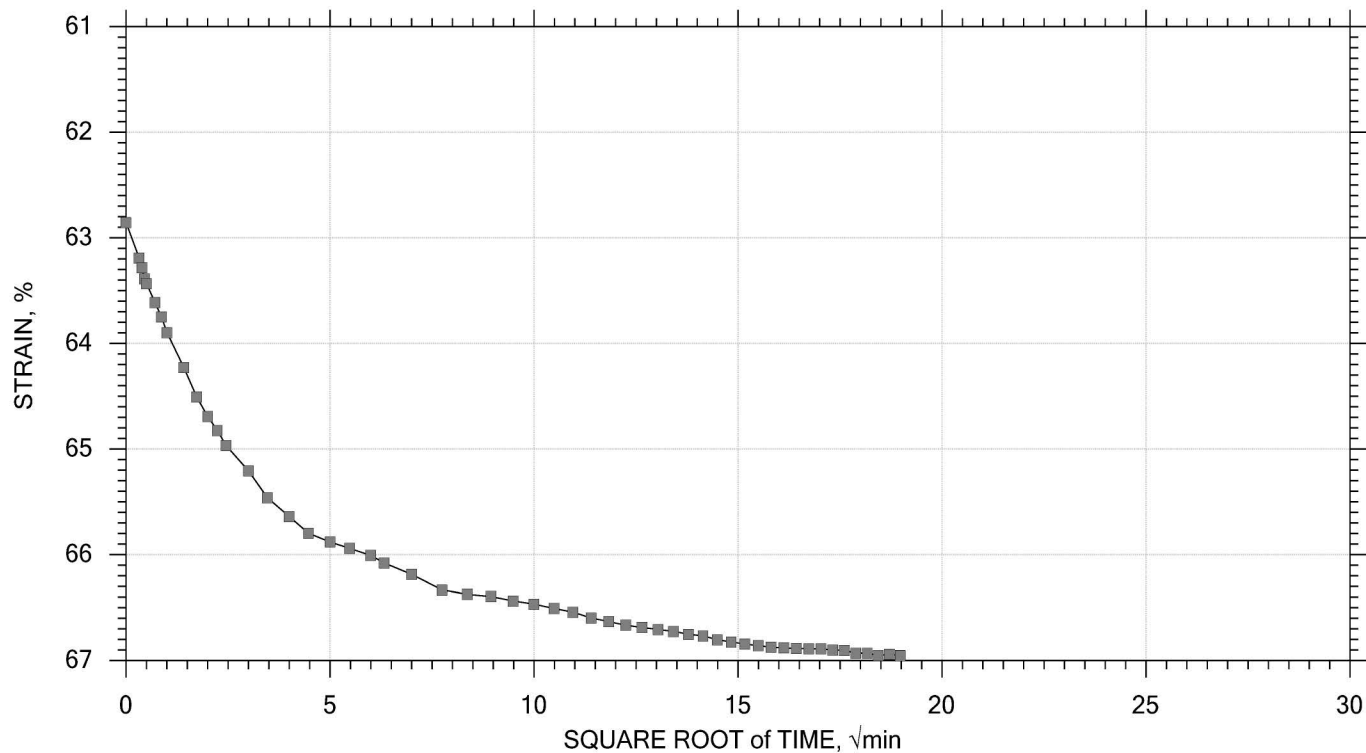
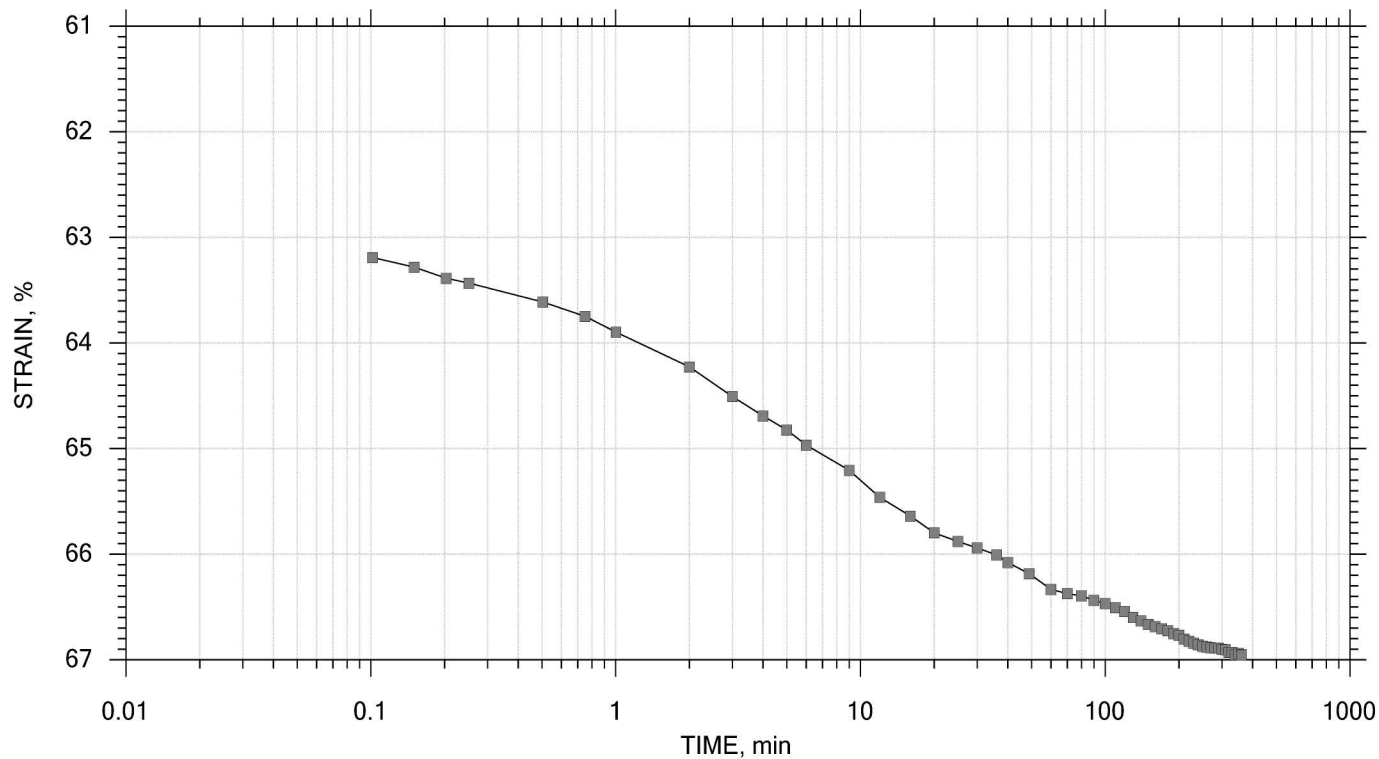
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



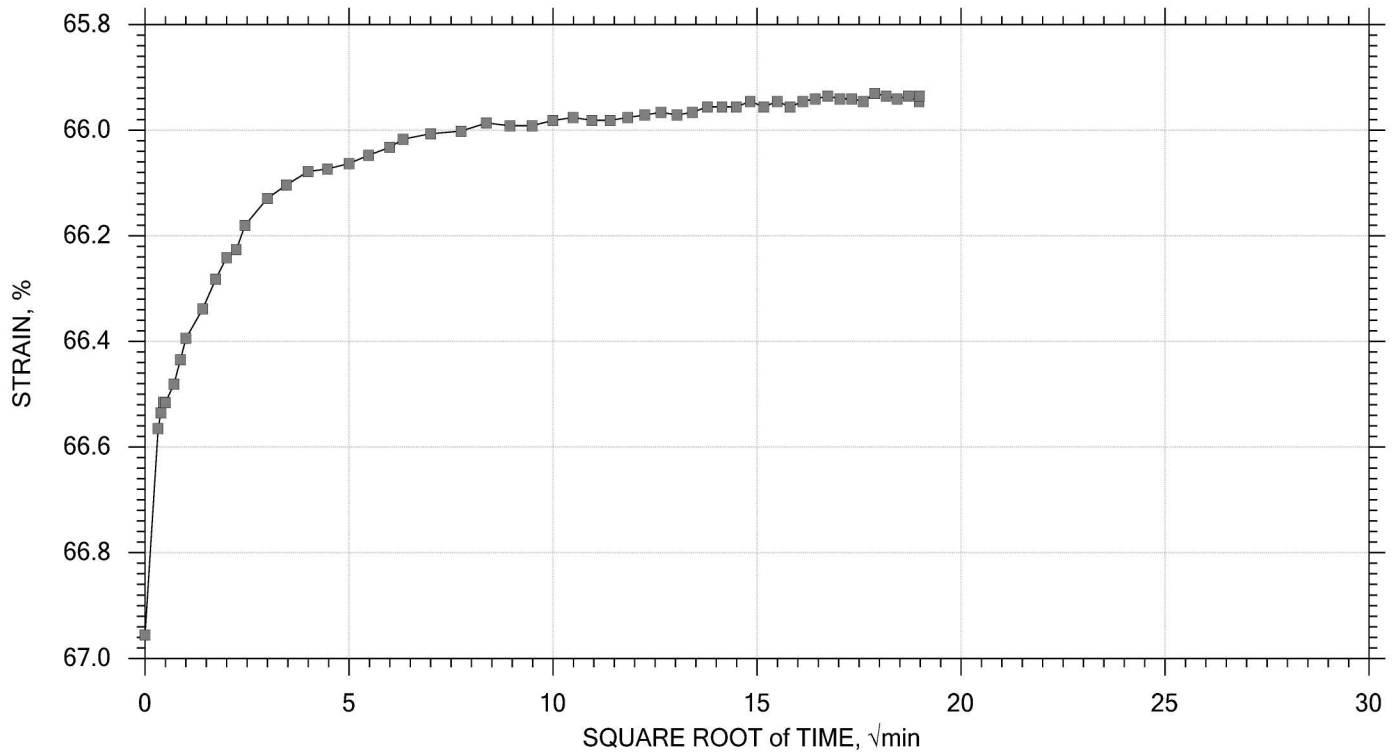
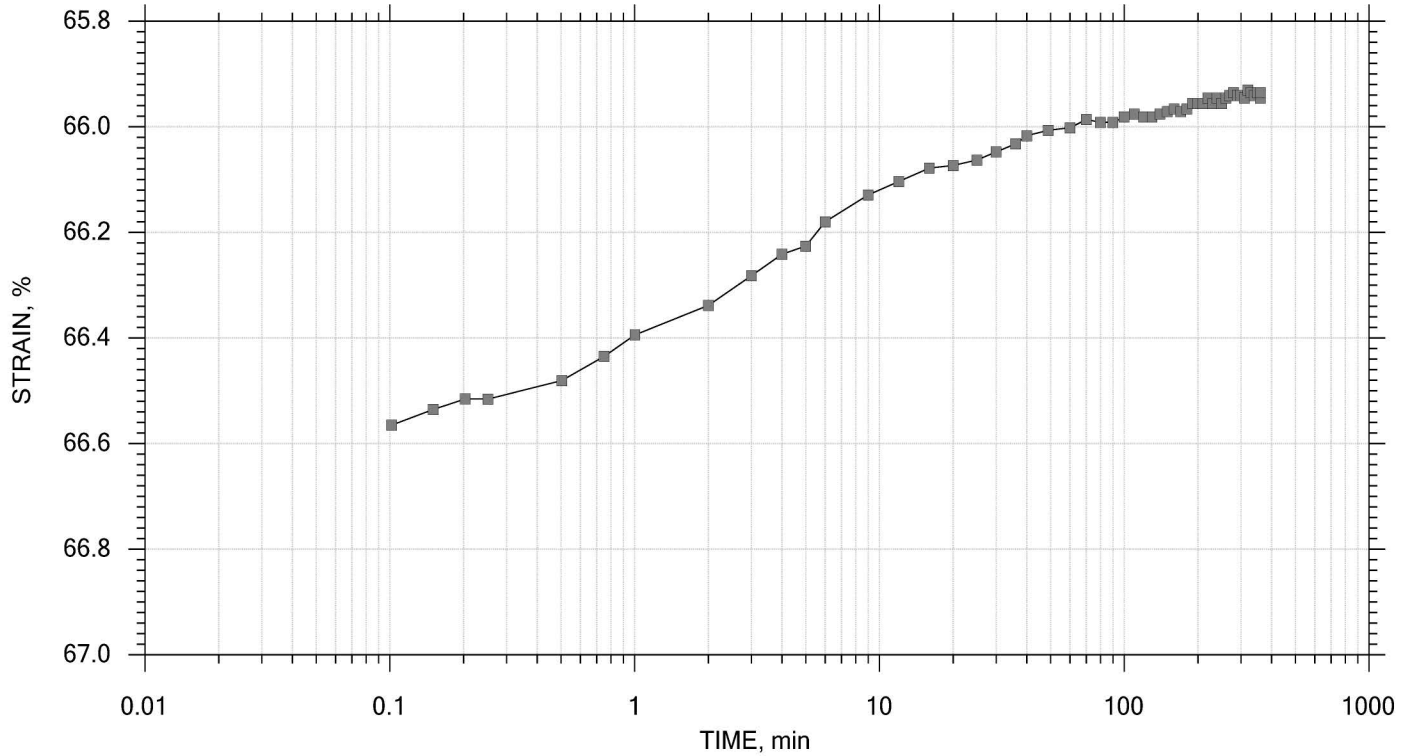
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



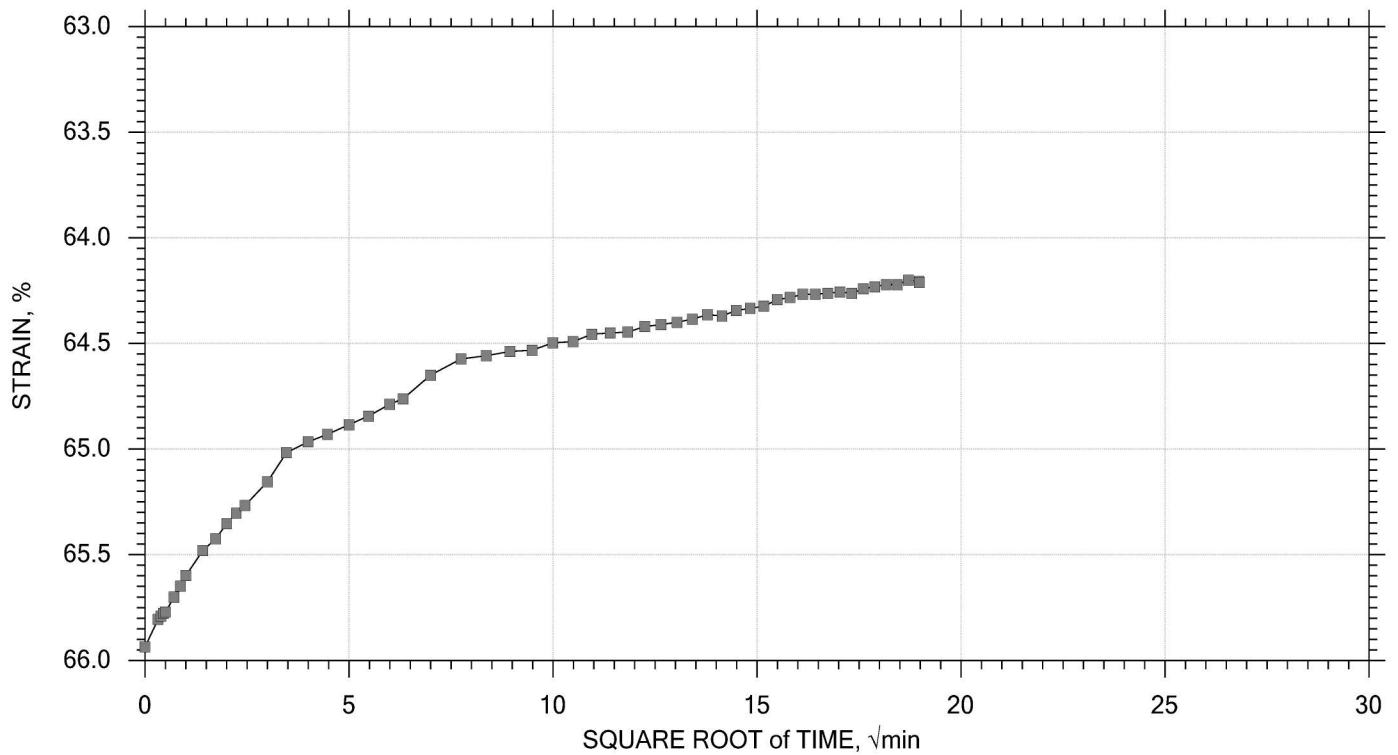
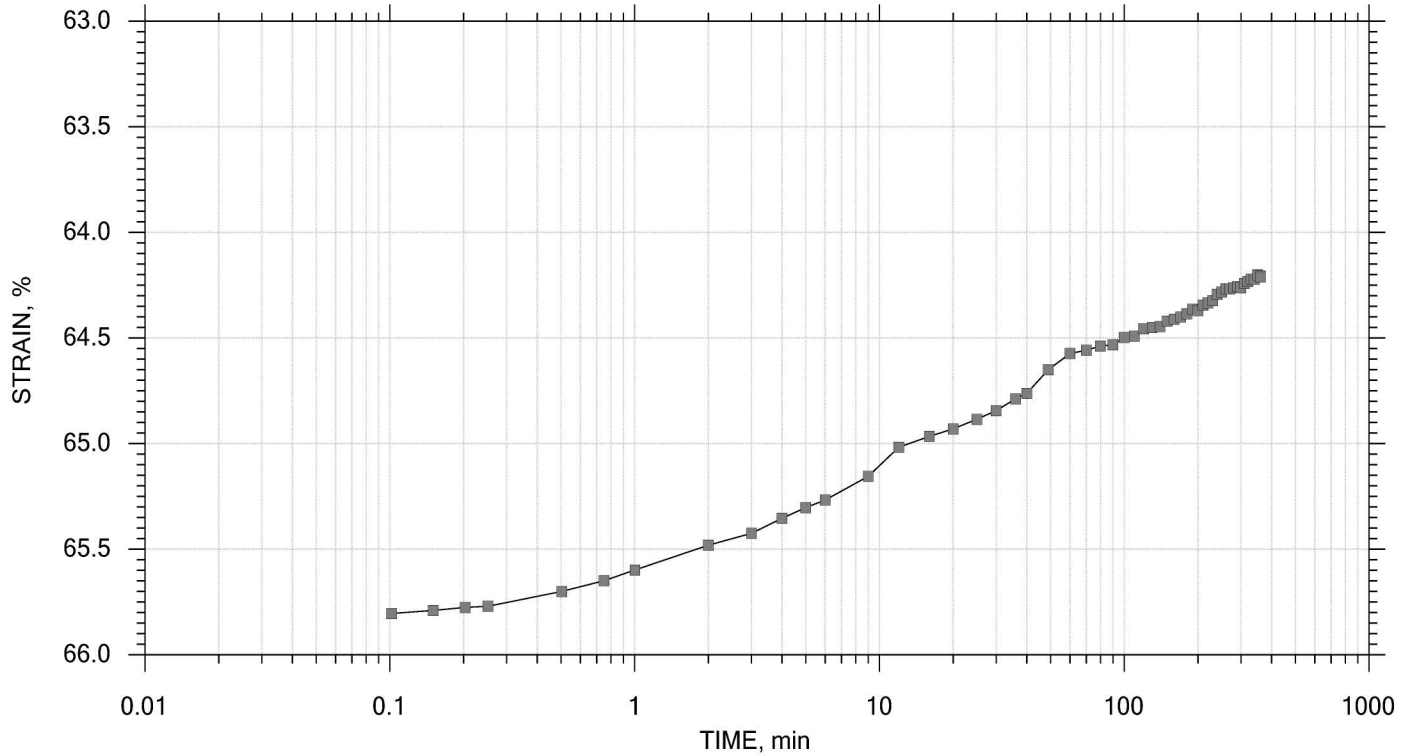
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



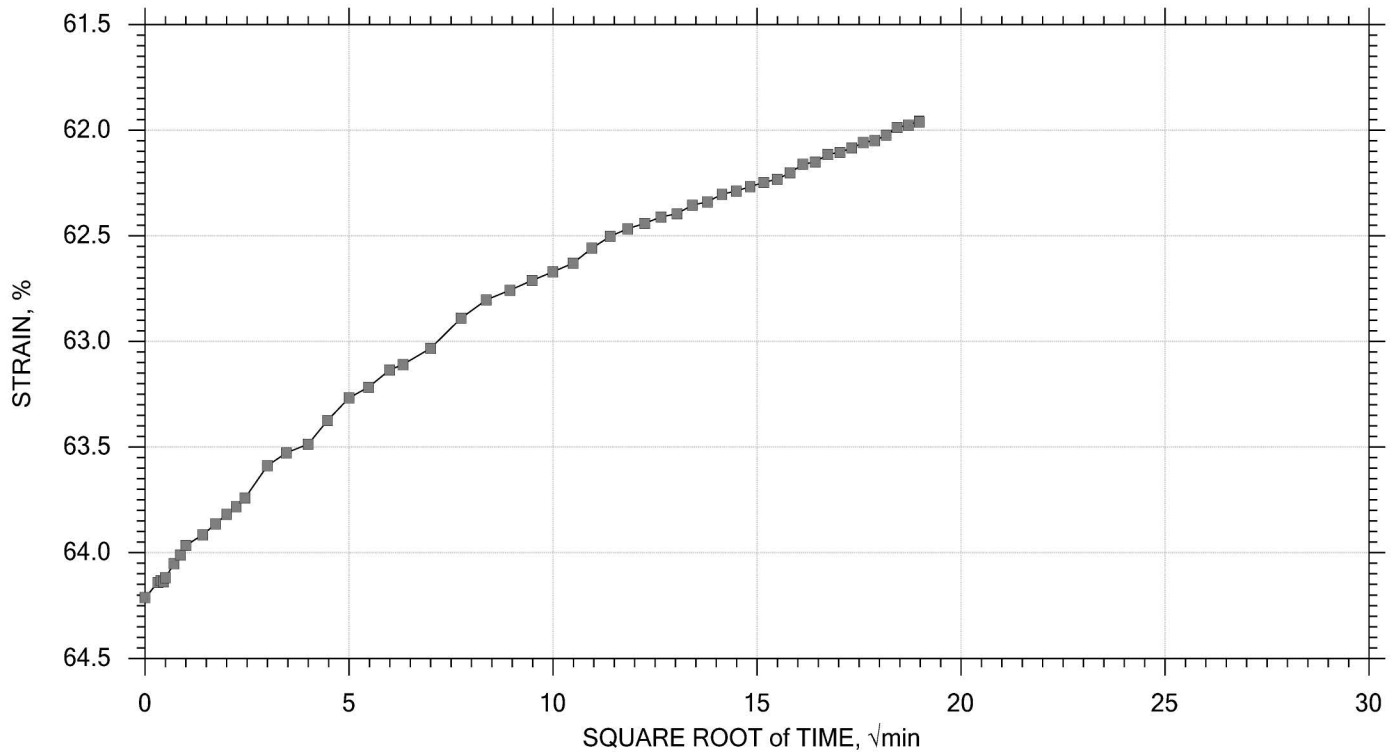
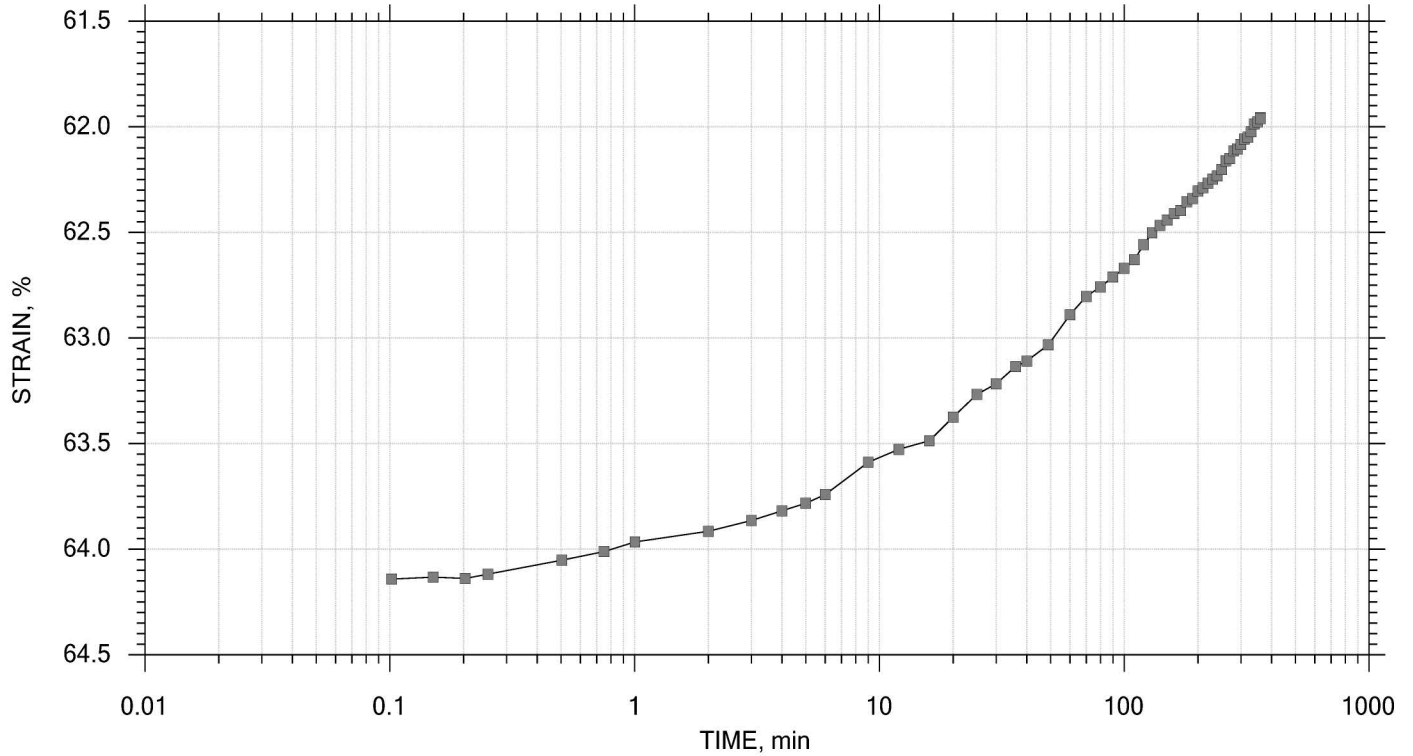
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



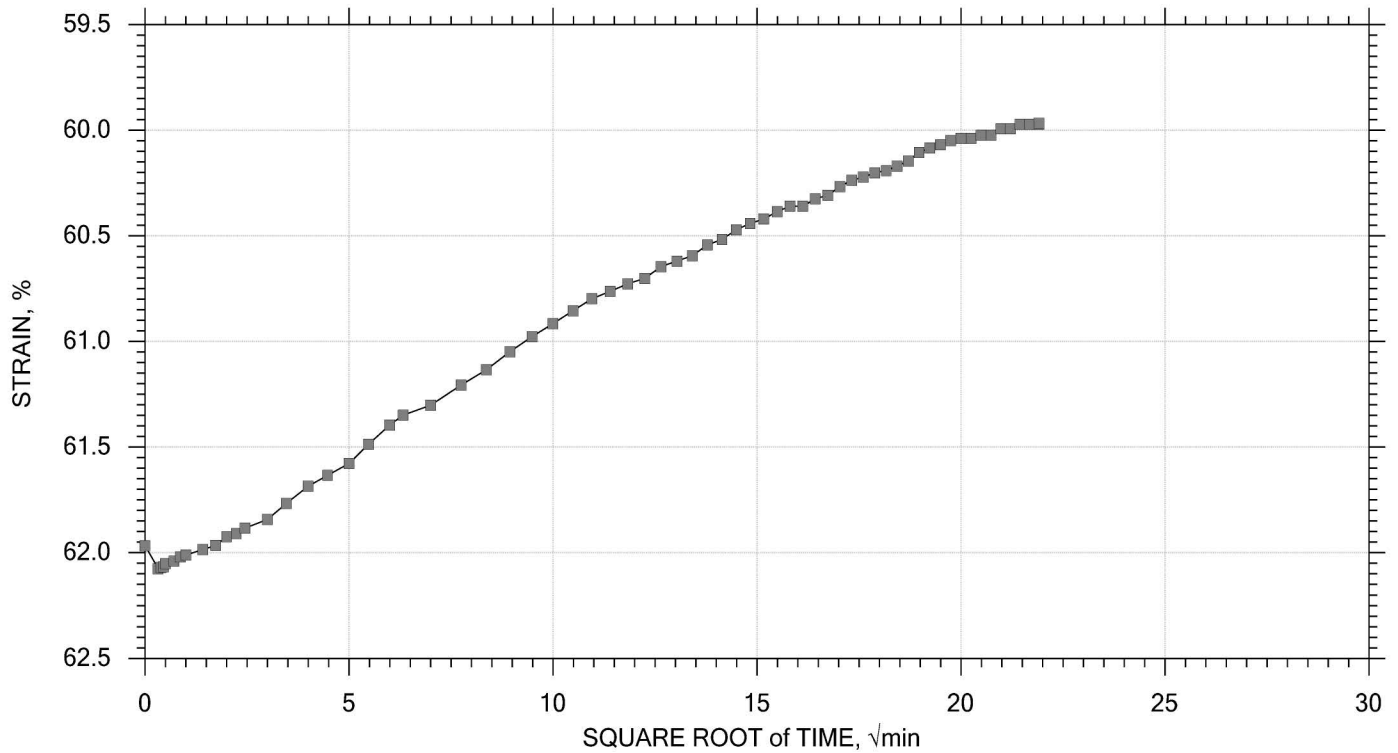
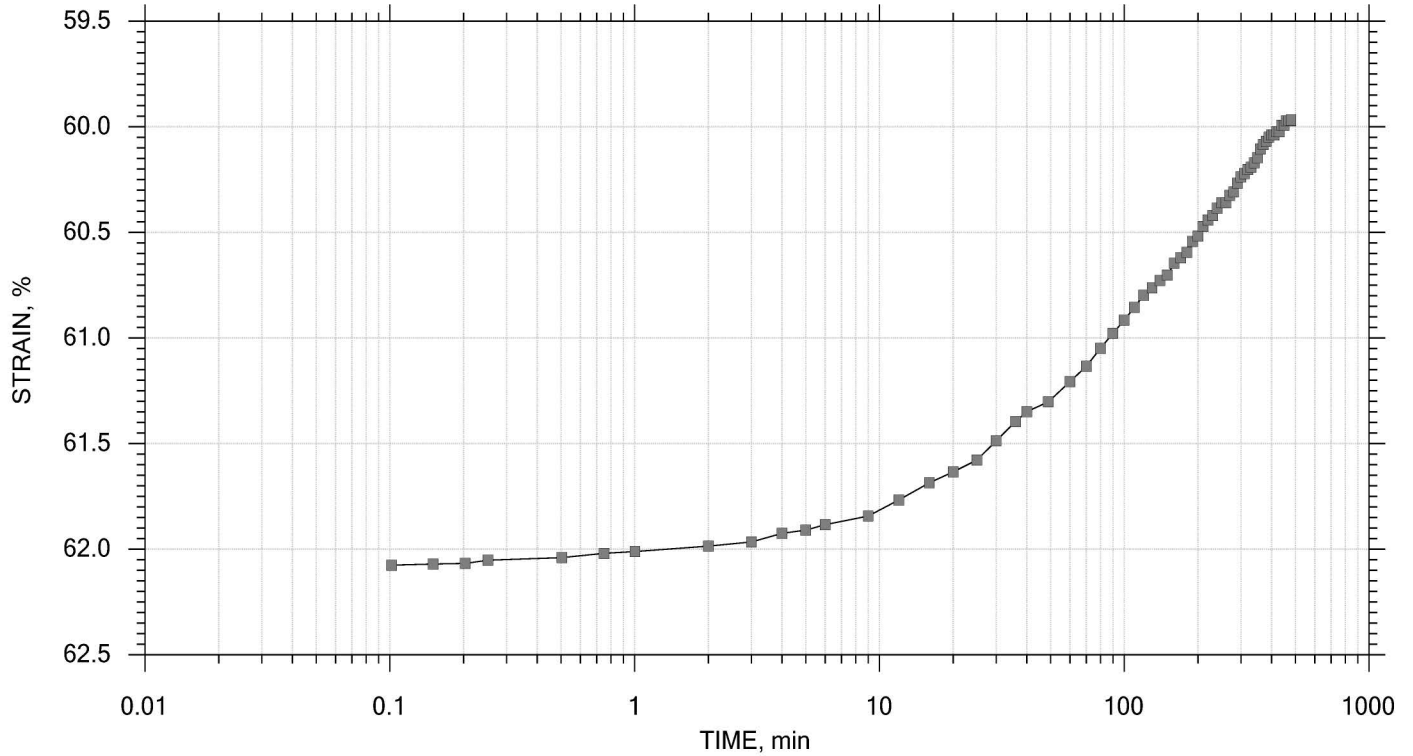
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



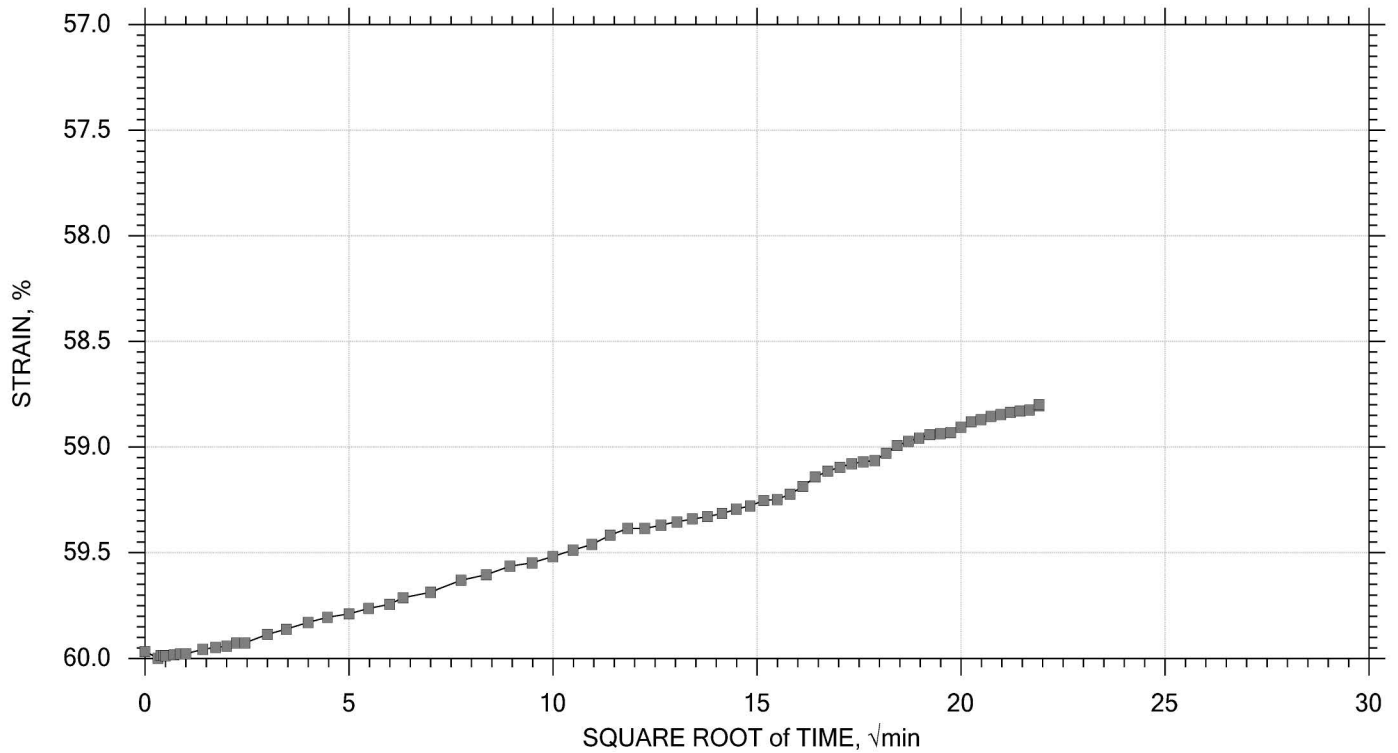
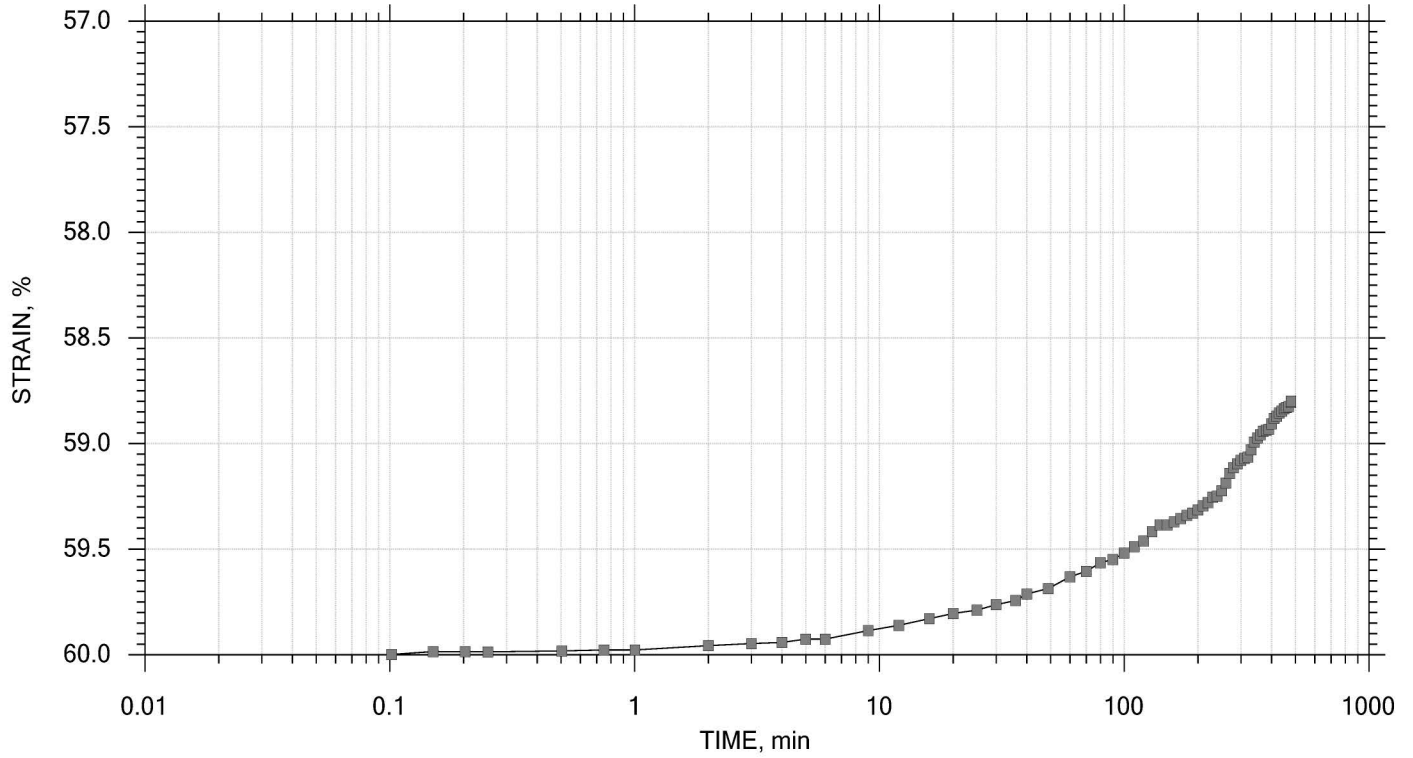
| | | | |
|--|--|---------------------------|-------------------------|
|  | Project: New Bedford Harbor | Location: New Bedford, MA | Project No.: GTX-306296 |
| | Boring No.: --- | Tested By: md | Checked By: njh |
| | Sample No.: RA-C002501 | Test Date: 11/13/17 | Test No.: IP-1 |
| | Depth: 0.0-0.5 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



| | | | |
|--|--|---------------------------|-------------------------|
|  | 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 | | Manometer Readings | | | Elapsed Time, sec | Gradient | Permeability K _i cm/sec | Temp, °C | R _t | Permeability K @ 20 °C, cm/sec |
|-------|---------|---------------|--------|--------------------|----------------|--------------------------------|-------------------|----------|------------------------------------|----------|----------------|--------------------------------|
| | | Cell | Sample | Z ₁ | Z ₂ | Z ₁ -Z ₂ | | | | | | |
| 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: 1.4×10^{-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 | | Manometer Readings | | | Elapsed Time, sec | Gradient | Permeability K _i cm/sec | Temp, °C | R _t | Permeability K @ 20 °C, cm/sec |
|-------|---------|---------------|--------|--------------------|----------------|--------------------------------|-------------------|----------|------------------------------------|----------|----------------|--------------------------------|
| | | Cell | Sample | Z ₁ | Z ₂ | Z ₁ -Z ₂ | | | | | | |
| 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: 3.2×10^{-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 | | Manometer Readings | | | Elapsed Time, sec | Gradient | Permeability K _i cm/sec | Temp, °C | R _t | Permeability K @ 20 °C, cm/sec |
|-------|---------|---------------|--------|--------------------|----------------|--------------------------------|-------------------|----------|------------------------------------|----------|----------------|--------------------------------|
| | | Cell | Sample | Z ₁ | Z ₂ | Z ₁ -Z ₂ | | | | | | |
| 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: 6.2×10^{-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 |

FLOW DATA

*B value did not increase with increase in pressure.
Final degree of saturation >95%.

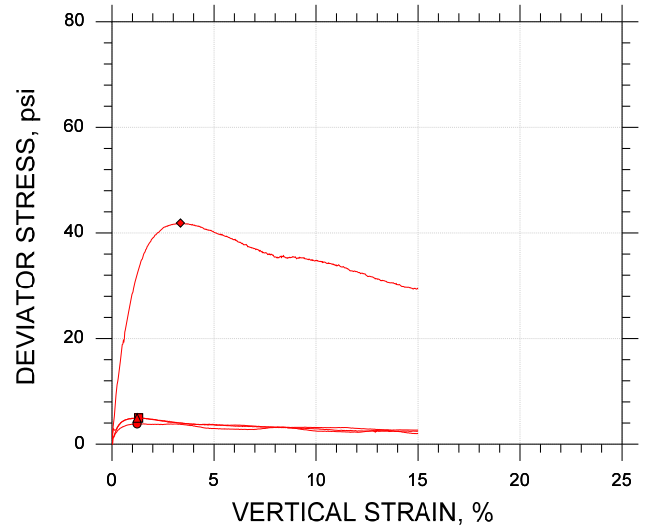
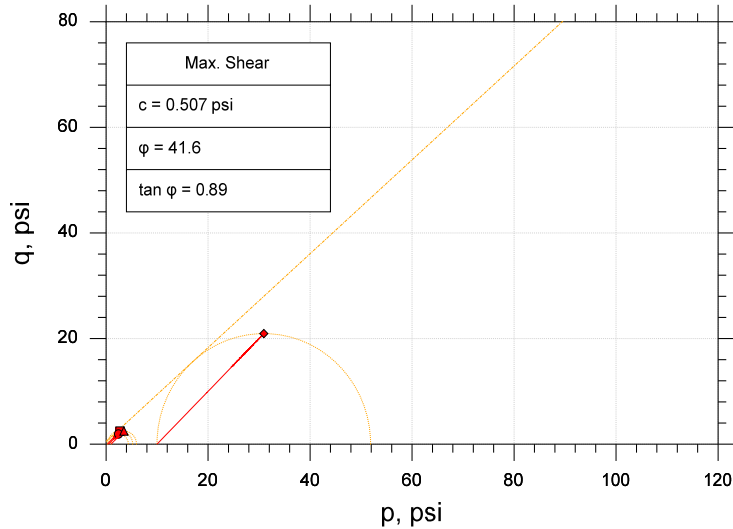
| Date | Trial # | Pressure, psi | | Manometer Readings | | | Elapsed Time, sec | Gradient | Permeability K _i cm/sec | Temp, °C | R _t | Permeability K @ 20 °C, cm/sec |
|-------|---------|---------------|--------|--------------------|----------------|--------------------------------|-------------------|----------|------------------------------------|----------|----------------|--------------------------------|
| | | Cell | Sample | Z ₁ | Z ₂ | Z ₁ -Z ₂ | | | | | | |
| 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: 6.4×10^{-8} cm/sec (@ 5 psi effective stress)



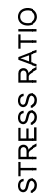
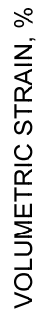
| | |
|---|----------------------------------|
| Client: Jacobs Engineering Group | |
| Project Name: New Bedford Harbor | |
| Project Location: New Bedford, MA | |
| Project Number: GTX-307167 | |
| Tested By: md | Checked By: njh |
| Boring ID: --- | |
| Preparation: reconstituted | |
| Description: 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 |
| | Diameter, in | 2.000 | 2.000 | 2.000 |
| | Moisture Content (from Cuttings), % | 11.1 | 11.5 | 15.3 |
| | Dry Density, pcf | 110. | 109. | 106. |
| | Saturation (Wet Method), % | 57.9 | 59.4 | 72.0 |
| | Void Ratio | 0.506 | 0.512 | 0.564 |
| Before Shear | Moisture Content, % | 19.7 | 19.1 | 21.8 |
| | Dry Density, pcf | 109. | 110. | 105. |
| | Cross-sectional Area (Method A), in ² | 3.165 | 3.133 | 3.167 |
| | Saturation, % | 100.0 | 100.0 | 100.0 |
| | Void Ratio | 0.522 | 0.505 | 0.579 |
| | Back Pressure, psi | 82.50 | 111.5 | 122.0 |
| Vertical Effective Consolidation Stress, psi | | 0.2549 | 0.5107 | 1.032 |
| Horizontal Effective Consolidation Stress, psi | | 0.2475 | 0.5061 | 1.002 |
| Vertical Strain after Consolidation, % | | -0.003740 | -0.003735 | -0.005124 |
| Volumetric Strain after Consolidation, % | | -0.1924 | -0.06491 | -0.5965 |
| Time to 50% Consolidation, min | | 0.1600 | 0.1600 | 0.1600 |
| Shear Strength, psi | | 2.477 | 1.924 | 2.482 |
| Strain at Failure, % | | 1.30 | 1.23 | 1.23 |
| Strain Rate, %/min | | 0.01000 | 0.01000 | 0.01000 |
| Deviator Stress at Failure, psi | | 4.954 | 3.849 | 4.963 |
| Effective Minor Principal Stress at Failure, psi | | 0.2719 | 0.5061 | 1.022 |
| Effective Major Principal Stress at Failure, psi | | 5.226 | 4.355 | 5.985 |
| B-Value | | 0.97 | 0.97 | 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: | | | | |

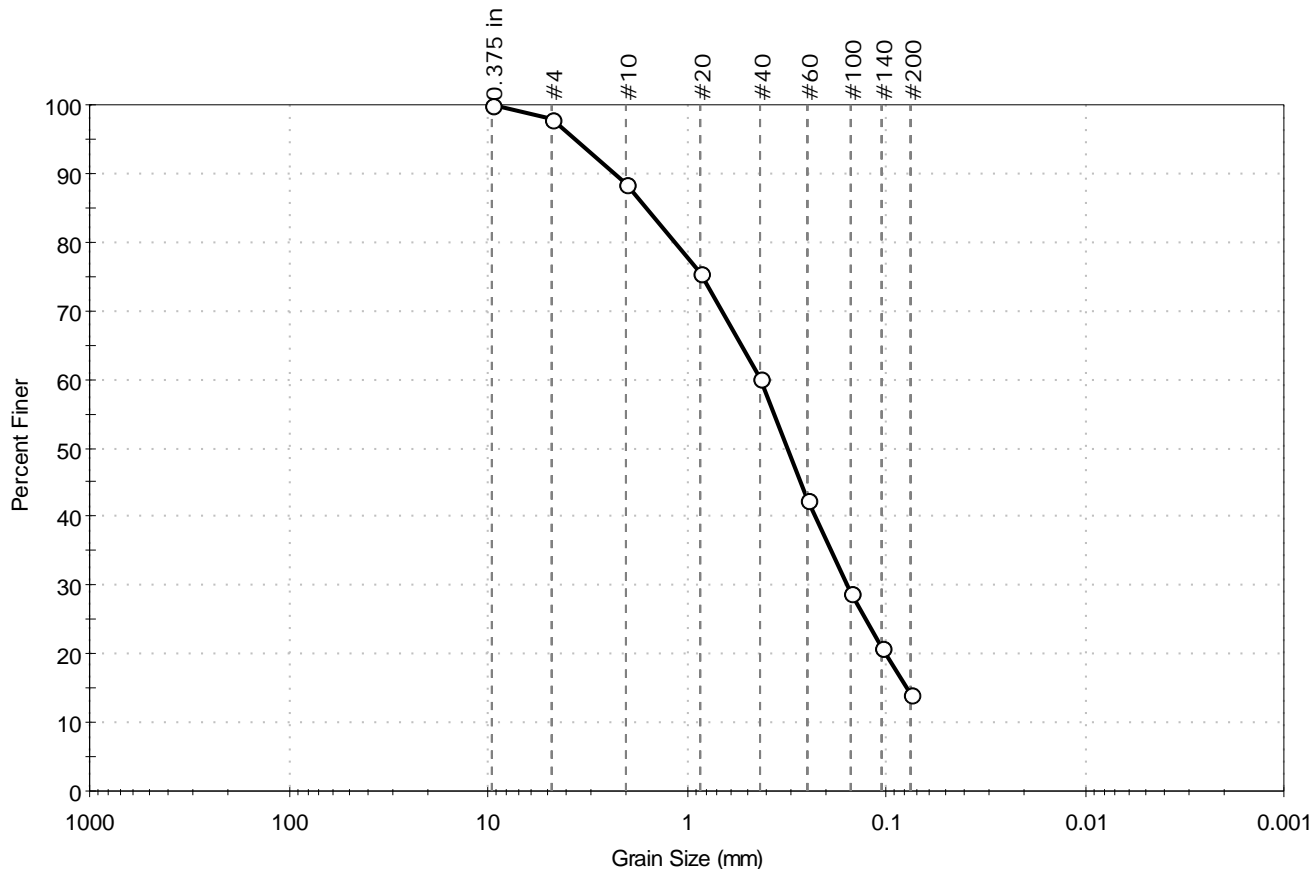
by ASTM D7181



| | | | |
|--|---|----------------------------|-------------------------|
|  | | | |
| | 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 No: | GTX-307334 |
| Project: | New Bedford Harbor | | |
| Location: | New Bedford, MA | | |
| Boring ID: | --- | Sample Type: | bag |
| Sample ID: | V1-102417-2 | Test Date: | 11/30/17 |
| 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

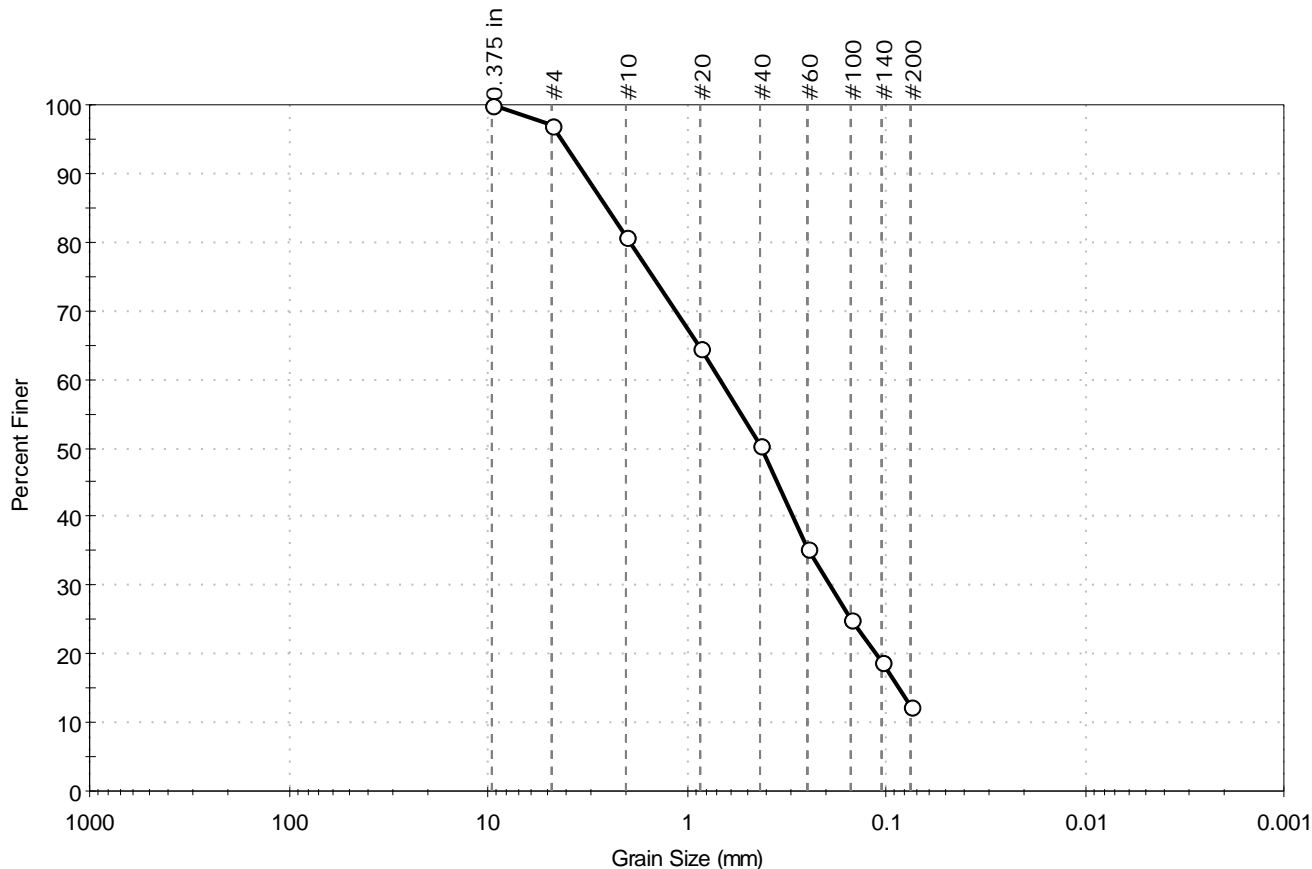
AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
Sand/Gravel Hardness : HARD

| | | |
|---|------------------------|-----------------|
| Client: Jacobs Engineering Group | Project No: GTX-307334 | |
| Project: New Bedford Harbor | | |
| Location: New Bedford, MA | | |
| 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

$D_{85} = 2.4986 \text{ mm}$ $D_{30} = 0.1919 \text{ mm}$
 $D_{60} = 0.6773 \text{ mm}$ $D_{15} = 0.0865 \text{ mm}$
 $D_{50} = 0.4184 \text{ mm}$ $D_{10} = \text{N/A}$
 $C_u = \text{N/A}$ $C_c = \text{N/A}$

Classification

ASTM N/A

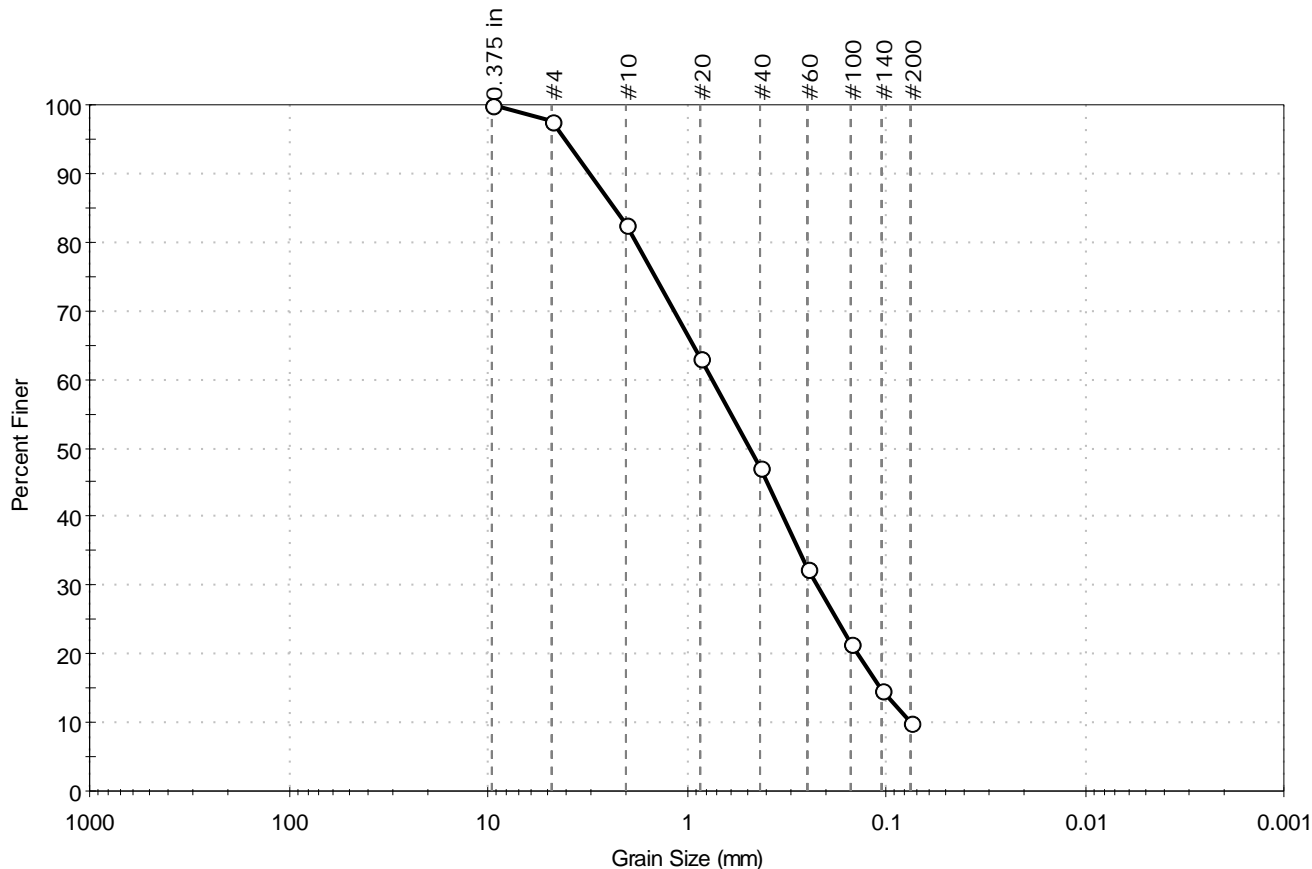
AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ANGULAR
 Sand/Gravel Hardness : HARD

| | |
|---|------------------------|
| Client: Jacobs Engineering Group | Project No: GTX-307334 |
| Project: New Bedford Harbor | |
| Location: New Bedford, MA | |
| Boring ID: --- | Sample Type: bag |
| Sample ID: V1-110917-2 | Test Date: 11/28/17 |
| Depth: --- | Test Id: 433578 |
| Test Comment: --- | Tested By: jbr |
| Visual Description: Moist, dark gray sand with silt | Checked By: emm |
| 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

$D_{85} = 2.2872 \text{ mm}$ $D_{30} = 0.2224 \text{ mm}$
 $D_{60} = 0.7451 \text{ mm}$ $D_{15} = 0.1066 \text{ mm}$
 $D_{50} = 0.4815 \text{ mm}$ $D_{10} = 0.0751 \text{ mm}$
 $C_u = 9.921$ $C_c = 0.884$

Classification

ASTM N/A

AASHTO Stone Fragments, Gravel and Sand (A-1-b (1))

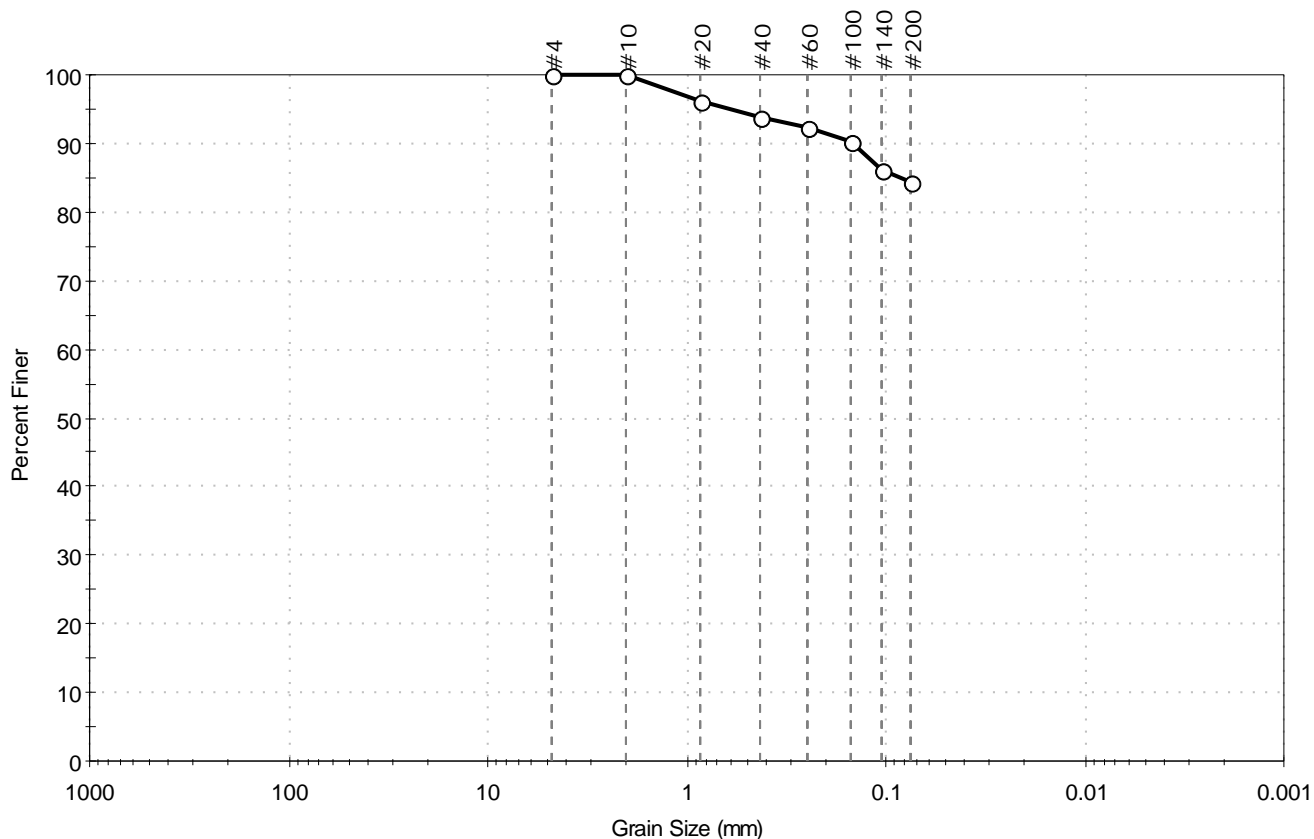
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

| | | |
|--|------------------------|-----------------|
| Client: Jacobs Engineering Group | Project No: GTX-307334 | |
| Project: New Bedford Harbor | | |
| Location: New Bedford, MA | | |
| 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

$D_{85} = 0.0846 \text{ mm}$ $D_{30} = \text{N/A}$
 $D_{60} = \text{N/A}$ $D_{15} = \text{N/A}$
 $D_{50} = \text{N/A}$ $D_{10} = \text{N/A}$
 $C_u = \text{N/A}$ $C_c = \text{N/A}$

Classification

ASTM N/A

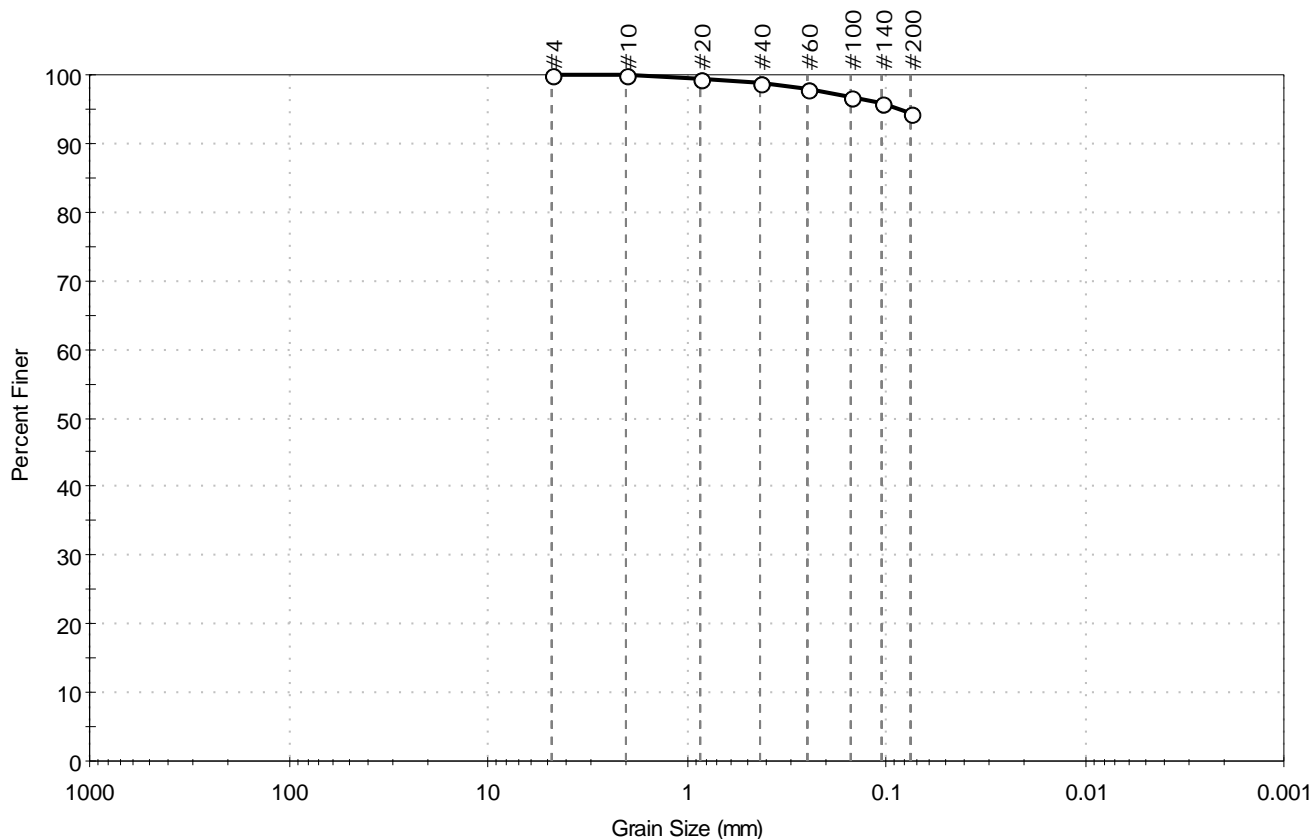
AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
 Sand/Gravel Hardness : ---

| | | | |
|---------------------|----------------------------|--------------|------------|
| Client: | Jacobs Engineering Group | | |
| Project: | New Bedford Harbor | | |
| Location: | New Bedford, MA | Project No: | GTX-307334 |
| Boring ID: | --- | Sample Type: | bag |
| Sample ID: | V2-20171027 | Test Date: | 11/28/17 |
| 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))

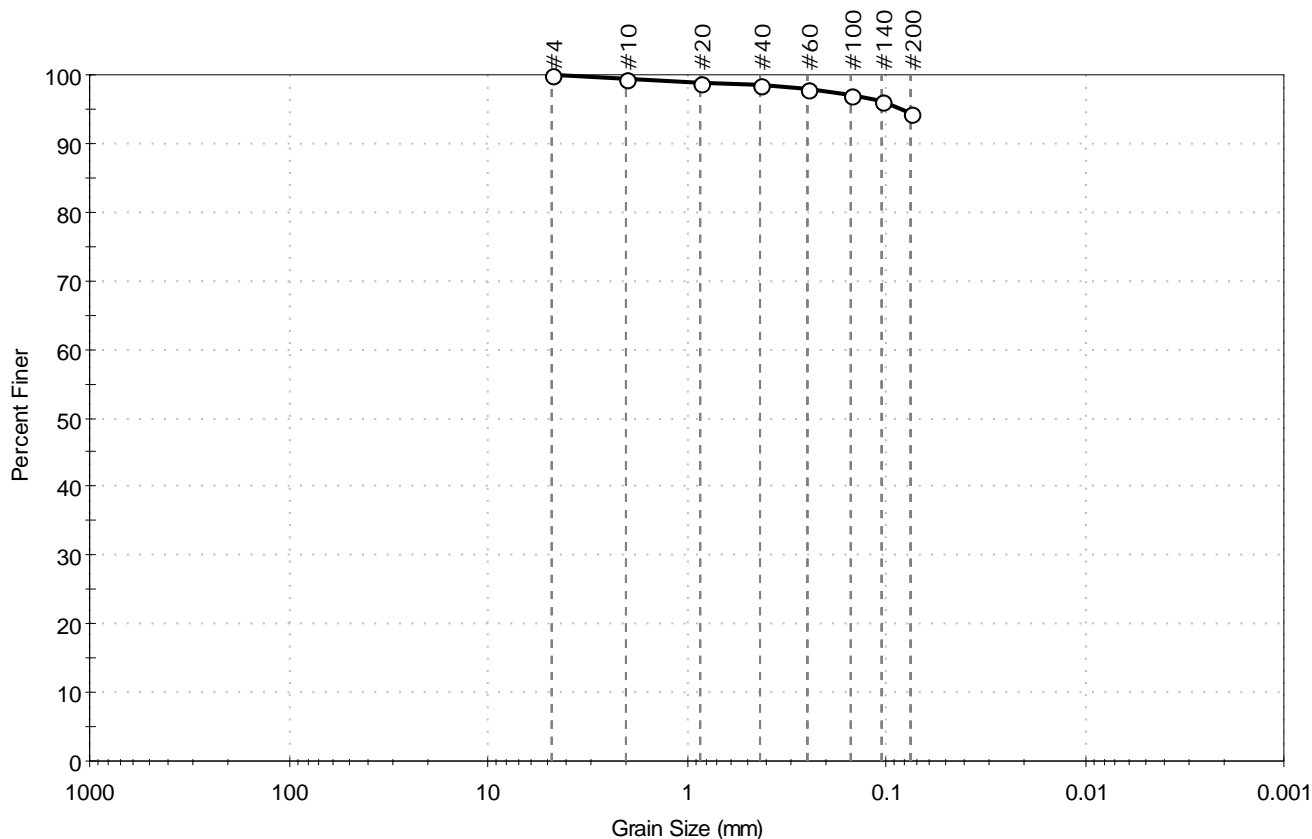
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

| | |
|--|------------------------|
| Client: Jacobs Engineering Group | Project No: GTX-307334 |
| Project: New Bedford Harbor | |
| Location: New Bedford, MA | |
| Boring ID: --- | Sample Type: bag |
| Sample ID: V2-20171102 | Test Date: 11/30/17 |
| Depth: --- | Test Id: 433573 |
| Test Comment: --- | Tested By: jbr |
| Visual Description: Moist, very dark gray silt | Checked By: emm |
| 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))

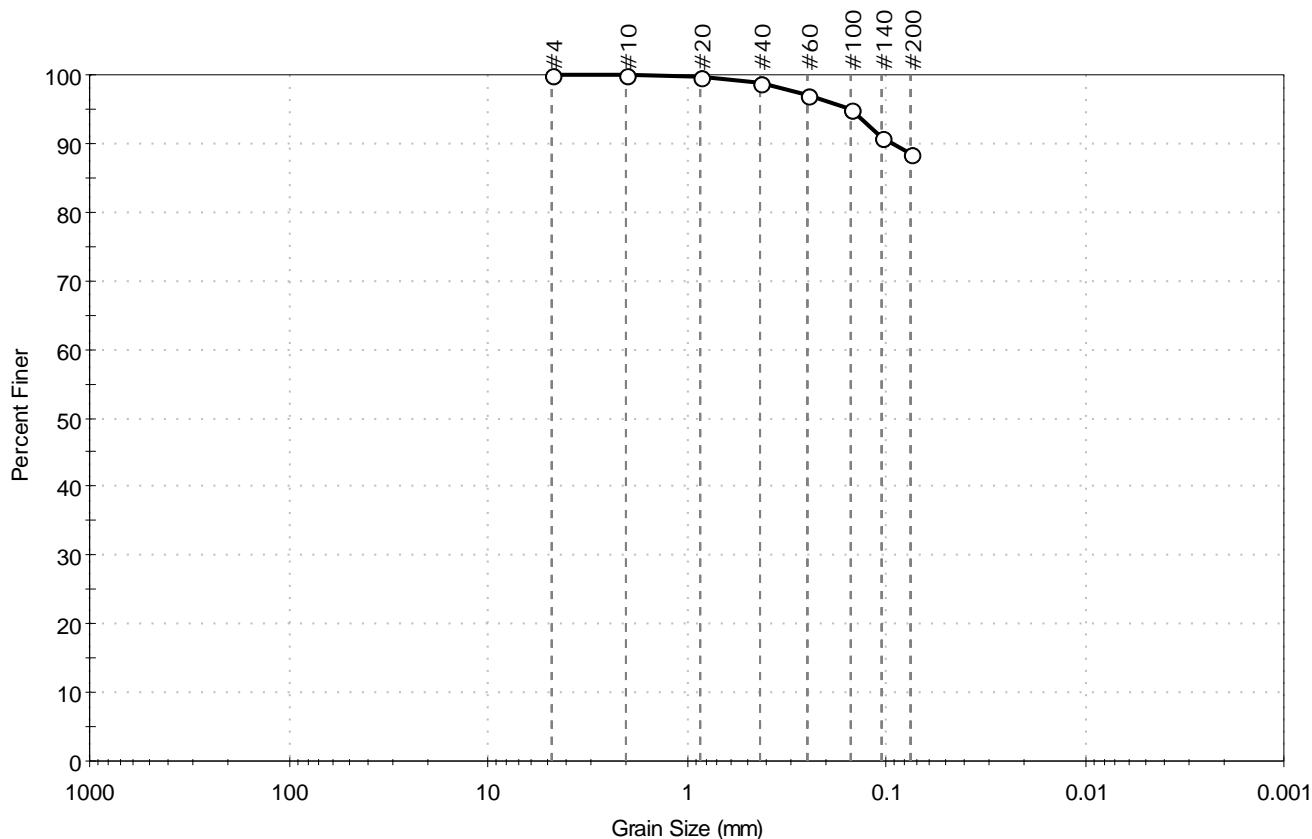
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

| | | | |
|---------------------|----------------------------|--------------|------------|
| Client: | Jacobs Engineering Group | Project No: | GTX-307334 |
| Project: | New Bedford Harbor | | |
| Location: | New Bedford, MA | | |
| Boring ID: | --- | Sample Type: | bag |
| Sample ID: | V2-20171107 | Test Date: | 11/30/17 |
| 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))

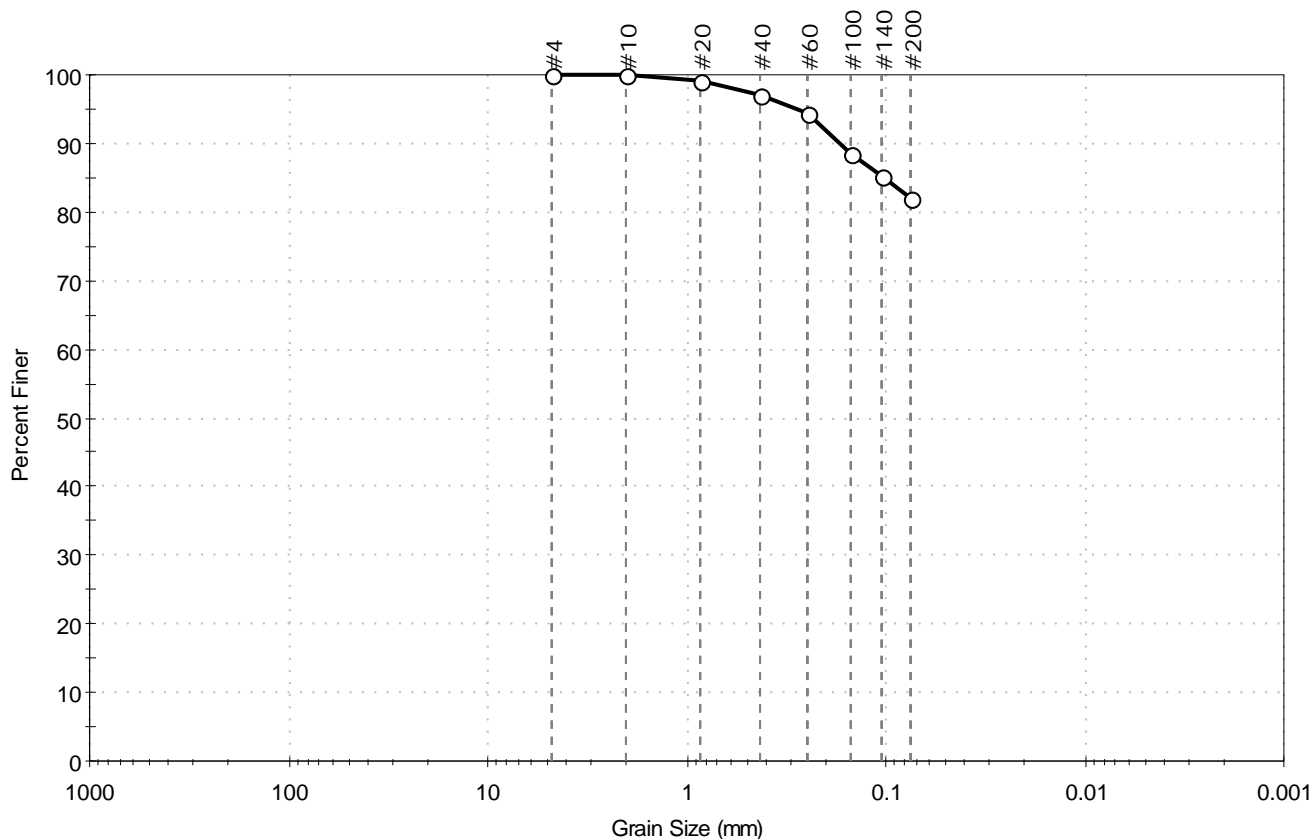
Sample/Test Description

Sand/Gravel Particle Shape : ---

Sand/Gravel Hardness : ---

| | |
|--|------------------------|
| Client: Jacobs Engineering Group | Project No: GTX-307334 |
| Project: New Bedford Harbor | |
| Location: New Bedford, MA | |
| Boring ID: --- | Sample Type: bag |
| Sample ID: V2-20171109 | Test Date: 11/28/17 |
| Depth: --- | Test Id: 433575 |
| Test Comment: --- | Tested By: jbr |
| Visual Description: Moist, very dark gray silt with sand | Checked By: emm |
| 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

$D_{85} = 0.1030 \text{ mm}$ $D_{30} = \text{N/A}$
 $D_{60} = \text{N/A}$ $D_{15} = \text{N/A}$
 $D_{50} = \text{N/A}$ $D_{10} = \text{N/A}$
 $C_u = \text{N/A}$ $C_c = \text{N/A}$

Classification

ASTM N/A

AASHTO Silty Soils (A-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape : ---
 Sand/Gravel Hardness : ---

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

Shane Taylor

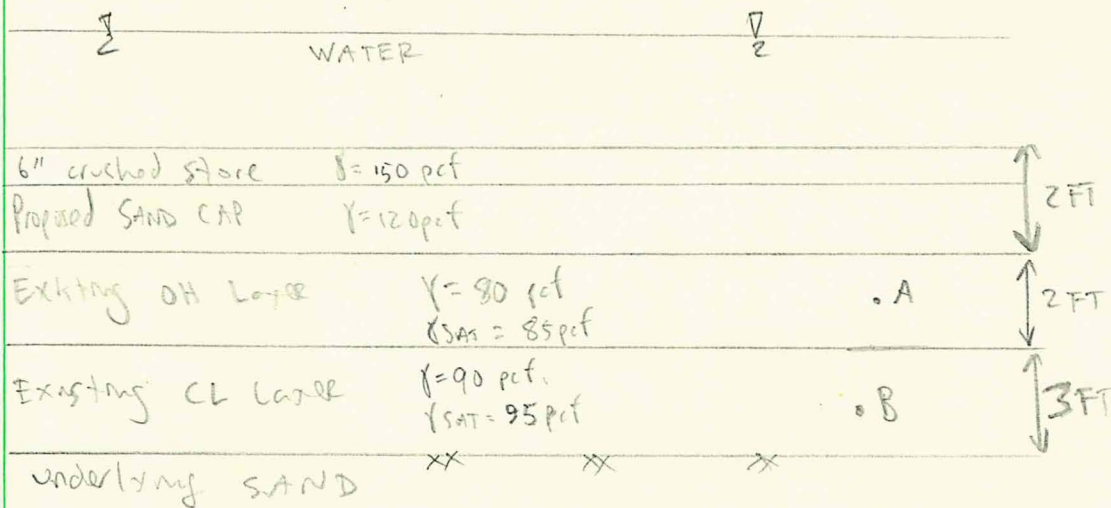
Jacobs

4 APR 2018

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

$$\sigma'_{vo} = 1 \text{ FT} (85 \text{ pcf} - 62.4 \text{ pcf}) = 22.6 \text{ pcf}$$

$$\sigma'_{vf} = \sigma'_{vo} + \sigma'_{CAP} = 22.6 \text{ pcf} + .5(150 \text{ pcf} - 62.4) + 1.5(120 \text{ pcf} - 62.4) = 152.8 \text{ pcf}$$

 $H_o = 2 \text{ FT}$ (assume single drainage from underlying clay) $C_c = 2$ (refer to Landva paper for C_c vs w relationship)

$$\text{Settlement (NC deposit)} = \Delta H = \frac{H_o C_c}{1 + e_o} \log \left(\frac{\sigma'_f}{\sigma'_o} \right)$$

 $e_o = 4.98$ (from LAB results)

$$\Delta H = \frac{2 \text{ FT} \cdot 2}{1 + 4.98} \log \frac{152.8}{22.6} = 0.6 \text{ FT}$$

1) ultimate settlement OH & CL combined

AT Point B

$$\sigma'_{v0} = 2 \text{ FT} (85 - 62.4) + 1.5 \text{ FT} (95 - 62.4) \\ = 94.1 \text{ psf}$$

$$\sigma'_{vf} = \sigma'_{v0} + \sigma'_{cap} = 94.1 \text{ psf} + .5(150 - 62.4) + 1.5(120 - 62.4) \\ = 224.3 \text{ psf}$$

$$H_0 = 3 \text{ FT} \text{ (assume single drainage from OH layer)}$$

$$C_c = 1.2 \text{ (assume 60 percent soil properties for OH layer)}$$

$$\text{Settlement (NC)} = \Delta H = \frac{H_0 C_c}{1 + e_0} \log \frac{\sigma'_{vf}}{\sigma'_{v0}}$$

$$e_0 = 3.0$$

$$\Delta H = \frac{3 + 1.2}{1 + 3} \log \frac{224.3}{94.1} = \underline{.4 \text{ FT}}$$

$$\text{TOTAL Settlement } \Delta H_{\text{UIT}} = \Delta H_{\text{PTA}} + \Delta H_{\text{PTB}}$$

$$\Delta H_{\text{UIT}} = 0.6 \text{ FT} + 0.4 \text{ FT} = \boxed{1.0 \text{ FT}}$$

2) Time RATE Consolidation (OH layer only)

95% Consolidation

$$T = \frac{C_v t}{D^2}, \text{ From } U \text{ vs } T \text{ chart } U = 0.95, T = 1.163$$

$$C_v = 3.0 \times 10^{-7} \text{ ft}^2/\text{sec} \text{ (From Lab data)}$$

$$D = 2 \text{ FT} \text{ (assume single drainage from underlying clay)}$$

$$t = \frac{T D^2}{C_v} = \frac{1.163 (2 \text{ FT})^2}{3 \times 10^{-7} \text{ ft}^2/\text{sec}} = 180 \text{ days}$$

50% Consolidation

$$T = 0.197$$

$$t = \frac{0.197 (2 \text{ FT})^2}{3 \times 10^{-7} \text{ ft}^2/\text{sec}} = 30 \text{ days}$$

2) Time Rate Consolidation (OH & CL combined)
95% consolidation

$$T = \frac{c_v t}{D^2}, \quad D = \frac{5FT}{2} \quad (\text{assume double drainage for entire cohesive layer})$$

$$t = \frac{1.163 (2.5)^2}{3 \times 10^{-7} \text{ ft}^2/\text{sec}} = \underline{280 \text{ days}}$$

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.



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 °C | Molecular diffusivity in water cm ² /s | Organic carbon partition coefficient log(L/kg) | Dissolved organic carbon partition coefficient log(L/kg) | Reference |
|-------------|--------|---------------|------------------|----------------|---|--|--|---------------------|
| 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 | $r = \lambda_1 C_{\text{PCB1242}}$ |
| Edit Delete | 2 | Reaction 2 | PCB80 Decay | $r = \lambda_2 C_{\text{PCB80}}$ |
| Edit Delete | 3 | Reaction 3 | PCB82 Decay | $r = \lambda_3 C_{\text{PCB82}}$ |
| Edit Delete | 4 | Reaction 4 | TCE Decay | $r = \lambda_4 C_{\text{TCE}}$ |
| Edit Delete | 5 | Reaction 5 | CIS 1,2 CDCE Decay | $r = \lambda_5 C_{\text{CIS 1,2 CDCE}}$ |

Add reactions

OK

3 -Material Input

Load materials- sand, organoclay, etc.

CapSim 3.6

Please select the potential layer materials and provide the following properties:

| | | Matrix | Porosity | Bulk density g/cm ³ | Organic carbon fraction |
|------|--------|------------|----------|-----------------------------------|-------------------------|
| Edit | Delete | Sand | 0.5 | 1.25 | 0.001 |
| Edit | Delete | Organoclay | 0.51 | 1.77 | 0.1 |
| Edit | Delete | Mixture | 0.42 | 1.468 | 0.031 |
| Edit | Delete | Sediment | 0.69 | 1.425 | 0.08 |
| Edit | Delete | Gravel | 0.38 | 1.6 | 0.01 |

Add materials

Load materials

Create mixtures

OK

Mixture properties can be calculated through the model:

CapSim 3.6

Please provides the following information about the mixture:

| Name | Porosity | Bulk density (g/cm ³) | Organic carbon fraction |
|---------|----------|-----------------------------------|-------------------------|
| Mixture | 0.422018 | 1.46789 | 0.03085 |

| Component | Weight fraction | Porosity | Bulk density (g/cm ³) | Organic carbon fraction |
|-------------------|-----------------|----------|-----------------------------------|-------------------------|
| Delete Organoclay | 0.15 | 0.5 | 1.0 | 0.2 |
| Delete Sand | 0.85 | 0.4 | 1.6 | 0.001 |

Add components

Load components

Estimate Mixture Properties

OK

Cancel

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 | $r = \lambda_{2,1} C_{\text{PCB80}}$ $\lambda_{2,1} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 3 | PCB82 Decay | $r = \lambda_{3,1} C_{\text{PCB82}}$ $\lambda_{3,1} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 4 | TCE Decay | $r = \lambda_{4,1} C_{\text{TCE}}$ $\lambda_{4,1} = 0.221 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 5 | CIS 1,2 CDCE Decay | $r = \lambda_{5,1} C_{\text{CIS 1,2 CDCE}}$ $\lambda_{5,1} = 0.125 \text{ yr}^{-1}$ |
| Layer 2 | Edit | Delete | Reaction 2 | PCB80 Decay | $r = \lambda_{2,2} C_{\text{PCB80}}$ $\lambda_{2,2} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 3 | PCB82 Decay | $r = \lambda_{3,2} C_{\text{PCB82}}$ $\lambda_{3,2} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 4 | TCE Decay | $r = \lambda_{4,2} C_{\text{TCE}}$ $\lambda_{4,2} = 0.221 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 5 | CIS 1,2 CDCE Decay | $r = \lambda_{5,2} C_{\text{CIS 1,2 CDCE}}$ $\lambda_{5,2} = 0.125 \text{ yr}^{-1}$ |
| Layer 3 | Edit | Delete | Reaction 2 | PCB80 Decay | $r = \lambda_{2,3} C_{\text{PCB80}}$ $\lambda_{2,3} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 3 | PCB82 Decay | $r = \lambda_{3,3} C_{\text{PCB82}}$ $\lambda_{3,3} = 0.143 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 4 | TCE Decay | $r = \lambda_{4,3} C_{\text{TCE}}$ $\lambda_{4,3} = 0.221 \text{ yr}^{-1}$ |
| | Edit | Delete | Reaction 5 | CIS 1,2 CDCE Decay | $r = \lambda_{5,3} C_{\text{CIS 1,2 CDCE}}$ $\lambda_{5,3} = 0.125 \text{ yr}^{-1}$ |

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 | $r = \lambda_{2,1} C_{\text{PCB80}}$ | 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.

$$T = (-\ln(C_f/C_i))/K$$

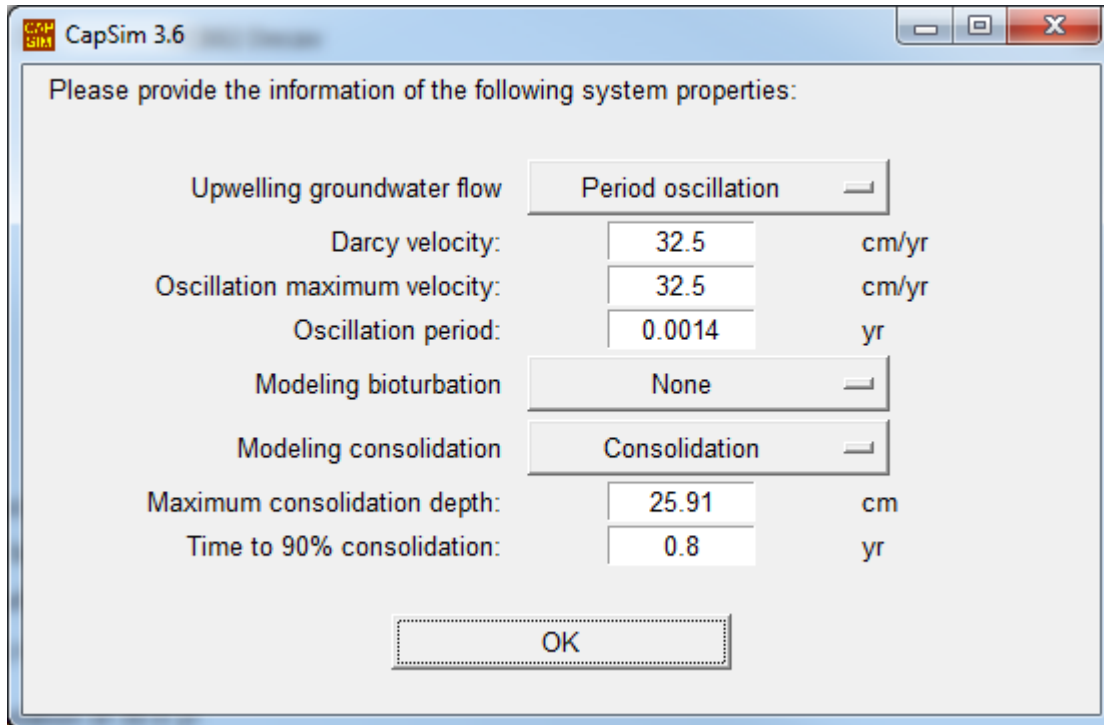
T=time in years – assumed half life provided by ERDC

C_f= assumed to be 50% reduction of C_i

C_i = assumed to be an initial concentration

K = bulk first order decay rate coefficient

7-System Parameters



CapSim 3.6

Please provide the information of the following system properties:

| | | |
|-------------------------------|--------------------|-------|
| Upwelling groundwater flow | Period oscillation | |
| Darcy velocity: | 32.5 | cm/yr |
| Oscillation maximum velocity: | 32.5 | cm/yr |
| Oscillation period: | 0.0014 | yr |
| Modeling bioturbation | None | |
| Modeling consolidation | Consolidation | |
| Maximum consolidation depth: | 25.91 | cm |
| Time to 90% consolidation: | 0.8 | yr |

OK

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)**

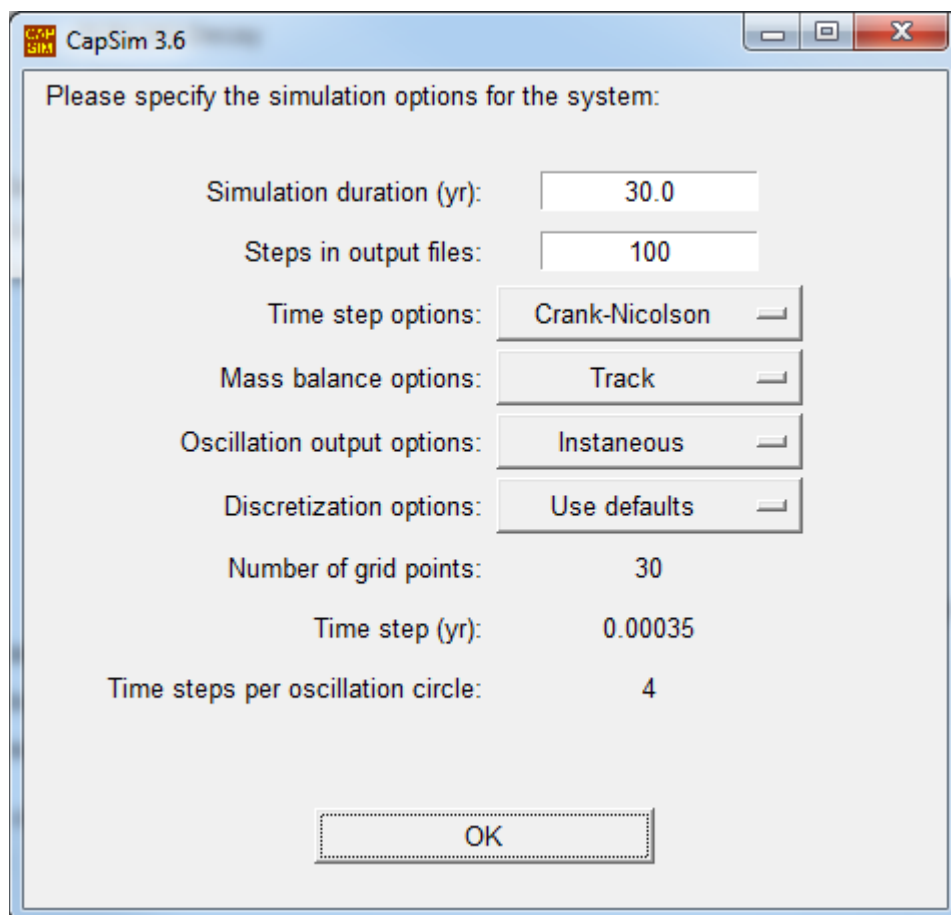
Assumed worst case – Solubility-

Aroclor 1242 = 240 PPB

Aroclor 1248 = PCB 80 = 52 PPB

Aroclor1254 = PCB 82 = 12 PPB

9-Simulation Options



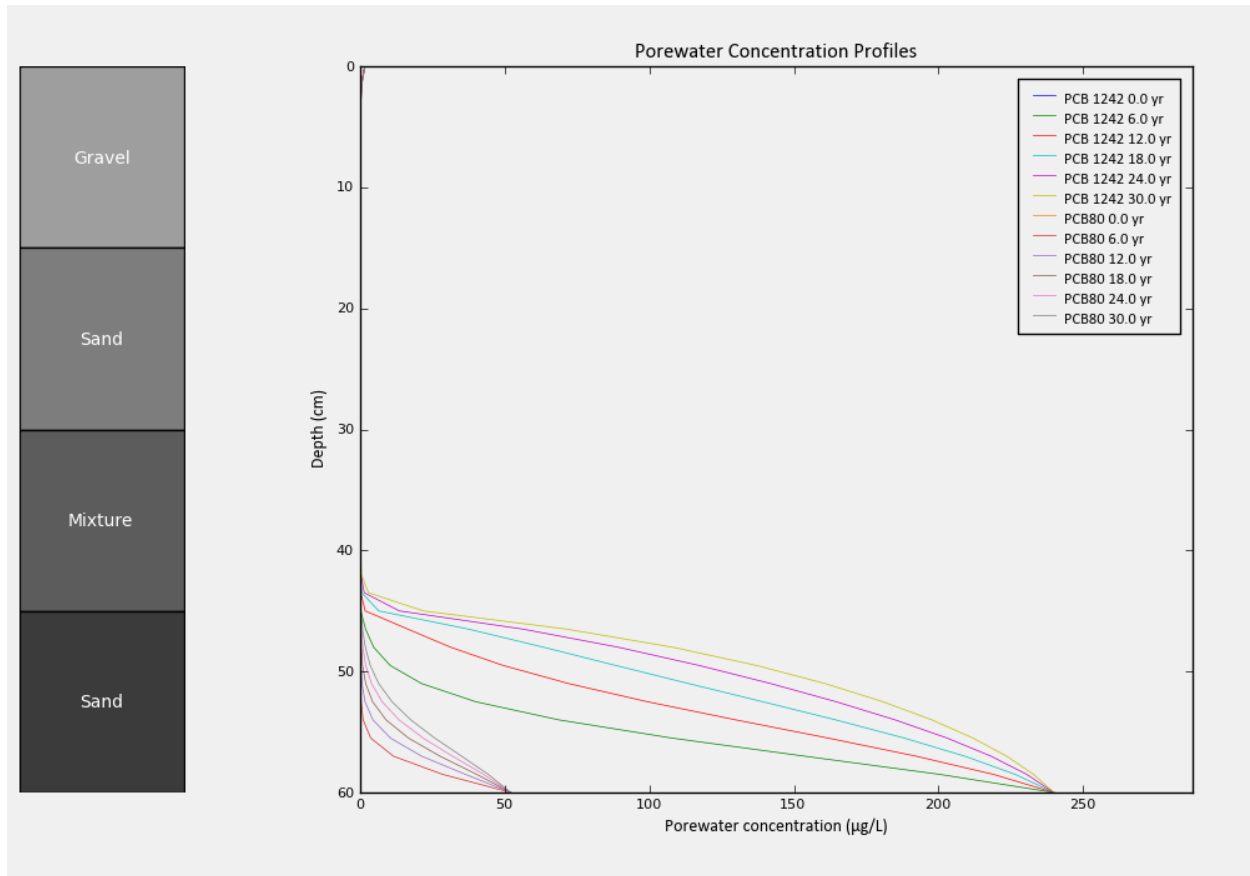
CapSim 3.6

Please specify the simulation options for the system:

| | |
|------------------------------------|---|
| Simulation duration (yr): | <input type="text" value="30.0"/> |
| Steps in output files: | <input type="text" value="100"/> |
| Time step options: | <input type="text" value="Crank-Nicolson"/> |
| Mass balance options: | <input type="text" value="Track"/> |
| Oscillation output options: | <input type="text" value="Instantaneous"/> |
| Discretization options: | <input type="text" value="Use defaults"/> |
| Number of grid points: | <input type="text" value="30"/> |
| Time step (yr): | <input type="text" value="0.00035"/> |
| Time steps per oscillation circle: | <input type="text" value="4"/> |

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.

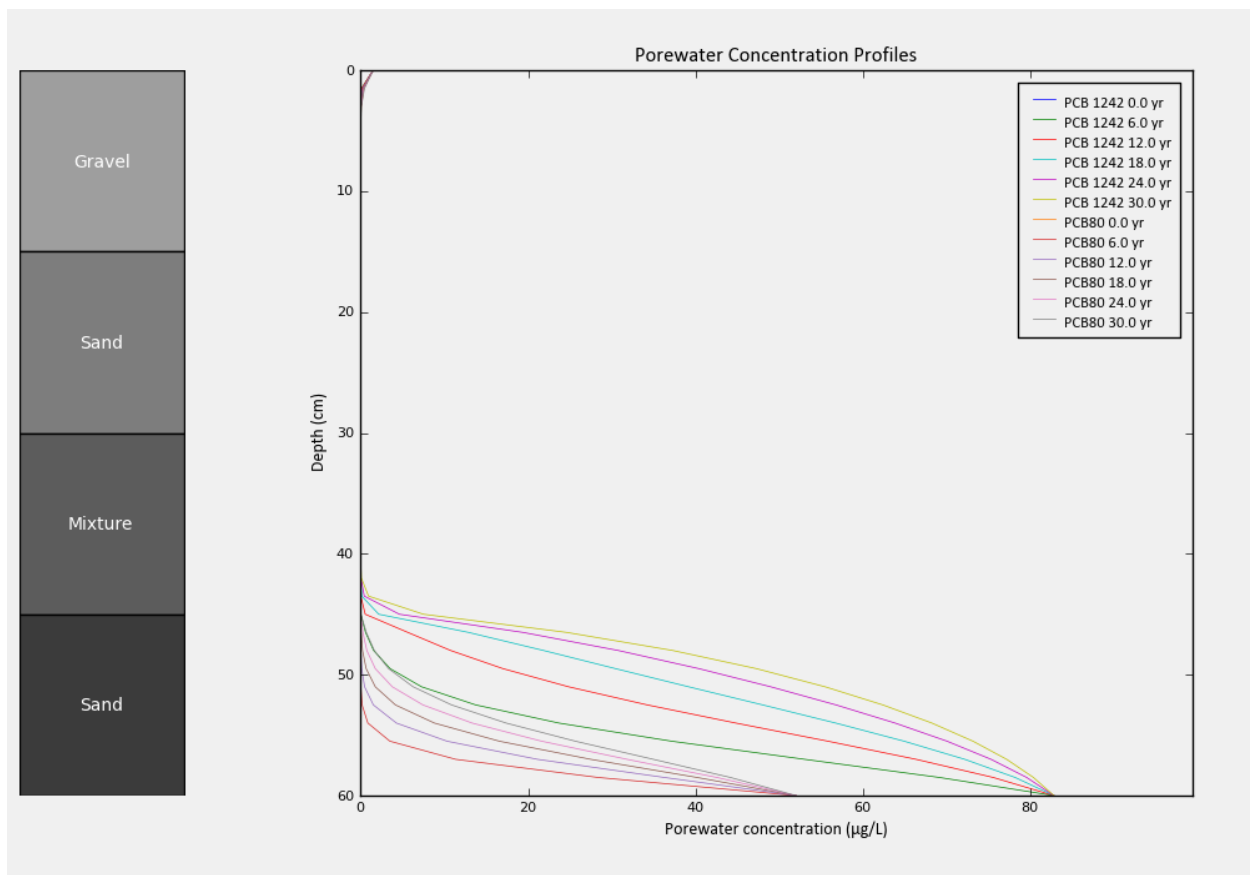
Additional Model run using max concentrations observed at Aerovox (MW15B)

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



Client: USACE
 Job Location: New Bedford Harbor
 Task Order Number: TV#5

Date: 16 March
 Project: 35860708
 Scale: NA

By: S. 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 LH-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 pore water sampling document (AppA.)

porewater $C_{max} = 36.9 \text{ ppb}$

PCB 1254 Solubility = 240 ppb

∴ since PCB conc cannot be greater than solubility - solubility will be used as worst case, conservative porewater value.

POREWATER VALUE FOR MODEL & DESIGN



HANDEX
Practical Business Solutions

Page 2 of 2

Client:
Job Location:
Task Order Number:

Date:
Project:
Scale:

By:
Checked By:

PCB transport - (Flux)

$$\begin{aligned} \text{Flux} &= K_d A C_{pw} \\ \text{Advection}_{\text{max}} &= V A C_{pw} \end{aligned}$$

Assume

$$\text{TDC} = f_a = 87\% \text{ (avg of samples)}$$

$$\text{Diffusive flux} = 2.380 \text{ g/m}^2/\text{yr}$$

from Battelle, 2017

$$\begin{aligned} V &= \text{Darcy velocity} - \text{calculated using max } K \\ &\text{from lab data} \\ &= 32.5 \text{ cm/yr} = 0.089 \text{ cm/day} \end{aligned}$$

$$\text{Max Advective Flux} = \text{g/acre/yr}$$

$$0.089 \frac{\text{cm}}{\text{day}} (1 \text{ acre}) \left(240 \frac{\text{ug}}{\text{g}} \right)$$

$$0.089 \frac{\text{cm}}{\text{day}} \cdot \frac{1 \text{ yr}}{100 \text{ cm}} (1 \text{ acre}) \left(\frac{240 \text{ ug}}{\text{g}} \cdot \frac{1 \times 10^{-6} \text{ g}}{1 \text{ ug}} \right) \left(\frac{365 \text{ d}}{1 \text{ yr}} \right)$$

$$\left(0.089 \frac{\text{cm}}{\text{day}} \cdot \frac{1 \text{ yr}}{100 \text{ cm}} \right) \left(\frac{4040 \text{ m}^2}{\text{acre}} \right) \left(\frac{240 \times 10^{-6} \text{ gm}}{\text{g}} \right) \left(\frac{1000 \text{ g}}{\text{kg}} \right)$$

$$= 0.863 \text{ gm/acre/day} = 314.97 \text{ g/acre/yr}$$

$$\text{max Advective Flux} = 0.315 \text{ kg/yr}$$

$$\begin{aligned} \text{Diffusive} &= 2.380 \frac{\text{g}}{\text{m}^2/\text{yr}} \left(\frac{4040 \text{ m}^2}{\text{acre}} \right) = 9615.2 \text{ g/acre/yr} \\ &= 9.61 \text{ kg/yr} \end{aligned}$$

∴ 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/organoclay = 0.422 (CapSim generated) – 15% organoclay by weight

sand/organoclay = 0.428 (CapSim generated) – 20% organoclay by weight

sediment (calculated from lab values) = 0.69

2. Dry Bulk density (g/cm³)

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.

$K=2.3 \text{ E-6 cm/sec}$

Max hydraulic gradient = 0.448

Darcy flux= $v = -K (\Delta h/\Delta l) = 1.0304\text{E-6 cm/sec} = 32.49 \text{ cm/yr}$

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

| Contaminant | PCB 1242 @ solubility | NOTES |
|--|----------------------------|--------------------------|
| 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 thickness | 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 | 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 |
| $\beta = \text{SQRT}(Pe_1^2/4+Da_1)$ | 3.03 |
| Conventional Cap Layer Peclet No., Pe_2 | 6.31 |
| Conventional Cap Layer Damkohler No., Da_2 | 0.00 |
| $\gamma = \text{SQRT}(Pe_2^2/4+Da_2)$ | 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

| Contaminant | PCB 1248 @ solubility | NOTES |
|--|----------------------------|--------------------------|
| 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_p | 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 thickness | 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 |
| $\beta = \text{SQRT}(Pe_1^2/4 + Da_1)$ | 2.61 |
| Conventional Cap Layer Peclet No., Pe_2 | 5.46 |
| Conventional Cap Layer Damkohler No., Da_2 | 0.00 |
| $\gamma = \text{SQRT}(Pe_2^2/4 + Da_2)$ | 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

| Contaminant | PCB 1254 | NOTES |
|--|----------------------------|--------------------------|
| 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_p | 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 thickness | 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 |
| $\beta = \text{SQRT}(Pe_1^2/4 + Da_1)$ | 2.67 |
| Conventional Cap Layer Peclet No., Pe_2 | 5.57 |
| Conventional Cap Layer Damkohler No., Da_2 | 0.00 |
| $\gamma = \text{SQRT}(Pe_2^2/4 + Da_2)$ | 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.



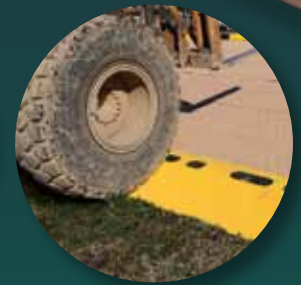
TREAD PATTERN

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°.



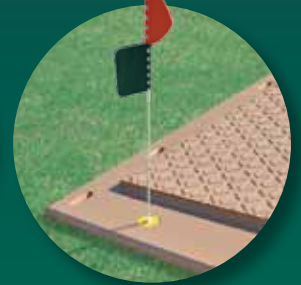
PIN EXTRACTOR

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.



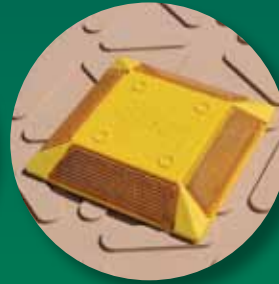
LOCKING PIN

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

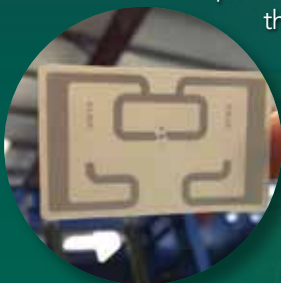
Follows surface contours.

**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.

**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 |

New **TURNING MAT COMPONENT** gives personnel and equipment a solid work platform to perform maintenance around storage tanks and other circular areas.

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.

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.



DURA-BASE provided a stable platform for this utility project



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

1-877-MAT-ROAD (1-877-628-7623) • MatSales@Newpark.com

www.newpark.com

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)

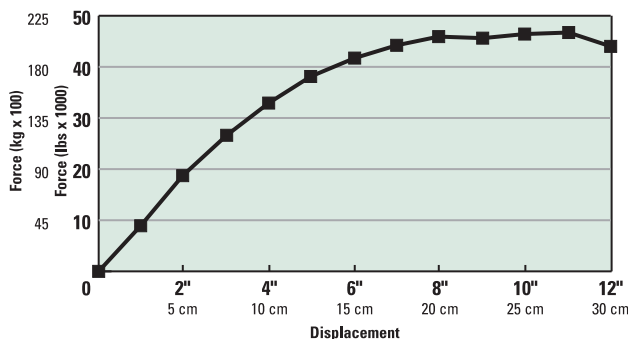
Overall Dimensions (*Small Mat*): 8' x 7'6" x 4" (2.44m x 2.29m x 10.2cm)
Surface Dimensions (*Small Mat*): 7' x 6'6" (2.13m x 1.98m)
Weight (*Small Mat*): 550 lbs. (249kg)

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/cm²). Compressive loads in excess of 1000 psi (70 kg/cm²) 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].

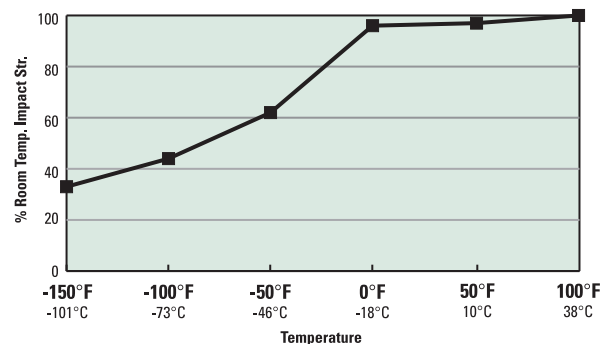
Static Dissipation

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.



Houston: 9320 Lakeside Blvd., Ste. 100 • The Woodlands, TX 77381 • (281) 362-6800 • Fax: (281) 362-6801

Carencro: 2900 Hwy 93 • Carencro, LA 70520 • (337) 896-8976 • Fax: (337) 896-1971

www.NewparkMats.com



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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365 South Holland Drive
Pendergrass, GA 30567

Tel 706 693 2226
Tel 888 795 0808

Fax 706 693 4400
www.tencate.com

FGS000358
ETQR43



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.

TenCate Geosynthetics Americas Laboratories are accredited by Geosynthetic Accreditation Institute – Laboratory Accreditation Program ([GAI-LAP](#)). [NTPEP Listed](#)

| 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 | |

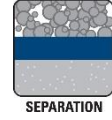
| Physical Properties | Unit | Roll Sizes | |
|----------------------------------|-----------------------------------|------------------------|-----------------------|
| Roll Dimensions (width x length) | ft (m) | 12.5 x 360 (3.8 x 110) | 15 x 360 (4.57 x 110) |
| Roll Area | yd ² (m ²) | 500 (418) | 600 (502) |

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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.

TenCate Geosynthetics Americas Laboratories are accredited by Geosynthetic Accreditation Institute – Laboratory Accreditation Program ([GAI-LAP](#)). [NTPEP Listed](#)

| 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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365 South Holland Drive
Pendergrass, GA 30567

Tel 706 693 2226
Tel 888 795 0808

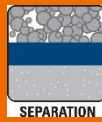
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ETQR65



GAI-LAP-25-97

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%.

TenCate Geosynthetics Americas Laboratories are accredited by Geosynthetic Accreditation Institute – Laboratory Accreditation Program ([GAI-LAP](#)). [NTPEP Listed](#)

| 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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Pendergrass, GA 30567

Tel 706 693 2226
Tel 888 795 0808

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FGS000385
ETQR77



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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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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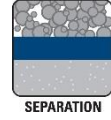
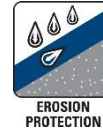
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ETORRQ



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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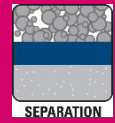
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ETQR50



GAI-LAP-25-97

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/ft² (l/min/m²) | 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 | yd² (m²) | 500 (418) | | |

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Tel 888 795 0808

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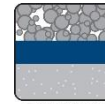
Mirafi® 180NC



DRAINAGE


EROSION
PROTECTION


FILTRATION



SEPARATION

Mirafi® 180NC 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® 180NC 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) | 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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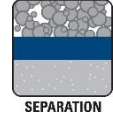
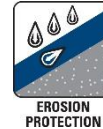
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GAI-LAP-25-97



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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GAI-LAP-25-97



DRAINAGE


EROSION
PROTECTION


FILTRATION



SEPARATION

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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GAI-LAP-25-97

Mirafi® 1100NPA



Mirafi® 1100NPA 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® 1100NPA 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) | 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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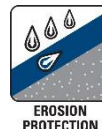
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GAI-LAP-25-97



Mirafi® 1120N

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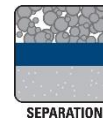
| Mechanical Properties | Test Method | Unit | Minimum Average Roll Value | |
|------------------------------|-------------|---|----------------------------|------------|
| | | | MD | CD |
| Grab Tensile Strength | ASTM D4632 | lbs (N) | 300 (1335) | 300 (1335) |
| Grab Tensile Elongation | ASTM D4632 | % | 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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Mirafi® 1160N

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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) |

Disclaimer: TenCate assumes no liability for the accuracy or completeness of this information or for the ultimate use by the purchaser. TenCate disclaims any and all express, implied, or statutory standards, warranties or guarantees, including without limitation any implied warranty as to merchantability or fitness for a particular purpose or arising from a course of dealing or usage of trade as to any equipment, materials, or information furnished herewith. This document should not be construed as engineering advice.

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365 South Holland Drive
Pendergrass, GA 30567

Tel 706 693 2226
Tel 888 795 0808

Fax 706 693 4400
www.tencate.com

FGS000353
ETQR44



Mirafi® N-Series Nonwoven Polypropylene Geotextiles for Soil Separation and Drainage

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.



Mirafi® N-Series Nonwoven Geotextiles

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.

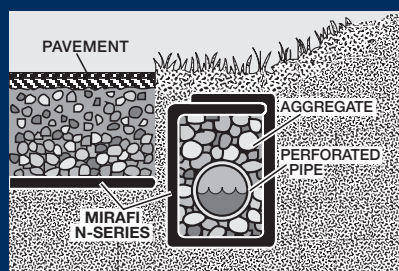


Mirafi® N-Series Nonwoven Polypropylene Geotextiles for Soil Separation and Drainage

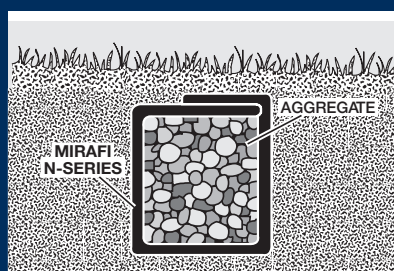
| Property / Test Method | Units | 140NL | 140NC | 140N | 160N | 170N | 180N | 1100N | 1120N | 1160N |
|------------------------------|-----------------------------------|----------------------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|
| 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 | | | | | | | | | | |
| ASTM D4533 | lbs | 40 | 45 | 50 | 60 | 75 | 80 | 100 | 115 | 140 |
| | (N) | (178) | (200) | (223) | (267) | (334) | (356) | (445) | (512) | (623) |
| CBR Puncture Strength | | | | | | | | | | |
| ASTM D6241 | lbs | 250 | 250 | 310 | 410 | 450 | 500 | 700 | 800 | 1025 |
| | (N) | (1113) | (1113) | (1380) | (1825) | (2003) | (2224) | (3115) | (3560) | (4561) |
| HYDRAULIC PROPERTIES | | | | | | | | | | |
| Maximum Opening Size | | | | | | | | | | |
| Apparent Opening Size (AOS) | US Sieve | 50 | 70 | 70 | 70 | 70 | 80 | 100 | 100 | 100 |
| ASTM D4751 | (mm) | (0.30) | (0.212) | (0.212) | (0.212) | (0.212) | (0.18) | (0.15) | (0.15) | (0.15) |
| Minimum Roll Value | | | | | | | | | | |
| Permittivity | sec ⁻¹ | 2.0 | 2.0 | 1.7 | 1.5 | 1.4 | 1.4 | 0.8 | 0.8 | 0.7 |
| ASTM D4491 | | | | | | | | | | |
| Flow Rate | gal/min/ft ² | 145 | 140 | 135 | 110 | 105 | 95 | 75 | 65 | 50 |
| ASTM D4491 | (l/min/m ²) | (5907) | (5704) | (5500) | (4481) | (4278) | (3870) | (3056) | (2648) | (2037) |
| Minimum Test Value | | | | | | | | | | |
| UV Resistance after 500 hrs. | % strength | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 | 70 |
| ASTM D4355 | | | | | | | | | | |
| Packaging | Units | 140NL | 140NC | 140N | 160N | 170N | 180N | 1100N | 1120N | 1160N |
| Roll Width | ft (m) | 12.5 (3.8) | 12.5 (3.8) | 12.5 (3.8) | 12.5 (3.8) | 12.5 (3.8) | 12.5 (3.8) | 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) | 300 (91.4) | 360 (110) | 300 (91.4) | 300 (91.4) | 150 (46) |
| | | | | | 360 (110) | 360 (110) | 300 (91.4) | | | |
| Area | yd ² (m ²) | 500 (418) | 500 (418) | 500 (418) | 500 (418) | 500 (418) | 500 (418) | 500 (418) | 500 (418) | 250 (209) |
| | | 600 (502) | 600 (502) | 600 (502) | 600 (502) | 600 (502) | 600 (502) | | | |

Note: Values and methods could change without notice

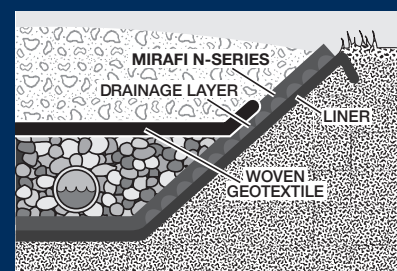
Mirafi® N-Series Nonwoven Geotextiles



**Cut-off/Interceptor Drain Along a Roadway
Or Another Critical Structure**



French Drain Without Pipe



Liner Protection Within a Landfill

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PDS.N1217

365 South Holland Drive Tel 800 685 9990 Fax 706 693 4400
Pendergrass, GA 30567 Tel 706 693 2226 www.mirafi.com



ISO 9001 FM 61026

TENCATE
materials that make a difference

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 | 1×10^{-3} cm/sec Minimum |
| Quaternary Amine Content | CETCO Test Method | 25–33% min. Quaternary Amine Loading |

North America: 847.851.1800 | 800.527.9948 | www.cetco.com

UPDATED: MAY 2017

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FORM: TDS_ORGANOCLAY_PM-200_AM_EN_201705_V2



CETCO®

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 States 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 (°F) and the air temperature is 10 °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, 1984). 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 (W_r) 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.



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)

GAULY 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 -

$U_f = 61.1 \text{ mph}$

$U_t = 1 \text{ hour}$

$$t = \frac{3600}{U_f} = \frac{3600}{61.1} = 58.92 \text{ sec}$$

$$U_f = 61.1 = U_{t_{58.92}} = 61.1 \text{ mph}$$

Using Fig 3-13 (USACE, 1984) from the manual

$$t = 58.92 \approx 59 \text{ sec} \quad \frac{U_t = 59}{U_{3600}} = 1.24, \text{ the 1-hour}$$

average wind speed is

$$U_{t_{3600 \text{ sec}}} = \frac{U_{t_{59}}}{\left(\frac{U_{t_{59}}}{U_{3600}}\right)} = \frac{61.1}{1.24} = 49.27 \text{ mph}$$



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Wind stress and drag

$$\tau = C_D \rho_{\text{air}} U^2$$

U_{10} = wind @ 10m above sea level
from site weather station

@ max observed = 93.9 mph

@ avg = 12.94

@ median = 11.72

@ NB Haupt = 61.1 mph
= 31 mph

$$\rho_{\text{air}} = 0.776 \text{ lb/ft}^3$$

C_D = drag coeff.

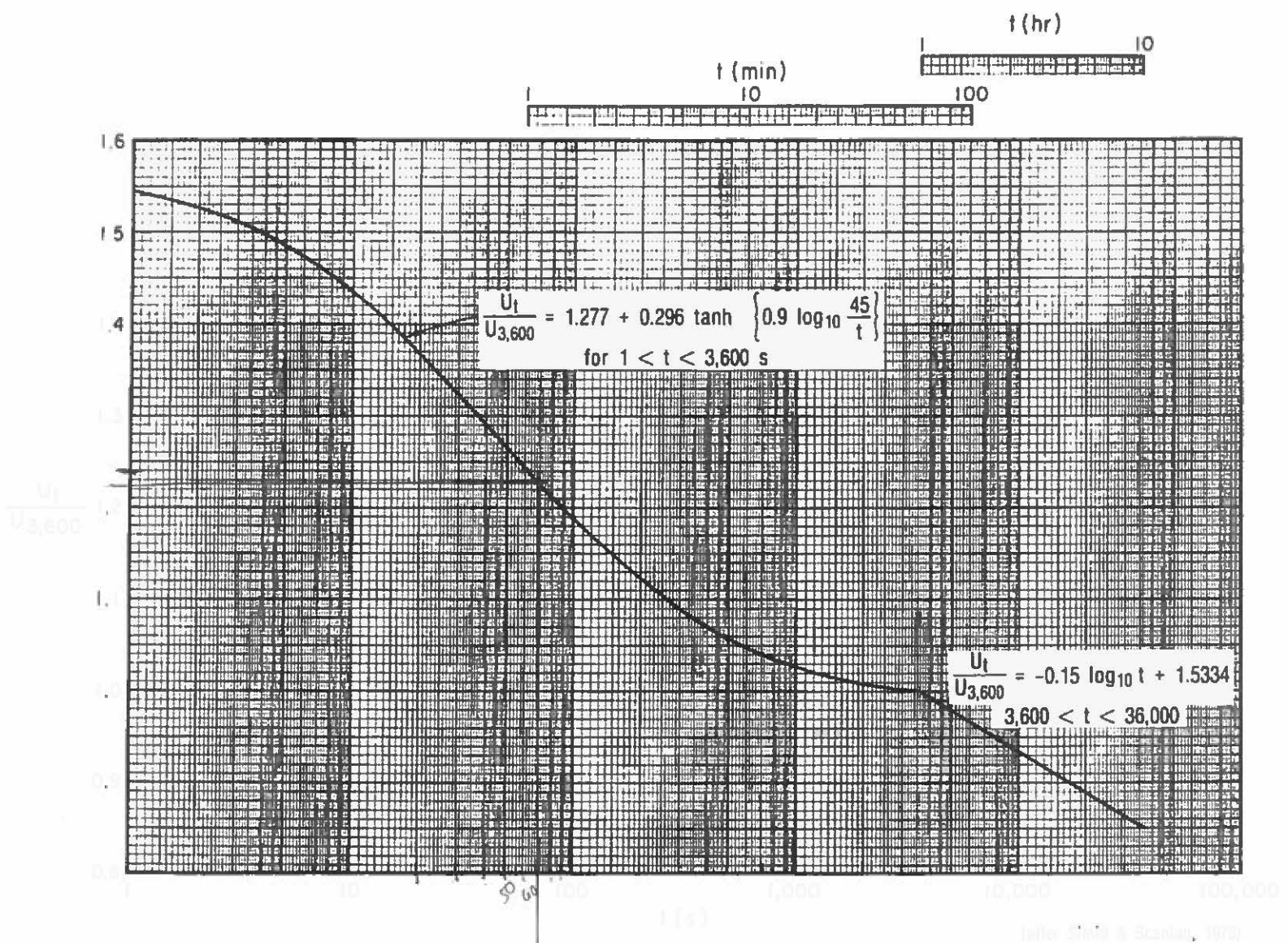


Figure 3-13. Ratio of windspeed of any duration, U_t , to the 1-hour windspeed, U_{3600}



Client:
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Scale:

By:
Checked By:

Stability Correction

ΔT_{as} = Air Sea Temp diff

$$T_a = 10$$

$$T_s = 40$$

$$\Delta T_{as} = T_a - T_s = 10 - 40 = -30^\circ\text{F} = -1.11^\circ\text{C}$$

\therefore per USACE, 1984 - boundary layer is unstable and windspeed is effective in causing wave growth

$$U = R_T U(10) = \text{effective wind speed}$$

$$R_T = \text{Fig 3-14} = 1.07$$

$$U = 1.07(49.27) = 53 \text{ mph } (52.72)$$

Coeff of Drag for wind stress

$$U_A = .589 U^{1.23}$$

$$= .589 (53)^{1.23} = 88.77$$

$$= 77.8$$

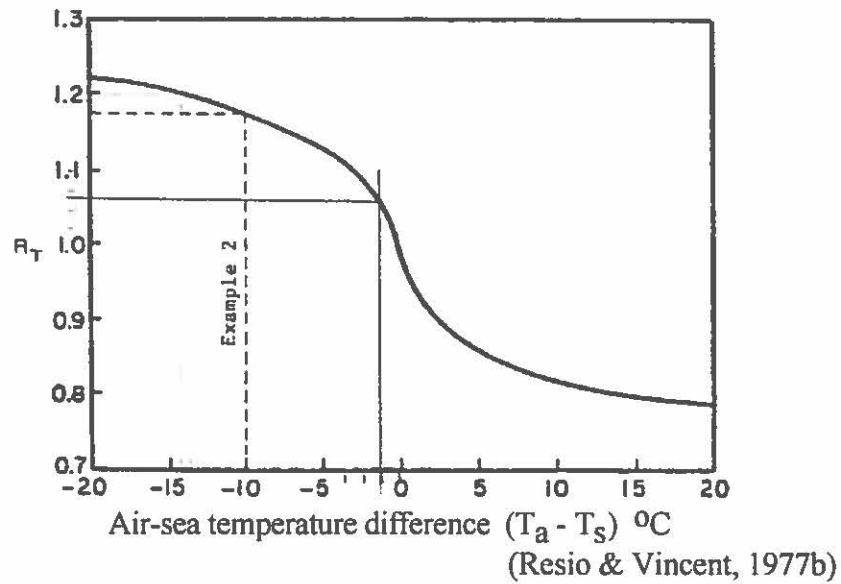
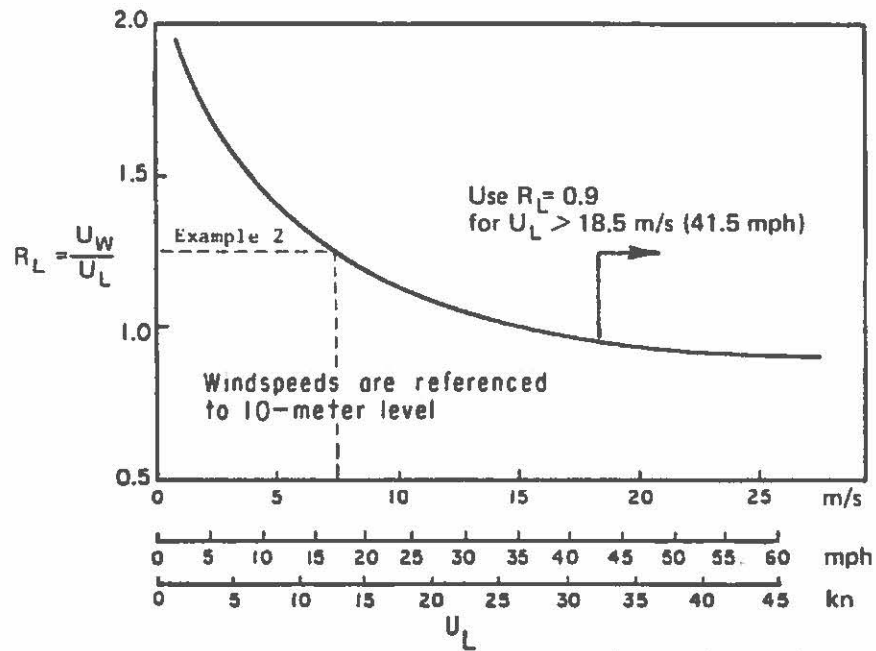


Figure 3-14. Amplification ratio, R_T , accounting for effects of air-sea temperature difference.



(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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Practical Business Solutions

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Fetch - wind wave -

wind speed $U_{10} = 55 \text{ mph}$

$f = \text{W.E dist} = 625 \text{ ft}$

water depth $= h = 20 \text{ ft}$

significant wave height $H_s = 0.838 \text{ ft}$

wave period $T = 1.179 \text{ sec}$

from

3-39 #

3-40 Shore Protection
manual.

$U_{10} = 30 \text{ mph}$

$f = 625$

$h = 20$

$H_s = 0.482 \text{ ft}$

$T = 0.979 \text{ s}$

wind = 55

$f = 6720$

$h = 20$

$H_s = 2.609$

$T = 2.511$



Client:
Job Location:
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Scale:

By:
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Armor - shoreline

γ_r = unit weight of stone $H = 3.0 \text{ ft.}$

γ_w = unit weight of water

K_d = stability coeff - 20 & 4

θ = angle of bank (slope = 3H:1V, 18.4)

$$W_r = \frac{\left(\frac{165 \text{ lb}}{4.3} \right) \left(\frac{3}{3} \right)^3 \rightarrow 4455}{2 \left(\frac{165}{62.4} \right)^3 \cot(18.4)^2} = 40 \text{ lb.}$$

110.93 ~~1156~~
~~110.93~~

from table 7-12 = 8" 8.6 in.

for $K_d = 4.0$

$$W_r = \frac{4455}{20} = 222.75 \text{ lb.} \approx 6.9 \text{ in.}$$

$$h = 2.61 \quad W_r = \frac{165(2.61)^3}{2 \left(\frac{165}{62.4} \right)^3 \cot 18.4} = \frac{2221.86}{20.44} = 108.7 \text{ lb.} \approx 7.4 \text{ " stone}$$

$$h = 0.402 \quad = 165(0.402)^2 = 0.166 \text{ lb.} \approx 1\frac{1}{2} \text{ " stone}$$

Table 7-12. Weight and size selection dimensions of quarystone¹.

| 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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Client:
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By:
Checked By:

Model - Lally

Bed Shear 8 N/m^2 → medium gravel 0.31 - .63 in.
(wind, wave, tide)

Ice scour

Boat scour / prop wash - 25hp -

2ft from MLW to cap.

non-ducted

① 1020hp $D_{50} = 2\frac{1}{4}"$

ducted

② 1020hp $D_{50} = 3\frac{1}{2}"$

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

Jacobs
103 Sawyer Street
New Bedford, MA 02746
508-996-5462
508-996-6742
www.jacobs.com

Document history and status

| Revision | Date | Description | By | Review | Approved |
|----------|------|-------------|----|--------|----------|
| | | | | | |
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- [Figure 2](#) Grid of Analyzed Asphalt Cap

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- [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 discrepancies within the area 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.

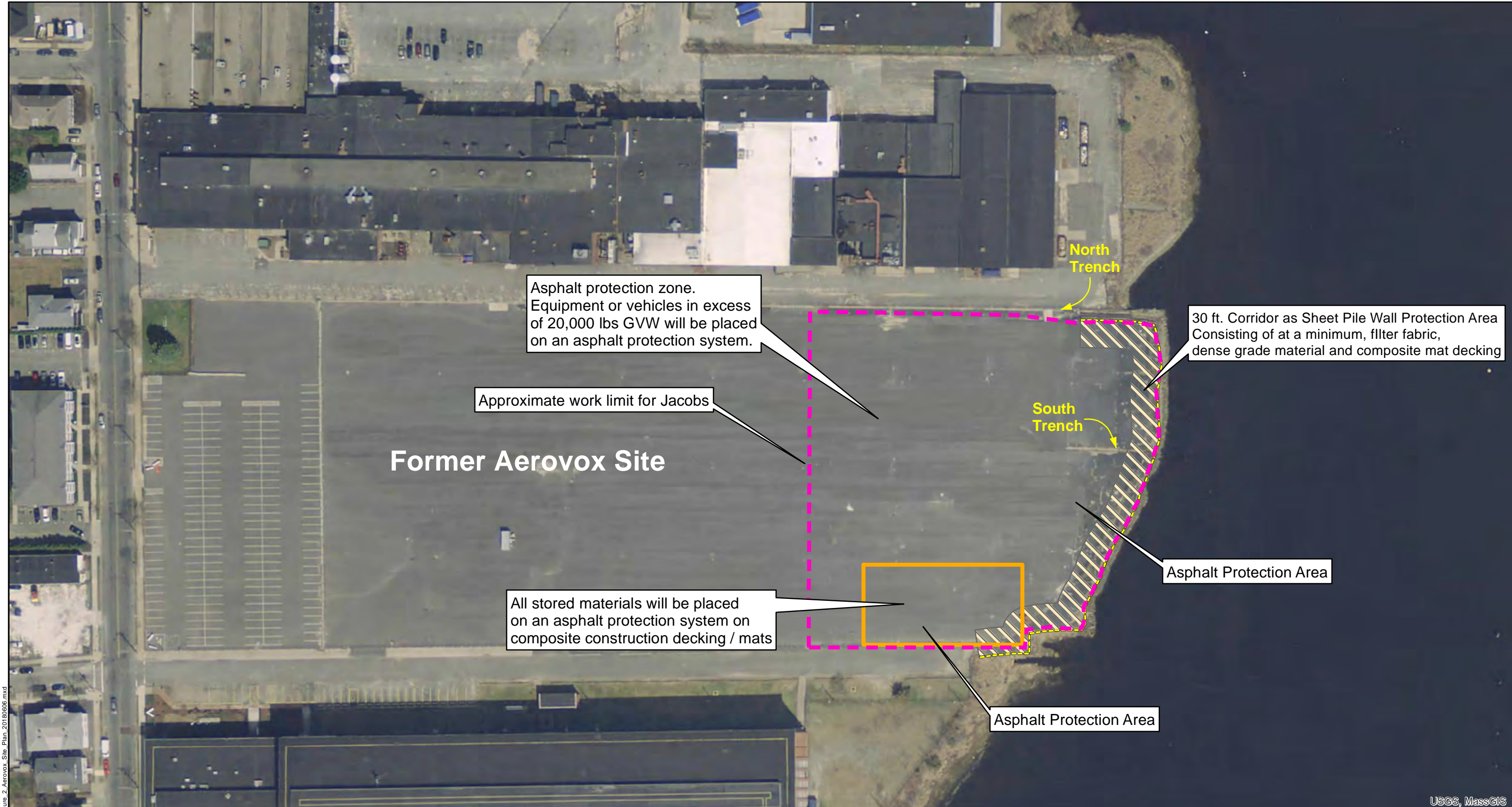
5.0 Deliverables

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

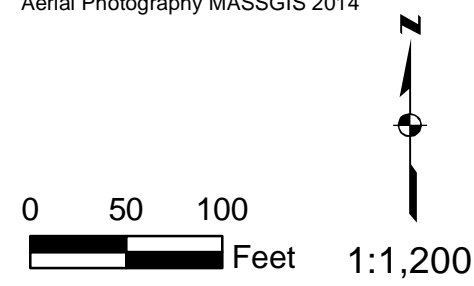



Path: Y:\NBBH\Projects\358BG1001\20180201\Aerovox_Site_Plan_20180606.mxd

Legend

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

Aerial Photography MASSGIS 2014





Former Aerovox Site Area

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/6/2018 **Figure 1**



USGS, MassGIS

Legend

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

Aerial Photography MASSGIS 2014



1:600

JACOBS

**Former Aerovox Site
Photo Points**

New Bedford Harbor Superfund Site

NAME: gscott Date: 6/13/2018 **Figure 2**

Path: Y:\NBBH\Projects\358BG1001\20180201\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

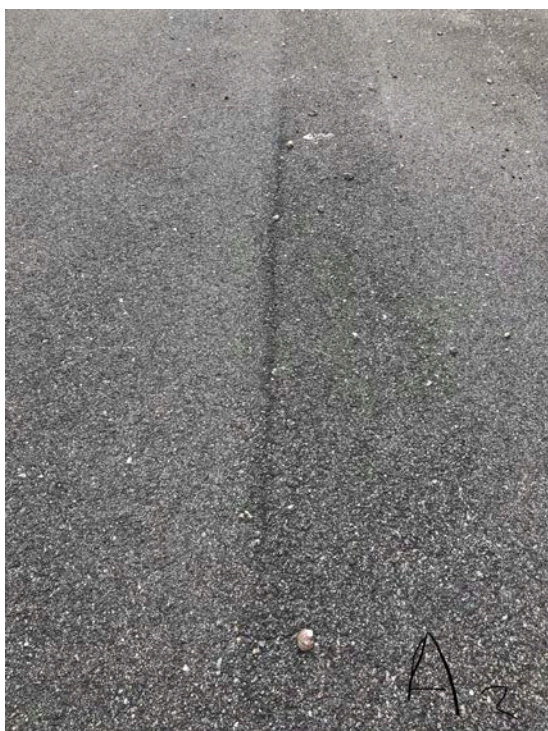
Photographs of Existing Conditions

A1





A2



A3





A4



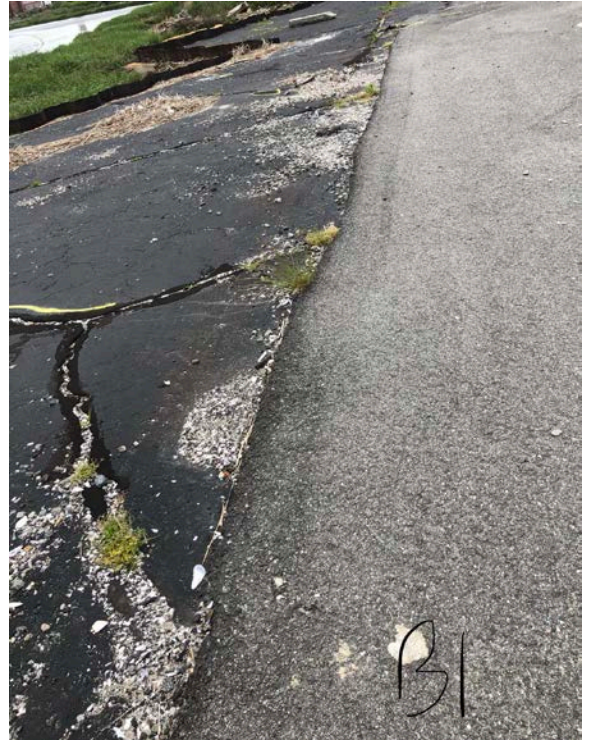
A5



A6



B1

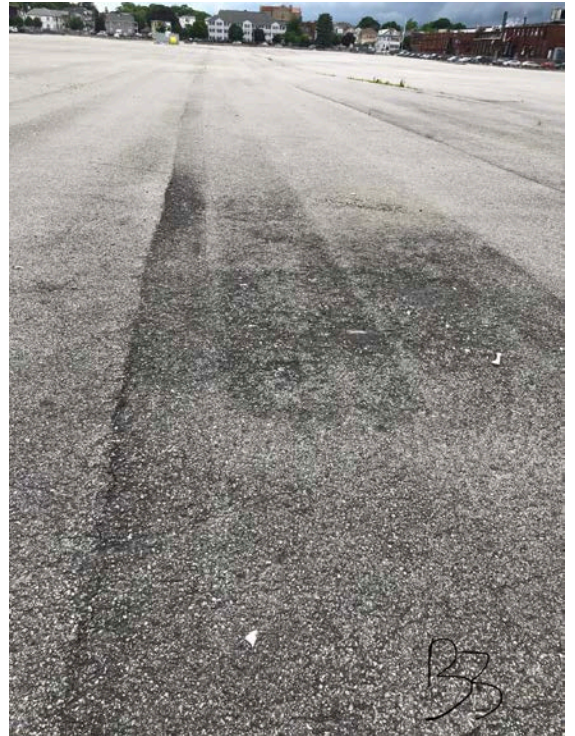




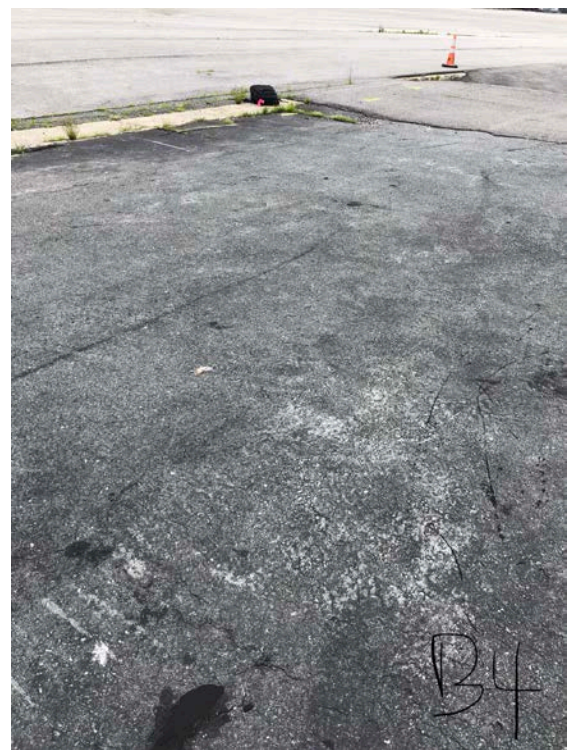
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B3



B4



B5





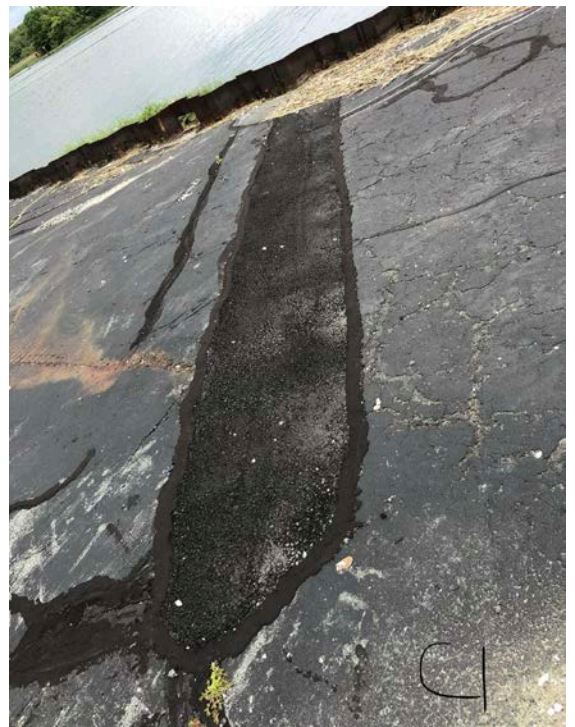
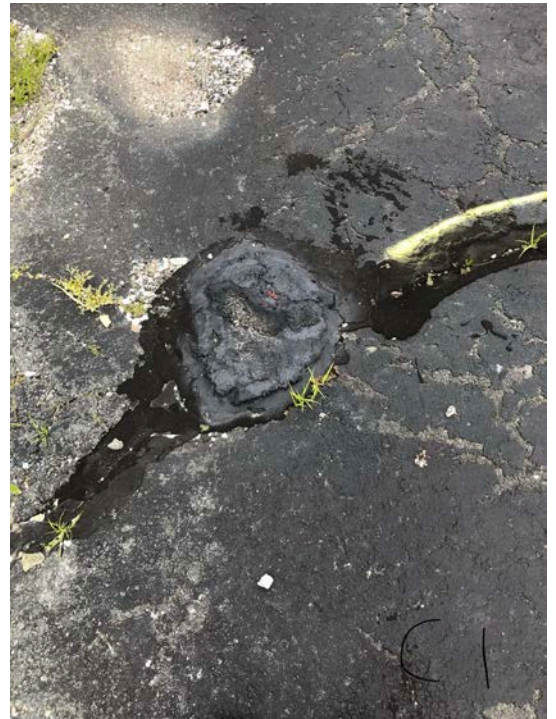
B6







C1





C2

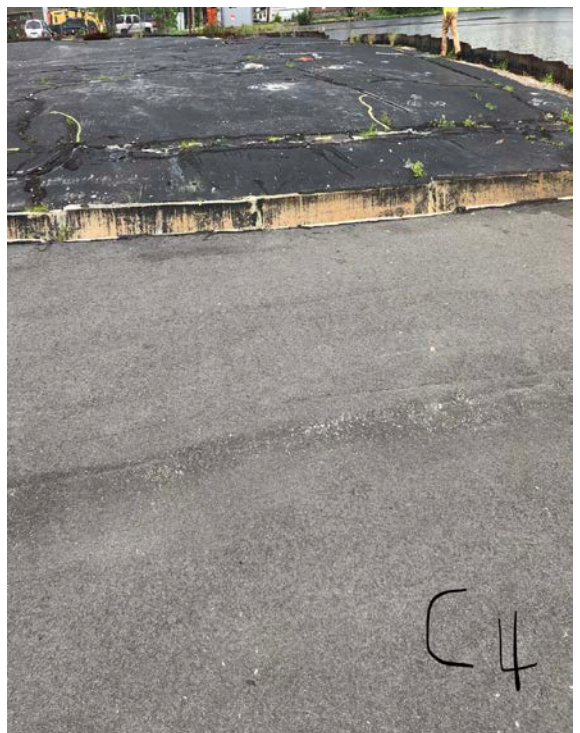




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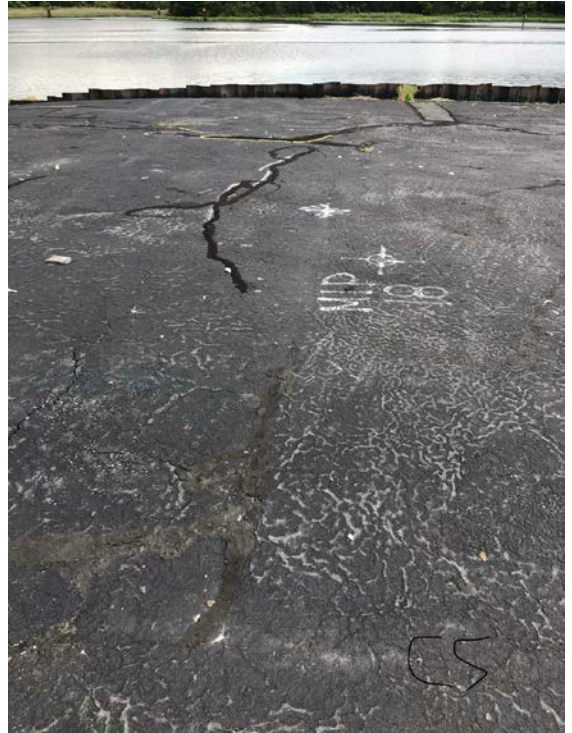


C4



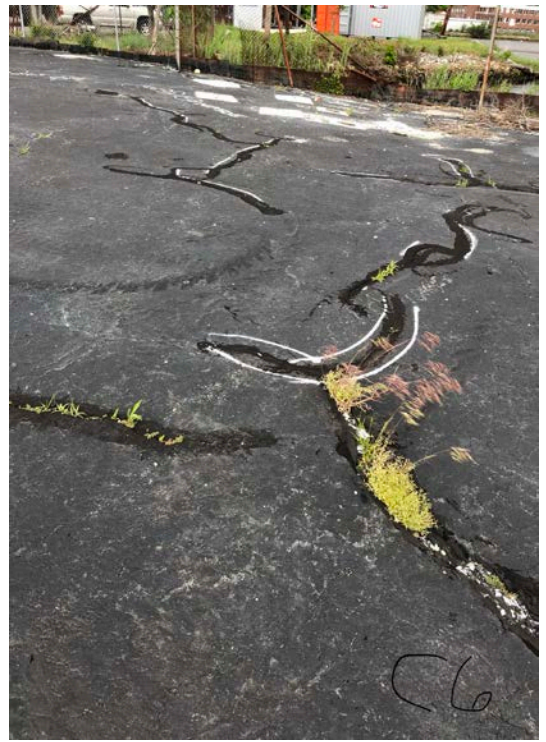


C5





C6





D1



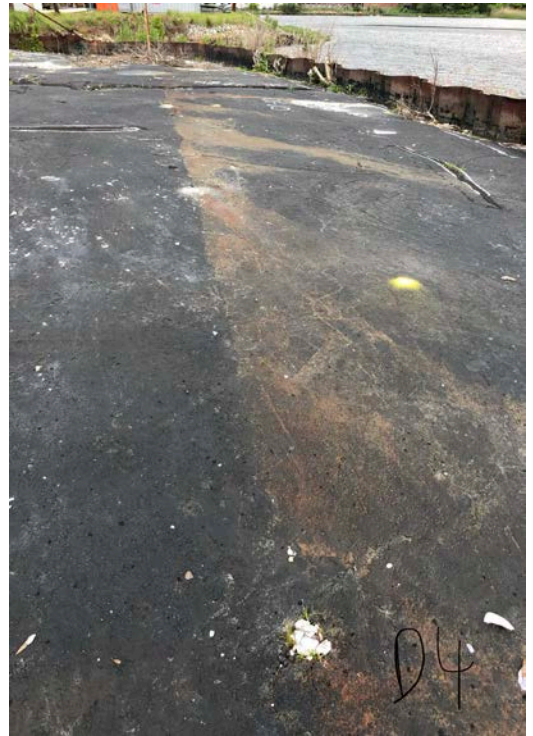
D2



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 |



USGS, MassGIS

Legend

- Cap Edge Location Point (10 ft Spacing)
- Sheet Pile Location

Aerial Photography MASSGIS 2014

DRAFT

0 20 40 Feet 1:600

N

JACOBS

**Aerovox Cap Boundary
Point Locations
10 ft Spacing**

New Bedford Harbor Superfund Site

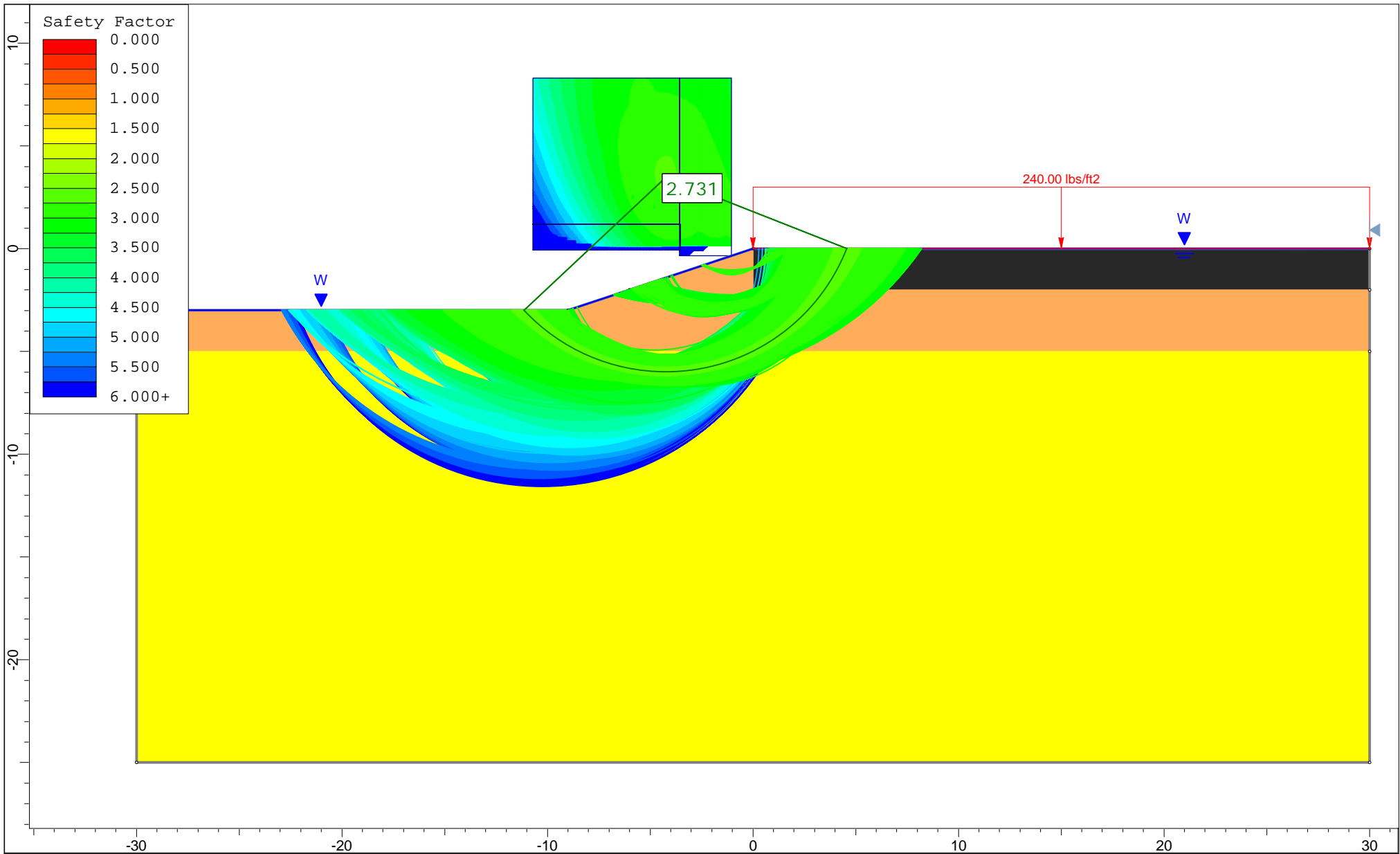
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Figure X-X

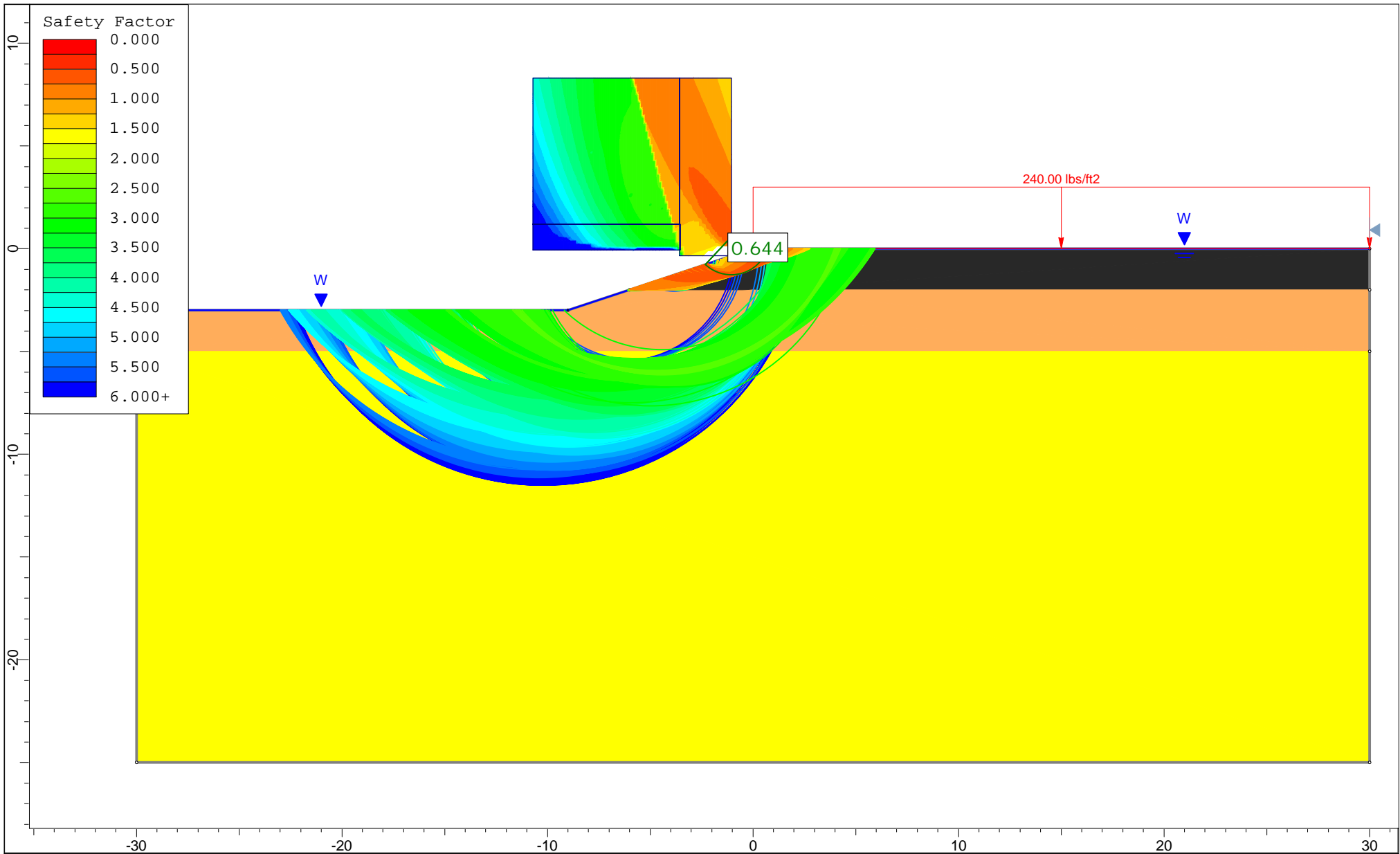
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Appendix Q

Slope Stability Calculations



| | | | | | |
|---|--|--|------------------------|------|----------------|
|  <small>SLIDEINTERPRET 7.020</small> | Project | | | | |
| | SLIDE - An Interactive Slope Stability Program | | | | |
| | Analysis Description | | | | |
| | Drawn By | | Scale | 1:78 | Company |
| | Date | | 11/6/2017, 11:16:37 AM | | File Name |
| | | | | | 3-1 Slope.slim |



| | | |
|--|------------------------|--------------------------|
| Project | | |
| SLIDE - An Interactive Slope Stability Program | | |
| Analysis Description | | |
| Drawn By | Scale 1:78 | Company |
| 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 $M\text{-Alpha} = \cos(\alpha)(1 + \tan(\alpha)\tan(\phi)/F) < 0.2$ 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

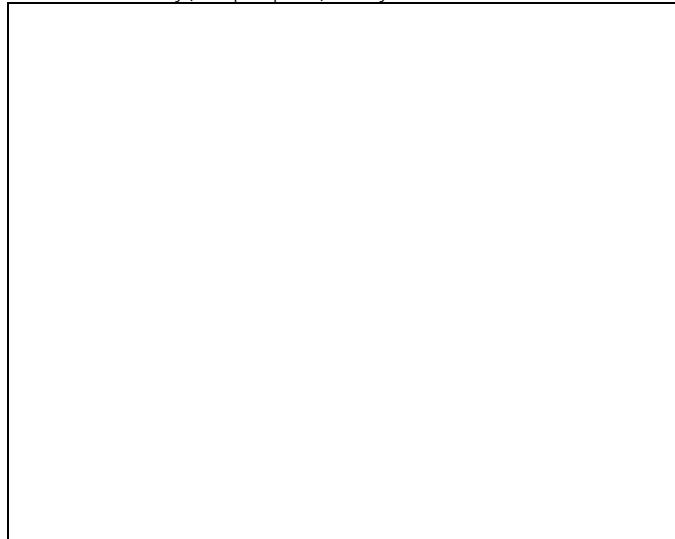
| Slice Number | Width [ft] | Weight [lbs] | Angle of Slice Base [degrees] | Base Material | Base Cohesion [psf] | Base Friction Angle [degrees] | Shear Stress [psf] | Shear Strength [psf] | Base Normal Stress [psf] | Pore Pressure [psf] | Effective Normal Stress [psf] | Base Vertical Stress [psf] | 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



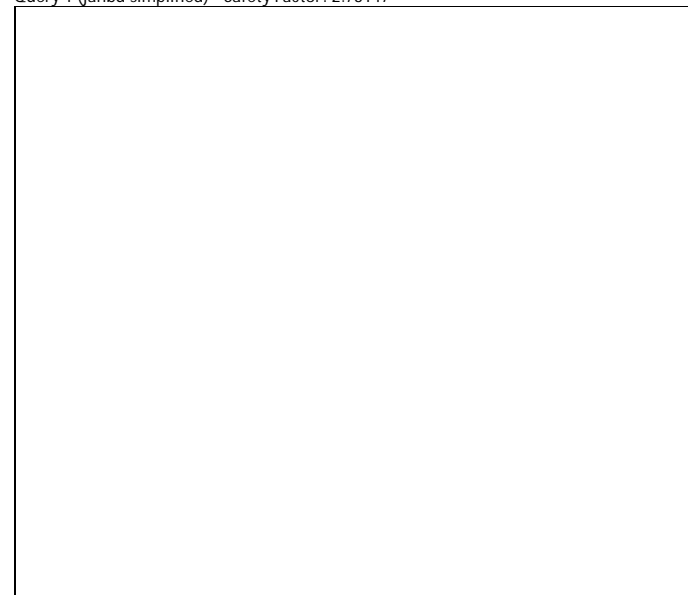
| Slice Number | X coordinate [ft] | Y coordinate - Bottom [ft] | Interslice Normal Force [lbs] | Interslice Shear Force [lbs] | Interslice Force Angle [degrees] |
|--------------|-------------------|----------------------------|-------------------------------|------------------------------|----------------------------------|
| 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

Aerovox Floating Dock Stability calculations

See attached Figures for Dock layout & cross-section

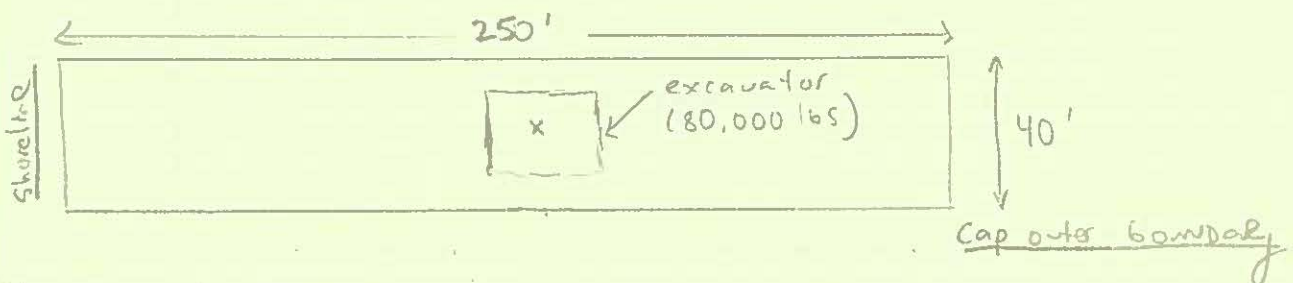
The Floating Dock layout:

$$250 \text{ FT} \times 40 \text{ FT} = 10,000 \text{ SF Footprint}$$

$$\text{WT per } 6 \text{ FT} \times 20 \text{ FT section} = 1000 \text{ LB}$$

$$\text{TOTAL Weight} = \frac{10000 \text{ SF}}{120 \text{ SF}} \times 1000 \text{ LB} = 84,000 \text{ LB}$$

During CAP placement operations, the Floating Dock will 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

$$\text{Weight} = W_{\text{dock}} + W_{\text{exc}} + W_{\text{truck}} = 84,000 + 40,000 + 80,000$$

$$\text{WT} \quad \quad \quad 244,000 \text{ LBS}$$

$$\text{Length: } L_B = 250 \text{ FT} \quad Z_{\text{bar}} = \frac{L_B}{2} = 125 \text{ FT}$$

$$\text{Width: } B_B = 40 \text{ FT} \quad X_{\text{bar}} = \frac{B_B}{2} = 20 \text{ FT}$$

$$\text{Depth: } D_B = 2.5 \text{ FT} \quad Y_{\text{bar}} = \frac{D_B}{2} = 1.25 \text{ FT}$$

$$\text{Water Plane Area: } A_B = 10,000 \text{ SF}$$

$$\text{Trans Mom of Inertia: } I_T = L_B \frac{B_B^3}{12} = 2.1 \times 10^6 \text{ ft}^4$$

$$\text{Long Mom of Inertia: } I_L = B_B \frac{L_B^3}{12} = 5.2 \times 10^7 \text{ ft}^4$$

Excavator on Center

$$W_{\text{exc}} = 80,000 \text{ LB}$$

Shane Taylor

Jardos

APR 16 2018

2

$$Z_{Exc\ bar} = \frac{LB}{2} = 200\text{ FT}$$

$$X_{Exc\ bar} = \frac{BB}{2} = 20\text{ FT}$$

$$Y_{Exc\ bar} = DB + 8\text{ FT} = 10.5\text{ FT}$$

Vertical Center of Gravity

$$Y_G = \frac{W_{Dock} Y_{Bbar} + W_{Exc} Y_{Exc\ bar}}{W_T}$$

$$= \underline{4.7\text{ FT}}$$

Port - Starboard Center of Gravity

$$X_G = \frac{W_{Dock} X_{Bbar} + W_{Exc} X_{Exc\ bar}}{W_T}$$

$$= 20\text{ FT}$$

$$e_x = X_G - X_{Bbar} = \underline{0\text{ FT}}$$

Fore - Aft Center of Gravity

$$Z_G = \frac{W_{Dock} Z_{Bbar} + W_{Exc} Z_{Exc\ bar}}{W_T}$$

$$= 125\text{ FT}$$

$$e_z = Z_G - Z_{Bbar} = \underline{0\text{ FT}}$$

Total Displacement

$$\Delta = 244,000\text{ lbs} = W_T$$

Displaced Volume

$$V_D = \frac{\Delta}{\gamma_w} = \frac{244,000}{62.4} = 3.910 \times 10^3\text{ ft}^3$$

Draft

$$D = \frac{V_D}{A_B} = 0.4\text{ FT}$$

Center of Buoyancy

$$KB = \frac{D}{2} = 0.2 \text{ FT}$$

Transverse Metacenter

$$B_{MT} = \frac{I_T}{V_D} = 537 \text{ FT}$$

Long. Metacenter

$$B_{ML} = \frac{I_L}{V_D} = 13299 \text{ FT}$$

Transverse Metacentric HT

$$G_{MT} = B_{MT} + KB - YG = 532 \text{ FT} \quad (\text{POS} \therefore \text{stable } \checkmark)$$

Long. Metacentric HT

$$G_{ML} = B_{ML} + KB - YG = 13294 \text{ FT} \quad (\text{POS} \therefore \text{stable } \checkmark)$$

Net List Moment

$$M_x = \Delta e_x = 0$$

List Angle

$$\phi = \left| \arcsin \left[\frac{M_x}{\Delta G_{MT}} \right] \right|, \quad \phi = 0^\circ < 5^\circ \quad (\text{stable})$$

Net Trim Moment

$$M_z = \Delta e_z = 0$$

Trim Angle

$$\theta = \left| \arcsin \left[\frac{M_z}{\Delta G_{ML}} \right] \right|, \quad \theta = 0^\circ < 5^\circ \quad (\text{stable})$$

Appendix S

Surface Water Run Off and Discharge Calculations

Client:
Job Location:
Task Order Number:

Date:
Project:
Scale:

By:
Checked By:

OUTFALL SCOUR

ID MAX velocity ft/sec
N Trench - cme
S Trench - cme

CB#1 - clay - 6" $n = 0.013$

Hadley Street - conc - 36" $n = 0.013$

Using Manning Equation

$$V = \frac{K}{n} R^{\frac{2}{3}} \sqrt{S} \quad K = 1.49$$

$$R = \frac{A}{P}$$

$$P = \frac{\theta d}{2}$$

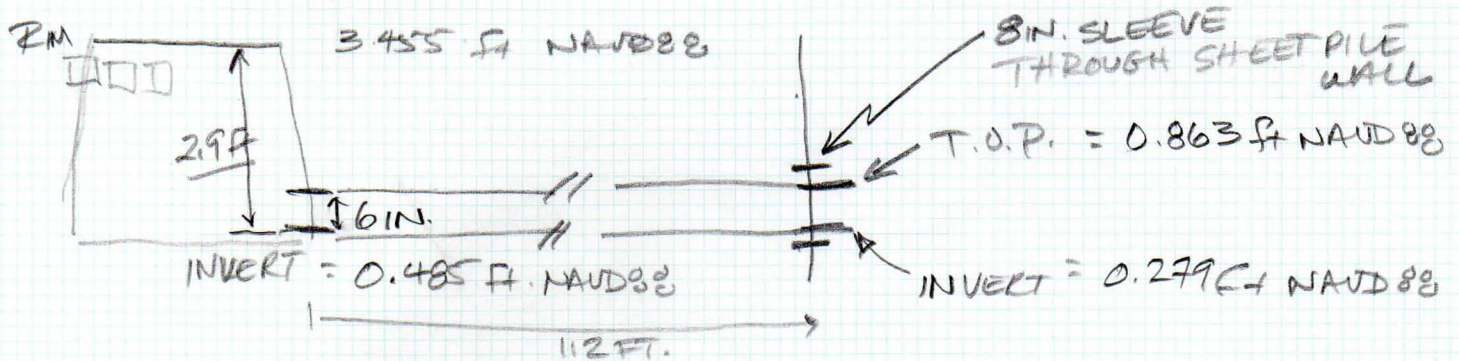
| OUTFALL ID | Diam or Width (in) | (ft) water Depth | ft/ft Slope | (ft) Wetted Perm. | ft ² Area | (ft) Hydraulic Radius | Manning Coeff | ft/sec Velocity |
|---------------|--------------------------|------------------------|----------------|-------------------------|-------------------------|-----------------------------|------------------|--------------------|
| CB-6" | 6" | 0.5 | 0.00189 | 1.57 | 0.196 | 0.123 | 0.013 | 1.22 ft/s |
| N Ditch | 12" | 0.5 | 0.0305 | 1.57 | .735 | .245 | 0.013 | 7.84 |
| S Ditch | 12" | 0.5 | 0.024 | 1.57 | .735 | .245 | 0.013 | 6.95 ft/s |
| Hadley | 36" | 2.0 | .02 | 3.82 | 4.22 | 0.737 | 0.013 | 13.22 |

Client: USACE - NAE
 Job Location: NEW BEDFORD
 Task Order Number: #5

Date: 15 MARCH 18
 Project: 35260708
 Scale:

By: EANDERSON
 Checked By:

STORM DRAIN - AEROVOX



SLOPE OF DISCHARGE =
$$\frac{0.485 - 0.279}{112} = 0.00184 \text{ ft/ft}$$

$$\approx 0.2\% \text{ slope}$$

AEROVOX PROPERTY - ALL ASPHALT -
 NO STRUCTURES
 NO TOPO FOR PROPERTY
 ASSUME 50% LOT DRAINS TO CR.

$\theta = 0.2A$

AUA = FROM CITY ASSESSOR'S MAPING
 LOTS 112-98 + 112-252 (11.48 AC) = 10.4 AC
 (9.00 AC)

$$A = 10.4(43500) = 453024 \text{ ft}^2 / 2 = \underline{226512 \text{ ft}^2}$$