Interim Action Work Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for
Washington State Department of Ecology on behalf of Port of Everett

August 14, 2015

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ACRONYMS AND ABBREVIATIONS

AET	Apparent Effects Threshold
AO	Agreed Order
ARARs	Applicable or Relevant and Appropriate Requirements
BMPs	best management practices
COPCs	contaminants of potential concern
cPAHs	carcinogenic polycyclic aromatic hydrocarbons
CSL	Cleanup Screening Level
CY	cubic yards
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Unit
DNR	Washington State Department of Natural Resources
Ecology	Washington State Department of Ecology
EMU	Ecological Management Unit
EPA	U.S. Environmental Protection Agency
HH/HTL	human health and higher trophic level
HPA	Hydraulic Project Approval
HPAHs	high-molecular-weight polycyclic aromatic hydrocarbon
IAWP	Interim Action Work Plan
Interim Action	interim cleanup action
JARPA	Joint Aquatic Resources Permit Application
LPAHs	low-molecular-weight polycyclic aromatic hydrocarbons
MDNS	Mitigated Determination of Non-significance
MLLW	Mean Lower Low Water
MTCA	Model Toxics Control Act
NCD	Near Shore Confined Disposal

OSHA	Occupational Safety and Health Act
PAHs	polycyclic aromatic hydrocarbons
PCBs	polychlorinated biphenyls
Port	Port of Everett
QA/QC	quality assurance and quality control
RCW	Revised Code of Washington
RI/FS	remedial investigation/feasibility study
SAP	Sampling and Analyses Plan
SCO	Sediment Cleanup Objective
SEPA	State Environmental Policy Act
Site	Weyerhaeuser Mill A Former Site
SMP	Shoreline Master Program
SMS	Sediment Management Standards
SPCC	Spill Prevention, Control and Countermeasures
SUA	Site Use Authorization
SVOCs	Semi-volatile organic compounds
SWPPP	stormwater pollution prevention plan
TCP	Toxics Cleanup Program
TEQ	toxicity equivalent factor
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation
WQC	Water Quality Certification

1.0 INTRODUCTION

This Interim Action Work Plan (IAWP) has been prepared on behalf of the Port of Everett (Port), Weyerhaeuser Company, and the Washington State Department of Natural Resources (DNR) to describe the approach and procedures to be used to complete a Model Toxics Control Act (MTCA) interim cleanup action (Interim Action) at the Weyerhaeuser Mill A Former Site (Site; Facility Site ID #1884322) (Figure 1) located in Everett, Washington. The Interim Action area is situated within the Site adjacent to the Pacific Terminal (Figure 2). The Pacific Terminal is the Port's primary marine terminal and currently provides a berth for deep draft vessels and is used by the Port for handling and loading of cargo. The proposed Interim Action will expedite part of the environmental cleanup at the Site and will meet terminal improvement requirements that will facilitate regional aerospace supply line needs and the associated larger vessels that will come to call on the terminal for other trade-related purposes.

The interim action dredging is to be performed under the amended Agreed Order (AO) with the Washington State Department of Ecology (Ecology) for the Weyerhaeuser Mill A Former Cleanup Site (AO No. NE 8979). The cleanup will be implemented by the Port in a manner that is consistent with the AO and the Washington MTCA Cleanup Regulation [Washington Administrative Code (WAC) 173-340] and the Washington State Sediment Management Standards (SMS; WAC 173-204). The Interim Action as described in this IAWP will be subject to review and approval by Ecology to ensure compliance with MTCA requirements and amended AO. The disposal of the proposed dredged sediment is subject to review and approval by the Dredge Material Management Program (DMMP) agencies, including the U.S. Army Corps of Engineers (USACE). Ecology, U.S. Environmental Protection Agency (EPA), and DNR to ensure compliance with DMMP requirements.

The Interim Action will be completed to remove identified contaminated sediment and to increase navigational access to the Pacific Terminal. Within the Interim Action area, 20,110 cubic yards (CY) of contaminated and 17,210 CY of clean sediment are planned to be removed. The rounded total volume of dredge material is 40,000 CY. The resulting depths will generally coincide with the adjacent Pacific Terminal navigation areas to the north. The total area of the proposed dredge prism will be approximately 1.7 acres (74,000 square feet). A temporary slope will be constructed to transition from the dredged area base elevations to existing elevations along the shoreline and off shore to the south (see Appendix A, Sheet 4). The temporary slope will be dredged and include a keyway at the toe of the slope. Armor rock will be placed in the keyway and on the slope to ensure there is a stable engineered structure to contain contaminated sediment and protect the entirety of the transition slope (see Appendix A, Sheet 5). Approximately 4,000 CY of armor rock will be placed over 23,000 square feet (0.5 acre) along the shoreline and temporary off shore transition slopes from the base of the dredge depth to the top of the dredged slope. Part of the transition slope located along the shoreline will be covered with habitat mix to soften the armoring within critical habitat elevations.

Dredged material characterization was completed to assess the conditions of sediment to be dredged from the Interim Action area to support identification of the appropriate approach for management and disposal of the dredge material. Additionally, samples were collected at the surfaces to be exposed at the base of the proposed dredge prism and on a temporary transition slope to inform cleanup decisions on the extent of dredging and management practices to contain exposed subsurface contamination along the slope. The dredged material characterization was performed in general accordance with the Dredged Material Characterization Sampling and Analyses Plan (SAP) that was approved by the DMMP agencies and Ecology

(GeoEngineers, 2014) prior to sampling. The report presenting the results of the dredged material characterization was submitted to the Ecology Toxics Cleanup Program and DMMP agencies for review and approval (GeoEngineers, 2015). The Dredged Material Characterization Report is provided in Appendix B.

The Ecology Toxics Cleanup Program (TCP) has completed a preliminary review of the dredged material characterization data and determined that sediment within the material to be dredged contains chemicals of concern that exceed SMS criteria. Ecology has determined that the proposed dredging qualifies as an interim cleanup action consistent with WAC 173-340-430. As a result, the Port and Ecology are developing this IAWP and an amendment to the Agreed Order for the interim action dredging project.

The following sections provide additional background for the Site and Interim Action to be performed at the Site.

2.0 BACKGROUND INFORMATION

2.1. Site Description

The Site is generally located at the southern end of the City of Everett waterfront (Figure 1). The address of the Property is 3500 Terminal Avenue, Everett, Snohomish County, Washington. The Upland Area of the Site generally encompasses the area comprising the Port of Everett South Terminal and Pacific Terminal (Figure 2). Three vessel berths are located at the marine terminals including: a 700-foot long wharf berth (Berth 1) at the South Terminal; a 650-foot long wharf berth at the Pacific Terminal; and a 675-foot long pier berth at Pier 1. The berths at the Pacific Terminal have been maintained to an approximate elevation of -40 feet Mean Lower Low Water (MLLW) with a 2-foot over dredge allowance to facilitate navigation. The shoreline in the terminal areas is typically comprised of bulkheads and armored slopes. The Marine Area of the Site refers to portions of the Site that are located off shore of the Upland Area and includes the marine area west of the Pacific Terminal.

2.2. Site History

This section summarizes the history for the Site including historical operations and development of the Pacific Terminal upland area and vessel berth.

2.2.1. Historical Operations at the Site

Historical operations at the Site and in the vicinity of the Interim Action area included wood milling, pulp production and log storage as described in the following sections.

2.2.1.1. Sawmill

The Weyerhaeuser Company operated a series of sawmills and related support facilities on the Site between 1896 and 1933. During this time, sawmill operations included in-water log storage, log haul-out and debarking, milling to produce dimension lumber, lumber drying, planning, storage and product shipment off site. Early mill operations were performed over the water and on piers supported by pilings.

2.2.1.2. Pulp Production

Weyerhaeuser constructed and began operation of an unbleached sulfite mill (Mill A) in the mid-1930s. In 1941 or 1945 (subject to additional research) a pulp bleach plant utilizing chlorine as the bleaching chemical was added to the Mill-A operations. In 1975, the sulfite pulp mill operation was converted into a thermomechanical pulp mill. The mill was dismantled and the site was razed in 1980. Figure 3 shows the general layout of the facility in 1965 overlain on an aerial photograph showing the current Site layout. Some potential contaminants associated with the pulp production operation include wood debris, petroleum products, chlorinated organic compounds such as polychlorinated biphenyls (PCBs) and dioxins/furans, and combustion residuals such as polycyclic aromatic hydrocarbons (PAHs). The full list of contaminants of potential concern (COPCs) will be identified in the remedial investigation/feasibility study (RI/FS) for the Site.

2.2.1.3. Log Storage

The practice of log rafting and storage has occurred throughout the East Waterway since the late 1800s as evidenced in aerial photographs and in Port and DNR lease records. Available information from DNR showed that Weyerhaeuser leased state owned tidelands from at least two areas adjacent to their former mill for log storage. One area was leased by Weyerhaeuser between 1924 and 1984 and the other area between 1954 and 1980. The former lease areas are within log storage areas 1 to 3 shown on Figure 4.

Historical documentation from 1987 (Port, 1987) indicates that three in-water log storage areas were located in the vicinity of the Site at that time including:

- Within the current South Terminal Berth 1 area (Area 1 in Figure 4);
- North of the former Mill A log haul out and log pond and adjacent to the southwest portion of the current Pacific Terminal (Area 2 in Figure 4); and
- Within the berthing area of the current Pacific Terminal berth and on the southwest side of the current Pier 1 (Area 3 in Figure 4).

The general size and shape of the in-water log storage areas varied depending on the product demand and supply. Potential contaminants associated with log storage includes wood debris.

2.2.2. Property Development at Pacific Terminal

The Pacific Terminal was constructed in the mid-1990s as part of construction of a Near Shore Confined Disposal (NCD) facility to contain contaminated sediment that was dredged from areas adjacent to the facility. A 650-foot-long shipping wharf supported by concrete piles was constructed and operates at the Pacific Terminal. Pacific Terminal and the NCD area are shown in relation to the Former Mill A Cleanup Site on Figure 2.

According to the information and drawings contained in the 1996 Ecology Cleanup Action Decision (Ecology, 1996), the NCD was constructed by dredging the log pond embayment located off shore of the current facility, constructing a containment berm, and placing contaminated sediment (about 130,000 CY) behind the berm, capping the sediment and covering the surface with asphalt. The nearshore area of the log pond embayment (i.e., within the NCD) was dredged to Elevation -25 MLLW while the off shore area (i.e., adjacent to the NCD) was dredged to depths ranging between -30 and -45 MLLW. A portion of the material that was dredged from the log pond embayment (off shore of the existing NCD) was used as clean cap material and placed on top of contaminated sediments in the disposal area; the remaining material that was dredged from the log pond embayment was characterized and approved for disposal under the Puget Sound Dredged Material Disposal program (predecessor to the DMMP) at the Port Gardner open water disposal site. Dredged material characterization and other sediment quality studies completed in 1993 and 1994 identified levels of sediment contamination in the area northeast of Pier 1 that did not meet open-water disposal criteria established at that time. The sediment contained low-molecular-weight polycyclic aromatic hydrocarbons (LPAHs), high-molecular-weight polycyclic aromatic hydrocarbon (HPAHs), metals, PCBs and other organic contaminants in addition to elevated total organic carbon (TOC) and wood debris.

2.3. Previous Sediment Investigations in the Vicinity of Interim Action Area

2.3.1. Sediment Quality Investigations in Area of Former Weyerhaeuser Mill A

GeoMatrix, on behalf of the Port, performed surface and subsurface sediment sampling in May 2007 in the marine area of the Former Mill A Cleanup Site (GeoMatrix, 2007). The purpose of the investigation was to evaluate the potential presence of contamination and to evaluate what potential cleanup actions, if any, would be required by the Port prior to or in conjunction with expansion of the South Terminal facility. In addition, SAIC performed a sediment investigation of Port Gardner Bay and the lower Snohomish estuary area on behalf of Ecology in 2008 (SAIC, 2009). The Ecology study included collection of samples from the general vicinity of the Mill A Cleanup Site. The Mill A RI/FS Work Plan summarizes these previous sediment investigations in detail. Figures 5 and 6 provide a summary of chemical analytical data in surface and subsurface sediment compared to preliminary sediment screening levels that were used in the Work Plan to evaluate chemical concentrations. Only few of the existing sampling data were collected from within the Interim Action area. Based on these investigations, the contaminants identified to exceed screening levels in sediment at the Site include:

- Metals (arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc);
- Semi-volatile organic compounds (SVOCs) (primarily PAHs and dibenzofuran);
- PCBs; and
- Dioxins and furans.

Wood debris including sawdust, wood chips or fragments, and bark was also observed at multiple sediment sample locations adjacent to the Interim Action area. The quantity of wood debris in samples collected from locations adjacent to the Interim Action area ranges from trace amounts to 100 percent. Figures 7 and 8 summarize wood debris observed at surface and subsurface sediment sampling locations.

2.3.2. 2009 Dredged Material Characterization for Maintenance Dredging at Pacific Terminal

An investigation to characterize sediment to be dredged in the berth area at the Pacific Terminal was performed in December 2009 under the authority of the DMMP. The investigation was performed to support maintenance dredging in an approximate 100-foot-wide area adjacent to the face to of the Pacific Terminal berth. This project was located within the area that was previously dredged as part of the mid-1990s Pacific Terminal construction project described above (Section 2.2.2). The investigation of the proposed dredged material included collection of sediment core samples at six locations situated adjacent to the shipping berth at the Pacific Terminal and compositing the core samples into three representative Dredged Material Management Unit (DMMU) samples. Visual observation of the samples collected from the cores identified the presence of wood debris in sediment to be dredged from the berth area. The wood debris was present in cores collected from the southwest end of the berth dredge area to depths of approximately 5 feet. Wood debris was observed in the top portion of sediment cores collected from the central and northeast portions of the berth dredge area. A dredged material characterization report for the Pacific Terminal was completed (CH2MHill, 2010) and the DMMP agencies issued a suitability determination in April 2010. The material was determined to be suitable for open water disposal. Maintenance dredging was completed in 2012 and 2,990 CY of sediment was placed at the Port Gardner open water disposal site.

2.4. Current and Future Site Use

The property comprising the Mill A Site is zoned for heavy manufacturing and is currently used for shipping and marine terminal operations. The South Terminal and Pacific Terminal are primarily being used as break bulk cargo terminals. Consistent with the Port's Master Plan, the long-term use of the upland and marine areas is as marine terminals. The current marine terminal facilities at the Site will continue to be maintained and improved by the Port, as necessary, to facilitate operations consistent with the Master Plan of Terminal Improvements.

The Port is in the process of planning near-term improvements at the site consistent with the Master Plan of Terminal Improvements (Port of Everett, 2008) that will also help to facilitate necessary cleanup actions at the site. The near-term improvement plans are to expand the Marine Area navigational approach to the Pacific Terminal to accommodate larger vessels. Part of this expansion will be accomplished as part of this Interim Action. Expansion of the Pacific Terminal approach will involve removal of shallow sediments located to the south of the berth area to increase the navigable area within the facility approach. Longer-term improvements at both the South Terminal and Pacific Terminal berths may also include deepening to facilitate navigation of larger vessels at the facilities and filling to expand the cargo areas at the berths. These actions are currently being planned in such a manor so they integrate with the necessary cleanup actions at the Site. As a result, some of the expansion is anticipated to be completed as part of the final cleanup action for the Site.

The general near and far term future property use assumptions are shown on Figure 9.

3.0 OVERVIEW OF THE INTERIM ACTION

3.1. Summary of Interim Action Activities

Dredging will be performed as part of the Interim Action to remove identified contaminated sediment and increase navigational access to the Pacific Terminal. The Interim Action also includes placing armoring on the transition slope. Plan sheets providing details of Interim Action activities are provided in Appendix A (Plan Sheets 1 through 9).

Within the Interim Action area, 20,110 CY of contaminated and 17,210 CY clean sediment will be removed to meet a navigation depth of -42 feet MLLW with a 1-foot over dredge allowance within the main part of the future navigation area (Sheet 4 in Appendix A). The rounded total volume of dredge material is 40,000 CY. The resulting depths will generally coincide with the adjacent Pacific Terminal navigation areas to the north. The total area of the proposed dredge prism will be approximately 1.7 acres (74,000 square feet).

A temporary 2-foot horizontal to 1-foot vertical (2H:1V) slope will be constructed to transition from the new navigation dredge base to existing elevations along the existing shoreline and off shore to the south. The temporary slope will include a keyway at the toe of the slope that will be dredged to -47 feet MLLW with a 1-foot over dredge allowance to facilitate construction of the slope armoring (Sheet 4 in Appendix A). Armor rock will be placed in the keyway and on the slope to ensure there is a stable engineered structure to contain contaminated sediment that exists along the slope (Sheet 5 in Appendix A), as required by Ecology.

The engineered slope will be protected by placement of approximately 3 feet of armor rock. Approximately 200 CY of habitat mix (i.e., rounded gravel and sand-sized material) will be placed on top of the riprap over approximately 3,600 square feet to fill interstitial voids and enhance the habitat characteristics of the armor rock placed along the shoreline between Elevations -4 and -20 feet MLLW along the shoreline. The off shore section of the transition slope is temporary for the purposes of the Interim Action and will be modified as necessary, as part of the future final cleanup actions for the Mill A site.

To complete the Interim Action dredging, approximately 1,500 square feet of existing armor rock that is located along the shoreline between approximate elevations of -2 feet and -43 feet MLLW will be removed to access the areas to be dredged (Sheet 4 in Appendix A). This armor rock slope protection will be replaced after dredge operations are completed along the shoreline (Sheet 5 in Appendix A). In total, approximately 4,000 CY of new armor rock will be placed over 23,000 square feet (0.5 acre) along the shoreline and temporary off shore transition slope from the base of the dredge depth to the top of the dredged slope.

The dredging activity will result in the permanent loss of approximately 700 square feet of shallow water habitat (shallower than -10 feet MLLW). This habitat loss will be mitigated through application of credits from the Port of Everett's Union Slough advance mitigation program as part of the project permitting process.

A dredged material characterization for the Interim Action was completed in January 2015 to characterize sediment in general accordance with DMMP requirements with additional characterization requirements required by Ecology to address specific MTCA cleanup considerations. The sediment investigation was performed to identify the potential extent of contamination within the proposed dredge area and at the surface(s) that will be exposed by the dredging and to serve as the basis for identification and permitting of disposal options for the project. Contaminated dredged material in the Interim Action area that does not meet the open water disposal criteria will be dredged separately, loaded onto barges, transported to a transload facility located either on or off the Site, offloaded and processed for transport and disposal at an Ecology-approved landfill. Dredged material in the Interim Action area that are shown to not contain contamination levels in excess of applicable criteria are anticipated to be loaded onto barges and disposed of at the Port Gardner non-dispersive Open Water Disposal Site.

3.2. Site Screening Levels and Dredge Material Management Criteria

Sediment within the Interim Action area has become contaminated as a result of historical activities at the Site. For the purposes of the Interim Action, sediment is being compared to MTCA screening levels established by Ecology for the Mill A RI/FS. Additionally sediment in the Interim Action area is being compared to the DMMP guideline chemistry values to evaluate suitability of the dredged material for disposal at an open water disposal site. The results for the material to be dredged are also being compared to the MTCA screening levels as required by the DMMP, so that material that does not meet the MTCA screening levels is not disposed of at the open water disposal site. The MTCA screening levels and DMMP guideline values applicable to sediment in the Interim Action area are presented in Table 1. The Dredged Material Characterization SAP prepared for the Interim Action that is provided in Appendix B presents additional detail concerning the MTCA screening levels and DMMP criteria applied to sediment in the Interim Action area.

The MTCA screening levels include separate values for protection of benthic organisms and protection of human health and higher trophic level (HH/HTL) ecological receptors as identified in Table 1. For some chemicals the MTCA screening level for protection of benthic organisms depends on the TOC value. For sediment with TOC of 0.5 percent to 3.5 percent, the organic-carbon normalized Sediment Cleanup Objective (SCO) is used as the screening level for protection of benthic organisms. If the TOC is less than 0.5 percent or greater than 3.5 percent then the dry-weight Apparent Effects Threshold (AET) criteria are used as the screening level for protection of benthic organisms. The DMMP guideline chemistry values include screening levels, maximum levels and bioaccumulation triggers and are in dry-weight units.

Site-specific HH/HTL risk-based sediment cleanup levels have not been developed for bioaccumulative chemicals such as arsenic, cadmium, lead, mercury, dioxin/furans, dioxin-like PCBs, total PCBs, and carcinogenic polycyclic aromatic hydrocarbons (cPAHs). Therefore, sediment cleanup levels for this Interim Action for these constituents are based upon either the Port Gardner regional background concentrations derived by Ecology (Ecology, 2015), or the Ecology-accepted practical quantitation limit, whichever is higher.

Chemical analytical results for sediment in the Interim Action area are independently compared to MTCA screening levels protective of benthic organisms, MTCA screening levels protective of HH/HTL ecological receptors, DMMP screening levels and DMMP bioaccumulation triggers. The results of bioassay testing are compared to SMS and DMMP biological test criteria.

3.3. 2015 Dredge Material Characterization of the Interim Action Area

3.3.1. Overview

In January 2015 sediment coring and sampling was completed for dredged material characterization and evaluation of the extent of contaminated sediment within the Interim Action area under Approvals by Ecology and the DMMP. Dredged material characterization was performed to identify the extent of potential contamination within the Interim Action area and to evaluate if the proposed material dredged from the Interim Action area was suitable for open water disposal. Additionally, samples were collected at the surfaces that will be exposed by dredging, at the base of the proposed dredge prism, and on the temporary transition slope to inform cleanup decisions on the extent of dredging and management practices to contain contamination that may be exposed by the dredging.

A Dredged Material Characterization SAP (Appendix B) was prepared to describe the approach and methodology for completing the dredged material characterization for the Interim Action and was approved by the DMMP agencies and Ecology TCP on December 20, 2014. A high ranking of the Site was assigned by the DMMP as the basis for determining sampling requirements in accordance with the Dredged Material Evaluation and Disposal Procedures User Manual (User Manual; USACE, 2013). The dredged material characterization activities were completed in general accordance with the agency approved-SAP. A Dredged Material Characterization report has been prepared that presents a detailed description of the results and is provided in Appendix B.

The following sections provide a summary of the results as the basis for development of the IAWP.

3.3.2. Sediment Sampling

Sediment cores were collected at 14 sampling locations to characterize dredged material and the surfaces to be exposed by dredging (“Z”-layer) at the base and transition slope of the dredge prism. The completed sediment core locations are presented in Figure 10 relative to the locations proposed in the SAP.

Sample locations PT-1 through PT-9 were positioned within the DMMUs in the portion of the dredge prism that will reach the full dredge depth (-42 feet MLLW plus 1-foot over dredge). These sediment cores were completed to a minimum of -45 feet MLLW (2 feet beyond the over dredge limit).

Sample locations PT-10 through PT-14 were positioned within the area of the transition slopes to characterize sediment within the DMMUs and the surface of the transition slope that will be exposed by dredging. Due to the potential for exposed contamination or wood debris on the off shore transition slope, individual samples representative of the exposed surface were collected to assist in the evaluation and design of environmental protections that will be utilized to contain potential contamination that would be exposed by the dredging.

3.3.3. Sediment Stratigraphy

The stratigraphy within the sediment cores was observed to be generally consistent throughout the Interim Action area. Wood debris including sawdust, fragments of dimensional lumber and wood chips mixed with silt and sand was present in the upper elevations at each sample location. In general, the thickness of wood debris ranges from approximately 2 to 15 feet in the core samples collected. Underlying the wood debris is native sediment consisting of gray fine to medium sand and silt. The elevation of the top of the native material ranged from approximately -23 feet MLLW near the shoreline to as deep as -42 feet MLLW farthest from the shoreline. Figures 11 through 13 present the sediment core locations and the observed stratigraphy within the Interim Action dredge area.

3.3.4. Chemical Analytical Results

In accordance with the SAP, 11 DMMU composite samples were collected and submitted for chemical analysis. Six of the 11 DMMU samples with higher wood content were also submitted for bioassay testing. In addition chemical analyses were completed on discrete 1-foot interval Z-layer samples to characterize the exposed surface after dredging.

Chemical analytical results for the 11 DMMU composite samples identify that six of the DMMUs (D-1, D-2, D-3A, D-3B, D-4B and D-7) contain sediment with chemical concentrations exceeding site-specific MTCA sediment screening levels. Chemicals exceeding MTCA sediment screening levels include:

- PAHs including naphthalene and total LPAHs;
- Phthalates including diethyl phthalate;
- Phenols including 2-methylphenol, 4-methylphenol, phenol and 2,4-dimethylphenol;
- Miscellaneous extractables including benzoic acid and benzyl alcohol;
- Total dioxin/furan toxicity equivalent factor (TEQ);
- Metals including cadmium and lead;
- cPAH TEQ; and
- Total PCBs.

Chemical analytical results from the DMMUs D-4A, D-5A, D-5B, D-6A and D-6B showed no exceedances of MTCA sediment screening levels. Figures 14 through 16 provide a summary of the chemical analytical results in cross section for the DMMU composite samples and Figure 17 provides a summary of the chemical analytical results in plan view. The laboratory analytical reports and the data validation report are provided in the Dredged Material Characterization Report (Appendix B).

3.3.5. Biological Testing Results

Bioassay testing was elected for six composite samples representative of DMMUs D-1, D-2, D-3A, D-3B, D-4B and D-7 due to the relatively high range of wood debris observed during core logging. Wood debris, by volume estimated during visual screening of the cores, ranged from approximately 40 to 70 percent in these DMMUs. The bioassay testing for the selected DMMUs was completed in parallel with chemical analysis to ensure compliance with the allowable sample holding times.

No additional bioassay samples were triggered based on the preliminary chemical analytical data. Exceedances of screening levels that would trigger bioassay testing were only identified in samples that had been subject to bioassay testing.

The standard suite of bioassay tests were completed including two acute and one chronic test to characterize the toxicity of the whole sediment. Bioassay testing was completed with an approved reference sediment from Carr Inlet.

In summary, the following are the testing results relative to the applicable SMS bioassay testing criteria:

- All samples passed the SCO and Cleanup Screening Level (CSL) criteria for the amphipod mortality and juvenile worm growth tests.
- Samples D-3A and D-7 passed SCO and CSL for the larval test.
- Samples D-1, D-2, D-3B and D-4B exceeded SCO for the larval test.
- Samples D-3B exceeded CSL for the larval test.

Comparison to DMMP bioassay guidelines were the same. The results of bioassay testing are shown on Figure 18. Additional details for the biological testing results are presented in the Dredged Material Characterization Report (Appendix B).

3.3.6. Summary of Dredged Material Characterization Results

The sediment core sampling completed for the dredged material characterization identified a consistent stratigraphy throughout the proposed dredge prism. The stratigraphy within the sediment cores was generally observed to consist of wood debris including sawdust, fragments of dimensional lumber and wood chips mixed with silt and sand overlying native sediment consisting of gray fine to medium sand and silt.

Based on the results of chemical analyses on DMMU samples, the portion of the dredge prism represented by DMMUs D-1, D-2, D-3A, D-3B, D-4B and D-7 do not meet open water disposal suitability criteria. The proposed dredge prism represented by DMMUs D-4A, D-5A, D-5B, D-6A and D-6B do meet open water disposal suitability criteria.

Chemical analytical results on Z-layer samples show that the base of the dredge prism (-43 feet MLLW) that will be exposed by the dredging does not exceed DMMP or the MTCA screening levels. The Z-layer analytical results show that the base of the dredge prism at -43 feet MLLW will provide a non-contaminated surface.

The analytical results for samples of the transition slope are consistent with results of adjacent DMMU composite samples at corresponding elevations. Testing of transition slope samples shows that the upper sections of the transition slope contain higher wood debris content and exceed the MTCA screening levels. As part of the MTCA Interim Action, Ecology requires that the temporary transition slope to be armored to contain the contaminated material and stabilize the slope. Ecology has completed a preliminary review of the recent sampling data and have determined that sediment within a discrete layer of the dredge material contains chemicals of concern that exceed SMS screening criteria.

3.4. Remedial Actions Considered

Remedial Actions to address contaminated sediment generally include the following:

- Natural recovery where deposition of clean sediment in addition to biological processes reduce contaminant concentrations;
- Capping or containment of contaminated sediment; and
- Dredging to remove contaminated sediment and on-site containment or off-site disposal.

As the contaminated sediment in the Interim Action area is located in an area that requires deepening for vessel navigation and berthing, natural recovery and capping were not considered applicable remedial actions for the Interim Action because removal of the contaminated sediment is required to allow vessel navigation and berthing at the Pacific Terminal. Dredging was selected as the applicable remedial action due to its compatibility with the future site use. Off-site disposal at an Ecology-approved disposal facility or facilities, based on contaminant concentrations, was also selected as the applicable remedial action approach for the Interim Action.

3.5. Coordination with Final Cleanup Action

The Port, Weyerhaeuser and DNR are completing an RI/FS and draft Cleanup Action Plan for the Mill A Site in accordance with the AO (No. NE 8979) (Ecology 2012), MTCA (Chapter 173-340 WAC), and SMS (Chapter 173-204 WAC) to identify the appropriate cleanup action for the Site. Sediment investigation activities to support RI/FS are currently scheduled to be initiated in 2015. Determination of the final cleanup action will be based on the sampling results of the RI.

The amendment to the AO (Ecology, 2015) specifies that the Port is completing an Interim Action to reduce the potential threat to human health and the environment. The Interim Action will be implemented in advance of selecting the final cleanup action for the Site and will not preclude reasonable alternatives for the final cleanup action (WAC 173-340-430(3)(b)). The action is interim or temporary and will be in place until the final cleanup action is implemented.

The RI/FS for the Site will identify the completion of the Interim Action as part of the Site conditions. The RI/FS will identify appropriate alternatives for the final cleanup of the Site. The final cleanup action will include integration of the cleanup remedy for the Interim Action area.

4.0 INTERIM ACTION COMPONENTS

The following sections provide a description of the main Interim Action components.

4.1. Dredging

Dredging will be completed using barge-based clamshell and/or fixed-arm excavation equipment as required to effectively remove the sediment and wood debris. Hydraulic dredging will not be conducted. Barges will utilize spuds or other typical anchoring methods. The dredged material will be placed on barges for dewatering within the project work area as allowed by the agency-approved permit conditions for the project.

4.2. Dredged Material Handling, Transport and Disposal at Upland Facility

Contaminated dredged material that is unsuitable for open water disposal will be offloaded at an upland transload facility using land based excavation equipment. The dredged material will be offloaded at a transload facility located either at the South Terminal or at an off-site facility appropriate for transloading and materials handling.

Figure 19 shows a conceptual layout for a transload facility at the South Terminal. A transload facility established at the South Terminal would utilize Berth 1 for offloading of the dredged material. Land-based equipment situated on the pier would be used to offload the dredged material into trucks. The trucks would transport the dredge material to a stockpile and processing area where the material would be stored prior to transport off site. The transload facility would be constructed to include necessary environmental controls to prevent loss of contaminants. An off-site transload facility may be proposed by the successful bidding contractor. If an off-site facility is proposed, the details of the operations will be provided to Ecology for approval.

The dredged material that is offloaded to a transload facility will be transported via trucks and/or train for disposal at an appropriate permitted upland landfill.

Based on the data presented in the Dredge Material Characterization Report, the rounded total dredge volume is estimated at 40,000 CY. Approximately 20,110 CY is contaminated and will be disposed of at an upland landfill. The remaining dredge material is clean native sediment that will be removed to meet navigation requirements. These materials will be disposed at an approved open-water disposal site. Bathymetric survey(s) will be completed to verify that the contaminated sediment has been removed prior to dredging clean material for disposal at the open water disposal site as described in the following section.

4.3. Dredged Material Transport and Disposal at Open Water Disposal Site

Dredged material that is suitable for open water disposal will be placed on a disposal barge. The disposal barge will be towed to the open water disposal site. Once the barge reaches the open water disposal site and is positioned over the site, the bottom of the barge will be opened and the dredged material will be deposited in accordance with the approved Aquatic Use Authorization.

Dredge material that is suitable for open water disposal is expected to be disposed at the Port Gardner open-water disposal site located in Everett, Washington.

Based on the data presented in the Dredge Material Characterization Report, of the total dredge volume (40,000 CY), approximately 17,210 CY is non-contaminated and will be disposed at the open water disposal site in accordance with the DMMP suitability determination and a DNR Site Use Authorization (SUA). The DMMP suitability determination is provided in Appendix B. An application will be submitted to acquire a DNR SUA as described in Section 5.1.4.

4.4. Armoring of the Transition Slopes

A temporary 2H:1V slope will be constructed to transition from the new navigation dredge base to existing elevations surrounding the Interim Action area. The transition slopes created as a result of Interim Action are considered to be temporary and are intended to stabilize the transition slopes until the final cleanup action is constructed.

As required by Ecology, armor rock will be placed on the transition slopes to ensure there is stable containment for the contaminated sediment that will be exposed. The slope armor will be constructed by placement of approximately 3 feet thick of armor rock on the dredged surface. In total, approximately 4,000 CY of new armor rock will be placed over 23,000 square feet (0.5 acre) along the shoreline and off shore transition slopes from the base of the dredge depth and keyway to the top of the dredged slope.

To complete the Interim Action dredging, approximately 1,500 square feet of existing armor rock that is located along the shoreline between approximate elevations of -2 feet and -43 feet MLLW will be removed to access the areas to be dredged. This armor rock slope protection will be replaced after dredge operations are completed as part of constructing the transition slopes.

Approximately 200 CY of habitat mix (rounded sand and gravel material) will be placed on top of the armored slope along the shoreline over an area of approximately 3,600 square feet. The habitat mix will be placed between approximate elevations of -4 and -20 feet MLLW to fill interstitial voids and enhance the characteristics of the critical shoreline habitat elevations. No habitat mix will be placed within the inter-tidal elevations to minimize erosion of the material or in the off shore areas where armor rock is placed.

Stabilization of the transition slope will be completed primarily by importing armor rock and habitat mix via barge to the Interim Action area. Armor rock will be placed along the transition slopes using a barge-mounted excavator/crane and bucket. Habitat mix will also be placed using a barge-mounted excavator/ crane and bucket. Armor rock and habitat mix will be sourced from a quarry. The component of the habitat mix that can be subject to chemical analysis (i.e., sand size and smaller) will be tested prior to use to confirm that the material does not contain unacceptable chemical concentrations.

4.5. Cultural Resources

Evaluation of the presence of cultural resources has been performed in the area encompassing the Interim Action. An evaluation of cultural resources is performed to identify any previously recorded archaeological or historic sites and to evaluate the potential for a project to affect cultural resources. No sites have been recorded within the Interim Action area and work in the Interim Action area is considered to have a very low potential to affect as-yet unknown sites. However, in the event that potentially significant archeological materials are encountered during the Interim Action, procedures for the inadvertent discovery of cultural resources will be followed. In summary, the procedures for the inadvertent discovery of cultural resources include notification of State, Local, and Tribal representatives; inspection and documentation of the discovery by an archaeologist; and development of a treatment plan if human remains are discovered. The procedures for the inadvertent discovery of cultural resources are presented in the Mill A RI Work Plan (GeoEngineers, 2014).

4.6. Environmental Protection During Construction

Interim Action activities will be performed in compliance with regulatory and permit requirements and will include implementation of best management practices (BMPs) to protect the environment during construction. The following regulatory and permit requirements are anticipated for Interim Action construction activities:

- Dredging and other marine work will occur within the permitted, allowed in-water work windows (August 15 to February 15).
- The contractor will prepare a construction Spill Prevention, Control and Countermeasures (SPCC) Plan for the project according to Washington State Department of Transportation's (WSDOT's) (2013) guidance that is consistent with 40 CFR 112.3 (i.e., Requirement to Prepare and Implement an SPCC Plan) and the State of Washington Oil Spill Contingency Plan (Chapter 173-182 WAC).
- Work will be performed in accordance with an Ecology Water Quality Certification (WQC) requirements.
- Water quality monitoring will be performed during dredging and placement of armoring and habitat mix per Ecology requirements to ensure compliance with the 401 WQC.
- Exceedances of water quality criteria will be managed according to Ecology's requirements and may include the following:
  - Modifying the dredging or armoring/habitat mix placement operations;
  - Modifying the BMPs for the specific activity;
  - Implementation of additional BMPs; and/or
  - Temporary suspension of dredging or armoring/habitat mix placement in order to allow the exceedance to pass.
- Ecology will be notified of exceedances of water quality criteria in accordance with the requirements of the 401 WQC.
- Work will be performed in compliance with other local, state and federal regulations and restrictions (e.g., Washington Department of Fish and Wildlife [WDFW] Hydraulic Project Approval [HPA], local Critical Areas Ordinance and land use regulations, Shoreline Master Program, State Environmental Policy Act [SEPA] and USACE Section 10 [Rivers and Harbors Act].

The following BMPs are planned to be implemented during construction. Additional BMPs may be required by regulatory agencies and stakeholders during the permitting process.

- All equipment used for construction activities will be cleaned and inspected prior to arriving at the project site to ensure that no potentially hazardous materials or leaks are present and the equipment is functioning properly.
- Spill prevention and response equipment will be stored and used on all project vessels/barges to prevent the release of petroleum products and other hazardous substances to surface water.
- The contractor will perform daily inspection of construction equipment to ensure there are no leaks of hydraulic fluids, fuel, lubricants or other petroleum products.
- Corrective actions will be taken in the event of any discharge of oil, fuel, or chemicals into the water, including:

  - In the event of a spill, containment and cleanup efforts will begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup will include proper disposal of any spilled material and used cleanup material.
  - The cause of the spill will be assessed and appropriate action will be taken to prevent further incidents or environmental damage.
  - Spills will be reported immediately to Ecology's Northwest Regional Spill Response Office at (425) 649-7000 (a 24-hour phone number). Spills of oil or hazardous materials will also be reported immediately to the National Response Center at 1 (800) 424-8802 and the Washington Emergency Management Division at 1 (800) 258-5990 or 1 (800) OILS-911.
- Operations will be stopped temporarily if listed species are observed as injured, sick or dead in the project area to evaluate whether additional listed species are present and to assess whether operations may continue without further impact. National Marine Fishery Service law enforcement will be notified and fish will be handled with care to ensure effective treatment or analysis of cause of death or injury.
- A floating surface debris boom will be deployed around the perimeter of the work area in the event that floatable debris appears as a result of the dredging of wood debris layer (saw dust, dimensional lumber, etc.).
- All construction-related debris will be cleaned up on a daily basis and proper conservation measures will be taken to ensure that debris will not contaminate the marine shoreline or marine waters.
- Debris and waste materials, including miscellaneous garbage and/or other debris removed from the shoreline environment, will be transported off site for disposal in accordance with applicable regulations.
- Barges and support vessels will be positioned and navigated in a manner that will avoid grounding out.
- Dredging and placement of armoring and habitat mix will be conducted in a controlled manner that limits turbidity and dispersal of material in the water, maintains surface water quality at the mixing zone boundary and prevents the spread of contaminated sediments to uncontaminated areas or areas that have already been dredged.
- The rate of ascent of the clamshell bucket will be controlled in a manner to limit sediment loss during ascent through the water column and while swinging the bucket to the barge.
- During dredging, each cycle of the bucket will be complete; partial loads of dredged material will not be dumped back into the water and stockpiling dredged material below the ordinary high water line will be prohibited.
- Leveling of the completed dredging surface by dragging a beam or the dredge bucket will not be permitted.
- If dredging operations and material handling methods are not sufficient to maintain surface water quality at the mixing zone boundary, a turbidity curtain will be deployed around the active dredging work area.
- Prior to dredging and disposal of the open water suitable material, the extent of non-suitable material dredging will be confirmed using bathymetric survey. The bathymetric survey will confirm that dredging has been performed to the elevation comprising the base of the contaminated material as documented in the dredge material characterization.

- Dredged material unsuitable for open water disposal will be loaded into a barge, transported and offloaded to an upland transload facility. Transloading activities will be completed in accordance with project permits. BMPs will be in place to prevent spillage of dredged sediments to adjacent water bodies.
- Dredged material suitable for open water disposal will be loaded into a barge for transport and disposal. The dredged sediments are expected to be disposed at the Port Gardner open-water disposal site located in Everett, Washington in accordance with the DMMP open water suitability determination.
- Because the open water suitable material is native sands and silts with no known material exceeding allowable size restrictions, it is anticipated that screening the dredged material for debris will not be required by the DMMP prior to disposal at the open water disposal site.
- Return water draining from receiving barges will be treated by a filter media such as straw bales or geo-textile fabric before return to surface water. Filter fabric will be cleaned and changed regularly to assure effective filtration.
- Imported materials will be inspected and tested prior to placement to ensure material are free of contaminants.

4.7. Interim Action Compliance Monitoring

In accordance with WAC 173-340-410, compliance monitoring for a cleanup action includes the following elements:

- Protection monitoring confirms that human health and the environment are adequately protected during the cleanup action.
- Performance monitoring confirms that the cleanup action has been completed in areas exceeding remediation levels and meet other performance standards, such as permit requirements.
- Confirmation monitoring confirms the long-term effectiveness of the cleanup action once cleanup levels and other performance standards have been reached.

For this Interim Action, protection and performance monitoring will be conducted during construction. Confirmation monitoring will be conducted after the final remedial action has been implemented at the Site. Interim Action compliance monitoring is described in the following sections.

4.7.1. Protection Monitoring

Protection monitoring will be implemented during the Interim Action by requiring that construction activities be performed in accordance with health and safety regulations and that on-site workers be appropriately trained in hazardous waste operations as well as follow a site-specific health and safety plan prepared specifically for the Interim Action project. Interim Action construction activities will be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (RCW 49.17) and the Federal Occupational Safety and Health Act (OSHA) (29 CFR 1910, 1926) (HAZWOPER). Personnel engaged in work that involves hazardous material dredging and handling shall comply with the provisions of WAC 173-340-810 (MTCA Cleanup Regulation, Worker Safety and Health) and will be OSHA HAZWOPER and WISHA certified.

GeoEngineers personnel performing observation of Interim Action construction activities for the Port will adhere to the requirements of the site-specific health and safety plan presented in Appendix C. The Contractor that is selected to perform the Interim Action construction will be required to develop a site-specific health and safety plan for their employees.

4.7.2. Performance Monitoring

Performance monitoring during the IA will include the following:

- Verifying elevations to confirm that the wood debris and sediment with chemical concentrations greater than MTCA and DMMP criteria as determined by the dredging plan elevations has been removed prior to dredging of the underlying native sand and silt.
- Inspection of the sources of armoring and habitat mix and sampling and analysis of the habitat mix.
- Confirmation of the placement of armoring on the transition slope to cover sediment with chemical concentrations greater MTCA screening levels.
- Existing sampling and analysis data will be used as a basis to confirm that the exposed surfaces at the design target navigation elevation of -42 feet MLLW meet MTCA screening levels. Sediment sampling and analysis completed as part of the Site RI in and around the Interim Action area will be used to verify compliance with the final MTCA cleanup criteria.

Upon initiation of the Interim Action, the contractor will identify the upland quarry that is to be the source of armoring and aggregate to be used as habitat mix. The source of the armoring and habitat mix will be undisturbed, native deposits from an upland quarry and will not include any reused or recycled materials. Recent existing data or new sample analyses representative of the quarry source will be provided by the contractor and reviewed by the Port to confirm that the materials meet the MTCA screening levels.

If sampling the quarry source is required, the contractor will collect a representative sample(s) and submit it for chemical analysis to demonstrate that the sand-sized and smaller component of the aggregate is free from contamination. The material will be collected using clean (i.e., decontaminated) stainless steel sampling equipment and placed in pre-cleaned, previously unused sample jars supplied by the laboratory. The sample will be labeled and placed in a cooler on ice for transport to the laboratory. Sample handling will follow appropriate chain of custody procedures from sample collection through analysis. The sample material will be analyzed for the following:

- Metals including arsenic, cadmium, chromium, copper, lead, mercury, silver and zinc by EPA Method 6000/7000 series;
- SVOCs (including PAHs) by EPA Method 8270/8270-SIM/8081B;
- PCB congeners (209 chlorinated biphenyl congeners) by EPA Method 1668A;
- Dioxins and furans by EPA Method 1613B; and
- Pesticides by EPA Method 8081B.

The results of the quarry source sample(s) will be reviewed to identify whether the material from the proposed source is free from contamination and is acceptable for use at the Site.

Placement of the armoring will be monitored by a representative of the Port to confirm that materials have been correctly placed on the transition slope. Armor placement will be confirmed based on comparison of hydrographic survey of the post dredge surface of the transition slope and survey performed after armoring has been placed on the slope. In instances where the armoring thickness is observed to be less than 3 feet on top of the existing slope surface, the contractor will be required to place additional material to achieve the desired armoring thickness.

Placement of habitat mix will also be monitored to confirm that the materials have been correctly placed on the shoreline slope adjacent to the Pacific Terminal berth.

The details of the procedures for armoring and habitat mix placement confirmation will be developed as part of the project contractor bid package preparation.

4.7.3. Compliance Monitoring

Compliance monitoring for the Interim Action will be performed as part of the RI/FS for the Site. Sediment sampling and testing will be performed in the portion of the Site encompassing the Interim Action area in accordance with the RI/FS Work Plan. The results of sediment sampling and testing will be used to evaluate the results of the Interim Action and compliance with the Site cleanup standards. Any additional remedial actions identified at the Site, including the Interim Acton area will be will be specified in the RI/FS.

4.8. Quality Assurance/Quality Control

This section describes general quality assurance and quality control (QA/QC) procedures that will be implemented during the Interim Action, including contractor quality control, construction monitoring and field documentation.

4.8.1. Contractor Quality Control

The contractor will prepare a Construction Quality Assurance Plan before commencing work. This plan will be subject to review and approval by the Port to ensure that the planned actions are implemented in general accordance with the project contract and Interim Action Work Plan requirements. The Construction Quality Assurance Plan will include construction plans for each of the primary elements of work, as well as a quality control plan for each relevant construction element. The quality control plan will address the following:

- General requirements;
- Quality control organization;
- Documentation of methods and procedures;
- Requirements for corrective action when QC and/or acceptance criteria are not met; and
- Any additional elements that the contractor deems necessary to adequately control construction processes required by the contract.

The contractor will maintain QC records and provide them to the Port as required by the contract. These records will include evidence that the required inspections or tests have been performed, including the type and number of inspections or tests involved; results of inspections or tests; nature of defects, deviations, causes for rejection, proposed corrective action, and corrective actions taken.

In addition to the contractor's Construction Quality Assurance Plan, the Port will perform oversight of the contractor's field activities.

4.8.2. Construction Monitoring and Field Documentation

Construction monitoring will be performed by the Port. A record of field activities will be maintained for the project. Field documentation will include field notes, field forms, field reports, and chain-of-custody forms for samples submitted for analytical testing. The field documentation will record construction, sampling, and monitoring activities, sampling personnel, and weather conditions, as well as decisions, corrective actions, and/or modifications to the project plans and procedures discussed in this report.

4.9. Schedule

Dredging and other Interim Action activities will occur within the permitted, allowed in-water work windows. The Interim Action is currently scheduled to be performed within the 2016/2017 in-water work window and is anticipated to occur between August 15, 2016 and February 15, 2017.

4.10. Reporting

Upon completion of the Interim Action work, an Interim Action Completion Report that describes the construction of the Interim Action will be prepared and submitted to Ecology for review and approval in accordance with the requirements of the Agreed Order, as amended. Additionally, the results of the Interim Action, as described in the final Interim Action Completion Report, will be incorporated into the RI/FS for the Site.

5.0 PERMITTING AND SUBSTANTIVE REQUIREMENTS

The Interim Action will be conducted under the Agreed Order No. DE 8979, as amended, with Ecology (Ecology, 2012). The amendment to the AO requires that the Interim Action be done in accordance with all applicable federal, state, and local requirements. Table 2 identifies potentially applicable laws and applicable or relevant and appropriate requirements (ARARs) for the Interim Action. The amendment to the AO also includes requirements to obtain necessary permits, except as provided in Chapter 70.105D.090 of the Revised Code of Washington (RCW). As specified in Chapter 70.105D.090 of the RCW the Port is exempt from the procedural requirements of Chapters 70.94, 70.95, 70.105, 77.55, 90.48, and 90.58 of the RCW and of any laws requiring or authorizing local government permits or approvals when performing the Interim Action. However, the Port must still comply with the substantive requirements of such permits or approvals. The amendment to the AO specifies that the exempt permits or approvals and the applicable substantive requirements of those permits or approvals will be identified in the work plan. Ecology's subsequent approval of the Work Plan reflects Ecology's determination as to the specific permits and substantive requirements that apply.

The following sections identify the permitting and substantive requirements for the Interim Action.

5.1 Applicable Permits and Requirements

The following sections identify the permitting requirements for the Interim Action at the Site.

5.1.1. U.S. Army Corps of Engineers (USACE) Individual Permit

Section 404 of the Clean Water Act, 33 U.S.C. § 1344, requires a permit prior to discharging dredged or fill material into the waters of the United States. The type of permit under which a specific project is completed is selected by the USACE. The USACE has identified that the dredging and fill (i.e., placement of armoring and habitat mix) to be performed will be required to be completed under an Individual Permit. The Port will obtain and comply with the conditions of a Standard Individual Permit for the activities to be performed as part of the Interim Action.

A Joint Aquatic Resources Permit Application (JARPA) is being prepared and will be submitted to the USACE to support acquisition of a Nationwide Permit 38.

5.1.2. Ecology Water Quality Certification (WQC)

Projects applying for a federal Individual Permit to conduct any activity that results in a discharge of dredge or fill material into water are required to acquire a Section 401 WQC. In Washington State, Ecology is the agency that provides the certification. The WQC includes requirements that are to provide assurance that the project will comply with state water quality standards and other aquatic resources protection requirements under Ecology's authority. The Port will obtain and comply with the conditions of a WQC for the activities to be performed as part of the Interim Action.

A JARPA is being prepared and will be submitted to the USACE who will coordinate with Ecology to support acquisition of a WQC.

5.1.3. State Environmental Policy Act (SEPA) Integrated Compliance

Compliance with the SEPA, Chapter 43.21C RCW, was achieved by conducting SEPA review in accordance with applicable regulatory requirements, including WAC 197-11-268 and Ecology guidance as presented in Ecology Policy 130A. The Port, acting as the SEPA lead agency and has issued a Mitigated Determination of Non-significance (MDNS), dated May 11, 2015, for the scope of work proposed by the Interim Action. The MDNS for the Interim Action is provided in Appendix D.

5.1.4. Washington State Department of Natural Resources (DNR) Site Use Authorization

A portion of the sediment to be dredged from the Interim Action area, that is deemed to be suitable, is to be disposed of at an unconfined open water disposal site located on State-owned land managed by DNR. Prior to using any of DNR's dredged material disposal sites, the dredger must apply for and receive permission from DNR. DNR manages use of the disposal sites through a SUA. The SUA is an agreement between DNR and the dredger that specifies the disposal requirements. The Port will prepare and submit an application for an SUA to utilize an open water disposal site. The Port will obtain and comply with the conditions of the SUA for disposal of dredge material from the Interim Action area that is deemed to be suitable for disposal at an unconfined open-water disposal site.

5.2. Permit Exemptions and Substantive Requirements

The following state and local requirements have been identified as applicable but are procedurally exempt for performing the Interim Action:

- HPA;
- City Shoreline Management Program including Critical Areas; and
- City Stormwater Management.

The applicable substantive requirements of these permits or programs, as they are known at the time of the preparation of this Interim Action Work Plan, are identified below. The manner in which the Interim Action will meet the substantive requirements for these permits and programs is presented in the following sections. Substantive requirements may be further identified in subsequent deliverables and their approval shall reflect Ecology's determination on what substantive requirements apply.

5.2.1. Washington Department of Fish and Wildlife Hydraulic Project Approval

Chapter 220-110 WAC (Hydraulic Code Rules) and Chapter 77.55 RCW (Construction Projects in State Waters) regulate work that uses, diverts, obstructs, or changes the natural flow or bed of any salt or fresh waters of the state and includes bed reconfiguration, all construction, or other work within the mean higher high water line in marine waters. The WDFW oversees the implementation of these laws and issues HPAs for protection of fish life. For projects being performed under Chapter 70.105D.090 of the RCW, WDFW reviews project submittals to identify whether a project meets the substantive requirements of the laws and an HPA.

An application was prepared for the Interim Action and submitted to the WDFW for review to ensure that the project meets the substantive requirements of the laws and an HPA. WDFW provided a letter dated July 6, 2015 identifying conditions to be implemented as part of the Interim Action to meet the substantive requirements of the HPA. The letter from WDFW is provided in Appendix D.

5.2.2. City of Everett Shoreline Substantial Development Permit

The Washington Shoreline Management Act (RCW 90.58) and its implementing regulations establish requirements for substantial developments occurring within water areas of the state or within 200 feet of the shoreline. According to Shoreline Management Act regulations, local shoreline management plans and requirements are adopted under the State regulations, creating an enforceable State law. Therefore, a shoreline permit is not required for the interim action. However, the Interim Action must meet the substantive requirements of the City of Everett Shoreline Master Program (SMP; Everett Municipal Code Chapter 33D),

Pursuant to the City of Everett SMP, the Interim Action must meet the substantive requirements of a City Shoreline Substantial Development Permit. As designated by Chapter 33D, the interim action will occur within Ecological Management Unit (EMU) 6 – Everett Harbor (East Waterway) which consists primarily of highly modified deep water and limited shallow subtidal and intertidal habitat. The shoreline designation for EMU 6 is "Urban Deep Water Port". Subsequently, the substantive requirements include meeting the requirements and conditions of the Urban Deep Water Port designation and applicable use activity policies, procedures, and regulations as well as the general conditions of the City of Everett SMP.

An application was prepared for the Interim Action and submitted to the City of Everett Planning and Community Development and Public Works departments for review to ensure that the project meets the substantive requirements of the City's SMP. The City Planning and Community Development and Public Works departments provided letters dated November 24, 2014 and December 16, 2014, respectively, stating that the Interim Action meets the substantive requirements. The letters from the City of Everett are provided in Appendix D.

5.2.3. City of Everett Construction Stormwater Permit

Pursuant to the City of Everett Surface and Storm Drainage Ordinance (EMC 14.28), components of the Interim Action may require compliance with requirements in the Phase II National Pollutant Discharge Elimination System stormwater permit. The requirements of the stormwater permit include preparation of a stormwater site plan, preparation of a construction stormwater pollution prevention plan (SWPPP), source control of pollution, preservation of natural drainage systems and outfalls, on-site stormwater management, run-off treatment, flow control, and system operations and maintenance. Construction stormwater pollution prevention shall be provided in accordance with the City of Everett Stormwater Management Manual effective date February 15, 2010.

6.0 LIMITATIONS

This report has been prepared for the exclusive use of the Port of Everett, their authorized agents and regulatory agencies in their evaluation of the Weyerhaeuser Mill A Former Cleanup Site Interim Action Dredging Project. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

7.0 REFERENCES

CH2MHILL, “Dredge Material Characterization Report, Pacific Terminal,” prepared for the Port of Everett, March 2010.

GeoEngineers, Inc. “Dredged Material Characterization Sampling and Analysis Plan, Weyerhaeuser Mill A Former Cleanup Site, Interim Action Dredging Project, Everett, Washington,” Prepared for the Port of Everett, December 16, 2014.

GeoEngineers, Inc. Draft “Dredged Material Characterization Report, Weyerhaeuser Mill A Former Cleanup Site, Interim Action Dredging Project, Everett, Washington,” Prepared for the Port of Everett, May 8, 2015.

GeoMatrix Consultants, Inc. (GeoMatrix), “Data Report, Former Mill A MTCA Support Collection, Everett, Washington,” prepared for the Port of Everett, November 2007.

Port of Everett (Port), “Log Storage at the Port of Everett,” prepared for the Port Working Group Membership and Commissioners, January 2, 1987.

Port of Everett, “Marine Terminal Master Plan 2008,” Port of Everett Comprehensive Scheme of Harbor Improvements on July 8, 2008 through Port Commission Resolution No. 895.

Science Applications International Corporation (SAIC), "Sediment Characterization Study in Port Gardner and Lower Snohomish Estuary, Port Gardner, WA," prepared for the Washington State Department of Ecology, July 10, 2009.

Washington State Department of Ecology (Ecology), "Sediment Management Standards Cleanup Action Decision, Port of Everett Piers 1 and 3 Sediments and Medium-Draft Nearshore Confined Disposal Facility," 1996.

Table 1

Method Analysis, DMMP Guideline Values and Mill A Cleanup Sediment Screening Levels

Mill A Former Site Interim Action Dredging Project

Everett, Washington

Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	Natural Background[3]	DMMP Guideline Chemistry Values[4]			Sediment Screening Level for Protection of Benthic Organisms[5]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[8]
					SL	BT	ML	Sediment Cleanup Objective[6] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[7] (for organic carbon <0.5% or >3.5%)	
Conventionals										
Grain Size (%)	--	PSEP 1986 or ASTM-Mod	--	--	--	--	--	--	--	--
Grain Size (%) on ashed debris from wood content analysis	--	PSEP 1986 or ASTM-Mod	--	--	--	--	--	--	--	--
Total Solids (%)	--	SM2540G	0.1	--	--	--	--	--	--	--
Total volatile solids (%)	--	SM2540G	0.1	--	--	--	--	--	--	--
Dry Weight Wood Content (%)	--	ASTM D-2974 Method C	0.1	--	25%					
Total Organic Carbon (%)	--	Plumb 1981 et al.	0.1	--	--	--	--	--	--	--
Ammonia (mg/kg)	--	EPA 350.1M/SM 4500-NH3	1	--	--	--	--	--	--	--
Total Sulfides (mg/kg)	--	EPA 376.2/ SM 4500-S2	1	--	--	--	--	--	--	--
Metals			**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Antimony	7440-36-0	EPA 6010/6020	5	--	150	--	200	--	--	--
Arsenic	7440-38-2	EPA 6010/6020	5	11	57	507.1	700	57	57	11
Cadmium	7440-43-9	EPA 6010/6020	0.2	0.8	5.1	11.3	14	5.1	5.1	0.8
Chromium	7440-47-3	EPA 6010/6020	0.5	62	260	260	--	260	260	--
Copper	7440-50-8	EPA 6010/6020	0.2	45	390	1,027	1,300	390	390	69,000
Lead	7439-92-1	EPA 6010/6020	2	21	450	975	1,200	450	450	21
Mercury	7439-97-6	EPA 7471A	0.05	0.2	0.41	1.5	2.3	0.41	0.41	0.2
Selenium	7782-49-2	EPA 6010/6020	0.5	--	--	3	--	--	--	--
Silver	7440-22-4	EPA 6010/6020	0.3	0.24	6.1	6.1	8.4	6.1	6.1	8,700
Zinc	7440-66-6	EPA 6010/6020	1	93	410	2,783	3,800	410	410	520,000
Polycyclic Aromatic Hydrocarbons (PAHs)			**µg/kg**		**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Naphthalene	91-20-3	EPA 8270-SIM	5	--	2,100	--	2,400	99	2,100	29,000,000
Acenaphthylene	208-96-8	EPA 8270-SIM	5	--	560	--	1,300	66	1,300	--
Acenaphthene	83-32-9	EPA 8270-SIM	5	--	500	--	2,000	16	500	88,000,000
Fluorene	86-73-7	EPA 8270-SIM	5	--	540	--	3,600	23	540	59,000,000
Phenanthrene	85-01-8	EPA 8270-SIM	5	--	1,500	--	21,000	100	1,500	--
Anthracene	120-12-7	EPA 8270-SIM	5	--	960	--	13,000	220	960	440,000,000
2-Methylnaphthalene[9]	91-57-6	EPA 8270-SIM	5	--	670	--	1,900	38	670	5,900,000
Total LPAH	--	--	5	--	5,200	--	29,000	370	5,200	--
Polycyclic Aromatic Hydrocarbons (PAHs)					**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Fluoranthene	206-44-0	EPA 8270-SIM	5	--	1,700	4,600	30,000	160	1,700	59,000,000
Pyrene	129-00-0	EPA 8270-SIM	5	--	2,600	11,980	16,000	1,000	2,600	44,000,000
Benz(a)anthracene	56-55-3	EPA 8270-SIM	5	--	1,300	--	5,100	110	1,300	5,000
Chrysene	218-01-9	EPA 8270-SIM	5	--	1,400	--	21,000	110	1,400	50,000
Benzofluoranthenes (b, j ,k)	205-99-2/205-82-3/207-08-9	EPA 8270-SIM	5	--	3,200	--	9,900	230	3,200	5,000
Benzo(a)pyrene	50-32-8	EPA 8270-SIM	5	--	1,600	--	3,600	99	1,600	500
Indeno(1,2,3-c,d)pyrene	193-39-5	EPA 8270-SIM	5	--	600	--	4,400	34	600	5,000
Dibenz(a,h)anthracene	53-70-3	EPA 8270-SIM	5	--	230	--	1,900	12	230	5,000
Benzo(g,h,i)perylene	191-24-2	EPA 8270-SIM	5	--	670	--	3,200	31	670	--
Total HPAH	--	--	5	--	12,000	--	69,000	960	12,000	--

Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	Natural Background[3]	DMMP Guideline Chemistry Values[4]			Sediment Screening Level for Protection of Benthic Organisms[5]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[8]
					SL	BT	ML	Sediment Cleanup Objective[6] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[7] (for organic carbon <0.5% or >3.5%)	
Carcinogenic PAHs (cPAHs)			μg/kg	μg/kg						μg/kg
Total cPAHs	--	--	5	16	--	--	--	--	--	16
Chlorinated Hydrocarbons			μg/kg		μg/kg	μg/kg	μg/kg	mg/kg OC	μg/kg	μg/kg
1,2-Dichlorobenzene	95-50-1	EPA 8270/EPA 8270-SIM	5	--	35	--	110	2.3	35	130,000,000
1,4-Dichlorobenzene	106-46-7	EPA 8270/EPA 8270-SIM	5	--	110	--	120	3.1	110	680,000
1,2,4-Trichlorobenzene	120-82-1	EPA 8270/EPA 8270-SIM	5	--	31	--	64	0.81	31	130,000
Hexachlorobenzene (HCB)	118-74-1	EPA 8081B	1	--	22	168	230	0.38	22	2,300
Phthalates			μg/kg		μg/kg	μg/kg	μg/kg	mg/kg OC	μg/kg	μg/kg
Bis(2-ethylhexyl) phthalate	117-81-7	EPA 8270	50	--	1,300	--	8,300	47	1,300	260,000
Butyl benzyl phthalate	85-68-7	EPA 8270/EPA 8270-SIM	5	--	63	--	970	4.9	63	1,900,000
Diethyl phthalate	84-66-2	EPA 8270	20	--	200	--	1,200	61	200	--
Dimethyl phthalate	131-11-3	EPA 8270	20	--	71	--	1,400	53	71	--
Di-n-butyl phthalate	84-74-2	EPA 8270	20	--	1,400	--	5,100	220	1,400	150,000,000
Di-n-octyl phthalate	117-84-0	EPA 8270	20	--	6,200	--	6,200	58	6,200	15,000,000
Phenols			μg/kg		μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
Phenol	108-95-2	EPA 8270	20	--	420	--	1,200	420	420	440,000,000
2-Methylphenol	95-48-7	EPA 8270	20	--	63	--	77	63	63	73,000,000
4-Methylphenol	106-44-5	EPA 8270	20	--	670	--	3,600	670	670	150,000,000
2,4-Dimethylphenol	105-67-9	EPA 8270/EPA 8270-SIM	25	--	29	--	210	29	29	29,000,000
Pentachlorophenol	87-86-5	EPA 8270	100	--	400	504	690	360	360	9,200
Miscellaneous Extractables			μg/kg		μg/kg	μg/kg	μg/kg	μg/kg	μg/kg	μg/kg
Benzyl alcohol	100-51-6	EPA 8270	20	--	57	--	870	57	57	150,000,000
Benzoic acid	65-85-0	EPA 8270	200	--	650	--	760	650	650	--
			μg/kg		μg/kg	μg/kg	μg/kg	mg/kg OC	μg/kg	μg/kg
Dibenzofuran	132-64-9	EPA 8270/EPA 8270-SIM	5	--	540	--	1,700	15	540	1,500,000
Hexachlorobutadiene	87-68-3	EPA 8081B	1	--	11	--	270	3.9	11	47,000
N-Nitrosodiphenylamine	86-30-6	EPA 8270/EPA 8270-SIM	5	--	28	--	130	11	28	750,000
Pesticides			μg/kg		μg/kg	μg/kg	μg/kg			
4,4'-DDD	72-54-8	EPA 8081B	1	--	16	--	--	--	--	--
4,4'-DDE	72-55-9	EPA 8081B	1	--	9	--	--	--	--	--
4,4'-DDT	50-29-3	EPA 8081B	1	--	12	--	--	--	--	--
Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT	--	--	1	--	--	50	69	--	--	--
Aldrin	309-00-2	EPA 8081B	0.5	--	9.5	--	--	--	--	--
cis-Chlordane	5103-71-9	EPA 8081B	0.5	--	--	--	--	--	--	--
trans-Chlordane	5103-74-2	EPA 8081B	0.5	--	--	--	--	--	--	--
cis-nonachlor	5103-73-1	EPA 8081B	1	--	--	--	--	--	--	--
trans-nonachlor	39765-80-5	EPA 8081B	1	--	--	--	--	--	--	--
Oxychlordane	27304-13-8	EPA 8081B	1	--	--	--	--	--	--	--
Total Chlordane[10]	--	--	1	--	2.8	37	--	--	--	--
Dieldrin	60-57-1	EPA 8081B	1	--	1.9	--	1,700	--	--	--
Heptachlor	76-44-8	EPA 8081B	0.5	--	1.5	--	270	--	--	--
Polychlorinate Bipheyls (PCBs)			μg/kg	μg/kg	μg/kg	mg/kg OC	μg/kg	mg/kg OC	μg/kg	μg/kg
Total Dioxin-Like PCB Congeners TEQ[11]	--	EPA 1668A	0.002	0.0002	--	--	--	--	--	0.002
Total PCBs Congeners	--	EPA 1668A	0.002	3.5						3.5
Total PCBs Aroclors	--	SW 8082	20	--	130	38	3,100	12	130	20

Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	Natural Background[3]	DMMP Guideline Chemistry Values[4]			Sediment Screening Level for Protection of Benthic Organisms[5]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[8]
					SL	BT	ML	Sediment Cleanup Objective[6] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[7] (for organic carbon <0.5% or >3.5%)	
Organometallic Compounds			**µg/L**			**µg/L**				
Tributyltin Ion (interstitial water)	56573-85-4	EPA 8270D-SIM/Krone	0.0052	–	–	0.15	–	–	–	–
			µg/kg			**µg/kg**				
Tributyltin Ion (bulk)[12]	56573-85-4	EPA 8270-SIM/Krone	3.86	–	–	73	–	–	–	–
Dixons/Furans			**ng/kg**	**ng/kg**	**ng/kg**	**ng/kg**		**ng/kg**	**ng/kg**	**ng/kg**
Total TEQ	–	EPA 1613	5	4	4 - 10 [12]	10	–	5	5	5

Notes:

[1] Chemical Abstracts Service registry number.

[2] Practical quantification limit (PQL) values from ARI of Tukwila, Washington and Frontier Analytical Laboratory of El Dorado Hills, California.

[3] Natural background values from Table 11-1 from the draft Sediment Cleanup User Manual II (Ecology, 2013).

[4] Sediment Quality Guidelines from the Dredged Material Management Program (DMMP) Dredged Material Evaluation and Disposal Procedures User Manual (July 2013).

[5] The organic carbon-normalized Sediment Cleanup Objective (SCO) criteria are applicable to sediment with a total organic carbon (TOC) concentration ranging from 0.5 to 3.5 percent. Sediment with TOC concentrations outside of the 0.5 to 3.5 percent range are screened against the AET Screening Level on a dry weight basis (EPA 1988).

[6] SCO criteria consistent with Chapter 173-204 WAC.

[7] Lowest value of the Apparent Effects Threshold (AET) Criteria from Table 8-1 of the draft Sediment Cleanup Users Manual II (Ecology 2013).

[8] Sediment screening levels are based on natural background or risk-based levels. Screening levels for the protection of human health are calculated using equations and input parameters provided by Ecology in the Sediment Cleanup Users Manual (SCUM) II guidance (draft Ecology 2013), assuming a direct contact/net fishing pathway for subtidal (deeper than -3 feet MLLW) sediment.

[9] 2-Methylnaphthalene is not included in the summation for total LPAH.

[10] Total chlordane is the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane.

[11] Toxicity equivalent factors (TEFs) for calculating dioxin-like PCB congeners toxicity equivalent are provided in Table 6-4 of the draft Sediment Cleanup Users Manual II (Ecology 2013).

[12] Due to the complexity of the project and the likelihood that the 7-day holding time for porewater tributyltin analysis will not be met, the DMMP agencies are allowing bulk tributyltin analysis as a replacement. Adsorptive losses from tributyltin in bulk sediment samples during an extended holding time should be less than adsorptive losses from porewater.

[12] Dioxin screening levels differ for dispersive and nondispersive disposal sites. Dioxin guidelines are developed and provided in the Dredged Material Management Program (DMMP) Dredged Material Evaluation and Disposal Procedures User Manual (July 2013).

BT = bioaccumulation trigger

DMMP = Dredged Material Management Program

EPA = U.S. Environmental Protection Agency

ML = maximum level

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

mg/kg = milligrams per kilogram

mg/kg OC = milligram per kilogram normalized to organic carbon

ng/kg = nanograms per kilogram

PSEP = Puget Sound Estuary Program

SL = screening level

TEQ = toxicity equivalent (concentration)

Shaded cells indicate units are in mg/kg organic carbon (OC) normalized

Table 2

Potentially Applicable Laws, and Applicable, or Relevant and Appropriate Requirements (ARARs)

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Laws and ARARs	Description and Applicability	Procedural/Substantive Requirements
Model Toxics Control Act (MTCA) Cleanup Regulation (RCW 70.105D; Chapter 173-340 WAC)	MTCA is the primary regulation governing cleanup actions at the Site.	Cleanup actions conducted by Ecology under MTCA are exempt from the procedural requirements of most state and local laws/permits; however, must meet substantive requirements of the laws/permits.
Sediment Management Standards (SMS) (RCW 90.48 and 70.105D; Chapter 173-204 WAC)	SMS is the primary regulation governing sediment cleanup actions at the Site.	MTCA is one of the authorities defining the SMS; thus, waivers of state and local laws/permits also apply to sediment cleanups.
State Environmental Policy Act (SEPA) (RCW 43.21C, Chapters 197-11 and 173-802 WAC)	Is intended to ensure that state and local government officials consider environmental values when making decisions or taking an official action such as review and approval of a cleanup action.	The requirements will be met by preparing a SEPA checklist and obtaining SEPA determination from the lead agency.
Federal Clean Water Act (CWA), Section 404 (Dredge and Fill Regulations)	Section 404 requires a permit for the discharge of dredge or fill material into waters of the United States, including filling or construction activities in navigable waters and wetlands. These requirements are applicable to proposed cleanup actions that include in-water dredging and slope armoring.	The requirements will be met by preparing Joint Aquatic Resource Permit Application (JARPA) for U.S Army Corps of Engineers (USACE) review to obtain coverage under an individual permit.
Federal Clean Water Act (CWA), Section 401 (Water Quality Certification)	Section 401 requires that any activity which may result in a discharge into the navigable waters shall obtain a certification from the state that the water quality standards will be met. These requirements are applicable to proposed cleanup actions that consist of in-water dredging and slope armoring.	The requirements will be met by preparing JARPA for Washington State Department of Ecology's review to obtain 401 Water Quality Certification.
Washington Hydraulic Project Approval (HPA), Chapter 77.55.061 RCW, Chapter 220-110 WAC	Hydraulic Project Approval (HPA) and associated requirements for construction projects in state waters have been established for the protection of fish and shellfish. Any form of work that uses, diverts, obstructs, or changes the natural flow or bed of any fresh water or saltwater of the state requires an HPA. These requirements are applicable to proposed cleanup actions that consist of in-water dredging and slope armoring.	Because activities will be performed as part of a MTCA cleanup action, procedural requirements of an HPA permit would not be applicable; however, substantive requirements of HPA will be applicable. The requirements will be met by preparing JARPA for the Washington Department of Fish and Wildlife (WDFW) review. The substantive requirements of an HPA includes restrictions on dates of in-water work (in-water windows) to protect fish species at critical life history stages (e.g., spawning season for salmonids). For cleanup actions in marine waters, the in-water work windows will be met during performance of the cleanup action.
Stormwater Permit Program, Water Pollution Control Act (RCW 90.48); National Pollution Discharge Elimination System Program (Chapter 173-220 WAC)	The Federal Clean Water Act (CWA), as delegated to Department of Ecology under RCW 90.48.260, requires that coverage under the general stormwater permit must be obtained for stormwater discharges associated with construction activities disturbing over 1 acre.	If required, the project will obtain coverage under the Washington State Construction Stormwater General Permit (CSWGP). In addition, a stormwater pollution prevention plan (SWPPP) will be prepared before start of land disturbing activities, which will describe the best management practices (BMPs) that will be implemented to protect surface water quality.
Washington Solid Waste Management Act and Solid Waste Management Handling Standards Regulations, Chapter 70.95 RCW, Chapter 173-350 WAC.	The solid waste requirements are applicable to remedial actions that consist of off-site disposal of solid non-hazardous wastes and contaminated media.	For off site disposal activities, waste materials will be sent to facilities licensed and permitted to accept the specific waste material and documentation will be obtained of such disposition.
Shoreline Management Act (RCW 90.58; Chapter 173-16 and 173-27-060 WAC); City of Everett Shoreline Master Program (SMP)	The Shoreline Management Act (RCW 90.58) and its implementing regulations establish requirements for substantial developments occurring within waters of the state or within 200 feet of the shoreline. Local shoreline management programs are adopted under state regulations, creating an enforceable state law. Applicable to cleanup actions that include activities within 200 feet of the shoreline and cleanup actions for sediment on the shoreline.	Cleanup actions under MTCA are exempt from shoreline management act permitting; however, will need to meet substantive requirements. To ensure that the cleanup actions meet the substantive requirements, the City of Everett will be consulted.

Laws and ARARs	Description and Applicability	Procedural/Substantive Requirements
Federal Coastal Zone Management Act (CZMA), 16 USC 1451-1464; RCW 90.58; WAC 173-27-060, 15 CFR 923-930	The CZMA requires that federal agency action that is reasonably likely to affect use of shorelines be consistent with the approved coastal zone management plan to the maximum extent practicable, subject to limitations set forth in the CZMA. These requirements are applicable to remedial actions that include in-water dredging and slope armoring.	The requirements will be met by preparing a CMZA form for Washington State Department of Ecology's review. Ecology reviews the proposed project for consistency with state environmental requirements, including shoreline permitting requirements. If the project is consistent, Ecology concurs with the certification in writing.
Endangered Species Act (ESA), 16 USC 1531-1543, 50 CFR 402, 50 CFR 17	The Endangered Species Act protects fish, wildlife and plants that are threatened or endangered with extinction. It also protects habitat designated as critical to the conservation of threatened or endangered species. Applicable to cleanup actions that have potential to impact endangered species and/or habitat.	The requirements include consultation with United States Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA) Fisheries, and Ecology to evaluate whether threatened or endangered species will be impacted. This consultation will be coordinated by USACE as part of coverage under the CWA Section 404 individual Permit.
Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), 16 USC 1801 et. seq., 50 CFR Part 600	The MSFCMA was adopted to conserve and manage the fishery resources found off the coasts of the United States and the anadromous species and Continental Shelf fishery resources of the United States by protecting essential fish habitat. Applicable to alternatives that have potential to impact such habitat.	The requirements include consultation with USFWS, NOAA Fisheries, and Ecology to evaluate MSFCMA requirements. This consultation will be coordinated with the Endangered Species Act consultation by USACE as part of coverage under the CWA Section 404 individual Permit.
Fish and Wildlife Conservation Act (FWCA), 16 USC 2901; 50 CFR 83	The FWCA requires federal agencies to use their authority to conserve and promote conservation of non-game fish and wildlife. Non-game fish and wildlife are defined as fish and wildlife that are not taken for food or sport, that are not endangered or threatened and that are not domesticated.	Requirements of the FWCA will be evaluated in conjunction with the Endangered Species Act consultation with USFWS and NOAA Fisheries.
Clean Air Act (RCW 70.94); Ambient Air Quality Standards (Chapter 173-746 WAC)	Applicable to construction activities during implementation of the cleanup action. Administered by the State and local authorities.	Because activities will be performed as part of a MTCA cleanup action, a permit would not be required but compliance with the substantive requirements of this ARAR would be required. The applicability of the substantive requirements will be determined through consultation with the State/local authorities.
City of Everett Title 19, Chapter 37 Critical Areas; Growth Management Act (GMA) (RCW 36.70A)	City ordinance implementing State requirements for identifying and restoring sensitive habitats and other natural resources that provide critical services (water quality, habitat, erosion protection, etc.).	Because activities will be performed as part of a MTCA cleanup action, a permit would not be required but compliance with the substantive requirements of this ARAR would be required. The applicability of the substantive requirements will be determined through consultation with the City of Everett.
Washington Industrial Safety and Health Act (WISHA) (RCW 49.17; Chapters 296-62, 296-843 WAC and others); Occupational Safety and Health Act (OSHA) (29 USC Chapter 15; 29 CFR 1910, 1926)	Applicable to construction of the cleanup action.	Construction activities will be conducted in accordance with the requirements of OSHA/WISHA.
Archaeological and Historic Preservation Act, 16 USC 469	This act establishes procedures to provide for the preservation of historical and archeological resources that might be destroyed through alteration of terrain as a result of a federally licensed activity or program.	A cultural resources assessment will be performed to evaluate the presence of cultural resources. Appropriate measures will be taken during excavation activities and appropriate agency and tribal representatives will be contacted in accordance with an inadvertent discovery plan in the event that an artifact is encountered.
City of Everett Traffic Code, Title 46 EMC	Applicable to construction traffic associated with a cleanup action.	Construction activities such as haul truck operations may require that traffic be directed by flaggers and signage. The applicability of the traffic code will be determined through consultation with the City of Everett.
City of Everett Discharge to Publicly Owned Treatment Works (POTW) Title 14.40 EMC	Applicable to remedial actions that involve discharge of construction wastewater to POTW.	Discharges to the POTW associated with the cleanup actions if needed will require a wastewater discharge permit. The applicability of the substantive requirements of the Title 14.40 EMC will be determined through consultation with the City of Everett.
City of Everett Noise Control, Title 20.08 EMC	Applicable to construction noise generated due to a cleanup action.	Construction activities associated with the cleanup action will comply with City of Everett noise control requirements.

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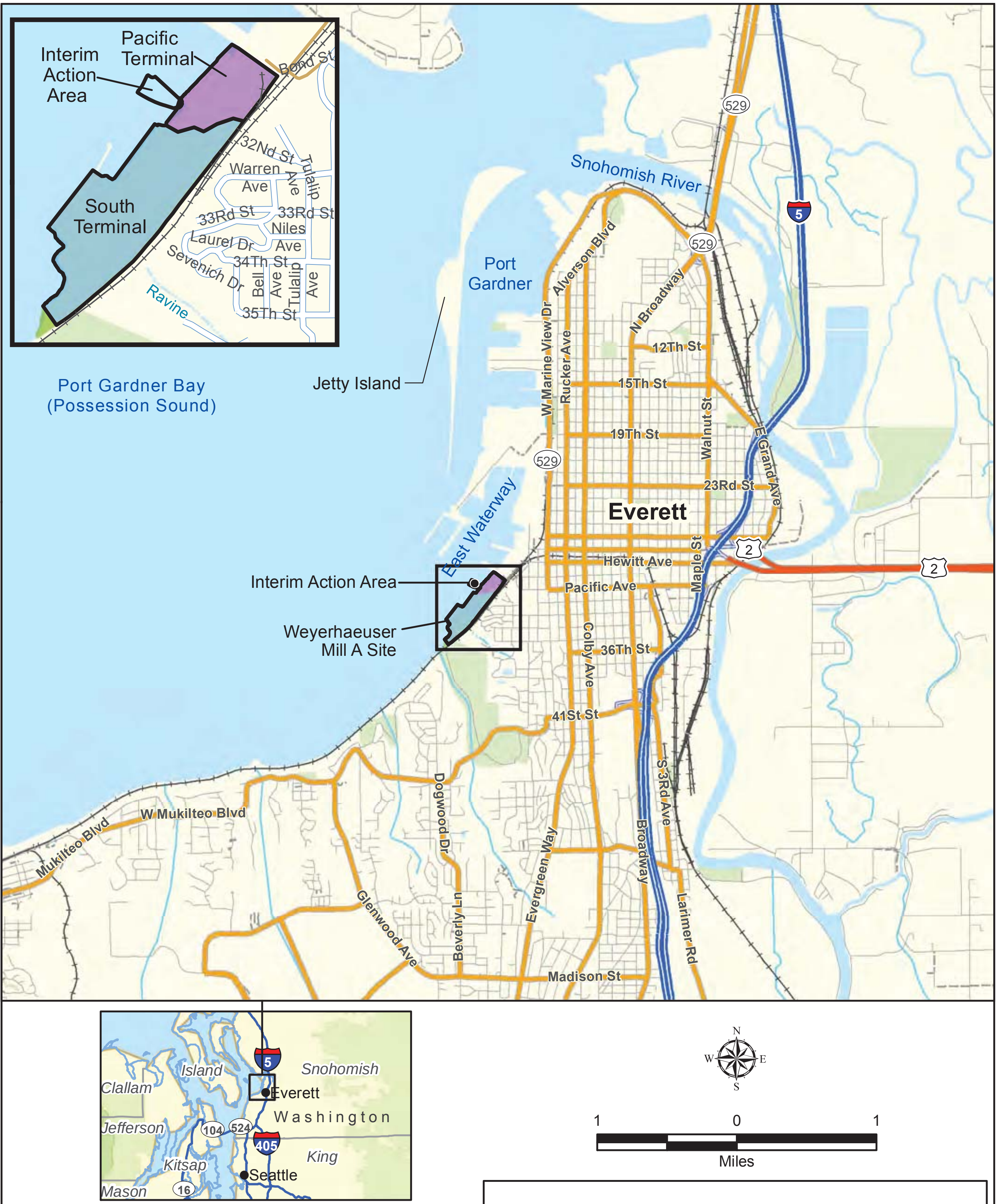

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD83 UTM zone 10N

Vicinity Map

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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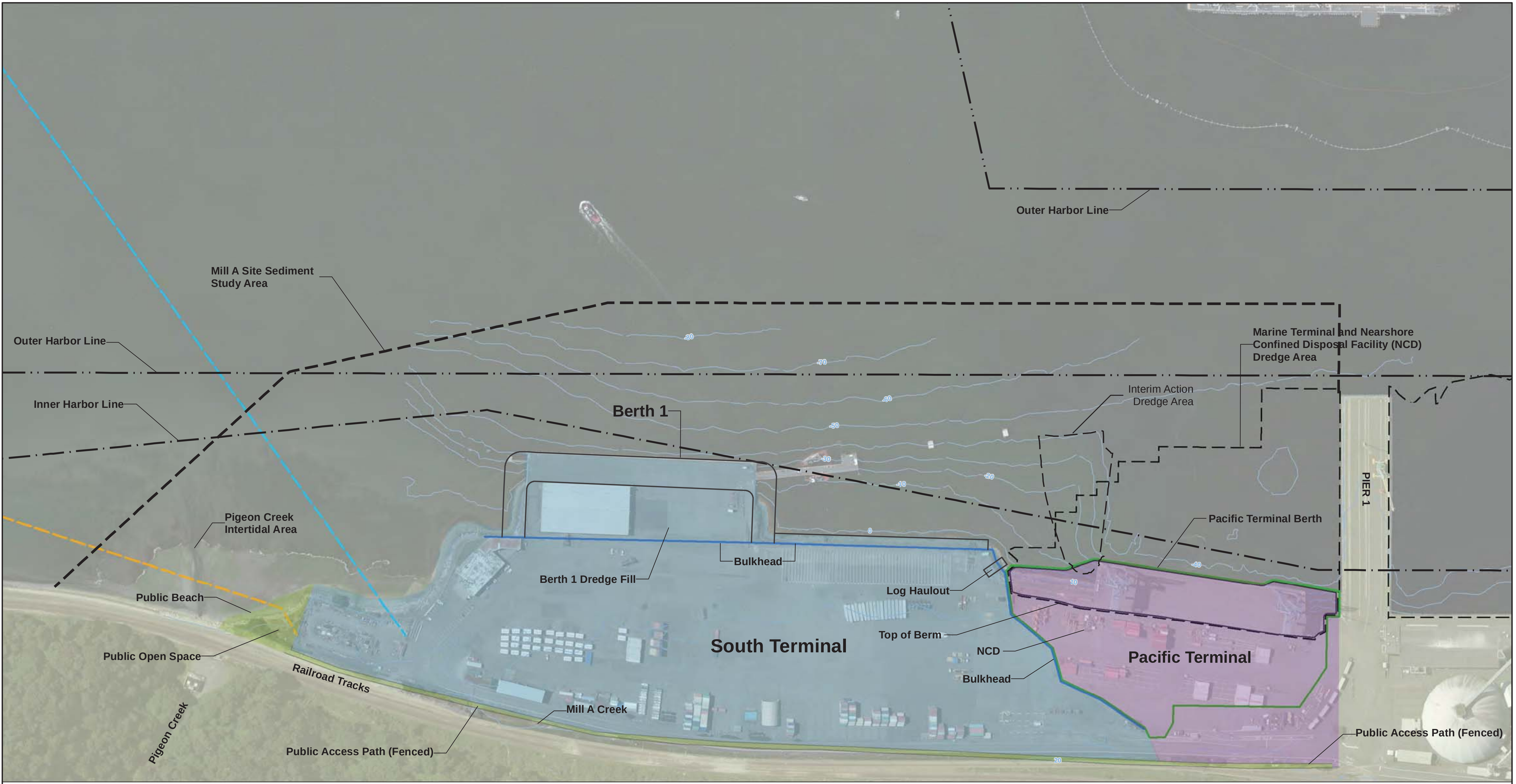
Figure 1



Legend

- 🟦 South Terminal
- 🟪 Pacific Terminal
- 🟩 Open Space/Beach/Access Path
- Dredged Area
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead
- Bathymetric and Topographic Contour (10ft, MLLW)

Data Source: Base aerial from Bing Maps, 2011.
Topography and bathymetry from Walker & Associates Survey, 2006.
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

300 0 300
Feet

Current Property Conditions

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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Figure 2

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Data Source: Base aerial from Bing Maps, 2011.
Historical mill layout from Port of Everett. Site features based on Everett Sulphite Mill Plot Plan dated January 5, 1965.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

1965 Weyerhaeuser Mill A Layout

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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Figure 3

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Data Source: Aerial image from Port of Everett, 1966.
Shoreline from Walker & Associates Survey, 2006.

Notes:
1. The locations of all features shown are approximate.
2. Log storage areas and capacities obtained from Port of Everett memo, "Log Storage and the Port of Everett" January 2, 1987.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Log Storage Areas Associated with Historical Use of the Property

① Mill A Dock (11 acres)
② Mill A Pocket (3.4 acres)
③ Mill A Storage (3.4 acres)

Other Historical East Waterway Log Storage Areas

④ 3 North (2.75 acres)
⑤ Scott's Rework (2.75 acres)
⑥ Naval Reserve Dock (2.75 acres)
⑦ Craneways (8.25 acres)
⑧ Cove (9.6 acres)
⑨ Face of the Fill (10.3 acres)
⑩ Eastside Log Dump (3.4 acres)

Historical Log Storage Areas

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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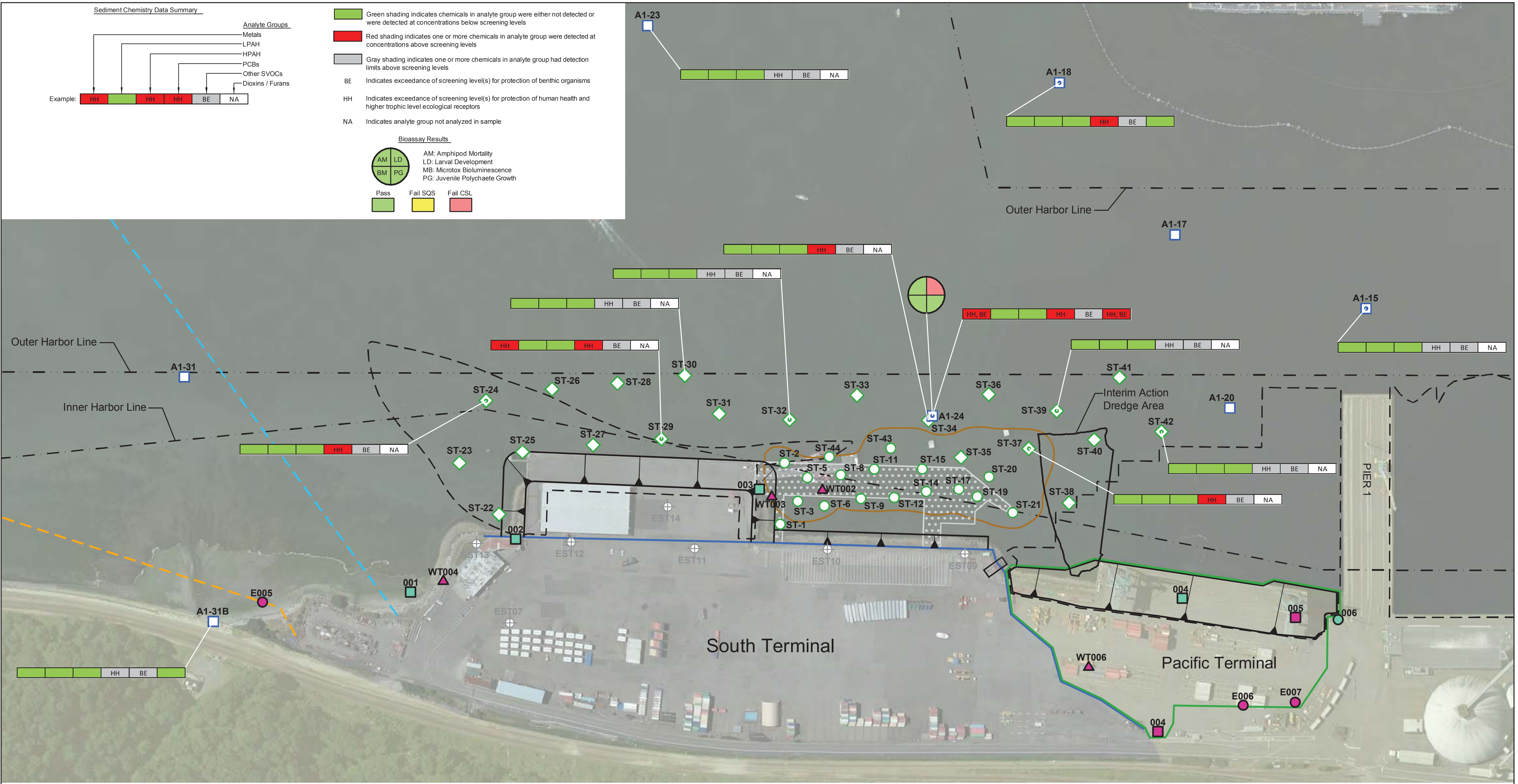
Figure 4

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\InterimActionWorkPlan\067602001_DNR_F04Log_Storage_Areas.mxd Map Revised: 26 May 2015 cgonzales



300 0 300
Feet

Data Source: Base aerial from Aerials Express Seattle, 2009.

Notes:

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Legend

Ecology Port Gardner Sediment Investigation Locations (August 2008)

- ☐ Surface Sediment Sample Location Only
- ☐ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)

- ◇ Surface Sediment Sample Location Only
- ◇ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

Port of Everett Mill A Upland Investigation Locations (January 2010)

- ⌖ Soil Boring and Monitoring Well Location

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall

Surface Sediment Results Summary

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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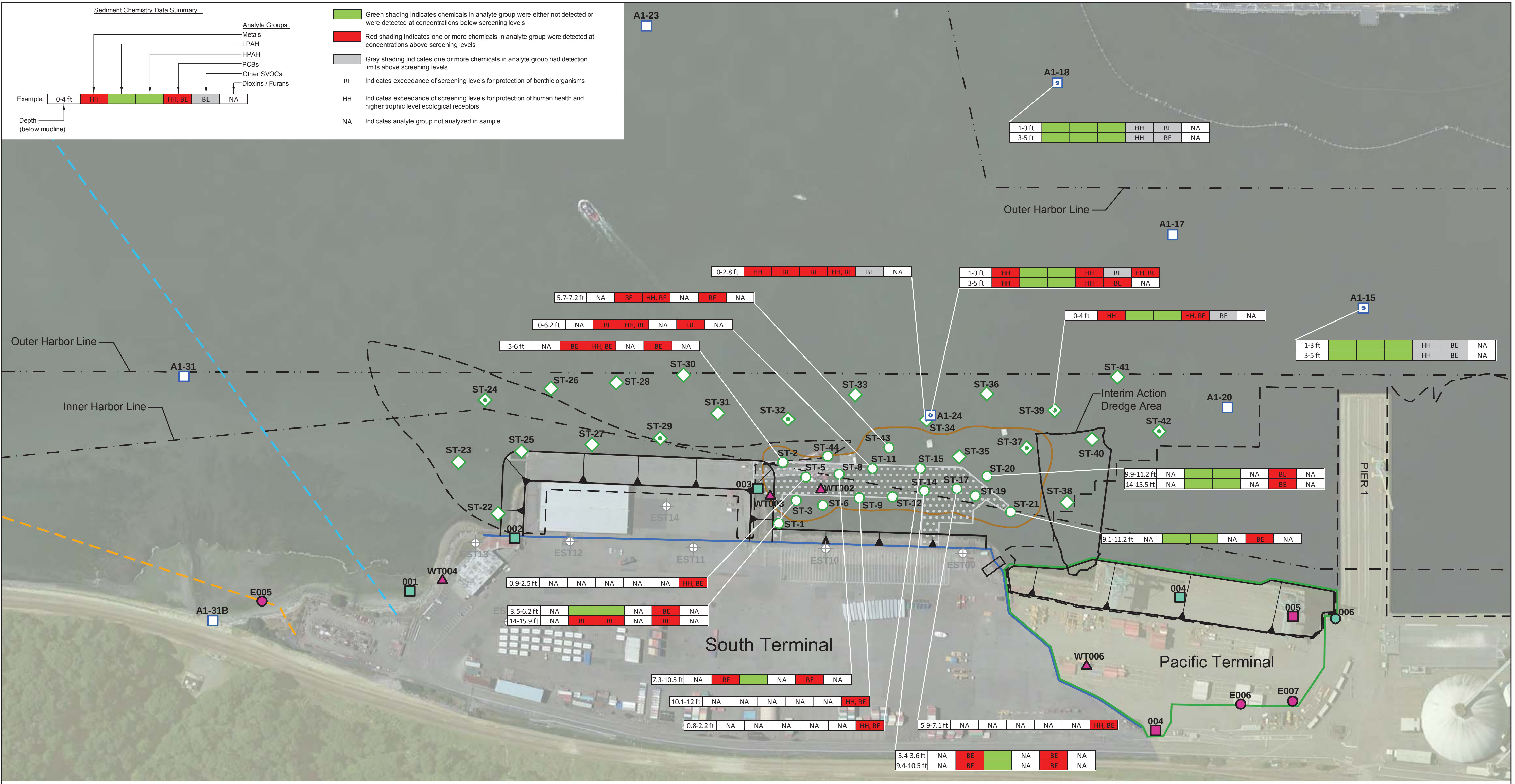
Figure 5

W:\Seattle\Projects\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_T1100_Figs 5 Surface Sediment Results Summary.dwg TAB:F5 Date Exported: 05/27/15 - 10:18 by syi



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Feet

Data Source: Base aerial from Aerials Express Seattle, 2009.

Notes:
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Legend

Ecology Port Gardner Sediment Investigation Locations (August 2008)
- □ Surface Sediment Sample Location Only
- ⊡ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)
- ◇ Surface Sediment Sample Location Only
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

Port of Everett Mill A Upland Investigation Locations (January 2010)
- ⌖ Soil Boring and Monitoring Well Location

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall

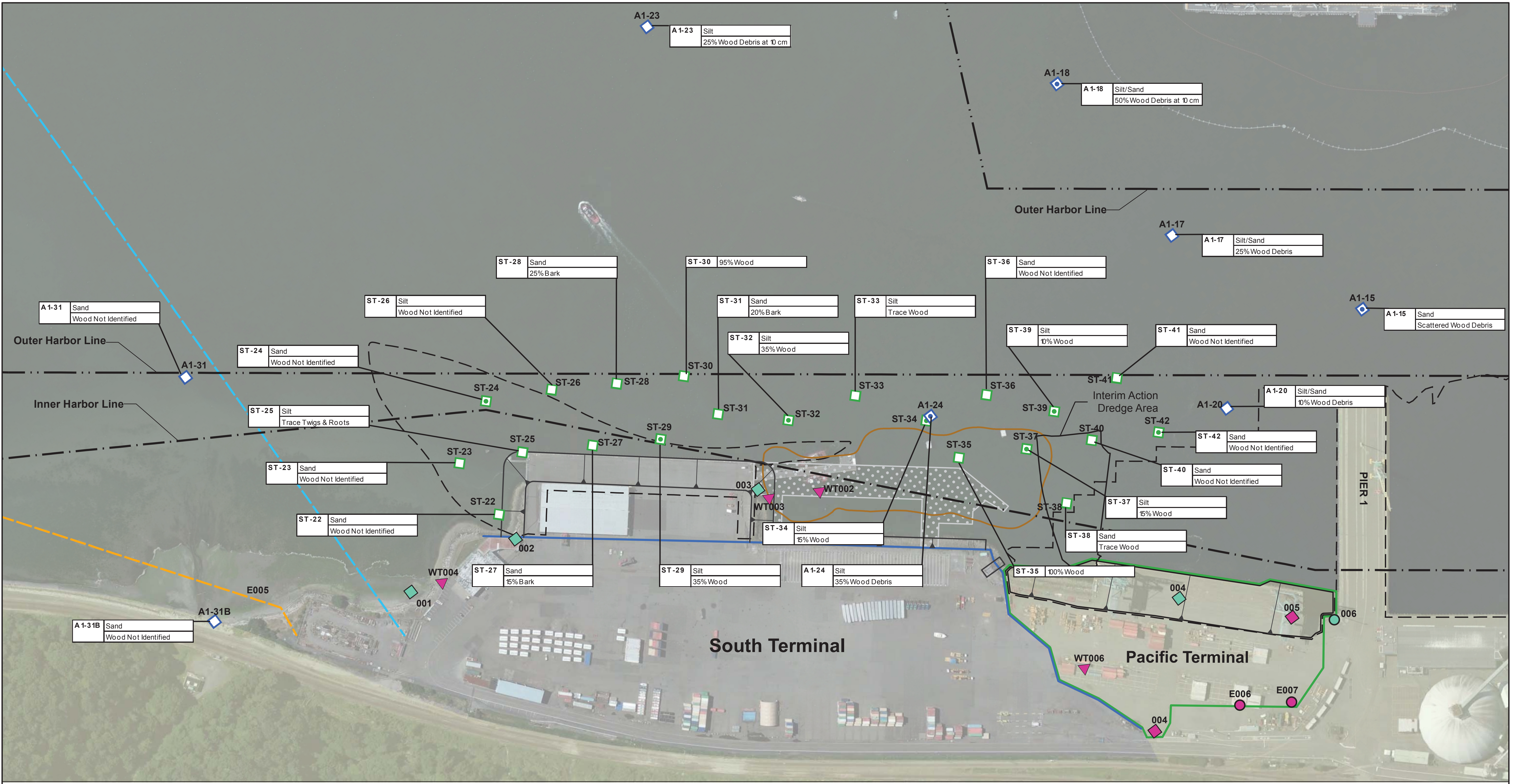
Subsurface Sediment Results Summary

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

GeoEngineers

Figure 6

W:\Seattle\Projects\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_T1100_Figs 6 Subsurface Sediment Results Summary.dwg TAB:F6 Date Exported: 05/27/15 - 10:19 by syi



300 0 300

Feet

Data Source: Base aerial from Esri World Imagery; Aerials Express Seattle, 2009.

Notes:
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Legend

Location	Predominant Component of Sample Wood Observation

Ecology Port Gardner Sediment Investigation Locations (August 2008)

- ☐ Surface Sediment Sample Location Only
- ▣ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)

- ◇ Surface Sediment Sample Location Only
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Bulkhead
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall

Observed Wood Debris in Surface Sediment

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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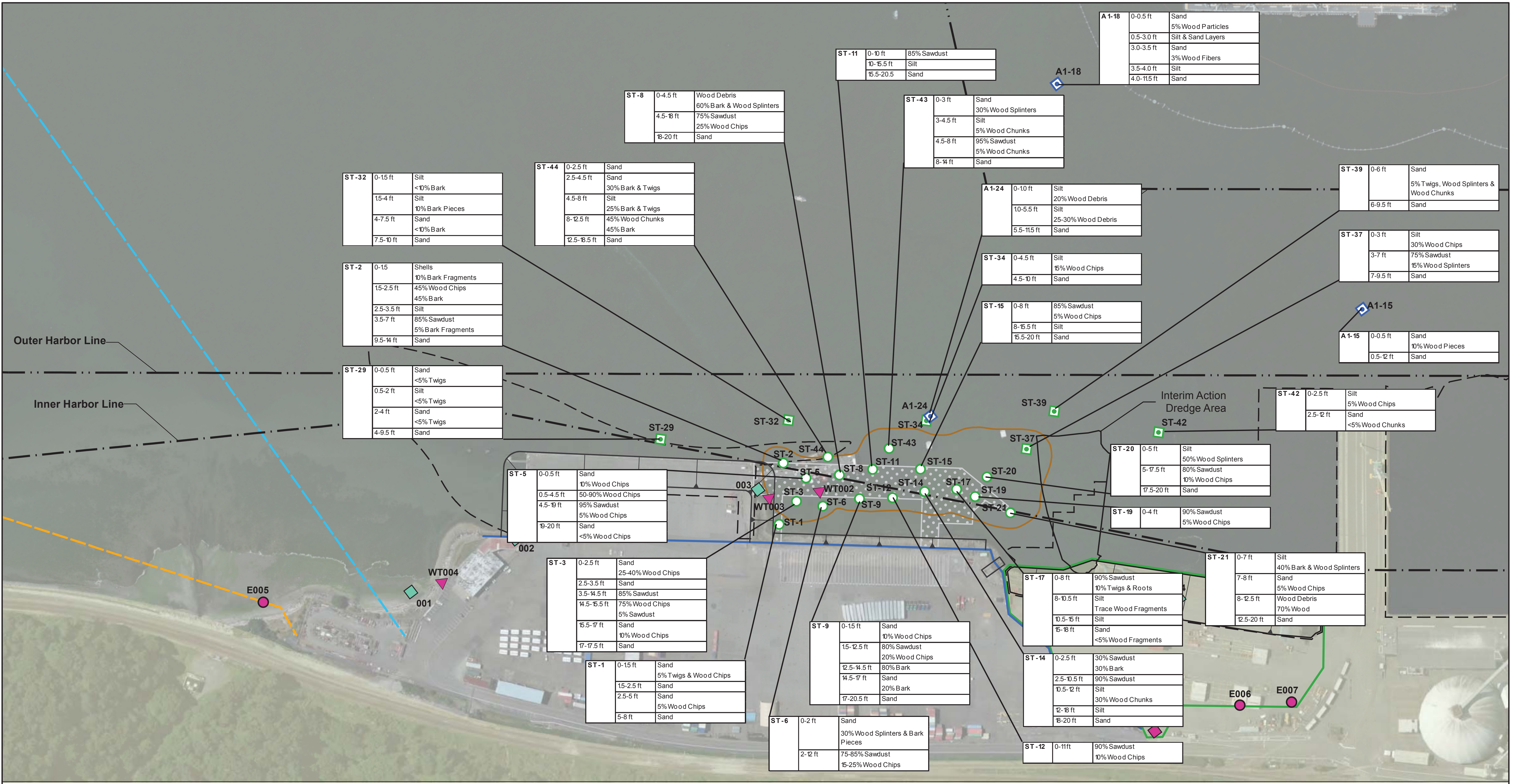
Figure 7

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\InterimActionWorkPlan\Draft Interim Action Work Plan_Fig 7_Surfacial Wood Content.mxd Map Revised: 26 May 2015 cgonzales



300 0 300
Feet

Data Source: Base aerial from Bing Maps, 2011.

Notes:
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Legend

Location	Depth	Predominant Component Wood Observation
	Depth	Predominant Component Wood Observation

Ecology Port Gardner Sediment Investigation Locations (August 2008)
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Bulkhead
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall

Observed Wood Debris in SubSurface Sediment

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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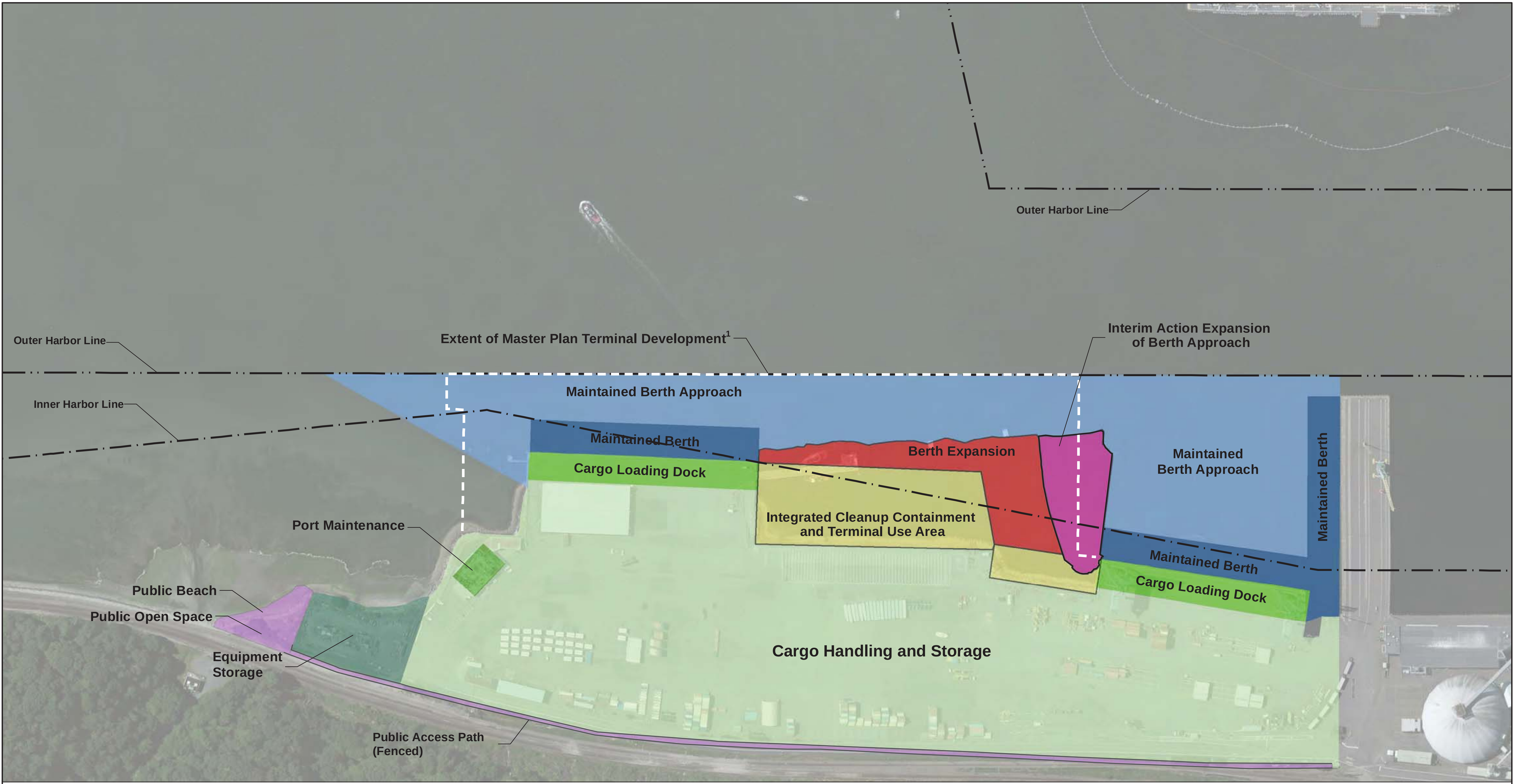
Figure 8

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\InterimActionWorkPlan\067602001_DNR_F08Wood_SubSurfaceSediment.mxd Map Revised: 26 May 2015 cgonzales

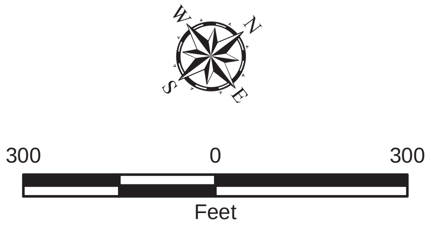


Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\InterimActionWorkPlan\067602001_DNR_F09FutureSiteUse_new.mxd Map Revised: 26 May 2015 cgonzales

Future site use areas shown are approximate.

Data Source: Base aerial from Bing Maps, 2011.

Notes:
1. Marine Terminal Master Plan 2008 Port of Everett Comprehensive Scheme of Harbor Improvements, July, 8 2008
2. The locations of all features shown are approximate.
3. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.



Future Property Use Assumptions

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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Figure 9

Notes:
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Data Source:

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

⊕ Proposed Core Location

● Actual Core Location

○ 10-ft Radius from Proposed Location

N
W E
S

50 0 50
Feet

Sediment Core Sample Location

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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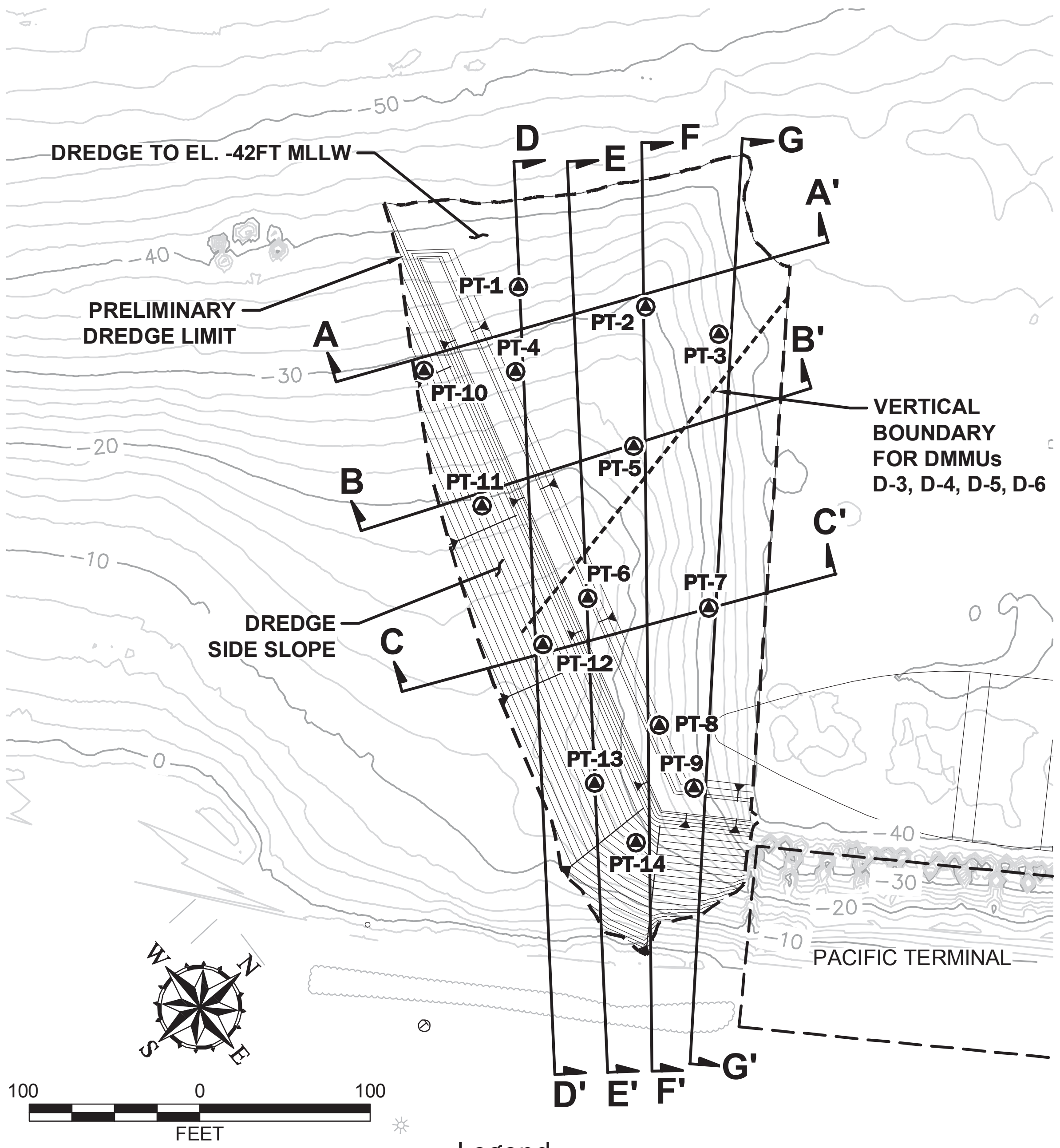
Figure 10

\\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\InterimActionWorkPlan\0676020001_DNR_F10SedimentCoreSampleLocations.mxd Date Exported: 05/26/15 by cgonzales



Legend

PT-1 ⊛	Sediment Core Location
- - - -	DMMU Boundary
D-1	DMMU Identification
A A'	Cross-Section Location

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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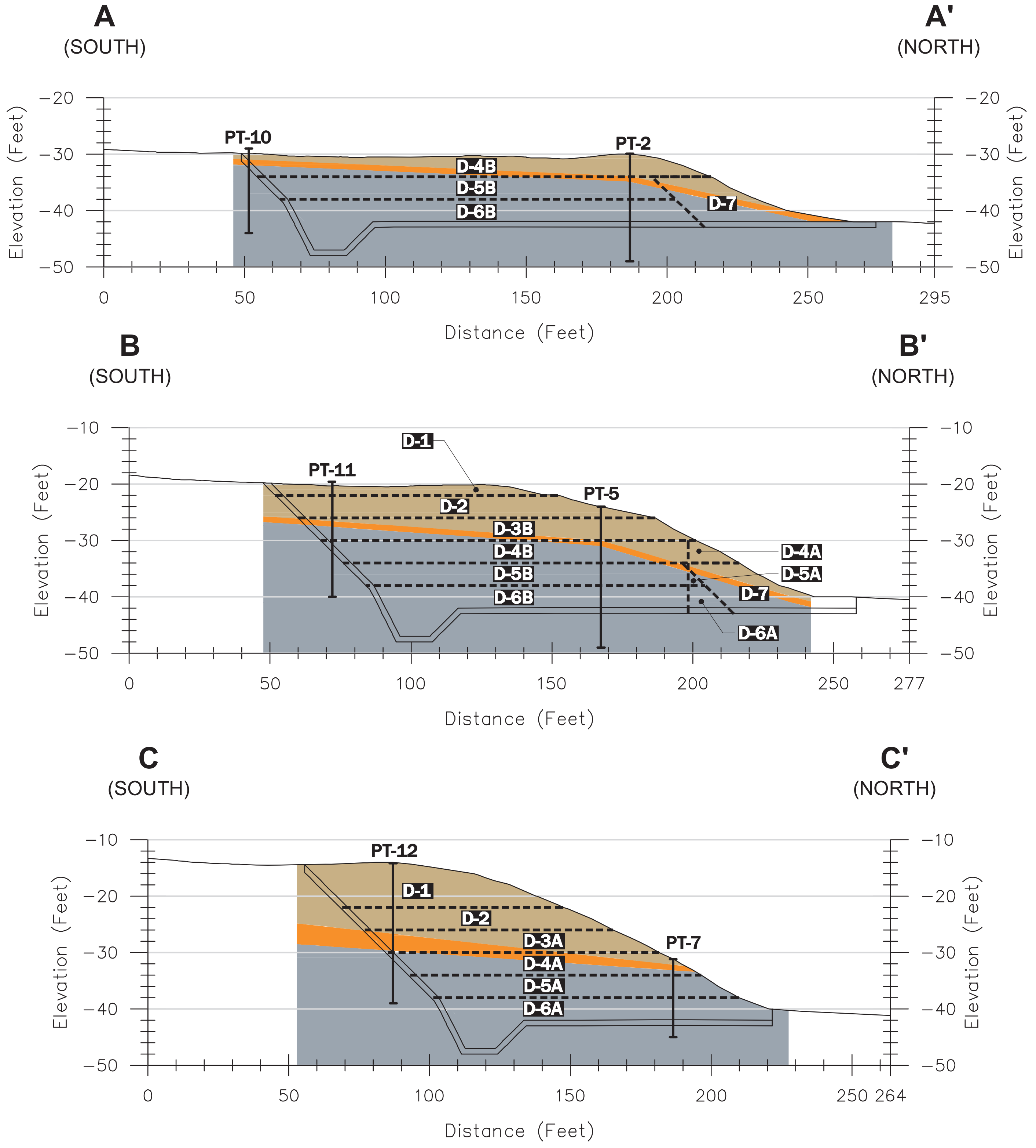
DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW



🟫	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
⬛	Gray silty sand (native material)

50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy - Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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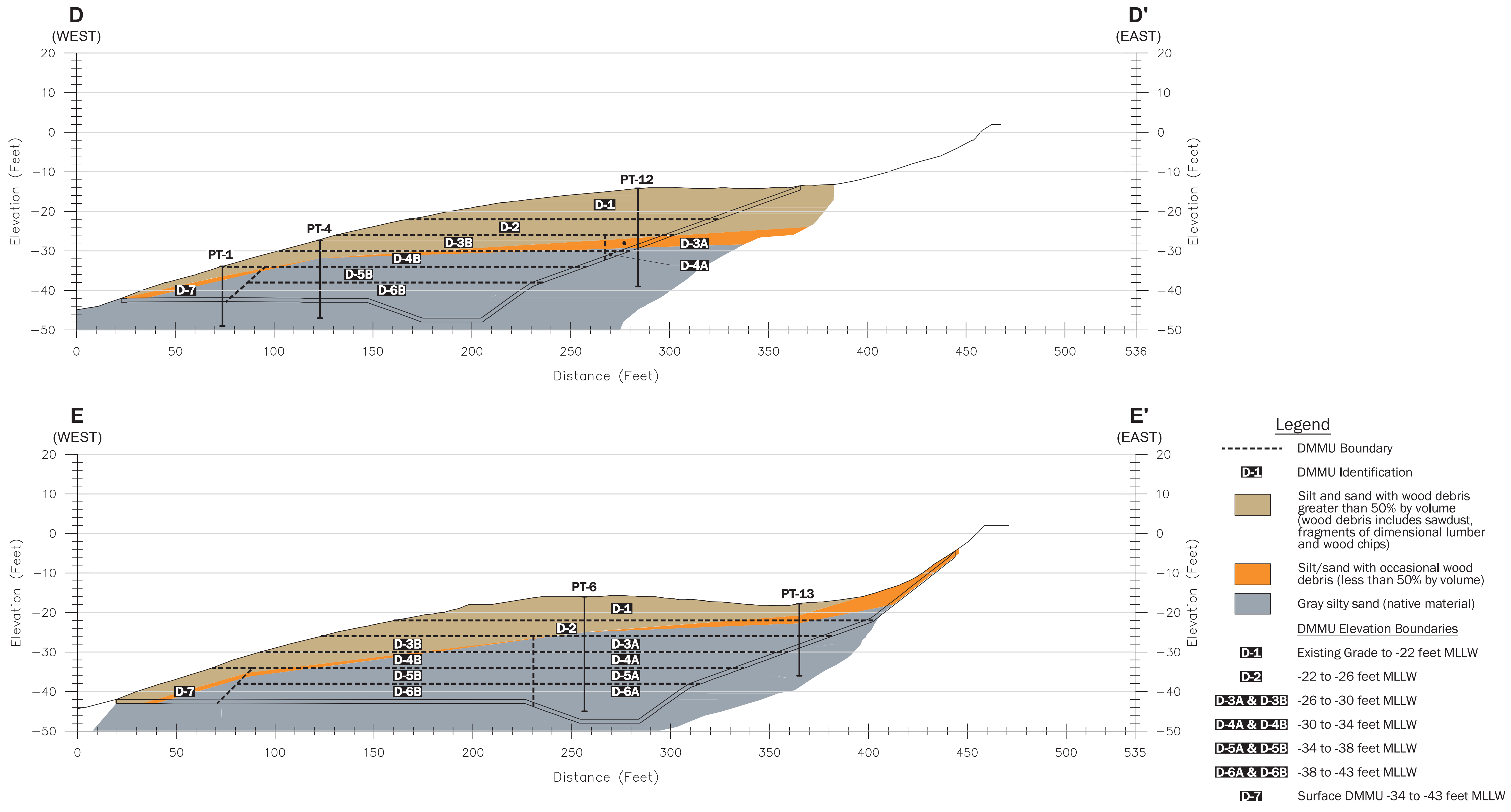
Figure 11

P:\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_TI100_FIGS II-13 SITE PLAN AND SECTIONS.DWG\TAB:DDEE MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:18



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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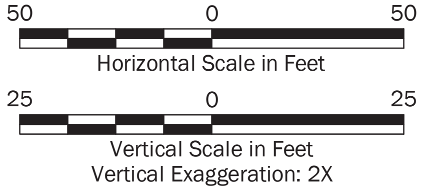

Summary of Stratigraphy - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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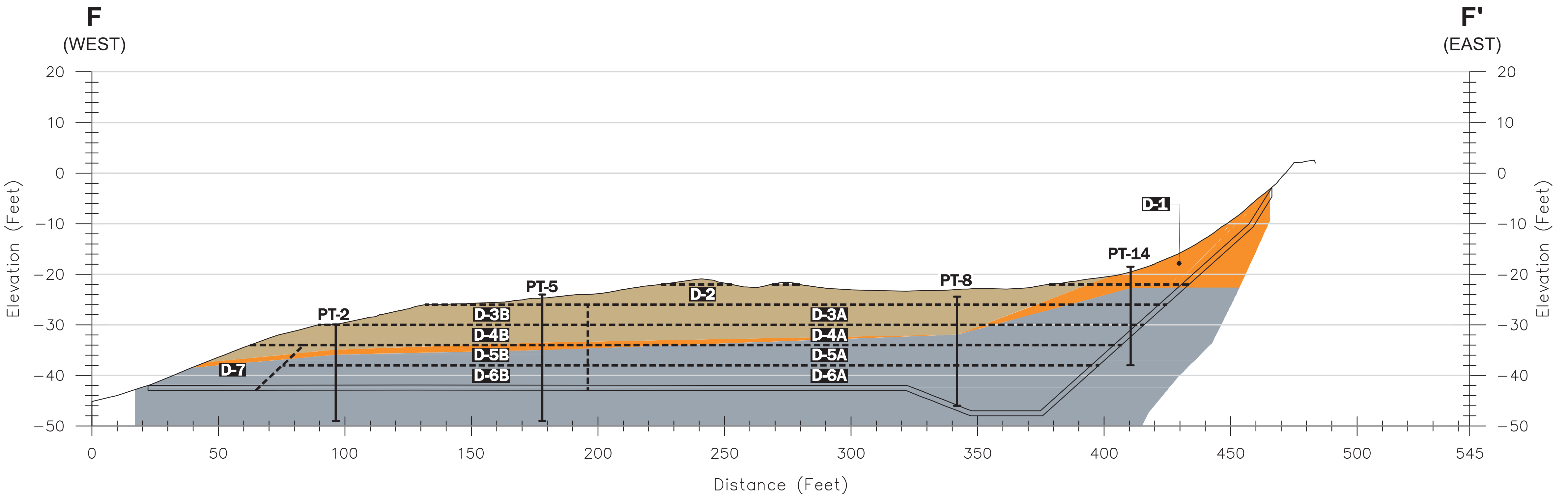
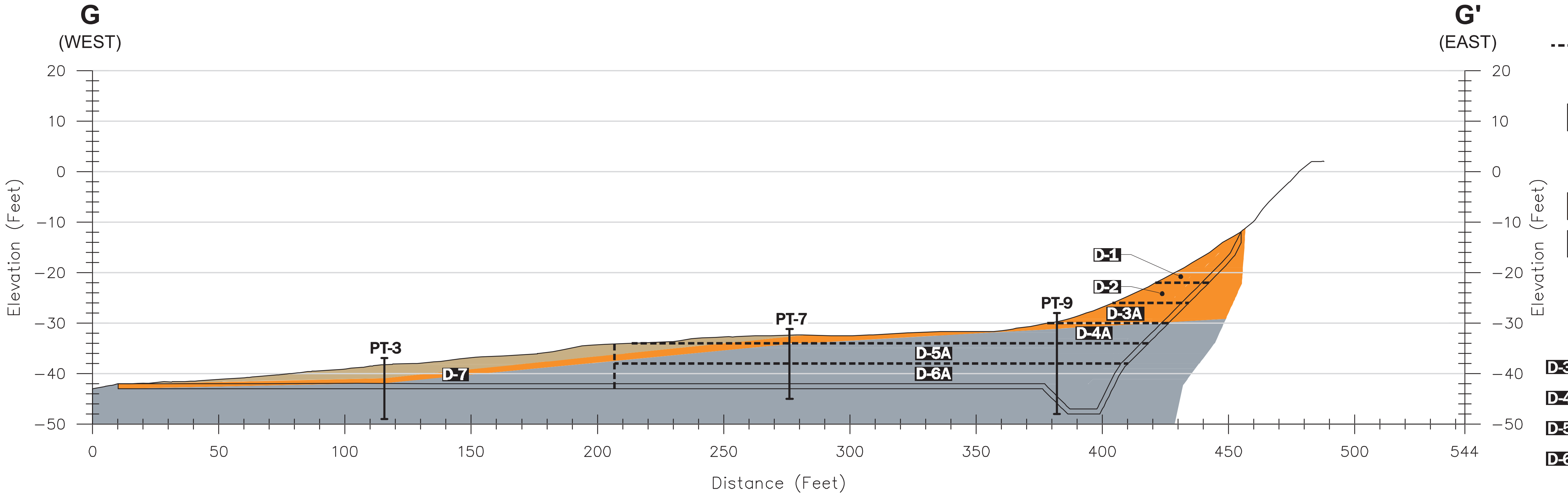
Figure 12





Legend

-------- DMMU Boundary

D-1 DMMU Identification

🟫 Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)

🟧 Silt/sand with occasional wood debris (less than 50% by volume)

▨ Gray silty sand (native material)

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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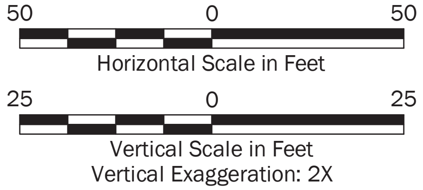


Horizontal Scale in Feet

Vertical Scale in Feet
Vertical Exaggeration: 2X

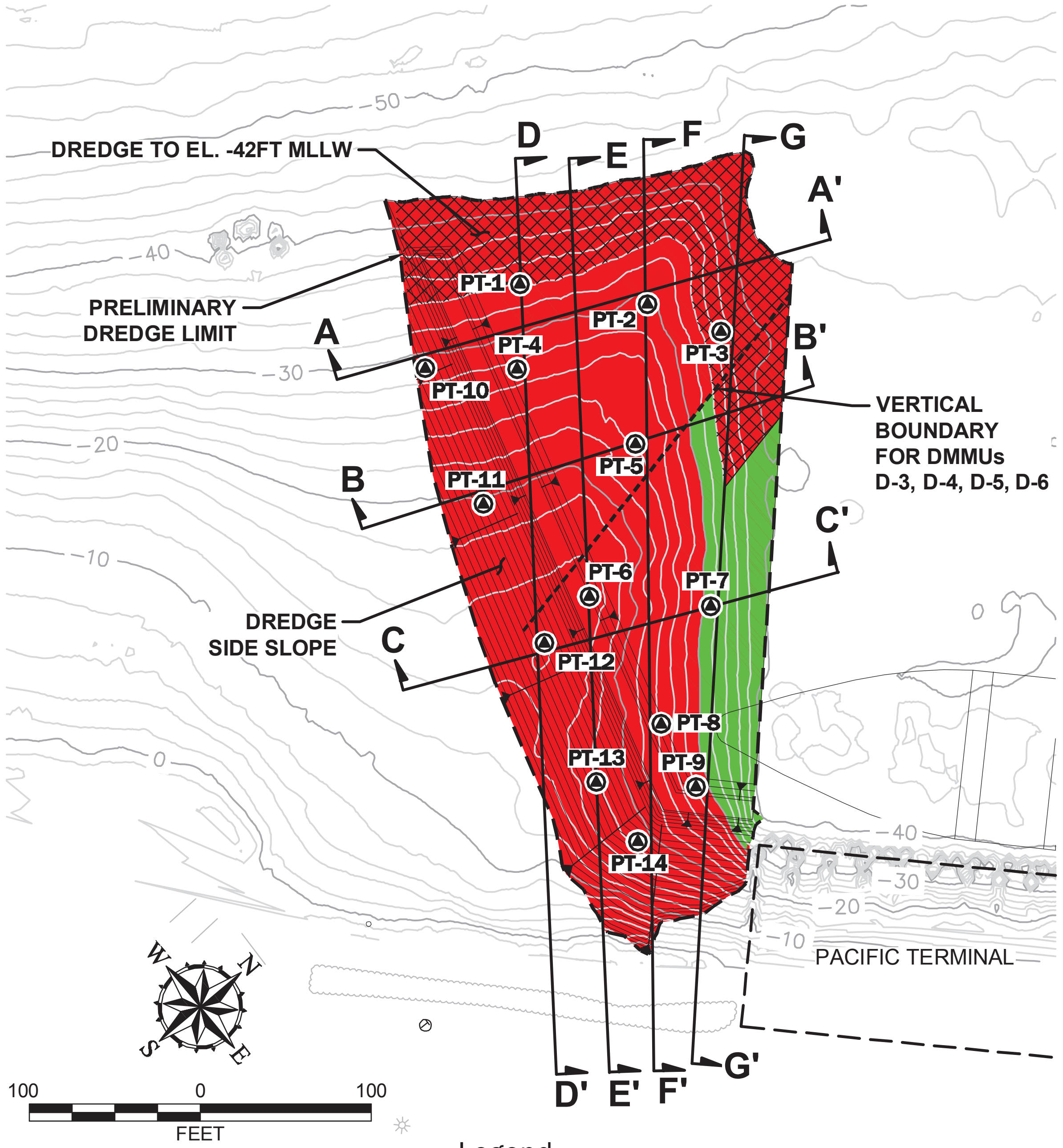
**Summary of Stratigraphy -
Cross-Sections F-F' and G-G'**

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

GEOENGINEERS

Figure 13

P:\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\0676020003_T1100_FIGS 14-16 SAMPLING PLAN SITE PLAN AND SECTIONS.DWG\TAB:SITE PLAN AABBCC MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:30



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Legend

PT-1 ◎ Sediment Core Location

┅ DMMU Boundary

D-1 DMMU Identification

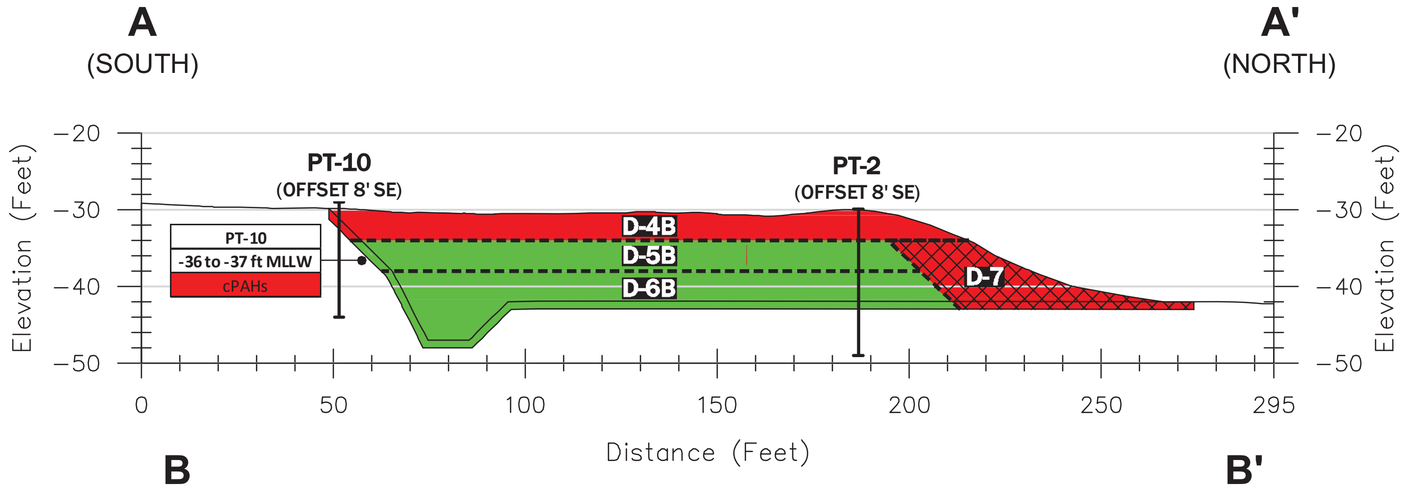
A A' Cross-Section Location

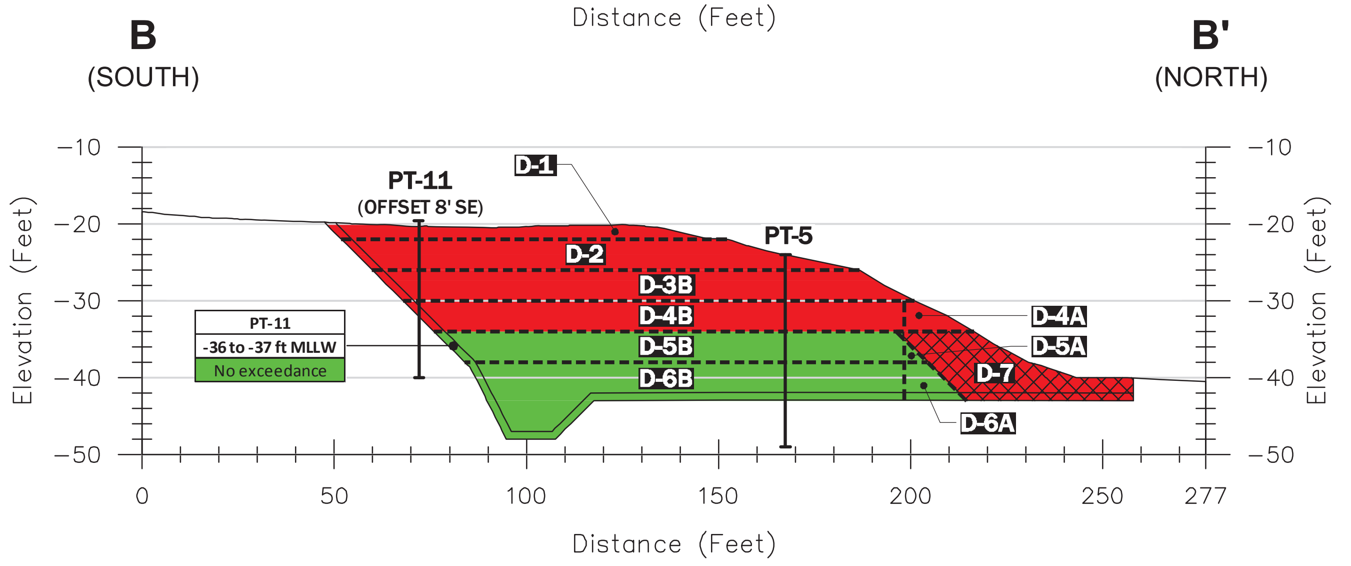
🟥 Chemical analytical results indicate one or more analytes exceeding screening levels.

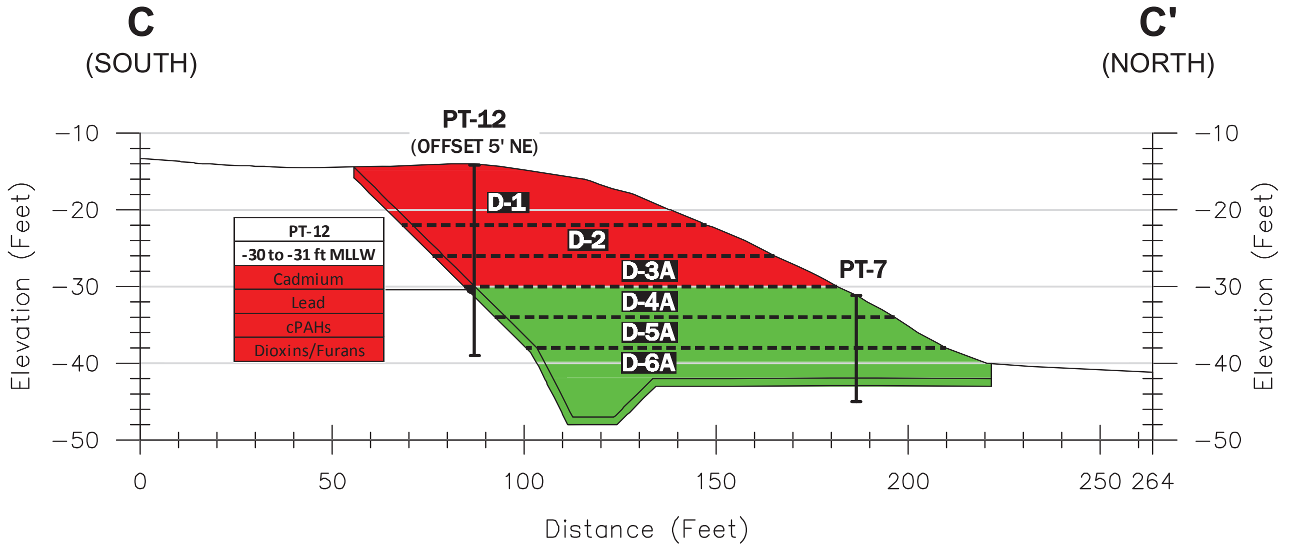
🟩 Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW







50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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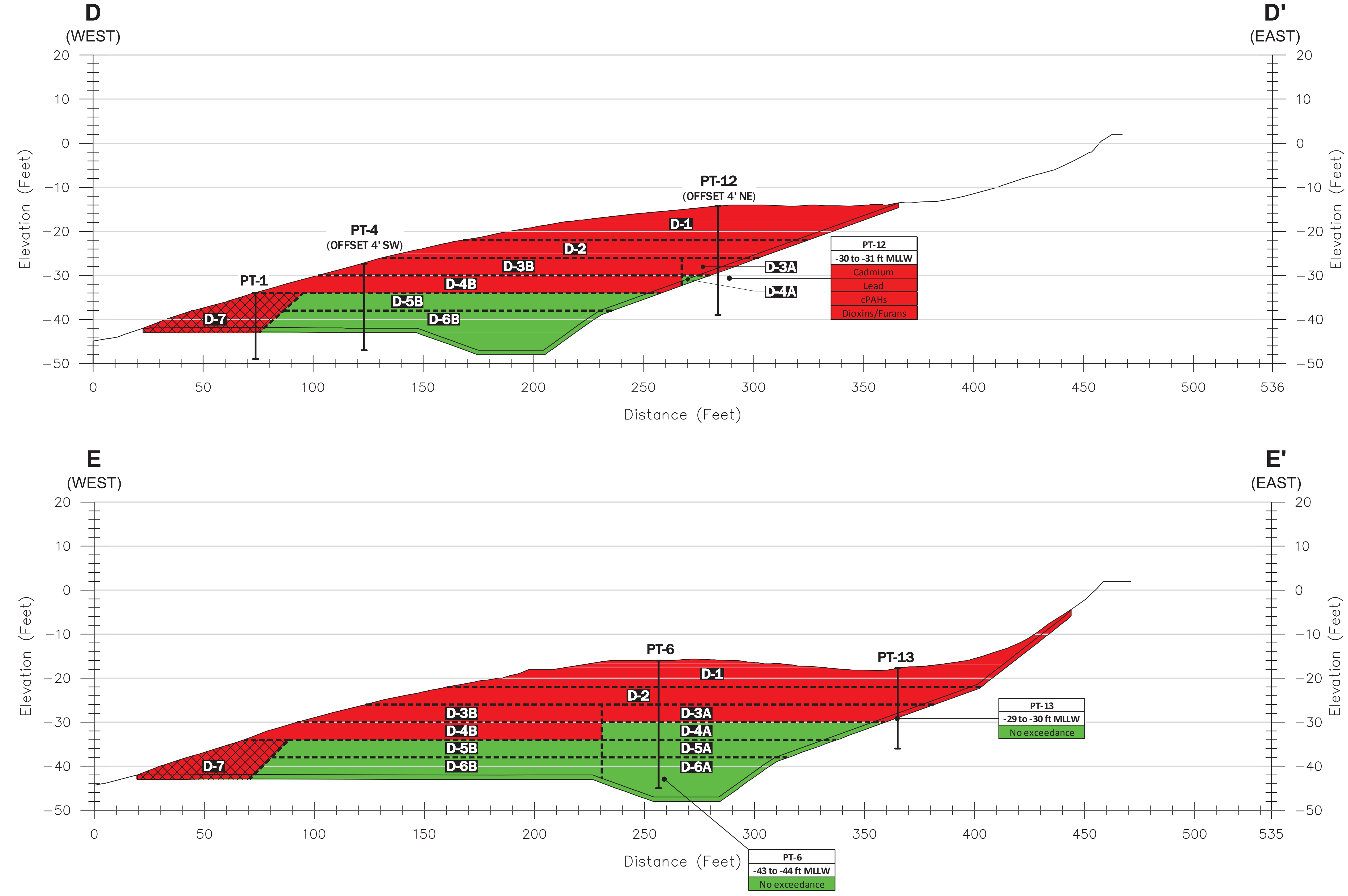
Figure 14



Legend

- - - - -	DMMU Boundary
D-1	DMMU Identification
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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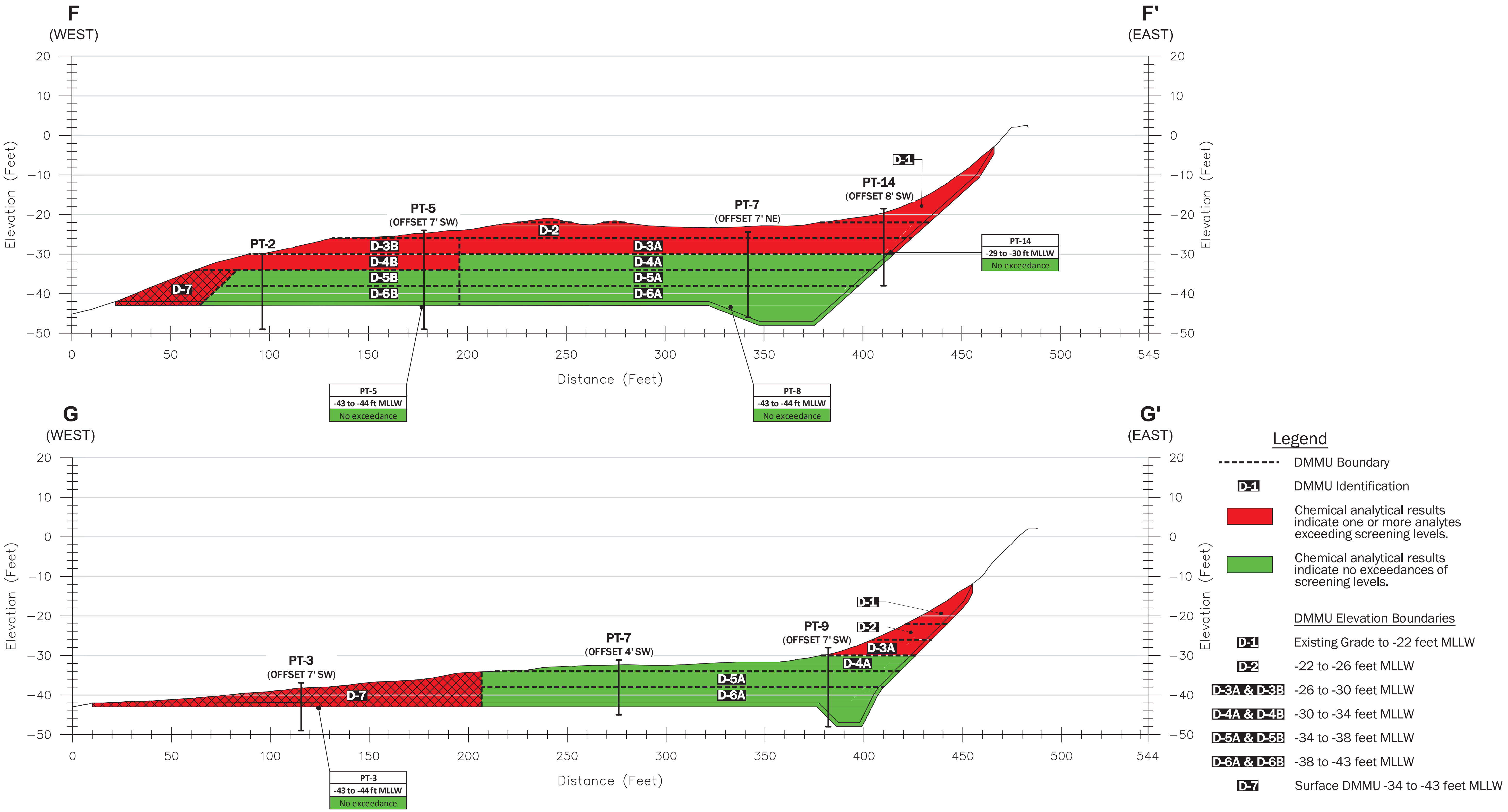
Figure 15

P:\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\0676020003_TI100_FIGS 14-16 SAMPLING PLAN SITE PLAN AND SECTIONS.DWG\TAB:DDEE MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:32



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections F-F' and G-G'

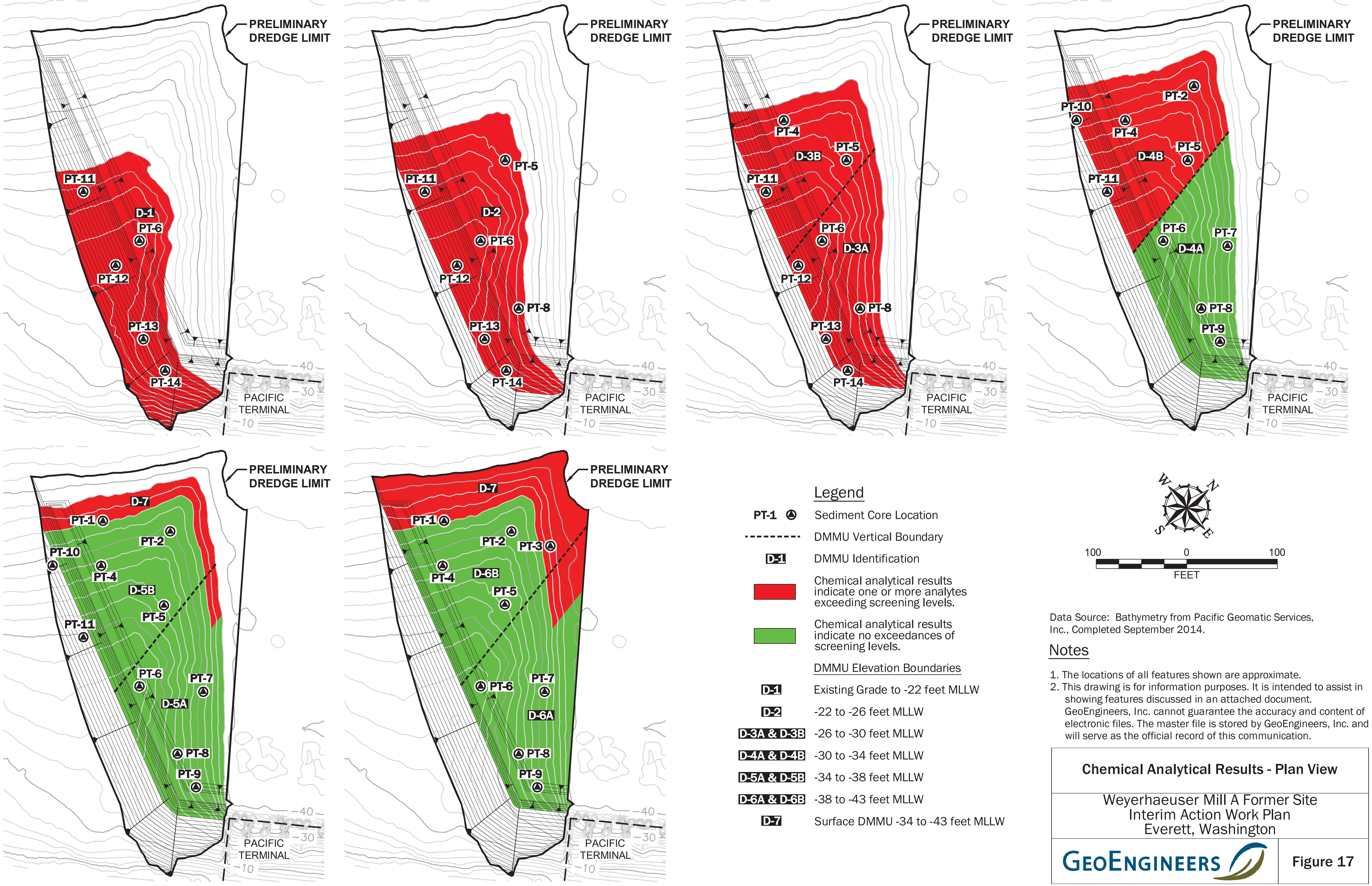
Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

GEOENGINEERS

Figure 16

P:\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_TI100_FIGS 14-16 SAMPLING PLAN SITE PLAN AND SECTIONS.DWG\TAB:FFGG MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:34

P:\0\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_TI100_FIGS 17 PLAN VIEW OF DMMU.DWG\TAB:AA CC MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:39



Legend

PT-1 ●	Sediment Core Location
- - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Chemical Analytical Results - Plan View

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

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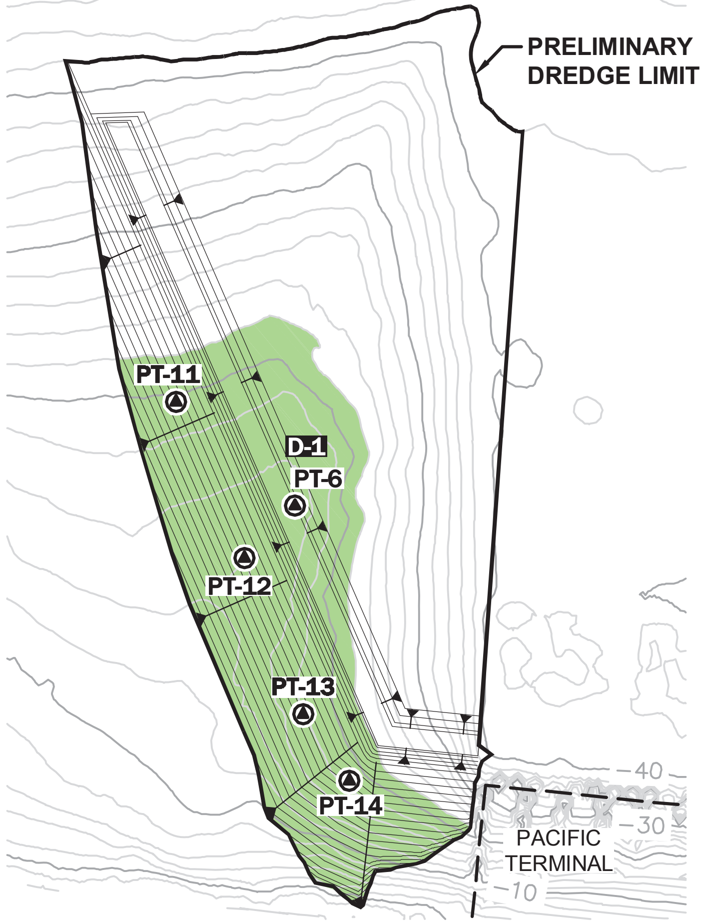
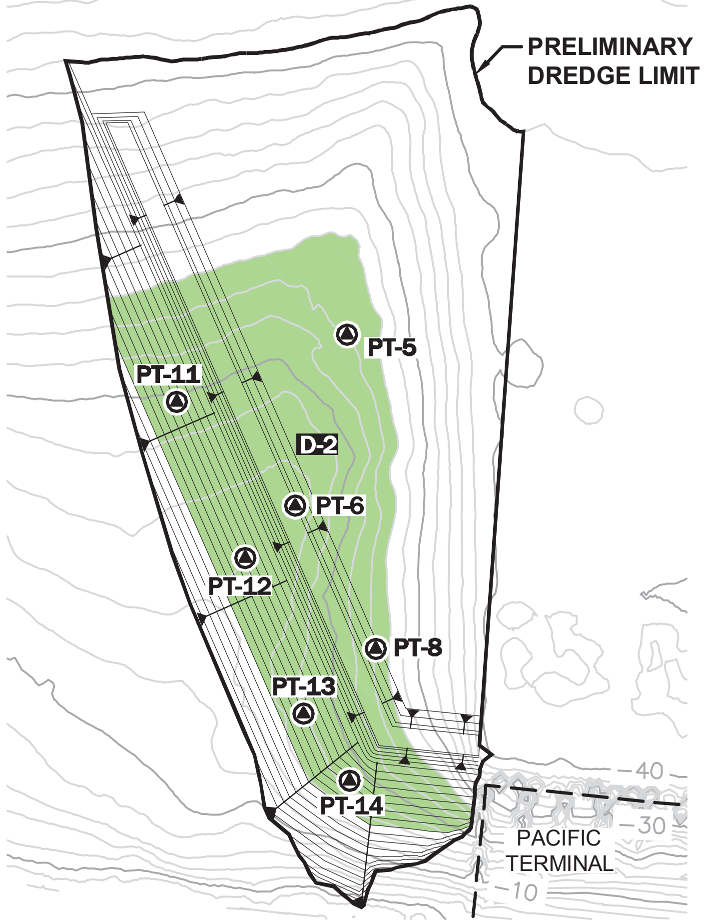
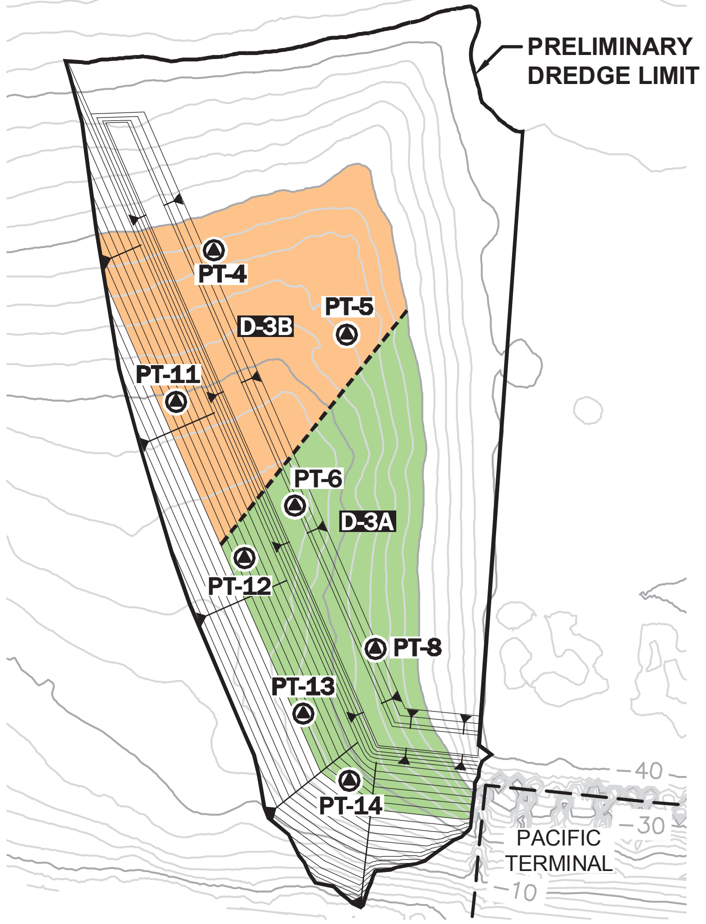
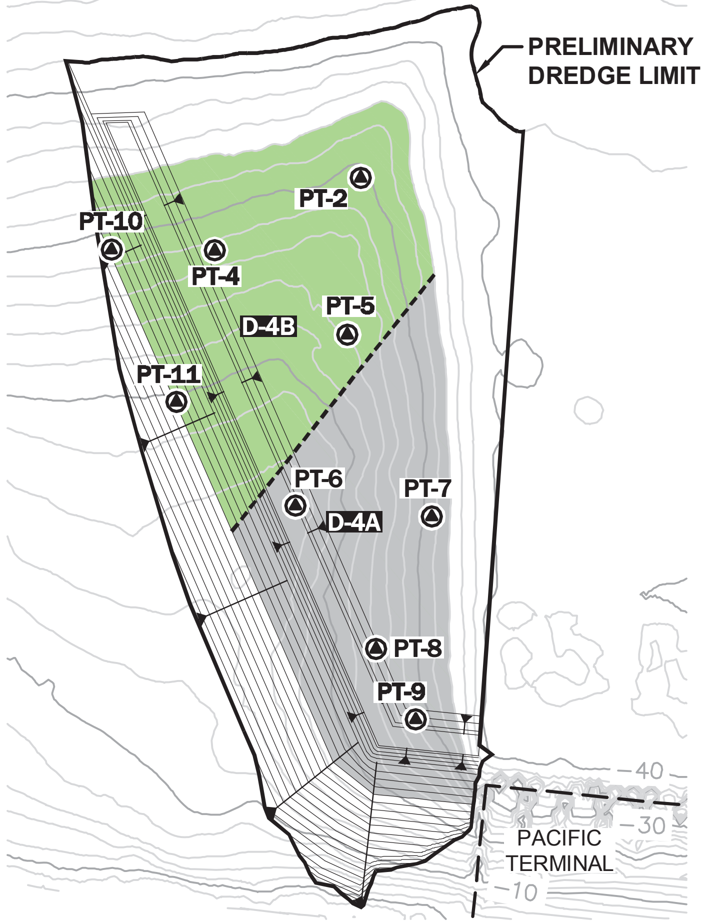
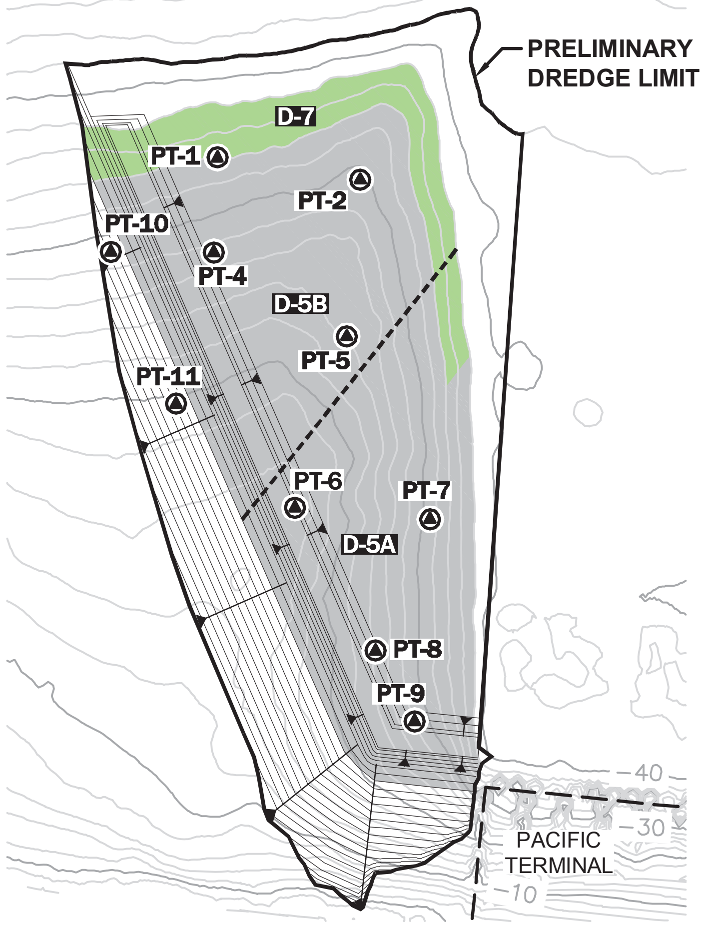
Figure 17

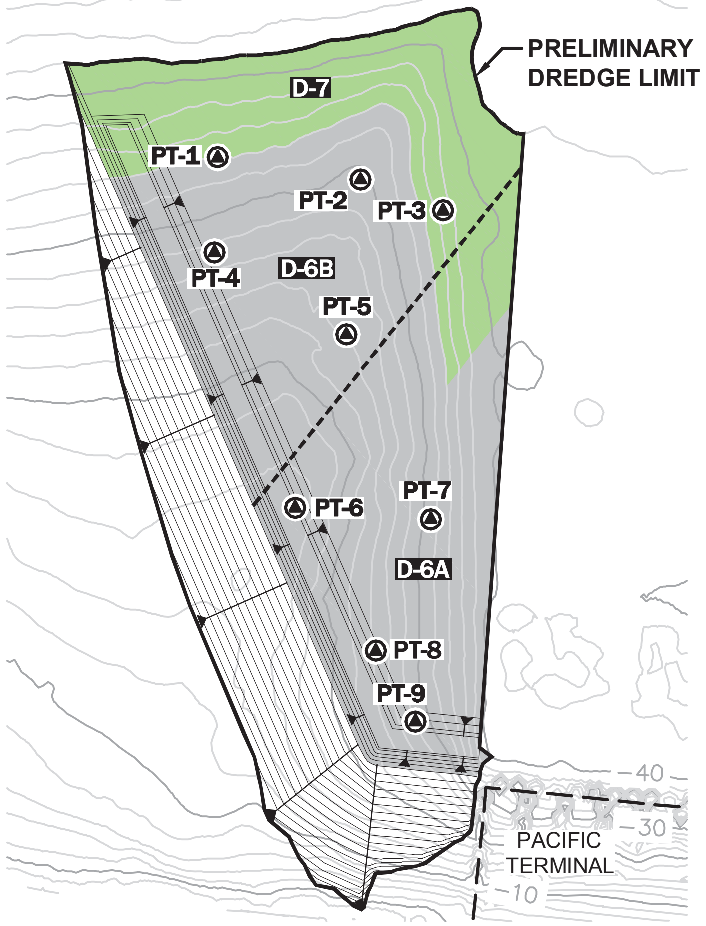










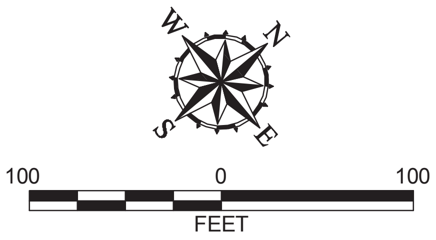


Legend

PT-1 ⓐ	Sediment Core Location
- - - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
🟧	Bioassay testing results indicate overall failure relative to screening criteria.
🟩	Bioassay testing results indicate pass relative to screening criteria.
▒	Bioassy testing not completed for DMMU.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

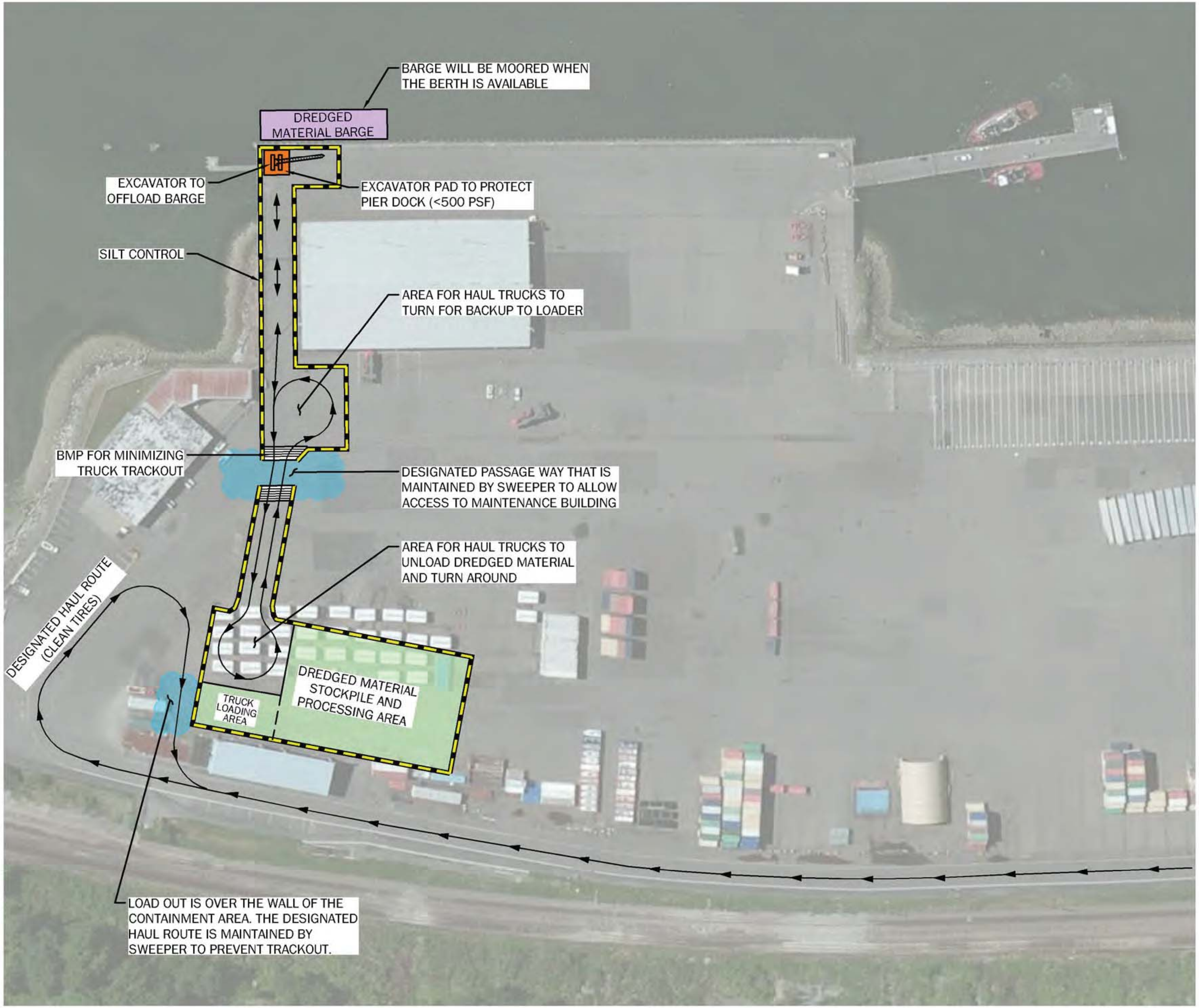
Biological Testing Results - Plan View

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

GeoEngineers

Figure 18

P:\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_TI100_FIGS 18 BIOLOGICAL TESTING RESULTS.DWG\TAB:AA CC MODIFIED BY TMICHAUD ON JUN 18, 2015 - 14:44



W N S E

120 0 120

Horizontal Scale in Feet

Notes

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Dredged Material Management Plan

Weyerhaeuser Mill A Former Site
Interim Action Work Plan
Everett, Washington

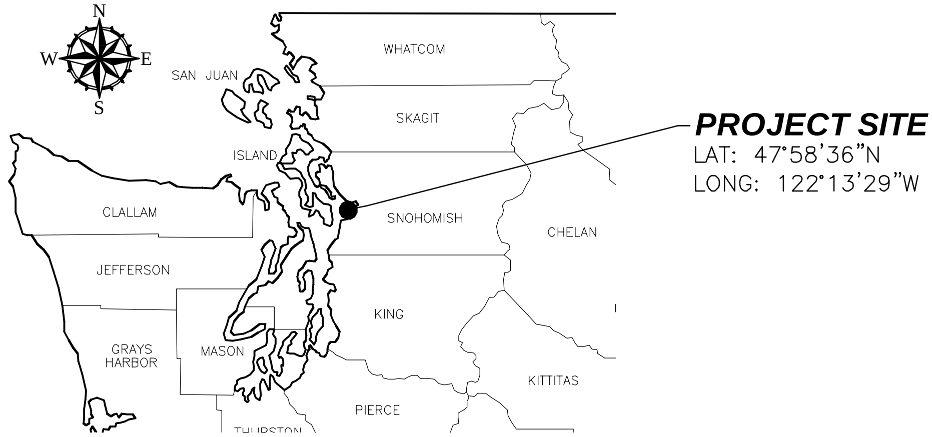
GEOENGINEERS

Figure 19

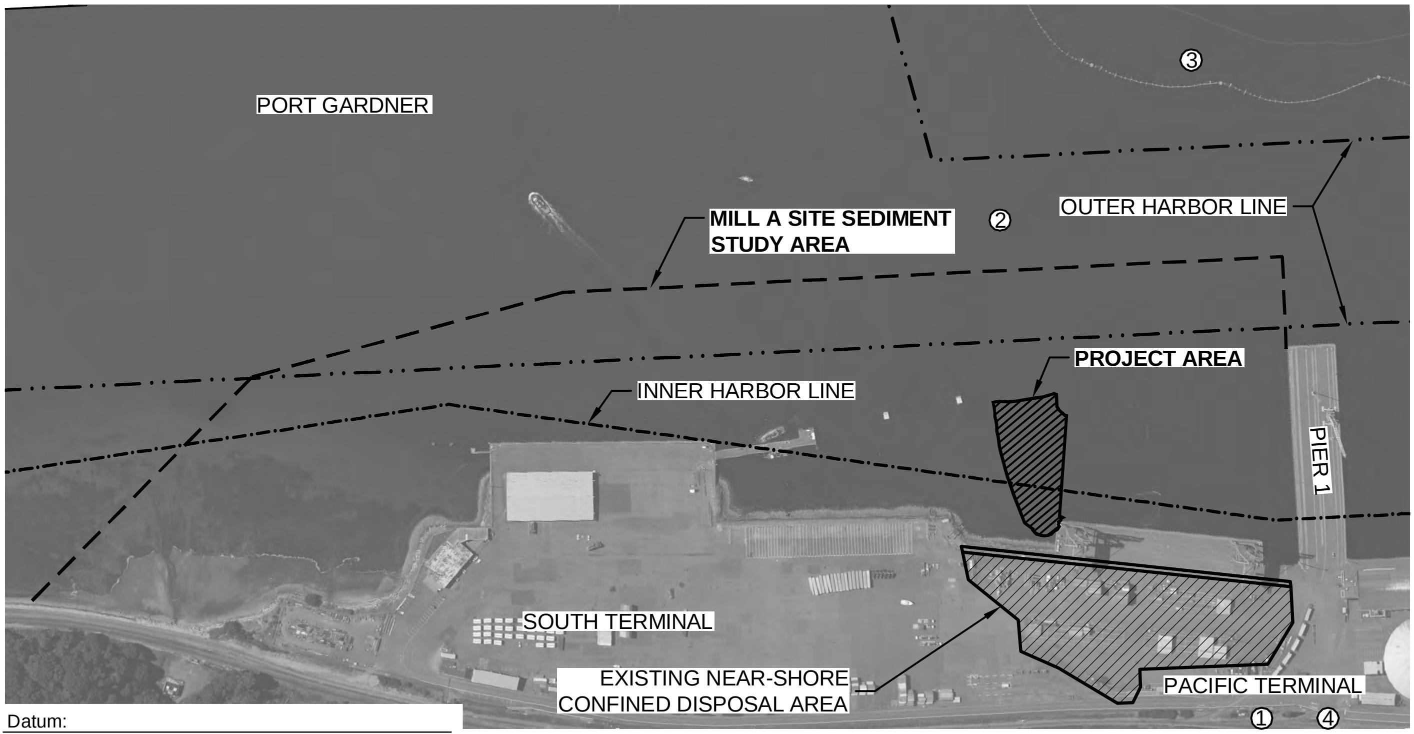
P:\0676020\03\CAD\INTERIM ACTION WORK PLAN\067602003_TI100_FIGS 19 DREDGED MATERIAL MANAGEMENT PLAN.DWG\TAB:AA MODIFIED BY TMICHAUD ON JUN 17, 2015 - 14:56

APPENDIX A

Plans for Interim Action



VICINITY MAP



Datum:

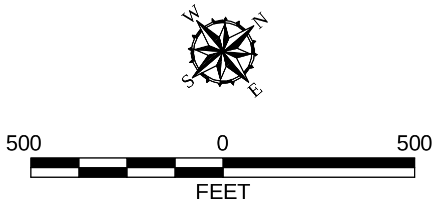
Elevation datum for this project is 0.0 Mean Lower Low Water (MLLW)

Total Data Plane - National Oceanic and Atmospheric Administration (NOAA) Tidal Benchmark at the Historic Everett Station 944-7659.

Mean Higher High Water (MHHW)	+11.09 ft
Mean High Water (MHW)	+10.21 ft
Mean (Half) Tide Level (MTL)	+ 6.51 ft
Mean Sea Level (MSL)	+ 6.48 ft
Mean Low Water (MLW)	+ 2.80 ft
NAVD88	+ 2.03 ft
Mean Lower Low Water (MLLW)	+ 0.00 ft
Extreme Low Water (ELW)	- 4.50 ft

PLAN

Reference: Base aerial from Aerials Express Seattle, 2009.



PURPOSE:
INTERIM CLEANUP ACTION DREDGING TO ELEVATION -42 FEET MLLW ADJACENT TO PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:
1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

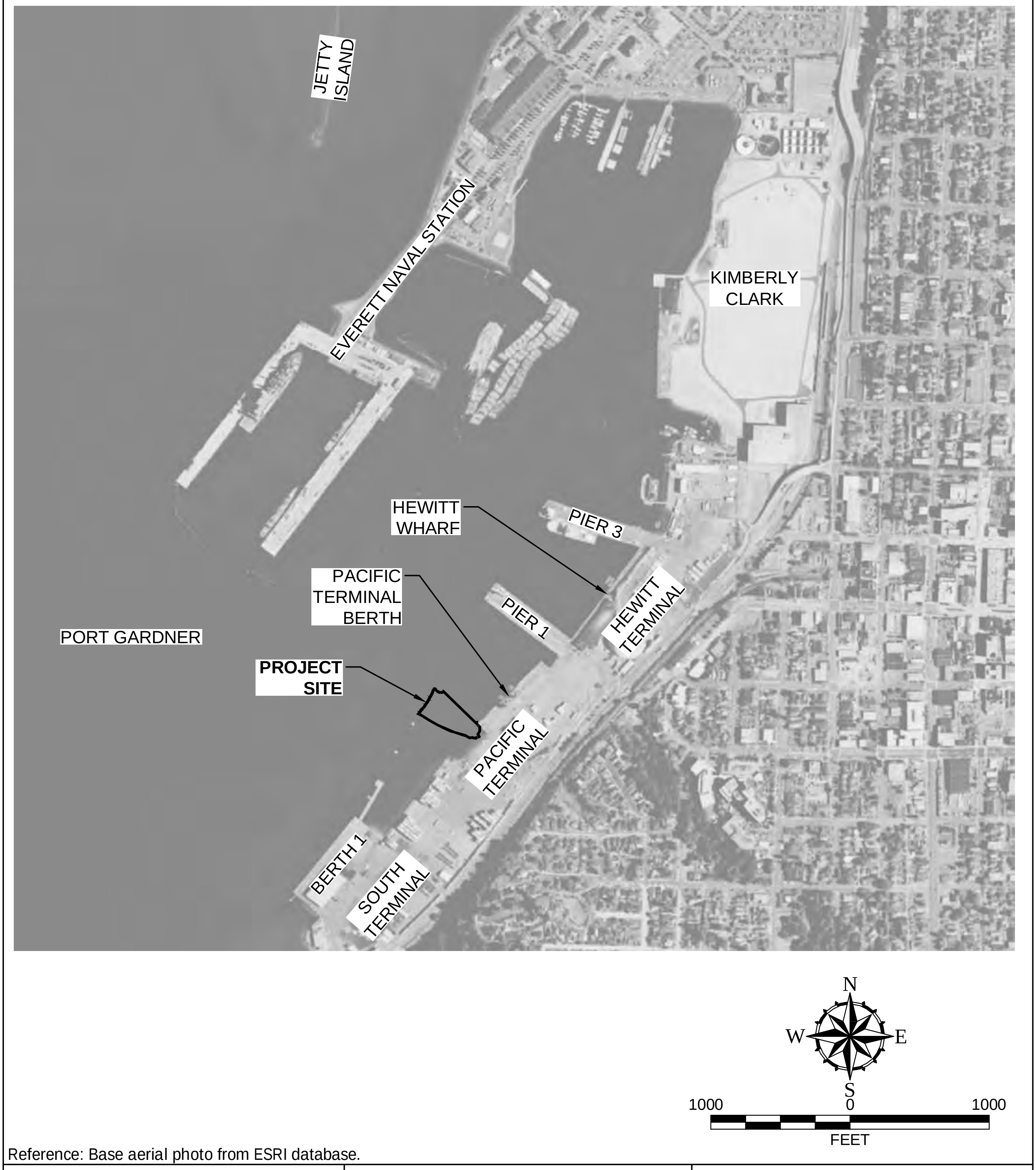
SITE PLAN

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 1 OF 9 DATE: JUNE 12, 2015

P:\0\0676020\03\CAD\JARPA FOR DREDGING\0676020-03 JARPA SHT 1.DWG\TAB:SITE PLAN MODIFIED BY TMICHAUD ON JUN 12, 2015 - 15:51



Reference: Base aerial photo from ESRI database.

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:

1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

STRUCTURES IN NEARBY VICINITY

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 2 OF 9 DATE: JUNE 12, 2015

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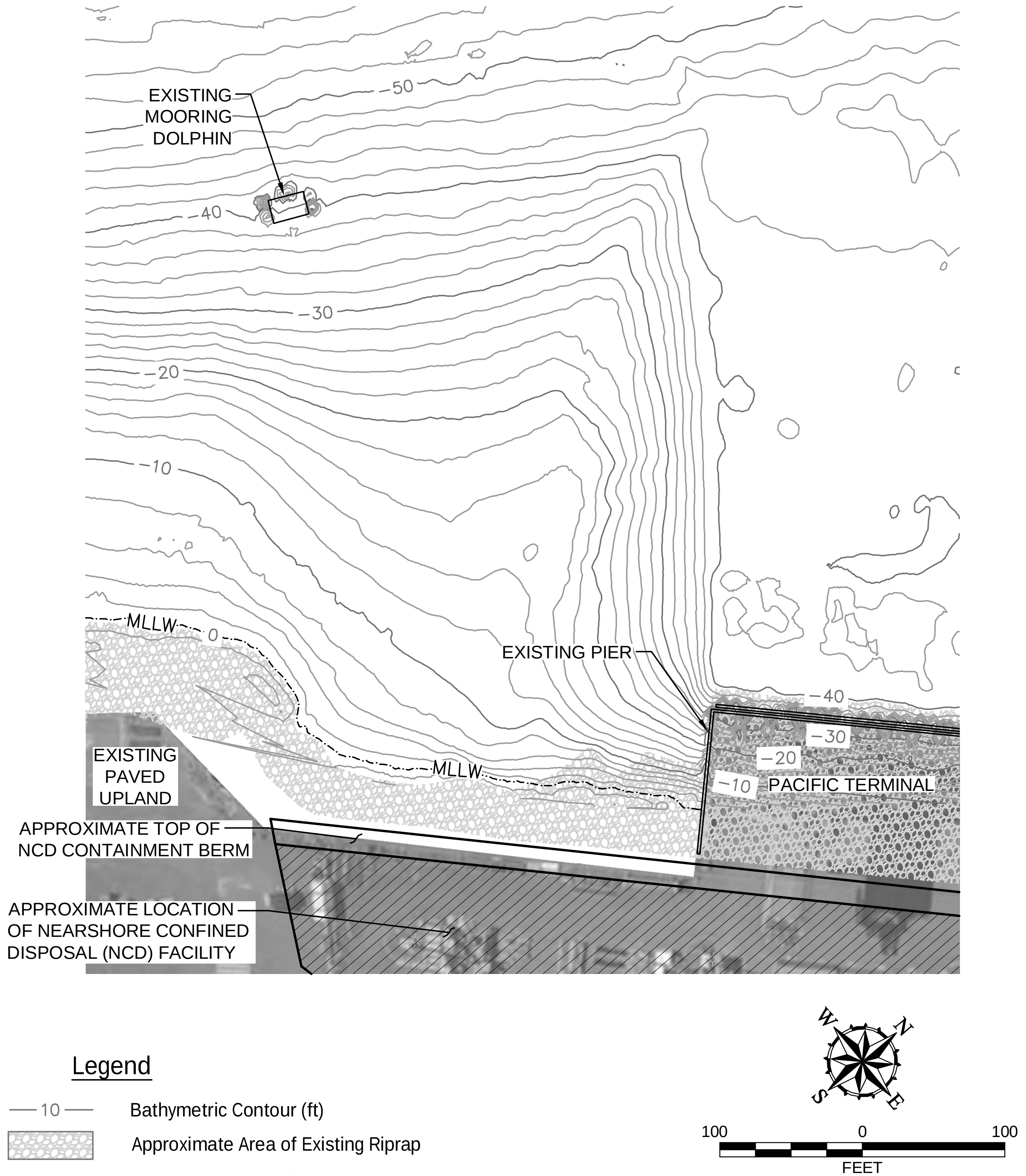

Reference: Hydrographic Survey by Pacific Geomatic Services Inc, dated October 15, 2014.

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:
1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

EXISTING CONDITIONS

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 3 OF 9 DATE: JUNE 12, 2015

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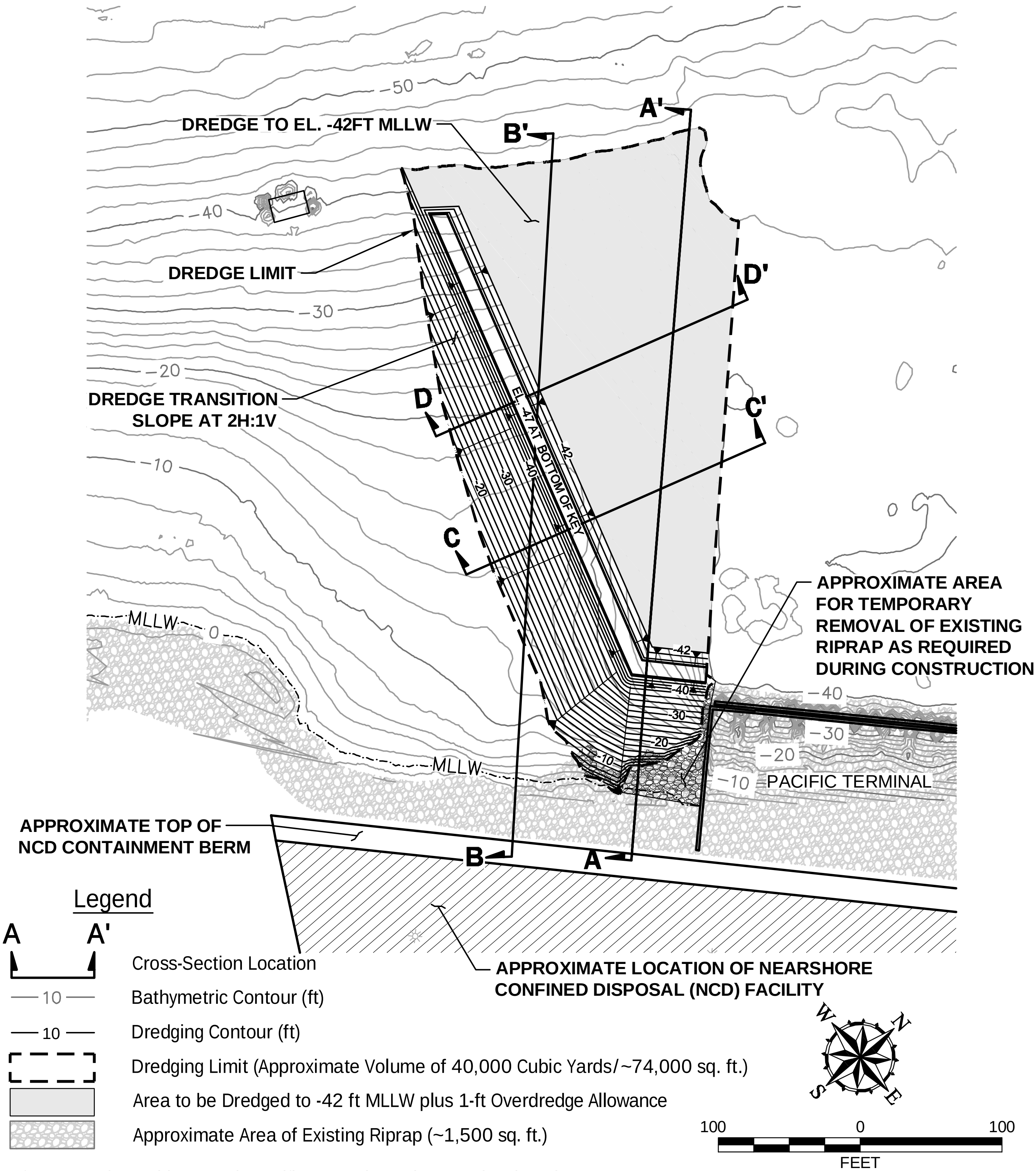

Reference: Hydrographic Survey by Pacific Geomatic Services Inc, dated October 15, 2014.

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:
1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

DREDGING PLAN

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION
DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 4 OF 9 DATE: JUNE 12, 2015

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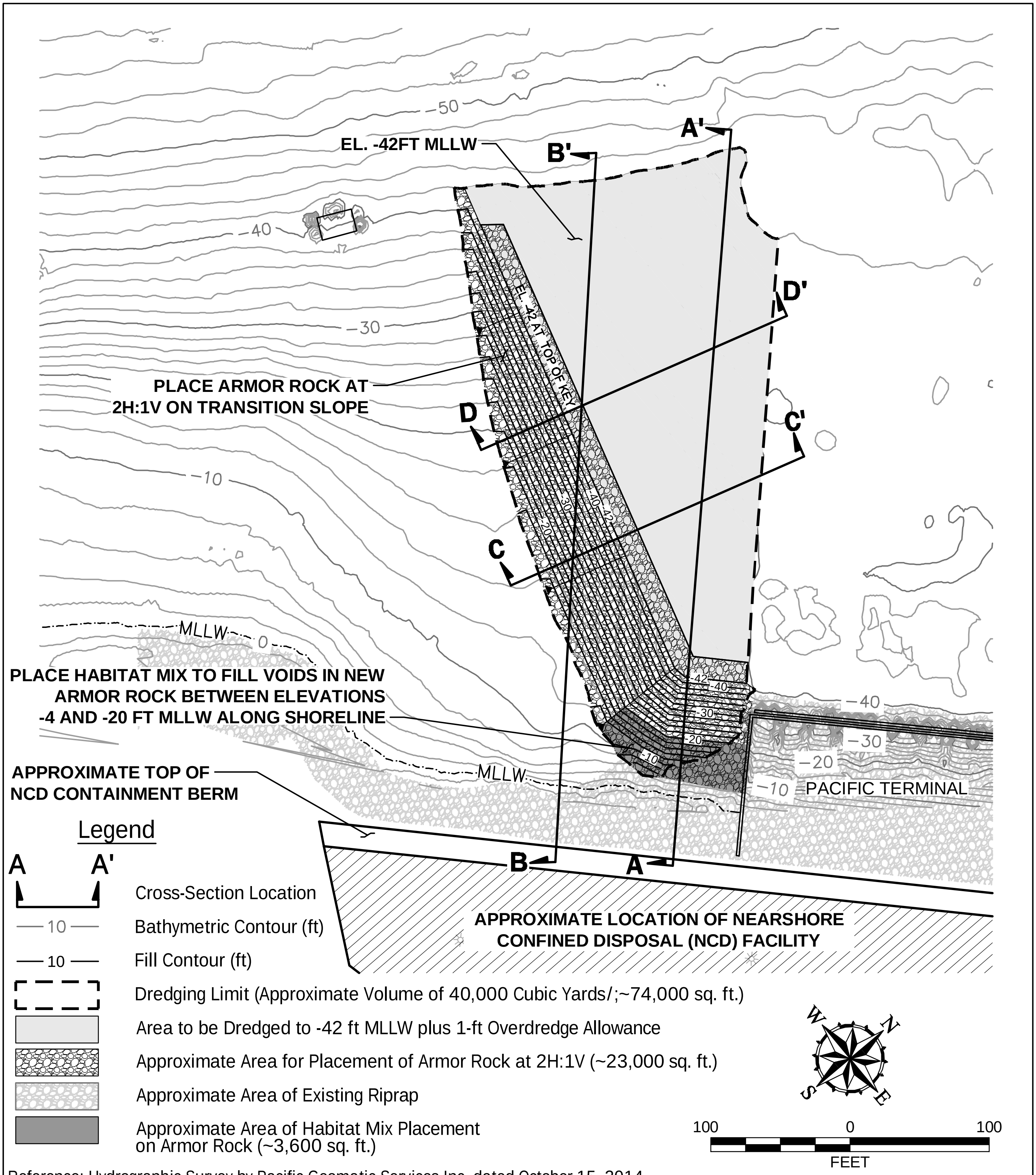

Reference: Hydrographic Survey by Pacific Geomatic Services Inc, dated October 15, 2014.

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:

1. WASHINGTON STATE DEPARTMENT
   OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

FILL PLAN

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION
DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 5 OF 9 DATE: JUNE 12, 2015

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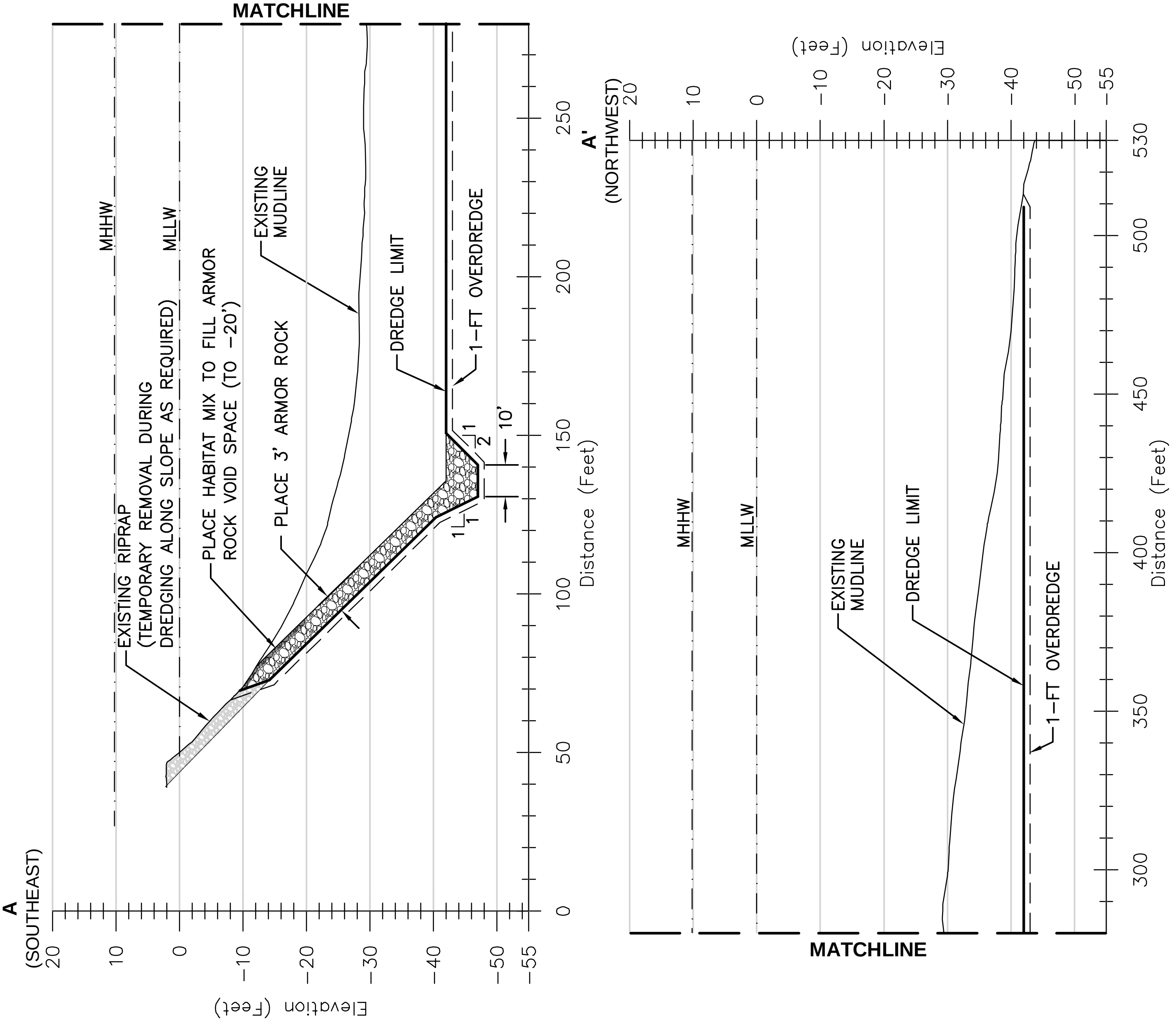


HORIZONTAL SCALE: 1"= 50'
VERTICAL SCALE: 1"= 25'
VERTICAL EXAGGERATION: 2X

50 0 50
FEET

PURPOSE:
INTERIM CLEANUP ACTION DREDGING TO ELEVATION -42 FEET MLLW ADJACENT TO PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:
1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP ACTION DREDGING
NWS-2014-0890

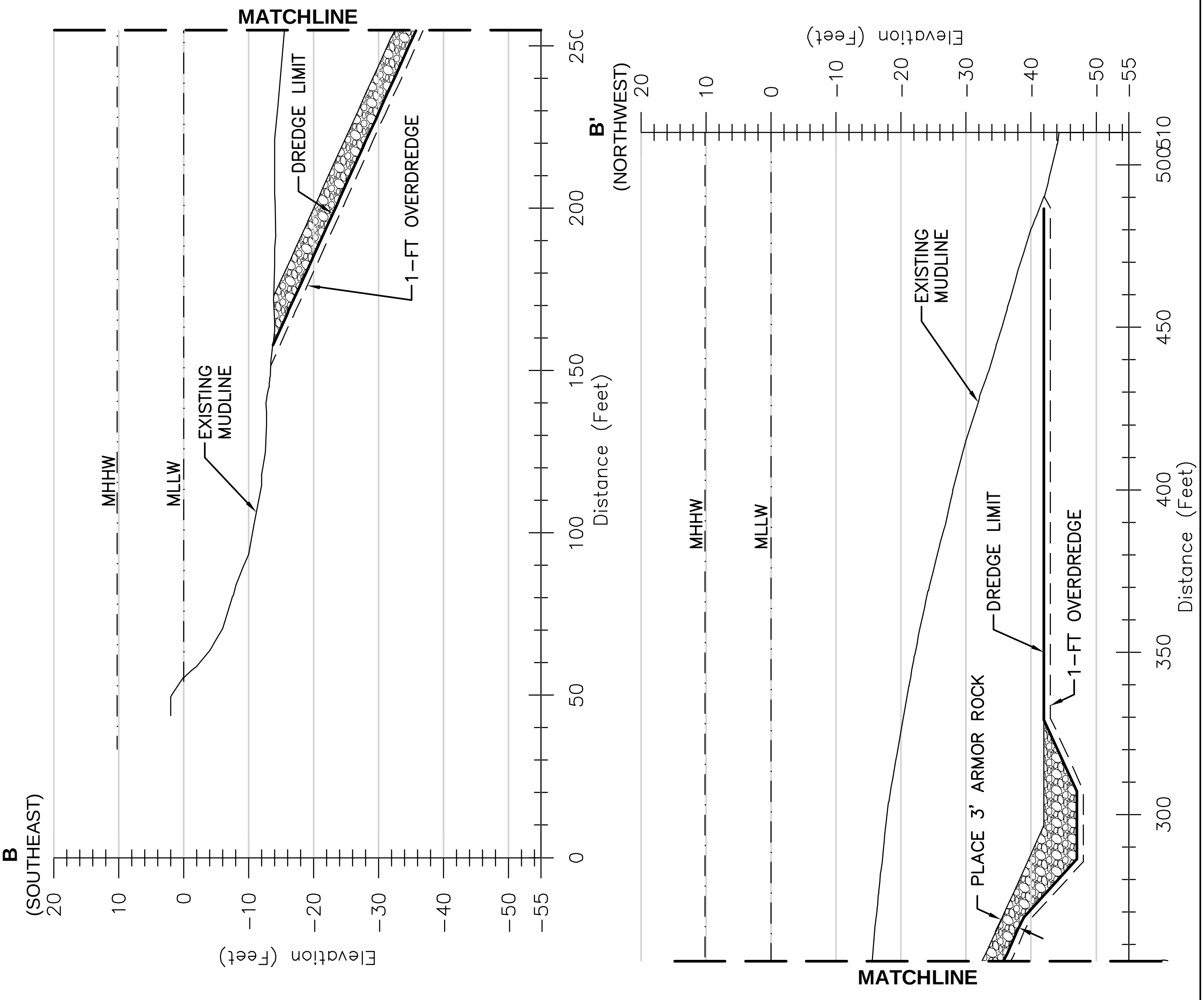
CROSS-SECTION A-A'

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 6 OF 9 DATE: JUNE 12, 2015

P:\0676020\03\CAD\JARPA FOR DREDGING\0676020-03 JARPA SECTIONS.DWG\TAB:BB MODIFIED BY TMICHAUD ON JUN 12, 2015 - 15:55



HORIZONTAL SCALE: 1"= 50'
VERTICAL SCALE: 1"= 25'
VERTICAL EXAGGERATION: 2X

50 0 50
FEET

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:

1. WASHINGTON STATE DEPARTMENT OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

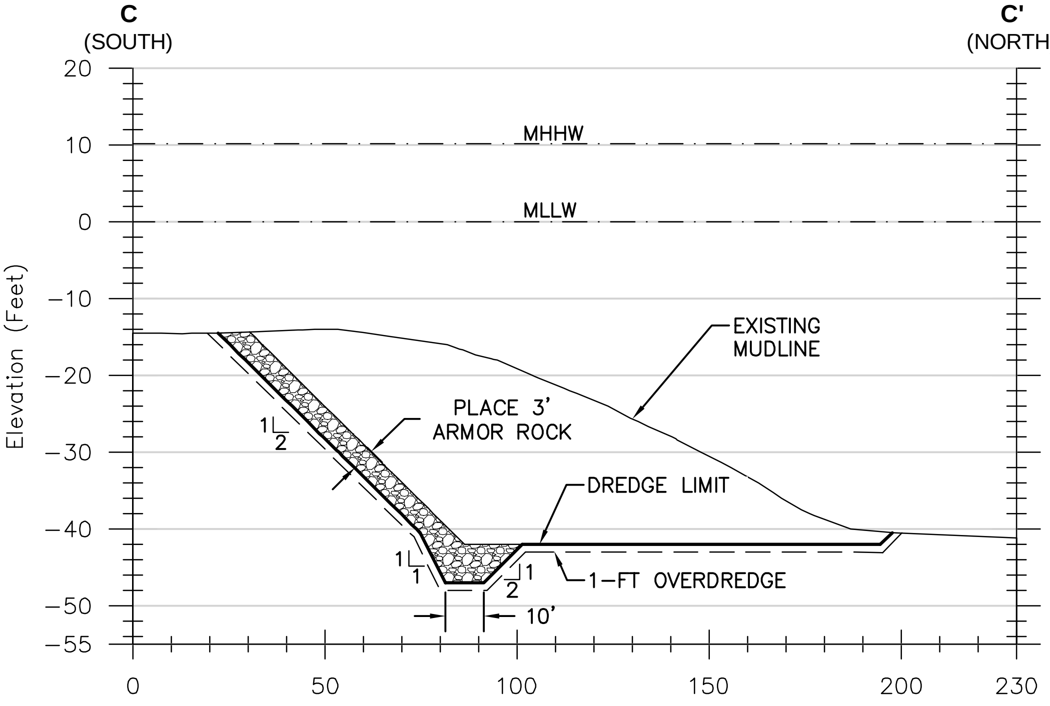
MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

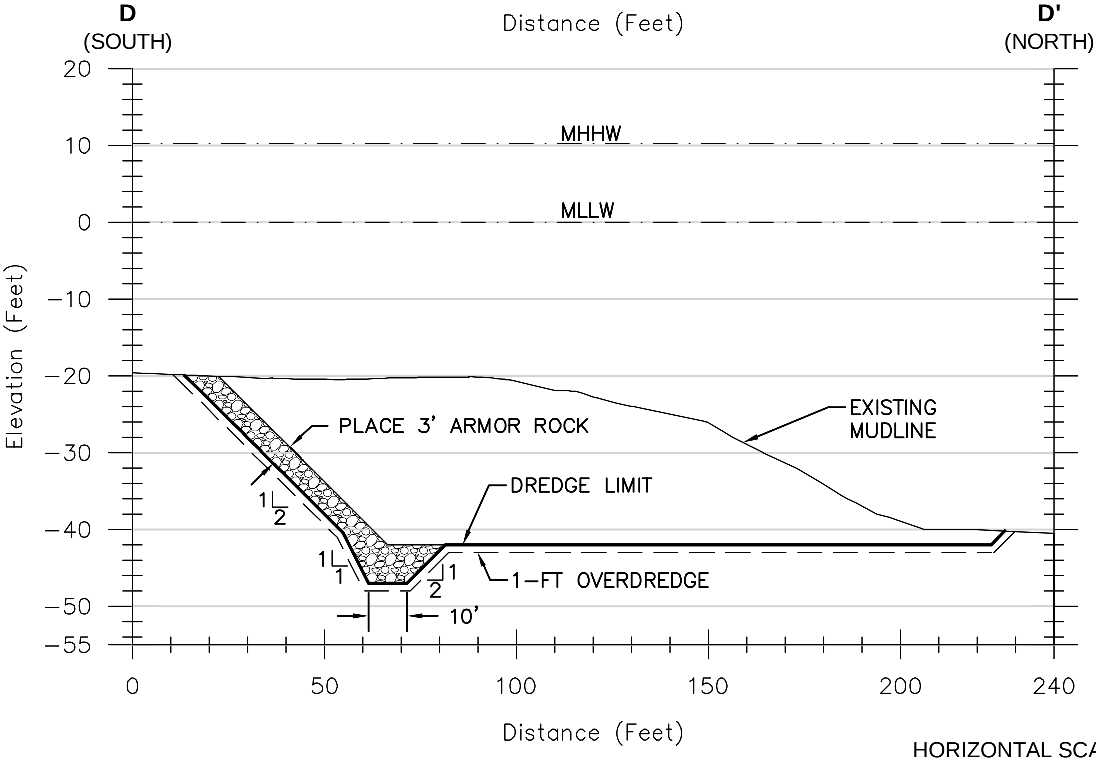
CROSS-SECTION B-B'

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 7 OF 9 DATE: JUNE 12, 2015





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VERTICAL SCALE: 1"= 25'
VERTICAL EXAGGERATION: 2X

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:

1. WASHINGTON STATE DEPARTMENT
OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

CROSS-SECTION C-C' & D-D'

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION
DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 8 OF 9   DATE: JUNE 12, 2015

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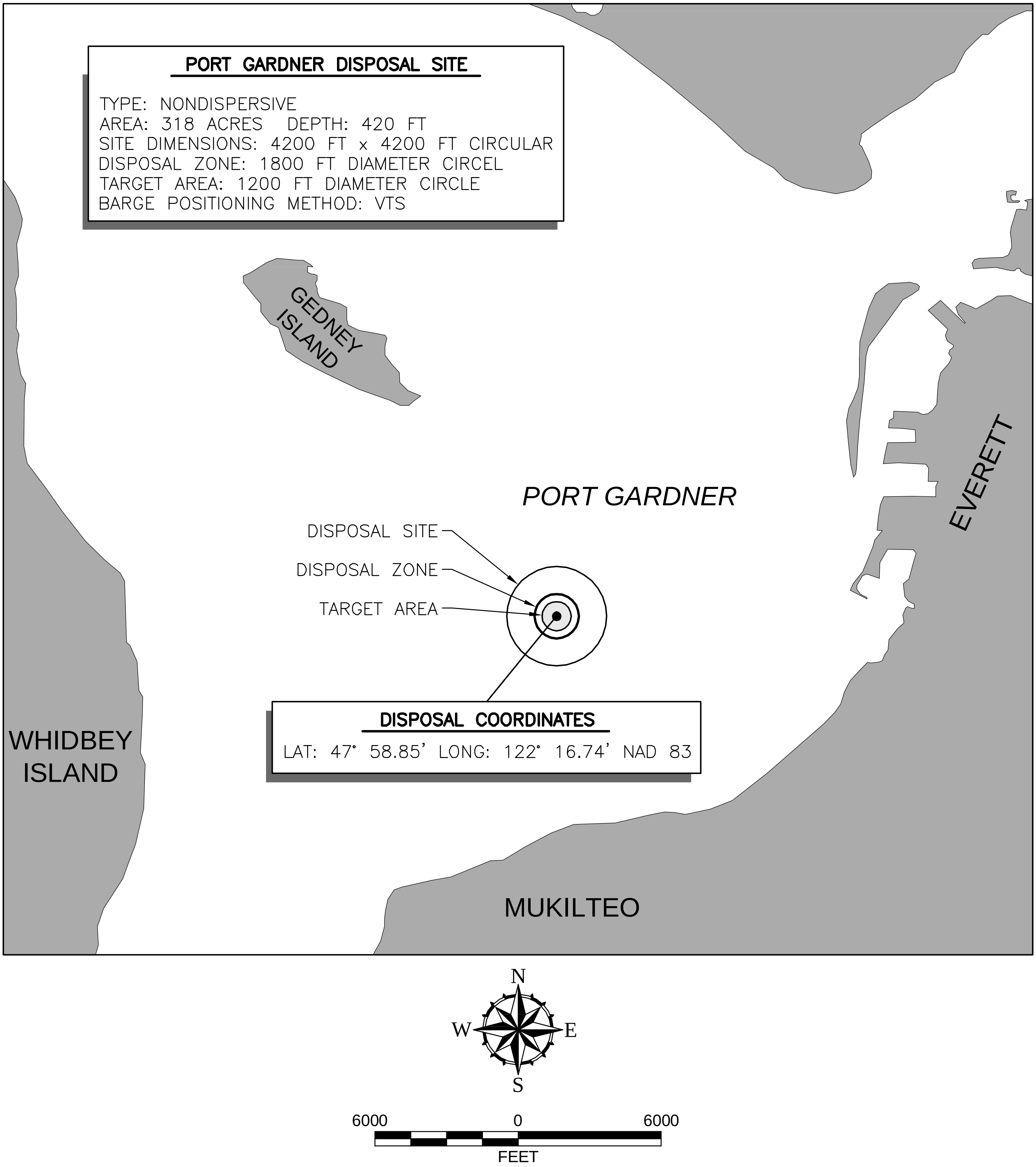

PORT GARDNER DISPOSAL SITE

TYPE: NONDISPERSIVE
AREA: 318 ACRES DEPTH: 420 FT
SITE DIMENSIONS: 4200 FT x 4200 FT CIRCULAR
DISPOSAL ZONE: 1800 FT DIAMETER CIRCEL
TARGET AREA: 1200 FT DIAMETER CIRCLE
BARGE POSITIONING METHOD: VTS

DISPOSAL COORDINATES

LAT: 47° 58.85' LONG: 122° 16.74' NAD 83

PURPOSE:
INTERIM CLEANUP ACTION
DREDGING TO ELEVATION -42
FEET MLLW ADJACENT TO
PACIFIC TERMINAL

ADJACENT PROPERTY OWNERS:

1. WASHINGTON STATE DEPARTMENT
   OF NATURAL RESOURCES
2. BNSF RAILWAY CO.
3. US NAVY
4. CITY OF EVERETT

MILL A INTERIM CLEANUP
ACTION DREDGING
NWS-2014-0890

PORT GARDNER DISPOSAL SITE

PACIFIC TERMINAL
3500 TERMINAL AVE
EVERETT, WA 98201

PROPOSED: INTERIM CLEANUP ACTION
DREDGING ADJACENT TO PACIFIC TERMINAL

IN: ADJ. TO PORT GARDNER
AT: EVERETT, WA
NW & NE QUARTER SEC 30, T29N, R5E
APPLICATION BY:
PORT OF EVERETT
(425) 388-0703
SHEET: 9 OF 9 DATE: JUNE 12, 2015

P:\0676020\03\CAD\JARPA for Dredging\0676020-03 JARPA SHT 9.dwg\TAB:PLAN (2) MODIFIED BY TMICHAUD ON JUN 12, 2015 - 16:20

APPENDIX B

Dredged Material Characterization Report, Sampling and Analysis Plan (Appendix A to the Characterization Report) and DMMP Suitability Determination Memorandum

Dredged Material Characterization Report, Sampling and Analysis Plan (Appendix A to the Characterization Report)

Final Dredged Material Characterization Report

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for
Dredged Material Management Office
and Washington State Department of Ecology
on behalf of Port of Everett

June 19, 2015

GeoEngineers
Earth Science + Technology

Final Dredged Material Characterization Report

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for
Dredged Material Management Office
and Washington State Department of Ecology
on behalf of Port of Everett

June 19, 2015

GEOENGINEERS

Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Final Dredged Material Characterization Report

Weyerhaeuser Mill A Former Cleanup Site Interim Action Dredging Project Everett, Washington

File No. 0676-020-03

June 19, 2015

Prepared for:

Dredged Material Management Office
US Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, Washington 98124-3755

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

Attention: David Fox and Andy Kallus

On Behalf of:

Port of Everett
P.O. Box 583
Everett, Washington 98206

Prepared by:

GeoEngineers, Inc.
Plaza 600 Building
600 Steward Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Brian J. Tracy, PE
Environmental Engineer

John M. Herzog, PhD, LG
Principal

BJT:JMH:ch

GEOENGINEERS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

1.0 INTRODUCTION AND BACKGROUND

This Dredged Material Characterization Report has been prepared on behalf of the Port of Everett (Port) and the Weyerhaeuser Company to present the results of the dredged material characterization activities completed for a Model Toxics Control Act (MTCA) Interim Cleanup Action (Interim Action) dredging project to be performed under an amendment to the existing Agreed Order with the Washington State Department of Ecology (Ecology) for the Weyerhaeuser Mill A Former Cleanup Site (Site; Facility Site ID #1884322). The Interim Action area is located adjacent to the Port of Everett's (Port's) Pacific Terminal located in Everett, Washington (Figure 1). The Pacific Terminal is the Port's primary marine terminal and currently provides a berth for deep draft vessels and is used by the Port for handling and loading of maritime cargo.

The proposed Interim Action is a combined project that expedites part of the environmental cleanup actions at the Weyerhaeuser Mill A Former Cleanup Site and will meet terminal improvement requirements that will facilitate regional aerospace supply line needs and the associated larger vessels that will come to call on the terminal for other trade-related purposes. The anticipated schedule for executing this dredging project is the 2016/2017 in-water work window.

Dredged material characterization was performed to evaluate if the material that will be dredged from the Interim Action area is suitable for open water disposal. Additionally, samples were collected at the final surfaces that will be exposed by dredging and on the temporary transition slope to inform cleanup decisions on the extent of dredging and management practices to contain exposed subsurface contamination. This report is being submitted to the Dredged Material Management Program (DMMP) and Ecology Toxics Cleanup Program for review and approval.

A Dredged Material Characterization Sampling and Analyses Plan (SAP; Appendix A) dated December 16, 2014 was prepared to describe the approach and methodology for completing the dredged material characterization and was approved by the DMMP agencies and Ecology Toxics Cleanup Program (TCP) on December 20, 2014. A high ranking of the Site was assigned by the DMMP as the basis for determining sampling requirements in accordance with the Dredged Material Evaluation and Disposal Procedures User Manual (User Manual; U.S. Army Corps of Engineers [USACE], 2013).

The dredged material characterization activities were completed in general accordance with the agency approved-SAP. TCP staff have reviewed data previously collected in the vicinity of the project, and Ecology has determined that sediment within a discrete layer of the material to be dredged likely contains chemicals of concern that exceed Washington State Sediment Management Standards Sediment Quality Objectives (SCOs) and Cleanup Screening Levels (CSLs). Ecology has determined that the proposed dredging qualifies as an interim cleanup action consistent with WAC 173-340-430. As a result, the Port and Ecology are developing an Interim Cleanup Action Work Plan and an amendment to the Agreed Order for this interim action dredging project.

The following sections describe sampling activities that were completed and the results of dredged material characterization.

2.0 DREDGING PROJECT DESCRIPTION

The Port is currently in the process of planning and permitting for the Interim Action dredging project. The proposed dredging project will be completed as an interim cleanup action for a portion of the sediment that is currently under investigation at the Mill A Former Cleanup Site. Currently, the Interim Action is anticipated to be constructed during the 2016/2017 in-water work window with a target completion of November 2016. Future cleanup actions in the Pacific Terminal and South Terminal areas will be determined by Ecology upon completion of the Remedial Investigation/Feasibility Study and draft Cleanup Action Plan for the Site.

The Interim Action will remove contaminated sediments and wood debris from an area southwest of the Pacific Terminal adjacent to the existing navigation area by dredging to a target elevation of -42 feet mean lower low water (MLLW) plus a one-foot overdredge allowance. A keyway will be constructed at the base of the transition slope to an elevation of -47 feet MLLW with a one-foot overdredge allowance (i.e., final elevation -48 feet MLLW). The Interim Action will remove contaminated material within the Interim Action area and also remove underlying native sediment to meet navigation depth requirements. The Interim Action will improve navigation at the Pacific Terminal until the final cleanup is implemented. The resulting navigation elevations will generally coincide with those located north of the Interim Action area, adjacent to Pacific Terminal.

A temporary transition slope will be constructed from the base of the dredged area to meet the existing elevations in the offshore part of the dredge prism. The offshore slope is considered temporary because it is to be addressed as part of the cleanup actions for the site. The offshore transition slope will be constructed at approximately 1V:2H (vertical:horizontal). The shoreline transition slope will be constructed at approximately 1V:2H to match the construction of the Pacific Terminal shoreline. Armor rock will be placed to reinforce the transition slopes to maintain stability of the slope and contain contaminated sediment located in the upper portions of the offshore transition slope, as approved by Ecology.

3.0 SEDIMENT SAMPLING

Sediment cores were collected at 14 sampling locations to characterize dredged material and the final surfaces to be exposed ("Z"-layer) at the base of the dredge footprint and transition slope of the dredge prism. The completed sediment core locations are presented in Figure 2 relative to the locations proposed in the SAP. Because the initial cores at four target locations did not yield sufficient sediment from all depth strata due to poor recovery, alternative locations were sampled within approximately 10 feet of these locations - as required by the SAP - in order to provide sediment from the missing strata.

Sample locations PT-1 through PT-9 were positioned within the portion of the dredge prism that will reach the full dredge depth (-42 feet MLLW plus 1-foot overdredge). These sediment cores were completed to a minimum of -45 feet MLLW (2 feet beyond the overdredge limit).

Sample locations PT-10 through PT-14 were located within the area of the transition slopes to characterize sediment within the dredged material management units (DMMUs) and the surface of the transition slope that will be exposed by dredging. Due to the potential for exposed contamination or wood debris on the offshore transition slope, individual samples representative of the exposed surface were collected to assist in the evaluation and design of environmental protections that will be needed to contain potential contamination that would be exposed by the dredging.

3.1. Sediment Coring and Sample Collection Field Activities

Sediment coring and sampling were completed between January 12 and 16, 2015, in accordance with the Nationwide Permit 6 acquired by the Port from the U.S. Army Corps of Engineers for the sampling activities and sampling activities. Coring was completed with a mobile sonic drilling rig that was deployed from a construction barge through a moon pool in the deck. The sonic drill rig was operated by a crew of Washington-state licensed drillers from Cascade Drilling Company. The construction barge was captained by Northern Marine Construction. GeoEngineers field representatives directed barge positioning for sediment drilling activities, logged the sediment cores and collected samples for laboratory analysis.

Sampling locations were recorded in latitude and longitude referenced to North American Datum of 1983 (NAD83) using a handheld global positioning system (GPS) unit (Trimble GeoXH 6000) that was positioned over the drill rig coring device on the barge. Following return from the field, Trimble Pathfinder Office software was used to perform a differential correction of the field-collected GPS coordinates, utilizing the closest and/or highest integrity base stations. The post-processed coordinates of each core location are presented in Table 1 and locations are shown on Figure 2. Vertical control was established relative to survey control points (with known elevation referenced to MLLW) and surveyed tide boards that were installed prior to drilling activities at Pacific Terminal and South Terminal to assess actual tidal elevations.

The depth of the water column at each coring location was measured by lowering a weighted tape measure from the sampling barge at the location of the drill rig (the barge moon pool). The actual mudline elevation at each coring location was determined by subtracting the measured depth of the water column from the real-time tidal elevation. The mudline elevation at each sampling location was confirmed to be acceptable prior to starting each sediment core. In some cases the sample location mudline elevation was higher than indicated in the SAP and the target depth was adjusted in the field to reach the target elevation. Mudline elevations measured at each sample location are presented in Table 1.

Sediment at each core location was sampled continuously by advancing core barrels in 5-foot increments using the sonic drill. Each core section contained a Lexan liner inside the barrel of the core. After the core barrel was advanced, the drill casing (with slightly larger diameter than the core barrel) was advanced to the depth of the bottom of the core barrel. When the drill casing was in place, the core barrel was pulled up to the barge and the core liner was removed for sample processing.

Upon retrieval of the core barrel, the core liner was carefully removed, ends capped and stored upright (mudline upward) prior to processing. Anticipated heaving of sediment in the drill casing was mitigated at each sampling location by the driller increasing the water pressure inside the drill casing upon retrieval of the core barrel. Significant heaving was not observed during sample collection or as part of logging of the core samples.

Cores achieving the desired penetration depth and recovery percentage were processed on the barge after retrieval. A minimum of 75 percent recovery was used as the core sample acceptance criteria (calculated as the ratio of the recovery length to the drive length of the core). Core intervals with recovery less than 75 percent were rejected and the missing interval was re-sampled at a location within 10 feet of the original boring. The core barrel was decontaminated between each 5-foot interval and drill casing was decontaminated between each sampling location in accordance with procedures specified in the SAP.

The target depth was reached or exceeded at each sample location, and it was confirmed that native material was encountered at each core location. The majority of collected sediment intervals achieved adequate recovery. In total, four 5-foot intervals did not achieve required recovery due to wood debris clogging the bit at the end of the core barrel. Inadequate recovery occurred in sections of the cores at locations PT-6, PT-8, PT-9 and PT-12. For these sample locations, the interval with poor recovery was rejected and duplicate cores were completed to collect the missing intervals. Duplicate cores were labelled as PT-106, PT-108, PT-109 and PT-112. The missing intervals were successfully collected at PT-108, PT-109 and PT-112. The target interval at PT-106 also had poor recovery due to wood debris. It was determined in the field that due to the sediment conditions, a third attempt within the allowable offset distance would not bear better results due to the high wood content and type of wood debris encountered so the missing interval was represented by the fraction recovered in PT-106. Table 2 presents a summary of each core that was completed and the percent recovery measured.

3.2. Sample Collection and Field Screening

Each accepted 5-foot core interval was processed after retrieval in the field at a core processing area on the barge. The core liner containing sediment was placed on a sample table and cut lengthwise for logging and sampling the sediment. A GeoEngineers field representative photographed and logged the cores prior to collecting sample material for testing. The stratigraphy of the core material was documented on a core log (i.e., exploration log) form and each core was described and classified according to the Unified Soil Classification System. Core compaction (based on ratio of core penetration to core recovery) was accounted for in determining sample intervals and stratigraphy. The lengths of core sections representing dredged material and Z-layer samples were recovery-corrected in the core logs to represent *in situ* conditions. The core logs are provided in Appendix B. Additionally, photographs of the cores were taken to document field observations and are provided in Appendix C.

The stratigraphy within the cores was generally consistent throughout the Interim Action dredging area. Wood debris including sawdust, fragments of dimensional lumber and wood chips mixed with silty sand was located in the upper elevations at each sample location. In general the thickness of the wood debris ranged from approximately 2 to 15 feet in the core samples. Underlying the wood debris was native material consisting of gray fine-to-medium sand and silt. The elevation of the top of the native material ranged from approximately -23 feet MLLW near the shoreline to as deep as -42 feet MLLW farthest from the shoreline. Figures 3 through 5 present the observed stratigraphy within the Interim Action area.

Field observations of core sample material included the presence of staining, sheen and odors. Some odor and very slight sheen were observed in some sample core intervals containing wood debris. No indications of contamination were identified in the native material based on field screening.

After logging each core sample, subsamples[1] were collected in 1-foot intervals. Sulfide samples were taken immediately upon extrusion of cores as discrete samples at pre-designated 1-foot intervals to represent each of the proposed DMMUs as specified in the SAP. The subsamples were labeled according to their location and elevation (in feet MLLW). The labeled sample jars were placed in coolers on ice and transported to the chemical analytical laboratory under chain-of-custody (COC) procedures. At the chemical

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[1] For the purposes of this report "subsamples" refer to the 1-foot sediment intervals that were collected continuously for each sediment core. These subsamples were ultimately used to create composite samples or selected for discrete analysis of the surface to be exposed by dredging.

analytical laboratory the subsamples were archived pending confirmation of the DMMU compositing scheme. The core logs in Appendix B include documentation of each subsample interval collected. Sampling and COC procedures were completed in general accordance with the SAP.

4.0 SAMPLE COMPOSITING, CHEMICAL AND BIOLOGICAL TESTING

In accordance with the SAP, core logs and stratigraphy of the dredged material were evaluated after sample collection to determine if DMMU revisions would be beneficial for the dredged material characterization and to determine if bioassay testing would be required.

4.1. Revisions to Compositing and Sample Analysis Based on Field Observations

After all of the sediment subsamples were collected and archived at the laboratory, the core logs were reviewed to determine if subsurface DMMU boundaries should be modified. The DMMUs established for the SAP were based on elevation and approximately 4,000 cubic yard volume limits. Due to the amount of wood debris observed throughout the surface sediments, the DMMUs were modified as follows to better separate observed native materials from those with high wood debris content:

- A new DMMU D-7 was created to include surface layers at deeper elevations of the dredge prism located in the most offshore portion of the proposed dredge prism. In this area, higher wood debris content was observed to be blanketing the base of the slope.
- As the result of the new DMMU D-7, the three DMMUs located between elevations -38 feet MLLW and -42 feet MLLW (DMMUs D-6A, D6-B and D6-C in the SAP) were consolidated into two DMMUs: D-6A and D-6B to optimize use of DMMP guidelines for allowable DMMU volumes.

In addition to the DMMU modifications, the Z-layer sample at location PT-3 was substituted for location PT-2 for up-front chemical analysis because wood debris was observed closer to the dredging limit at the this location. Analysis of the Z-sample at PT-3 provides a more conservative assessment of contamination potential in the underlying surface.

The DMMU and Z-layer modifications were submitted to Dredged Material Management Office (DMMO) and Ecology for review and approval prior to creating the representative DMMU composite samples. Both the DMMO (on behalf of the DMMP agencies) and Ecology provided email correspondence approving the modified DMMU layout and analysis for Z-layer samples. Figures 3 through 5 show the modified DMMUs.

Following completion of the sample testing, Ecology was consulted on requirements to manage contamination that will be exposed on the temporary side slope as part of the Interim Action. Based on review of the data, Ecology will require placement of armor rock on the transition slopes to contain contamination and provide stability. The placement of armor rock necessitates a design change to key the rock into the slope. A volume modification for the modified DMMU layout was requested to meet the MTCA project requirements. The DMMP-approved modified DMMU layout and volume revisions for each DMMU are summarized in Table 3. Figure 6 shows the subsample compositing for the modified DMMUs.

4.2. Sample Compositing at the Chemical Analytical Laboratory

The subsample compositing for each of the representative DMMUs was performed at the chemical analytical laboratory on February 2 and 3, 2015. Laboratory staff at Analytical Resources, Inc. (ARI) completed the compositing to create the 11 DMMU samples under supervision from GeoEngineers.

Compositing was completed to create samples representative of each DMMU in general accordance with the SAP by placing equal volumes from each 1-foot interval that composed the respective DMMU (as specified in Figure 6) into a large, decontaminated glass container. After all representative subsamples were consolidated, the sediment was homogenized. After mixing, samples were placed in clean containers for chemical analyses and biological testing. Discrete 1-foot samples that were not used in the representative DMMU composites or to characterize the Z-layer were archived for potential follow-up analyses.

In accordance with the SAP, Z-layer samples were not composited. Chemical analyses were completed on discrete 1-foot interval Z-layer samples identified in Figure 6.

4.3. Determination of Initial Samples for Bioassay Testing

Initially, each of the 11 DMMU samples was analyzed for dry-weight wood content (or organic matter) by Method ASTM D-2974 Method C as described in the SAP to help determine which DMMU composites would require bioassay testing (prior to receipt of chemical analytical results). The threshold level identified in the SAP for bioassay testing was organic content greater than 25 percent by weight as determined by Method ASTM D-2974 Method C. The SAP established that DMMU samples with organic matter above this threshold would trigger bioassay testing in parallel with chemical analysis to evaluate the potential toxicity of the wood debris.

The results of the dry-weight wood content are presented in Table 4. Results for organic matter ranged from 5.9 percent to 17.0 percent for DMMUs where wood debris was observed, and from 0.5 percent to 1.1 percent for DMMUs where minimal wood debris was observed. Although the threshold of 25 percent by weight was not reached in any of the DMMU samples analyzed, bioassay testing was elected for composite samples representative of DMMUs D-1, D-2, D-3A, D-3B, D-4B and D-7 due to the relatively high range of wood debris observed during core logging. Wood debris by volume estimated during visual screening of the cores ranged from approximately 40 percent to 70 percent in these DMMUs. This approach was approved by the DMMP after consultation prior to initiation of the tests. The bioassay testing for the selected DMMUs was completed in parallel with chemical analysis to avoid the potential for exceedance of established holding times for the bioassay samples.

No additional bioassay samples were triggered based on receipt of the preliminary chemical analytical data. Exceedances of screening levels that would trigger bioassay testing were only identified in samples that had been subject to bioassay testing based on the volume of wood debris, as described above.

5.0 CHEMICAL ANALYTICAL RESULTS

This section summarized the samples analyzed for chemical analyses and analytical results.

5.1. Samples Analyzed

Samples collected for sulfide analysis were submitted to the laboratory for analysis immediately following field activities to ensure that sulfide analyses were completed within appropriate holding times. The following discrete samples were analyzed for total sulfides by United States Environmental Protection Agency (EPA) Method EPA 376.2/SM 4500-S2:

- PT-3 sample interval: -41 to -42 feet MLLW.
- PT-6 sample intervals: -19 to -20 feet MLLW; -23 to -24 feet MLLW; -31 to -32 feet MLLW; -35 to -36 feet MLLW; and -40 to -41 feet MLLW.
- PT-8 sample intervals: -24 to -25 feet MLLW; -25 to -26 feet MLLW; -31 to -32 feet MLLW; -35 to -36 feet MLLW; and -40 to -41 feet MLLW.
- PT-13 sample interval: -27 to -28 feet MLLW.

The samples collected and submitted for total sulfides analysis are identified on Figure 6.

DMMU composite samples representing each of the established DMMUs including D-1, D-2, D-3A, D-3B, D-4A, D-4B, D-5A, D-5B, D-6A, D-6B and D-7 were analyzed for the suite of DMMP and MTCA chemical analyses identified in the SAP.

A total of nine individual Z-layer samples were analyzed for the suite of DMMP and MTCA chemical analyses.

Dredge prism base:

- PT-3 sample interval -43 to -44 feet MLLW
- PT-5 sample interval -43 to -44 feet MLLW.
- PT-6 sample interval -43 to -44 feet MLLW.
- PT-8 sample interval -43 to -44 feet MLLW.

Transition slope:

- PT-10 sample interval -36 to -37 feet MLLW.
- PT-11 sample interval -36 to -37 feet MLLW.
- PT-12 sample interval -30 to -31 feet MLLW.
- PT-13 sample interval -29 to -30 feet MLLW.
- PT-14 sample interval -29 to -30 feet MLLW.

5.2. Chemical Testing Results

Composite dredge prism samples, discrete Z-layer and discrete transition slope samples were chemically analyzed by ARI laboratory of Tukwila, Washington.

Conventional analyses included:

- Grain size by PSEP 1986[2];
- Total solids by SM2540G;

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[2] Additional grain-size analyses of the ashed remains from wood content analyses were completed for bioassay reference sediment matching on composite samples with wood waste.

- Total volatile solids (TVS) by SM2540G;
- Dry-weight wood content by ASTM D-2974 Method C (with a sample size of 300 g);
- Total organic carbon (TOC) by Plumb 1981 et al.;
- Ammonia by EPA 350.1M/SM4500-NH3; and
- Total sulfides by EPA 376.2/SM 4500-S2.

Chemical analyses included:

- Metals by EPA Method 6000/7000 series;
- Semi-volatile organic compounds (SVOCs) [including polycyclic aromatic hydrocarbons (PAHs)] by EPA Method 8270/8270-SIM/8081B;
- Polychlorinated biphenyls (PCBs) by EPA Method 1668A;
- Dioxins and furans by EPA Method 1613B;
- Tributyltin ion (bulk)[3] by EPA Method 8270D-SIM/Krone 1989; and
- Pesticides by EPA Method 8081B.

Results were evaluated relative to DMMP Guideline values (Screening Level [SL], Maximum Level [ML] and Bioaccumulative Trigger [BT]) and site-specific MTCA preliminary sediment screening levels in accordance with the SAP to characterize sediment quality and evaluate suitability of the dredged material for open-water disposal. The validated results of conventional and chemical analyses performed on dredge prism and Z-layer samples are tabulated and compared to DMMP guideline chemistry values in Table 5a and compared to site-specific MTCA preliminary sediment screening levels in Table 6. Both laboratory and validation qualifiers are also tabulated in Tables 5a and 6. Tables 5b and 5c document the toxicity equivalent calculations for carcinogenic PAHs and dioxins/furans. The validated results were submitted to Ecology TCP for review and to the DMMP in advance of this report.

Chemical analytical results for the 11 DMMU composite samples showed that six of the representative DMMUs (D-1, D-2, D-3A, D-3B, D-4B and D-7) contained sediment with chemical concentrations exceeding DMMP guidelines and site-specific MTCA sediment screening levels. Tables 5a and 6 provide details on the specific DMMP guidelines and/or MTCA screening levels that were exceeded. Chemical exceedances included:

- PAHs including naphthalene and total LPAHs;
- Phthalates including diethyl phthalate;
- Phenols including 2-methylphenol, 4-methylphenol, phenol and 2,4-dimethylphenol;
- Miscellaneous extractables including benzoic acid and benzyl alcohol; and
- Total dioxin/furan (expressed as a toxicity equivalent [TEQ] concentration).

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[3] Due to the complexity of the project and the likelihood that the 7-day holding time for porewater tributyltin would be exceeded, the DMMP agencies allowed bulk tributyltin analysis as a replacement.

Chemicals that only exceeded MTCA sediment screening levels included:

- Metals including cadmium and lead;
- Carcinogenic PAHs (cPAHs) TEQ; and
- Total PCBs.

Chemical analytical results from the DMMUs D-4A, D-5A, D-5B, D-6A and D-6B showed no exceedances of DMMP guidelines or MTCA sediment screening levels. Figures 7 through 10 provide a summary of the chemical analytical results for the DMMU composite samples.

A total of four Z-layer samples were analyzed to characterize the exposed surface at the base of the dredge prism after dredging. Chemical analytical results from the four samples (PT-3, PT-5, PT-6 and PT-8), representing the first foot beyond the overdredge depth (-43 to -44 feet MLLW), indicated no exceedances of DMMP guidelines or MTCA sediment screening levels.

Chemical analytical results for 2 of the 5 transition slope samples (PT-10 through PT-14) showed exceedances of DMMP guidelines and MTCA sediment screening levels as follows:

- Sample PT-12 contained dioxin/furan TEQ concentrations in excess of the DMMP guidelines. No other DMMP exceedances were found;
- Metals including cadmium and lead (PT-12 only) exceeded MTCA sediment screening levels;
- cPAH TEQ (PT-10 and PT-12) exceeded MTCA sediment screening levels; and
- Total dioxin/furan TEQ (PT-12 only) exceeded MTCA sediment screening levels.

Tables 5a and 6 provide the specific DMMP chemical guidelines and MTCA sediment screening levels that were exceeded.

No exceedances of either the DMMP guidelines or the MTCA sediment screening levels were identified in samples PT-11, PT-13 and PT-14. Figures 7 through 9 summarize the Z-layer and transition slope sample results and highlight the exceedances that were identified.

Laboratory analytical reports for conventional and chemical analyses provided by ARI are presented in Appendix D. Laboratory data were validated for data quality and usability in general accordance with EPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (EPA 2010) and EPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (EPA 2008). All data were subjected to Stage 2B validation, with 10 percent of the data receiving Stage 4 validation. The data were determined to be of acceptable quality for use, as qualified. A report presenting the results of the data validation is included in Appendix E.

6.0 BIOASSAY TESTING RESULTS

Bioassay testing was completed on DMMU composite sample D-1, D-2, D-3A, D-3B, D-4B and D-7. ENVIRON International Corporation (ENVIRON), an Ecology-certified laboratory located in Port Gamble, Washington conducted the bioassay testing (Accreditation No. C2021) and reference test sample collection. Biological testing was completed in general accordance with the SAP, Puget Sound Estuary Program's (PSEP) recommended protocols (PSEP, 1995), the Sediment Sampling and Analysis Plan Appendix ([SAPA] Ecology, 2008) and with modifications as specified by the Sediment Management Annual Review Meeting (SMARM).

There were several deviations from protocol in the bioassays. One deviation was that the larval bioassays were not aerated; however, test chambers remained above 60 percent saturation (and at or above 5.0 mg/L) for dissolved oxygen. In addition, ammonia was not detected and sulfides, while initially slightly elevated, dropped to low levels during the test period. In two tests (amphipod and larval bioassays) the salinity exceeded the recommended range for test conditions by 1 part per thousand. Test performance did not appear to be adversely affected by deviations in any of these parameters.

The standard suite of bioassay was completed including both acute and chronic tests to characterize toxicity of whole sediment. Bioassay testing for each DMMU sample included:

- 10-day amphipod mortality test (acute toxicity) using *Eohaustorius estuarius*.
- 20-day juvenile infaunal growth test (chronic toxicity) using *Neanthes arenaceodentata*.
- Sediment larval test (acute toxicity) using *Mytilus galloprovincialis*.

Bioassay testing required that test sediments be matched and run with appropriate DMMP-approved reference sediment to factor out sediment grain-size effects on bioassay organisms. Matching reference sediment was collected from Carr Inlet. Grain size characteristics of the reference sample are provided in Table 7.

In summary, the following are the testing results relative to the applicable DMMP bioassay testing criteria:

- All samples tested passed DMMP single-hit and double-hit criteria for the amphipod and juvenile infaunal growth tests.
- Sample D-3B failed the single-hit criteria for the larval test. Samples D-1, D-2 and D-4B exhibited hits under the double-hit criteria and the remaining samples tested, D-3A and D-7, had no hits in the larval test.
- Overall bioassay test results compared to DMMP criteria indicate that sample D-3B fails and the remaining samples tested, D-1, D-2, D-3A, D-4B and D-7 pass.

Table 8 presents a summary of bioassay test results compared to DMMP criteria.

In summary, the following are the testing results relative to the applicable SMS bioassay testing criteria:

- All samples passed SQO and CSL criteria for the amphipod and juvenile infaunal growth tests.
- Samples D-3A and D-7 passed SQO and CSL for the larval test.
- Samples D-1, D-2 and D-4B exceeded SQO for the larval test.
- Sample D-3B exceeded CSL for the larval test.

Table 9 presents a summary of bioassay test results compared to Ecology's Sediment Management Standards (SMS) criteria.

Bioassay testing results are shown on Figure 11. The biological testing results and documentation of testing protocols and procedures prepared by ENVIRON is presented in Appendix F.

7.0 SUMMARY OF DREDGED MATERIAL CHARACTERIZATION RESULTS

The high density of sediment core sampling completed for the dredged material characterization identified a consistent stratigraphy throughout the proposed dredge prism. The DMMP provided consultation and approval of modifications to the DMMU layout and revision of the volumes to more effectively characterize the proposed dredged material based on the stratigraphy observed in the sediment cores and design requirements for the Interim Action.

Chemical analytical and biological testing results showed that biological toxicity generally occurs within the DMMUs containing high wood debris content and non-bioaccumulative chemical contamination exceeding DMMP or MTCA criteria. The bioassay test results do not supersede chemical analytical exceedances for bioaccumulative chemicals (e.g., cPAHs, PCBs and dioxin/furans). The results of this dredge material characterization showed that the portions of the dredge prism represented by DMMUs D-1, D-2, D-3A, D-3B, D-4B and D-7 do not meet open-water disposal suitability criteria. The proposed dredge prism represented by DMMUs D-4A, D-5A, D-5B, D-6A and D-6B do meet open-water disposal suitability criteria.

Chemical analytical results for the Z-layer samples showed that the base of the dredge prism (-43 feet MLLW) that will be exposed by the dredging does not exceed DMMP or MTCA criteria. The Z-layer analytical results show that the base of the dredge prism at -43 feet MLLW will provide a non-contaminated surface.

The transition slope chemical analytical results are consistent with results of adjacent DMMU composite samples at corresponding elevations. Testing of transition slope samples showed that the upper sections of the transition slope exceeded MTCA criteria. As part of the MTCA Interim Action, Ecology will require the transition slope to be armored to contain the contaminated material and stabilize the slope. The details of the slope protection measures will be developed as part of the Interim Cleanup Action Work Plan that will be prepared for Ecology review.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of the Port of Everett, their authorized agents and regulatory agencies in their evaluation of the Weyerhaeuser Mill A Former Cleanup Site Interim Action Dredging Project. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

9.0 REFERENCES

Dredged Material Management Office (DMMO), 2014a. Email from Lauran C. Warner with DMMO, U.S. Army Corps of Engineers to John M. Herzog with GeoEngineers dated July 16, 2014, 2:39 PM.

DMMO, 2014b. Email from Lauran C. Warner with DMMO, U.S. Army Corps of Engineers to John M. Herzog with GeoEngineers dated July 16, 2014, 2:53 PM.

U.S. Army Corps of Engineers (USACE), 2013. “Dredged Material Evaluation and Disposal Procedures User Manual,” Dredged Material Management Program: USACE, Seattle District; U.S. Environmental Protection Agency, Region 10; Washington State Department of Natural Resources; Washington State Department of Ecology, July 2013.

U.S. Environmental Protection Agency (USEPA), 2010. “Contract Laboratory Program National Functional Guidelines for Inorganic Data Review,” OSWER 9240.1-45, EPA 540-R-10-011, dated January 2010.

USEPA, 2008. “Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review,” EPA-540-R-08-01, dated June 2008.

GeoEngineers, Inc., 2014. “Remedial Investigation/Feasibility Study Work Plan for the Weyerhaeuser Mill A Former Everett, Washington Ecology Agreed Order No. DE 8979,” October 16, 2014.

Puget Sound Estuary Program (PSEP), 1995. Review of Sediment Management Standards Bioassay Protocols, April 1995.

Washington State Department of Ecology (Ecology), 2008. Sediment Sampling and Analysis Plan Appendix [SAPA], February 2008.

Table 1

Field Sediment Core Locations

Former Mill A Cleanup Interim Action Dredging Project
Everett, Washington

Core Location		Planned Coordinates (Lat/Long)	Actual Coordinates[1] (Northing/Easting)	Date	Time	Tide Elevation[2] (ft MLLW)	Depth to Mudline[2] (ft)	Anticipated Mudline Elevation (ft MLLW)	Actual Mudline Elevation (ft MLLW)	Target Penetration Elevation[3] (ft MLLW)	Actual Penetration Elevation (ft MLLW)
Base of Dredge Prism	PT-1	N 47° 58' 37.82" W 122° 13' 34.04"	N 47° 58' 37.768" W 122° 13' 33.965"	1/14/2015	1510	5.75	39.75	-35	-34.00	-45	-49.00
	PT-2	N 47° 58' 38.30" W 122° 13' 33.23"	N 47° 58' 38.268" W 122° 13' 33.139"	1/14/2015	800	8.50	38.00	-30	-29.50	-45	-49.50
	PT-3	N 47° 58' 38.50" W 122° 13' 32.39"	N 47° 58' 38.498" W 122° 13' 32.540"	1/13/2015	1340	5.00	42.50	-38	-37.50	-45	-47.50
	PT-4	N 47° 58' 37.49" W 122° 13' 33.39"	N 47° 58' 37.447" W 122° 13' 33.405"	1/14/2015	1300	9.25	36.50	-27	-27.25	-45	-47.25
	PT-5	N 47° 58' 37.71" W 122° 13' 32.29"	N 47° 58' 37.709" W 122° 13' 32.275"	1/13/2015	1230	9.00	33.25	-24	-24.25	-45	-49.25
	PT-6	N 47° 58' 36.97" W 122° 13' 31.43"	N 47° 58' 36.952" W 122° 13' 31.504"	1/13/2015	815	9.75	25.00	-16	-15.25	-45	-45.25
	PT-7	N 47° 58' 37.45" W 122° 13' 30.78"	N 47° 58' 37.456" W 122° 13' 30.776"	1/14/2015	955	10.50	40.50	-31	-30.00	-45	-45.00
	PT-8	N 47° 58' 36.79" W 122° 13' 30.45"	N 47° 58' 36.806" W 122° 13' 30.297"	1/12/2015	930	11.00	34.25	-23	-23.25	-45	-45.25
	PT-9	N 47° 58' 36.80" W 122° 13' 29.61"	N 47° 58' 36.772" W 122° 13' 29.631"	1/12/2015	1405	5.50	34.00	-30	-28.50	-45	-48.50
Dredge Transition Slope	PT-10	N 47° 58' 37.12" W 122° 13' 33.98"	N 47° 58' 37.039" W 122° 13' 33.906"	1/14/2015	1135	10.50	39.50	-30	-29.00	-38	-44.00
	PT-11	N 47° 58' 36.92" W 122° 13' 32.74"	N 47° 58' 36.822" W 122° 13' 32.695"	1/15/2015	1330	9.75	29.75	-20	-20.00	-38	-40.00
	PT-12	N 47° 58' 36.55" W 122° 13' 31.37"	N 47° 58' 36.577" W 122° 13' 31.431"	1/15/2015	745	8.00	22.00	-14	-14.00	-32	-39.00
	PT-13	N 47° 58' 36.31" W 122° 13' 30.22"	N 47° 58' 36.314" W 122° 13' 30.222"	1/15/2015	1140	10.75	26.75	-18	-16.00	-31	-36.00
	PT-14	N 47° 58' 36.32" W 122° 13' 29.49"	W 122° 13' 29.604" N 47° 58' 36.278"	1/15/2015	935	10.00	28.00	-19	-18.00	-31	-38.00
Duplicate Cores[4]	PT-106	N 47° 58' 36.97" W 122° 13' 31.43"	N 47° 58' 37.038" W 122° 13' 31.408"	1/16/2015	755	8.00	25.00	-16	-17.00	a	-32.00
	PT-108	N 47° 58' 36.79" W 122° 13' 30.45"	N 47° 58' 36.783" W 122° 13' 30.543"	1/16/2015	925	9.00	31.00	-23	-22.00	a	-30.00
	PT-109	N 47° 58' 36.80" W 122° 13' 29.61"	N 47° 58' 36.737" W 122° 13' 29.649"	1/12/2015	1600	5.50	34.00	-30	-28.50	a	-33.50
	PT-112	N 47° 58' 36.55" W 122° 13' 31.37"	N 47° 58' 36.605" W 122° 13' 31.454"	1/16/2015	1000	9.50	24.00	-14	-14.50	a	-24.00

Notes:

[1] Actual coordinates have been corrected using post-processing software.

[2] Depth of to mudline and tide elevation (from tideboard) measurements were rounded to the nearest 0.25 feet.

[3] Target penetration depths are from Sampling and Analysis Plan (GeoEngineers, 2014)

[4] Duplicate cores were completed to obtain core intervals and samples from elevation where required recovery (75%) was not obtained in the original core.

[a] Target depth in duplicate core dependent on missing interval in primary core

ft = Feet

MLLW = Mean low low water

Table 2

Sediment Core Interval Data and Recovery Measurements

Former Mill A Cleanup Interim Action Dredging Project

Everett, Washington

Sample Location		Date	Total Depth Penetrated (ft below mudline)	Core Starting Elevation (ft MLLW)	Depth Penetrated (ft)	Core Ending Elevation (ft MLLW)	Recovery Measurement (ft)	% Recovery	Core Accepted (Y/N)
Base of Dredge Prism	PT-1	1/14/2015	5.0	-34.00	5.0	-39.00	5.0	100.0%	Yes
			10.0	-39.00	5.0	-44.00	5.0	100.0%	Yes
			15.0	-44.00	5.0	-49.00	5.0	100.0%	Yes
	PT-2	1/14/2015	5.0	-29.50	5.0	-34.50	4.6	92.0%	Yes
			10.0	-34.50	5.0	-39.50	4.0	80.0%	Yes
			15.0	-39.50	5.0	-44.50	4.0	80.0%	Yes
			20.0	-44.50	5.0	-49.50	5.0	100.0%	Yes
	PT-3	1/13/2015	5.0	-37.50	5.0	-42.50	4.0	80.0%	Yes
			10.0	-42.50	5.0	-47.50	5.0	100.0%	Yes
	PT-4	1/14/2015	5.0	-27.25	5.0	-32.25	5.0	100.0%	Yes
			10.0	-32.25	5.0	-37.25	5.0	100.0%	Yes
			15.0	-37.25	5.0	-42.25	5.0	100.0%	Yes
			20.0	-42.25	5.0	-47.25	5.0	100.0%	Yes
	PT-5	1/13/2015	5.0	-24.25	5.0	-29.25	5.0	100.0%	Yes
			10.0	-29.25	5.0	-34.25	4.0	80.0%	Yes
			15.0	-34.25	5.0	-39.25	5.0	100.0%	Yes
			20.0	-39.25	5.0	-44.25	5.0	100.0%	Yes
			25.0	-44.25	5.0	-49.25	5.0	100.0%	Yes
	PT-6	1/13/2015	5.0	-15.25	5.0	-20.25	5.0	100.0%	Yes
			10.0	-20.25	5.0	-25.25	4.2	84.0%	Yes
			15.0	-25.25	5.0	-30.25	1.0	20.0%	No
			20.0	-30.25	5.0	-35.25	5.0	100.0%	Yes
			25.0	-35.25	5.0	-40.25	5.0	100.0%	Yes
			30.0	-40.25	5.0	-45.25	5.0	100.0%	Yes
	PT-106	1/16/2015	10.0	-24.50	2.5	-27.00	2.2	88.0%	Yes
			15.0	-27.00	5.0	-32.00	0.3	5.0%	No
	PT-7	1/14/2015	5.0	-30.00	5.0	-35.00	5.0	100.0%	Yes
			10.0	-35.00	5.0	-40.00	5.0	100.0%	Yes
			15.0	-40.00	5.0	-45.00	5.0	100.0%	Yes
	PT-8	1/12/2015	2.0	-23.25	2.0	-25.25	2.0	100.0%	Yes
			7.0	-25.25	5.0	-30.25	1.0	20.0%	No
			12.0	-30.25	5.0	-35.25	5.0	100.0%	Yes
			17.0	-35.25	5.0	-40.25	5.0	100.0%	Yes
			22.0	-40.25	5.0	-45.25	5.0	100.0%	Yes
	PT-108[a]	1/16/2015	5.0	-25.00	5.0	-30.00	4.0	80.0%	Yes
	PT-9	1/12/2015	5.0	-28.50	5.0	-33.50	2.5	50.0%	No
			10.0	-33.50	5.0	-38.50	5.0	100.0%	Yes
			15.0	-38.50	5.0	-43.50	5.0	100.0%	Yes
			20.0	-43.50	5.0	-48.50	5.0	100.0%	Yes
	PT-109	1/12/2015	5.0	-28.50	5.0	-33.50	4.8	96.0%	Yes

Sample Location		Date	Total Depth Penetrated (ft below mudline)	Core Starting Elevation (ft MLLW)	Depth Penetrated (ft)	Core Ending Elevation (ft MLLW)	Recovery Measurement (ft)	% Recovery	Core Accepted (Y/N)
Dredge Transition Slope	PT-10	1/14/2015	5.0	-29.00	5.0	-34.00	5.0	100.0%	Yes
			10.0	-34.00	5.0	-39.00	4.5	90.0%	Yes
			15.0	-39.00	5.0	-44.00	5.0	100.0%	Yes
	PT-11	1/15/2015	5.0	-20.00	5.0	-25.00	5.0	100.0%	Yes
			10.0	-25.00	5.0	-30.00	5.0	100.0%	Yes
			15.0	-30.00	5.0	-35.00	5.0	100.0%	Yes
			20.0	-35.00	5.0	-40.00	5.0	100.0%	Yes
	PT-12	1/15/2014	5.0	-14.00	5.0	-19.00	5.0	100.0%	Yes
			10.0	-19.00	5.0	-24.00	1.0	20.0%	No
			15.0	-24.00	5.0	-29.00	4.0	80.0%	Yes
			20.0	-29.00	5.0	-34.00	5.0	100.0%	Yes
			25.0	-34.00	5.0	-39.00	5.0	100.0%	Yes
	PT-112[a]	1/16/2015	5.0	-19.00	5.0	-24.00	5.0	100.0%	Yes
	PT-13	1/15/2015	5.0	-16.00	5.0	-21.00	4.0	80.0%	Yes
			10.0	-21.00	5.0	-26.00	4.8	95.0%	Yes
			15.0	-26.00	5.0	-31.00	5.0	100.0%	Yes
			20.0	-31.00	5.0	-36.00	5.0	100.0%	Yes
	PT-14	1/15/2015	5.0	-18.00	5.0	-23.00	5.0	100.0%	Yes
			10.0	-23.00	5.0	-28.00	4.8	96.0%	Yes
			15.0	-28.00	5.0	-33.00	5.0	100.0%	Yes
			20.0	-33.00	5.0	-38.00	5.0	100.0%	Yes

Notes:

[a] Top interval of core was water-jetted to reach core starting elevation.

ft = Feet

MLLW = Mean low low water

Table 3

Revisions to DMMU Volumes

Mill A Former Site Interim Action Dredging Project
Everett, Washington

						Estimated in Agency-approved SAP	Revised as approved by DMMP following sample collection and core log review	Second revision to allow for Ecology-required transition slope armor rock		
Dredging Location	**Dredged Material Ranking[1]**	**Sediment Classification**	**Number of DMMUs**	**DMMU Identification**	**DMMU Boundary Elevations**	**Total Dredge Volume per DMMU[2] (CY)**	**Total Dredge Volume per DMMU[2] (CY)**	**Total Dredge Volume per DMMU[2] (CY)**	**Number of Sample Cores**	**Sampling Layer[3]**
Interim Action Cleanup	High	Heterogeneous	11	D-1	Existing Surface to -22 ft	3,750	3,750	3,940	5	Surface DMMU
				D-2	-22 to -26 ft	3,680	3,680	3,750	7	Subsurface DMMU
				D-3A	-26 ft to -30 ft	2,380	2,380	2,450	3	Subsurface DMMU
				D-3B	-26 ft to -30 ft	2,420	2,420	2,420	5	Subsurface DMMU
				D-4A	-30 ft to -34 ft	2,710	2,710	2,790	2	Subsurface DMMU
				D-4B	-30 ft to -34 ft	3,160	3,160	3,160	6	Subsurface DMMU
				D-5A	-34 ft to -38 ft	3,010	2,800	2,870	3	Subsurface DMMU
				D-5B	-34 ft to -38 ft	3,810	2,710	2,710	7	Subsurface DMMU
				D-6A	-38 ft to -43 ft	2,870	3,920	4,520	3	Subsurface DMMU Z-layer
				D-6B	-38 ft to -43 ft	3,520	3,370	4,320	3	Subsurface DMMU Z-layer
				D-6C	-38 ft to -43 ft	3,830	Eliminated	Eliminated	--	-- --
				D-7	Surface in areas from -34 to -43 ft	--	4,240	4,390	3	Subsurface DMMU Z-layer
				Total Dredge Volume (CY)		**35,140**	**35,140**	**37,320**		

Notes:

[1] Due to the status of the Site as a MTCA cleanup, the subsurface DMMUs are treated as surface DMMUs with a high ranking as required by the Dredged Material Management Office.

[2] DMMU volume includes 1-foot overdredge allowance and 10% contingency. Volumes calculated using bathymetry survey completed between September 8 and 11, 2014.

[3] Z-layer samples were collected to characterize the dredge-prism side-slope. Five core locations were completed within the side-slope area.

CY = *In situ* cubic yards

DMMP = Dredged Material Management Program

DMMU = Dredged Material Management Unit

NA = Not Applicable

Table 4

Wood Content Analytical Results for DMMU

Mill A Former Site Interim Action Dredging Project
Everett, Washington

DMMU	Approx. Average Wood Debris Content Observed in DMMU[1] (% by volume)	Organic Matter by Method ASTM D2974 (% by weight)	Bioassay[2]
D-1	70%	17.03%	X
D-2	50%	11.93%	X
D-3A	40%	5.91%	X
D-3B	70%	13.20%	X
D-4A	10%	0.65%	
D-4B	50%	7.87%	X
D-5A	0%	0.52%	
D-5B	10%	1.14%	
D-6A	0%	0.54%	
D-6B	0%	0.58%	
D-7	50%	7.20%	X

Notes:

[1] Approximate volume of wood debris observed during sediment core collection was determined by evaluating core logs.

[2] Samples were selected for bioassay based on observed wood debris volume to ensure that bioassay holding times were met.

DMMU = Dredged Material Management Unit

Table 5a

Interim Action Sediment Chemical Analytical Results Compared to DMMP Guideline Chemistry Values

Mill A Former Site Interim Action Dredging Project
Everett, Washington

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
Conventionals																				
Total Organic Carbon	NE	NE	NE	%	14.4	9.93	5.6	13.3	0.313	8.49	0.152	0.124	0.157	0.176	2.94	2.7	--	0.228	7.76	--
Total Solids	NE	NE	NE	%	45.98	50.15	62.61	44.45	79.68	51.63	81.11	81.14	82.81	81.72	57.21	71.55	--	81.58	61.16	--
Total Volatile Solids	NE	NE	NE	%	21.02	18.9	12.12	31.21	1.31	14.52	1.14	1.05	1.19	0.95	12.15	5.09	--	1.01	10.3	--
Organic Matter	25	NE	NE	%	16.73	11.93	5.91	13.2	0.65	7.87	0.52	1.14	0.54	0.58	7.2	4.39	--	0.43	8.29	--
Preserved Total Solids	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	58.07	--	--	81.39
Sulfide	NE	NE	NE	mg/kg	--	--	--	--	--	--	--	--	1.92 J	4.38 J	112 J	16	205	1.32	4.8	22.3 J
Ammonia	NE	NE	NE	mg/kg	21	30	8.47	45.1	3.93	28.7	9.95	7.88	2.78	6.01	20.2	13.2	--	26.6	42.2	--
Grain Size																				
Gravel (≤ -1)	NE	NE	NE	%	10.2	8.2	1.8	7.2	0.3	5.7	0.1	1.6	0.7	0.1 U	4.6	1.1	--	0.1	0.8	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	4.8	2.4	1.5	3.9	0.3	2.2	0.1	0.6	0.1	0.2	1.9	0.8	--	0.4	1.6	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	6.6	3.7	2.7	5.8	1.1	3.5	0.5	1.6	0.5	1.2	3.8	2.2	--	2.8	2.3	--
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	15	16.1	23	12.1	18.3	12.2	10.4	22.9	27.5	22.5	20.5	20.4	--	10.9	5.2	--
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	19.3	30.2	42	27	49.2	42.5	52.6	55.5	41.8	60.2	34.9	51.2	--	46.3	14.7	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	10.4	11.4	12.6	11.7	20.4	13.3	25.7	7.3	18.5	8.4	8.3	6	--	29.2	23.4	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	4.8	5.2	2.6	5.1	3.7	1.6	3.6	2.7	4.1	2.1	7.9	4	--	4.1	13.6	--
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	6.6	4.6	3	6.3	1.6	4.6	1.7	2	1.5	1.2	4.3	3.3	--	1.6	11.3	--
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	5.4	4.5	2.8	5.1	1.2	3.4	1.2	1.5	1.2	0.8	3.1	2.7	--	1.1	7.9	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	4.4	3.5	2.1	4.4	1	2.9	1	1.1	1.2	0.7	2.6	2	--	0.8	5.3	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	2.8	2.3	1.5	3.2	0.7	2.1	0.7	1	0.8	0.6	2.2	1.8	--	0.7	4	--
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	3	2.8	1.6	2.6	0.7	2	0.8	0.8	0.8	0.7	1.8	1.6	--	0.6	3.5	--
Particle/Grain Size, Phi >10	NE	NE	NE	%	6.7	5.2	2.9	5.7	1.6	4	1.8	1.4	1.3	1.3	4	2.8	--	1.4	6.1	--
Total Fines	NE	NE	NE	%	33.7	28	16.5	32.4	10.4	20.6	10.7	10.4	10.9	7.5	25.9	18.3	--	10.3	51.8	--
Grain Size (Ash Wt.)																				
Gravel (≤ -1)	NE	NE	NE	%	2.1	1.1	1.2	2.8	0.1 U	3.5	0.1 U	0.1 U	0.2	0.1 U	1.5	--	--	--	--	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	2.0	1.4	0.6	1.9	0.3	1.0	0.1	0.3	0.1	0.2	1.6	--	--	--	--	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	3.8	2.5	1.3	2.7	1.3	2.0	0.4	1.2	0.5	1.2	4.1	--	--	--	--	--
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	14.6	14.8	21.5	8.6	19.1	9.5	12.9	16.2	26.6	28.2	24.0	--	--	--	--	--
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	23.3	35.6	43.6	31.7	46.5	41.6	52.3	61.4	43.9	56.5	41.6	--	--	--	--	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	14.8	16.1	13.0	16.8	20.8	14.9	23.8	12.4	18.4	7.2	9.7	--	--	--	--	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	8.5	6.6	4.6	6.0	5.6	6.5	4.3	3.2	4.1	2.7	3.1	--	--	--	--	--
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	15.6	9.1	4.5	17.7	1.9	11.0	1.6	1.2	2.1	1.0	6.0	--	--	--	--	--
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	6.9	4.9	4.0	5.5	1.7	5.5	1.6	1.1	2.4	0.9	3.6	--	--	--	--	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	1.9	2.4	1.8	1.2	1.1	1.2	1.2	0.9	0.2	0.5	1.4	--	--	--	--	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	0.9	1.4	0.9	0.5	0.4	0.5	0.5	0.5	0.1 U	0.4	0.7	--	--	--	--	--
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	0.3	0.6	0.4	0.2	0.1	0.1	0.2	0.4	0.1	0.2	0.1	--	--	--	--	--
Particle/Grain Size, Phi >10	NE	NE	NE	%	5.1	3.4	2.5	4.3	1.3	2.9	1.3	1.1	1.4	0.9	2.5	--	--	--	--	--
Total Fines	NE	NE	NE	%	39.4	28.5	18.8	35.5	12.0	27.6	10.6	8.5	10.3	6.6	17.5	--	--	--	--	--
Metals																				
Antimony	150	NE	200	mg/kg	1.1 J	1.40 J	0.75 J	1.1 J	0.82 J	2.38 J	0.68 J	0.75 J	1.03 J	0.68 J	1.07 J	0.84 J	--	0.77 J	1.46 J	--
Arsenic	57	507	700	mg/kg	10.7 J	6.80 J	5.83 J	9.5 J	4.57 J	6.67 J	5.14 J	4.81 J	5.18 J	4.42 J	7.69 J	6.08 J	--	3.92 J	9	--
Cadmium	5.1	11.3	14	mg/kg	1.3	1	0.6	1.3	0.2	0.7	0.3	0.3	0.220 J	0.210 J	1	0.4	--	0.211 J	1.1	--
Chromium	260	260	NE	mg/kg	35	31.3	24.3	35	28.4	30.3	27.7	25.7	29.9	22.2	31.5	28.2	--	24.2	47.9	--
Copper	390	1,027	1,300	mg/kg	43.9	32.9	18.3	43.2	11	24.8	9.9	9.8	10.2	7.1	33.6	12.8	--	7.6	44.2	--
Lead	450	975	1,200	mg/kg	28	22	9	31	1.86 J	14	1.80 J	5	1.94 J	2.30 J	19	10	--	1.48 J	26	--
Mercury	0.41	1.5	2.3	mg/kg	0.13	0.14	0.0380 J	0.12	0.0120 J	0.14	0.0106 J	0.0159 J	0.02	0.0080 J	0.1	0.08	--	0.0071 J	0.11	--
Selenium	NE	3	NE	mg/kg	0.52 J	0.337 J	0.214 J	0.45 J	0.6 U	0.311 J	0.6 U	0.127 J	0.6 U	0.125 J	0.315 J	0.185 J	--	0.6 U	0.487 J	--
Silver	6.1	6.1	8.4	mg/kg	0.7 U	0.6 U	0.5 U	0.7 U	0.4 U	0.6 U	0.3 U	0.4 U	0.3 U	0.4 U	0.6 U	0.4 U	--	0.3 U	0.5 U	--
Zinc	410	2,783	3,800	mg/kg	76	54	37	69	31	49	31	30	31	27	58	34	--	28	70	--
LPAHs																				
2-Methylnaphthalene	670	NE	1,900	µg/kg	280	190	130	410	5.7	280	3.2 J	5.9	2.5 J	4.8 U	240	75	--	4.7 U	180	--
Acenaphthene	500	NE	2,000	µg/kg	340	210	160	420	4.4 J	410	4.8 U	4.5 J	4.7 U	4.8 U	260	73	--	4.7 U	210	--
Acenaphthylene	560	NE	1,300	µg/kg	57	82	89	210	4.8 U	110	4.8 U	2.4 J	4.7 U	4.8 U	110	53	--	4.7 U	80	--
Anthracene	960	NE	13,000	µg/kg	280	150	99	210	3.4 J	180	4.8 U	6.1	4.7 U	4.8 U	150	100	--	4.7 U	160	--
Fluorene	540	NE	3,600	µg/kg	330	210	160	400	4.8 J	370	4.8 U	5.8	4.7 U	4.8 U	250	89	--	4.7 U	240	--
Naphthalene	2,100	NE	2,400	µg/kg	1,100	1,100	1,200	3,600	33	1,600	8.5	26	4.7 U	6.8	1,300	460	--	3.3 J	1,100	--
Phenanthrene	1,500	NE	21,000	µg/kg	680	600	550	1100	15	900	7.9	18	4.7 U	4.8 U	630	260	--	4.7 U	650	--
Total LPAHs	5,200	NE	29,000	µg/kg	2,787 T	2,352 T	2,258 T	5,940 T	60.6 T	3,570 T	16.4 T	62.8 T	4.7 UT	6.8 T	2,700 T	1,035 T	--	3.3 T	2,440 T	--

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
HPAHs																				
Benzo(a)anthracene	1,300	NE	5,100	µg/kg	**140**	**58**	**34**	**52**	4.8 U	**130**	4.8 U	**5.4**	4.7 U	4.8 U	**55**	**59**	–	4.7 U	**71**	–
Benzo(a)pyrene	1,600	NE	3,600	µg/kg	**79**	**34**	**18 J**	**29**	4.8 U	**84**	4.8 U	**3.9 J**	4.7 U	4.8 U	**28**	**51**	–	4.7 U	**49**	–
Benzo(ghi)perylene	670	NE	3,200	µg/kg	**55**	**22 J**	**14 J**	**25**	4.8 U	**58**	4.8 U	**4.2 J**	4.7 U	4.8 U	**20**	**38**	–	4.7 U	**44**	–
Benzofluoranthenes (Sum)	3,200	NE	9,900	µg/kg	**200**	**83**	**45**	**89**	4.8 U	**200**	4.8 U	**7.5**	4.7 U	4.8 U	**76**	**84**	–	4.7 U	**98**	–
Chrysene	1,400	NE	21,000	µg/kg	**230**	**90**	**54**	**83**	**2.8 J**	**140**	4.8 U	**6.1**	4.7 U	4.8 U	**85**	**62**	–	4.7 U	**98**	–
Dibenzo(a,h)anthracene	230	NE	1,900	µg/kg	**16 J**	25 U	24 U	24 U	4.8 U	**12 J**	4.8 U	4.8 U	4.7 U	4.8 U	**4.0 J**	24 U	–	4.7 U	24 U	–
Fluoranthene	1,700	4,600	30,000	µg/kg	**570**	**480**	**360**	**670**	**11**	**640**	**7**	**19**	4.7 U	4.8 U	**420**	**260**	–	4.7 U	**460**	–
Indeno(1,2,3-cd)pyrene	600	NE	4,400	µg/kg	**45**	**18 J**	24 U	**16 J**	4.8 U	**44**	4.8 U	4.8 U	4.7 U	4.8 U	**13**	**27**	–	4.7 U	**25**	–
Pyrene	2,600	11,980	16,000	µg/kg	**440**	**360**	**270**	**460**	**9.5**	**460**	**4.4 J**	**21**	4.7 U	4.8 U	**300**	**240**	–	4.7 U	**430**	–
Total HPAHs	12,000	NE	69,000	µg/kg	**1,775 T**	**1,145 T**	**795 T**	**1,424 T**	**23.3 T**	**1,768 T**	**11.4 T**	**67.1 T**	4.7 UT	4.8 UT	**1,001 T**	**821 T**	–	4.7 UT	**1,275 T**	–
cPAHs																				
Total cPAH TEQ (ND=0.5DL)	NE	NE	NE	µg/kg	**121.4 JT**	**52.1 JT**	**28.8 JT**	**46.7 JT**	**3.4 JT**	**124 JT**	3.4 UT	**5.7 JT**	3.3 UT	3.4 UT	**43.7 JT**	**69.8 T**	–	3.3 UT	**70.6 T**	–
Chlorinated Hydrocarbons																				
Hexachlorobenzene	22	168	230	µg/kg	0.99 U	1.3 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	14 U	0.97 U	–	0.95 U	0.96 U	–
1,2,4-Trichlorobenzene	31	NE	64	µg/kg	4.9 U	4.9 U	4.7 U	**3.5 J**	4.8 U	**8.4**	4.8 U	4.8 U	4.8 U	4.8 U	**2.5 J**	4.9 U	–	4.7 U	4.8 U	–
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	NE	110	µg/kg	**13**	**7.7**	**3.7 J**	**11**	**3.0 J**	**5.8**	**2.5 J**	4.8 U	4.8 U	4.8 U	**11**	4.9 U	–	4.7 U	4.8 U	–
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	NE	120	µg/kg	**6.3**	**4.6 J**	**3.2 J**	**6.7**	4.8 U	**5.2**	4.8 U	4.8 U	4.8 U	4.8 U	**5.2**	4.9 U	–	4.7 U	4.8 U	–
Phthalates																				
Bis(2-Ethylhexyl) Phthalate	1,300	NE	8,300	µg/kg	**30 J**	49 UJ	47 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	**28 J**	49 U	–	47 U	48 U	–
Di-N-Octyl Phthalate	6,200	NE	6,200	µg/kg	**11 J**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–
Dibutyl Phthalate	1,400	NE	5,100	µg/kg	**65**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–
Diethyl Phthalate	200	NE	1,200	µg/kg	20 U	**380**	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	**34**	–
Dimethyl Phthalate	71	NE	1,400	µg/kg	20 U	20 U	19 U	19 U	19 U	**22**	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–
Butyl benzyl Phthalate	63	NE	970	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**4.8**	**31**	**3.2 J**	4.8 U	**2.5 J**	**2.6 J**	**22**	4.9 U	–	**7.4**	**8.8**	–
Phenols																				
o-Cresol (2-methylphenol)	63	NE	77	µg/kg	**37**	**68**	**45**	**140**	19 U	**81**	19 U	19 U	19 U	19 U	**49**	20 U	–	19 U	**36**	–
p-Cresol (4-methylphenol)	670	NE	3,600	µg/kg	**1,700**	**2,400**	**930**	**1,900**	**34**	**1,000**	19 U	**16 J**	19 U	19 U	**1,200**	20 U	–	**92**	**180**	–
Pentachlorophenol	400	504	690	µg/kg	**46 J**	99 U	94 U	**33 J**	96 U	**33 J**	97 U	97 U	95 U	96 U	96 U	98 U	–	94 U	96 U	–
Phenol	420	NE	1,200	µg/kg	**390**	**430**	**240**	**460**	**29**	**320**	**34**	19 U	19 U	19 U	**250**	20 U	–	**38**	**59**	–
2,4-Dimethylphenol	29	NE	210	µg/kg	**46**	**54**	**26**	**78**	24 U	**56**	24 U	24 U	24 U	24 U	**44**	24 U	–	23 U	**24 J**	–
Miscellaneous Extractables																				
Benzoic Acid	650	NE	760	µg/kg	**790**	**940**	**540**	**1,100**	190 U	**860**	190 U	190 U	190 U	190 U	**720**	200 U	–	**82 J**	**150 J**	–
Benzyl Alcohol	57	NE	870	µg/kg	**30**	**33**	**25**	**59**	19 U	**32**	19 U	19 U	19 U	19 U	**24**	20 U	–	19 U	19 U	–
Dibenzofuran	540	NE	1,700	µg/kg	**300**	**220**	**180**	**410**	**4.8 J**	**340**	4.8 U	**5.8**	4.7 U	4.8 U	**240**	**86**	–	4.7 U	**200**	–
Hexachlorobutadiene	11	NE	270	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
N-Nitrosodiphenylamine (as diphenylamine)	28	NE	130	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**2.9 J**	4.8 U	**3.0 J**	4.8 U	4.8 U	4.8 U	4.8 U	4.9 U	–	4.7 U	4.8 U	–
Pesticides																				
4,4'-DDD	16	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
4,4'-DDE	9	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
4,4'-DDT	12	NE	NE	µg/kg	6.9 U	4.3 U	0.99 U	4.0 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Total DDT (4,4 isomers)	NE	50	69	µg/kg	6.9 UT	4.3 UT	0.99 UT	4 UT	0.98 UT	0.98 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	0.98 UT	0.97 UT	–	0.95 UT	0.96 UT	–
Aldrin	9.5	NE	NE	µg/kg	1.7 U	0.49 U	1.8 U	3.6 U	0.49 U	3.9 U	0.49 U	0.49 U	0.48 U	0.49 U	1.7 U	0.48 U	–	0.48 U	0.48 U	–
alpha-Chlordane (cis)	NE	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	0.49 U	0.48 U	–	0.48 U	0.48 U	–
beta or gamma-Chlordane (trans)	NE	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	1.0 U	0.48 U	–	0.48 U	0.48 U	–
Chlordane (Total)	2.8	37	NE	µg/kg	4.5 UT	1.7 UT	0.99 UT	**2.3 J**	0.98 UT	2.3 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	2.7 UT	0.97 UT	–	0.95 UT	1.6 UT	–
cis-Nonachlor	NE	NE	NE	µg/kg	1.6 U	1.7 U	0.99 U	**2.3 J**	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Dieldrin	1.9	NE	1700	µg/kg	1.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Heptachlor	1.5	NE	270	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.80 U	0.49 U	0.49 U	0.48 U	0.49 U	1.5 U	0.48 U	–	0.48 U	0.48 U	–
Oxychlordane	NE	NE	NE	µg/kg	4.5 U	0.99 U	0.99 U	0.99 U	0.98 U	2.3 U	0.98 U	0.98 U	0.97 U	0.97 U	2.7 U	0.97 U	–	0.95 U	1.6 U	–
trans-Nonachlor	NE	NE	NE	µg/kg	2.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Polychlorinated Biphenyls (PCBs)																				
PCB-001	NE	NE	NE	ng/kg	**18.2**	**18.0**	**20.5**	**5.77**	0.867 U	**5.34**	0.450 U	0.752 U	0.600 U	0.397 U	**9.50**	**1.20 J**	–	0.315 U	**3.28 J**	–
PCB-002	NE	NE	NE	ng/kg	**4.98**	**5.12**	**12.6**	**4.61**	0.973 U	**4.08**	0.544 U	0.856 U	0.696 U	0.461 U	**4.92**	**2.47 J**	–	0.381 U	**6.95**	–
PCB-003	NE	NE	NE	ng/kg	**13.3**	**11.4**	**16.9**	**6.67**	0.937 U	**4.56**	0.558 U	0.833 U	0.689 U	0.458 U	**7.96**	**1.82 J**	–	0.381 U	**5.20**	–
PCB-004	NE	NE	NE	ng/kg	**16.5**	**13.7**	**29.7**	**7.09**	1.62 U	**4.11**	1.63 U	1.21 U	1.39 U	1.39 U	**8.94**	**2.22 J**	–	0.810 U	0.626 U	–
PCB-005	NE	NE	NE	ng/kg	0.572 U	1.82 U	1.99 U	1.77 U	1.43 U	0.928 U	1.49 U	1.07 U	1.26 U	1.35 U	0.617 U	0.735 U	–	0.744 U	0.491 U	–
PCB-006	NE	NE	NE	ng/kg	**9.37**	**9.26**	**16.5**	**6.98**	**2.86 J**	**3.23 J**	1.39 U	0.994 U	1.17 U	1.25 U	**12.5**	**5.07**	–	0.710 U	**2.50 J**	–
PCB-007	NE	NE	NE	ng/kg	**2.94 J**	**3.61 J**	**4.40**	1.68 U	1.39 U	0.900 U	1.45 U	1.04 U	1.22 U	1.31 U	**3.48 J**	0.716 U	–	0.725 U	0.478 U	–
PCB-008	NE	NE	NE	ng/kg	**39.6**	**37.5**	**66.4**	**20.7**	1.45 U	**10.1**	1.52 U	1.09 U	1.28 U	1.37 U	**26.7**	**3.72 J**	–	0.741 U	**2.29 J**	–
PCB-009	NE	NE	NE	ng/kg	**3.61 J**	**2.72 J**	**6.64**	1.78 U	1.45 U	0.943 U	1.52 U	1.09 U	1.28 U	1.37 U	0.627 U	0.746 U	–	0.756 U	0.499 U	–
PCB-010	NE	NE	NE	ng/kg	0.590 U	1.97 U	2.15 U	1.92 U	1.62 U	1.05 U	1.69 U	1.21 U	1.42 U	1.53 U	0.699 U	0.765 U	–	0.776 U	0.512 U	–
PCB-011	NE	NE	NE	ng/kg	**13.0**	**14.4**	**11.8**	**9.70**	**3.91 J**	**5.32**	1.59 U	**3.10 J**	1.33 U	1.43 U	**13.9**	**6.53**	–	**2.91 J**	**4.55**	–
PCB-012	NE	NE	NE	ng/kg	**2.87 J**	**3.61 J**	**7.67**	1.79 U	1.43 U	1.37 U	1.50 U	1.07 U	1.26 U	1.35 U	**3.21 J**	**4.24**	–	0.798 U	**2.56 J**	–
PCB-013	NE	NE	NE	ng/kg	**4.80**	**4.87**	**5.44**	**4.99**	1.59 U	1.52 U	1.66 U	1.19 U	1.40 U	1.50 U	**8.75**	**2.36 J**	–	0.859 U	**1.94 J**	–
PCB-014	NE	NE	NE	ng/kg	0.599 U	1.88 U	2.06 U	1.83 U	1.47 U	0.954 U	1.54 U	1.10 U	1.29 U	1.38 U	0.634 U	0.758 U	–	0.768 U	0.506 U	–
PCB-015	NE	NE	NE	ng/kg	**36.6**	**28.6**	**22.4**	**11.8**	1.47 U	**7.61**	1.58 U	1.10 U	1.32 U	1.47 U	**19.4**	**1.97 J**	–	0.815 U	**1.16 J**	–
PCB-016	NE	NE	NE	ng/kg	**32.6**	**37.1**	**35.3**	**19.4**	1.32 U	**7.75**	0.566 U	1.44 U	0.546 U	0.646 U	**17.9**	0.553 U	–	0.404 U	0.583 U	–
PCB-017	NE	NE	NE	ng/kg	**45.3**	**41.1**	**51.5**	**21.3**	1.38 U	**10.4**	0.590 U	1.50 U	0.569 U	0.673 U	**23.3**	0.614 U	–	0.449 U	1.79 U	–
PCB-018	NE	NE	NE	ng/kg	**120.0**	**107**	**131**	**56.4**	1.53 U	**26.8**	0.654 U	1.66 U	0.631 U	0.747 U	**64.0**	0.681 U	–	0.497 U	1.98 U	–
PCB-019	NE	NE	NE	ng/kg	**10.9**	**11.4**	**12.4**	**5.95**	1.53 U	1.75 U	0.653 U	1.66 U	0.630 U	0.745 U	**5.88**	0.660 U	–	0.482 U	0.696 U	–
PCB-020	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	–	0.843 U	**3.99**	–

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-021	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	–	0.843 U	**3.99**	–
PCB-022	NE	NE	NE	ng/kg	**52.9**	**39.8**	**45.4**	**22.0**	1.13 U	**11.1**	0.873 U	1.52 U	1.02 U	0.772 U	**28.1**	0.911 U	–	0.826 U	1.34 U	–
PCB-023	NE	NE	NE	ng/kg	1.85 U	1.88 U	1.71 U	1.85 U	1.21 U	1.98 U	0.935 U	1.63 U	1.09 U	0.827 U	1.84 U	0.961 U	–	0.871 U	1.41 U	–
PCB-024	NE	NE	NE	ng/kg	**1.77 J**	**4.60**	**2.16 J**	1.50 U	1.02 U	1.17 U	0.437 U	1.11 U	0.422 U	0.499 U	**1.40 J**	0.475 U	–	0.347 U	0.501 U	–
PCB-025	NE	NE	NE	ng/kg	**9.50**	**7.96**	**9.97**	**3.58 J**	0.974 U	1.59 U	0.752 U	1.31 U	0.876 U	0.666 U	**6.23**	0.812 U	–	0.736 U	1.20 U	–
PCB-026	NE	NE	NE	ng/kg	**20.6**	**18.8**	**21.4**	**8.27**	1.12 U	**3.97 J**	0.869 U	1.52 U	1.01 U	0.769 U	**14.0**	0.949 U	–	0.860 U	1.40 U	–
PCB-027	NE	NE	NE	ng/kg	**6.95**	**4.76**	**8.46**	**4.00**	1.04 U	1.20 U	0.446 U	1.13 U	0.431 U	0.510 U	**2.79 J**	0.459 U	–	0.335 U	0.484 U	–
PCB-028	NE	NE	NE	ng/kg	**137**	**115**	**113**	**56.3**	**2.20 J**	**27.8**	0.770 U	**2.60 J**	0.896 U	0.682 U	**76.1**	0.787 U	–	0.713 U	**5.45**	–
PCB-029	NE	NE	NE	ng/kg	1.82 U	1.90 U	1.73 U	1.86 U	1.10 U	1.80 U	0.850 U	1.48 U	0.989 U	0.752 U	1.67 U	0.954 U	–	0.864 U	1.40 U	–
PCB-030	NE	NE	NE	ng/kg	0.637 U	1.70 U	1.20 U	1.42 U	0.991 U	1.13 U	0.424 U	1.08 U	0.409 U	0.484 U	1.44 U	0.440 U	–	0.321 U	0.464 U	–
PCB-031	NE	NE	NE	ng/kg	**138**	**99.8**	**113**	**58.3**	**1.94 J**	**29.6**	0.819 U	**2.37 J**	0.954 U	0.725 U	**44.8**	0.979 U	–	0.887 U	**6.29**	–
PCB-032	NE	NE	NE	ng/kg	**39.0**	**28.7**	**37.3**	**15.0**	1.11 U	**7.47**	0.476 U	1.21 U	0.459 U	0.543 U	**17.1**	0.516 U	–	0.376 U	0.544 U	–
PCB-033	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	–	0.843 U	**3.99**	–
PCB-034	NE	NE	NE	ng/kg	1.81 U	2.15 U	1.96 U	2.11 U	1.09 U	1.78 U	0.844 U	1.47 U	0.981 U	0.746 U	1.66 U	0.949 U	–	0.860 U	1.40 U	–
PCB-035	NE	NE	NE	ng/kg	1.69 U	1.97 U	1.79 U	1.93 U	1.17 U	1.91 U	0.905 U	1.58 U	1.05 U	0.801 U	1.78 U	0.993 U	–	0.900 U	1.46 U	–
PCB-036	NE	NE	NE	ng/kg	1.63 U	1.88 U	1.71 U	1.84 U	1.10 U	1.79 U	0.847 U	1.48 U	0.986 U	0.750 U	1.67 U	0.931 U	–	0.844 U	1.37 U	–
PCB-037	NE	NE	NE	ng/kg	**39.7**	**24.7**	**28.9**	**14.7**	1.05 U	**8.04**	0.812 U	1.42 U	0.944 U	0.718 U	**20.3**	0.873 U	–	0.791 U	1.28 U	–
PCB-038	NE	NE	NE	ng/kg	1.59 U	1.83 U	1.67 U	1.80 U	1.10 U	1.79 U	0.846 U	1.48 U	0.985 U	0.749 U	1.66 U	0.891 U	–	0.807 U	1.31 U	–
PCB-039	NE	NE	NE	ng/kg	1.68 U	1.94 U	1.76 U	1.90 U	1.13 U	1.84 U	0.870 U	1.52 U	1.01 U	0.770 U	**8.88**	0.954 U	–	0.865 U	1.41 U	–
PCB-040	NE	NE	NE	ng/kg	**40.8**	**32.0**	**27.0**	**20.9**	1.57 U	**9.19**	0.997 U	0.721 U	0.651 U	0.843 U	**18.4**	0.790 U	–	0.613 U	0.809 U	–
PCB-041	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-042	NE	NE	NE	ng/kg	**81.0**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-043	NE	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.90**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-044	NE	NE	NE	ng/kg	**345**	**259**	**185**	**142**	**3.07 J**	**71.0**	0.865 U	**5.67**	0.565 U	0.731 U	**135**	0.686 U	–	0.532 U	**4.96**	–
PCB-045	NE	NE	NE	ng/kg	**42.3**	**25.3**	**25.8**	**15.6**	1.34 U	**7.77**	0.856 U	0.619 U	0.559 U	0.723 U	**15.9**	0.680 U	–	0.527 U	0.880 U	–
PCB-046	NE	NE	NE	ng/kg	**17.6**	**11.8**	**12.5**	**7.45**	1.45 U	**3.42 J**	0.926 U	0.670 U	0.605 U	0.783 U	**7.54**	0.726 U	–	0.563 U	0.940 U	–
PCB-047	NE	NE	NE	ng/kg	**71.3**	**49.8**	**45.1**	**22.7**	0.983 U	**15.0**	0.625 U	**2.04 J**	0.408 U	0.529 U	**16.7**	0.527 U	–	0.408 U	**2.61 J**	–
PCB-048	NE	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-049	NE	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.90**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-050	NE	NE	NE	ng/kg	0.849 U	2.22 U	2.35 U	1.77 U	1.19 U	0.546 U	0.756 U	0.547 U	0.494 U	0.639 U	0.731 U	0.602 U	–	0.467 U	0.780 U	–
PCB-051	NE	NE	NE	ng/kg	**12.2**	**8.76**	**8.73**	**5.64**	1.20 U	**2.70 J**	0.766 U	0.554 U	0.501 U	0.648 U	**5.00**	0.640 U	–	0.496 U	0.828 U	–
PCB-052	NE	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-053	NE	NE	NE	ng/kg	**44.9**	**30.0**	**27.8**	**17.7**	1.25 U	**8.88**	0.798 U	0.577 U	0.522 U	0.675 U	**18.6**	0.659 U	–	0.511 U	0.854 U	–
PCB-054	NE	NE	NE	ng/kg	0.649 U	1.73 U	1.83 U	1.38 U	0.936 U	0.430 U	0.596 U	0.431 U	0.389 U	0.504 U	0.576 U	0.484 U	–	0.375 U	0.627 U	–
PCB-055	NE	NE	NE	ng/kg	**9.62**	**5.25**	**7.78**	**3.94 J**	0.879 U	**2.10 J**	0.559 U	0.404 U	0.365 U	0.473 U	**4.23**	0.448 U	–	0.347 U	0.459 U	–
PCB-056	NE	NE	NE	ng/kg	**212**	**155**	**110.0**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-057	NE	NE	NE	ng/kg	**1.50 J**	1.62 U	1.71 U	1.29 U	0.879 U	0.404 U	0.559 U	0.404 U	0.365 U	0.473 U	0.540 U	0.444 U	–	0.344 U	0.454 U	–
PCB-058	NE	NE	NE	ng/kg	0.630 U	1.60 U	1.70 U	1.28 U	0.929 U	0.427 U	0.591 U	0.427 U	0.386 U	0.500 U	0.571 U	0.457 U	–	0.354 U	0.468 U	–
PCB-059	NE	NE	NE	ng/kg	**81.0**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-060	NE	NE	NE	ng/kg	**212**	**155**	**110.0**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-061	NE	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-062	NE	NE	NE	ng/kg	0.742 U	1.84 U	1.95 U	1.47 U	0.949 U	0.436 U	0.604 U	0.437 U	0.395 U	0.511 U	0.584 U	0.517 U	–	0.401 U	0.529 U	–
PCB-063	NE	NE	NE	ng/kg	**13.8**	**9.31**	**9.41**	**4.69**	0.855 U	**2.51 J**	0.544 U	0.394 U	0.355 U	0.460 U	**6.14**	0.439 U	–	0.340 U	0.450 U	–
PCB-064	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-065	NE	NE	NE	ng/kg	0.651 U	1.79 U	1.89 U	1.43 U	1.00 U	0.461 U	0.638 U	0.462 U	0.417 U	0.540 U	0.617 U	0.469 U	–	0.363 U	0.480 U	–
PCB-066	NE	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140.0**	0.431 U	–	0.334 U	**6.16**	–
PCB-067	NE	NE	NE	ng/kg	**9.97**	**7.14**	**6.44**	**3.85 J**	0.862 U	**1.51 J**	0.548 U	0.397 U	0.358 U	0.464 U	**4.20**	0.453 U	–	0.351 U	0.463 U	–
PCB-068	NE	NE	NE	ng/kg	0.600 U	1.58 U	1.67 U	1.26 U	0.843 U	0.387 U	0.536 U	0.388 U	0.350 U	0.453 U	0.518 U	0.435 U	–	0.337 U	0.445 U	–
PCB-069	NE	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-070	NE	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-071	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-072	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-073	NE	NE	NE	ng/kg	0.662 U	1.79 U	1.90 U	1.43 U	0.886 U	0.407 U	0.563 U	0.407 U	0.368 U	0.476 U	0.545 U	0.502 U	–	0.389 U	0.650 U	–
PCB-074	NE	NE	NE	ng/kg	**179**	**125**	**89.6**	**64.5**	0.818 U	**32.9**	0.520 U	**3.17 J**	0.340 U	0.440 U	**78.7**	0.436 U	–	0.338 U	**4.41**	–
PCB-075	NE	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-076	NE	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140.0**	0.431 U	–	0.334 U	**6.16**	–
PCB-077	NE	NE	NE	ng/kg	**22.9**	**18.2**	**18.4**	**9.78**	1.33 U	**3.66 J**	0.523 U	0.522 U	0.464 U	0.561 U	**9.47**	0.727 U	–	0.662 U	**1.18 J**	–
PCB-078	NE	NE	NE	ng/kg	1.28 U	2.35 U	1.91 U	1.97 U	1.31 U	0.651 U	0.514 U	0.521 U	0.458 U	0.550 U	0.926 U	0.688 U	–	0.607 U	0.632 U	–
PCB-079	NE	NE	NE	ng/kg	**7.14**	**8.56**	**7.22**	**4.95**	1.26 U	**1.62 J**	0.494 U	0.501 U	0.439 U	0.529 U	**4.16**	0.652 U	–	0.575 U	0.599 U	–
PCB-080	NE	NE	NE	ng/kg	0.535 U	1.44 U	1.52 U	1.15 U	0.767 U	0.353 U	0.488 U	0.353 U	0.319 U	0.413 U	0.472 U	0.384 U	–	0.298 U	0.393 U	–
PCB-081	NE	NE	NE	ng/kg	**10.8**	**13.8**	**11.4**	**8.83**	1.21 U	**3.62 J**	0.469 U	0.483 U	0.418 U	0.500 U	**8.53**	0.604 U	–	0.515 U	0.580 U	–
PCB-082	NE	NE	NE	ng/kg	**100.0**	**100.0**	**47.4**	**57.9**	1.29 U	**24.1**	1.02 U	1.05 U	0.779 U	1.14 U	**51.1**	0.555 U	–	0.996 U	**1.43 J**	–
PCB-083	NE	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-084	NE	NE	NE	ng/kg	**328**	**290.0**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-085	NE	NE	NE	ng/kg	**129**	**134**	**59.0**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-086	NE	NE	NE	ng/kg	0.667 U	1.55 U	1.66 U	1.50 U	1.02 U	0.432 U	0.805 U	0.829 U	0.616 U	0.905 U	1.81 U	0.395 U	–	0.711 U	0.523 U	–
PCB-087	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-088	NE	NE	NE	ng/kg	**120.0**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71.0**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-089	NE	NE	NE	ng/kg	**9.27**	**9.67**	**6.42**	**5.15**	1.20 U	**2.14 J**	0.953 U	0.982 U	0.730 U	1.07 U	**3.87 J**	0.475 U	–	0.854 U	0.628 U	–
PCB-090	NE	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-091	NE	NE	NE	ng/kg	**120.0**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71.0**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-092	NE	NE	NE	ng/kg	**328**	**290.0**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-093	NE	NE	NE	ng/kg	0.607 U	**99.2**	**136**	**23.6**	0.605 U	1.75 U	0.618 U	0.387 U	0.584 U	0.907 U	1.03 U	0.386 U	–	0.601 U	0.879 U	–
PCB-094	NE	NE	NE	ng/kg	**4.63**	2.71 U	1.75 U	1.64 U	0.613 U	1.77 U	0.625 U	0.392 U	0.591 U	0.918 U	1.05 U	0.429 U	–	0.667 U	0.977 U	–
PCB-095	NE	NE	NE	ng/kg	**718**	**473**	**232**	**76.8**	**2.52 J**	**183**	0.521 U	**6.65**	0.493 U	0.765 U	**114**	**1.08 J**	–	0.560 U	**7.06**	–
PCB-096	NE	NE	NE	ng/kg	**5.17**	**4.58**	**4.25**	**3.29 J**	0.419 U	1.21 U	0.427 U	0.268 U	0.404 U	0.628 U	**2.25 J**	0.286 U	–	0.445 U	0.651 U	–
PCB-097	NE	NE	NE	ng/kg	**221**	**222**	**104**	**123**	1.03 U	**58.9**	0.817 U	**2.95 J**	0.626 U	0.918 U	**121**	0.412 U	–	0.740 U	**2.48 J**	–
PCB-098	NE	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-099	NE	NE	NE	ng/kg	**319**	**327**	**156**	**173**	0.991 U	**84.4**	0.786 U	**4.25**	0.602 U	0.884 U	**167**	0.406 U	–	0.730 U	**4.16**	–
PCB-100	NE	NE	NE	ng/kg	**2.55 J**	2.21 U	1.43 U	1.34 U	0.519 U	1.50 U	0.530 U	0.332 U	0.501 U	0.778 U	0.887 U	0.359 U	–	0.558 U	0.817 U	–
PCB-101	NE	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-102	NE	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-103	NE	NE	NE	ng/kg	**5.40**	2.12 U	**4.27**	1.28 U	0.496 U	1.43 U	0.506 U	0.317 U	0.478 U	0.743 U	**2.71 J**	0.341 U	–	0.531 U	0.777 U	–
PCB-104	NE	NE	NE	ng/kg	0.410 U	1.72 U	1.11 U	1.04 U	0.394 U	1.14 U	0.402 U	0.252 U	0.381 U	0.591 U	0.673 U	0.273 U	–	0.424 U	0.621 U	–
PCB-105	NE	NE	NE	ng/kg	**301**	**285**	**125**	**146**	1.40 U	**72.2**	0.795 U	**3.45 J**	0.516 U	0.648 U	**161**	0.772 U	–	0.672 U	**3.45 J**	–
PCB-106	NE	NE	NE	ng/kg	**765**	**676**	**310.0**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.60**	–
PCB-107	NE	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-108	NE	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-109	NE	NE	NE	ng/kg	0.522 U	1.27 U	1.37 U	1.24 U	0.867 U	0.369 U	0.688 U	0.708 U	0.527 U	0.773 U	1.54 U	0.354 U	–	0.635 U	0.468 U	–
PCB-110	NE	NE	NE	ng/kg	**754**	**759**	**381**	**426**	**3.07 J**	**187**	0.586 U	**8.21**	0.449 U	0.659 U	**430.0**	**1.41 J**	–	0.572 U	**7.60**	–
PCB-111	NE	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10.0**	0.305 U	–	0.549 U	0.404 U	–
PCB-112	NE	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-113	NE	NE	NE	ng/kg	0.527 U	**18.3**	1.41 U	**4.04**	0.837 U	0.356 U	0.663 U	0.683 U	0.508 U	0.746 U	1.49 U	0.346 U	–	0.622 U	0.458 U	–
PCB-114	NE	NE	NE	ng/kg	**20.2**	**18.2**	**12.0**	**10.7**	1.34 U	**5.49**	0.831 U	0.568 U	0.585 U	0.708 U	**11.6**	0.838 U	–	0.644 U	0.647 U	–
PCB-115	NE	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10.0**	0.305 U	–	0.549 U	0.404 U	–
PCB-116	NE	NE	NE	ng/kg	**129**	**134**	**59.0**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-117	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-118	NE	NE	NE	ng/kg	**765**	**676**	**310.0**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.60**	–
PCB-119	NE	NE	NE	ng/kg	**11.0**	**11.7**	**8.31**	**5.39**	0.767 U	**2.66 J**	0.608 U	0.627 U	0.466 U	0.684 U	**5.52**	0.313 U	–	0.563 U	0.415 U	–
PCB-120	NE	NE	NE	ng/kg	0.462 U	**2.29 J**	1.20 U	**2.27 J**	0.719 U	0.306 U	0.570 U	0.587 U	0.437 U	0.641 U	1.28 U	0.300 U	–	0.540 U	0.397 U	–
PCB-121	NE	NE	NE	ng/kg	0.455 U	1.97 U	1.27 U	1.20 U	0.434 U	1.25 U	0.443 U	0.278 U	0.419 U	0.651 U	0.741 U	0.306 U	–	0.475 U	0.696 U	–
PCB-122	NE	NE	NE	ng/kg	**9.52**	**10.8**	**6.81**	**5.60**	1.31 U	**2.32 J**	0.803 U	0.563 U	0.511 U	0.669 U	**5.13**	0.774 U	–	0.643 U	0.661 U	–
PCB-123	NE	NE	NE	ng/kg	**12.0**	**13.1**	**4.87**	**7.36**	1.15 U	**3.21 J**	0.769 U	0.605 U	0.522 U	0.700 U	**6.26**	0.710 U	–	0.544 U	0.604 U	–
PCB-124	NE	NE	NE	ng/kg	**29.5**	**25.6**	**14.1**	**13.4**	1.50 U	**8.69**	0.923 U	0.647 U	0.587 U	0.769 U	**20.3**	0.806 U	–	0.669 U	0.688 U	–
PCB-125	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-126	NE	NE	NE	ng/kg	**4.61**	**3.78 J**	**8.85**	1.59 U	1.60 U	0.541 U	1.10 U	0.646 U	0.577 U	0.878 U	**2.79 J**	0.987 U	–	1.05 U	0.765 U	–
PCB-127	NE	NE	NE	ng/kg	0.944 U	1.92 U	2.09 U	1.52 U	1.34 U	0.518 U	0.826 U	0.579 U	0.525 U	0.688 U	0.804 U	0.845 U	–	0.702 U	0.722 U	–
PCB-128	NE	NE	NE	ng/kg	**162**	**140.0**	**85.1**	**84.0**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-129	NE	NE	NE	ng/kg	**50.2**	**41.0**	**27.3**	**27.0**	1.36 U	**14.1**	0.750 U	1.57 U	0.698 U	1.37 U	**35.7**	0.859 U	–	0.811 U	0.872 U	–
PCB-130	NE	NE	NE	ng/kg	**61.8**	**44.6**	**34.3**	**29.0**	1.18 U	**15.6**	0.651 U	1.36 U	0.606 U	1.19 U	**46.4**	0.812 U	–	0.766 U	0.824 U	–
PCB-131	NE	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-132	NE	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-133	NE	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-134	NE	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-135	NE	NE	NE	ng/kg	**144**	**87.2**	**97.3**	**57.5**	1.35 U	**42.6**	0.743 U	1.56 U	0.691 U	1.36 U	**122**	0.711 U	–	0.670 U	0.721 U	–
PCB-136	NE	NE	NE	ng/kg	**146**	**131**	**138**	**117**	0.405 U	**50.3**	0.398 U	0.971 U	0.363 U	0.479 U	**180.0**	0.387 U	–	0.334 U	0.669 U	–
PCB-137	NE	NE	NE	ng/kg	**52.9**	**46.5**	**20.9**	**27.4**	1.24 U	**15.9**	0.682 U	1.43 U	0.635 U	1.24 U	**31.4**	0.756 U	–	0.713 U	0.767 U	–
PCB-138	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-139	NE	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270.0**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-140	NE	NE	NE	ng/kg	**5.03**	**4.71**	**3.28 J**	2.17 U	1.15 U	0.880 U	0.635 U	1.33 U	0.591 U	1.16 U	**3.10 J**	0.677 U	–	0.639 U	0.687 U	–
PCB-141	NE	NE	NE	ng/kg	**225**	**166**	**176**	**120.0**	1.14 U	**73.7**	0.628 U	**2.11 J**	0.584 U	1.15 U	**204**	0.704 U	–	0.665 U	**1.81 J**	–
PCB-142	NE	NE	NE	ng/kg	0.680 U	2.00 U	1.42 U	2.58 U	1.32 U	1.01 U	0.729 U	1.53 U	0.678 U	1.33 U	0.639 U	0.808 U	–	0.763 U	0.821 U	–
PCB-143	NE	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-144	NE	NE	NE	ng/kg	**57.2**	**37.8**	**43.9**	**29.5**	1.18 U	**19.0**	0.651 U	1.36 U	0.606 U	1.19 U	**51.5**	0.687 U	–	0.648 U	0.697 U	–
PCB-145	NE	NE	NE	ng/kg	0.859 U	0.930 U	1.62 U	1.95 U	0.414 U	0.356 U	0.407 U	0.994 U	0.372 U	0.491 U	0.751 U	0.397 U	–	0.343 U	0.686 U	–
PCB-146	NE	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-147	NE	NE	NE	ng/kg	**16.0**	**12.5**	**6.26**	**8.24**	1.15 U	**5.29**	0.632 U	1.32 U	0.588 U	1.15 U	**10.1**	0.663 U	–	0.625 U	0.673 U	–
PCB-148	NE	NE	NE	ng/kg	1.14 U	1.20 U	2.09 U	2.52 U	0.468 U	0.402 U	0.460 U	1.12 U	0.420 U	0.555 U	0.849 U	0.494 U	–	0.426 U	0.853 U	–
PCB-149	NE	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270.0**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-150	NE	NE	NE	ng/kg	0.840 U	0.886 U	1.54 U	1.86 U	0.400 U	0.344 U	0.394 U	0.960 U	0.359 U	0.474 U	0.726 U	0.392 U	–	0.338 U	0.677 U	–
PCB-151	NE	NE	NE	ng/kg	**125**	**85.3**	**162**	**69.2**	1.19 U	**70.4**	0.658 U	**2.32 J**	0.613 U	1.20 U	**156**	0.709 U	–	0.669 U	**1.79 J**	–
PCB-152	NE	NE	NE	ng/kg	0.817 U	0.887 U	1.54 U	1.86 U	0.399 U	0.342 U	0.392 U	0.956 U	0.357 U	0.472 U	0.723 U	0.380 U	–	0.328 U	0.656 U	–
PCB-153	NE	NE	NE	ng/kg	**962**	**707**	**712**	**509**	**1.89 J**	**313**	0.492 U	**8.18**	0.458 U	0.898 U	**770.0**	**1.32 J**	–	0.564 U	**6.70**	–
PCB-154	NE	NE	NE	ng/kg	**6.71**	**7.47**	**5.92**	2.01 U	0.426 U	**2.06 J**	0.418 U	1.02 U	0.382 U	0.504 U	**5.51**	0.439 U	–	0.379 U	0.758 U	–
PCB-155	NE	NE	NE	ng/kg	0.759 U	0.792 U	1.38 U	1.66 U	0.364 U	0.313 U	0.358 U	0.873 U	0.326 U	0.431 U	0.660 U	0.349 U	–	0.302 U	0.604 U	–
PCB-156	NE	NE	NE	ng/kg	**99.3**	**84.8**	**57.3**	**49.9**	0.837 U	**30.5**	0.447 U	0.972 U	0.415 U	0.833 U	**79.7**	0.524 U	–	0.488 U	0.554 U	–
PCB-157	NE	NE	NE	ng/kg	**20.8**	**19.5**	**11.9**	**10.6**	0.819 U	**5.54**	0.462 U	0.983 U	0.474 U	0.850 U	**13.5**	0.638 U	–	0.571 U	0.594 U	–
PCB-158	NE	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-159	NE	NE	NE	ng/kg	**11.1**	**7.81**	**11.9**	**7.33**	0.800 U	**4.51**	0.441 U	0.924 U	0.410 U	0.805 U	**8.98**	0.507 U	–	0.478 U	0.514 U	–
PCB-160	NE	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-161	NE	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-162	NE	NE	NE	ng/kg	**162**	**140.0**	**85.1**	**84.0**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-163	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-164	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-165	NE	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-166	NE	NE	NE	ng/kg	**3.70 J**	1.33 U	**2.86 J**	1.72 U	0.893 U	0.682 U	0.492 U	1.03 U	0.458 U	0.898 U	**2.30 J**	0.569 U	–	0.537 U	0.578 U	–
PCB-167	NE	NE	NE	ng/kg	**38.1**	**30.3**	**22.0**	**18.1**	0.826 U	**12.0**	0.453 U	0.915 U	0.426 U	0.825 U	**32.3**	0.584 U	–	0.503 U	0.547 U	–
PCB-168	NE	NE	NE	ng/kg	0.464 U	1.38 U	**3.38 J**	1.78 U	0.884 U	0.675 U	0.487 U	1.02 U	0.453 U	0.889 U	0.427 U	0.568 U	–	0.535 U	0.576 U	–
PCB-169	NE	NE	NE	ng/kg	0.458 U	1.30 U	**10.0**	1.67 U	0.863 U	0.646 U	0.483 U	0.991 U	0.400 U	0.857 U	0.384 U	0.523 U	–	0.586 U	0.613 U	–
PCB-170	NE	NE	NE	ng/kg	**282**	**186**	**274**	**164**	1.36 U	**142**	0.987 U	**2.42 J**	1.01 U	1.02 U	**337**	0.750 U	–	0.556 U	**2.36 J**	–
PCB-171	NE	NE	NE	ng/kg	**90.9**	**64.3**	**87.2**	**53.4**	1.24 U	**42.7**	0.900 U	0.879 U	0.925 U	0.928 U	**95.6**	0.683 U	–	0.506 U	0.552 U	–
PCB-172	NE	NE	NE	ng/kg	**50.1**	**34.9**	**50.2**	**27.7**	1.30 U	**25.1**	0.943 U	0.921 U	0.969 U	0.973 U	**60.0**	0.704 U	–	0.522 U	0.569 U	–
PCB-173	NE	NE	NE	ng/kg	**7.80**	**6.25**	**8.90**	**5.35**	1.44 U	**3.92 J**	1.05 U	1.02 U	1.08 U	1.08 U	**8.24**	0.770 U	–	0.571 U	0.622 U	–
PCB-174	NE	NE	NE	ng/kg	**305**	**214**	**290.0**	**181**	1.22 U	**137**	0.888 U	**2.66 J**	0.913 U	0.916 U	**297**	0.622 U	–	0.461 U	**2.32 J**	–
PCB-175	NE	NE	NE	ng/kg	**13.8**	**9.95**	**15.1**	**9.06**	1.24 U	**5.95**	0.901 U	0.880 U	0.926 U	0.930 U	**16.3**	0.652 U	–	0.483 U	0.526 U	–
PCB-176	NE	NE	NE	ng/kg	**45.3**	**34.0**	**47.9**	**27.0**	0.934 U	**21.1**	0.679 U	0.663 U	0.697 U	0.700 U	**45.9**	0.480 U	–	0.356 U	0.388 U	–
PCB-177	NE	NE	NE	ng/kg	**182**	**128**	**180.0**	**106**	1.34 U	**84.8**	0.972 U	0.949 U	0.999 U	1.00 U	**177**	0.708 U	–	0.525 U	0.572 U	–
PCB-178	NE	NE	NE	ng/kg	**60.0**	**41.7**	**60.6**	**36.4**	1.28 U	**27.5**	0.928 U	0.907 U	0.954 U	0.958 U	**60.8**	0.699 U	–	0.518 U	0.565 U	–
PCB-179	NE	NE	NE	ng/kg	**126**	**97.9**	**128**	**80.8**	0.892 U	**55.4**	0.648 U	0.633 U	0.666 U	0.669 U	**115**	0.474 U	–	0.352 U	**1.32 J**	–
PCB-180	NE	NE	NE	ng/kg	**630.0**	**416**	**566**	**352**	1.05 U	**315**	0.765 U	**5.10**	0.787 U	0.790 U	**694**	0.589 U	–	0.437 U	**4.59**	–
PCB-181	NE	NE	NE	ng/kg	0.793 U	1.41 U	1.61 U	1.73 U	1.27 U	0.543 U	0.920 U	0.898 U	0.945 U	0.949 U	0.656 U	0.734 U	–	0.544 U	0.593 U	–
PCB-182	NE	NE	NE	ng/kg	**361**	**275**	**350.0**	**220.0**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-183	NE	NE	NE	ng/kg	**192**	**142**	**192**	**122**	1.11 U	**95.0**	0.807 U	**2.61 J**	0.830 U	0.833 U	**204**	**1.46 J**	–	**1.20 J**	**3.21 J**	–
PCB-184	NE	NE	NE	ng/kg	0.545 U	0.990 U	1.13 U	1.21 U	0.889 U	0.381 U	0.646 U	0.631 U	0.664 U	0.666 U	0.461 U	0.466 U	–	0.346 U	0.377 U	–
PCB-185	NE	NE	NE	ng/kg	**38.3**	**30.8**	**41.7**	**24.5**	1.27 U	**18.8**	0.926 U	0.904 U	0.952 U	0.955 U	**39.8**	0.691 U	–	0.512 U	0.558 U	–
PCB-186	NE	NE	NE	ng/kg	0.600 U	1.06 U	1.20 U	1.30 U	0.960 U	0.412 U	0.698 U	0.681 U	0.717 U	0.720 U	0.498 U	0.494 U	–	0.366 U	0.399 U	–
PCB-187	NE	NE	NE	ng/kg	**361**	**275**	**350.0**	**220.0**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-188	NE	NE	NE	ng/kg	0.611 U	1.16 U	1.24 U	1.36 U	0.963 U	0.384 U	0.652 U	0.667 U	0.774 U	0.690 U	0.476 U	0.506 U	–	0.371 U	0.439 U	–
PCB-189	NE	NE	NE	ng/kg	**10.8**	**9.23**	**14.0**	**6.49**	0.879 U	**5.72**	0.688 U	0.639 U	0.595 U	0.689 U	**17.5**	0.506 U	–	0.379 U	0.374 U	–
PCB-190	NE	NE	NE	ng/kg	**56.1**	**41.1**	**61.6**	**35.7**	1.01 U	**32.4**	0.732 U	0.715 U	0.752 U	0.755 U	**74.4**	0.536 U	–	0.398 U	0.433 U	–
PCB-191	NE	NE	NE	ng/kg	**13.9**	**9.72**	**14.1**	**7.74**	0.921 U	**6.19**	0.669 U	0.654 U	0.688 U	0.691 U	**16.3**	0.508 U	–	0.377 U	0.411 U	–
PCB-192	NE	NE	NE	ng/kg	0.644 U	1.10 U	1.26 U	1.35 U	1.05 U	0.452 U	0.765 U	0.747 U	0.787 U	0.790 U	0.546 U	0.566 U	–	0.420 U	0.458 U	–
PCB-193	NE	NE	NE	ng/kg	**34.8**	**24.1**	**34.8**	**19.5**	0.944 U	**17.7**	0.686 U	0.670 U	0.705 U	0.708 U	**39.7**	0.510 U	–	0.378 U	0.412 U	–
PCB-194	NE	NE	NE	ng/kg	**157**	**101**	**158**	**96.8**	0.501 U	**79.8**	0.430 U	1.27 U	0.347 U	0.477 U	**291**	0.420 U	–	0.502 U	**2.15 J**	–
PCB-195	NE	NE	NE	ng/kg	**62.9**	**39.3**	**69.5**	**38.3**	0.566 U	**36.4**	0.486 U	1.43 U	0.392 U	0.540 U	**121**	0.465 U	–	0.555 U	0.548 U	–
PCB-196	NE	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-197	NE	NE	NE	ng/kg	**7.94**	**5.52**	**10.9**	**6.30**	0.627 U	**4.70**	0.461 U	1.15 U	0.328 U	0.537 U	**13.7**	0.446 U	–	0.445 U	0.518 U	–
PCB-198	NE	NE	NE	ng/kg	**9.16**	**7.36**	**12.5**	**6.34**	0.866 U	**5.52**	0.636 U	1.58 U	0.452 U	0.741 U	**16.7**	0.677 U	–	0.674 U	0.785 U	–
PCB-199	NE	NE	NE	ng/kg	**165**	**115**	**159**	**110.0**	0.912 U	**92.7**	0.670 U	1.67 U	0.476 U	0.781 U	**250.0**	0.645 U	–	0.643 U	**4.79**	–
PCB-200	NE	NE	NE	ng/kg	**19.4**	**13.7**	**20.7**	**13.9**	0.607 U	**11.4**	0.446 U	1.11 U	0.317 U	0.520 U	**30.3**	0.452 U	–	0.450 U	0.524 U	–
PCB-201	NE	NE	NE	ng/kg	**24.2**	**20.2**	**27.4**	**17.5**	0.623 U	**13.7**	0.458 U	1.14 U	0.325 U	0.533 U	**35.1**	0.451 U	–	0.449 U	0.523 U	–
PCB-202	NE	NE	NE	ng/kg	**32.8**	**28.2**	**31.1**	**24.6**	0.613 U	**17.2**	0.451 U	1.12 U	0.320 U	0.525 U	**41.7**	0.463 U	–	0.461 U	**1.57 J**	–
PCB-203	NE	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-204	NE	NE	NE	ng/kg	0.335 U	1.70 U	0.803 U	1.41 U	0.619 U	0.416 U	0.455 U	1.13 U	0.323 U	0.530 U	0.399 U	0.449 U	–	0.447 U	0.521 U	–
PCB-205	NE	NE	NE	ng/kg	**7.98**	**5.30**	**13.4**	**4.71**	0.402 U	**4.36**	0.345 U	1.02 U	0.278 U	0.383 U	**16.6**	0.326 U	–	0.389 U	0.384 U	–
PCB-206	NE	NE	NE	ng/kg	**68.5**	**68.0**	**81.0**	**61.1**	0.974 U	**38.7**	0.351 U	0.632 U	0.318 U	0.336 U	**106**	0.412 U	–	0.506 U	**12.4**	–
PCB-207	NE	NE	NE	ng/kg	**9.69**	**10.5**	**14.1**	**7.46**	0.754 U	**5.69**	0.259 U	0.478 U	0.239 U	0.251 U	**16.2**	0.296 U	–	0.376 U	**1.25 J**	–
PCB-208	NE	NE	NE	ng/kg	**18.7**	**21.6**	**25.3**	**16.4**	0.725 U	**10.8**	0.238 U	0.450 U	0.224 U	0.233 U	**21.8**	0.278 U	–	0.364 U	**4.57**	–
PCB-209	NE	NE	NE	ng/kg	**42.4**	**164**	**121**	**120.0**	1.04 U	**27.3**	0.213 U	0.546 U	0.271 U	0.247 U	**30.3**	0.308 U	–	0.272 U	**14.9**	–
Total PCBs	130,000	NE	3,100,000	ng/kg	**27,102 T**	**22,080 T**	**17,935 T**	**13,887 T**	**65.1 T**	**7,913 T**	1.7 UT	**270 T**	1.4 UT	1.5 UT	**19,387 T**	**50.2 T**	–	**4.1 T**	**355 T**	–
Total PCBs	NE	38	NE	mg/kg OC	**0.2**	**0.2**	**0.3**	**0.1**	**0.0**	**0.1**	0.001 U	**0.2**	0.001 U	0.001 U	**0.7**	**0.002**	–	**0.002**	**0.005**	–
Organometallic Compounds																				
Tributyltin Ion	NE	73	NE	µg/kg	**3.7**	**1.8 J**	3.6 U	3.6 U	3.5 U	**2.2 J**	3.5 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	–	3.4 U	3.7 U	–
Dioxins/Furans																				
Total Dioxin/Furan TEQ (ND=0.5EDL)	4-10	10	NE	ng/kg	**32.3 JT**	**25.1 JT**	**8.1 JT**	**26.1 JT**	**0.2 T**	**10.2 JT**	**0.2 T**	**0.4 JT**	**0.1 JT**	**0.1 JT**	**14.8 JT**	**0.6 JT**		**0.1 T**	**7.1 JT**	

	DMMP Guideline Chemistry Values			Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
				Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
				Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
Analyte	SL	BT	ML	Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
Conventionals																				
Total Organic Carbon	NE	NE	NE	%	0.214	0.092	--	0.237	0.193	--	--	--	--	--	0.109	--	--	--	--	0.114
Total Solids	NE	NE	NE	%	82.12	83.46	--	75.67	79.92	--	--	--	--	--	82.58	--	--	--	--	82.67
Total Volatile Solids	NE	NE	NE	%	0.88	0.73	--	1.24	1.08	--	--	--	--	--	0.99	--	--	--	--	1.07
Organic Matter	25	NE	NE	%	0.29	0.37	--	0.61	0.68	--	--	--	--	--	0.34	--	--	--	--	0.38
Preserved Total Solids	NE	NE	NE	%	--	--	47.18	--	--	33.86	42.38	78.28	77.56	78.43	--	46.23	77.15	77.77	81.04	--
Sulfide	NE	NE	NE	mg/kg	4.05	2.25	392 J	5.47	1.74	1190 J	327 J	7.40 J	1.20 UJ	1.20 UJ	4.15	383	28.9	1.94	6.61	1.71
Ammonia	NE	NE	NE	mg/kg	1.93	0.65	--	2.46	11.6	--	--	--	--	--	6.99	--	--	--	--	0.63
Grain Size																				
Gravel (≤ -1)	NE	NE	NE	%	0.1 U	0.2	--	0.1 U	0.2	--	--	--	--	--	0.2	--	--	--	--	0.1
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	0.1	0.2	--	0.3	0.7	--	--	--	--	--	0.1	--	--	--	--	0.1
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	0.6	0.9	--	3.7	5.5	--	--	--	--	--	0.3	--	--	--	--	0.5
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	19.9	29.8	--	10.3	16.3	--	--	--	--	--	23.5	--	--	--	--	34.5
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	55.1	51.3	--	59.9	41.3	--	--	--	--	--	51	--	--	--	--	43.4
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	13	10.8	--	15.6	27.2	--	--	--	--	--	16	--	--	--	--	15.1
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	3.7	3.7	--	2.4	3.6	--	--	--	--	--	2.9	--	--	--	--	1.7
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	2	0.7	--	1.7	1.2	--	--	--	--	--	1.4	--	--	--	--	0.9
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	1.6	0.6	--	1.3	0.9	--	--	--	--	--	1.1	--	--	--	--	0.7
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	1.2	0.4	--	0.9	0.7	--	--	--	--	--	0.9	--	--	--	--	0.7
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	0.8	0.3	--	0.9	0.6	--	--	--	--	--	0.7	--	--	--	--	0.5
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	0.8	0.3	--	0.8	0.6	--	--	--	--	--	0.7	--	--	--	--	0.5
Particle/Grain Size, Phi >10	NE	NE	NE	%	1.2	0.9	--	2.1	1.3	--	--	--	--	--	1.3	--	--	--	--	1.3
Total Fines	NE	NE	NE	%	11.3	6.9	--	10.2	8.8	--	--	--	--	--	8.9	--	--	--	--	6.3
Grain Size (Ash Wt.)																				
Gravel (≤ -1)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Particle/Grain Size, Phi >10	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Fines	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																				
Antimony	150	NE	200	mg/kg	0.59 J	0.65 J	--	0.76 J	0.60 J	--	--	--	--	--	0.84 J	--	--	--	--	0.77 J
Arsenic	57	507	700	mg/kg	7	3.95 J	--	4.39 J	4.64 J	--	--	--	--	--	5.16 J	--	--	--	--	6
Cadmium	5.1	11.3	14	mg/kg	0.2	0.165 J	--	0.3	0.3	--	--	--	--	--	0.3	--	--	--	--	0.220 J
Chromium	260	260	NE	mg/kg	22.2	18.2	--	26.3	23.5	--	--	--	--	--	30.1	--	--	--	--	29
Copper	390	1,027	1,300	mg/kg	6.6	5.9	--	8.7	7.9	--	--	--	--	--	10.5	--	--	--	--	10.2
Lead	450	975	1,200	mg/kg	1.25 J	1.12 J	--	2.15 J	1.55 J	--	--	--	--	--	2.20 J	--	--	--	--	2.04 J
Mercury	0.41	1.5	2.3	mg/kg	0.0072 J	0.0104 J	--	0.0116 J	0.0107 J	--	--	--	--	--	0.0101 J	--	--	--	--	0.0079 J
Selenium	NE	3	NE	mg/kg	0.124 J	0.6 U	--	0.131 J	0.133 J	--	--	--	--	--	0.5 U	--	--	--	--	0.118 J
Silver	6.1	6.1	8.4	mg/kg	0.3 U	0.131 J	--	0.4 U	0.3 U	--	--	--	--	--	0.3 U	--	--	--	--	0.3 U
Zinc	410	2,783	3,800	mg/kg	25	22	--	30	27	--	--	--	--	--	32	--	--	--	--	31
LPAHs																				
2-Methylnaphthalene	670	NE	1,900	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Acenaphthene	500	NE	2,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Acenaphthylene	560	NE	1,300	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Anthracene	960	NE	13,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Fluorene	540	NE	3,600	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Naphthalene	2,100	NE	2,400	µg/kg	5	2.5 J	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Phenanthrene	1,500	NE	21,000	µg/kg	4.9 U	5.0 U	--	2.4 J	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Total LPAHs	5,200	NE	29,000	µg/kg	5 T	2.5 T	--	2.4 T	4.9 UT	--	--	--	--	--	4.7 UT	--	--	--	--	4.7 UT

	DMMP Guideline Chemistry Values			Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
				Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
				Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
Analyte	SL	BT	ML	Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
HPAHs																				
Benzo(a)anthracene	1,300	NE	5,100	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Benzo(a)pyrene	1,600	NE	3,600	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Benzo(ghi)perylene	670	NE	3,200	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Benzofluoranthenes (Sum)	3,200	NE	9,900	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Chrysene	1,400	NE	21,000	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Dibenzo(a,h)anthracene	230	NE	1,900	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Fluoranthene	1,700	4,600	30,000	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Indeno(1,2,3-cd)pyrene	600	NE	4,400	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Pyrene	2,600	11,980	16,000	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Total HPAHs	12,000	NE	69,000	µg/kg	4.9 UT	5 UT	–	4.8 UT	4.9 UT	–	–	–	–	–	4.7 UT	–	–	–	–	4.7 UT
cPAHs																				
Total cPAH TEQ (ND=0.5DL)	NE	NE	NE	µg/kg	3.5 UT	3.5 UT	–	3.4 UT	3.5 UT	–	–	–	–	–	3.3 UT	–	–	–	–	3.3 UT
Chlorinated Hydrocarbons																				
Hexachlorobenzene	22	168	230	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
1,2,4-Trichlorobenzene	31	NE	64	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	NE	110	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	NE	120	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Phthalates																				
Bis(2-Ethylhexyl) Phthalate	1,300	NE	8,300	µg/kg	49 U	50 U	–	48 U	49 U	–	–	–	–	–	47 U	–	–	–	–	47 U
Di-N-Octyl Phthalate	6,200	NE	6,200	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Dibutyl Phthalate	1,400	NE	5,100	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Diethyl Phthalate	200	NE	1,200	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Dimethyl Phthalate	71	NE	1,400	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Butyl benzyl Phthalate	63	NE	970	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Phenols																				
o-Cresol (2-methylphenol)	63	NE	77	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
p-Cresol (4-methylphenol)	670	NE	3,600	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Pentachlorophenol	400	504	690	µg/kg	99 U	99 U	–	96 U	98 U	–	–	–	–	–	94 U	–	–	–	–	95 U
Phenol	420	NE	1,200	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
2,4-Dimethylphenol	29	NE	210	µg/kg	25 U	25 U	–	24 U	24 U	–	–	–	–	–	24 U	–	–	–	–	24 U
Miscellaneous Extractables																				
Benzoic Acid	650	NE	760	µg/kg	200 U	200 U	–	190 U	200 U	–	–	–	–	–	190 U	–	–	–	–	190 U
Benzyl Alcohol	57	NE	870	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Dibenzofuran	540	NE	1,700	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Hexachlorobutadiene	11	NE	270	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
N-Nitrosodiphenylamine (as diphenylamine)	28	NE	130	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Pesticides																				
4,4'-DDD	16	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
4,4'-DDE	9	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
4,4'-DDT	12	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Total DDT (4,4 isomers)	NE	50	69	µg/kg	0.98 UT	1 UT	–	0.98 UT	0.99 UT	–	–	–	–	–	0.95 UT	–	–	–	–	0.96 UT
Aldrin	9.5	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
alpha-Chlordane (cis)	NE	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
beta or gamma-Chlordane (trans)	NE	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
Chlordane (Total)	2.8	37	NE	µg/kg	0.98 UT	1.0 UT	–	0.98 UT	0.99 UT	–	–	–	–	–	0.95 UT	–	–	–	–	0.96 UT
cis-Nonachlor	NE	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Dieldrin	1.9	NE	1700	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Heptachlor	1.5	NE	270	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
Oxychlordane	NE	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
trans-Nonachlor	NE	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Polychlorinated Biphenyls (PCBs)																				
PCB-001	NE	NE	NE	ng/kg	0.254 U	0.308 U	–	0.431 U	0.240 U	–	–	–	–	–	0.484 U	–	–	–	–	0.323 U
PCB-002	NE	NE	NE	ng/kg	0.296 U	0.396 U	–	0.563 U	0.295 U	–	–	–	–	–	0.591 U	–	–	–	–	0.432 U
PCB-003	NE	NE	NE	ng/kg	0.287 U	0.418 U	–	0.603 U	0.300 U	–	–	–	–	–	0.596 U	–	–	–	–	0.471 U
PCB-004	NE	NE	NE	ng/kg	0.817 U	0.850 U	–	0.860 U	0.666 U	–	–	–	–	–	0.865 U	–	–	–	–	0.977 U
PCB-005	NE	NE	NE	ng/kg	0.650 U	0.790 U	–	0.815 U	0.664 U	–	–	–	–	–	0.753 U	–	–	–	–	0.903 U
PCB-006	NE	NE	NE	ng/kg	0.620 U	0.754 U	–	0.778 U	0.633 U	–	–	–	–	–	**1.32 J**	–	–	–	–	0.862 U
PCB-007	NE	NE	NE	ng/kg	0.633 U	0.770 U	–	0.794 U	0.647 U	–	–	–	–	–	0.734 U	–	–	–	–	0.880 U
PCB-008	NE	NE	NE	ng/kg	0.647 U	0.786 U	–	0.811 U	0.661 U	–	–	–	–	–	0.750 U	–	–	–	–	0.899 U
PCB-009	NE	NE	NE	ng/kg	0.660 U	0.802 U	–	0.828 U	0.674 U	–	–	–	–	–	0.765 U	–	–	–	–	0.917 U
PCB-010	NE	NE	NE	ng/kg	0.677 U	0.823 U	–	0.849 U	0.692 U	–	–	–	–	–	0.785 U	–	–	–	–	0.942 U
PCB-011	NE	NE	NE	ng/kg	**2.28 J**	0.877 U	–	0.905 U	**2.53 J**	–	–	–	–	–	**2.95 J**	–	–	–	–	1.00 U
PCB-012	NE	NE	NE	ng/kg	0.697 U	0.847 U	–	0.874 U	0.712 U	–	–	–	–	–	0.808 U	–	–	–	–	0.968 U
PCB-013	NE	NE	NE	ng/kg	0.750 U	0.912 U	–	0.941 U	0.766 U	–	–	–	–	–	0.869 U	–	–	–	–	1.04 U
PCB-014	NE	NE	NE	ng/kg	0.670 U	0.815 U	–	0.841 U	0.685 U	–	–	–	–	–	0.777 U	–	–	–	–	0.932 U
PCB-015	NE	NE	NE	ng/kg	0.645 U	0.872 U	–	0.910 U	0.766 U	–	–	–	–	–	0.795 U	–	–	–	–	0.995 U
PCB-016	NE	NE	NE	ng/kg	1.01 U	0.658 U	–	0.617 U	0.664 U	–	–	–	–	–	0.725 U	–	–	–	–	0.782 U
PCB-017	NE	NE	NE	ng/kg	1.12 U	0.731 U	–	0.686 U	0.738 U	–	–	–	–	–	0.806 U	–	–	–	–	0.869 U
PCB-018	NE	NE	NE	ng/kg	1.24 U	0.811 U	–	0.760 U	0.818 U	–	–	–	–	–	0.893 U	–	–	–	–	0.964 U
PCB-019	NE	NE	NE	ng/kg	1.20 U	0.787 U	–	0.738 U	0.792 U	–	–	–	–	–	0.865 U	–	–	–	–	0.936 U
PCB-020	NE	NE	NE	ng/kg	1.45 U	0.908 U	–	1.02 U	0.882 U	–	–	–	–	–	0.856 U	–	–	–	–	0.854 U

	DMMP Guideline Chemistry Values			Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
				Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
				Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
Analyte	SL	BT	ML	Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-021	NE	NE	NE	ng/kg	1.45 U	0.908 U	--	1.02 U	0.882 U	--	--	--	--	--	0.856 U	--	--	--	--	0.854 U
PCB-022	NE	NE	NE	ng/kg	1.42 U	0.889 U	--	0.998 U	0.864 U	--	--	--	--	--	0.839 U	--	--	--	--	0.837 U
PCB-023	NE	NE	NE	ng/kg	1.50 U	0.938 U	--	1.05 U	0.911 U	--	--	--	--	--	0.884 U	--	--	--	--	0.882 U
PCB-024	NE	NE	NE	ng/kg	0.866 U	0.566 U	--	0.530 U	0.570 U	--	--	--	--	--	0.623 U	--	--	--	--	0.672 U
PCB-025	NE	NE	NE	ng/kg	1.27 U	0.792 U	--	0.889 U	0.770 U	--	--	--	--	--	0.747 U	--	--	--	--	0.745 U
PCB-026	NE	NE	NE	ng/kg	1.48 U	0.926 U	--	1.04 U	0.899 U	--	--	--	--	--	0.873 U	--	--	--	--	0.871 U
PCB-027	NE	NE	NE	ng/kg	0.838 U	0.547 U	--	0.513 U	0.552 U	--	--	--	--	--	0.602 U	--	--	--	--	0.650 U
PCB-028	NE	NE	NE	ng/kg	1.23 U	0.768 U	--	0.862 U	0.746 U	--	--	--	--	--	0.724 U	--	--	--	--	0.723 U
PCB-029	NE	NE	NE	ng/kg	1.49 U	0.931 U	--	1.04 U	0.904 U	--	--	--	--	--	0.878 U	--	--	--	--	0.876 U
PCB-030	NE	NE	NE	ng/kg	0.803 U	0.524 U	--	0.491 U	0.529 U	--	--	--	--	--	0.577 U	--	--	--	--	0.623 U
PCB-031	NE	NE	NE	ng/kg	1.53 U	0.955 U	--	1.07 U	0.928 U	--	--	--	--	--	0.901 U	--	--	--	--	0.899 U
PCB-032	NE	NE	NE	ng/kg	0.940 U	0.614 U	--	0.575 U	0.619 U	--	--	--	--	--	0.676 U	--	--	--	--	0.730 U
PCB-033	NE	NE	NE	ng/kg	1.45 U	0.908 U	--	1.02 U	0.882 U	--	--	--	--	--	0.856 U	--	--	--	--	0.854 U
PCB-034	NE	NE	NE	ng/kg	1.48 U	0.926 U	--	1.04 U	0.900 U	--	--	--	--	--	0.873 U	--	--	--	--	0.872 U
PCB-035	NE	NE	NE	ng/kg	1.55 U	0.969 U	--	1.09 U	0.941 U	--	--	--	--	--	0.914 U	--	--	--	--	0.912 U
PCB-036	NE	NE	NE	ng/kg	1.45 U	0.909 U	--	1.02 U	0.883 U	--	--	--	--	--	0.857 U	--	--	--	--	0.855 U
PCB-037	NE	NE	NE	ng/kg	1.36 U	0.852 U	--	0.955 U	0.828 U	--	--	--	--	--	0.803 U	--	--	--	--	0.801 U
PCB-038	NE	NE	NE	ng/kg	1.39 U	0.869 U	--	0.975 U	0.845 U	--	--	--	--	--	0.820 U	--	--	--	--	0.818 U
PCB-039	NE	NE	NE	ng/kg	1.49 U	0.931 U	--	1.04 U	0.905 U	--	--	--	--	--	0.878 U	--	--	--	--	0.876 U
PCB-040	NE	NE	NE	ng/kg	0.824 U	0.759 U	--	0.742 U	0.595 U	--	--	--	--	--	0.687 U	--	--	--	--	0.705 U
PCB-041	NE	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-042	NE	NE	NE	ng/kg	0.539 U	0.497 U	--	0.486 U	0.390 U	--	--	--	--	--	0.450 U	--	--	--	--	0.462 U
PCB-043	NE	NE	NE	ng/kg	0.620 U	0.571 U	--	0.558 U	0.448 U	--	--	--	--	--	0.517 U	--	--	--	--	0.531 U
PCB-044	NE	NE	NE	ng/kg	0.715 U	0.659 U	--	0.644 U	0.517 U	--	--	--	--	--	0.596 U	--	--	--	--	0.612 U
PCB-045	NE	NE	NE	ng/kg	0.708 U	0.652 U	--	0.638 U	0.512 U	--	--	--	--	--	0.591 U	--	--	--	--	0.606 U
PCB-046	NE	NE	NE	ng/kg	0.757 U	0.697 U	--	0.682 U	0.547 U	--	--	--	--	--	0.631 U	--	--	--	--	0.648 U
PCB-047	NE	NE	NE	ng/kg	0.549 U	0.505 U	--	0.494 U	0.397 U	--	--	--	--	--	0.458 U	--	--	--	--	0.470 U
PCB-048	NE	NE	NE	ng/kg	0.509 U	0.469 U	--	0.458 U	0.368 U	--	--	--	--	--	0.424 U	--	--	--	--	0.435 U
PCB-049	NE	NE	NE	ng/kg	0.620 U	0.571 U	--	0.558 U	0.448 U	--	--	--	--	--	0.517 U	--	--	--	--	0.531 U
PCB-050	NE	NE	NE	ng/kg	0.628 U	0.578 U	--	0.566 U	0.454 U	--	--	--	--	--	0.524 U	--	--	--	--	0.537 U
PCB-051	NE	NE	NE	ng/kg	0.667 U	0.614 U	--	0.601 U	0.482 U	--	--	--	--	--	0.556 U	--	--	--	--	0.571 U
PCB-052	NE	NE	NE	ng/kg	0.505 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.433 U
PCB-053	NE	NE	NE	ng/kg	0.687 U	0.633 U	--	0.619 U	0.497 U	--	--	--	--	--	0.573 U	--	--	--	--	0.588 U
PCB-054	NE	NE	NE	ng/kg	0.504 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.432 U
PCB-055	NE	NE	NE	ng/kg	0.467 U	0.430 U	--	0.421 U	0.337 U	--	--	--	--	--	0.389 U	--	--	--	--	0.400 U
PCB-056	NE	NE	NE	ng/kg	0.614 U	0.623 U	--	0.760 U	0.608 U	--	--	--	--	--	0.643 U	--	--	--	--	0.728 U
PCB-057	NE	NE	NE	ng/kg	0.462 U	0.426 U	--	0.417 U	0.334 U	--	--	--	--	--	0.386 U	--	--	--	--	0.396 U
PCB-058	NE	NE	NE	ng/kg	0.476 U	0.439 U	--	0.429 U	0.344 U	--	--	--	--	--	0.397 U	--	--	--	--	0.408 U
PCB-059	NE	NE	NE	ng/kg	0.539 U	0.497 U	--	0.486 U	0.390 U	--	--	--	--	--	0.450 U	--	--	--	--	0.462 U
PCB-060	NE	NE	NE	ng/kg	0.614 U	0.623 U	--	0.760 U	0.608 U	--	--	--	--	--	0.643 U	--	--	--	--	0.728 U
PCB-061	NE	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.380 U	--	--	--	--	0.390 U
PCB-062	NE	NE	NE	ng/kg	0.538 U	0.496 U	--	0.485 U	0.389 U	--	--	--	--	--	0.449 U	--	--	--	--	0.461 U
PCB-063	NE	NE	NE	ng/kg	0.457 U	0.421 U	--	0.412 U	0.331 U	--	--	--	--	--	0.382 U	--	--	--	--	0.392 U
PCB-064	NE	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-065	NE	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-066	NE	NE	NE	ng/kg	0.449 U	0.413 U	--	0.404 U	0.324 U	--	--	--	--	--	0.374 U	--	--	--	--	0.384 U
PCB-067	NE	NE	NE	ng/kg	0.472 U	0.434 U	--	0.425 U	0.341 U	--	--	--	--	--	0.393 U	--	--	--	--	0.404 U
PCB-068	NE	NE	NE	ng/kg	0.453 U	0.417 U	--	0.408 U	0.328 U	--	--	--	--	--	0.378 U	--	--	--	--	0.388 U
PCB-069	NE	NE	NE	ng/kg	0.505 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.433 U
PCB-070	NE	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.380 U	--	--	--	--	0.390 U
PCB-071	NE	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-072	NE	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-073	NE	NE	NE	ng/kg	0.523 U	0.482 U	--	0.471 U	0.378 U	--	--	--	--	--	0.436 U	--	--	--	--	0.448 U
PCB-074	NE	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.379 U	--	--	--	--	0.389 U
PCB-075	NE	NE	NE	ng/kg	0.509 U	0.469 U	--	0.458 U	0.368 U	--	--	--	--	--	0.424 U	--	--	--	--	0.435 U
PCB-076	NE	NE	NE	ng/kg	0.449 U	0.413 U	--	0.404 U	0.324 U	--	--	--	--	--	0.374 U	--	--	--	--	0.384 U
PCB-077	NE	NE	NE	ng/kg	0.655 U	0.703 U	--	0.897 U	0.705 U	--	--	--	--	--	0.721 U	--	--	--	--	0.854 U
PCB-078	NE	NE	NE	ng/kg	0.618 U	0.627 U	--	0.764 U	0.612 U	--	--	--	--	--	0.647 U	--	--	--	--	0.732 U
PCB-079	NE	NE	NE	ng/kg	0.586 U	0.594 U	--	0.724 U	0.580 U	--	--	--	--	--	0.613 U	--	--	--	--	0.694 U
PCB-080	NE	NE	NE	ng/kg	0.400 U	0.369 U	--	0.361 U	0.289 U	--	--	--	--	--	0.334 U	--	--	--	--	0.343 U
PCB-081	NE	NE	NE	ng/kg	0.541 U	0.514 U	--	0.597 U	0.486 U	--	--	--	--	--	0.536 U	--	--	--	--	0.577 U
PCB-082	NE	NE	NE	ng/kg	0.950 U	1.06 U	--	0.995 U	1.11 U	--	--	--	--	--	1.04 U	--	--	--	--	0.997 U
PCB-083	NE	NE	NE	ng/kg	0.716 U	0.796 U	--	0.750 U	0.834 U	--	--	--	--	--	0.784 U	--	--	--	--	0.751 U
PCB-084	NE	NE	NE	ng/kg	0.777 U	0.863 U	--	0.814 U	0.905 U	--	--	--	--	--	0.850 U	--	--	--	--	0.815 U
PCB-085	NE	NE	NE	ng/kg	0.681 U	0.757 U	--	0.713 U	0.793 U	--	--	--	--	--	0.746 U	--	--	--	--	0.714 U
PCB-086	NE	NE	NE	ng/kg	0.678 U	0.753 U	--	0.710 U	0.789 U	--	--	--	--	--	0.742 U	--	--	--	--	0.711 U
PCB-087	NE	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-088	NE	NE	NE	ng/kg	0.831 U	0.586 U	--	0.581 U	0.512 U	--	--	--	--	--	0.754 U	--	--	--	--	0.640 U
PCB-089	NE	NE	NE	ng/kg	0.814 U	0.904 U	--	0.852 U	0.948 U	--	--	--	--	--	0.891 U	--	--	--	--	0.854 U
PCB-090	NE	NE	NE	ng/kg	0.731 U	0.812 U	--	0.766 U	0.851 U	--	--	--	--	--	0.800 U	--	--	--	--	0.767 U
PCB-091	NE	NE	NE	ng/kg	0.831 U	0.586 U	--	0.581 U	0.512 U	--	--	--	--	--	0.754 U	--	--	--	--	0.640 U
PCB-092	NE	NE	NE	ng/kg	0.777 U	0.863 U	--	0.814 U	0.905 U	--	--	--	--	--	0.850 U	--	--	--	--	0.815 U

Analyte	DMMP Guideline Chemistry Values			Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
				Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
				Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
	SL	BT	ML	Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-093	NE	NE	NE	ng/kg	0.863 U	0.609 U	--	0.603 U	0.531 U	--	--	--	--	--	0.783 U	--	--	--	--	0.665 U
PCB-094	NE	NE	NE	ng/kg	0.958 U	0.676 U	--	0.670 U	0.590 U	--	--	--	--	--	0.870 U	--	--	--	--	0.739 U
PCB-095	NE	NE	NE	ng/kg	0.805 U	0.568 U	--	0.563 U	0.496 U	--	--	--	--	--	0.730 U	--	--	--	--	0.620 U
PCB-096	NE	NE	NE	ng/kg	0.639 U	0.451 U	--	0.447 U	0.394 U	--	--	--	--	--	0.580 U	--	--	--	--	0.493 U
PCB-097	NE	NE	NE	ng/kg	0.705 U	0.783 U	--	0.739 U	0.821 U	--	--	--	--	--	0.772 U	--	--	--	--	0.740 U
PCB-098	NE	NE	NE	ng/kg	0.832 U	0.587 U	--	0.582 U	0.513 U	--	--	--	--	--	0.755 U	--	--	--	--	0.642 U
PCB-099	NE	NE	NE	ng/kg	0.696 U	0.773 U	--	0.729 U	0.811 U	--	--	--	--	--	0.762 U	--	--	--	--	0.730 U
PCB-100	NE	NE	NE	ng/kg	0.801 U	0.565 U	--	0.560 U	0.493 U	--	--	--	--	--	0.727 U	--	--	--	--	0.618 U
PCB-101	NE	NE	NE	ng/kg	0.731 U	0.812 U	--	0.766 U	0.851 U	--	--	--	--	--	0.800 U	--	--	--	--	0.767 U
PCB-102	NE	NE	NE	ng/kg	0.832 U	0.587 U	--	0.582 U	0.513 U	--	--	--	--	--	0.755 U	--	--	--	--	0.642 U
PCB-103	NE	NE	NE	ng/kg	0.762 U	0.538 U	--	0.533 U	0.469 U	--	--	--	--	--	0.691 U	--	--	--	--	0.587 U
PCB-104	NE	NE	NE	ng/kg	0.609 U	0.430 U	--	0.426 U	0.375 U	--	--	--	--	--	0.553 U	--	--	--	--	0.470 U
PCB-105	NE	NE	NE	ng/kg	0.691 U	0.756 U	--	0.840 U	0.785 U	--	--	--	--	--	0.861 U	--	--	--	--	0.962 U
PCB-106	NE	NE	NE	ng/kg	0.678 U	0.732 U	--	0.809 U	0.821 U	--	--	--	--	--	0.880 U	--	--	--	--	0.864 U
PCB-107	NE	NE	NE	ng/kg	0.679 U	0.722 U	--	0.834 U	0.755 U	--	--	--	--	--	0.877 U	--	--	--	--	0.907 U
PCB-108	NE	NE	NE	ng/kg	0.679 U	0.722 U	--	0.834 U	0.755 U	--	--	--	--	--	0.877 U	--	--	--	--	0.907 U
PCB-109	NE	NE	NE	ng/kg	0.606 U	0.673 U	--	0.635 U	0.705 U	--	--	--	--	--	0.663 U	--	--	--	--	0.635 U
PCB-110	NE	NE	NE	ng/kg	0.545 U	0.606 U	--	0.571 U	0.635 U	--	--	--	--	--	0.597 U	--	--	--	--	0.730 U
PCB-111	NE	NE	NE	ng/kg	0.523 U	0.581 U	--	0.548 U	0.609 U	--	--	--	--	--	0.573 U	--	--	--	--	0.549 U
PCB-112	NE	NE	NE	ng/kg	0.716 U	0.796 U	--	0.750 U	0.834 U	--	--	--	--	--	0.784 U	--	--	--	--	0.751 U
PCB-113	NE	NE	NE	ng/kg	0.593 U	0.659 U	--	0.621 U	0.691 U	--	--	--	--	--	0.650 U	--	--	--	--	0.622 U
PCB-114	NE	NE	NE	ng/kg	0.709 U	0.722 U	--	0.842 U	0.741 U	--	--	--	--	--	0.898 U	--	--	--	--	0.938 U
PCB-115	NE	NE	NE	ng/kg	0.523 U	0.581 U	--	0.548 U	0.609 U	--	--	--	--	--	0.573 U	--	--	--	--	0.549 U
PCB-116	NE	NE	NE	ng/kg	0.681 U	0.757 U	--	0.713 U	0.793 U	--	--	--	--	--	0.746 U	--	--	--	--	0.714 U
PCB-117	NE	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-118	NE	NE	NE	ng/kg	0.678 U	0.732 U	--	0.809 U	0.821 U	--	--	--	--	--	0.880 U	--	--	--	--	0.864 U
PCB-119	NE	NE	NE	ng/kg	0.537 U	0.596 U	--	0.562 U	0.625 U	--	--	--	--	--	0.588 U	--	--	--	--	0.563 U
PCB-120	NE	NE	NE	ng/kg	0.515 U	0.572 U	--	0.539 U	0.599 U	--	--	--	--	--	0.563 U	--	--	--	--	0.540 U
PCB-121	NE	NE	NE	ng/kg	0.683 U	0.482 U	--	0.477 U	0.420 U	--	--	--	--	--	0.619 U	--	--	--	--	0.526 U
PCB-122	NE	NE	NE	ng/kg	0.660 U	0.701 U	--	0.810 U	0.733 U	--	--	--	--	--	0.851 U	--	--	--	--	0.881 U
PCB-123	NE	NE	NE	ng/kg	0.567 U	0.601 U	--	0.751 U	0.596 U	--	--	--	--	--	0.769 U	--	--	--	--	0.773 U
PCB-124	NE	NE	NE	ng/kg	0.686 U	0.729 U	--	0.842 U	0.762 U	--	--	--	--	--	0.885 U	--	--	--	--	0.916 U
PCB-125	NE	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-126	NE	NE	NE	ng/kg	0.979 U	1.10 U	--	1.21 U	1.20 U	--	--	--	--	--	1.32 U	--	--	--	--	1.32 U
PCB-127	NE	NE	NE	ng/kg	0.720 U	0.765 U	--	0.884 U	0.800 U	--	--	--	--	--	0.929 U	--	--	--	--	0.961 U
PCB-128	NE	NE	NE	ng/kg	0.606 U	0.621 U	--	0.701 U	0.588 U	--	--	--	--	--	0.578 U	--	--	--	--	0.675 U
PCB-129	NE	NE	NE	ng/kg	0.804 U	0.825 U	--	0.930 U	0.781 U	--	--	--	--	--	0.767 U	--	--	--	--	0.896 U
PCB-130	NE	NE	NE	ng/kg	0.759 U	0.779 U	--	0.879 U	0.738 U	--	--	--	--	--	0.725 U	--	--	--	--	0.846 U
PCB-131	NE	NE	NE	ng/kg	0.679 U	0.697 U	--	0.786 U	0.660 U	--	--	--	--	--	0.648 U	--	--	--	--	0.757 U
PCB-132	NE	NE	NE	ng/kg	0.602 U	0.617 U	--	0.696 U	0.585 U	--	--	--	--	--	0.574 U	--	--	--	--	0.670 U
PCB-133	NE	NE	NE	ng/kg	0.679 U	0.697 U	--	0.786 U	0.660 U	--	--	--	--	--	0.648 U	--	--	--	--	0.757 U
PCB-134	NE	NE	NE	ng/kg	0.699 U	0.717 U	--	0.809 U	0.679 U	--	--	--	--	--	0.667 U	--	--	--	--	0.779 U
PCB-135	NE	NE	NE	ng/kg	0.665 U	0.682 U	--	0.769 U	0.646 U	--	--	--	--	--	0.635 U	--	--	--	--	0.741 U
PCB-136	NE	NE	NE	ng/kg	0.401 U	0.367 U	--	0.368 U	0.351 U	--	--	--	--	--	0.363 U	--	--	--	--	0.410 U
PCB-137	NE	NE	NE	ng/kg	0.707 U	0.725 U	--	0.818 U	0.687 U	--	--	--	--	--	0.675 U	--	--	--	--	0.788 U
PCB-138	NE	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**
PCB-139	NE	NE	NE	ng/kg	0.629 U	0.645 U	--	0.728 U	0.611 U	--	--	--	--	--	0.601 U	--	--	--	--	0.701 U
PCB-140	NE	NE	NE	ng/kg	0.634 U	0.650 U	--	0.733 U	0.615 U	--	--	--	--	--	0.605 U	--	--	--	--	0.706 U
PCB-141	NE	NE	NE	ng/kg	0.659 U	0.676 U	--	0.763 U	0.640 U	--	--	--	--	--	0.629 U	--	--	--	--	0.734 U
PCB-142	NE	NE	NE	ng/kg	0.756 U	0.776 U	--	0.875 U	0.735 U	--	--	--	--	--	0.722 U	--	--	--	--	0.843 U
PCB-143	NE	NE	NE	ng/kg	0.699 U	0.717 U	--	0.809 U	0.679 U	--	--	--	--	--	0.667 U	--	--	--	--	0.779 U
PCB-144	NE	NE	NE	ng/kg	0.643 U	0.659 U	--	0.744 U	0.624 U	--	--	--	--	--	0.613 U	--	--	--	--	0.716 U
PCB-145	NE	NE	NE	ng/kg	0.411 U	0.376 U	--	0.377 U	0.360 U	--	--	--	--	--	0.373 U	--	--	--	--	0.421 U
PCB-146	NE	NE	NE	ng/kg	0.577 U	0.592 U	--	0.668 U	0.561 U	--	--	--	--	--	0.551 U	--	--	--	--	0.643 U
PCB-147	NE	NE	NE	ng/kg	0.620 U	0.636 U	--	0.717 U	0.602 U	--	--	--	--	--	0.592 U	--	--	--	--	0.691 U
PCB-148	NE	NE	NE	ng/kg	0.511 U	0.468 U	--	0.469 U	0.447 U	--	--	--	--	--	0.463 U	--	--	--	--	0.523 U
PCB-149	NE	NE	NE	ng/kg	0.629 U	0.645 U	--	0.728 U	0.611 U	--	--	--	--	--	0.601 U	--	--	--	--	0.701 U
PCB-150	NE	NE	NE	ng/kg	0.406 U	0.371 U	--	0.372 U	0.355 U	--	--	--	--	--	0.368 U	--	--	--	--	0.415 U
PCB-151	NE	NE	NE	ng/kg	0.664 U	0.681 U	--	0.768 U	0.645 U	--	--	--	--	--	0.633 U	--	--	--	--	0.739 U
PCB-152	NE	NE	NE	ng/kg	0.393 U	0.360 U	--	0.361 U	0.344 U	--	--	--	--	--	0.356 U	--	--	--	--	0.403 U
PCB-153	NE	NE	NE	ng/kg	0.560 U	0.574 U	--	0.648 U	0.544 U	--	--	--	--	--	0.534 U	--	--	--	--	**1.45 J**
PCB-154	NE	NE	NE	ng/kg	0.455 U	0.416 U	--	0.417 U	0.398 U	--	--	--	--	--	0.412 U	--	--	--	--	0.465 U
PCB-155	NE	NE	NE	ng/kg	0.362 U	0.331 U	--	0.332 U	0.317 U	--	--	--	--	--	0.328 U	--	--	--	--	0.370 U
PCB-156	NE	NE	NE	ng/kg	0.484 U	0.494 U	--	0.553 U	0.484 U	--	--	--	--	--	0.470 U	--	--	--	--	0.533 U
PCB-157	NE	NE	NE	ng/kg	0.560 U	0.564 U	--	0.658 U	0.560 U	--	--	--	--	--	0.530 U	--	--	--	--	0.625 U
PCB-158	NE	NE	NE	ng/kg	0.496 U	0.509 U	--	0.574 U	0.482 U	--	--	--	--	--	0.473 U	--	--	--	--	0.553 U
PCB-159	NE	NE	NE	ng/kg	0.474 U	0.486 U	--	0.548 U	0.460 U	--	--	--	--	--	0.452 U	--	--	--	--	0.528 U
PCB-160	NE	NE	NE	ng/kg	0.496 U	0.509 U	--	0.574 U	0.482 U	--	--	--	--	--	0.473 U	--	--	--	--	0.553 U
PCB-161	NE	NE	NE	ng/kg	0.602 U	0.617 U	--	0.696 U	0.585 U	--	--	--	--	--	0.574 U	--	--	--	--	0.670 U
PCB-162	NE	NE	NE	ng/kg	0.606 U	0.621 U	--	0.701 U	0.588 U	--	--	--	--	--	0.578 U	--	--	--	--	0.675 U
PCB-163	NE	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**
PCB-164	NE	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**

Analyte	DMMP Guideline Chemistry Values			Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
				Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
				Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
	SL	BT	ML	Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-165	NE	NE	NE	ng/kg	0.577 U	0.592 U	--	0.668 U	0.561 U	--	--	--	--	--	0.551 U	--	--	--	--	0.643 U
PCB-166	NE	NE	NE	ng/kg	0.533 U	0.546 U	--	0.616 U	0.517 U	--	--	--	--	--	0.508 U	--	--	--	--	0.593 U
PCB-167	NE	NE	NE	ng/kg	0.516 U	0.515 U	--	0.549 U	0.477 U	--	--	--	--	--	0.477 U	--	--	--	--	0.519 U
PCB-168	NE	NE	NE	ng/kg	0.531 U	0.545 U	--	0.614 U	0.516 U	--	--	--	--	--	0.507 U	--	--	--	--	0.592 U
PCB-169	NE	NE	NE	ng/kg	0.567 U	0.612 U	--	0.710 U	0.547 U	--	--	--	--	--	0.557 U	--	--	--	--	0.705 U
PCB-170	NE	NE	NE	ng/kg	0.650 U	0.630 U	--	0.655 U	0.549 U	--	--	--	--	--	0.537 U	--	--	--	--	0.546 U
PCB-171	NE	NE	NE	ng/kg	0.592 U	0.573 U	--	0.596 U	0.500 U	--	--	--	--	--	0.489 U	--	--	--	--	0.498 U
PCB-172	NE	NE	NE	ng/kg	0.610 U	0.591 U	--	0.614 U	0.515 U	--	--	--	--	--	0.504 U	--	--	--	--	0.513 U
PCB-173	NE	NE	NE	ng/kg	0.667 U	0.646 U	--	0.672 U	0.563 U	--	--	--	--	--	0.551 U	--	--	--	--	0.561 U
PCB-174	NE	NE	NE	ng/kg	0.538 U	0.521 U	--	0.542 U	0.455 U	--	--	--	--	--	0.445 U	--	--	--	--	0.453 U
PCB-175	NE	NE	NE	ng/kg	0.564 U	0.547 U	--	0.568 U	0.477 U	--	--	--	--	--	0.466 U	--	--	--	--	0.475 U
PCB-176	NE	NE	NE	ng/kg	0.416 U	0.403 U	--	0.419 U	0.351 U	--	--	--	--	--	0.344 U	--	--	--	--	0.350 U
PCB-177	NE	NE	NE	ng/kg	0.613 U	0.594 U	--	0.618 U	0.518 U	--	--	--	--	--	0.507 U	--	--	--	--	0.516 U
PCB-178	NE	NE	NE	ng/kg	0.605 U	0.586 U	--	0.610 U	0.511 U	--	--	--	--	--	0.500 U	--	--	--	--	0.509 U
PCB-179	NE	NE	NE	ng/kg	0.411 U	0.398 U	--	0.414 U	0.347 U	--	--	--	--	--	0.339 U	--	--	--	--	0.345 U
PCB-180	NE	NE	NE	ng/kg	0.510 U	0.494 U	--	0.514 U	0.431 U	--	--	--	--	--	0.421 U	--	--	--	--	0.429 U
PCB-181	NE	NE	NE	ng/kg	0.635 U	0.616 U	--	0.640 U	0.537 U	--	--	--	--	--	0.525 U	--	--	--	--	0.535 U
PCB-182	NE	NE	NE	ng/kg	0.525 U	0.509 U	--	0.529 U	0.444 U	--	--	--	--	--	0.434 U	--	--	--	--	0.442 U
PCB-183	NE	NE	NE	ng/kg	**1.43 J**	**1.36 J**	--	**1.58 J**	**1.24 J**	--	--	--	--	--	**1.27 J**	--	--	--	--	**1.42 J**
PCB-184	NE	NE	NE	ng/kg	0.404 U	0.391 U	--	0.407 U	0.341 U	--	--	--	--	--	0.334 U	--	--	--	--	0.340 U
PCB-185	NE	NE	NE	ng/kg	0.598 U	0.580 U	--	0.603 U	0.505 U	--	--	--	--	--	0.494 U	--	--	--	--	0.503 U
PCB-186	NE	NE	NE	ng/kg	0.428 U	0.415 U	--	0.431 U	0.361 U	--	--	--	--	--	0.354 U	--	--	--	--	0.360 U
PCB-187	NE	NE	NE	ng/kg	0.525 U	0.509 U	--	0.529 U	0.444 U	--	--	--	--	--	0.434 U	--	--	--	--	0.442 U
PCB-188	NE	NE	NE	ng/kg	0.438 U	0.426 U	--	0.422 U	0.376 U	--	--	--	--	--	0.359 U	--	--	--	--	0.351 U
PCB-189	NE	NE	NE	ng/kg	0.437 U	0.422 U	--	0.464 U	0.362 U	--	--	--	--	--	0.366 U	--	--	--	--	0.389 U
PCB-190	NE	NE	NE	ng/kg	0.464 U	0.450 U	--	0.468 U	0.392 U	--	--	--	--	--	0.384 U	--	--	--	--	0.391 U
PCB-191	NE	NE	NE	ng/kg	0.440 U	0.427 U	--	0.443 U	0.372 U	--	--	--	--	--	0.364 U	--	--	--	--	0.370 U
PCB-192	NE	NE	NE	ng/kg	0.490 U	0.475 U	--	0.494 U	0.414 U	--	--	--	--	--	0.405 U	--	--	--	--	0.413 U
PCB-193	NE	NE	NE	ng/kg	0.441 U	0.428 U	--	0.445 U	0.373 U	--	--	--	--	--	0.365 U	--	--	--	--	0.371 U
PCB-194	NE	NE	NE	ng/kg	0.517 U	0.488 U	--	0.519 U	0.484 U	--	--	--	--	--	0.532 U	--	--	--	--	0.510 U
PCB-195	NE	NE	NE	ng/kg	0.572 U	0.541 U	--	0.574 U	0.536 U	--	--	--	--	--	0.588 U	--	--	--	--	0.565 U
PCB-196	NE	NE	NE	ng/kg	0.676 U	0.634 U	--	0.681 U	0.696 U	--	--	--	--	--	0.647 U	--	--	--	--	0.661 U
PCB-197	NE	NE	NE	ng/kg	0.504 U	0.472 U	--	0.508 U	0.519 U	--	--	--	--	--	0.482 U	--	--	--	--	0.493 U
PCB-198	NE	NE	NE	ng/kg	0.763 U	0.716 U	--	0.769 U	0.786 U	--	--	--	--	--	0.730 U	--	--	--	--	0.747 U
PCB-199	NE	NE	NE	ng/kg	0.728 U	0.683 U	--	0.734 U	0.750 U	--	--	--	--	--	0.696 U	--	--	--	--	0.712 U
PCB-200	NE	NE	NE	ng/kg	0.510 U	0.478 U	--	0.514 U	0.525 U	--	--	--	--	--	0.487 U	--	--	--	--	0.499 U
PCB-201	NE	NE	NE	ng/kg	0.509 U	0.477 U	--	0.513 U	0.524 U	--	--	--	--	--	0.487 U	--	--	--	--	0.498 U
PCB-202	NE	NE	NE	ng/kg	0.522 U	0.490 U	--	0.526 U	0.538 U	--	--	--	--	--	0.499 U	--	--	--	--	0.511 U
PCB-203	NE	NE	NE	ng/kg	0.676 U	0.634 U	--	0.681 U	0.696 U	--	--	--	--	--	0.647 U	--	--	--	--	0.661 U
PCB-204	NE	NE	NE	ng/kg	0.507 U	0.475 U	--	0.511 U	0.522 U	--	--	--	--	--	0.485 U	--	--	--	--	0.496 U
PCB-205	NE	NE	NE	ng/kg	0.401 U	0.379 U	--	0.403 U	0.376 U	--	--	--	--	--	0.412 U	--	--	--	--	0.396 U
PCB-206	NE	NE	NE	ng/kg	0.491 U	0.451 U	--	0.506 U	0.435 U	--	--	--	--	--	0.421 U	--	--	--	--	0.481 U
PCB-207	NE	NE	NE	ng/kg	0.353 U	0.327 U	--	0.363 U	0.317 U	--	--	--	--	--	0.303 U	--	--	--	--	0.340 U
PCB-208	NE	NE	NE	ng/kg	0.331 U	0.308 U	--	0.340 U	0.301 U	--	--	--	--	--	0.286 U	--	--	--	--	0.316 U
PCB-209	NE	NE	NE	ng/kg	0.316 U	0.278 U	--	0.282 U	0.300 U	--	--	--	--	--	0.291 U	--	--	--	--	0.262 U
Total PCBs	130,000	NE	3,100,000	ng/kg	**3.7 T**	**1.4 T**	--	**1.6 T**	**3.8 T**	--	--	--	--	--	**5.5 T**	--	--	--	--	**8.3 T**
Total PCBs	NE	38	NE	mg/kg OC	**0.002**	**0.001**	--	**0.001**	**0.002**	--	--	--	--	--	**0.005**	--	--	--	--	**0.008**
Organometallic Compounds																				
Tributyltin Ion	NE	73	NE	µg/kg	3.8 U	3.8 U	--	3.5 U	3.5 U	--	--	--	--	--	3.4 U	--	--	--	--	3.4 U
Dioxins/Furans																				
Total Dioxin/Furan TEQ (ND=0.5EDL)	4-10	10	NE	ng/kg	**0.1 T**	**0.1 T**		**0.1 T**	**0.2 T**						**0.1 UT**					**0.5 JT**

Notes:

-- = not tested
BT = bioaccumulation trigger
cPAH = carcinogenic polycyclic aromatic hydrocarbon
EDL = estimated detection limit
HPAH = high molecular weight polycyclic aromatic hydrocarbon
J = Estimated concentration
JT = Estimated concentration total
LPAH = low molecular weight polycyclic aromatic hydrocarbon
mg/kg = milligram per kilogram
mg/kg OC = milligram per kilogram organic carbon normalized
ML = maximum level
NE = not established
ng/kg = nanogram per kilogram
PCB = polychlorinated biphenyl
SL = screening level
TEQ = toxicity equivalent
U = The analyte is not detected at or above the reported concentration.
µg/kg = microgram per kilogram
Bold indicates the analyte was detected.
Yellow shading indicates exceedance of SL.
Orange shading indicates exceedance of BT.
Red border indicates exceedance of ML.

Table 5b

Carcinogenic PAH Constituents and Toxic Equivalent Calculations

Mill A Former Site Interim Action Dredging Project

Everett, Washington

Sample ID	**Chemical**	**Result**	**Qualifier**	**TEF**	**TEQ**	**Units**	**Detected?**
D-1	Benzo(a)anthracene	140		0.1	14	µg/Kg	Y
D-1	Benzo(a)pyrene	79		1	79	µg/Kg	Y
D-1	Benzofluoranthenes (Sum)	200		0.1	20	µg/Kg	Y
D-1	Chrysene	230		0.01	2.3	µg/Kg	Y
D-1	Dibenz(a,h)anthracene	16	J	0.1	1.6	µg/Kg	Y
D-1	Indeno(1,2,3-cd)pyrene	45		0.1	4.5	µg/Kg	Y
D-1	**cPAH TEQ**	**121.4**	**JT**	--	--	**µg/Kg**	**Y**
D-2	Benzo(a)anthracene	58		0.1	5.8	µg/Kg	Y
D-2	Benzo(a)pyrene	34		1	34	µg/Kg	Y
D-2	Benzofluoranthenes (Sum)	83		0.1	8.3	µg/Kg	Y
D-2	Chrysene	90		0.01	0.9	µg/Kg	Y
D-2	Dibenz(a,h)anthracene	25	U	0.1	1.3	µg/Kg	N
D-2	Indeno(1,2,3-cd)pyrene	18	J	0.1	1.8	µg/Kg	Y
D-2	**cPAH TEQ**	**52.1**	**JT**	--	--	**µg/Kg**	**Y**
D-3A	Benzo(a)anthracene	34		0.1	3.4	µg/Kg	Y
D-3A	Benzo(a)pyrene	18	J	1	18	µg/Kg	Y
D-3A	Benzofluoranthenes (Sum)	45		0.1	4.5	µg/Kg	Y
D-3A	Chrysene	54		0.01	0.54	µg/Kg	Y
D-3A	Dibenz(a,h)anthracene	24	U	0.1	1.2	µg/Kg	N
D-3A	Indeno(1,2,3-cd)pyrene	24	U	0.1	1.2	µg/Kg	N
D-3A	**cPAH TEQ**	**28.8**	**JT**	--	--	**µg/Kg**	**Y**
D-3B	Benzo(a)anthracene	52		0.1	5.2	µg/Kg	Y
D-3B	Benzo(a)pyrene	29		1	29	µg/Kg	Y
D-3B	Benzofluoranthenes (Sum)	89		0.1	8.9	µg/Kg	Y
D-3B	Chrysene	83		0.01	0.83	µg/Kg	Y
D-3B	Dibenz(a,h)anthracene	24	U	0.1	1.2	µg/Kg	N
D-3B	Indeno(1,2,3-cd)pyrene	16	J	0.1	1.6	µg/Kg	Y
D-3B	**cPAH TEQ**	**46.7**	**JT**	--	--	**µg/Kg**	**Y**
D-4A	Benzo(a)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-4A	Benzo(a)pyrene	4.8	U	1	2.4	µg/Kg	N
D-4A	Benzofluoranthenes (Sum)	4.8	U	0.1	0.2	µg/Kg	N
D-4A	Chrysene	2.8	J	0.01	0.028	µg/Kg	Y
D-4A	Dibenz(a,h)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-4A	Indeno(1,2,3-cd)pyrene	4.8	U	0.1	0.2	µg/Kg	N
D-4A	**cPAH TEQ**	**3.4**	**JT**	--	--	**µg/Kg**	**Y**
D-4B	Benzo(a)anthracene	130		0.1	13	µg/Kg	Y
D-4B	Benzo(a)pyrene	84		1	84	µg/Kg	Y
D-4B	Benzofluoranthenes (Sum)	200		0.1	20	µg/Kg	Y
D-4B	Chrysene	140		0.01	1.4	µg/Kg	Y
D-4B	Dibenz(a,h)anthracene	12	J	0.1	1.2	µg/Kg	Y
D-4B	Indeno(1,2,3-cd)pyrene	44		0.1	4.4	µg/Kg	Y
D-4B	**cPAH TEQ**	**124**	**JT**	--	--	**µg/Kg**	**Y**

Sample ID	Chemical	Result	Qualifier	TEF	TEQ	Units	Detected?
D-5A	Benzo(a)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-5A	Benzo(a)pyrene	4.8	U	1	2.4	µg/Kg	N
D-5A	Benzofluoranthenes (Sum)	4.8	U	0.1	0.2	µg/Kg	N
D-5A	Chrysene	4.8	U	0.01	0.0	µg/Kg	N
D-5A	Dibenz(a,h)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-5A	Indeno(1,2,3-cd)pyrene	4.8	U	0.1	0.2	µg/Kg	N
D-5A	**cPAH TEQ**	**3.4**	**UT**	**--**	**--**	**µg/Kg**	**N**
D-5B	Benzo(a)anthracene	5.4		0.1	0.54	µg/Kg	Y
D-5B	Benzo(a)pyrene	3.9	J	1	3.9	µg/Kg	Y
D-5B	Benzofluoranthenes (Sum)	7.5		0.1	0.75	µg/Kg	Y
D-5B	Chrysene	6.1		0.01	0.061	µg/Kg	Y
D-5B	Dibenz(a,h)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-5B	Indeno(1,2,3-cd)pyrene	4.8	U	0.1	0.2	µg/Kg	N
D-5B	**cPAH TEQ**	**5.7**	**JT**	**--**	**--**	**µg/Kg**	**Y**
D-6A	Benzo(a)anthracene	4.7	U	0.1	0.2	µg/Kg	N
D-6A	Benzo(a)pyrene	4.7	U	1	2.4	µg/Kg	N
D-6A	Benzofluoranthenes (Sum)	4.7	U	0.1	0.2	µg/Kg	N
D-6A	Chrysene	4.7	U	0.01	0.0	µg/Kg	N
D-6A	Dibenz(a,h)anthracene	4.7	U	0.1	0.2	µg/Kg	N
D-6A	Indeno(1,2,3-cd)pyrene	4.7	U	0.1	0.2	µg/Kg	N
D-6A	**cPAH TEQ**	**3.3**	**UT**	**--**	**--**	**µg/Kg**	**N**
D-6B	Benzo(a)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-6B	Benzo(a)pyrene	4.8	U	1	2.4	µg/Kg	N
D-6B	Benzofluoranthenes (Sum)	4.8	U	0.1	0.2	µg/Kg	N
D-6B	Chrysene	4.8	U	0.01	0.0	µg/Kg	N
D-6B	Dibenz(a,h)anthracene	4.8	U	0.1	0.2	µg/Kg	N
D-6B	Indeno(1,2,3-cd)pyrene	4.8	U	0.1	0.2	µg/Kg	N
D-6B	**cPAH TEQ**	**3.4**	**UT**	**--**	**--**	**µg/Kg**	**N**
D-7	Benzo(a)anthracene	55		0.1	5.5	µg/Kg	Y
D-7	Benzo(a)pyrene	28		1	28	µg/Kg	Y
D-7	Benzofluoranthenes (Sum)	76		0.1	7.6	µg/Kg	Y
D-7	Chrysene	85		0.01	0.85	µg/Kg	Y
D-7	Dibenz(a,h)anthracene	4	J	0.1	0.4	µg/Kg	Y
D-7	Indeno(1,2,3-cd)pyrene	13		0.1	1.3	µg/Kg	Y
D-7	**cPAH TEQ**	**43.7**	**JT**	**--**	**--**	**µg/Kg**	**Y**
PT-10-36.0-37.0	Benzo(a)anthracene	59		0.1	5.9	µg/Kg	Y
PT-10-36.0-37.0	Benzo(a)pyrene	51		1	51	µg/Kg	Y
PT-10-36.0-37.0	Benzofluoranthenes (Sum)	84		0.1	8.4	µg/Kg	Y
PT-10-36.0-37.0	Chrysene	62		0.01	0.62	µg/Kg	Y
PT-10-36.0-37.0	Dibenz(a,h)anthracene	24	U	0.1	1.2	µg/Kg	N
PT-10-36.0-37.0	Indeno(1,2,3-cd)pyrene	27		0.1	2.7	µg/Kg	Y
PT-10-36.0-37.0	**cPAH TEQ**	**69.8**	**T**	**--**	**--**	**µg/Kg**	**Y**
PT-11-36.0-37.0	Benzo(a)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-11-36.0-37.0	Benzo(a)pyrene	4.7	U	1	2.4	µg/Kg	N
PT-11-36.0-37.0	Benzofluoranthenes (Sum)	4.7	U	0.1	0.2	µg/Kg	N
PT-11-36.0-37.0	Chrysene	4.7	U	0.01	0.0	µg/Kg	N
PT-11-36.0-37.0	Dibenz(a,h)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-11-36.0-37.0	Indeno(1,2,3-cd)pyrene	4.7	U	0.1	0.2	µg/Kg	N
PT-11-36.0-37.0	**cPAH TEQ**	**3.3**	**UT**	**--**	**--**	**µg/Kg**	**N**

Sample ID	Chemical	Result	Qualifier	TEF	TEQ	Units	Detected?
PT-12-30.0-31.0	Benzo(a)anthracene	71		0.1	7.1	µg/Kg	Y
PT-12-30.0-31.0	Benzo(a)pyrene	49		1	49	µg/Kg	Y
PT-12-30.0-31.0	Benzofluoranthenes (Sum)	98		0.1	9.8	µg/Kg	Y
PT-12-30.0-31.0	Chrysene	98		0.01	0.98	µg/Kg	Y
PT-12-30.0-31.0	Dibenz(a,h)anthracene	24	U	0.1	1.2	µg/Kg	N
PT-12-30.0-31.0	Indeno(1,2,3-cd)pyrene	25		0.1	2.5	µg/Kg	Y
PT-12-30.0-31.0	**cPAH TEQ**	**70.6**	**T**	--	--	**µg/Kg**	**Y**
PT-13-29.0-30.0	Benzo(a)anthracene	4.9	U	0.1	0.2	µg/Kg	N
PT-13-29.0-30.0	Benzo(a)pyrene	4.9	U	1	2.5	µg/Kg	N
PT-13-29.0-30.0	Benzofluoranthenes (Sum)	4.9	U	0.1	0.2	µg/Kg	N
PT-13-29.0-30.0	Chrysene	4.9	U	0.01	0.0	µg/Kg	N
PT-13-29.0-30.0	Dibenz(a,h)anthracene	4.9	U	0.1	0.2	µg/Kg	N
PT-13-29.0-30.0	Indeno(1,2,3-cd)pyrene	4.9	U	0.1	0.2	µg/Kg	N
PT-13-29.0-30.0	**cPAH TEQ**	**3.5**	**UT**	--	--	**µg/Kg**	**N**
PT-14-29.0-30.0	Benzo(a)anthracene	5	U	0.1	0.3	µg/Kg	N
PT-14-29.0-30.0	Benzo(a)pyrene	5	U	1	2.5	µg/Kg	N
PT-14-29.0-30.0	Benzofluoranthenes (Sum)	5	U	0.1	0.3	µg/Kg	N
PT-14-29.0-30.0	Chrysene	5	U	0.01	0.0	µg/Kg	N
PT-14-29.0-30.0	Dibenz(a,h)anthracene	5	U	0.1	0.3	µg/Kg	N
PT-14-29.0-30.0	Indeno(1,2,3-cd)pyrene	5	U	0.1	0.3	µg/Kg	N
PT-14-29.0-30.0	**cPAH TEQ**	**3.5**	**UT**	--	--	**µg/Kg**	**N**
PT-3-43.0-44.0	Benzo(a)anthracene	4.8	U	0.1	0.2	µg/Kg	N
PT-3-43.0-44.0	Benzo(a)pyrene	4.8	U	1	2.4	µg/Kg	N
PT-3-43.0-44.0	Benzofluoranthenes (Sum)	4.8	U	0.1	0.2	µg/Kg	N
PT-3-43.0-44.0	Chrysene	4.8	U	0.01	0.0	µg/Kg	N
PT-3-43.0-44.0	Dibenz(a,h)anthracene	4.8	U	0.1	0.2	µg/Kg	N
PT-3-43.0-44.0	Indeno(1,2,3-cd)pyrene	4.8	U	0.1	0.2	µg/Kg	N
PT-3-43.0-44.0	**cPAH TEQ**	**3.4**	**UT**	--	--	**µg/Kg**	**N**
PT-5-43.0-44.0	Benzo(a)anthracene	4.9	U	0.1	0.2	µg/Kg	N
PT-5-43.0-44.0	Benzo(a)pyrene	4.9	U	1	2.5	µg/Kg	N
PT-5-43.0-44.0	Benzofluoranthenes (Sum)	4.9	U	0.1	0.2	µg/Kg	N
PT-5-43.0-44.0	Chrysene	4.9	U	0.01	0.0	µg/Kg	N
PT-5-43.0-44.0	Dibenz(a,h)anthracene	4.9	U	0.1	0.2	µg/Kg	N
PT-5-43.0-44.0	Indeno(1,2,3-cd)pyrene	4.9	U	0.1	0.2	µg/Kg	N
PT-5-43.0-44.0	**cPAH TEQ**	**3.5**	**UT**	--	--	**µg/Kg**	**N**
PT-6-43.0-44.0	Benzo(a)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-6-43.0-44.0	Benzo(a)pyrene	4.7	U	1	2.4	µg/Kg	N
PT-6-43.0-44.0	Benzofluoranthenes (Sum)	4.7	U	0.1	0.2	µg/Kg	N
PT-6-43.0-44.0	Chrysene	4.7	U	0.01	0.0	µg/Kg	N
PT-6-43.0-44.0	Dibenz(a,h)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-6-43.0-44.0	Indeno(1,2,3-cd)pyrene	4.7	U	0.1	0.2	µg/Kg	N
PT-6-43.0-44.0	**cPAH TEQ**	**3.3**	**UT**	--	--	**µg/Kg**	**N**
PT-8-43.0-44.0	Benzo(a)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-8-43.0-44.0	Benzo(a)pyrene	4.7	U	1	2.4	µg/Kg	N
PT-8-43.0-44.0	Benzofluoranthenes (Sum)	4.7	U	0.1	0.2	µg/Kg	N
PT-8-43.0-44.0	Chrysene	4.7	U	0.01	0.0	µg/Kg	N
PT-8-43.0-44.0	Dibenz(a,h)anthracene	4.7	U	0.1	0.2	µg/Kg	N
PT-8-43.0-44.0	Indeno(1,2,3-cd)pyrene	4.7	U	0.1	0.2	µg/Kg	N
PT-8-43.0-44.0	**cPAH TEQ**	**3.3**	**UT**	--	--	**µg/Kg**	**N**

Notes:

cPAH = carcinogenica polycyclic aromatic hydrocarbons

J = estimated

JT = estimated total

N = no

TEF = toxicity equivalency factor

TEQ = toxicity equivalent

U = not detected

µg/Kg = micrograms per kilogram

UT = not detected total

Y = yes

Table 5c

Dioxin/Furan Constituents and Toxic Equivalent Calculations

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
D-1	1,2,3,4,6,7,8-HpCDD	0.747	190		0.01	1.9	ng/kg	Y
D-1	1,2,3,4,6,7,8-HpCDF	1.1	35.9		0.01	0.359	ng/kg	Y
D-1	1,2,3,4,7,8,9-HpCDF	0.872	2.14		0.01	0.0214	ng/kg	Y
D-1	1,2,3,4,7,8-HxCDD	0.765	4.28		0.1	0.428	ng/kg	Y
D-1	1,2,3,4,7,8-HxCDF	0.711	4.06	J	0.1	0.406	ng/kg	Y
D-1	1,2,3,6,7,8-HxCDD	0.652	11.7		0.1	1.17	ng/kg	Y
D-1	1,2,3,6,7,8-HxCDF	0.273	3.08		0.1	0.308	ng/kg	Y
D-1	1,2,3,7,8,9-HxCDD	0.473	6.57		0.1	0.657	ng/kg	Y
D-1	1,2,3,7,8,9-HxCDF	0.888	1.42		0.1	0.142	ng/kg	Y
D-1	1,2,3,7,8-PeCDD	0.374	4.51		1	4.51	ng/kg	Y
D-1	1,2,3,7,8-PeCDF	0.514	4.31	J	0.03	0.1293	ng/kg	Y
D-1	2,3,4,6,7,8-HxCDF	0.692	3.61	J	0.1	0.361	ng/kg	Y
D-1	2,3,4,7,8-PeCDF	0.667	5.72		0.3	1.716	ng/kg	Y
D-1	2,3,7,8-TCDD	0.173	1.48		1	1.48	ng/kg	Y
D-1	2,3,7,8-TCDF	0.234	183		0.1	18.3	ng/kg	Y
D-1	OCDD	1.73	1390		0.0003	0.417	ng/kg	Y
D-1	OCDF	1.51	53.5		0.0003	0.01605	ng/kg	Y
D-1	**Dioxin/Furan TEQ**		**32.3**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-2	1,2,3,4,6,7,8-HpCDD	0.746	178		0.01	1.78	ng/kg	Y
D-2	1,2,3,4,6,7,8-HpCDF	1.1	29.7		0.01	0.297	ng/kg	Y
D-2	1,2,3,4,7,8,9-HpCDF	0.87	1.77	U	0.01	0.00885	ng/kg	N
D-2	1,2,3,4,7,8-HxCDD	0.763	7.87		0.1	0.787	ng/kg	Y
D-2	1,2,3,4,7,8-HxCDF	0.71	3.08	J	0.1	0.308	ng/kg	Y
D-2	1,2,3,6,7,8-HxCDD	0.651	13.7		0.1	1.37	ng/kg	Y
D-2	1,2,3,6,7,8-HxCDF	0.272	2.56		0.1	0.256	ng/kg	Y
D-2	1,2,3,7,8,9-HxCDD	0.472	9.75		0.1	0.975	ng/kg	Y
D-2	1,2,3,7,8,9-HxCDF	0.887	0.954	J	0.1	0.0954	ng/kg	Y
D-2	1,2,3,7,8-PeCDD	0.373	5.37		1	5.37	ng/kg	Y
D-2	1,2,3,7,8-PeCDF	0.513	3.76	J	0.03	0.1128	ng/kg	Y
D-2	2,3,4,6,7,8-HxCDF	0.691	3.07	J	0.1	0.307	ng/kg	Y
D-2	2,3,4,7,8-PeCDF	0.666	4.11		0.3	1.233	ng/kg	Y
D-2	2,3,7,8-TCDD	0.173	1.6		1	1.6	ng/kg	Y
D-2	2,3,7,8-TCDF	0.234	104		0.1	10.4	ng/kg	Y
D-2	OCDD	1.72	627		0.0003	0.1881	ng/kg	Y
D-2	OCDF	1.51	41.9		0.0003	0.01257	ng/kg	Y
D-2	**Dioxin/Furan TEQ**		**25.1**	**JT**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
D-3A	1,2,3,4,6,7,8-HpCDD	0.737	43.3		0.01	0.433	ng/kg	Y
D-3A	1,2,3,4,6,7,8-HpCDF	1.09	9.97		0.01	0.0997	ng/kg	Y
D-3A	1,2,3,4,7,8,9-HpCDF	0.86	0.669	J	0.01	0.00669	ng/kg	Y
D-3A	1,2,3,4,7,8-HxCDD	0.755	2.8		0.1	0.28	ng/kg	Y
D-3A	1,2,3,4,7,8-HxCDF	0.702	1.41	J	0.1	0.141	ng/kg	Y
D-3A	1,2,3,6,7,8-HxCDD	0.644	4.5		0.1	0.45	ng/kg	Y
D-3A	1,2,3,6,7,8-HxCDF	0.269	1.43		0.1	0.143	ng/kg	Y
D-3A	1,2,3,7,8,9-HxCDD	0.467	3.21		0.1	0.321	ng/kg	Y
D-3A	1,2,3,7,8,9-HxCDF	0.877	0.541		0.1	0.0541	ng/kg	Y
D-3A	1,2,3,7,8-PeCDD	0.369	3.15		1	3.15	ng/kg	Y
D-3A	1,2,3,7,8-PeCDF	0.507	2.28	J	0.03	0.0684	ng/kg	Y
D-3A	2,3,4,6,7,8-HxCDF	0.683	1.6	J	0.1	0.16	ng/kg	Y
D-3A	2,3,4,7,8-PeCDF	0.659	2.39		0.3	0.717	ng/kg	Y
D-3A	2,3,7,8-TCDD	0.171	1.08	U	1	0.54	ng/kg	N
D-3A	2,3,7,8-TCDF	0.231	14.1		0.1	1.41	ng/kg	Y
D-3A	OCDD	1.7	241		0.0003	0.0723	ng/kg	Y
D-3A	OCDF	1.49	15.9		0.0003	0.00477	ng/kg	Y
D-3A	**Dioxin/Furan TEQ**		**8.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-3B	1,2,3,4,6,7,8-HpCDD	0.738	141		0.01	1.41	ng/kg	Y
D-3B	1,2,3,4,6,7,8-HpCDF	1.09	34.2		0.01	0.342	ng/kg	Y
D-3B	1,2,3,4,7,8,9-HpCDF	0.861	1.87		0.01	0.0187	ng/kg	Y
D-3B	1,2,3,4,7,8-HxCDD	0.756	6.65		0.1	0.665	ng/kg	Y
D-3B	1,2,3,4,7,8-HxCDF	0.703	3.77	J	0.1	0.377	ng/kg	Y
D-3B	1,2,3,6,7,8-HxCDD	0.645	11.8		0.1	1.18	ng/kg	Y
D-3B	1,2,3,6,7,8-HxCDF	0.27	3.42		0.1	0.342	ng/kg	Y
D-3B	1,2,3,7,8,9-HxCDD	0.468	7.83		0.1	0.783	ng/kg	Y
D-3B	1,2,3,7,8,9-HxCDF	0.878	1.14		0.1	0.114	ng/kg	Y
D-3B	1,2,3,7,8-PeCDD	0.369	7.12		1	7.12	ng/kg	Y
D-3B	1,2,3,7,8-PeCDF	0.508	5.73	J	0.03	0.1719	ng/kg	Y
D-3B	2,3,4,6,7,8-HxCDF	0.684	4.16	J	0.1	0.416	ng/kg	Y
D-3B	2,3,4,7,8-PeCDF	0.659	6.29		0.3	1.887	ng/kg	Y
D-3B	2,3,7,8-TCDD	0.171	2.39		1	2.39	ng/kg	Y
D-3B	2,3,7,8-TCDF	0.231	86		0.1	8.6	ng/kg	Y
D-3B	OCDD	1.7	740		0.0003	0.222	ng/kg	Y
D-3B	OCDF	1.49	57.1		0.0003	0.01713	ng/kg	Y
D-3B	**Dioxin/Furan TEQ**		**26.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-4A	1,2,3,4,6,7,8-HpCDD	0.745	2.07	U	0.01	0.01035	ng/kg	N
D-4A	1,2,3,4,6,7,8-HpCDF	1.1	0.127	U	0.01	0.000635	ng/kg	N
D-4A	1,2,3,4,7,8,9-HpCDF	0.0596	0.993	U	0.01	0.000298	ng/kg	N
D-4A	1,2,3,4,7,8-HxCDD	0.763	0.129	U	0.1	0.00645	ng/kg	N
D-4A	1,2,3,4,7,8-HxCDF	0.709	0.0576	U	0.1	0.00288	ng/kg	N
D-4A	1,2,3,6,7,8-HxCDD	0.65	0.153		0.1	0.0153	ng/kg	Y
D-4A	1,2,3,6,7,8-HxCDF	0.0437	0.993	U	0.1	0.002185	ng/kg	N
D-4A	1,2,3,7,8,9-HxCDD	0.472	0.211	U	0.1	0.01055	ng/kg	N
D-4A	1,2,3,7,8,9-HxCDF	0.886	0.0735	U	0.1	0.003675	ng/kg	N
D-4A	1,2,3,7,8-PeCDD	0.372	0.0973	U	1	0.04865	ng/kg	N
D-4A	1,2,3,7,8-PeCDF	0.512	0.123	U	0.03	0.001845	ng/kg	N

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
D-4A	2,3,4,6,7,8-HxCDF	0.0477	0.993	U	0.1	0.002385	ng/kg	N
D-4A	2,3,4,7,8-PeCDF	0.0636	0.993	U	0.3	0.00954	ng/kg	N
D-4A	2,3,7,8-TCDD	0.173	0.145	U	1	0.0725	ng/kg	N
D-4A	2,3,7,8-TCDF	0.233	0.109	U	0.1	0.00545	ng/kg	N
D-4A	OCDD	1.72	12.7	U	0.0003	0.001905	ng/kg	N
D-4A	OCDF	1.51	0.222	U	0.0003	0.0000333	ng/kg	N
D-4A	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**
D-4B	1,2,3,4,6,7,8-HpCDD	0.737	57.3		0.01	0.573	ng/kg	Y
D-4B	1,2,3,4,6,7,8-HpCDF	1.09	13.4		0.01	0.134	ng/kg	Y
D-4B	1,2,3,4,7,8,9-HpCDF	0.86	0.946	J	0.01	0.00946	ng/kg	Y
D-4B	1,2,3,4,7,8-HxCDD	0.755	2.91		0.1	0.291	ng/kg	Y
D-4B	1,2,3,4,7,8-HxCDF	0.702	1.8	J	0.1	0.18	ng/kg	Y
D-4B	1,2,3,6,7,8-HxCDD	0.644	4.77		0.1	0.477	ng/kg	Y
D-4B	1,2,3,6,7,8-HxCDF	0.269	1.56		0.1	0.156	ng/kg	Y
D-4B	1,2,3,7,8,9-HxCDD	0.467	3.31		0.1	0.331	ng/kg	Y
D-4B	1,2,3,7,8,9-HxCDF	0.877	0.82		0.1	0.082	ng/kg	Y
D-4B	1,2,3,7,8-PeCDD	0.369	3.14		1	3.14	ng/kg	Y
D-4B	1,2,3,7,8-PeCDF	0.507	2.2	J	0.03	0.066	ng/kg	Y
D-4B	2,3,4,6,7,8-HxCDF	0.683	1.82	J	0.1	0.182	ng/kg	Y
D-4B	2,3,4,7,8-PeCDF	0.659	2.6		0.3	0.78	ng/kg	Y
D-4B	2,3,7,8-TCDD	0.171	0.991	U	1	0.4955	ng/kg	N
D-4B	2,3,7,8-TCDF	0.231	31.5		0.1	3.15	ng/kg	Y
D-4B	OCDD	1.7	388		0.0003	0.1164	ng/kg	Y
D-4B	OCDF	1.49	18.9		0.0003	0.00567	ng/kg	Y
D-4B	**Dioxin/Furan TEQ**		**10.2**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-5A	1,2,3,4,6,7,8-HpCDD	0.742	1	U	0.01	0.005	ng/kg	N
D-5A	1,2,3,4,6,7,8-HpCDF	1.1	0.111	U	0.01	0.000555	ng/kg	N
D-5A	1,2,3,4,7,8,9-HpCDF	0.0534	0.989	U	0.01	0.000267	ng/kg	N
D-5A	1,2,3,4,7,8-HxCDD	0.0475	0.989	U	0.1	0.002375	ng/kg	N
D-5A	1,2,3,4,7,8-HxCDF	0.0317	0.989	U	0.1	0.001585	ng/kg	N
D-5A	1,2,3,6,7,8-HxCDD	0.648	0.095	U	0.1	0.00475	ng/kg	N
D-5A	1,2,3,6,7,8-HxCDF	0.271	0.0593		0.1	0.00593	ng/kg	Y
D-5A	1,2,3,7,8,9-HxCDD	0.47	0.194		0.1	0.0194	ng/kg	Y
D-5A	1,2,3,7,8,9-HxCDF	0.882	0.101	U	0.1	0.00505	ng/kg	N
D-5A	1,2,3,7,8-PeCDD	0.371	0.0851		1	0.0851	ng/kg	Y
D-5A	1,2,3,7,8-PeCDF	0.51	0.0653	U	0.03	0.0009795	ng/kg	N
D-5A	2,3,4,6,7,8-HxCDF	0.687	0.0455		0.1	0.00455	ng/kg	Y
D-5A	2,3,4,7,8-PeCDF	0.0376	0.989	U	0.3	0.00564	ng/kg	N
D-5A	2,3,7,8-TCDD	0.172	0.125	U	1	0.0625	ng/kg	N
D-5A	2,3,7,8-TCDF	0.0336	0.989	U	0.1	0.00168	ng/kg	N
D-5A	OCDD	1.71	7.41	U	0.0003	0.0011115	ng/kg	N
D-5A	OCDF	1.5	0.346		0.0003	0.0001038	ng/kg	Y
D-5A	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
D-5B	1,2,3,4,6,7,8-HpCDD	0.743	2.11	U	0.01	0.01055	ng/kg	N
D-5B	1,2,3,4,6,7,8-HpCDF	1.1	0.475	U	0.01	0.002375	ng/kg	N
D-5B	1,2,3,4,7,8,9-HpCDF	0.866	0.149	U	0.01	0.000745	ng/kg	N
D-5B	1,2,3,4,7,8-HxCDD	0.76	0.125	U	0.1	0.00625	ng/kg	N
D-5B	1,2,3,4,7,8-HxCDF	0.707	0.107	J	0.1	0.0107	ng/kg	Y
D-5B	1,2,3,6,7,8-HxCDD	0.649	0.248	U	0.1	0.0124	ng/kg	N
D-5B	1,2,3,6,7,8-HxCDF	0.271	0.097	U	0.1	0.00485	ng/kg	N
D-5B	1,2,3,7,8,9-HxCDD	0.47	0.313		0.1	0.0313	ng/kg	Y
D-5B	1,2,3,7,8,9-HxCDF	0.883	0.18	U	0.1	0.009	ng/kg	N
D-5B	1,2,3,7,8-PeCDD	0.371	0.162	U	1	0.081	ng/kg	N
D-5B	1,2,3,7,8-PeCDF	0.511	0.129	U	0.03	0.001935	ng/kg	N
D-5B	2,3,4,6,7,8-HxCDF	0.688	0.0891	U	0.1	0.004455	ng/kg	N
D-5B	2,3,4,7,8-PeCDF	0.663	0.117	U	0.3	0.01755	ng/kg	N
D-5B	2,3,7,8-TCDD	0.172	0.186	U	1	0.093	ng/kg	N
D-5B	2,3,7,8-TCDF	0.233	1.51		0.1	0.151	ng/kg	Y
D-5B	OCDD	1.71	17.4	U	0.0003	0.00261	ng/kg	N
D-5B	OCDF	1.5	0.952		0.0003	0.0002856	ng/kg	Y
D-5B	**Dioxin/Furan TEQ**		**0.4**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-6A	1,2,3,4,6,7,8-HpCDD	0.744	1.37	U	0.01	0.00685	ng/kg	N
D-6A	1,2,3,4,6,7,8-HpCDF	1.1	0.107	U	0.01	0.000535	ng/kg	N
D-6A	1,2,3,4,7,8,9-HpCDF	0.868	0.0456	J	0.01	0.000456	ng/kg	Y
D-6A	1,2,3,4,7,8-HxCDD	0.0516	0.992	U	0.1	0.00258	ng/kg	N
D-6A	1,2,3,4,7,8-HxCDF	0.0317	0.992	U	0.1	0.001585	ng/kg	N
D-6A	1,2,3,6,7,8-HxCDD	0.0536	0.992	U	0.1	0.00268	ng/kg	N
D-6A	1,2,3,6,7,8-HxCDF	0.272	0.0298	U	0.1	0.00149	ng/kg	N
D-6A	1,2,3,7,8,9-HxCDD	0.471	0.131	U	0.1	0.00655	ng/kg	N
D-6A	1,2,3,7,8,9-HxCDF	0.885	0.0853		0.1	0.00853	ng/kg	Y
D-6A	1,2,3,7,8-PeCDD	0.0516	0.992	U	1	0.0258	ng/kg	N
D-6A	1,2,3,7,8-PeCDF	0.0337	0.992	U	0.03	0.0005055	ng/kg	N
D-6A	2,3,4,6,7,8-HxCDF	0.689	0.0456	U	0.1	0.00228	ng/kg	N
D-6A	2,3,4,7,8-PeCDF	0.0357	0.992	U	0.3	0.005355	ng/kg	N
D-6A	2,3,7,8-TCDD	0.0317	0.992	U	1	0.01585	ng/kg	N
D-6A	2,3,7,8-TCDF	0.0198	0.992	U	0.1	0.00099	ng/kg	N
D-6A	OCDD	1.72	13.2	U	0.0003	0.00198	ng/kg	N
D-6A	OCDF	1.5	0.518	J	0.0003	0.0001554	ng/kg	Y
D-6A	**Dioxin/Furan TEQ**		**0.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-6B	1,2,3,4,6,7,8-HpCDD	0.741	1.45	U	0.01	0.00725	ng/kg	N
D-6B	1,2,3,4,6,7,8-HpCDF	1.1	0.292	U	0.01	0.00146	ng/kg	N
D-6B	1,2,3,4,7,8,9-HpCDF	0.865	0.241	J	0.01	0.00241	ng/kg	Y
D-6B	1,2,3,4,7,8-HxCDD	0.759	0.107	U	0.1	0.00535	ng/kg	N
D-6B	1,2,3,4,7,8-HxCDF	0.706	0.0909	J	0.1	0.00909	ng/kg	Y
D-6B	1,2,3,6,7,8-HxCDD	0.647	0.15	U	0.1	0.0075	ng/kg	N
D-6B	1,2,3,6,7,8-HxCDF	0.271	0.115	U	0.1	0.00575	ng/kg	N
D-6B	1,2,3,7,8,9-HxCDD	0.469	0.229	U	0.1	0.01145	ng/kg	N
D-6B	1,2,3,7,8,9-HxCDF	0.881	0.14	U	0.1	0.007	ng/kg	N
D-6B	1,2,3,7,8-PeCDD	0.371	0.0988	U	1	0.0494	ng/kg	N

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
D-6B	1,2,3,7,8-PeCDF	0.51	0.081	U	0.03	0.001215	ng/kg	N
D-6B	2,3,4,6,7,8-HxCDF	0.687	0.136	U	0.1	0.0068	ng/kg	N
D-6B	2,3,4,7,8-PeCDF	0.662	0.0711	U	0.3	0.010665	ng/kg	N
D-6B	2,3,7,8-TCDD	0.0336	0.988	U	1	0.0168	ng/kg	N
D-6B	2,3,7,8-TCDF	0.232	0.0455	U	0.1	0.002275	ng/kg	N
D-6B	OCDD	1.71	19.6	U	0.0003	0.00294	ng/kg	N
D-6B	OCDF	1.5	1.52		0.0003	0.000228	ng/kg	N
D-6B	**Dioxin/Furan TEQ**		**0.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-7	1,2,3,4,6,7,8-HpCDD	0.746	108		0.01	1.08	ng/kg	Y
D-7	1,2,3,4,6,7,8-HpCDF	1.1	30.6		0.01	0.306	ng/kg	Y
D-7	1,2,3,4,7,8,9-HpCDF	0.871	1.48		0.01	0.0148	ng/kg	Y
D-7	1,2,3,4,7,8-HxCDD	0.764	3.25		0.1	0.325	ng/kg	Y
D-7	1,2,3,4,7,8-HxCDF	0.71	2.05	J	0.1	0.205	ng/kg	Y
D-7	1,2,3,6,7,8-HxCDD	0.652	6.35		0.1	0.635	ng/kg	Y
D-7	1,2,3,6,7,8-HxCDF	0.273	1.59		0.1	0.159	ng/kg	Y
D-7	1,2,3,7,8,9-HxCDD	0.473	3.77		0.1	0.377	ng/kg	Y
D-7	1,2,3,7,8,9-HxCDF	0.888	0.647		0.1	0.0647	ng/kg	Y
D-7	1,2,3,7,8-PeCDD	0.373	3.09		1	3.09	ng/kg	Y
D-7	1,2,3,7,8-PeCDF	0.513	2.63	J	0.03	0.0789	ng/kg	Y
D-7	2,3,4,6,7,8-HxCDF	0.692	1.98	J	0.1	0.198	ng/kg	Y
D-7	2,3,4,7,8-PeCDF	0.667	3.15		0.3	0.945	ng/kg	Y
D-7	2,3,7,8-TCDD	0.173	1.13		1	1.13	ng/kg	Y
D-7	2,3,7,8-TCDF	0.234	60.3		0.1	6.03	ng/kg	Y
D-7	OCDD	1.72	749	U	0.0003	0.11235	ng/kg	N
D-7	OCDF	1.51	94.3		0.0003	0.02829	ng/kg	Y
D-7	**Dioxin/Furan TEQ**		**14.8**	**JT**	**--**	**--**	**ng/kg**	**Y**
PT-10-36.0-37.0	1,2,3,4,6,7,8-HpCDD	0.743	2.1	U	0.01	0.0105	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,6,7,8-HpCDF	1.1	0.427	U	0.01	0.002135	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,7,8,9-HpCDF	0.866	0.246	U	0.01	0.00123	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,7,8-HxCDD	0.76	0.248		0.1	0.0248	ng/kg	Y
PT-10-36.0-37.0	1,2,3,4,7,8-HxCDF	0.707	0.323	J	0.1	0.0323	ng/kg	Y
PT-10-36.0-37.0	1,2,3,6,7,8-HxCDD	0.649	0.281	U	0.1	0.01405	ng/kg	N
PT-10-36.0-37.0	1,2,3,6,7,8-HxCDF	0.271	0.271	U	0.1	0.01355	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8,9-HxCDD	0.47	0.371		0.1	0.0371	ng/kg	Y
PT-10-36.0-37.0	1,2,3,7,8,9-HxCDF	0.883	0.269	U	0.1	0.01345	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8-PeCDD	0.371	0.317	U	1	0.1585	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8-PeCDF	0.511	0.41	U	0.03	0.00615	ng/kg	N
PT-10-36.0-37.0	2,3,4,6,7,8-HxCDF	0.688	0.259		0.1	0.0259	ng/kg	Y
PT-10-36.0-37.0	2,3,4,7,8-PeCDF	0.663	0.352	U	0.3	0.0528	ng/kg	N
PT-10-36.0-37.0	2,3,7,8-TCDD	0.172	0.244	U	1	0.122	ng/kg	N
PT-10-36.0-37.0	2,3,7,8-TCDF	0.233	1.09		0.1	0.109	ng/kg	Y
PT-10-36.0-37.0	OCDD	1.71	15.6	U	0.0003	0.00234	ng/kg	N
PT-10-36.0-37.0	OCDF	1.5	0.547	U	0.0003	0.00008205	ng/kg	N
PT-10-36.0-37.0	**Dioxin/Furan TEQ**		**0.6**	**JT**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
PT-11-36.0-37.0	1,2,3,4,6,7,8-HpCDD	0.738	0.747	U	0.01	0.003735	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,6,7,8-HpCDF	1.09	0.0768	U	0.01	0.000384	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8,9-HpCDF	0.0335	0.984	U	0.01	0.0001675	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8-HxCDD	0.756	0.0453	U	0.1	0.002265	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8-HxCDF	0.0236	0.984	U	0.1	0.00118	ng/kg	N
PT-11-36.0-37.0	1,2,3,6,7,8-HxCDD	0.645	0.0719		0.1	0.00719	ng/kg	Y
PT-11-36.0-37.0	1,2,3,6,7,8-HxCDF	0.0217	0.984	U	0.1	0.001085	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8,9-HxCDD	0.468	0.0943		0.1	0.00943	ng/kg	Y
PT-11-36.0-37.0	1,2,3,7,8,9-HxCDF	0.878	0.0906	U	0.1	0.00453	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8-PeCDD	0.369	0.0571	U	1	0.02855	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8-PeCDF	0.508	0.0559		0.03	0.001677	ng/kg	Y
PT-11-36.0-37.0	2,3,4,6,7,8-HxCDF	0.684	0.0374	U	0.1	0.00187	ng/kg	N
PT-11-36.0-37.0	2,3,4,7,8-PeCDF	0.0394	0.984	U	0.3	0.00591	ng/kg	N
PT-11-36.0-37.0	2,3,7,8-TCDD	0.0295	0.984	U	1	0.01475	ng/kg	N
PT-11-36.0-37.0	2,3,7,8-TCDF	0.0236	0.984	U	0.1	0.00118	ng/kg	N
PT-11-36.0-37.0	OCDD	1.7	7.57	U	0.0003	0.0011355	ng/kg	N
PT-11-36.0-37.0	OCDF	1.49	0.167	U	0.0003	0.00002505	ng/kg	N
PT-11-36.0-37.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-12-30.0-31.0	1,2,3,4,6,7,8-HpCDD	0.746	57.3		0.01	0.573	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,6,7,8-HpCDF	1.1	6.01		0.01	0.0601	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8,9-HpCDF	0.87	1.37		0.01	0.0137	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8-HxCDD	0.763	3.78		0.1	0.378	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8-HxCDF	0.71	1.92	J	0.1	0.192	ng/kg	Y
PT-12-30.0-31.0	1,2,3,6,7,8-HxCDD	0.651	5.38		0.1	0.538	ng/kg	Y
PT-12-30.0-31.0	1,2,3,6,7,8-HxCDF	0.272	2.12		0.1	0.212	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8,9-HxCDD	0.472	4.57		0.1	0.457	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8,9-HxCDF	0.887	0.866	J	0.1	0.0866	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8-PeCDD	0.373	2.87		1	2.87	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8-PeCDF	0.513	1.83	J	0.03	0.0549	ng/kg	Y
PT-12-30.0-31.0	2,3,4,6,7,8-HxCDF	0.691	2.58	J	0.1	0.258	ng/kg	Y
PT-12-30.0-31.0	2,3,4,7,8-PeCDF	0.666	2.53		0.3	0.759	ng/kg	Y
PT-12-30.0-31.0	2,3,7,8-TCDD	0.173	0.672	U	1	0.336	ng/kg	N
PT-12-30.0-31.0	2,3,7,8-TCDF	0.234	3.44		0.1	0.344	ng/kg	Y
PT-12-30.0-31.0	OCDD	1.72	65.8	U	0.0003	0.00987	ng/kg	N
PT-12-30.0-31.0	OCDF	1.51	3.83		0.0003	0.001149	ng/kg	Y
PT-12-30.0-31.0	**Dioxin/Furan TEQ**		**7.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
PT-13-29.0-30.0	1,2,3,4,6,7,8-HpCDD	0.735	1.08	U	0.01	0.0054	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,6,7,8-HpCDF	1.09	0.18	U	0.01	0.0009	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,7,8,9-HpCDF	0.047	0.979	U	0.01	0.000235	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,7,8-HxCDD	0.752	0.104		0.1	0.0104	ng/kg	Y
PT-13-29.0-30.0	1,2,3,4,7,8-HxCDF	0.699	0.0392	U	0.1	0.00196	ng/kg	N
PT-13-29.0-30.0	1,2,3,6,7,8-HxCDD	0.642	0.0725	U	0.1	0.003625	ng/kg	N
PT-13-29.0-30.0	1,2,3,6,7,8-HxCDF	0.268	0.0541		0.1	0.00541	ng/kg	Y
PT-13-29.0-30.0	1,2,3,7,8,9-HxCDD	0.465	0.165	U	0.1	0.00825	ng/kg	N
PT-13-29.0-30.0	1,2,3,7,8,9-HxCDF	0.874	0.0995		0.1	0.00995	ng/kg	Y
PT-13-29.0-30.0	1,2,3,7,8-PeCDD	0.367	0.0627	U	1	0.03135	ng/kg	N
PT-13-29.0-30.0	1,2,3,7,8-PeCDF	0.505	0.0337		0.03	0.001011	ng/kg	Y

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
PT-13-29.0-30.0	2,3,4,6,7,8-HxCDF	0.0313	0.979	U	0.1	0.001565	ng/kg	N
PT-13-29.0-30.0	2,3,4,7,8-PeCDF	0.0372	0.979	U	0.3	0.00558	ng/kg	N
PT-13-29.0-30.0	2,3,7,8-TCDD	0.0274	0.979	U	1	0.0137	ng/kg	N
PT-13-29.0-30.0	2,3,7,8-TCDF	0.0235	0.979	U	0.1	0.001175	ng/kg	N
PT-13-29.0-30.0	OCDD	1.7	10.7	U	0.0003	0.001605	ng/kg	N
PT-13-29.0-30.0	OCDF	1.48	0.749		0.0003	0.0002247	ng/kg	Y
PT-13-29.0-30.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-14-29.0-30.0	1,2,3,4,6,7,8-HpCDD	0.746	0.836	U	0.01	0.00418	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,6,7,8-HpCDF	1.1	0.0577	U	0.01	0.0002885	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,7,8,9-HpCDF	0.179	0.995	U	0.01	0.000895	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,7,8-HxCDD	0.764	0.0412		0.1	0.00412	ng/kg	Y
PT-14-29.0-30.0	1,2,3,4,7,8-HxCDF	0.0219	0.995	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	1,2,3,6,7,8-HxCDD	0.652	0.0517	U	0.1	0.002585	ng/kg	N
PT-14-29.0-30.0	1,2,3,6,7,8-HxCDF	0.0219	0.995	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8,9-HxCDD	0.0398	0.995	U	0.1	0.00199	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8,9-HxCDF	0.888	0.0756	U	0.1	0.00378	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8-PeCDD	0.0398	0.995	U	1	0.0199	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8-PeCDF	0.513	0.0577	U	0.03	0.0008655	ng/kg	N
PT-14-29.0-30.0	2,3,4,6,7,8-HxCDF	0.0219	0.995	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	2,3,4,7,8-PeCDF	0.0318	0.995	U	0.3	0.00477	ng/kg	N
PT-14-29.0-30.0	2,3,7,8-TCDD	0.173	0.151	U	1	0.0755	ng/kg	N
PT-14-29.0-30.0	2,3,7,8-TCDF	0.0259	0.995	U	0.1	0.001295	ng/kg	N
PT-14-29.0-30.0	OCDD	1.72	4.89	U	0.0003	0.0007335	ng/kg	N
PT-14-29.0-30.0	OCDF	0.0637	1.99	U	0.0003	0.000009555	ng/kg	N
PT-14-29.0-30.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-3-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.743	2.02	U	0.01	0.0101	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.1	0.268	U	0.01	0.00134	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.867	0.2	U	0.01	0.001	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,7,8-HxCDD	0.761	0.0894		0.1	0.00894	ng/kg	Y
PT-3-43.0-44.0	1,2,3,4,7,8-HxCDF	0.708	0.0614	U	0.1	0.00307	ng/kg	N
PT-3-43.0-44.0	1,2,3,6,7,8-HxCDD	0.649	0.123	U	0.1	0.00615	ng/kg	N
PT-3-43.0-44.0	1,2,3,6,7,8-HxCDF	0.272	0.0396	U	0.1	0.00198	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8,9-HxCDD	0.471	0.165	U	0.1	0.00825	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8,9-HxCDF	0.0337	0.991	U	0.1	0.001685	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8-PeCDD	0.0436	0.991	U	1	0.0218	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8-PeCDF	0.511	0.0416	U	0.03	0.000624	ng/kg	N
PT-3-43.0-44.0	2,3,4,6,7,8-HxCDF	0.689	0.0496	U	0.1	0.00248	ng/kg	N
PT-3-43.0-44.0	2,3,4,7,8-PeCDF	0.0278	0.991	U	0.3	0.00417	ng/kg	N
PT-3-43.0-44.0	2,3,7,8-TCDD	0.0337	0.991	U	1	0.01685	ng/kg	N
PT-3-43.0-44.0	2,3,7,8-TCDF	0.0258	0.991	U	0.1	0.00129	ng/kg	N
PT-3-43.0-44.0	OCDD	1.72	20.6	U	0.0003	0.00309	ng/kg	N
PT-3-43.0-44.0	OCDF	1.5	1.5		0.0003	0.00045	ng/kg	Y
PT-3-43.0-44.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
PT-5-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.736	2.45	U	0.01	0.01225	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.09	0.475	U	0.01	0.002375	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.859	0.194	U	0.01	0.00097	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8-HxCDD	0.754	0.173	U	0.1	0.00865	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8-HxCDF	0.701	0.0569	U	0.1	0.002845	ng/kg	N
PT-5-43.0-44.0	1,2,3,6,7,8-HxCDD	0.643	0.179	U	0.1	0.00895	ng/kg	N
PT-5-43.0-44.0	1,2,3,6,7,8-HxCDF	0.269	0.165	U	0.1	0.00825	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8,9-HxCDD	0.466	0.457	U	0.1	0.02285	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8,9-HxCDF	0.875	0.192		0.1	0.0192	ng/kg	Y
PT-5-43.0-44.0	1,2,3,7,8-PeCDD	0.368	0.108	U	1	0.054	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8-PeCDF	0.506	0.0883	U	0.03	0.0013245	ng/kg	N
PT-5-43.0-44.0	2,3,4,6,7,8-HxCDF	0.682	0.132	U	0.1	0.0066	ng/kg	N
PT-5-43.0-44.0	2,3,4,7,8-PeCDF	0.658	0.0393	U	0.3	0.005895	ng/kg	N
PT-5-43.0-44.0	2,3,7,8-TCDD	0.0334	0.981	U	1	0.0167	ng/kg	N
PT-5-43.0-44.0	2,3,7,8-TCDF	0.0294	0.981	U	0.1	0.00147	ng/kg	N
PT-5-43.0-44.0	OCDD	1.7	23.5	U	0.0003	0.003525	ng/kg	N
PT-5-43.0-44.0	OCDF	1.49	2.01	U	0.0003	0.0003015	ng/kg	N
PT-5-43.0-44.0	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-6-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.745	1.21	U	0.01	0.00605	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.1	0.0497	U	0.01	0.0002485	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.869	0.0377	U	0.01	0.0001885	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8-HxCDD	0.763	0.0338	U	0.1	0.00169	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8-HxCDF	0.0179	0.993	U	0.1	0.000895	ng/kg	N
PT-6-43.0-44.0	1,2,3,6,7,8-HxCDD	0.0397	0.993	U	0.1	0.001985	ng/kg	N
PT-6-43.0-44.0	1,2,3,6,7,8-HxCDF	0.0179	0.993	U	0.1	0.000895	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8,9-HxCDD	0.472	0.0775	U	0.1	0.003875	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8,9-HxCDF	0.886	0.0397	U	0.1	0.001985	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8-PeCDD	0.0417	0.993	U	1	0.02085	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8-PeCDF	0.0278	0.993	U	0.03	0.000417	ng/kg	N
PT-6-43.0-44.0	2,3,4,6,7,8-HxCDF	0.0199	0.993	U	0.1	0.000995	ng/kg	N
PT-6-43.0-44.0	2,3,4,7,8-PeCDF	0.0278	0.993	U	0.3	0.00417	ng/kg	N
PT-6-43.0-44.0	2,3,7,8-TCDD	0.0357	0.993	U	1	0.01785	ng/kg	N
PT-6-43.0-44.0	2,3,7,8-TCDF	0.0238	0.993	U	0.1	0.00119	ng/kg	N
PT-6-43.0-44.0	OCDD	1.72	16.2	U	0.0003	0.00243	ng/kg	N
PT-6-43.0-44.0	OCDF	1.51	0.213	U	0.0003	0.00003195	ng/kg	N
PT-6-43.0-44.0	**Dioxin/Furan TEQ**		**0.1**	**UT**	**--**	**--**	**ng/kg**	**N**
PT-8-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.74	2.38	U	0.01	0.0119	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.09	0.807	U	0.01	0.004035	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.863	0.465	U	0.01	0.002325	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8-HxCDD	0.757	0.353	U	0.1	0.01765	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8-HxCDF	0.704	0.41	U	0.1	0.0205	ng/kg	N
PT-8-43.0-44.0	1,2,3,6,7,8-HxCDD	0.646	0.432		0.1	0.0432	ng/kg	Y
PT-8-43.0-44.0	1,2,3,6,7,8-HxCDF	0.27	0.424	U	0.1	0.0212	ng/kg	N

Sample ID	Congener	EDL	Result(a)	Qualifier	TEF	TEQ(b)	Units	Detected?
PT-8-43.0-44.0	1,2,3,7,8,9-HxCDD	0.468	0.758		0.1	0.0758	ng/kg	Y
PT-8-43.0-44.0	1,2,3,7,8,9-HxCDF	0.88	0.465	U	0.1	0.02325	ng/kg	N
PT-8-43.0-44.0	1,2,3,7,8-PeCDD	0.37	0.284	U	1	0.142	ng/kg	N
PT-8-43.0-44.0	1,2,3,7,8-PeCDF	0.509	0.234		0.03	0.00702	ng/kg	Y
PT-8-43.0-44.0	2,3,4,6,7,8-HxCDF	0.685	0.316	U	0.1	0.0158	ng/kg	N
PT-8-43.0-44.0	2,3,4,7,8-PeCDF	0.661	0.147	J	0.3	0.0441	ng/kg	Y
PT-8-43.0-44.0	2,3,7,8-TCDD	0.172	0.148	U	1	0.074	ng/kg	N
PT-8-43.0-44.0	2,3,7,8-TCDF	0.232	0.0592	U	0.1	0.00296	ng/kg	N
PT-8-43.0-44.0	OCDD	1.71	20.4	U	0.0003	0.00306	ng/kg	N
PT-8-43.0-44.0	OCDF	1.5	2.56		0.0003	0.000768	ng/kg	Y
PT-8-43.0-44.0	**Dioxin/Furan TEQ**		**0.5**	**JT**	**--**	**--**	**ng/kg**	**Y**

Notes:

EDL = estimated detection limit

J = estimated

JT = estimated total

N = no

ng/kg = nanogram per kilogram

TEQ = toxicity equivalent

U = not detected

UT = not detected total

(a) Results flagged as not detected are represented by the reporting limit

(b) Undetected values are included in the TEQ calculation as half of the EDL, except in cases where the validator reclassified the reported result as not detected. In those cases, the EDL was elevated to the reported result and included in the TEQ as half the reported result.

Table 6

Interim Action Sediment Chemical Analytical Results Compared to MTCA Cleanup Preliminary Screening Levels

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
Conventionals																			
Total Organic Carbon	NE	NE	%	14.4	9.93	5.6	13.3	0.313	8.49	0.152	0.124	0.157	0.176	2.94	2.7	–	0.228	7.76	–
Organic Matter	NE	NE	%	16.73	11.93	5.91	13.2	0.65	7.87	0.52	1.14	0.54	0.58	7.2	4.39	–	0.43	8.29	–
Preserved Total Solids	NE	NE	%	–	–	–	–	–	–	–	–	–	–	–	–	58.07	–	–	81.39
Total Solids	NE	NE	%	45.98	50.15	62.61	44.45	79.68	51.63	81.11	81.14	82.81	81.72	57.21	71.55	–	81.58	61.16	–
Total Volatile Solids	NE	NE	%	21.02	18.9	12.12	31.21	1.31	14.52	1.14	1.05	1.19	0.95	12.15	5.09	–	1.01	10.3	–
Ammonia	NE	NE	mg/kg	21	30	8.47	45.1	3.93	28.7	9.95	7.88	2.78	6.01	20.2	13.2	–	26.6	42.2	–
Sulfide	NE	NE	mg/kg	–	–	–	–	–	–	–	–	1.92 J	4.38 J	112 J	16	205	1.32	4.8	22.3 J
Grain Size																			
Gravel (≤ -1)	NE	NE	%	10.2	8.2	1.8	7.2	0.3	5.7	0.1	1.6	0.7	0.1 U	4.6	1.1	–	0.1	0.8	–
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	4.8	2.4	1.5	3.9	0.3	2.2	0.1	0.6	0.1	0.2	1.9	0.8	–	0.4	1.6	–
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	6.6	3.7	2.7	5.8	1.1	3.5	0.5	1.6	0.5	1.2	3.8	2.2	–	2.8	2.3	–
Medium sand (1 < Phi ≤ 2)	NE	NE	%	15	16.1	23	12.1	18.3	12.2	10.4	22.9	27.5	22.5	20.5	20.4	–	10.9	5.2	–
Fine sand (2 < Phi ≤ 3)	NE	NE	%	19.3	30.2	42	27	49.2	42.5	52.6	55.5	41.8	60.2	34.9	51.2	–	46.3	14.7	–
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	10.4	11.4	12.6	11.7	20.4	13.3	25.7	7.3	18.5	8.4	8.3	6	–	29.2	23.4	–
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	4.8	5.2	2.6	5.1	3.7	1.6	3.6	2.7	4.1	2.1	7.9	4	–	4.1	13.6	–
Medium silt (5 < Phi ≤ 6)	NE	NE	%	6.6	4.6	3	6.3	1.6	4.6	1.7	2	1.5	1.2	4.3	3.3	–	1.6	11.3	–
Fine silt (6 < Phi ≤ 7)	NE	NE	%	5.4	4.5	2.8	5.1	1.2	3.4	1.2	1.5	1.2	0.8	3.1	2.7	–	1.1	7.9	–
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	4.4	3.5	2.1	4.4	1	2.9	1	1.1	1.2	0.7	2.6	2	–	0.8	5.3	–
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	2.8	2.3	1.5	3.2	0.7	2.1	0.7	1	0.8	0.6	2.2	1.8	–	0.7	4	–
Medium clay (9 < Phi ≤ 10)	NE	NE	%	3	2.8	1.6	2.6	0.7	2	0.8	0.8	0.8	0.7	1.8	1.6	–	0.6	3.5	–
Particle/Grain Size, Phi >10	NE	NE	%	6.7	5.2	2.9	5.7	1.6	4	1.8	1.4	1.3	1.3	4	2.8	–	1.4	6.1	–
Total Fines	NE	NE	%	33.7	28	16.5	32.4	10.4	20.6	10.7	10.4	10.9	7.5	25.9	18.3	–	10.3	51.8	–
Grain Size (Ash Wt.)																			
Gravel (≤ -1)	NE	NE	%	2.1	1.1	1.2	2.8	0.1 U	3.5	0.1 U	0.1 U	0.2	0.1 U	1.5	–	–	–	–	–
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	2.0	1.4	0.6	1.9	0.3	1.0	0.1	0.3	0.1	0.2	1.6	–	–	–	–	–
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	3.8	2.5	1.3	2.7	1.3	2.0	0.4	1.2	0.5	1.2	4.1	–	–	–	–	–
Medium sand (1 < Phi ≤ 2)	NE	NE	%	14.6	14.8	21.5	8.6	19.1	9.5	12.9	16.2	26.6	28.2	24.0	–	–	–	–	–
Fine sand (2 < Phi ≤ 3)	NE	NE	%	23.3	35.6	43.6	31.7	46.5	41.6	52.3	61.4	43.9	56.5	41.6	–	–	–	–	–
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	14.8	16.1	13.0	16.8	20.8	14.9	23.8	12.4	18.4	7.2	9.7	–	–	–	–	–
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	8.5	6.6	4.6	6.0	5.6	6.5	4.3	3.2	4.1	2.7	3.1	–	–	–	–	–
Medium silt (5 < Phi ≤ 6)	NE	NE	%	15.6	9.1	4.5	17.7	1.9	11.0	1.6	1.2	2.1	1.0	6.0	–	–	–	–	–
Fine silt (6 < Phi ≤ 7)	NE	NE	%	6.9	4.9	4.0	5.5	1.7	5.5	1.6	1.1	2.4	0.9	3.6	–	–	–	–	–
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	1.9	2.4	1.8	1.2	1.1	1.2	1.2	0.9	0.2	0.5	1.4	–	–	–	–	–
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	0.9	1.4	0.9	0.5	0.4	0.5	0.5	0.5	0.1 U	0.4	0.7	–	–	–	–	–
Medium clay (9 < Phi ≤ 10)	NE	NE	%	0.3	0.6	0.4	0.2	0.1	0.1	0.2	0.4	0.1	0.2	0.1	–	–	–	–	–
Particle/Grain Size, Phi >10	NE	NE	%	5.1	3.4	2.5	4.3	1.3	2.9	1.3	1.1	1.4	0.9	2.5	–	–	–	–	–
Total Fines	NE	NE	%	39.4	28.5	18.8	35.5	12.0	27.6	10.6	8.5	10.3	6.6	17.5	–	–	–	–	–
Metals																			
Antimony			mg/kg	1.1 J	1.40 J	0.75 J	1.1 J	0.82 J	2.38 J	0.68 J	0.75 J	1.03 J	0.68 J	1.07 J	0.84 J	–	0.77 J	1.46 J	–
Arsenic	57	11	mg/kg	10.7 J	6.80 J	5.83 J	9.5 J	4.57 J	6.67 J	5.14 J	4.81 J	5.18 J	4.42 J	7.69 J	6.08 J	–	3.92 J	9	–
Cadmium	5.1	1	mg/kg	1.3	1	0.6	1.3	0.2	0.7	0.3	0.3	0.220 J	0.210 J	1	0.4	–	0.211 J	1.1	–
Chromium	260	NE	mg/kg	35	31.3	24.3	35	28.4	30.3	27.7	25.7	29.9	22.2	31.5	28.2	–	24.2	47.9	–
Copper	390	69,000	mg/kg	43.9	32.9	18.3	43.2	11	24.8	9.9	9.8	10.2	7.1	33.6	12.8	–	7.6	44.2	–
Lead	450	21	mg/kg	28	22	9	31	1.86 J	14	1.80 J	5	1.94 J	2.30 J	19	10	–	1.48 J	26	–
Mercury	0.41	0.2	mg/kg	0.13	0.14	0.0380 J	0.12	0.0120 J	0.14	0.0106 J	0.0159 J	0.02	0.0080 J	0.1	0.08	–	0.0071 J	0.11	–
Selenium	NE	NE	mg/kg	0.52 J	0.337 J	0.214 J	0.45 J	0.6 U	0.311 J	0.6 U	0.127 J	0.6 U	0.125 J	0.315 J	0.185 J	–	0.6 U	0.487 J	–
Silver	6.1	8,700	mg/kg	0.7 U	0.6 U	0.5 U	0.7 U	0.4 U	0.6 U	0.3 U	0.4 U	0.3 U	0.4 U	0.6 U	0.4 U	–	0.3 U	0.5 U	–
Zinc	410	520,000	mg/kg	76	54	37	69	31	49	31	30	31	27	58	34	–	28	70	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
LPAHs (OC Normalized)																			
2-Methylnaphthalene	38	NA	mg/kg OC	**1.9**	**1.9**	**2.3**	**3.1**	**1.8**	**3.3**	**2.1**	**4.8**	**1.6**	2.7 U	**8.2**	**2.8**	–	2.1 U	**2.3**	–
Acenaphthene	16	NA	mg/kg OC	**2.4**	**2.1**	**2.9**	**3.2**	**1.4**	**4.8**	3.2 U	**3.6**	3 U	2.7 U	**8.8**	**2.7**	–	2.1 U	**2.7**	–
Acenaphthylene	66	NA	mg/kg OC	**0.4**	**0.83**	**1.6**	**1.6**	1.5 U	**1.3**	3.2 U	**1.9**	3 U	2.7 U	**3.7**	**2**	–	2.1 U	**1**	–
Anthracene	220	NA	mg/kg OC	**1.9**	**1.5**	**1.8**	**1.6**	**1.1**	**2.1**	3.2 U	**4.9**	3 U	2.7 U	**5.1**	**4**	–	2.1 U	**2.1**	–
Fluorene	23	NA	mg/kg OC	**2.3**	**2.1**	**2.9**	**3**	**1.5**	**4.4**	3.2 U	**4.7**	3 U	2.7 U	**8.5**	**3.3**	–	2.1 U	**3.1**	–
Naphthalene	99	NA	mg/kg OC	**7.6**	**11**	**21**	**27**	**11**	**19**	**5.6**	**21**	3 U	**3.9**	**44**	**17**	–	**1.4**	**14**	–
Phenanthrene	100	NA	mg/kg OC	**4.7**	**6**	**9.8**	**8.3**	**4.8**	**10**	**5.2**	**15**	3 U	2.7 U	**21**	**9.6**	–	2.1 U	**8.4**	–
Total LPAHs	370	NA	mg/kg OC	**19.4**	**23.7**	**40.3**	**44.7**	**19.4**	**42**	**10.8**	**50.6**	3 U	**3.9**	**91.8**	**38.3**	–	**1.4**	**31.4**	–
LPAHs																			
2-Methylnaphthalene	670	5,900,000	µg/kg	**280**	**190**	**130**	**410**	**5.7**	**280**	**3.2 J**	**5.9**	**2.5 J**	4.8 U	**240**	**75**	–	4.7 U	**180**	–
Acenaphthene	500	88,000,000	µg/kg	**340**	**210**	**160**	**420**	**4.4 J**	**410**	4.8 U	**4.5 J**	4.7 U	4.8 U	**260**	**73**	–	4.7 U	**210**	–
Acenaphthylene	1,300	NE	µg/kg	**57**	**82**	**89**	**210**	4.8 U	**110**	4.8 U	**2.4 J**	4.7 U	4.8 U	**110**	**53**	–	4.7 U	**80**	–
Anthracene	960	440,000,000	µg/kg	**280**	**150**	**99**	**210**	**3.4 J**	**180**	4.8 U	**6.1**	4.7 U	4.8 U	**150**	**100**	–	4.7 U	**160**	–
Fluorene	540	59,000,000	µg/kg	**330**	**210**	**160**	**400**	**4.8 J**	**370**	4.8 U	**5.8**	4.7 U	4.8 U	**250**	**89**	–	4.7 U	**240**	–
Naphthalene	2,100	29,000,000	µg/kg	**1,100**	**1,100**	**1,200**	**3,600**	**33**	**1,600**	**8.5**	**26**	4.7 U	**6.8**	**1,300**	**460**	–	**3.3 J**	**1,100**	–
Phenanthrene	1,500	NE	µg/kg	**680**	**600**	**550**	**1,100**	**15**	**900**	**7.9**	**18**	4.7 U	4.8 U	**630**	**260**	–	4.7 U	**650**	–
Total LPAHs	5,200	NE	µg/kg	**2,787 T**	**2,352 T**	**2,258 T**	**5,940 T**	**60.6 T**	**3,570 T**	**16.4 T**	**62.8 T**	4.7 UT	**6.8 T**	**2,700 T**	**1,035 T**	–	**3.3 T**	**2,440 T**	–
HPAHs (OC Normalized)																			
Benzo(a)anthracene	110	NE	mg/kg OC	**0.97**	**0.58**	**0.61**	**0.39**	1.5 U	**1.5**	3.2 U	**4.4**	3 U	2.7 U	**1.9**	**2.2**	–	2.1 U	**0.91**	–
Benzo(a)pyrene	99	NE	mg/kg OC	**0.55**	**0.34**	**0.32**	**0.22**	1.5 U	**0.99**	3.2 U	**3.1**	3 U	2.7 U	**0.95**	**1.9**	–	2.1 U	**0.63**	–
Benzo(ghi)perylene	31	NE	mg/kg OC	**0.38**	**0.22**	**0.25**	**0.19**	1.5 U	**0.68**	3.2 U	**3.4**	3 U	2.7 U	**0.7**	**1.4**	–	2.1 U	**0.57**	–
Chrysene	110	NE	mg/kg OC	**1.6**	**0.9**	**0.96**	**0.62**	**0.89**	**1.6**	3.2 U	**4.9**	3 U	2.7 U	**2.9**	**2.3**	–	2.1 U	**1.3**	–
Dibenzo(a,h)anthracene	12	NE	mg/kg OC	**0.11**	0.25 U	0.43 U	0.18 U	1.5 U	**0.14**	3.2 U	3.9 U	3 U	2.7 U	**0.14**	0.89 U	–	2.1 U	0.31 U	–
Fluoranthene	160	NE	mg/kg OC	**4**	**4.8**	**6.4**	**5**	**3.5**	**7.5**	**4.6**	**15**	3 U	2.7 U	**14**	**9.6**	–	2.1 U	**5.9**	–
Indeno(1,2,3-cd)pyrene	34	NE	mg/kg OC	**0.31**	**0.18**	0.43 U	**0.12**	1.5 U	**0.52**	3.2 U	3.9 U	3 U	2.7 U	**0.44**	**1**	–	2.1 U	**0.32**	–
Pyrene	1,000	NE	mg/kg OC	**3.1**	**3.6**	**4.8**	**3.5**	**3**	**5.4**	**2.9**	**17**	3 U	2.7 U	**10**	**8.9**	–	2.1 U	**5.5**	–
Total HPAHs	960.0	NE	mg/kg OC	**12.3**	**11.5**	**14.2**	**10.7**	**7.4**	**20.8**	**7.5**	**54.1**	3 U	2.7 U	**34.1**	**30.4**	–	2.1 U	**16.4**	–
HPAHs																			
Benzo(a)anthracene	1,300	5,000	µg/kg	**140**	**58**	**34**	**52**	4.8 U	**130**	4.8 U	**5.4**	4.7 U	4.8 U	**55**	**59**	–	4.7 U	**71**	–
Benzo(a)pyrene	1,600	500	µg/kg	**79**	**34**	**18 J**	**29**	4.8 U	**84**	4.8 U	**3.9 J**	4.7 U	4.8 U	**28**	**51**	–	4.7 U	**49**	–
Benzo(ghi)perylene	670	NE	µg/kg	**55**	**22 J**	**14 J**	**25**	4.8 U	**58**	4.8 U	**4.2 J**	4.7 U	4.8 U	**20**	**38**	–	4.7 U	**44**	–
Benzofluoranthenes (Sum)	3,200	5,000	µg/kg	**200**	**83**	**45**	**89**	4.8 U	**200**	4.8 U	**7.5**	4.7 U	4.8 U	**76**	**84**	–	4.7 U	**98**	–
Chrysene	1,400	50,000	µg/kg	**230**	**90**	**54**	**83**	**2.8 J**	**140**	4.8 U	**6.1**	4.7 U	4.8 U	**85**	**62**	–	4.7 U	**98**	–
Dibenzo(a,h)anthracene	230	5,000	µg/kg	**16 J**	25 U	24 U	24 U	4.8 U	**12 J**	4.8 U	4.8 U	4.7 U	4.8 U	**4.0 J**	24 U	–	4.7 U	24 U	–
Fluoranthene	1,700	59,000,000	µg/kg	**570**	**480**	**360**	**670**	**11**	**640**	**7**	**19**	4.7 U	4.8 U	**420**	**260**	–	4.7 U	**460**	–
Indeno(1,2,3-cd)pyrene	600	5,000	µg/kg	**45**	**18 J**	24 U	**16 J**	4.8 U	**44**	4.8 U	4.8 U	4.7 U	4.8 U	**13**	**27**	–	4.7 U	**25**	–
Pyrene	2,600	44,000,000	µg/kg	**440**	**360**	**270**	**460**	**9.5**	**460**	**4.4 J**	**21**	4.7 U	4.8 U	**300**	**240**	–	4.7 U	**430**	–
Total HPAHs	12,000	NE	µg/kg	**1,775 T**	**1,145 T**	**795 T**	**1,424 T**	**23.3 T**	**1,768 T**	**11.4 T**	**67.1 T**	4.7 UT	4.8 UT	**1,001 T**	**821 T**	–	4.7 UT	**1,275 T**	–
cPAHs																			
Total cPAH TEQ (ND=0.5DL)	NE	16	µg/kg	**121.4 JT**	**52.1 JT**	**28.8 JT**	**46.7 JT**	**3.4 JT**	**124 JT**	3.4 UT	**5.7 JT**	3.3 UT	3.4 UT	**43.7 JT**	**69.8 T**	–	3.3 UT	**70.6 T**	–
Chlorinated Hydrocarbons (OC Normalized)																			
1,2,4-Trichlorobenzene	0.81	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	**0.026**	1.5 U	**0.099**	3.2 U	3.9 U	3.1 U	2.7 U	**0.085**	0.18 U	–	2.1 U	0.062 U	–
1,2-Dichlorobenzene (o-Dichlorobenzene)	2.3	NE	mg/kg OC	**0.09**	**0.078**	**0.066**	**0.083**	**0.96**	**0.068**	**1.6**	3.9 U	3.1 U	2.7 U	**0.37**	0.18 U	–	2.1 U	0.062 U	–
1,4-Dichlorobenzene (p-Dichlorobenzene)	3.1	NE	mg/kg OC	**0.044**	**0.046**	**0.057**	**0.05**	1.5 U	**0.061**	3.2 U	3.9 U	3.1 U	2.7 U	**0.18**	0.18 U	–	2.1 U	0.062 U	–
Hexachlorobenzene	0.38	NE	mg/kg OC	0.0069 U	0.013 U	0.018 U	0.0074 U	0.31 U	0.012 U	0.64 U	0.79 U	0.62 U	0.55 U	0.48 U	0.036 U	–	0.42 U	0.012 U	–
Chlorinated Hydrocarbons																			
1,2,4-Trichlorobenzene	31	130	µg/kg	4.9 U	4.9 U	4.7 U	**3.5 J**	4.8 U	**8.4**	4.8 U	4.8 U	4.8 U	4.8 U	**2.5 J**	4.9 U	–	4.7 U	4.8 U	–
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	130,000	µg/kg	**13**	**7.7**	**3.7 J**	**11**	**3.0 J**	**5.8**	**2.5 J**	4.8 U	4.8 U	4.8 U	**11**	4.9 U	–	4.7 U	4.8 U	–
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	680	µg/kg	**6.3**	**4.6 J**	**3.2 J**	**6.7**	4.8 U	**5.2**	4.8 U	4.8 U	4.8 U	4.8 U	**5.2**	4.9 U	–	4.7 U	4.8 U	–
Hexachlorobenzene	22	2.3	µg/kg	0.99 U	1.3 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	14 U	0.97 U	–	0.95 U	0.96 U	–
Phthalates (OC Normalized)																			
Bis(2-Ethylhexyl) Phthalate	47	NE	mg/kg OC	**0.2**	0.49 U	0.84 U	0.36 U	15 U	0.57 U	32 U	39 U	31 U	27 U	**0.95**	1.8 U	–	21 U	0.62 U	–
Butyl benzyl Phthalate	4.9	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	0.036 U	**1.5**	**0.37**	**2.1**	3.9 U	**1.6**	**1.5**	**0.75**	0.18 U	–	**3.2**	**0.11**	–
Dibutyl Phthalate	220	NE	mg/kg OC	**0.45**	0.2 U	0.34 U	0.14 U	6.1 U	0.22 U		15 U	12 U	11 U	0.65 U	0.7 U	–	8.3 U	0.24 U	–
Diethyl Phthalate	61	NE	mg/kg OC	0.1 U	**3.8**	0.34 U	0.14 U	6.1 U	0.22 U	13 U	15 U	12 U	11 U	0.65 U	0.7 U	–	8.3 U	**0.44**	–
Dimethyl Phthalate	53	NE	mg/kg OC	0.1 U	0.2 U	0.34 U	0.14 U	6.1 U	**0.26**	13 U	15 U	12 U	11 U	0.65 U	0.7 U	–	8.3 U	0.24 U	–
Di-N-Octyl Phthalate	58	NE	mg/kg OC	**0.076**	0.2 U	0.34 U	0.14 U	6.1 U	0.22 U	13 U	15 U	12 U	11 U	0.65 U	0.7 U	–	8.3 U	0.24 U	–
Phthalates																			
Bis(2-Ethylhexyl) Phthalate	1,300	260,000	µg/kg	**30 J**	49 UJ	47 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	**28 J**	49 U	–	47 U	48 U	–
Butyl benzyl Phthalate	63	1,900,000	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**4.8**	**31**	**3.2 J**	4.8 U	**2.5 J**	**2.6 J**	**22**	4.9 U	–	**7.4**	**8.8**	–
Dibutyl Phthalate	1,400	150,000,000	µg/kg	**65**	20 U	19 U	19 U	19 U	19 U	**19 U**	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–
Diethyl Phthalate	200	NE	µg/kg	20 U	**380**	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	**34**	–
Dimethyl Phthalate	71	NE	µg/kg	20 U	20 U	19 U	19 U	19 U	**22**	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–
Di-N-Octyl Phthalate	6,200	15,000,000	µg/kg	**11 J**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	–	19 U	19 U	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	**D-1**	**D-2**	**D-3A**	**D-3B**	**D-4A**	**D-4B**	**D-5A**	**D-5B**	**D-6A**	**D-6B**	**D-7**	**PT-10-36.0-37.0**	**PT-108-25.0-26.0**	**PT-11-36.0-37.0**	**PT-12-30.0-31.0**	**PT-13-27.0-28.0**
			Sample Date	**01/13/2015**	**01/12/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/13/2015**	**01/14/2015**	**01/16/2015**	**01/15/2015**	**01/15/2015**	**01/15/2015**
			Sample Depth	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**-36 to -37 ft MLLW**	**-25 to -26 ft MLLW**	**-36 to -37 ft MLLW**	**-30 to -31 ft MLLW**	**-27 to -28 ft MLLW**
Phenols																			
2,4-Dimethylphenol	29	29,000,000	µg/kg	**46**	**54**	**26**	**78**	24 U	**56**	24 U	24 U	24 U	24 U	**44**	24 U	–	23 U	**24 J**	–
o-Cresol (2-methylphenol)	63	73,000,000	µg/kg	**37**	**68**	**45**	**140**	19 U	**81**	19 U	19 U	19 U	19 U	**49**	20 U	–	19 U	**36**	–
p-Cresol (4-methylphenol)	670	150,000,000	µg/kg	**1,700**	**2,400**	**930**	**1,900**	**34**	**1,000**	19 U	**16 J**	19 U	19 U	**1,200**	20 U	–	**92**	**180**	–
Pentachlorophenol	360	9,200	µg/kg	**46 J**	99 U	94 U	**33 J**	96 U	**33 J**	97 U	97 U	95 U	96 U	96 U	98 U	–	94 U	96 U	–
Phenol	420	440,000,000	µg/kg	**390**	**430**	**240**	**460**	**29**	**320**	**34**	19 U	19 U	19 U	**250**	20 U	–	**38**	**59**	–
Miscellaneous Extractables (OC Normalized)																			
Dibenzofuran	15	NE	mg/kg OC	**2**	**2.2**	**3.2**	**3.1**	**1.5**	**4**	3.2 U	**4.7**	3 U	2.7 U	**8.2**	**3.2**	–	2.1 U	**3**	–
Hexachlorobutadiene	3.9	NE	mg/kg OC	0.0069 U	0.01 U	0.018 U	0.0074 U	0.31 U	0.012 U	0.64 U	0.79 U	0.62 U	0.55 U	0.033 U	0.036 U	–	0.42 U	0.012 U	–
N-Nitrosodiphenylamine (as diphenylamine)	11	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	0.036 U	**0.93**	0.057 U	**2**	3.9 U	3.1 U	2.7 U	0.16 U	0.18 U	–	2.1 U	0.062 U	–
Miscellaneous Extractables																			
Benzoic Acid	650	NE	µg/kg	**790**	**940**	**540**	**1,100**	190 U	**860**	190 U	190 U	190 U	190 U	**720**	200 U	–	**82 J**	**150 J**	–
Benzyl Alcohol	57	150,000,000	µg/kg	**30**	**33**	**25**	**59**	19 U	**32**	19 U	19 U	19 U	19 U	**24**	20 U	–	19 U	19 U	–
Dibenzofuran	540	1,500,000	µg/kg	**300**	**220**	**180**	**410**	**4.8 J**	**340**	4.8 U	**5.8**	4.7 U	4.8 U	**240**	**86**	–	4.7 U	**200**	–
Hexachlorobutadiene	11	47,000	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
N-Nitrosodiphenylamine (as diphenylamine)	28	750,000	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**2.9 J**	4.8 U	**3.0 J**	4.8 U	4.8 U	4.8 U	4.8 U	4.9 U	–	4.7 U	4.8 U	–
Pesticides																			
4,4'-DDD	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
4,4'-DDE	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
4,4'-DDT	NE	NE	µg/kg	6.9 U	4.3 U	0.99 U	4.0 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Total DDT (4,4 isomers)	NE	NE	µg/kg	6.9 UT	4.3 UT	0.99 UT	4 UT	0.98 UT	0.98 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	0.98 UT	0.97 UT	–	0.95 UT	0.96 UT	–
Aldrin	NE	NE	µg/kg	1.7 U	0.49 U	1.8 U	3.6 U	0.49 U	3.9 U	0.49 U	0.49 U	0.48 U	0.49 U	1.7 U	0.48 U	–	0.48 U	0.48 U	–
alpha-Chlordane (cis)	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	0.49 U	0.48 U	–	0.48 U	0.48 U	–
beta or gamma-Chlordane (trans)	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	1.0 U	0.48 U	–	0.48 U	0.48 U	–
Chlordane (Total)	NE	NE	µg/kg	4.5 UT	1.7 UT	0.99 UT	**2.3 J**	0.98 UT	2.3 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	2.7 UT	0.97 UT	–	0.95 UT	1.6 UT	–
cis-Nonachlor	NE	NE	µg/kg	1.6 U	1.7 U	0.99 U	**2.3 J**	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Dieldrin	NE	NE	µg/kg	1.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Heptachlor	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.80 U	0.49 U	0.49 U	0.48 U	0.49 U	1.5 U	0.48 U	–	0.48 U	0.48 U	–
Oxychlordane	NE	NE	µg/kg	4.5 U	0.99 U	0.99 U	0.99 U	0.98 U	2.3 U	0.98 U	0.98 U	0.97 U	0.97 U	2.7 U	0.97 U	–	0.95 U	1.6 U	–
trans-Nonachlor	NE	NE	µg/kg	2.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	–	0.95 U	0.96 U	–
Polychlorinated Biphenyls (PCBs)																			
PCB-001	NE	NE	ng/kg	**18.2**	**18**	**20.5**	**5.77**	0.867 U	**5.34**	0.450 U	0.752 U	0.600 U	0.397 U	**9.5**	**1.20 J**	–	0.315 U	**3.28 J**	–
PCB-002	NE	NE	ng/kg	**4.98**	**5.12**	**12.6**	**4.61**	0.973 U	**4.08**	0.544 U	0.856 U	0.696 U	0.461 U	**4.92**	**2.47 J**	–	0.381 U	**6.95**	–
PCB-003	NE	NE	ng/kg	**13.3**	**11.4**	**16.9**	**6.67**	0.937 U	**4.56**	0.558 U	0.833 U	0.689 U	0.458 U	**7.96**	**1.82 J**	–	0.381 U	**5.2**	–
PCB-004	NE	NE	ng/kg	**16.5**	**13.7**	**29.7**	**7.09**	1.62 U	**4.11**	1.63 U	1.21 U	1.39 U	1.39 U	**8.94**	**2.22 J**	–	0.810 U	0.626 U	–
PCB-005	NE	NE	ng/kg	0.572 U	1.82 U	1.99 U	1.77 U	1.43 U	0.928 U	1.49 U	1.07 U	1.26 U	1.35 U	0.617 U	0.735 U	–	0.744 U	0.491 U	–
PCB-006	NE	NE	ng/kg	**9.37**	**9.26**	**16.5**	**6.98**	**2.86 J**	**3.23 J**	1.39 U	0.994 U	1.17 U	1.25 U	**12.5**	**5.07**	–	0.710 U	**2.50 J**	–
PCB-007	NE	NE	ng/kg	**2.94 J**	**3.61 J**	**4.4**	1.68 U	1.39 U	0.900 U	1.45 U	1.04 U	1.22 U	1.31 U	**3.48 J**	0.716 U	–	0.725 U	0.478 U	–
PCB-008	NE	NE	ng/kg	**39.6**	**37.5**	**66.4**	**20.7**	1.45 U	**10.1**	1.52 U	1.09 U	1.28 U	1.37 U	**26.7**	**3.72 J**	–	0.741 U	**2.29 J**	–
PCB-009	NE	NE	ng/kg	**3.61 J**	**2.72 J**	**6.64**	1.78 U	1.45 U	0.943 U	1.52 U	1.09 U	1.28 U	1.37 U	0.627 U	0.746 U	–	0.756 U	0.499 U	–
PCB-010	NE	NE	ng/kg	0.590 U	1.97 U	2.15 U	1.92 U	1.62 U	1.05 U	1.69 U	1.21 U	1.42 U	1.53 U	0.699 U	0.765 U	–	0.776 U	0.512 U	–
PCB-011	NE	NE	ng/kg	**13**	**14.4**	**11.8**	**9.7**	**3.91 J**	**5.32**	1.59 U	**3.10 J**	1.33 U	1.43 U	**13.9**	**6.53**	–	**2.91 J**	**4.55**	–
PCB-012	NE	NE	ng/kg	**2.87 J**	**3.61 J**	**7.67**	1.79 U	1.43 U	1.37 U	1.50 U	1.07 U	1.26 U	1.35 U	**3.21 J**	**4.24**	–	0.798 U	**2.56 J**	–
PCB-013	NE	NE	ng/kg	**4.8**	**4.87**	**5.44**	**4.99**	1.59 U	1.52 U	1.66 U	1.19 U	1.40 U	1.50 U	**8.75**	**2.36 J**	–	0.859 U	**1.94 J**	–
PCB-014	NE	NE	ng/kg	0.599 U	1.88 U	2.06 U	1.83 U	1.47 U	0.954 U	1.54 U	1.10 U	1.29 U	1.38 U	0.634 U	0.758 U	–	0.768 U	0.506 U	–
PCB-015	NE	NE	ng/kg	**36.6**	**28.6**	**22.4**	**11.8**	1.47 U	**7.61**	1.58 U	1.10 U	1.32 U	1.47 U	**19.4**	**1.97 J**	–	0.815 U	**1.16 J**	–
PCB-016	NE	NE	ng/kg	**32.6**	**37.1**	**35.3**	**19.4**	1.32 U	**7.75**	0.566 U	1.44 U	0.546 U	0.646 U	**17.9**	0.553 U	–	0.404 U	0.583 U	–
PCB-017	NE	NE	ng/kg	**45.3**	**41.1**	**51.5**	**21.3**	1.38 U	**10.4**	0.590 U	1.50 U	0.569 U	0.673 U	**23.3**	0.614 U	–	0.449 U	1.79 U	–
PCB-018	NE	NE	ng/kg	**120**	**107**	**131**	**56.4**	1.53 U	**26.8**	0.654 U	1.66 U	0.631 U	0.747 U	**64**	0.681 U	–	0.497 U	1.98 U	–
PCB-019	NE	NE	ng/kg	**10.9**	**11.4**	**12.4**	**5.95**	1.53 U	1.75 U	0.653 U	1.66 U	0.630 U	0.745 U	**5.88**	0.660 U	–	0.482 U	0.696 U	–
PCB-020	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	–	0.843 U	**3.99**	–
PCB-021	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	–	0.843 U	**3.99**	–
PCB-022	NE	NE	ng/kg	**52.9**	**39.8**	**45.4**	**22**	1.13 U	**11.1**	0.873 U	1.52 U	1.02 U	0.772 U	**28.1**	0.911 U	–	0.826 U	1.34 U	–
PCB-023	NE	NE	ng/kg	1.85 U	1.88 U	1.71 U	1.85 U	1.21 U	1.98 U	0.935 U	1.63 U	1.09 U	0.827 U	1.84 U	0.961 U	–	0.871 U	1.41 U	–
PCB-024	NE	NE	ng/kg	**1.77 J**	**4.6**	**2.16 J**	1.50 U	1.02 U	1.17 U	0.437 U	1.11 U	0.422 U	0.499 U	**1.40 J**	0.475 U	–	0.347 U	0.501 U	–
PCB-025	NE	NE	ng/kg	**9.5**	**7.96**	**9.97**	**3.58 J**	0.974 U	1.59 U	0.752 U	1.31 U	0.876 U	0.666 U	**6.23**	0.812 U	–	0.736 U	1.20 U	–
PCB-026	NE	NE	ng/kg	**20.6**	**18.8**	**21.4**	**8.27**	1.12 U	**3.97 J**	0.869 U	1.52 U	1.01 U	0.769 U	**14**	0.949 U	–	0.860 U	1.40 U	–
PCB-027	NE	NE	ng/kg	**6.95**	**4.76**	**8.46**	**4**	1.04 U	1.20 U	0.446 U	1.13 U	0.431 U	0.510 U	**2.79 J**	0.459 U	–	0.335 U	0.484 U	–
PCB-028	NE	NE	ng/kg	**137**	**115**	**113**	**56.3**	**2.20 J**	**27.8**	0.770 U	**2.60 J**	0.896 U	0.682 U	**76.1**	0.787 U	–	0.713 U	**5.45**	–
PCB-029	NE	NE	ng/kg	1.82 U	1.90 U	1.73 U	1.86 U	1.10 U	1.80 U	0.850 U	1.48 U	0.989 U	0.752 U	1.67 U	0.954 U	–	0.864 U	1.40 U	–
PCB-030	NE	NE	ng/kg	0.637 U	1.70 U	1.20 U	1.42 U	0.991 U	1.13 U	0.424 U	1.08 U	0.409 U	0.484 U	1.44 U	0.440 U	–	0.321 U	0.464 U	–
PCB-031	NE	NE	ng/kg	**138**	**99.8**	**113**	**58.3**	**1.94 J**	**29.6**	0.819 U	**2.37 J**	0.954 U	0.725 U	**44.8**	0.979 U	–	0.887 U	**6.29**	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-032	NE	NE	ng/kg	**39**	**28.7**	**37.3**	**15**	1.11 U	**7.47**	0.476 U	1.21 U	0.459 U	0.543 U	**17.1**	0.516 U	–	0.376 U	0.544 U	–
PCB-033	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	–	0.843 U	**3.99**	–
PCB-034	NE	NE	ng/kg	1.81 U	2.15 U	1.96 U	2.11 U	1.09 U	1.78 U	0.844 U	1.47 U	0.981 U	0.746 U	1.66 U	0.949 U	–	0.860 U	1.40 U	–
PCB-035	NE	NE	ng/kg	1.69 U	1.97 U	1.79 U	1.93 U	1.17 U	1.91 U	0.905 U	1.58 U	1.05 U	0.801 U	1.78 U	0.993 U	–	0.900 U	1.46 U	–
PCB-036	NE	NE	ng/kg	1.63 U	1.88 U	1.71 U	1.84 U	1.10 U	1.79 U	0.847 U	1.48 U	0.986 U	0.750 U	1.67 U	0.931 U	–	0.844 U	1.37 U	–
PCB-037	NE	NE	ng/kg	**39.7**	**24.7**	**28.9**	**14.7**	1.05 U	**8.04**	0.812 U	1.42 U	0.944 U	0.718 U	**20.3**	0.873 U	–	0.791 U	1.28 U	–
PCB-038	NE	NE	ng/kg	1.59 U	1.83 U	1.67 U	1.80 U	1.10 U	1.79 U	0.846 U	1.48 U	0.985 U	0.749 U	1.66 U	0.891 U	–	0.807 U	1.31 U	–
PCB-039	NE	NE	ng/kg	1.68 U	1.94 U	1.76 U	1.90 U	1.13 U	1.84 U	0.870 U	1.52 U	1.01 U	0.770 U	**8.88**	0.954 U	–	0.865 U	1.41 U	–
PCB-040	NE	NE	ng/kg	**40.8**	**32**	**27**	**20.9**	1.57 U	**9.19**	0.997 U	0.721 U	0.651 U	0.843 U	**18.4**	0.790 U	–	0.613 U	0.809 U	–
PCB-041	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-042	NE	NE	ng/kg	**81**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-043	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.9**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-044	NE	NE	ng/kg	**345**	**259**	**185**	**142**	**3.07 J**	**71**	0.865 U	**5.67**	0.565 U	0.731 U	**135**	0.686 U	–	0.532 U	**4.96**	–
PCB-045	NE	NE	ng/kg	**42.3**	**25.3**	**25.8**	**15.6**	1.34 U	**7.77**	0.856 U	0.619 U	0.559 U	0.723 U	**15.9**	0.680 U	–	0.527 U	0.880 U	–
PCB-046	NE	NE	ng/kg	**17.6**	**11.8**	**12.5**	**7.45**	1.45 U	**3.42 J**	0.926 U	0.670 U	0.605 U	0.783 U	**7.54**	0.726 U	–	0.563 U	0.940 U	–
PCB-047	NE	NE	ng/kg	**71.3**	**49.8**	**45.1**	**22.7**	0.983 U	**15**	0.625 U	**2.04 J**	0.408 U	0.529 U	**16.7**	0.527 U	–	0.408 U	**2.61 J**	–
PCB-048	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-049	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.9**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-050	NE	NE	ng/kg	0.849 U	2.22 U	2.35 U	1.77 U	1.19 U	0.546 U	0.756 U	0.547 U	0.494 U	0.639 U	0.731 U	0.602 U	–	0.467 U	0.780 U	–
PCB-051	NE	NE	ng/kg	**12.2**	**8.76**	**8.73**	**5.64**	1.20 U	**2.70 J**	0.766 U	0.554 U	0.501 U	0.648 U	**5**	0.640 U	–	0.496 U	0.828 U	–
PCB-052	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-053	NE	NE	ng/kg	**44.9**	**30**	**27.8**	**17.7**	1.25 U	**8.88**	0.798 U	0.577 U	0.522 U	0.675 U	**18.6**	0.659 U	–	0.511 U	0.854 U	–
PCB-054	NE	NE	ng/kg	0.649 U	1.73 U	1.83 U	1.38 U	0.936 U	0.430 U	0.596 U	0.431 U	0.389 U	0.504 U	0.576 U	0.484 U	–	0.375 U	0.627 U	–
PCB-055	NE	NE	ng/kg	**9.62**	**5.25**	**7.78**	**3.94 J**	0.879 U	**2.10 J**	0.559 U	0.404 U	0.365 U	0.473 U	**4.23**	0.448 U	–	0.347 U	0.459 U	–
PCB-056	NE	NE	ng/kg	**212**	**155**	**110**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-057	NE	NE	ng/kg	**1.50 J**	1.62 U	1.71 U	1.29 U	0.879 U	0.404 U	0.559 U	0.404 U	0.365 U	0.473 U	0.540 U	0.444 U	–	0.344 U	0.454 U	–
PCB-058	NE	NE	ng/kg	0.630 U	1.60 U	1.70 U	1.28 U	0.929 U	0.427 U	0.591 U	0.427 U	0.386 U	0.500 U	0.571 U	0.457 U	–	0.354 U	0.468 U	–
PCB-059	NE	NE	ng/kg	**81**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-060	NE	NE	ng/kg	**212**	**155**	**110**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-061	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-062	NE	NE	ng/kg	0.742 U	1.84 U	1.95 U	1.47 U	0.949 U	0.436 U	0.604 U	0.437 U	0.395 U	0.511 U	0.584 U	0.517 U	–	0.401 U	0.529 U	–
PCB-063	NE	NE	ng/kg	**13.8**	**9.31**	**9.41**	**4.69**	0.855 U	**2.51 J**	0.544 U	0.394 U	0.355 U	0.460 U	**6.14**	0.439 U	–	0.340 U	0.450 U	–
PCB-064	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-065	NE	NE	ng/kg	0.651 U	1.79 U	1.89 U	1.43 U	1.00 U	0.461 U	0.638 U	0.462 U	0.417 U	0.540 U	0.617 U	0.469 U	–	0.363 U	0.480 U	–
PCB-066	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140**	0.431 U	–	0.334 U	**6.16**	–
PCB-067	NE	NE	ng/kg	**9.97**	**7.14**	**6.44**	**3.85 J**	0.862 U	**1.51 J**	0.548 U	0.397 U	0.358 U	0.464 U	**4.2**	0.453 U	–	0.351 U	0.463 U	–
PCB-068	NE	NE	ng/kg	0.600 U	1.58 U	1.67 U	1.26 U	0.843 U	0.387 U	0.536 U	0.388 U	0.350 U	0.453 U	0.518 U	0.435 U	–	0.337 U	0.445 U	–
PCB-069	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-070	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-071	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-072	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-073	NE	NE	ng/kg	0.662 U	1.79 U	1.90 U	1.43 U	0.886 U	0.407 U	0.563 U	0.407 U	0.368 U	0.476 U	0.545 U	0.502 U	–	0.389 U	0.650 U	–
PCB-074	NE	NE	ng/kg	**179**	**125**	**89.6**	**64.5**	0.818 U	**32.9**	0.520 U	**3.17 J**	0.340 U	0.440 U	**78.7**	0.436 U	–	0.338 U	**4.41**	–
PCB-075	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-076	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140**	0.431 U	–	0.334 U	**6.16**	–
PCB-077	NE	NE	ng/kg	**22.9**	**18.2**	**18.4**	**9.78**	1.33 U	**3.66 J**	0.523 U	0.522 U	0.464 U	0.561 U	**9.47**	0.727 U	–	0.662 U	**1.18 J**	–
PCB-078	NE	NE	ng/kg	1.28 U	2.35 U	1.91 U	1.97 U	1.31 U	0.651 U	0.514 U	0.521 U	0.458 U	0.550 U	0.926 U	0.688 U	–	0.607 U	0.632 U	–
PCB-079	NE	NE	ng/kg	**7.14**	**8.56**	**7.22**	**4.95**	1.26 U	**1.62 J**	0.494 U	0.501 U	0.439 U	0.529 U	**4.16**	0.652 U	–	0.575 U	0.599 U	–
PCB-080	NE	NE	ng/kg	0.535 U	1.44 U	1.52 U	1.15 U	0.767 U	0.353 U	0.488 U	0.353 U	0.319 U	0.413 U	0.472 U	0.384 U	–	0.298 U	0.393 U	–
PCB-081	NE	NE	ng/kg	**10.8**	**13.8**	**11.4**	**8.83**	1.21 U	**3.62 J**	0.469 U	0.483 U	0.418 U	0.500 U	**8.53**	0.604 U	–	0.515 U	0.580 U	–
PCB-082	NE	NE	ng/kg	**100**	**100**	**47.4**	**57.9**	1.29 U	**24.1**	1.02 U	1.05 U	0.779 U	1.14 U	**51.1**	0.555 U	–	0.996 U	**1.43 J**	–
PCB-083	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-084	NE	NE	ng/kg	**328**	**290**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-085	NE	NE	ng/kg	**129**	**134**	**59**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-086	NE	NE	ng/kg	0.667 U	1.55 U	1.66 U	1.50 U	1.02 U	0.432 U	0.805 U	0.829 U	0.616 U	0.905 U	1.81 U	0.395 U	–	0.711 U	0.523 U	–
PCB-087	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-088	NE	NE	ng/kg	**120**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-089	NE	NE	ng/kg	**9.27**	**9.67**	**6.42**	**5.15**	1.20 U	**2.14 J**	0.953 U	0.982 U	0.730 U	1.07 U	**3.87 J**	0.475 U	–	0.854 U	0.628 U	–
PCB-090	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-091	NE	NE	ng/kg	**120**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-092	NE	NE	ng/kg	**328**	**290**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-093	NE	NE	ng/kg	0.607 U	**99.2**	**136**	**23.6**	0.605 U	1.75 U	0.618 U	0.387 U	0.584 U	0.907 U	1.03 U	0.386 U	–	0.601 U	0.879 U	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-094	NE	NE	ng/kg	**4.63**	2.71 U	1.75 U	1.64 U	0.613 U	1.77 U	0.625 U	0.392 U	0.591 U	0.918 U	1.05 U	0.429 U	–	0.667 U	0.977 U	–
PCB-095	NE	NE	ng/kg	**718**	**473**	**232**	**76.8**	**2.52 J**	**183**	0.521 U	**6.65**	0.493 U	0.765 U	**114**	**1.08 J**	–	0.560 U	**7.06**	–
PCB-096	NE	NE	ng/kg	**5.17**	**4.58**	**4.25**	**3.29 J**	0.419 U	1.21 U	0.427 U	0.268 U	0.404 U	0.628 U	**2.25 J**	0.286 U	–	0.445 U	0.651 U	–
PCB-097	NE	NE	ng/kg	**221**	**222**	**104**	**123**	1.03 U	**58.9**	0.817 U	**2.95 J**	0.626 U	0.918 U	**121**	0.412 U	–	0.740 U	**2.48 J**	–
PCB-098	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-099	NE	NE	ng/kg	**319**	**327**	**156**	**173**	0.991 U	**84.4**	0.786 U	**4.25**	0.602 U	0.884 U	**167**	0.406 U	–	0.730 U	**4.16**	–
PCB-100	NE	NE	ng/kg	**2.55 J**	2.21 U	1.43 U	1.34 U	0.519 U	1.50 U	0.530 U	0.332 U	0.501 U	0.778 U	0.887 U	0.359 U	–	0.558 U	0.817 U	–
PCB-101	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-102	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-103	NE	NE	ng/kg	**5.4**	2.12 U	**4.27**	1.28 U	0.496 U	1.43 U	0.506 U	0.317 U	0.478 U	0.743 U	**2.71 J**	0.341 U	–	0.531 U	0.777 U	–
PCB-104	NE	NE	ng/kg	0.410 U	1.72 U	1.11 U	1.04 U	0.394 U	1.14 U	0.402 U	0.252 U	0.381 U	0.591 U	0.673 U	0.273 U	–	0.424 U	0.621 U	–
PCB-105	NE	NE	ng/kg	**301**	**285**	**125**	**146**	1.40 U	**72.2**	0.795 U	**3.45 J**	0.516 U	0.648 U	**161**	0.772 U	–	0.672 U	**3.45 J**	–
PCB-106	NE	NE	ng/kg	**765**	**676**	**310**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.6**	–
PCB-107	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-108	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-109	NE	NE	ng/kg	0.522 U	1.27 U	1.37 U	1.24 U	0.867 U	0.369 U	0.688 U	0.708 U	0.527 U	0.773 U	1.54 U	0.354 U	–	0.635 U	0.468 U	–
PCB-110	NE	NE	ng/kg	**754**	**759**	**381**	**426**	**3.07 J**	**187**	0.586 U	**8.21**	0.449 U	0.659 U	**430**	**1.41 J**	–	0.572 U	**7.6**	–
PCB-111	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10**	0.305 U	–	0.549 U	0.404 U	–
PCB-112	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-113	NE	NE	ng/kg	0.527 U	**18.3**	1.41 U	**4.04**	0.837 U	0.356 U	0.663 U	0.683 U	0.508 U	0.746 U	1.49 U	0.346 U	–	0.622 U	0.458 U	–
PCB-114	NE	NE	ng/kg	**20.2**	**18.2**	**12**	**10.7**	1.34 U	**5.49**	0.831 U	0.568 U	0.585 U	0.708 U	**11.6**	0.838 U	–	0.644 U	0.647 U	–
PCB-115	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10**	0.305 U	–	0.549 U	0.404 U	–
PCB-116	NE	NE	ng/kg	**129**	**134**	**59**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-117	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-118	NE	NE	ng/kg	**765**	**676**	**310**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.6**	–
PCB-119	NE	NE	ng/kg	**11**	**11.7**	**8.31**	**5.39**	0.767 U	**2.66 J**	0.608 U	0.627 U	0.466 U	0.684 U	**5.52**	0.313 U	–	0.563 U	0.415 U	–
PCB-120	NE	NE	ng/kg	0.462 U	**2.29 J**	1.20 U	**2.27 J**	0.719 U	0.306 U	0.570 U	0.587 U	0.437 U	0.641 U	1.28 U	0.300 U	–	0.540 U	0.397 U	–
PCB-121	NE	NE	ng/kg	0.455 U	1.97 U	1.27 U	1.20 U	0.434 U	1.25 U	0.443 U	0.278 U	0.419 U	0.651 U	0.741 U	0.306 U	–	0.475 U	0.696 U	–
PCB-122	NE	NE	ng/kg	**9.52**	**10.8**	**6.81**	**5.6**	1.31 U	**2.32 J**	0.803 U	0.563 U	0.511 U	0.669 U	**5.13**	0.774 U	–	0.643 U	0.661 U	–
PCB-123	NE	NE	ng/kg	**12**	**13.1**	**4.87**	**7.36**	1.15 U	**3.21 J**	0.769 U	0.605 U	0.522 U	0.700 U	**6.26**	0.710 U	–	0.544 U	0.604 U	–
PCB-124	NE	NE	ng/kg	**29.5**	**25.6**	**14.1**	**13.4**	1.50 U	**8.69**	0.923 U	0.647 U	0.587 U	0.769 U	**20.3**	0.806 U	–	0.669 U	0.688 U	–
PCB-125	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-126	NE	NE	ng/kg	**4.61**	**3.78 J**	**8.85**	1.59 U	1.60 U	0.541 U	1.10 U	0.646 U	0.577 U	0.878 U	**2.79 J**	0.987 U	–	1.05 U	0.765 U	–
PCB-127	NE	NE	ng/kg	0.944 U	1.92 U	2.09 U	1.52 U	1.34 U	0.518 U	0.826 U	0.579 U	0.525 U	0.688 U	0.804 U	0.845 U	–	0.702 U	0.722 U	–
PCB-128	NE	NE	ng/kg	**162**	**140**	**85.1**	**84**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-129	NE	NE	ng/kg	**50.2**	**41**	**27.3**	**27**	1.36 U	**14.1**	0.750 U	1.57 U	0.698 U	1.37 U	**35.7**	0.859 U	–	0.811 U	0.872 U	–
PCB-130	NE	NE	ng/kg	**61.8**	**44.6**	**34.3**	**29**	1.18 U	**15.6**	0.651 U	1.36 U	0.606 U	1.19 U	**46.4**	0.812 U	–	0.766 U	0.824 U	–
PCB-131	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-132	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-133	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-134	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-135	NE	NE	ng/kg	**144**	**87.2**	**97.3**	**57.5**	1.35 U	**42.6**	0.743 U	1.56 U	0.691 U	1.36 U	**122**	0.711 U	–	0.670 U	0.721 U	–
PCB-136	NE	NE	ng/kg	**146**	**131**	**138**	**117**	0.405 U	**50.3**	0.398 U	0.971 U	0.363 U	0.479 U	**180**	0.387 U	–	0.334 U	0.669 U	–
PCB-137	NE	NE	ng/kg	**52.9**	**46.5**	**20.9**	**27.4**	1.24 U	**15.9**	0.682 U	1.43 U	0.635 U	1.24 U	**31.4**	0.756 U	–	0.713 U	0.767 U	–
PCB-138	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-139	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-140	NE	NE	ng/kg	**5.03**	**4.71**	**3.28 J**	2.17 U	1.15 U	0.880 U	0.635 U	1.33 U	0.591 U	1.16 U	**3.10 J**	0.677 U	–	0.639 U	0.687 U	–
PCB-141	NE	NE	ng/kg	**225**	**166**	**176**	**120**	1.14 U	**73.7**	0.628 U	**2.11 J**	0.584 U	1.15 U	**204**	0.704 U	–	0.665 U	**1.81 J**	–
PCB-142	NE	NE	ng/kg	0.680 U	2.00 U	1.42 U	2.58 U	1.32 U	1.01 U	0.729 U	1.53 U	0.678 U	1.33 U	0.639 U	0.808 U	–	0.763 U	0.821 U	–
PCB-143	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-144	NE	NE	ng/kg	**57.2**	**37.8**	**43.9**	**29.5**	1.18 U	**19**	0.651 U	1.36 U	0.606 U	1.19 U	**51.5**	0.687 U	–	0.648 U	0.697 U	–
PCB-145	NE	NE	ng/kg	0.859 U	0.930 U	1.62 U	1.95 U	0.414 U	0.356 U	0.407 U	0.994 U	0.372 U	0.491 U	0.751 U	0.397 U	–	0.343 U	0.686 U	–
PCB-146	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-147	NE	NE	ng/kg	**16**	**12.5**	**6.26**	**8.24**	1.15 U	**5.29**	0.632 U	1.32 U	0.588 U	1.15 U	**10.1**	0.663 U	–	0.625 U	0.673 U	–
PCB-148	NE	NE	ng/kg	1.14 U	1.20 U	2.09 U	2.52 U	0.468 U	0.402 U	0.460 U	1.12 U	0.420 U	0.555 U	0.849 U	0.494 U	–	0.426 U	0.853 U	–
PCB-149	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-150	NE	NE	ng/kg	0.840 U	0.886 U	1.54 U	1.86 U	0.400 U	0.344 U	0.394 U	0.960 U	0.359 U	0.474 U	0.726 U	0.392 U	–	0.338 U	0.677 U	–
PCB-151	NE	NE	ng/kg	**125**	**85.3**	**162**	**69.2**	1.19 U	**70.4**	0.658 U	**2.32 J**	0.613 U	1.20 U	**156**	0.709 U	–	0.669 U	**1.79 J**	–
PCB-152	NE	NE	ng/kg	0.817 U	0.887 U	1.54 U	1.86 U	0.399 U	0.342 U	0.392 U	0.956 U	0.357 U	0.472 U	0.723 U	0.380 U	–	0.328 U	0.656 U	–
PCB-153	NE	NE	ng/kg	**962**	**707**	**712**	**509**	**1.89 J**	**313**	0.492 U	**8.18**	0.458 U	0.898 U	**770**	**1.32 J**	–	0.564 U	**6.7**	–
PCB-154	NE	NE	ng/kg	**6.71**	**7.47**	**5.92**	2.01 U	0.426 U	**2.06 J**	0.418 U	1.02 U	0.382 U	0.504 U	**5.51**	0.439 U	–	0.379 U	0.758 U	–
PCB-155	NE	NE	ng/kg	0.759 U	0.792 U	1.38 U	1.66 U	0.364 U	0.313 U	0.358 U	0.873 U	0.326 U	0.431 U	0.660 U	0.349 U	–	0.302 U	0.604 U	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-156	NE	NE	ng/kg	**99.3**	**84.8**	**57.3**	**49.9**	0.837 U	**30.5**	0.447 U	0.972 U	0.415 U	0.833 U	**79.7**	0.524 U	–	0.488 U	0.554 U	–
PCB-157	NE	NE	ng/kg	**20.8**	**19.5**	**11.9**	**10.6**	0.819 U	**5.54**	0.462 U	0.983 U	0.474 U	0.850 U	**13.5**	0.638 U	–	0.571 U	0.594 U	–
PCB-158	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-159	NE	NE	ng/kg	**11.1**	**7.81**	**11.9**	**7.33**	0.800 U	**4.51**	0.441 U	0.924 U	0.410 U	0.805 U	**8.98**	0.507 U	–	0.478 U	0.514 U	–
PCB-160	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-161	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-162	NE	NE	ng/kg	**162**	**140**	**85.1**	**84**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-163	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-164	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-165	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-166	NE	NE	ng/kg	**3.70 J**	1.33 U	**2.86 J**	1.72 U	0.893 U	0.682 U	0.492 U	1.03 U	0.458 U	0.898 U	**2.30 J**	0.569 U	–	0.537 U	0.578 U	–
PCB-167	NE	NE	ng/kg	**38.1**	**30.3**	**22**	**18.1**	0.826 U	**12**	0.453 U	0.915 U	0.426 U	0.825 U	**32.3**	0.584 U	–	0.503 U	0.547 U	–
PCB-168	NE	NE	ng/kg	0.464 U	1.38 U	**3.38 J**	1.78 U	0.884 U	0.675 U	0.487 U	1.02 U	0.453 U	0.889 U	0.427 U	0.568 U	–	0.535 U	0.576 U	–
PCB-169	NE	NE	ng/kg	0.458 U	1.30 U	**10**	1.67 U	0.863 U	0.646 U	0.483 U	0.991 U	0.400 U	0.857 U	0.384 U	0.523 U	–	0.586 U	0.613 U	–
PCB-170	NE	NE	ng/kg	**282**	**186**	**274**	**164**	1.36 U	**142**	0.987 U	**2.42 J**	1.01 U	1.02 U	**337**	0.750 U	–	0.556 U	**2.36 J**	–
PCB-171	NE	NE	ng/kg	**90.9**	**64.3**	**87.2**	**53.4**	1.24 U	**42.7**	0.900 U	0.879 U	0.925 U	0.928 U	**95.6**	0.683 U	–	0.506 U	0.552 U	–
PCB-172	NE	NE	ng/kg	**50.1**	**34.9**	**50.2**	**27.7**	1.30 U	**25.1**	0.943 U	0.921 U	0.969 U	0.973 U	**60**	0.704 U	–	0.522 U	0.569 U	–
PCB-173	NE	NE	ng/kg	**7.8**	**6.25**	**8.9**	**5.35**	1.44 U	**3.92 J**	1.05 U	1.02 U	1.08 U	1.08 U	**8.24**	0.770 U	–	0.571 U	0.622 U	–
PCB-174	NE	NE	ng/kg	**305**	**214**	**290**	**181**	1.22 U	**137**	0.888 U	**2.66 J**	0.913 U	0.916 U	**297**	0.622 U	–	0.461 U	**2.32 J**	–
PCB-175	NE	NE	ng/kg	**13.8**	**9.95**	**15.1**	**9.06**	1.24 U	**5.95**	0.901 U	0.880 U	0.926 U	0.930 U	**16.3**	0.652 U	–	0.483 U	0.526 U	–
PCB-176	NE	NE	ng/kg	**45.3**	**34**	**47.9**	**27**	0.934 U	**21.1**	0.679 U	0.663 U	0.697 U	0.700 U	**45.9**	0.480 U	–	0.356 U	0.388 U	–
PCB-177	NE	NE	ng/kg	**182**	**128**	**180**	**106**	1.34 U	**84.8**	0.972 U	0.949 U	0.999 U	1.00 U	**177**	0.708 U	–	0.525 U	0.572 U	–
PCB-178	NE	NE	ng/kg	**60**	**41.7**	**60.6**	**36.4**	1.28 U	**27.5**	0.928 U	0.907 U	0.954 U	0.958 U	**60.8**	0.699 U	–	0.518 U	0.565 U	–
PCB-179	NE	NE	ng/kg	**126**	**97.9**	**128**	**80.8**	0.892 U	**55.4**	0.648 U	0.633 U	0.666 U	0.669 U	**115**	0.474 U	–	0.352 U	**1.32 J**	–
PCB-180	NE	NE	ng/kg	**630**	**416**	**566**	**352**	1.05 U	**315**	0.765 U	**5.1**	0.787 U	0.790 U	**694**	0.589 U	–	0.437 U	**4.59**	–
PCB-181	NE	NE	ng/kg	0.793 U	1.41 U	1.61 U	1.73 U	1.27 U	0.543 U	0.920 U	0.898 U	0.945 U	0.949 U	0.656 U	0.734 U	–	0.544 U	0.593 U	–
PCB-182	NE	NE	ng/kg	**361**	**275**	**350**	**220**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-183	NE	NE	ng/kg	**192**	**142**	**192**	**122**	1.11 U	**95**	0.807 U	**2.61 J**	0.830 U	0.833 U	**204**	**1.46 J**	–	**1.20 J**	**3.21 J**	–
PCB-184	NE	NE	ng/kg	0.545 U	0.990 U	1.13 U	1.21 U	0.889 U	0.381 U	0.646 U	0.631 U	0.664 U	0.666 U	0.461 U	0.466 U	–	0.346 U	0.377 U	–
PCB-185	NE	NE	ng/kg	**38.3**	**30.8**	**41.7**	**24.5**	1.27 U	**18.8**	0.926 U	0.904 U	0.952 U	0.955 U	**39.8**	0.691 U	–	0.512 U	0.558 U	–
PCB-186	NE	NE	ng/kg	0.600 U	1.06 U	1.20 U	1.30 U	0.960 U	0.412 U	0.698 U	0.681 U	0.717 U	0.720 U	0.498 U	0.494 U	–	0.366 U	0.399 U	–
PCB-187	NE	NE	ng/kg	**361**	**275**	**350**	**220**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-188	NE	NE	ng/kg	0.611 U	1.16 U	1.24 U	1.36 U	0.963 U	0.384 U	0.652 U	0.667 U	0.774 U	0.690 U	0.476 U	0.506 U	–	0.371 U	0.439 U	–
PCB-189	NE	NE	ng/kg	**10.8**	**9.23**	**14**	**6.49**	0.879 U	**5.72**	0.688 U	0.639 U	0.595 U	0.689 U	**17.5**	0.506 U	–	0.379 U	0.374 U	–
PCB-190	NE	NE	ng/kg	**56.1**	**41.1**	**61.6**	**35.7**	1.01 U	**32.4**	0.732 U	0.715 U	0.752 U	0.755 U	**74.4**	0.536 U	–	0.398 U	0.433 U	–
PCB-191	NE	NE	ng/kg	**13.9**	**9.72**	**14.1**	**7.74**	0.921 U	**6.19**	0.669 U	0.654 U	0.688 U	0.691 U	**16.3**	0.508 U	–	0.377 U	0.411 U	–
PCB-192	NE	NE	ng/kg	0.644 U	1.10 U	1.26 U	1.35 U	1.05 U	0.452 U	0.765 U	0.747 U	0.787 U	0.790 U	0.546 U	0.566 U	–	0.420 U	0.458 U	–
PCB-193	NE	NE	ng/kg	**34.8**	**24.1**	**34.8**	**19.5**	0.944 U	**17.7**	0.686 U	0.670 U	0.705 U	0.708 U	**39.7**	0.510 U	–	0.378 U	0.412 U	–
PCB-194	NE	NE	ng/kg	**157**	**101**	**158**	**96.8**	0.501 U	**79.8**	0.430 U	1.27 U	0.347 U	0.477 U	**291**	0.420 U	–	0.502 U	**2.15 J**	–
PCB-195	NE	NE	ng/kg	**62.9**	**39.3**	**69.5**	**38.3**	0.566 U	**36.4**	0.486 U	1.43 U	0.392 U	0.540 U	**121**	0.465 U	–	0.555 U	0.548 U	–
PCB-196	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-197	NE	NE	ng/kg	**7.94**	**5.52**	**10.9**	**6.3**	0.627 U	**4.7**	0.461 U	1.15 U	0.328 U	0.537 U	**13.7**	0.446 U	–	0.445 U	0.518 U	–
PCB-198	NE	NE	ng/kg	**9.16**	**7.36**	**12.5**	**6.34**	0.866 U	**5.52**	0.636 U	1.58 U	0.452 U	0.741 U	**16.7**	0.677 U	–	0.674 U	0.785 U	–
PCB-199	NE	NE	ng/kg	**165**	**115**	**159**	**110**	0.912 U	**92.7**	0.670 U	1.67 U	0.476 U	0.781 U	**250**	0.645 U	–	0.643 U	**4.79**	–
PCB-200	NE	NE	ng/kg	**19.4**	**13.7**	**20.7**	**13.9**	0.607 U	**11.4**	0.446 U	1.11 U	0.317 U	0.520 U	**30.3**	0.452 U	–	0.450 U	0.524 U	–
PCB-201	NE	NE	ng/kg	**24.2**	**20.2**	**27.4**	**17.5**	0.623 U	**13.7**	0.458 U	1.14 U	0.325 U	0.533 U	**35.1**	0.451 U	–	0.449 U	0.523 U	–
PCB-202	NE	NE	ng/kg	**32.8**	**28.2**	**31.1**	**24.6**	0.613 U	**17.2**	0.451 U	1.12 U	0.320 U	0.525 U	**41.7**	0.463 U	–	0.461 U	**1.57 J**	–
PCB-203	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-204	NE	NE	ng/kg	0.335 U	1.70 U	0.803 U	1.41 U	0.619 U	0.416 U	0.455 U	1.13 U	0.323 U	0.530 U	0.399 U	0.449 U	–	0.447 U	0.521 U	–
PCB-205	NE	NE	ng/kg	**7.98**	**5.3**	**13.4**	**4.71**	0.402 U	**4.36**	0.345 U	1.02 U	0.278 U	0.383 U	**16.6**	0.326 U	–	0.389 U	0.384 U	–
PCB-206	NE	NE	ng/kg	**68.5**	**68**	**81**	**61.1**	0.974 U	**38.7**	0.351 U	0.632 U	0.318 U	0.336 U	**106**	0.412 U	–	0.506 U	**12.4**	–
PCB-207	NE	NE	ng/kg	**9.69**	**10.5**	**14.1**	**7.46**	0.754 U	**5.69**	0.259 U	0.478 U	0.239 U	0.251 U	**16.2**	0.296 U	–	0.376 U	**1.25 J**	–
PCB-208	NE	NE	ng/kg	**18.7**	**21.6**	**25.3**	**16.4**	0.725 U	**10.8**	0.238 U	0.450 U	0.224 U	0.233 U	**21.8**	0.278 U	–	0.364 U	**4.57**	–
PCB-209	NE	NE	ng/kg	**42.4**	**164**	**121**	**120**	1.04 U	**27.3**	0.213 U	0.546 U	0.271 U	0.247 U	**30.3**	0.308 U	–	0.272 U	**14.9**	–
Total PCBs (OC Normalized)	12	NA	mg/kg OC	**0.2**	**0.2**	**0.3**	**0.1**	**0.02**	**0.1**	0.001 U	**0.2**	0.001 U	0.001 U	**0.7**	**0.002**	–	**0.002**	**0.005**	–
Total PCBs	130,000	3,500	ng/kg	**27,102 T**	**22,080 T**	**17,935 T**	**13,887 T**	**65.1 T**	**7,913 T**	1.7 UT	**270 T**	1.4 UT	1.5 UT	**19,387 T**	**50.2 T**	–	**4.1 T**	**355 T**	–
Total Dioxin-Like PCBs TEQ (ND=0.5DL)	NE	2	ng/kg	**0.5 T**	**0.4 T**	**1.2 T**	**0.1 T**	0.1 UT	**0.05 T**	0.06 UT	**0.05 T**	0.03 UT	0.06 UT	**0.3 T**	0.06 UT	–	0.06 UT	**0.05 T**	–
Organometallic Compounds																			
Tributyltin Ion	NE	NE	µg/kg	**3.7**	**1.8 J**	3.6 U	3.6 U	3.5 U	**2.2 J**	3.5 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	–	3.4 U	3.7 U	–
Dioxins/Furans																			
Total Dioxin/Furan TEQ (ND=0.5DL)	5	5	ng/kg	**32.3 JT**	**25.1 JT**	**8.1 JT**	**26.1 JT**	**0.2 T**	**10.2 JT**	**0.2 T**	**0.4 JT**	**0.1 JT**	**0.1 JT**	**14.8 JT**	**0.6 JT**		**0.1 T**	**7.1 T**	

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
Conventionals																			
Total Organic Carbon	NE	NE	%	**0.214**	**0.092**	--	**0.237**	**0.193**	--	--	--	--	--	**0.109**	--	--	--	--	**0.114**
Organic Matter	NE	NE	%	**0.29**	**0.37**	--	**0.61**	**0.68**	--	--	--	--	--	**0.34**	--	--	--	--	**0.38**
Preserved Total Solids	NE	NE	%	--	--	**47.18**	--	--	**33.86**	**42.38**	**78.28**	**77.56**	**78.43**	--	**46.23**	**77.15**	**77.77**	**81.04**	--
Total Solids	NE	NE	%	**82.12**	**83.46**	--	**75.67**	**79.92**	--	--	--	--	--	**82.58**	--	--	--	--	**82.67**
Total Volatile Solids	NE	NE	%	**0.88**	**0.73**	--	**1.24**	**1.08**	--	--	--	--	--	**0.99**	--	--	--	--	**1.07**
Ammonia	NE	NE	mg/kg	**1.93**	**0.65**	--	**2.46**	**11.6**	--	--	--	--	--	**6.99**	--	--	--	--	**0.63**
Sulfide	NE	NE	mg/kg	**4.05**	**2.25**	**392 J**	**5.47**	**1.74**	**1190 J**	**327 J**	**7.40 J**	1.20 UJ	1.20 UJ	**4.15**	**383**	**28.9**	**1.94**	**6.61**	**1.71**
Grain Size																			
Gravel (≤ -1)	NE	NE	%	**0.1 U**	**0.2**	--	**0.1 U**	**0.2**	--	--	--	--	--	**0.2**	--	--	--	--	**0.1**
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	**0.1**	**0.2**	--	**0.3**	**0.7**	--	--	--	--	--	**0.1**	--	--	--	--	**0.1**
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	**0.6**	**0.9**	--	**3.7**	**5.5**	--	--	--	--	--	**0.3**	--	--	--	--	**0.5**
Medium sand (1 < Phi ≤ 2)	NE	NE	%	**19.9**	**29.8**	--	**10.3**	**16.3**	--	--	--	--	--	**23.5**	--	--	--	--	**34.5**
Fine sand (2 < Phi ≤ 3)	NE	NE	%	**55.1**	**51.3**	--	**59.9**	**41.3**	--	--	--	--	--	**51**	--	--	--	--	**43.4**
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	**13**	**10.8**	--	**15.6**	**27.2**	--	--	--	--	--	**16**	--	--	--	--	**15.1**
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	**3.7**	**3.7**	--	**2.4**	**3.6**	--	--	--	--	--	**2.9**	--	--	--	--	**1.7**
Medium silt (5 < Phi ≤ 6)	NE	NE	%	**2**	**0.7**	--	**1.7**	**1.2**	--	--	--	--	--	**1.4**	--	--	--	--	**0.9**
Fine silt (6 < Phi ≤ 7)	NE	NE	%	**1.6**	**0.6**	--	**1.3**	**0.9**	--	--	--	--	--	**1.1**	--	--	--	--	**0.7**
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	**1.2**	**0.4**	--	**0.9**	**0.7**	--	--	--	--	--	**0.9**	--	--	--	--	**0.7**
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	**0.8**	**0.3**	--	**0.9**	**0.6**	--	--	--	--	--	**0.7**	--	--	--	--	**0.5**
Medium clay (9 < Phi ≤ 10)	NE	NE	%	**0.8**	**0.3**	--	**0.8**	**0.6**	--	--	--	--	--	**0.7**	--	--	--	--	**0.5**
Particle/Grain Size, Phi >10	NE	NE	%	**1.2**	**0.9**	--	**2.1**	**1.3**	--	--	--	--	--	**1.3**	--	--	--	--	**1.3**
Total Fines	NE	NE	%	**11.3**	**6.9**	--	**10.2**	**8.8**	--	--	--	--	--	**8.9**	--	--	--	--	**6.3**
Grain Size (Ash Wt.)																			
Gravel (≤ -1)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium sand (1 < Phi ≤ 2)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine sand (2 < Phi ≤ 3)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium silt (5 < Phi ≤ 6)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Fine silt (6 < Phi ≤ 7)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Medium clay (9 < Phi ≤ 10)	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Particle/Grain Size, Phi >10	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Fines	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Metals																			
Antimony			mg/kg	**0.59 J**	**0.65 J**	--	**0.76 J**	**0.60 J**	--	--	--	--	--	**0.84 J**	--	--	--	--	**0.77 J**
Arsenic	57	11	mg/kg	**7**	**3.95 J**	--	**4.39 J**	**4.64 J**	--	--	--	--	--	**5.16 J**	--	--	--	--	**6**
Cadmium	5.1	1	mg/kg	**0.2**	**0.165 J**	--	**0.3**	**0.3**	--	--	--	--	--	**0.3**	--	--	--	--	**0.220 J**
Chromium	260	NE	mg/kg	**22.2**	**18.2**	--	**26.3**	**23.5**	--	--	--	--	--	**30.1**	--	--	--	--	**29**
Copper	390	69,000	mg/kg	**6.6**	**5.9**	--	**8.7**	**7.9**	--	--	--	--	--	**10.5**	--	--	--	--	**10.2**
Lead	450	21	mg/kg	**1.25 J**	**1.12 J**	--	**2.15 J**	**1.55 J**	--	--	--	--	--	**2.20 J**	--	--	--	--	**2.04 J**
Mercury	0.41	0.2	mg/kg	**0.0072 J**	**0.0104 J**	--	**0.0116 J**	**0.0107 J**	--	--	--	--	--	**0.0101 J**	--	--	--	--	**0.0079 J**
Selenium	NE	NE	mg/kg	**0.124 J**	0.6 U	--	**0.131 J**	**0.133 J**	--	--	--	--	--	0.5 U	--	--	--	--	**0.118 J**
Silver	6.1	8,700	mg/kg	0.3 U	**0.131 J**	--	0.4 U	0.3 U	--	--	--	--	--	0.3 U	--	--	--	--	0.3 U
Zinc	410	520,000	mg/kg	**25**	**22**	--	**30**	**27**	--	--	--	--	--	**32**	--	--	--	--	**31**

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
LPAHs (OC Normalized)																			
2-Methylnaphthalene	38	NA	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Acenaphthene	16	NA	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Acenaphthylene	66	NA	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Anthracene	220	NA	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Fluorene	23	NA	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Naphthalene	99	NA	mg/kg OC	**2.3**	**2.7**	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Phenanthrene	100	NA	mg/kg OC	2.3 U	5.4 U	--	**1**	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Total LPAHs	370	NA	mg/kg OC	**2.3**	**2.7**	--	**1**	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
LPAHs																			
2-Methylnaphthalene	670	5,900,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Acenaphthene	500	88,000,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Acenaphthylene	1,300	NE	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Anthracene	960	440,000,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Fluorene	540	59,000,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Naphthalene	2,100	29,000,000	µg/kg	**5**	**2.5 J**	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Phenanthrene	1,500	NE	µg/kg	4.9 U	5.0 U	--	**2.4 J**	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Total LPAHs	5,200	NE	µg/kg	**5 T**	**2.5 T**	--	**2.4 T**	4.9 UT	--	--	--	--	--	4.7 UT	--	--	--	--	4.7 UT
HPAHs (OC Normalized)																			
Benzo(a)anthracene	110	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Benzo(a)pyrene	99	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Benzo(ghi)perylene	31	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Chrysene	110	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Dibenzo(a,h)anthracene	12	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Fluoranthene	160	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Indeno(1,2,3-cd)pyrene	34	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Pyrene	1,000	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Total HPAHs	960.0	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
HPAHs																			
Benzo(a)anthracene	1,300	5,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Benzo(a)pyrene	1,600	500	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Benzo(ghi)perylene	670	NE	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Benzofluoranthenes (Sum)	3,200	5,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Chrysene	1,400	50,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Dibenzo(a,h)anthracene	230	5,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Fluoranthene	1,700	59,000,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Indeno(1,2,3-cd)pyrene	600	5,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Pyrene	2,600	44,000,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Total HPAHs	12,000	NE	µg/kg	4.9 UT	5 UT	--	4.8 UT	4.9 UT	--	--	--	--	--	4.7 UT	--	--	--	--	4.7 UT
cPAHs																			
Total cPAH TEQ (ND=0.5DL)	NE	16	µg/kg	3.5 UT	3.5 UT	--	3.4 UT	3.5 UT	--	--	--	--	--	3.3 UT	--	--	--	--	3.3 UT
Chlorinated Hydrocarbons (OC Normalized)																			
1,2,4-Trichlorobenzene	0.81	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
1,2-Dichlorobenzene (o-Dichlorobenzene)	2.3	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
1,4-Dichlorobenzene (p-Dichlorobenzene)	3.1	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Hexachlorobenzene	0.38	NE	mg/kg OC	0.46 U	1.1 U	--	0.41 U	0.51 U	--	--	--	--	--	0.87 U	--	--	--	--	0.84 U
Chlorinated Hydrocarbons																			
1,2,4-Trichlorobenzene	31	130	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	130,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	680	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Hexachlorobenzene	22	2.3	µg/kg	0.98 U	1.0 U	--	0.98 U	0.99 U	--	--	--	--	--	0.95 U	--	--	--	--	0.96 U
Phthalates (OC Normalized)																			
Bis(2-Ethylhexyl) Phthalate	47	NE	mg/kg OC	23 U	50 U	--	20 U	25 U	--	--	--	--	--	43 U	--	--	--	--	41 U
Butyl benzyl Phthalate	4.9	NE	mg/kg OC	2.3 U	5.4 U	--	2 U	2.5 U	--	--	--	--	--	4.3 U	--	--	--	--	4.1 U
Dibutyl Phthalate	220	NE	mg/kg OC	9 U	20 U	--	8 U	10 U	--	--	--	--	--	17 U	--	--	--	--	17 U
Diethyl Phthalate	61	NE	mg/kg OC	9 U	20 U	--	8 U	10 U	--	--	--	--	--	17 U	--	--	--	--	17 U
Dimethyl Phthalate	53	NE	mg/kg OC	9 U	20 U	--	8 U	10 U	--	--	--	--	--	17 U	--	--	--	--	17 U
Di-N-Octyl Phthalate	58	NE	mg/kg OC	9 U	20 U	--	8 U	10 U	--	--	--	--	--	17 U	--	--	--	--	17 U
Phthalates																			
Bis(2-Ethylhexyl) Phthalate	1,300	260,000	µg/kg	49 U	50 U	--	48 U	49 U	--	--	--	--	--	47 U	--	--	--	--	47 U
Butyl benzyl Phthalate	63	1,900,000	µg/kg	4.9 U	5.0 U	--	4.8 U	4.9 U	--	--	--	--	--	4.7 U	--	--	--	--	4.7 U
Dibutyl Phthalate	1,400	150,000,000	µg/kg	20 U	20 U	--	19 U	20 U	--	--	--	--	--	19 U	--	--	--	--	19 U
Diethyl Phthalate	200	NE	µg/kg	20 U	20 U	--	19 U	20 U	--	--	--	--	--	19 U	--	--	--	--	19 U
Dimethyl Phthalate	71	NE	µg/kg	20 U	20 U	--	19 U	20 U	--	--	--	--	--	19 U	--	--	--	--	19 U
Di-N-Octyl Phthalate	6,200	15,000,000	µg/kg	20 U	20 U	--	19 U	20 U	--	--	--	--	--	19 U	--	--	--	--	19 U

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
Phenols																			
2,4-Dimethylphenol	29	29,000,000	µg/kg	25 U	25 U	–	24 U	24 U	–	–	–	–	–	24 U	–	–	–	–	24 U
o-Cresol (2-methylphenol)	63	73,000,000	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
p-Cresol (4-methylphenol)	670	150,000,000	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Pentachlorophenol	360	9,200	µg/kg	99 U	99 U	–	96 U	98 U	–	–	–	–	–	94 U	–	–	–	–	95 U
Phenol	420	440,000,000	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Miscellaneous Extractables (OC Normalized)																			
Dibenzofuran	15	NE	mg/kg OC	2.3 U	5.4 U	–	2 U	2.5 U	–	–	–	–	–	4.3 U	–	–	–	–	4.1 U
Hexachlorobutadiene	3.9	NE	mg/kg OC	0.46 U	1.1 U	–	0.41 U	0.51 U	–	–	–	–	–	0.87 U	–	–	–	–	0.84 U
N-Nitrosodiphenylamine (as diphenylamine)	11	NE	mg/kg OC	2.3 U	5.4 U	–	2 U	2.5 U	–	–	–	–	–	4.3 U	–	–	–	–	4.1 U
Miscellaneous Extractables																			
Benzoic Acid	650	NE	µg/kg	200 U	200 U	–	190 U	200 U	–	–	–	–	–	190 U	–	–	–	–	190 U
Benzyl Alcohol	57	150,000,000	µg/kg	20 U	20 U	–	19 U	20 U	–	–	–	–	–	19 U	–	–	–	–	19 U
Dibenzofuran	540	1,500,000	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Hexachlorobutadiene	11	47,000	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
N-Nitrosodiphenylamine (as diphenylamine)	28	750,000	µg/kg	4.9 U	5.0 U	–	4.8 U	4.9 U	–	–	–	–	–	4.7 U	–	–	–	–	4.7 U
Pesticides																			
4,4'-DDD	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
4,4'-DDE	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
4,4'-DDT	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Total DDT (4,4 isomers)	NE	NE	µg/kg	0.98 UT	1 UT	–	0.98 UT	0.99 UT	–	–	–	–	–	0.95 UT	–	–	–	–	0.96 UT
Aldrin	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
alpha-Chlordane (cis)	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
beta or gamma-Chlordane (trans)	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
Chlordane (Total)	NE	NE	µg/kg	0.98 UT	1.0 UT	–	0.98 UT	0.99 UT	–	–	–	–	–	0.95 UT	–	–	–	–	0.96 UT
cis-Nonachlor	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Dieldrin	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Heptachlor	NE	NE	µg/kg	0.49 U	0.50 U	–	0.49 U	0.50 U	–	–	–	–	–	0.48 U	–	–	–	–	0.48 U
Oxychlordane	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
trans-Nonachlor	NE	NE	µg/kg	0.98 U	1.0 U	–	0.98 U	0.99 U	–	–	–	–	–	0.95 U	–	–	–	–	0.96 U
Polychlorinated Biphenyls (PCBs)																			
PCB-001	NE	NE	ng/kg	0.254 U	0.308 U	–	0.431 U	0.240 U	–	–	–	–	–	0.484 U	–	–	–	–	0.323 U
PCB-002	NE	NE	ng/kg	0.296 U	0.396 U	–	0.563 U	0.295 U	–	–	–	–	–	0.591 U	–	–	–	–	0.432 U
PCB-003	NE	NE	ng/kg	0.287 U	0.418 U	–	0.603 U	0.300 U	–	–	–	–	–	0.596 U	–	–	–	–	0.471 U
PCB-004	NE	NE	ng/kg	0.817 U	0.850 U	–	0.860 U	0.666 U	–	–	–	–	–	0.865 U	–	–	–	–	0.977 U
PCB-005	NE	NE	ng/kg	0.650 U	0.790 U	–	0.815 U	0.664 U	–	–	–	–	–	0.753 U	–	–	–	–	0.903 U
PCB-006	NE	NE	ng/kg	0.620 U	0.754 U	–	0.778 U	0.633 U	–	–	–	–	–	**1.32 J**	–	–	–	–	0.862 U
PCB-007	NE	NE	ng/kg	0.633 U	0.770 U	–	0.794 U	0.647 U	–	–	–	–	–	0.734 U	–	–	–	–	0.880 U
PCB-008	NE	NE	ng/kg	0.647 U	0.786 U	–	0.811 U	0.661 U	–	–	–	–	–	0.750 U	–	–	–	–	0.899 U
PCB-009	NE	NE	ng/kg	0.660 U	0.802 U	–	0.828 U	0.674 U	–	–	–	–	–	0.765 U	–	–	–	–	0.917 U
PCB-010	NE	NE	ng/kg	0.677 U	0.823 U	–	0.849 U	0.692 U	–	–	–	–	–	0.785 U	–	–	–	–	0.942 U
PCB-011	NE	NE	ng/kg	**2.28 J**	0.877 U	–	0.905 U	**2.53 J**	–	–	–	–	–	**2.95 J**	–	–	–	–	1.00 U
PCB-012	NE	NE	ng/kg	0.697 U	0.847 U	–	0.874 U	0.712 U	–	–	–	–	–	0.808 U	–	–	–	–	0.968 U
PCB-013	NE	NE	ng/kg	0.750 U	0.912 U	–	0.941 U	0.766 U	–	–	–	–	–	0.869 U	–	–	–	–	1.04 U
PCB-014	NE	NE	ng/kg	0.670 U	0.815 U	–	0.841 U	0.685 U	–	–	–	–	–	0.777 U	–	–	–	–	0.932 U
PCB-015	NE	NE	ng/kg	0.645 U	0.872 U	–	0.910 U	0.766 U	–	–	–	–	–	0.795 U	–	–	–	–	0.995 U
PCB-016	NE	NE	ng/kg	1.01 U	0.658 U	–	0.617 U	0.664 U	–	–	–	–	–	0.725 U	–	–	–	–	0.782 U
PCB-017	NE	NE	ng/kg	1.12 U	0.731 U	–	0.686 U	0.738 U	–	–	–	–	–	0.806 U	–	–	–	–	0.869 U
PCB-018	NE	NE	ng/kg	1.24 U	0.811 U	–	0.760 U	0.818 U	–	–	–	–	–	0.893 U	–	–	–	–	0.964 U
PCB-019	NE	NE	ng/kg	1.20 U	0.787 U	–	0.738 U	0.792 U	–	–	–	–	–	0.865 U	–	–	–	–	0.936 U
PCB-020	NE	NE	ng/kg	1.45 U	0.908 U	–	1.02 U	0.882 U	–	–	–	–	–	0.856 U	–	–	–	–	0.854 U
PCB-021	NE	NE	ng/kg	1.45 U	0.908 U	–	1.02 U	0.882 U	–	–	–	–	–	0.856 U	–	–	–	–	0.854 U
PCB-022	NE	NE	ng/kg	1.42 U	0.889 U	–	0.998 U	0.864 U	–	–	–	–	–	0.839 U	–	–	–	–	0.837 U
PCB-023	NE	NE	ng/kg	1.50 U	0.938 U	–	1.05 U	0.911 U	–	–	–	–	–	0.884 U	–	–	–	–	0.882 U
PCB-024	NE	NE	ng/kg	0.866 U	0.566 U	–	0.530 U	0.570 U	–	–	–	–	–	0.623 U	–	–	–	–	0.672 U
PCB-025	NE	NE	ng/kg	1.27 U	0.792 U	–	0.889 U	0.770 U	–	–	–	–	–	0.747 U	–	–	–	–	0.745 U
PCB-026	NE	NE	ng/kg	1.48 U	0.926 U	–	1.04 U	0.899 U	–	–	–	–	–	0.873 U	–	–	–	–	0.871 U
PCB-027	NE	NE	ng/kg	0.838 U	0.547 U	–	0.513 U	0.552 U	–	–	–	–	–	0.602 U	–	–	–	–	0.650 U
PCB-028	NE	NE	ng/kg	1.23 U	0.768 U	–	0.862 U	0.746 U	–	–	–	–	–	0.724 U	–	–	–	–	0.723 U
PCB-029	NE	NE	ng/kg	1.49 U	0.931 U	–	1.04 U	0.904 U	–	–	–	–	–	0.878 U	–	–	–	–	0.876 U
PCB-030	NE	NE	ng/kg	0.803 U	0.524 U	–	0.491 U	0.529 U	–	–	–	–	–	0.577 U	–	–	–	–	0.623 U
PCB-031	NE	NE	ng/kg	1.53 U	0.955 U	–	1.07 U	0.928 U	–	–	–	–	–	0.901 U	–	–	–	–	0.899 U

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-032	NE	NE	ng/kg	0.940 U	0.614 U	--	0.575 U	0.619 U	--	--	--	--	--	0.676 U	--	--	--	--	0.730 U
PCB-033	NE	NE	ng/kg	1.45 U	0.908 U	--	1.02 U	0.882 U	--	--	--	--	--	0.856 U	--	--	--	--	0.854 U
PCB-034	NE	NE	ng/kg	1.48 U	0.926 U	--	1.04 U	0.900 U	--	--	--	--	--	0.873 U	--	--	--	--	0.872 U
PCB-035	NE	NE	ng/kg	1.55 U	0.969 U	--	1.09 U	0.941 U	--	--	--	--	--	0.914 U	--	--	--	--	0.912 U
PCB-036	NE	NE	ng/kg	1.45 U	0.909 U	--	1.02 U	0.883 U	--	--	--	--	--	0.857 U	--	--	--	--	0.855 U
PCB-037	NE	NE	ng/kg	1.36 U	0.852 U	--	0.955 U	0.828 U	--	--	--	--	--	0.803 U	--	--	--	--	0.801 U
PCB-038	NE	NE	ng/kg	1.39 U	0.869 U	--	0.975 U	0.845 U	--	--	--	--	--	0.820 U	--	--	--	--	0.818 U
PCB-039	NE	NE	ng/kg	1.49 U	0.931 U	--	1.04 U	0.905 U	--	--	--	--	--	0.878 U	--	--	--	--	0.876 U
PCB-040	NE	NE	ng/kg	0.824 U	0.759 U	--	0.742 U	0.595 U	--	--	--	--	--	0.687 U	--	--	--	--	0.705 U
PCB-041	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-042	NE	NE	ng/kg	0.539 U	0.497 U	--	0.486 U	0.390 U	--	--	--	--	--	0.450 U	--	--	--	--	0.462 U
PCB-043	NE	NE	ng/kg	0.620 U	0.571 U	--	0.558 U	0.448 U	--	--	--	--	--	0.517 U	--	--	--	--	0.531 U
PCB-044	NE	NE	ng/kg	0.715 U	0.659 U	--	0.644 U	0.517 U	--	--	--	--	--	0.596 U	--	--	--	--	0.612 U
PCB-045	NE	NE	ng/kg	0.708 U	0.652 U	--	0.638 U	0.512 U	--	--	--	--	--	0.591 U	--	--	--	--	0.606 U
PCB-046	NE	NE	ng/kg	0.757 U	0.697 U	--	0.682 U	0.547 U	--	--	--	--	--	0.631 U	--	--	--	--	0.648 U
PCB-047	NE	NE	ng/kg	0.549 U	0.505 U	--	0.494 U	0.397 U	--	--	--	--	--	0.458 U	--	--	--	--	0.470 U
PCB-048	NE	NE	ng/kg	0.509 U	0.469 U	--	0.458 U	0.368 U	--	--	--	--	--	0.424 U	--	--	--	--	0.435 U
PCB-049	NE	NE	ng/kg	0.620 U	0.571 U	--	0.558 U	0.448 U	--	--	--	--	--	0.517 U	--	--	--	--	0.531 U
PCB-050	NE	NE	ng/kg	0.628 U	0.578 U	--	0.566 U	0.454 U	--	--	--	--	--	0.524 U	--	--	--	--	0.537 U
PCB-051	NE	NE	ng/kg	0.667 U	0.614 U	--	0.601 U	0.482 U	--	--	--	--	--	0.556 U	--	--	--	--	0.571 U
PCB-052	NE	NE	ng/kg	0.505 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.433 U
PCB-053	NE	NE	ng/kg	0.687 U	0.633 U	--	0.619 U	0.497 U	--	--	--	--	--	0.573 U	--	--	--	--	0.588 U
PCB-054	NE	NE	ng/kg	0.504 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.432 U
PCB-055	NE	NE	ng/kg	0.467 U	0.430 U	--	0.421 U	0.337 U	--	--	--	--	--	0.389 U	--	--	--	--	0.400 U
PCB-056	NE	NE	ng/kg	0.614 U	0.623 U	--	0.760 U	0.608 U	--	--	--	--	--	0.643 U	--	--	--	--	0.728 U
PCB-057	NE	NE	ng/kg	0.462 U	0.426 U	--	0.417 U	0.334 U	--	--	--	--	--	0.386 U	--	--	--	--	0.396 U
PCB-058	NE	NE	ng/kg	0.476 U	0.439 U	--	0.429 U	0.344 U	--	--	--	--	--	0.397 U	--	--	--	--	0.408 U
PCB-059	NE	NE	ng/kg	0.539 U	0.497 U	--	0.486 U	0.390 U	--	--	--	--	--	0.450 U	--	--	--	--	0.462 U
PCB-060	NE	NE	ng/kg	0.614 U	0.623 U	--	0.760 U	0.608 U	--	--	--	--	--	0.643 U	--	--	--	--	0.728 U
PCB-061	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.380 U	--	--	--	--	0.390 U
PCB-062	NE	NE	ng/kg	0.538 U	0.496 U	--	0.485 U	0.389 U	--	--	--	--	--	0.449 U	--	--	--	--	0.461 U
PCB-063	NE	NE	ng/kg	0.457 U	0.421 U	--	0.412 U	0.331 U	--	--	--	--	--	0.382 U	--	--	--	--	0.392 U
PCB-064	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-065	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-066	NE	NE	ng/kg	0.449 U	0.413 U	--	0.404 U	0.324 U	--	--	--	--	--	0.374 U	--	--	--	--	0.384 U
PCB-067	NE	NE	ng/kg	0.472 U	0.434 U	--	0.425 U	0.341 U	--	--	--	--	--	0.393 U	--	--	--	--	0.404 U
PCB-068	NE	NE	ng/kg	0.453 U	0.417 U	--	0.408 U	0.328 U	--	--	--	--	--	0.378 U	--	--	--	--	0.388 U
PCB-069	NE	NE	ng/kg	0.505 U	0.465 U	--	0.455 U	0.365 U	--	--	--	--	--	0.421 U	--	--	--	--	0.433 U
PCB-070	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.380 U	--	--	--	--	0.390 U
PCB-071	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-072	NE	NE	ng/kg	0.488 U	0.450 U	--	0.440 U	0.353 U	--	--	--	--	--	0.407 U	--	--	--	--	0.418 U
PCB-073	NE	NE	ng/kg	0.523 U	0.482 U	--	0.471 U	0.378 U	--	--	--	--	--	0.436 U	--	--	--	--	0.448 U
PCB-074	NE	NE	ng/kg	0.455 U	0.419 U	--	0.410 U	0.329 U	--	--	--	--	--	0.379 U	--	--	--	--	0.389 U
PCB-075	NE	NE	ng/kg	0.509 U	0.469 U	--	0.458 U	0.368 U	--	--	--	--	--	0.424 U	--	--	--	--	0.435 U
PCB-076	NE	NE	ng/kg	0.449 U	0.413 U	--	0.404 U	0.324 U	--	--	--	--	--	0.374 U	--	--	--	--	0.384 U
PCB-077	NE	NE	ng/kg	0.655 U	0.703 U	--	0.897 U	0.705 U	--	--	--	--	--	0.721 U	--	--	--	--	0.854 U
PCB-078	NE	NE	ng/kg	0.618 U	0.627 U	--	0.764 U	0.612 U	--	--	--	--	--	0.647 U	--	--	--	--	0.732 U
PCB-079	NE	NE	ng/kg	0.586 U	0.594 U	--	0.724 U	0.580 U	--	--	--	--	--	0.613 U	--	--	--	--	0.694 U
PCB-080	NE	NE	ng/kg	0.400 U	0.369 U	--	0.361 U	0.289 U	--	--	--	--	--	0.334 U	--	--	--	--	0.343 U
PCB-081	NE	NE	ng/kg	0.541 U	0.514 U	--	0.597 U	0.486 U	--	--	--	--	--	0.536 U	--	--	--	--	0.577 U
PCB-082	NE	NE	ng/kg	0.950 U	1.06 U	--	0.995 U	1.11 U	--	--	--	--	--	1.04 U	--	--	--	--	0.997 U
PCB-083	NE	NE	ng/kg	0.716 U	0.796 U	--	0.750 U	0.834 U	--	--	--	--	--	0.784 U	--	--	--	--	0.751 U
PCB-084	NE	NE	ng/kg	0.777 U	0.863 U	--	0.814 U	0.905 U	--	--	--	--	--	0.850 U	--	--	--	--	0.815 U
PCB-085	NE	NE	ng/kg	0.681 U	0.757 U	--	0.713 U	0.793 U	--	--	--	--	--	0.746 U	--	--	--	--	0.714 U
PCB-086	NE	NE	ng/kg	0.678 U	0.753 U	--	0.710 U	0.789 U	--	--	--	--	--	0.742 U	--	--	--	--	0.711 U
PCB-087	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-088	NE	NE	ng/kg	0.831 U	0.586 U	--	0.581 U	0.512 U	--	--	--	--	--	0.754 U	--	--	--	--	0.640 U
PCB-089	NE	NE	ng/kg	0.814 U	0.904 U	--	0.852 U	0.948 U	--	--	--	--	--	0.891 U	--	--	--	--	0.854 U
PCB-090	NE	NE	ng/kg	0.731 U	0.812 U	--	0.766 U	0.851 U	--	--	--	--	--	0.800 U	--	--	--	--	0.767 U
PCB-091	NE	NE	ng/kg	0.831 U	0.586 U	--	0.581 U	0.512 U	--	--	--	--	--	0.754 U	--	--	--	--	0.640 U
PCB-092	NE	NE	ng/kg	0.777 U	0.863 U	--	0.814 U	0.905 U	--	--	--	--	--	0.850 U	--	--	--	--	0.815 U
PCB-093	NE	NE	ng/kg	0.863 U	0.609 U	--	0.603 U	0.531 U	--	--	--	--	--	0.783 U	--	--	--	--	0.665 U

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-094	NE	NE	ng/kg	0.958 U	0.676 U	--	0.670 U	0.590 U	--	--	--	--	--	0.870 U	--	--	--	--	0.739 U
PCB-095	NE	NE	ng/kg	0.805 U	0.568 U	--	0.563 U	0.496 U	--	--	--	--	--	0.730 U	--	--	--	--	0.620 U
PCB-096	NE	NE	ng/kg	0.639 U	0.451 U	--	0.447 U	0.394 U	--	--	--	--	--	0.580 U	--	--	--	--	0.493 U
PCB-097	NE	NE	ng/kg	0.705 U	0.783 U	--	0.739 U	0.821 U	--	--	--	--	--	0.772 U	--	--	--	--	0.740 U
PCB-098	NE	NE	ng/kg	0.832 U	0.587 U	--	0.582 U	0.513 U	--	--	--	--	--	0.755 U	--	--	--	--	0.642 U
PCB-099	NE	NE	ng/kg	0.696 U	0.773 U	--	0.729 U	0.811 U	--	--	--	--	--	0.762 U	--	--	--	--	0.730 U
PCB-100	NE	NE	ng/kg	0.801 U	0.565 U	--	0.560 U	0.493 U	--	--	--	--	--	0.727 U	--	--	--	--	0.618 U
PCB-101	NE	NE	ng/kg	0.731 U	0.812 U	--	0.766 U	0.851 U	--	--	--	--	--	0.800 U	--	--	--	--	0.767 U
PCB-102	NE	NE	ng/kg	0.832 U	0.587 U	--	0.582 U	0.513 U	--	--	--	--	--	0.755 U	--	--	--	--	0.642 U
PCB-103	NE	NE	ng/kg	0.762 U	0.538 U	--	0.533 U	0.469 U	--	--	--	--	--	0.691 U	--	--	--	--	0.587 U
PCB-104	NE	NE	ng/kg	0.609 U	0.430 U	--	0.426 U	0.375 U	--	--	--	--	--	0.553 U	--	--	--	--	0.470 U
PCB-105	NE	NE	ng/kg	0.691 U	0.756 U	--	0.840 U	0.785 U	--	--	--	--	--	0.861 U	--	--	--	--	0.962 U
PCB-106	NE	NE	ng/kg	0.678 U	0.732 U	--	0.809 U	0.821 U	--	--	--	--	--	0.880 U	--	--	--	--	0.864 U
PCB-107	NE	NE	ng/kg	0.679 U	0.722 U	--	0.834 U	0.755 U	--	--	--	--	--	0.877 U	--	--	--	--	0.907 U
PCB-108	NE	NE	ng/kg	0.679 U	0.722 U	--	0.834 U	0.755 U	--	--	--	--	--	0.877 U	--	--	--	--	0.907 U
PCB-109	NE	NE	ng/kg	0.606 U	0.673 U	--	0.635 U	0.705 U	--	--	--	--	--	0.663 U	--	--	--	--	0.635 U
PCB-110	NE	NE	ng/kg	0.545 U	0.606 U	--	0.571 U	0.635 U	--	--	--	--	--	0.597 U	--	--	--	--	0.730 U
PCB-111	NE	NE	ng/kg	0.523 U	0.581 U	--	0.548 U	0.609 U	--	--	--	--	--	0.573 U	--	--	--	--	0.549 U
PCB-112	NE	NE	ng/kg	0.716 U	0.796 U	--	0.750 U	0.834 U	--	--	--	--	--	0.784 U	--	--	--	--	0.751 U
PCB-113	NE	NE	ng/kg	0.593 U	0.659 U	--	0.621 U	0.691 U	--	--	--	--	--	0.650 U	--	--	--	--	0.622 U
PCB-114	NE	NE	ng/kg	0.709 U	0.722 U	--	0.842 U	0.741 U	--	--	--	--	--	0.898 U	--	--	--	--	0.938 U
PCB-115	NE	NE	ng/kg	0.523 U	0.581 U	--	0.548 U	0.609 U	--	--	--	--	--	0.573 U	--	--	--	--	0.549 U
PCB-116	NE	NE	ng/kg	0.681 U	0.757 U	--	0.713 U	0.793 U	--	--	--	--	--	0.746 U	--	--	--	--	0.714 U
PCB-117	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-118	NE	NE	ng/kg	0.678 U	0.732 U	--	0.809 U	0.821 U	--	--	--	--	--	0.880 U	--	--	--	--	0.864 U
PCB-119	NE	NE	ng/kg	0.537 U	0.596 U	--	0.562 U	0.625 U	--	--	--	--	--	0.588 U	--	--	--	--	0.563 U
PCB-120	NE	NE	ng/kg	0.515 U	0.572 U	--	0.539 U	0.599 U	--	--	--	--	--	0.563 U	--	--	--	--	0.540 U
PCB-121	NE	NE	ng/kg	0.683 U	0.482 U	--	0.477 U	0.420 U	--	--	--	--	--	0.619 U	--	--	--	--	0.526 U
PCB-122	NE	NE	ng/kg	0.660 U	0.701 U	--	0.810 U	0.733 U	--	--	--	--	--	0.851 U	--	--	--	--	0.881 U
PCB-123	NE	NE	ng/kg	0.567 U	0.601 U	--	0.751 U	0.596 U	--	--	--	--	--	0.769 U	--	--	--	--	0.773 U
PCB-124	NE	NE	ng/kg	0.686 U	0.729 U	--	0.842 U	0.762 U	--	--	--	--	--	0.885 U	--	--	--	--	0.916 U
PCB-125	NE	NE	ng/kg	0.650 U	0.722 U	--	0.681 U	0.757 U	--	--	--	--	--	0.712 U	--	--	--	--	0.682 U
PCB-126	NE	NE	ng/kg	0.979 U	1.10 U	--	1.21 U	1.20 U	--	--	--	--	--	1.32 U	--	--	--	--	1.32 U
PCB-127	NE	NE	ng/kg	0.720 U	0.765 U	--	0.884 U	0.800 U	--	--	--	--	--	0.929 U	--	--	--	--	0.961 U
PCB-128	NE	NE	ng/kg	0.606 U	0.621 U	--	0.701 U	0.588 U	--	--	--	--	--	0.578 U	--	--	--	--	0.675 U
PCB-129	NE	NE	ng/kg	0.804 U	0.825 U	--	0.930 U	0.781 U	--	--	--	--	--	0.767 U	--	--	--	--	0.896 U
PCB-130	NE	NE	ng/kg	0.759 U	0.779 U	--	0.879 U	0.738 U	--	--	--	--	--	0.725 U	--	--	--	--	0.846 U
PCB-131	NE	NE	ng/kg	0.679 U	0.697 U	--	0.786 U	0.660 U	--	--	--	--	--	0.648 U	--	--	--	--	0.757 U
PCB-132	NE	NE	ng/kg	0.602 U	0.617 U	--	0.696 U	0.585 U	--	--	--	--	--	0.574 U	--	--	--	--	0.670 U
PCB-133	NE	NE	ng/kg	0.679 U	0.697 U	--	0.786 U	0.660 U	--	--	--	--	--	0.648 U	--	--	--	--	0.757 U
PCB-134	NE	NE	ng/kg	0.699 U	0.717 U	--	0.809 U	0.679 U	--	--	--	--	--	0.667 U	--	--	--	--	0.779 U
PCB-135	NE	NE	ng/kg	0.665 U	0.682 U	--	0.769 U	0.646 U	--	--	--	--	--	0.635 U	--	--	--	--	0.741 U
PCB-136	NE	NE	ng/kg	0.401 U	0.367 U	--	0.368 U	0.351 U	--	--	--	--	--	0.363 U	--	--	--	--	0.410 U
PCB-137	NE	NE	ng/kg	0.707 U	0.725 U	--	0.818 U	0.687 U	--	--	--	--	--	0.675 U	--	--	--	--	0.788 U
PCB-138	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**
PCB-139	NE	NE	ng/kg	0.629 U	0.645 U	--	0.728 U	0.611 U	--	--	--	--	--	0.601 U	--	--	--	--	0.701 U
PCB-140	NE	NE	ng/kg	0.634 U	0.650 U	--	0.733 U	0.615 U	--	--	--	--	--	0.605 U	--	--	--	--	0.706 U
PCB-141	NE	NE	ng/kg	0.659 U	0.676 U	--	0.763 U	0.640 U	--	--	--	--	--	0.629 U	--	--	--	--	0.734 U
PCB-142	NE	NE	ng/kg	0.756 U	0.776 U	--	0.875 U	0.735 U	--	--	--	--	--	0.722 U	--	--	--	--	0.843 U
PCB-143	NE	NE	ng/kg	0.699 U	0.717 U	--	0.809 U	0.679 U	--	--	--	--	--	0.667 U	--	--	--	--	0.779 U
PCB-144	NE	NE	ng/kg	0.643 U	0.659 U	--	0.744 U	0.624 U	--	--	--	--	--	0.613 U	--	--	--	--	0.716 U
PCB-145	NE	NE	ng/kg	0.411 U	0.376 U	--	0.377 U	0.360 U	--	--	--	--	--	0.373 U	--	--	--	--	0.421 U
PCB-146	NE	NE	ng/kg	0.577 U	0.592 U	--	0.668 U	0.561 U	--	--	--	--	--	0.551 U	--	--	--	--	0.643 U
PCB-147	NE	NE	ng/kg	0.620 U	0.636 U	--	0.717 U	0.602 U	--	--	--	--	--	0.592 U	--	--	--	--	0.691 U
PCB-148	NE	NE	ng/kg	0.511 U	0.468 U	--	0.469 U	0.447 U	--	--	--	--	--	0.463 U	--	--	--	--	0.523 U
PCB-149	NE	NE	ng/kg	0.629 U	0.645 U	--	0.728 U	0.611 U	--	--	--	--	--	0.601 U	--	--	--	--	0.701 U
PCB-150	NE	NE	ng/kg	0.406 U	0.371 U	--	0.372 U	0.355 U	--	--	--	--	--	0.368 U	--	--	--	--	0.415 U
PCB-151	NE	NE	ng/kg	0.664 U	0.681 U	--	0.768 U	0.645 U	--	--	--	--	--	0.633 U	--	--	--	--	0.739 U
PCB-152	NE	NE	ng/kg	0.393 U	0.360 U	--	0.361 U	0.344 U	--	--	--	--	--	0.356 U	--	--	--	--	0.403 U
PCB-153	NE	NE	ng/kg	0.560 U	0.574 U	--	0.648 U	0.544 U	--	--	--	--	--	0.534 U	--	--	--	--	**1.45 J**
PCB-154	NE	NE	ng/kg	0.455 U	0.416 U	--	0.417 U	0.398 U	--	--	--	--	--	0.412 U	--	--	--	--	0.465 U
PCB-155	NE	NE	ng/kg	0.362 U	0.331 U	--	0.332 U	0.317 U	--	--	--	--	--	0.328 U	--	--	--	--	0.370 U

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	PT-13-Z	PT-14-Z	PT-3	PT-3-Z	PT-5-Z	PT-6	PT-6	PT-6	PT-6	PT-6	PT-6-Z	PT-8	PT-8	PT-8	PT-8	PT-8-Z
			Sample ID	PT-13-29.0-30.0	PT-14-29.0-30.0	PT-3-41.0-42.0	PT-3-43.0-44.0	PT-5-43.0-44.0	PT-6-19.0-20.0	PT-6-23.0-24.0	PT-6-31.0-32.0	PT-6-35.0-36.0	PT-6-40.0-41.0	PT-6-43.0-44.0	PT-8-24.0-25.0	PT-8-31.0-32.0	PT-8-35.0-36.0	PT-8-40.0-41.0	PT-8-43.0-44.0
			Sample Date	01/15/2015	01/15/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/13/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015	01/12/2015
			Sample Depth	-29 to -30 ft MLLW	-29 to -30 ft MLLW	-41 to -42 ft MLLW	-43 to -44 ft MLLW	-43 to -44 ft MLLW	-19 to -20 ft MLLW	-23 to -24 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW	-24 to -25 ft MLLW	-31 to -32 ft MLLW	-35 to -36 ft MLLW	-40 to -41 ft MLLW	-43 to -44 ft MLLW
PCB-156	NE	NE	ng/kg	0.484 U	0.494 U	--	0.553 U	0.484 U	--	--	--	--	--	0.470 U	--	--	--	--	0.533 U
PCB-157	NE	NE	ng/kg	0.560 U	0.564 U	--	0.658 U	0.560 U	--	--	--	--	--	0.530 U	--	--	--	--	0.625 U
PCB-158	NE	NE	ng/kg	0.496 U	0.509 U	--	0.574 U	0.482 U	--	--	--	--	--	0.473 U	--	--	--	--	0.553 U
PCB-159	NE	NE	ng/kg	0.474 U	0.486 U	--	0.548 U	0.460 U	--	--	--	--	--	0.452 U	--	--	--	--	0.528 U
PCB-160	NE	NE	ng/kg	0.496 U	0.509 U	--	0.574 U	0.482 U	--	--	--	--	--	0.473 U	--	--	--	--	0.553 U
PCB-161	NE	NE	ng/kg	0.602 U	0.617 U	--	0.696 U	0.585 U	--	--	--	--	--	0.574 U	--	--	--	--	0.670 U
PCB-162	NE	NE	ng/kg	0.606 U	0.621 U	--	0.701 U	0.588 U	--	--	--	--	--	0.578 U	--	--	--	--	0.675 U
PCB-163	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**
PCB-164	NE	NE	ng/kg	0.505 U	0.518 U	--	0.584 U	0.490 U	--	--	--	--	--	0.482 U	--	--	--	--	**1.92 J**
PCB-165	NE	NE	ng/kg	0.577 U	0.592 U	--	0.668 U	0.561 U	--	--	--	--	--	0.551 U	--	--	--	--	0.643 U
PCB-166	NE	NE	ng/kg	0.533 U	0.546 U	--	0.616 U	0.517 U	--	--	--	--	--	0.508 U	--	--	--	--	0.593 U
PCB-167	NE	NE	ng/kg	0.516 U	0.515 U	--	0.549 U	0.477 U	--	--	--	--	--	0.477 U	--	--	--	--	0.519 U
PCB-168	NE	NE	ng/kg	0.531 U	0.545 U	--	0.614 U	0.516 U	--	--	--	--	--	0.507 U	--	--	--	--	0.592 U
PCB-169	NE	NE	ng/kg	0.567 U	0.612 U	--	0.710 U	0.547 U	--	--	--	--	--	0.557 U	--	--	--	--	0.705 U
PCB-170	NE	NE	ng/kg	0.650 U	0.630 U	--	0.655 U	0.549 U	--	--	--	--	--	0.537 U	--	--	--	--	0.546 U
PCB-171	NE	NE	ng/kg	0.592 U	0.573 U	--	0.596 U	0.500 U	--	--	--	--	--	0.489 U	--	--	--	--	0.498 U
PCB-172	NE	NE	ng/kg	0.610 U	0.591 U	--	0.614 U	0.515 U	--	--	--	--	--	0.504 U	--	--	--	--	0.513 U
PCB-173	NE	NE	ng/kg	0.667 U	0.646 U	--	0.672 U	0.563 U	--	--	--	--	--	0.551 U	--	--	--	--	0.561 U
PCB-174	NE	NE	ng/kg	0.538 U	0.521 U	--	0.542 U	0.455 U	--	--	--	--	--	0.445 U	--	--	--	--	0.453 U
PCB-175	NE	NE	ng/kg	0.564 U	0.547 U	--	0.568 U	0.477 U	--	--	--	--	--	0.466 U	--	--	--	--	0.475 U
PCB-176	NE	NE	ng/kg	0.416 U	0.403 U	--	0.419 U	0.351 U	--	--	--	--	--	0.344 U	--	--	--	--	0.350 U
PCB-177	NE	NE	ng/kg	0.613 U	0.594 U	--	0.618 U	0.518 U	--	--	--	--	--	0.507 U	--	--	--	--	0.516 U
PCB-178	NE	NE	ng/kg	0.605 U	0.586 U	--	0.610 U	0.511 U	--	--	--	--	--	0.500 U	--	--	--	--	0.509 U
PCB-179	NE	NE	ng/kg	0.411 U	0.398 U	--	0.414 U	0.347 U	--	--	--	--	--	0.339 U	--	--	--	--	0.345 U
PCB-180	NE	NE	ng/kg	0.510 U	0.494 U	--	0.514 U	0.431 U	--	--	--	--	--	0.421 U	--	--	--	--	0.429 U
PCB-181	NE	NE	ng/kg	0.635 U	0.616 U	--	0.640 U	0.537 U	--	--	--	--	--	0.525 U	--	--	--	--	0.535 U
PCB-182	NE	NE	ng/kg	0.525 U	0.509 U	--	0.529 U	0.444 U	--	--	--	--	--	0.434 U	--	--	--	--	0.442 U
PCB-183	NE	NE	ng/kg	**1.43 J**	**1.36 J**	--	**1.58 J**	**1.24 J**	--	--	--	--	--	**1.27 J**	--	--	--	--	**1.42 J**
PCB-184	NE	NE	ng/kg	0.404 U	0.391 U	--	0.407 U	0.341 U	--	--	--	--	--	0.334 U	--	--	--	--	0.340 U
PCB-185	NE	NE	ng/kg	0.598 U	0.580 U	--	0.603 U	0.505 U	--	--	--	--	--	0.494 U	--	--	--	--	0.503 U
PCB-186	NE	NE	ng/kg	0.428 U	0.415 U	--	0.431 U	0.361 U	--	--	--	--	--	0.354 U	--	--	--	--	0.360 U
PCB-187	NE	NE	ng/kg	0.525 U	0.509 U	--	0.529 U	0.444 U	--	--	--	--	--	0.434 U	--	--	--	--	0.442 U
PCB-188	NE	NE	ng/kg	0.438 U	0.426 U	--	0.422 U	0.376 U	--	--	--	--	--	0.359 U	--	--	--	--	0.351 U
PCB-189	NE	NE	ng/kg	0.437 U	0.422 U	--	0.464 U	0.362 U	--	--	--	--	--	0.366 U	--	--	--	--	0.389 U
PCB-190	NE	NE	ng/kg	0.464 U	0.450 U	--	0.468 U	0.392 U	--	--	--	--	--	0.384 U	--	--	--	--	0.391 U
PCB-191	NE	NE	ng/kg	0.440 U	0.427 U	--	0.443 U	0.372 U	--	--	--	--	--	0.364 U	--	--	--	--	0.370 U
PCB-192	NE	NE	ng/kg	0.490 U	0.475 U	--	0.494 U	0.414 U	--	--	--	--	--	0.405 U	--	--	--	--	0.413 U
PCB-193	NE	NE	ng/kg	0.441 U	0.428 U	--	0.445 U	0.373 U	--	--	--	--	--	0.365 U	--	--	--	--	0.371 U
PCB-194	NE	NE	ng/kg	0.517 U	0.488 U	--	0.519 U	0.484 U	--	--	--	--	--	0.532 U	--	--	--	--	0.510 U
PCB-195	NE	NE	ng/kg	0.572 U	0.541 U	--	0.574 U	0.536 U	--	--	--	--	--	0.588 U	--	--	--	--	0.565 U
PCB-196	NE	NE	ng/kg	0.676 U	0.634 U	--	0.681 U	0.696 U	--	--	--	--	--	0.647 U	--	--	--	--	0.661 U
PCB-197	NE	NE	ng/kg	0.504 U	0.472 U	--	0.508 U	0.519 U	--	--	--	--	--	0.482 U	--	--	--	--	0.493 U
PCB-198	NE	NE	ng/kg	0.763 U	0.716 U	--	0.769 U	0.786 U	--	--	--	--	--	0.730 U	--	--	--	--	0.747 U
PCB-199	NE	NE	ng/kg	0.728 U	0.683 U	--	0.734 U	0.750 U	--	--	--	--	--	0.696 U	--	--	--	--	0.712 U
PCB-200	NE	NE	ng/kg	0.510 U	0.478 U	--	0.514 U	0.525 U	--	--	--	--	--	0.487 U	--	--	--	--	0.499 U
PCB-201	NE	NE	ng/kg	0.509 U	0.477 U	--	0.513 U	0.524 U	--	--	--	--	--	0.487 U	--	--	--	--	0.498 U
PCB-202	NE	NE	ng/kg	0.522 U	0.490 U	--	0.526 U	0.538 U	--	--	--	--	--	0.499 U	--	--	--	--	0.511 U
PCB-203	NE	NE	ng/kg	0.676 U	0.634 U	--	0.681 U	0.696 U	--	--	--	--	--	0.647 U	--	--	--	--	0.661 U
PCB-204	NE	NE	ng/kg	0.507 U	0.475 U	--	0.511 U	0.522 U	--	--	--	--	--	0.485 U	--	--	--	--	0.496 U
PCB-205	NE	NE	ng/kg	0.401 U	0.379 U	--	0.403 U	0.376 U	--	--	--	--	--	0.412 U	--	--	--	--	0.396 U
PCB-206	NE	NE	ng/kg	0.491 U	0.451 U	--	0.506 U	0.435 U	--	--	--	--	--	0.421 U	--	--	--	--	0.481 U
PCB-207	NE	NE	ng/kg	0.353 U	0.327 U	--	0.363 U	0.317 U	--	--	--	--	--	0.303 U	--	--	--	--	0.340 U
PCB-208	NE	NE	ng/kg	0.331 U	0.308 U	--	0.340 U	0.301 U	--	--	--	--	--	0.286 U	--	--	--	--	0.316 U
PCB-209	NE	NE	ng/kg	0.316 U	0.278 U	--	0.282 U	0.300 U	--	--	--	--	--	0.291 U	--	--	--	--	0.262 U
Total PCBs (OC Normalized)	12	NA	mg/kg OC	**0.002**	**0.001**	--	**0.001**	**0.002**	--	--	--	--	--	**0.005**	--	--	--	--	**0.008**
Total PCBs	130,000	3,500	ng/kg	**3.7 T**	**1.4 T**	--	**1.6 T**	**3.8 T**	--	--	--	--	--	**5.5 T**	--	--	--	--	**8.6 T**
Total Dioxin-Like PCBs TEQ (ND=0.5DL)	NE	2	ng/kg	0.06 UT	0.06 UT	--	0.07 UT	0.07 UT	--	--	--	--	--	0.07 UT	--	--	--	--	0.08 UT
Organometallic Compounds																			
Tributyltin Ion	NE	NE	µg/kg	3.8 U	3.8 U	--	3.5 U	3.5 U	--	--	--	--	--	3.4 U	--	--	--	--	3.4 U
Dioxins/Furans																			
Total Dioxin/Furan TEQ (ND=0.5DL)	5	5	ng/kg	**0.1 T**	**0.1 T**		**0.1 T**	**0.2 T**						**0.1 UT**					**0.5 JT**

Notes:

-- = not tested
BT = bioaccumulation trigger
cPAH = carcinogenic polycyclic aromatic hydrocarbon
DL = detection limit
HPAH = high molecular weight polycyclic aromatic hydrocarbon
J = Estimated concentration
JT = Estimated concentration total
LPAH = low molecular weight polycyclic aromatic hydrocarbon
mg/kg = milligram per kilogram
mg/kg OC = milligram per kilogram organic carbon normalized
ML = maximum level
NA = not applicable because TOC outside of range for comparison to TOC-normalized screening levels
NE = not established
ng/kg = nanogram per kilogram
PCB = polychlorinated biphenyl
SL = screening level
TEQ = toxicity equivalent
U = The analyte is not detected at or above the reported concentration.
µg/kg = microgram per kilogram
Bold indicates the analyte was detected.
Blue border indicates total organic carbon is outside the range of 0.5% to 3.5% and will be compared to dry weight screening levels for protection of benthic organisms.
Orange shading indicates exceedance of screening level protective of benthic organisms
Yellow shading indicates exceedance of screening level protective of human health and higher trophic level ecological receptors
Red shading indicates exceedance of screening levels protective of benthic organisms and protective of human health and higher trophic level ecological receptors.
Light blue shading indicates a non-detect that exceeds any screening level

Table 7

Summary of Conventional Parameters Associated with Bioassay Results

Mill A Former Site Interim Action Dredging Project

Everett, Washington

	Sample Location	**Grab**
	Sample ID	**CARR-REF**
	Sample Date	**2/24/2015**
Analyte	**Sample Depth**	**10 cm**
Conventionals		
Total Organic Carbon	%	**0.195**
Total Solids	%	**72.8**
Grain Size		
Gravel (≤ -1)	%	**0**
Very coarse sand (-1 < Phi ≤ 0)	%	**0.2**
Coarse sand (0 < Phi ≤ 1)	%	**1.4**
Medium sand (1 < Phi ≤ 2)	%	**33.8**
Fine sand (2 < Phi ≤ 3)	%	**60.7**
Very fine sand (3 < Phi ≤ 4)	%	**2.8**
Total sand	%	**98.9**
Coarse silt (4 < Phi ≤ 5)	%	**<1.1**
Medium silt (5 < Phi ≤ 6)	%	**<1.1**
Fine silt (6 < Phi ≤ 7)	%	**<1.1**
Very fine silt (7 < Phi ≤ 8)	%	**<1.1**
Total silt	%	**<1.1**
Coarse clay (8 < Phi ≤ 9)	%	**<1.1**
Medium clay (9 < Phi ≤ 10)	%	**<1.1**
Particle/Grain Size, Phi >10	%	**<1.1**
Total clay	%	**<1.1**
Total Fines	%	**1.1**

Table 8

Summary of Bioassay Test Results for DMMP Evaluation

Mill A Former Site Interim Action Dredging Project

Everett, Washington

Bioassay Test	**Amphipod**		**Polychaete**		**Larval**		**Overall Determination**
Screening Criteria	**Double-Hit**[1]	**Single-Hit**[2]	**Double-Hit**[1]	**Single-Hit**[2]	**Double-Hit**[1]	**Single-Hit**[2]	
D-1	Pass	Pass	Pass	Pass	**Fail**	Pass	Pass
D-2	Pass	Pass	Pass	Pass	**Fail**	Pass	Pass
D-3A	Pass	Pass	Pass	Pass	Pass	Pass	Pass
D-3B	Pass	Pass	Pass	Pass	**Fail**	**Fail**	**Fail**
D-4B	Pass	Pass	Pass	Pass	**Fail**	Pass	Pass
D-7	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Notes:

[1] When any two biological tests (amphipod, juvenile infaunal growth or sediment larval) exhibit test sediment response below the bioassay-specific guidelines for a single-hit failure but above the bioassay-specific double-hit failure, the DMMU is unsuitable for unconfined open water disposal.

[2] When any one biological test exhibits test sediment response that exceeds the bioassay-specific guidelines for a single-hit failure, the DMMU is unsuitable for unconfined open-water disposal.

DMMU = Dredged Material Management Unit

Table 9

Summary of Bioassay Test Results for SMS Evaluation

Mill A Former Site Interim Action Dredging Project

Everett, Washington

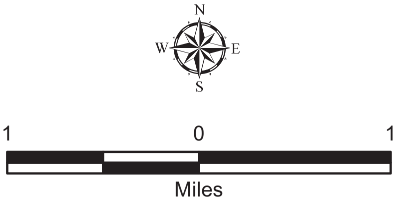
Bioassay Test	**Amphipod**		**Polychaete**		**Larval**	
Screening Criteria	**SQO**	**CSL**	**SQO**	**CSL**	**SQO**	**CSL**
D-1	Pass	Pass	Pass	Pass	**Fail**	Pass
D-2	Pass	Pass	Pass	Pass	**Fail**	Pass
D-3A	Pass	Pass	Pass	Pass	Pass	Pass
D-3B	Pass	Pass	Pass	Pass	**Fail**	**Fail**
D-4B	Pass	Pass	Pass	Pass	**Fail**	Pass
D-7	Pass	Pass	Pass	Pass	Pass	Pass

Notes:

SMS = Sediment Managment Standards

SQO = Sediment Quality Objectives

CSL = Cleanup Screening Level



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
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Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Weyerhaeuser Mill A Former Site
Everett, Washington

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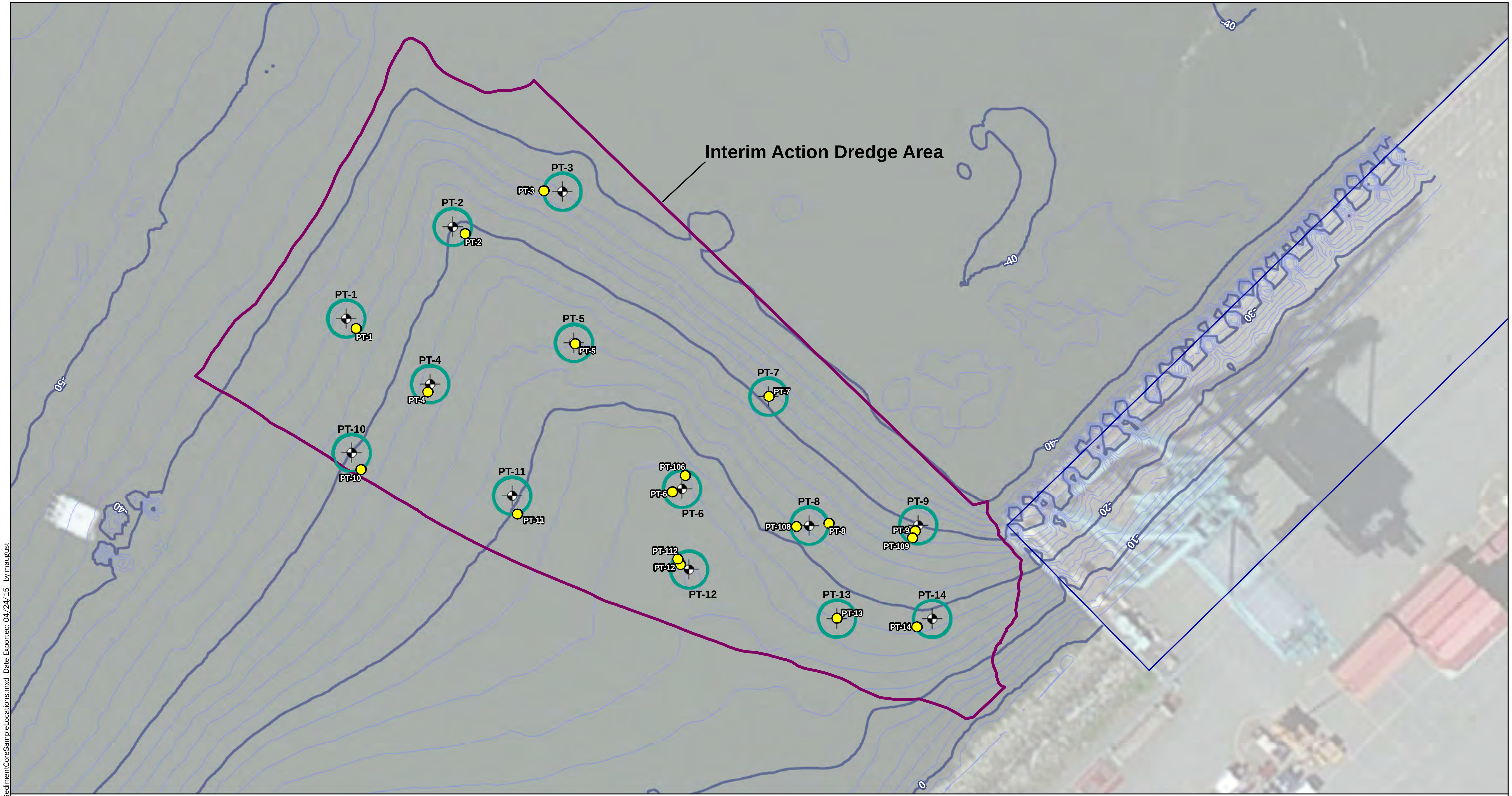
Figure 1

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\067602001_DNR_VicinityMap.mxd   Map Revised: 13 December 2012   amanza



Notes:

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Data Source:

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

⊕	Proposed Core Location
●	Actual Core Location
○	10-ft Radius from Proposed Location

N
W E
S

50 0 50
Feet

Sediment Core Sample Location

Weyerhaeuser Mill A Former Site
Everett, Washington

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Figure 2

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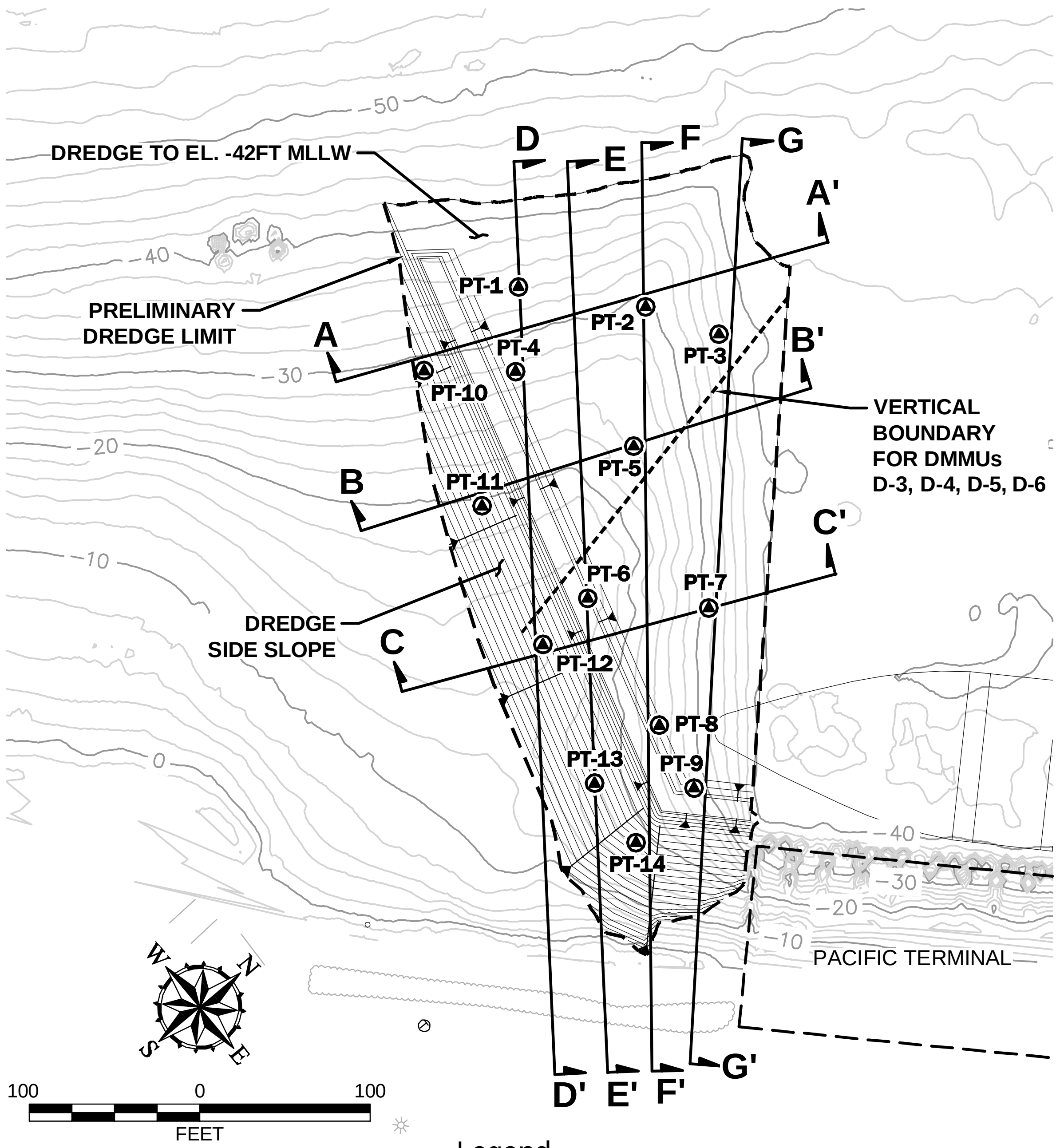

Legend

PT-1 ●	Sediment Core Location
--------	DMMU Boundary
D-1	DMMU Identification
A A'	Cross-Section Location

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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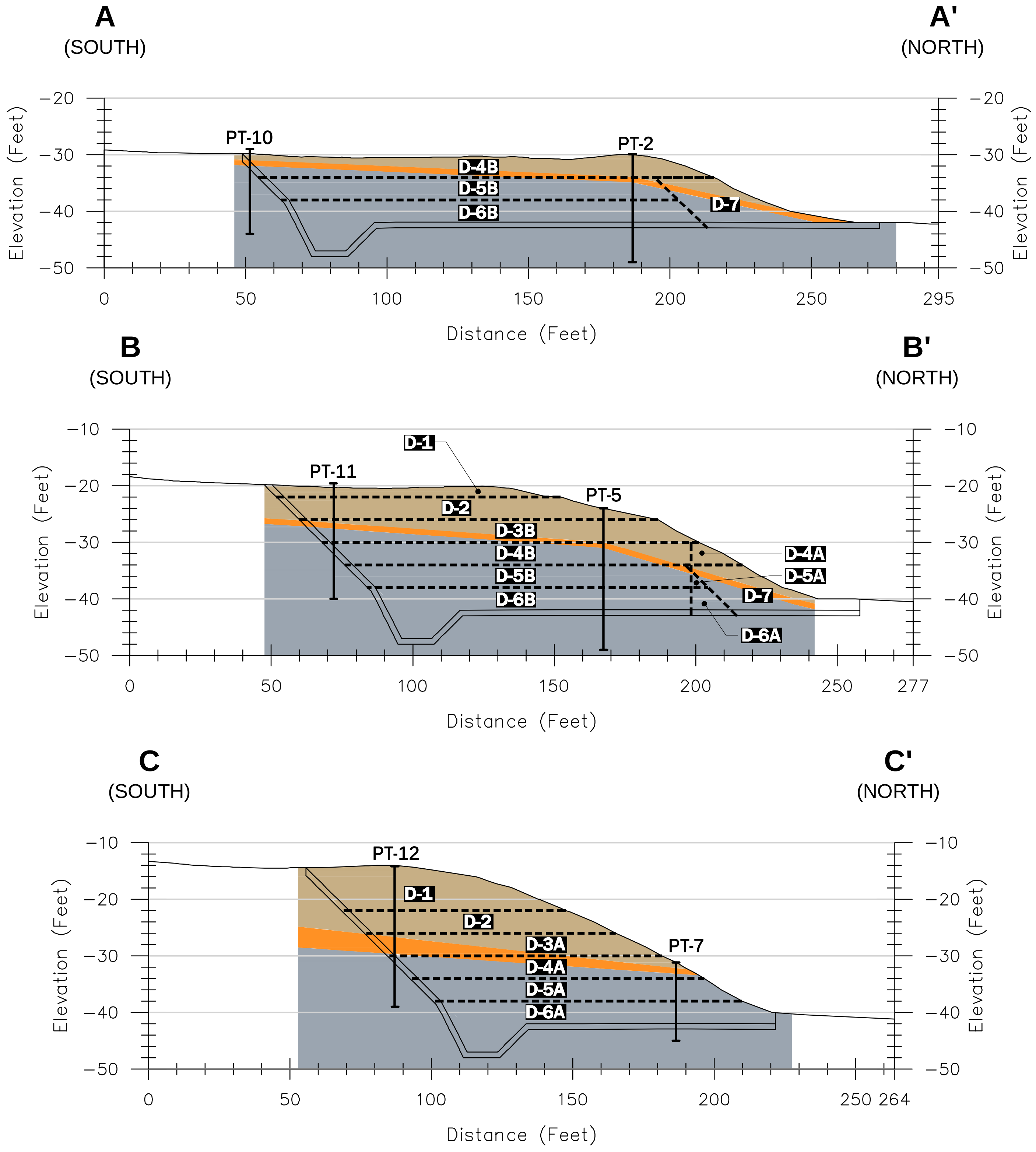

▨	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
⬜	Gray silty sand (native material)

50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy - Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Everett, Washington

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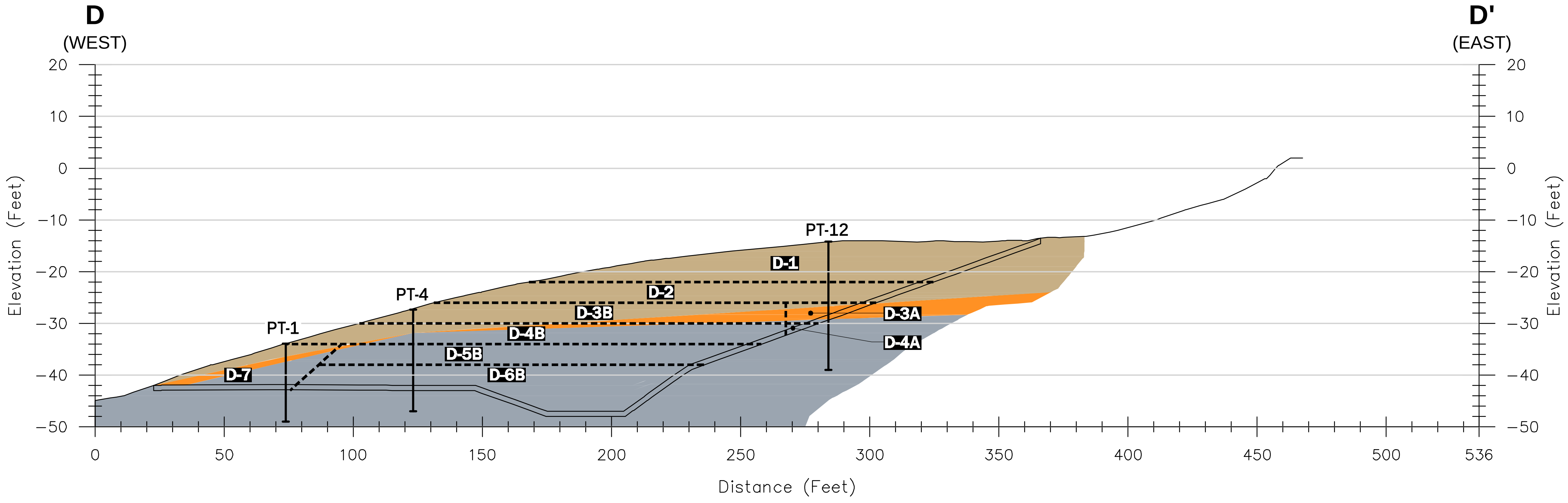
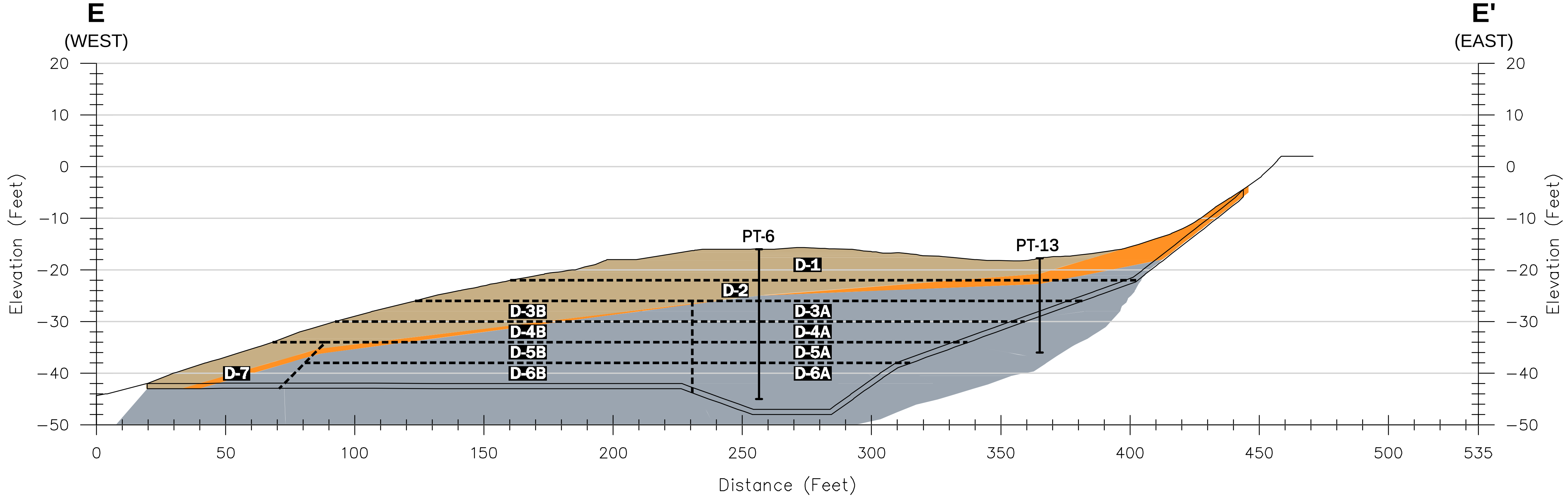
Figure 3

P:\0\0676020\03\CAD\DREDGE MATERIAL CHARACTERIZATION REPORT\FIGS 3-5 SITE PLAN AND SECTIONS.DWG\TAB:DDEE MODIFIED BY TMICHAUD ON JUN 02, 2015 - 9:07





Legend

------	DMMU Boundary
D-1	DMMU Identification
🟫	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
▨	Gray silty sand (native material)

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Everett, Washington

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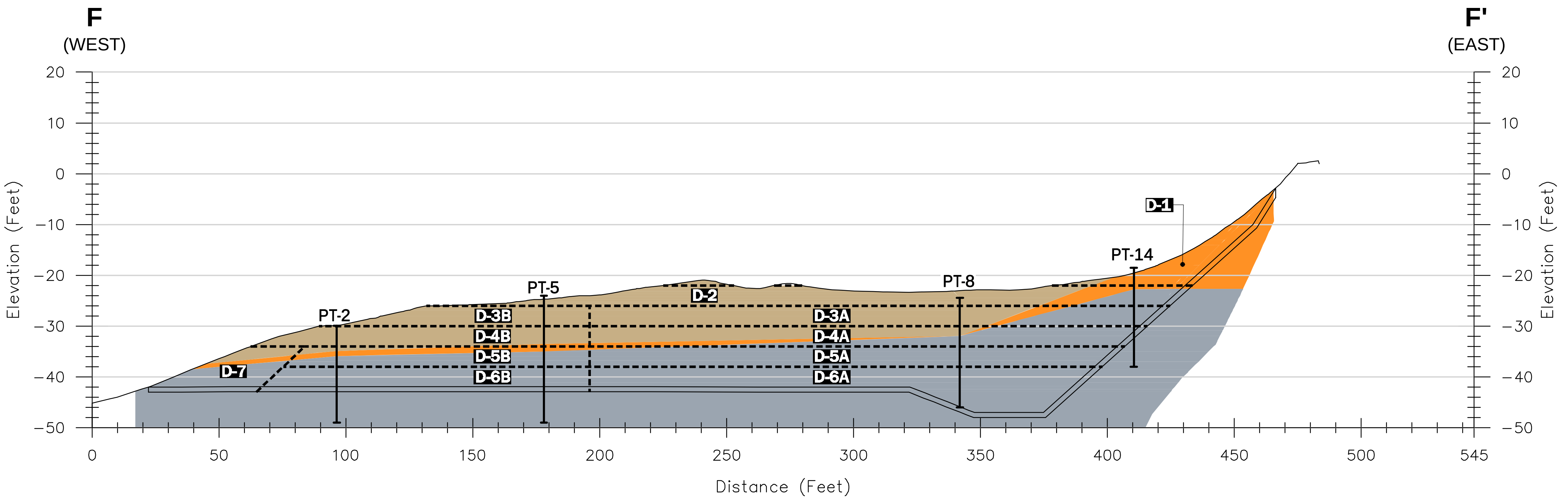
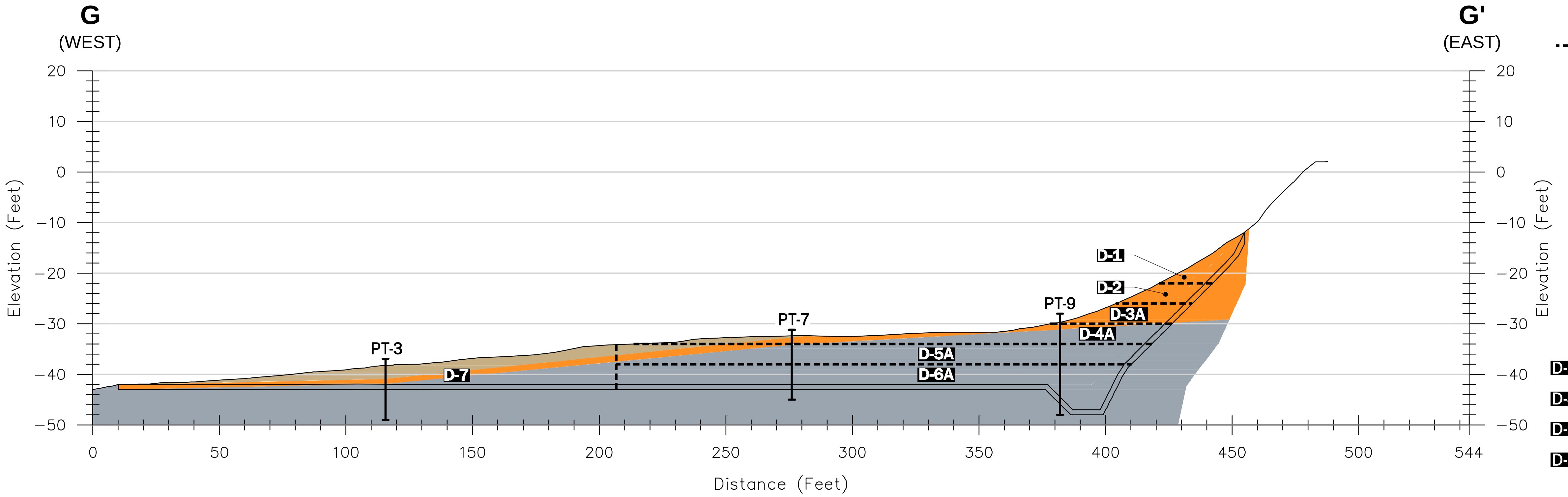
Figure 4





Legend

--------	DMMU Boundary
D-1	DMMU Identification
🟫	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
▨	Gray silty sand (native material)

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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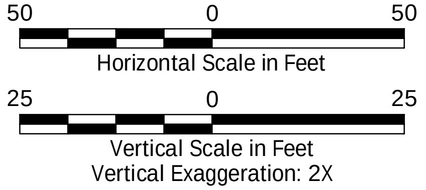

Horizontal Scale in Feet

Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy -
Cross-Sections F-F' and G-G'

Weyerhaeuser Mill A Former Site
Everett, Washington

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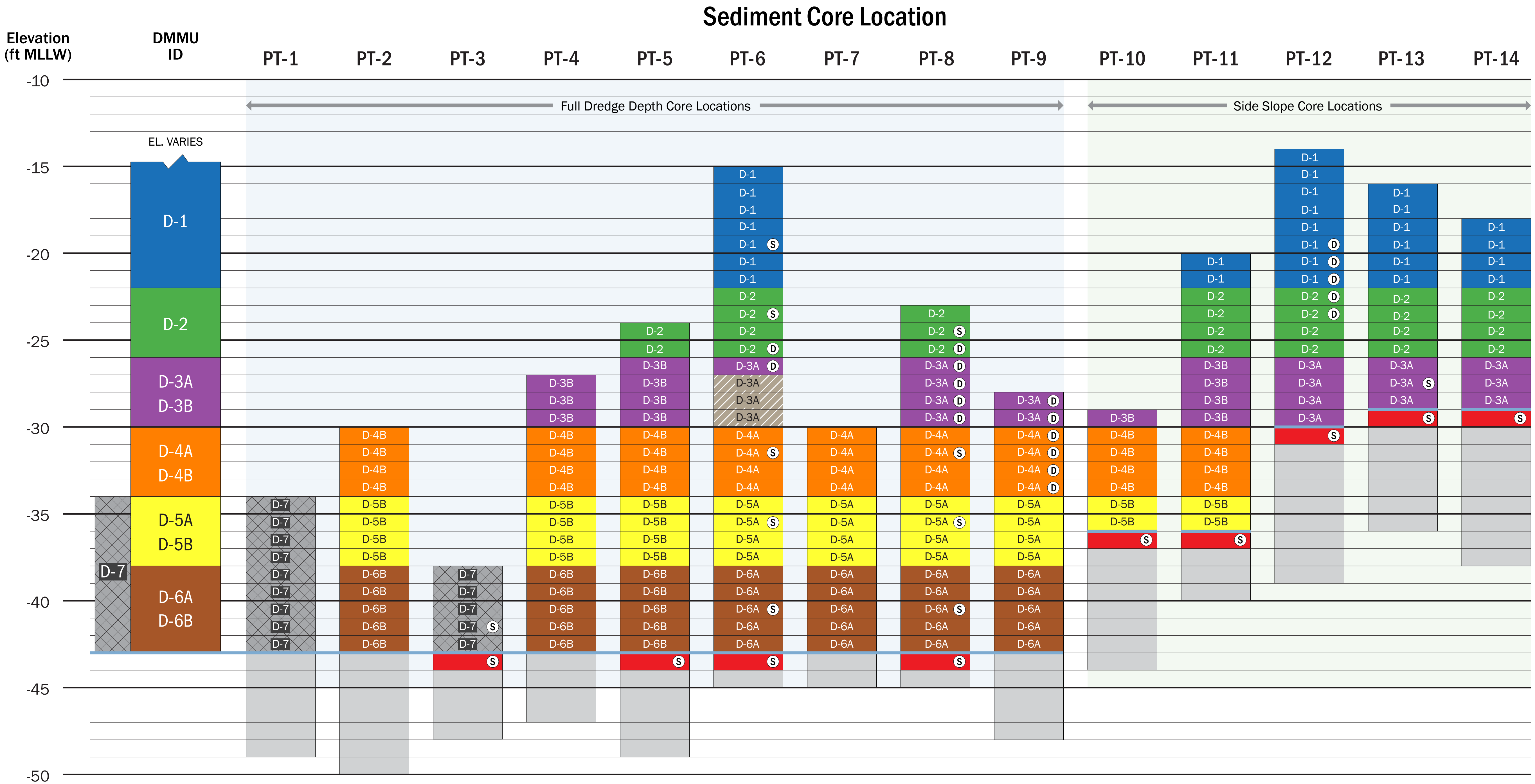
Figure 5

P:\0676020\03\CAD\DREDGE MATERIAL CHARACTERIZATION REPORT\FIGS 3-5 SITE PLAN AND SECTIONS.DWG\TAB:FFGG MODIFIED BY TMICHAUD ON JUN 02, 2015 - 9:07

\\sea\projects\0\0676020\03\Figures\Figure 6 Mill-a-sediment-core-sampling-and-dmmu-compositing-summary.ai Date Exported :06-05/15 by spride



Notes:

The top of each sediment core is shown at the existing mudline elevation for the core location.

Mudline elevations and maximum penetration depths are rounded to the nearest foot.

DMMU = Dredged Material Management Unit
FT = Feet
MLLW = Mean Lower Low Water

Legend:

―	Dredge Limit (including overdredge allowance)
🟦🟩🟪🟧🟨🟫	1-ft sample interval collected and used as composite material for corresponding color DMMU and individually archived
⬜	1-ft sample interval collected and archived
🟥	1-ft sample interval collected and analyzed for characterization of exposed surface (Z-layer)
▨	Sample interval not collected due to poor recovery
Ⓢ	Sample collected and analyzed for total sulfides
Ⓓ	Sample collected from duplicate core (i.e. 106, 108, 109, 112)

Sediment Core Sampling and DMMU Compositing Summary

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 6

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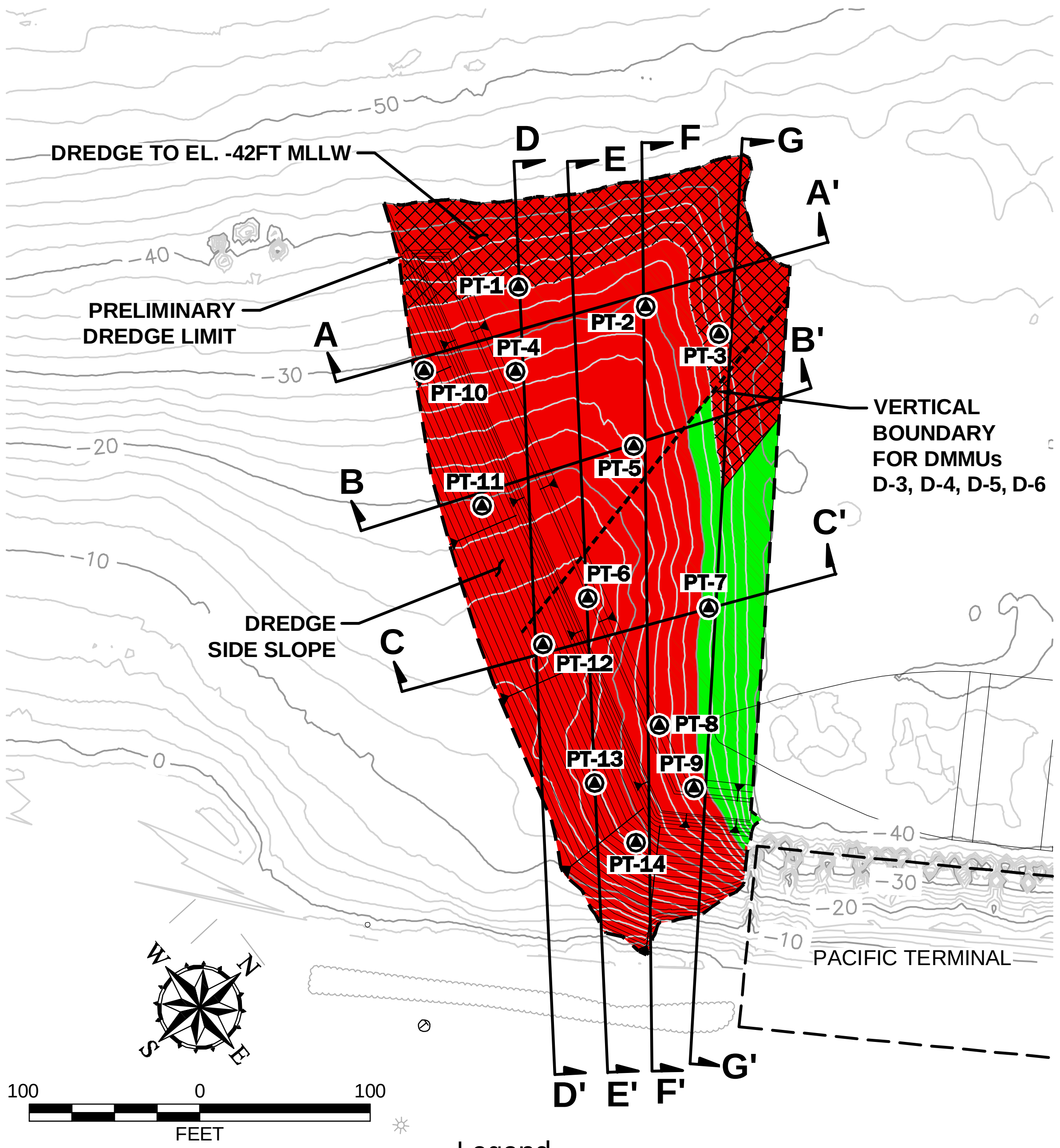

Legend

PT-1 ⊛	Sediment Core Location
- - - -	DMMU Boundary
D-1	DMMU Identification
A A'	Cross-Section Location
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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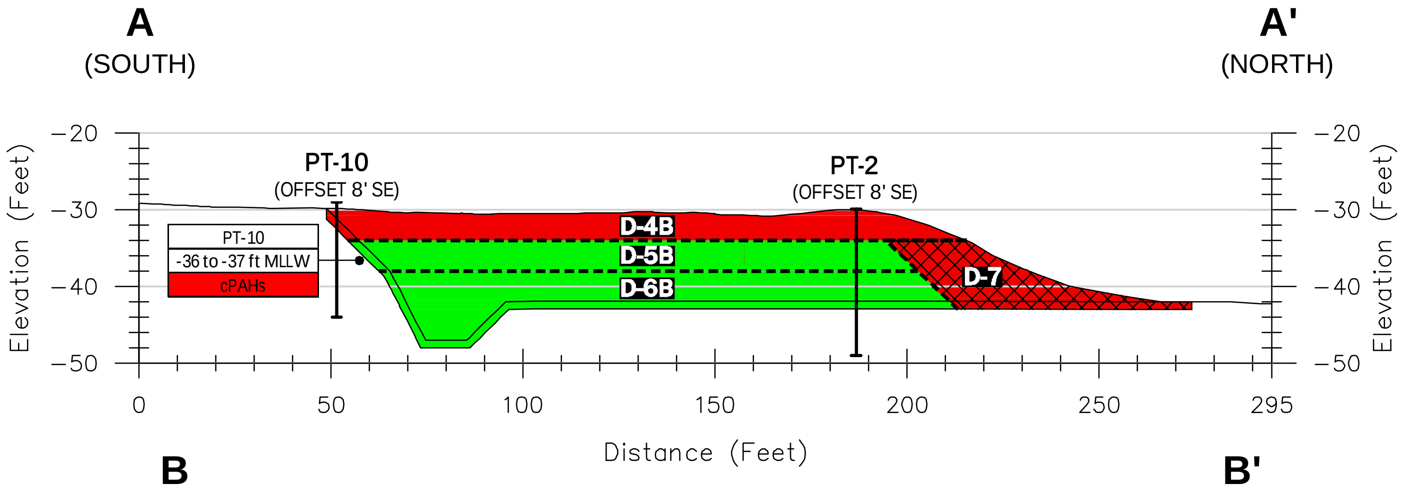

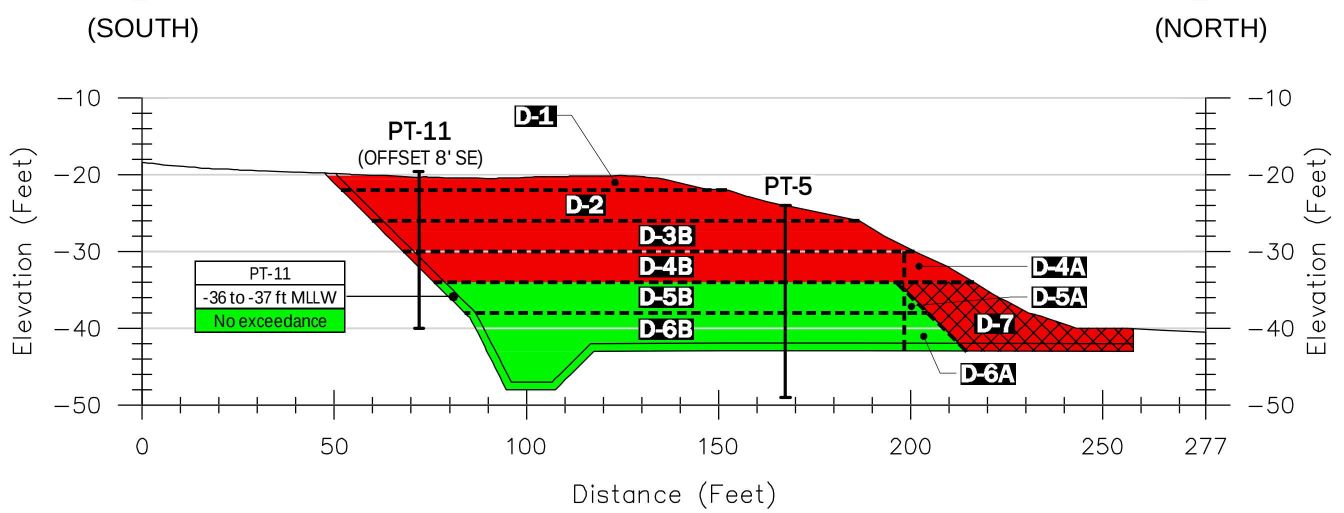

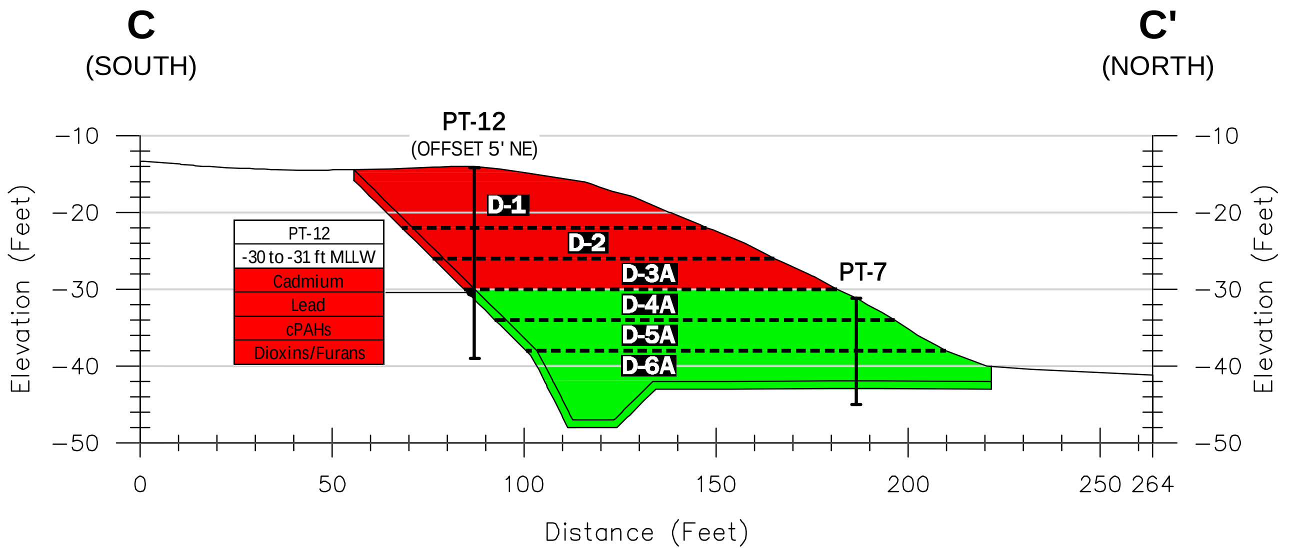

50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Everett, Washington

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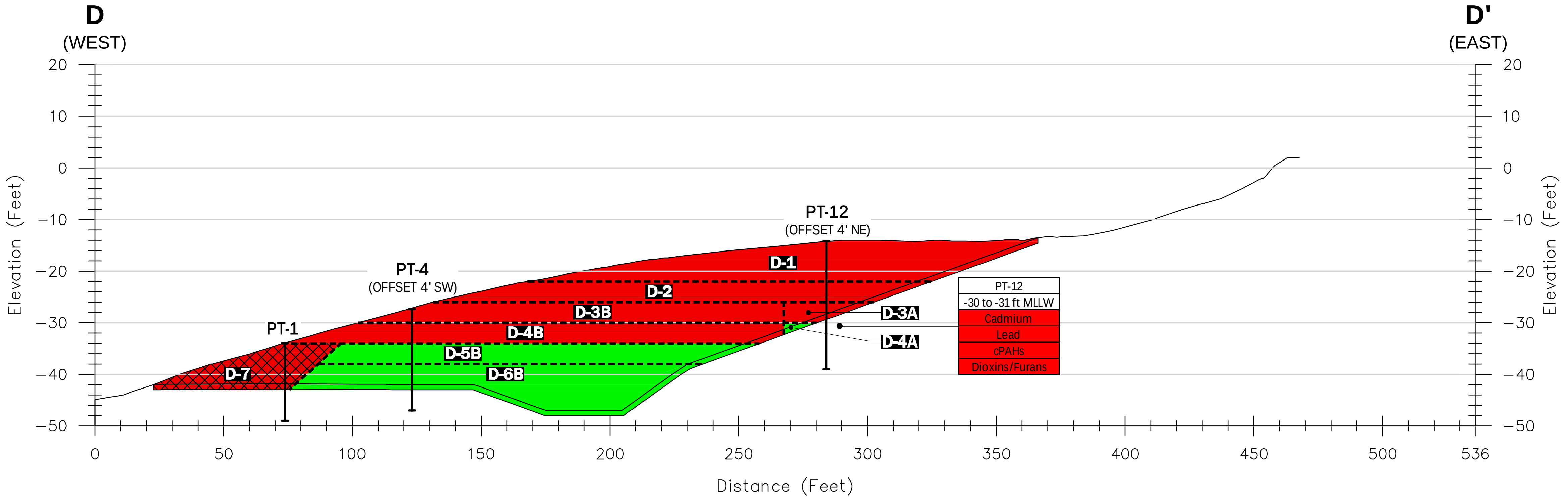
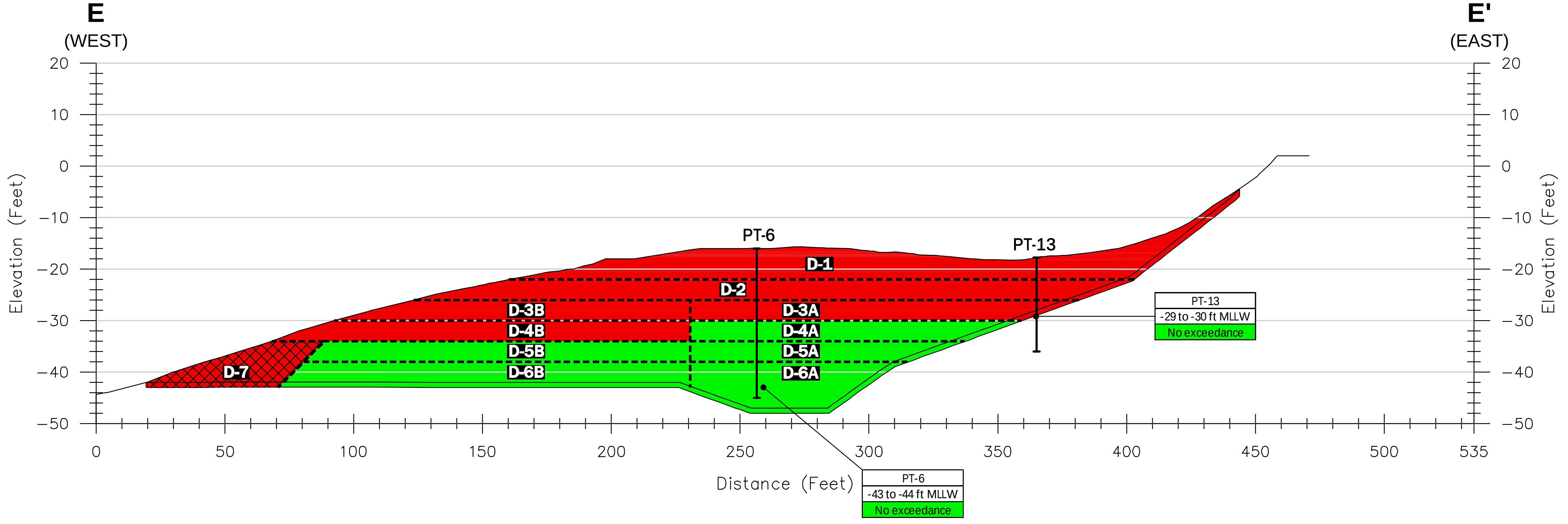
Figure 7

P:\0676020\03\CAD\Dredge Material Characterization Report\Figs 7-9 Sampling Plan Site Plan and Sections.dwg\TAB:DDEE modified by tmichaud on Jun 04, 2015 - 13:45





Legend

- - - - - -	DMMU Boundary
D-1	DMMU Identification
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Everett, Washington

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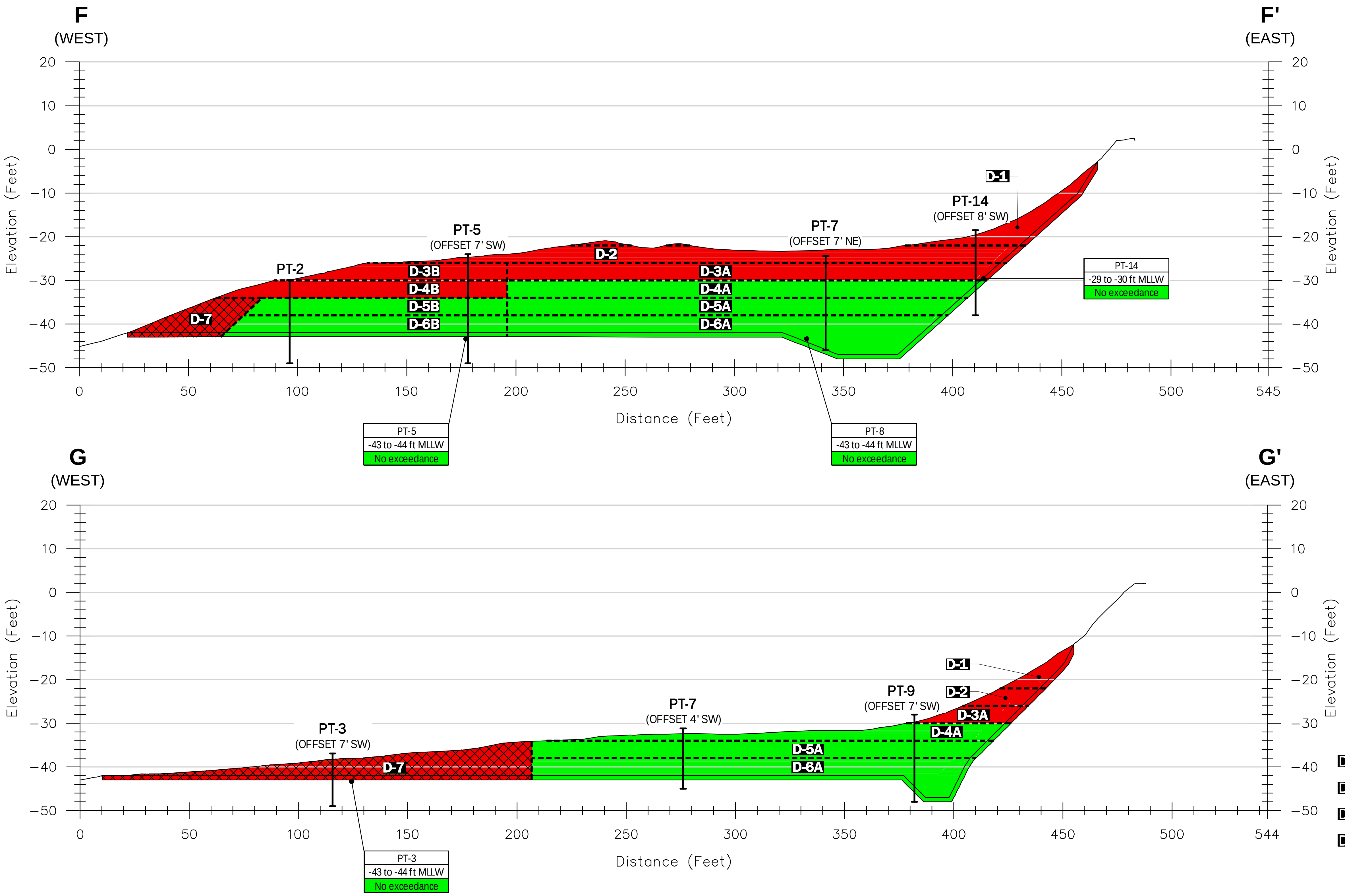
Figure 8



Legend

- - - - - DMMU Boundary

D-1 DMMU Identification

🟥 Chemical analytical results indicate one or more analytes exceeding screening levels.

🟩 Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections F-F' and G-G'

Weyerhaeuser Mill A Former Site
Everett, Washington

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Figure 9

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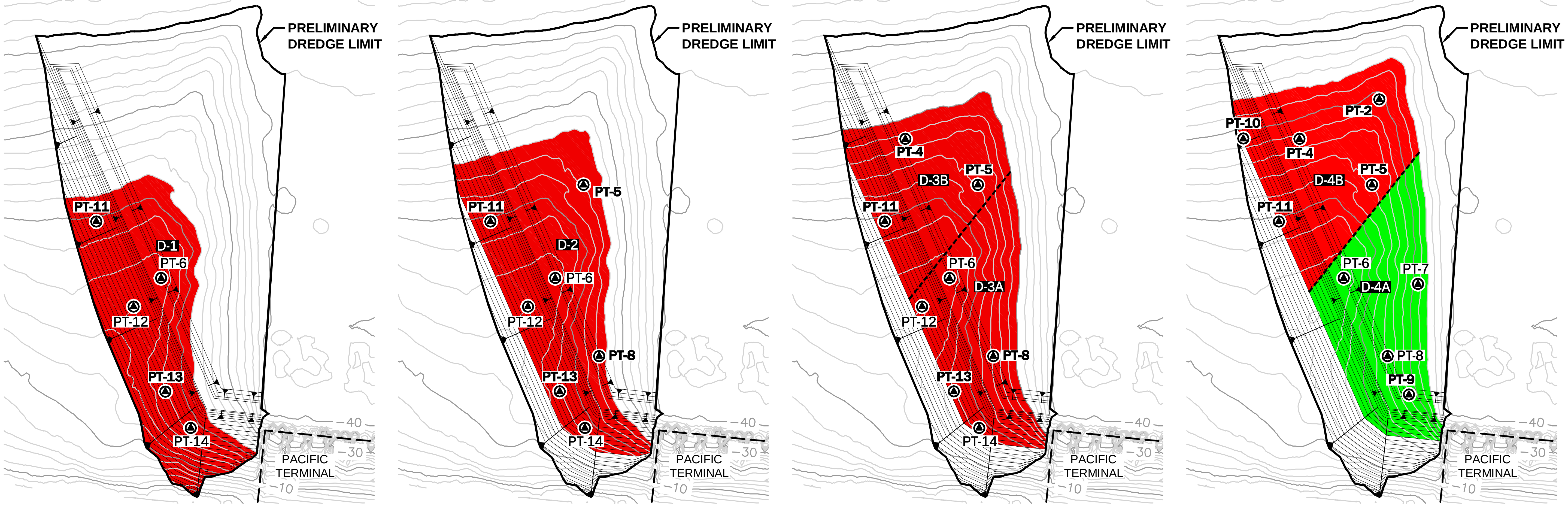

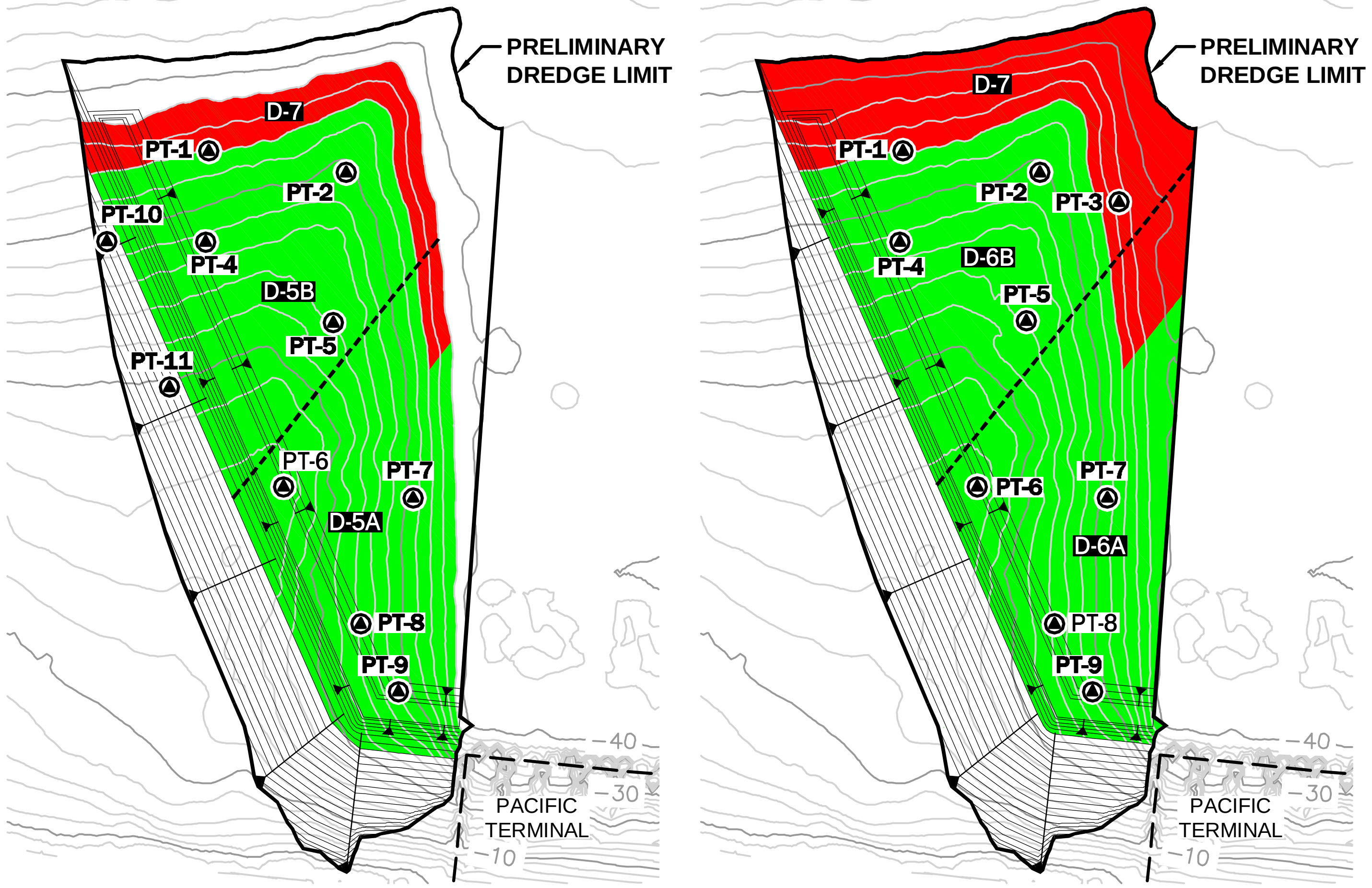

Legend

PT-1 ⊚	Sediment Core Location
- - - - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.
	DMMU Elevation Boundaries
D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

W N S E

100 0 100

FEET

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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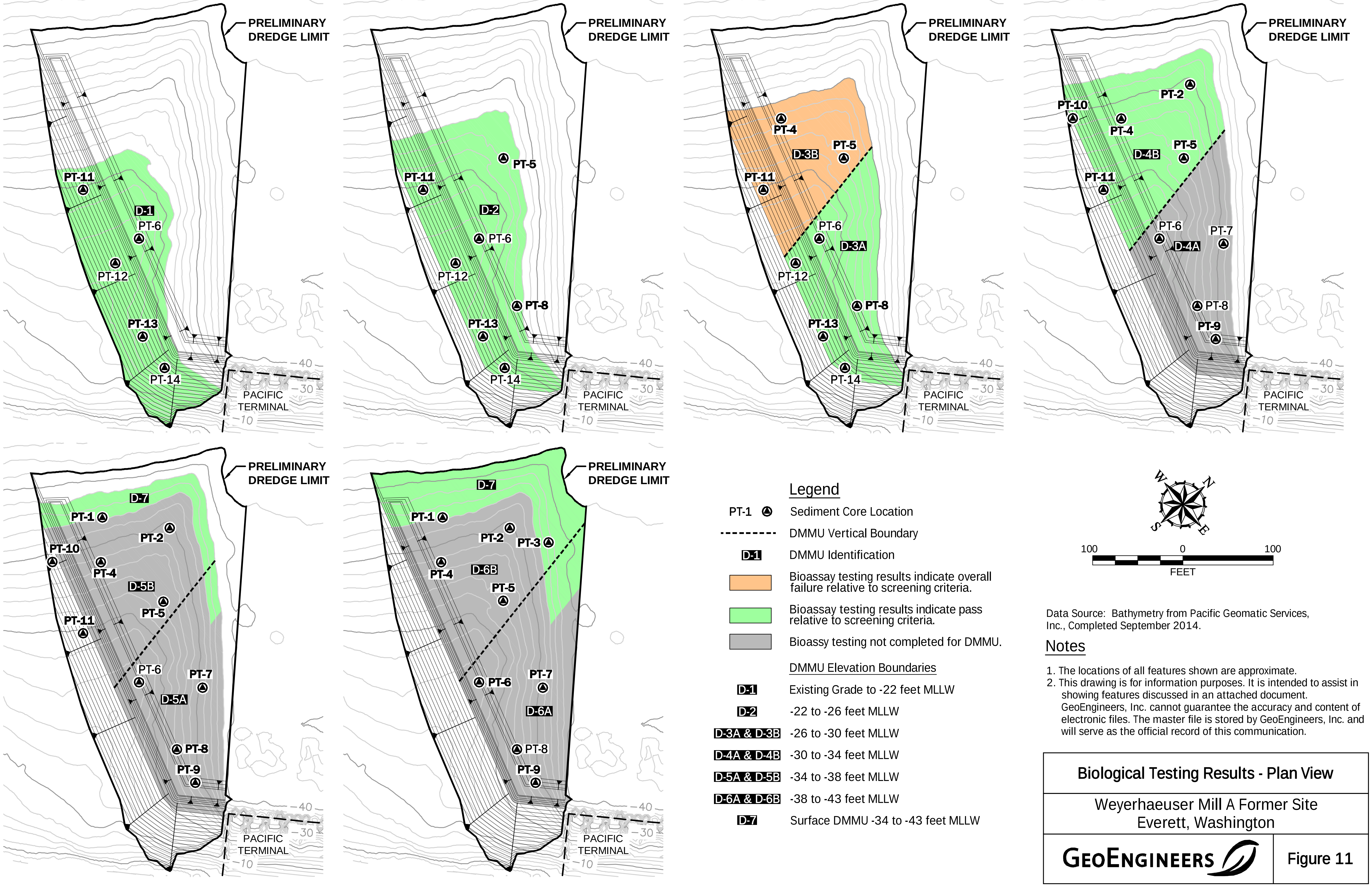
Chemical Analytical Results - Plan View

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 10

P:\0676020\03\CAD\Dredge Material Characterization Report\Figs 10 Plan View of DMMU.dwg\TAB:AA CC modified by tmichaud on Jun 02, 2015 - 9:11



Legend

PT-1 ●	Sediment Core Location
- - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
🟧	Bioassay testing results indicate overall failure relative to screening criteria.
🟩	Bioassay testing results indicate pass relative to screening criteria.
▨	Bioassy testing not completed for DMMU.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Biological Testing Results - Plan View

Weyerhaeuser Mill A Former Site
Everett, Washington

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Figure 11

P:\0\0676020\03\CAD\Dredge Material Characterization Report\Figs II Biological Testing Results.dwg\TAB:AA CC modified by tmichaud on Jun 02, 2015 - 9:09

APPENDIX A

Dredged Material Characterization Sampling and Analysis Plan (SAP)

Dredged Material Characterization Sampling and Analysis Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for
Dredged Material Management Office and
Washington State Department of Ecology
on behalf of Port of Everett

December 16, 2014

GeoEngineers
Earth Science + Technology

Dredged Material Characterization Sampling and Analysis Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for
Dredged Material Management Office and
Washington State Department of Ecology
on behalf of Port of Everett

December 16, 2014

GeoEngineers

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Seattle, Washington 98101
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Dredged Material Characterization Sampling and Analysis Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

File No. 0676-020-03

December 16, 2014

Prepared for:

Dredged Material Management Office
US Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, Washington 98124-3755

Washington State Department of Ecology
P.O. Box 47600
Olympia, Washington 98504-7600

On Behalf of:

Port of Everett
P.O. Box 583
Everett, Washington 98206

Attention: David Fox and Andy Kallus

Prepared by:

GeoEngineers, Inc.
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Brian Tracy, PE
Environmental Engineer

John Herzog, LG, PhD
Principal

BJT:

GEOENGINEERS

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SUBCONTRACTOR ACKNOWLEDGMENT FORM
WEYERHAEUSER MILL A FORMER CLEANUP INTERIM ACTION DREDGING PROJECT
FILE NO. 0676-020-03

I verify that a copy of the Dredged Material Characterization Sampling and Analysis Plan has been provided by GeoEngineers, Inc. to inform me of the procedures and protocols that will be used.

Print Name	Signature	Firm	Date

LIST OF ABBREVIATIONS AND ACRONYMS

ARI	Analytical Resources, Inc.
ASTM	American Society for Testing and Materials International
BL	Bioaccumulation Level
CCALs	Instrument Continuing Calibrations
COC	Chemicals-of-concern
CRM	Certified Reference Material
CSL	Cleanup Screening Level
CY	Cubic Yards
DMMO	Dredged Material Management Office
DMMP	Dredged Material Management Program
DMMU	Dredged Material Management Unit
Ecology	Washington State Department of Ecology
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
ft	Feet
GPS	Global Positioning System
ICALs	Instrument Initial Calibrations
LCS/LCSD	Laboratory Control Sample/Laboratory Control Sample Duplicate
LOQ	Limits of Quantification
MDL	Method Detection Limit
ML	Maximum Level
MLLW	Mean lower low water
MS/MSD	Matrix Spike/Matrix Spike Duplicate
PCBs	Polychlorinated biphenyls
ppt	Parts per thousand
pptr	Parts per trillion
PQL	Practical Quantitation Limit
PSDDA	Puget Sound Dredged Disposal Analysis Program
PSEP	Puget Sound Estuary Program
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference

SAP	Sampling and Analysis Plan
SAPA	Sediment Sampling and Analysis plan Appendix
SL	Screening level
SMARM	Sediment Management Annual Review Meeting
SMS	Sediment Management Standards
SOP	Standard Operating Procedures
PS-SRM	Puget Sound Sediment Reference Material
RI/FS	Remedial Investigation/Feasibility Study
SVOC	Semivolatile organic compound
TEQ	Toxic Equivalent
TRL	Target Reporting Limit
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
VOC	Volatile organic compound

1.0 INTRODUCTION

This Dredged Material Characterization Sampling and Analysis Plan (SAP) has been prepared to describe the sediment characterization sampling and analyses approach for a Model Toxics Control Act (MTCA) Interim Cleanup Action (Interim Action) dredging project to be performed under an amendment to the existing Agreed Order with the Washington State Department of Ecology (Ecology) for the Weyerhaeuser Mill A Former Cleanup Site (Site; Facility Site ID #1884322). The Interim Action area is located adjacent to the Port of Everett's (Port's) Pacific Terminal located in Everett, Washington (Figure 1). The Pacific Terminal is the Port's primary marine terminal and currently provides a berth for deep draft vessels and is used by the Port for handling and loading of maritime cargo. The results of this study will inform agency decisions on disposal options for the proposed dredged materials and environmental protections that will be required to complete the work in a manner consistent with the Site cleanup requirements.

The proposed interim action is a combined project that expedites part of the environmental cleanup actions at the Weyerhaeuser Mill A Former Cleanup Site and meets immediate Port needs to expand the Pacific Terminal berth approach to support Boeing's 777x supply chain. The anticipated schedule for executing this dredging project is the 2015/2016 in-water work window.

Dredged material characterization is being performed to evaluate if the proposed material dredged from the Interim Action area is suitable for open water disposal. This SAP is also being submitted to the Ecology Toxics Cleanup Program (TCP) for review and approval to ensure compliance with MTCA. The results of the dredged material characterization will also provide the basis for preparation of an Interim Cleanup Action Work Plan that will later be submitted to Ecology TCP for review and approval.

1.1. Weyerhaeuser Mill A Former Cleanup Site Project Location

The former Mill A facility is generally located at the southern end of the City of Everett waterfront (Figure 1). The address of the Property is 3500 Terminal Avenue, Everett, Snohomish County, Washington. The Upland Area of the Cleanup Site generally encompasses the area comprising the Port of Everett South Terminal and Pacific Terminal. Three vessel berths are located at the marine terminals including: a 700-foot long berth (Berth 1) at the South Terminal; a 650-foot long berth at the Pacific Terminal; and a 675-foot long berth at Pier 1. The berths are maintained to an approximate elevation of -40 feet Mean Lower Low Water (MLLW) to facilitate navigation. The shoreline in the terminal areas is typically comprised of bulkheads and/or armored slopes. The Marine Area of the Cleanup Site refers to portions of the Site that are located offshore of the Upland Area and includes the marine area west of the Pacific Terminal (Figure 1).

Figure 2 shows the general vicinity of the former Mill A facility relative to the established parcel boundaries, inner and outer harbor lines, and a circa 2011 aerial photograph. Parts of the Washington State-owned aquatic lands that are located within the marine area are managed by the Port under Port Management Agreement (PMA) No. 20-080027.

1.2. Prior Sediment Characterization and Suitability Determination

Limited existing data is available for the sediments that are located within the proposed interim action dredge prism. Based on existing data from the surrounding area, the proposed dredge material likely contains sediment with chemical contamination from historical site operations and varying amounts of wood debris including sawdust, bark and other forms of wood, as well as native silts and sand. The following sections describe previous characterization related to Site cleanup actions and maintenance dredging at Pacific Terminal.

1.2.1. Pacific Terminal and Nearshore Confined Disposal (NCD) Facility Construction

The Pacific Terminal was constructed in the mid-1990s in conjunction as part of a Near Shore Confined Disposal (NCD) facility in the vicinity of the proposed interim action dredging project. Currently, a 650-foot-long shipping berth supported by concrete piles operates at Pacific Terminal. Pacific Terminal and the NCD area are shown in relation to the Former Mill A Cleanup Site on Figure 3.

According to the information and drawings contained in the 1996 Ecology Cleanup Action Decision (Ecology, 1996), the NCD was constructed by dredging the log pond embayment located offshore of the current facility, constructing a containment berm, and placing contaminated sediment (about 130,000 cubic yards) behind the berm, capping the sediment and covering the surface with asphalt. The nearshore area of the log pond embayment (i.e., within the NCD) was dredged to elevation -25 MLLW while the offshore area (i.e., adjacent to the NCD) was dredged to depths ranging between -30 and -45 MLLW. A portion of the material that was dredged from the log pond embayment (offshore of the existing NCD) was used as clean cap material and placed on top of contaminated sediments in the disposal area; the remaining material that was dredged from the log pond embayment was characterized and approved for disposal under the Puget Sound Dredged Material Disposal program (predecessor to the Dredged Material Management Program [DMMP]) at the Port Gardner open water disposal site. Dredged material characterization and other sediment quality studies completed in 1993 and 1994 identified levels of sediment contamination in the area northeast of Pier 1 that did not meet open-water disposal criteria established at that time. The sediment contained low-molecular-weight polycyclic aromatic hydrocarbons (LPAHs), high-molecular-weight polycyclic aromatic hydrocarbon (HPAHs), metals, polychlorinated biphenyls (PCBs) and other organic contaminants in addition to elevated total organic carbon (TOC) and wood debris.

1.2.2. Sediment Quality Investigations in Area of Former Weyerhaeuser Mill A

Geomatrix, on behalf of the Port, performed surface and subsurface sediment sampling in May 2007 in the marine area of the Former Mill A Cleanup Site (GeoMatrix, 2007). The purpose of the investigation was to evaluate the potential presence of contamination and to evaluate what potential cleanup actions, if any, would be required by the Port prior to or in conjunction with expansion of the South Terminal facility. In addition, SAIC performed a sediment investigation of Port Gardner Bay and the lower Snohomish estuary area on behalf of Ecology in 2008 (SAIC, 2009). The Ecology study included collection of samples from the general vicinity of the Mill A Cleanup Site. The Mill A Remedial Investigation/Feasibility Study (RI/FS) Work Plan summarizes these previous sediment investigations in detail. Figures 4 and 5 provide a summary of chemical analytical data in surface and subsurface sediment compared to preliminary sediment screening levels that are being used by Ecology for the cleanup studies of the Site. Based on previous sediment investigations, the RI/FS Work Plan identifies the following preliminary hazardous substances for sediment at the Site:

- Metals (arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc);
- Semi-volatile organic compounds (SVOCs) (primarily polycyclic aromatic hydrocarbons [PAHs] and dibenzofuran);

- Polychlorinated biphenyls (PCBs); and
- Dioxins and furans.

Wood debris including sawdust, wood chips or fragments, and bark was also observed at multiple sediment sample locations adjacent to the Interim Action area. The quantity of wood debris in samples collected from locations adjacent to the Interim Action area ranges from trace amounts to 100 percent. Figures 6 and 7 summarize wood debris observed at surface and subsurface sediment sampling locations.

1.2.1. Dredged Material Characterization for Maintenance Dredging at Pacific Terminal

An investigation to characterize sediment to be dredged in the berth area at the Pacific Terminal was performed in December 2009 under the authority of the DMMP. The investigation was performed to support maintenance dredging in an approximate 100-foot-wide area adjacent to the face to of the Pacific Terminal berth. This project was located within the area that was previously dredged as part of the mid-1990s Pacific Terminal construction project described above. The investigation of the proposed dredged material included collection of sediment core samples at six locations situated adjacent to the shipping berth at the Pacific Terminal and compositing the core samples into three representative Dredged Material Management Unit (DMMU) samples. Visual observation of the samples collected from the cores identified the presence of wood debris in sediment to be dredged from the berth area. The wood debris was present in cores collected from the southwest end of the berth dredge area to depths of approximately five feet. Wood debris was observed in the top portion of sediment cores collected from the central and northeast portions of the berth dredge area. A dredged material characterization report for the Pacific Terminal was completed (CH2MHill, 2010) and the DMMP agencies issued a suitability determination in April 2010. The material was determined to be suitable for open water disposal. Maintenance dredging was completed in 2012 and 2,990 cubic yards of sediment was placed at the Port Gardner open water disposal site.

2.0 DREDGING PROJECT DESCRIPTION

The Port is currently in the process of planning and permitting for the Interim Action dredging project adjacent to the Pacific Terminal to remove contaminated sediment and improve vessel navigation at the Pacific Terminal. The proposed dredging project will be completed as an interim cleanup action for a portion of the MTCA sediment cleanup that is anticipated at the Former Mill A Cleanup Site. Currently, the Interim Action is anticipated to be constructed during the 2015/2016 in-water work window. Future cleanup actions in the Pacific Terminal and South Terminal areas are anticipated to remove or contain contaminated sediment adjacent to the current Interim Action area. The future actions are anticipated to be the final cleanup actions required by Ecology at the Site.

The interim action will remove contaminated sediments and wood debris from an area southwest of the Pacific Terminal adjacent to the existing navigation area by dredging to a target elevation of -42 feet MLLW plus a one-foot overdredge allowance (see Figures 8 through 10). The Interim Action is expected to achieve removal of contaminated material within the Interim Action Area and provide a partial solution to improving navigation at the Pacific Terminal. The resulting elevations will generally coincide with those at the adjacent Pacific Terminal navigation area. A temporary transition slope will be constructed from the base of the navigation area to meet the existing elevations to the southwest. The transition slope is currently anticipated to be constructed at approximately 1V:2H (vertical:horizontal) for the slope in the southwest portion of the dredge prism. The slope to the south (toward the existing upland terminal) is expected to be dredged at approximately 1V:2H, and riprap may be placed to reinforce this slope adjacent to Pacific Terminal. The transition slope is considered temporary because it is to be removed later under a separate, near-term future cleanup action. The estimated total in place volume for the proposed dredge prism is summarized in Table 1.

Additional sediment removal may be determined to be necessary by Ecology to remove sediment or wood debris with unacceptable levels of contamination that is identified within the dredge area of this interim action below the target navigation elevation. Additional dredging will be determined based on the sediment characterization results and technical/regulatory analysis of the need for further removal. This determination will be integrated into the Interim Action Cleanup Work Plan for the project.

3.0 CHARACTERIZATION OBJECTIVES AND APPROACH

3.1. Objectives

The objectives of this SAP are:

- To characterize dredged material for the Interim Action dredging project adjacent to the Pacific Terminal for the purposes of determining the suitability of the dredged material for open water disposal.
- To characterize sediment representing the post-dredge surface (i.e. Z-layer) relative to DMMP requirements and the Site's Ecology cleanup preliminary sediment screening levels to ensure compliance with the MTCA cleanup objectives for the Site.

The characterization of dredged material and the Z-layer at each location will be performed in accordance with DMMP guidelines specified in the Dredged Material Evaluation and Disposal Procedures User's Manual (DMMP User Manual; USACE, 2013) and additional requirements identified by Ecology as part of the review and approval process for this SAP.

Dredged material ranking, DMMU designation, and sampling approach and intensity to be used to characterize the material to be dredged as part of the Interim Action are summarized in Table 2 and described in Sections 3.2 through 3.4.

3.2. Dredged Material Ranking

Based on the results of previous dredged material characterization studies completed at Pacific Terminal berth area and that the project is located within a MTCA cleanup site, the Dredged Material Management Office (DMMO) has determined the dredged material ranking for this Interim Action dredging project as "High". A high ranking indicates that many known chemical sources and high concentrations of chemicals of concern exist in the vicinity of the project area. A high ranking for the Interim Action dredging project is used as the basis for identifying the number of DMMUs and sampling intensity for the dredge area presented in Sections 3.3 and 3.4 respectively.

3.3. Dredged Material Management Units (DMMUs)

As defined in the DMMP User Manual, DMMUs are manageable units of sediment which can be separately dredged within a larger dredging area (i.e., capable of being dredged independently from adjacent sediment). The existing surface of the dredge prism slopes away from the shoreline to the northwest and northeast moving offshore. The maximum thickness of the dredge prism is approximately 25 feet. Because of the existing sloped surface, DMMUs are proposed to be developed using fixed horizontal elevations as the upper and lower boundaries so that the materials contained within the DMMUs are able to be readily identified, managed and dredged separately.

The surface DMMU has variable elevations at the mudline. This unit was delineated to be on average of approximately 4 feet thick from the average elevation of the existing mudline across the portion of the dredge cut that is relatively flat (i.e. less steep slope). In some locations the surface DMMU is more or less than 4 feet thick due to the sloping surface. The lower boundary of the proposed surface DMMU is -22 feet MLLW and is designated as D-1. Subsurface DMMUs have been developed in approximately 4-foot thick lifts to characterize the subsurface material resulting in a total of 5 layers. Each of these subsurface DMMU layers is designated as D-2 through D-6. Each of the subsurface DMMU layers have a small portion of surface sediment in the areas where the DMMU "daylights" along the existing mudline (see Figures 8 through 10).

Due to the heterogeneity at the Site and the Site's designation as a MTCA cleanup site, the DMMP has required that the subsurface and subsurface DMMUs be limited to 4,000 cubic yards in volume. To achieve these volumes, DMMUs at lower elevations have been divided into two or three individual units as required to create 4,000 cubic yard units. These DMMUs that are divided within a given elevation layer are designated by an additional letter (i.e. D-6A, D-6B). In total, one surface DMMU and 10 subsurface DMMUs have been identified for the characterization of the proposed dredge prism.

The estimated volumes for the surface and subsurface DMMUs are presented in Table 2. The proposed dredge prism and DMMUs are presented in Figures 8 through 11.

The DMMUs identified in Figures 8 through 11 and Table 2 are considered the default DMMUs and were laid out based on elevations and DMMP volume requirements. Dredge material characterization sampling is proposed to be completed in a way that allows for DMMU boundaries to be adjusted if necessary to improve the characterization study, based on the observed lithology within the dredge material samples. Modification to the DMMU boundaries would be proposed for the case where thick layers and/or areas of homogenous or similar type material/wood debris are observed in the individual sediment cores. Existing sediment data for the area adjacent to the Interim Action indicates that wood debris deposits may exist within the proposed dredge prism. It is proposed that modifications to subsurface DMMUs would be allowed within the following constraints:

- The boundary will remain at a constant elevation throughout the dredge prism (i.e., the base of each DMMU will remain as a horizontal surface).
- The vertical boundaries separating lower elevation DMMUs could be modified based on observed lithology.
- Each DMMU would be approximately equal to 4,000 cubic yards per or as otherwise agreed to by the DMMP. If necessary, additional DMMUs may be added if agreed to by the DMMP.

- Changes to subsurface DMMU boundaries would be subject to DMMP approval prior to creation of composite samples.

If field observations based on sampling of the dredge material shows substantial variability across the dredge prism and/or highly heterogeneous material, the proposed default subsurface DMMUs would be used for dredged material characterization purposes.

Section 4.2 describes procedures for completing sediment core processing and compositing to allow for potential modifications to DMMUs based on observations of the dredge material lithology.

3.4. Characterization and Sampling Approach and Intensity

Sediment cores will be collected at 14 proposed locations to characterize the material that comprises the DMMUs and to characterize the exposed surface at the Z-layer and side slope of the dredge prism. The proposed sediment core sampling locations are presented in plan view and cross-section on Figures 8 through 10.

Sediments will be logged and sampled continuously at each location to the base of each exploration. Samples will be collected from each core location at 1-foot intervals and archived prior to creation of the DMMU composites and analysis of discrete samples. Collection of samples in individual 1-foot intervals will allow for review of the site lithology to maintain flexibility for possible adjustment of the DMMU layout prior to creation of the representative composite samples. Sample analysis will be completed within the recommended holding times. Figure 12 presents an overview of the approach for collecting samples at each sediment core location and how the DMMUs will be represented.

Sample locations PT-1 through PT-9 are located within the portion of the dredge prism that will reach the full dredge depth (-42 feet MLLW). The minimum depth of these sediment cores will be -45 feet MLLW (2 feet beyond the overdredge limit) or to native material if deeper than -45 feet MLLW. The Z-layer sample will be collected from the 2 feet located below the dredge prism (-43 to -45 feet MLLW) in accordance with the DMMP User Manual guidelines. Z-layer samples will be collected and archived as discrete samples.

Ecology and DMMP will be consulted to determine appropriate discrete and/or composited DMMU and Z-layer samples for analysis to characterize material to be exposed after dredging as described in detail in Section 5.1.2.

Existing sediment data indicates that native material is generally found deeper moving away from shore and is expected to be encountered from approximately -25 feet MLLW to -44 feet MLLW within the proposed Interim Action area. If native material is not present at the minimum required core depth (-45 feet MLLW), the sediment core will be drilled deeper to reach a depth of at least two feet into native material. Sediment samples collected from deeper than -45 feet MLLW will be archived at a laboratory for potential future analysis. These samples may be analyzed to evaluate the need to remove additional sediment beyond the planned overdredge allowance limit, due to the presence of contamination at concentrations greater than screening levels as part of the Interim Action cleanup.

Sample locations PT-10 through PT-14 are located within the area of the dredge prism side slope to characterize sediment within the DMMUs and at the side slope surfaces to be exposed by the dredging. As previously stated, a temporary slope will be constructed from the base of the dredge area to transition to adjacent mudline elevations. The transition slope is currently anticipated to be constructed at approximately 1V:2H. Final slope angles may be adjusted during design of the Interim Action as necessary to achieve the desired contaminant removal and result in stable side slopes. The transition slope is considered temporary and it is expected to be addressed under a separate, future final cleanup action. Due to the potential for exposed contamination or wood debris on the side slope, individual samples representative of the exposed surface will be collected to assist in the evaluation for and design (if necessary) of environmental protections that can be utilized to contain potential contamination during the temporary condition of the side slope cut. The environmental protections will be determined as part of the interim action Work Plan that will be approved by Ecology.

The side slope core locations are placed to provide adequate geographic coverage and to intersect the anticipated side slope at various elevations. Sediment cores will be completed at each side slope location to a depth to reach 2 feet into native material or 10 feet below the overdredge limit of the side slope, whichever is deeper. The lithology of adjacent sediment cores will be evaluated to determine if distinct sediment layers and/or wood debris are present in the vicinity of the side slope. DMMP and Ecology will be consulted to determine appropriate sample intervals for laboratory analysis to represent the exposed surface along the temporary side slope. Each core will transect the slope surface and samples collected from the slope surface, as well as above and below the slope surface, , will be utilized as necessary based on observed lithology, to characterize sediment quality at various elevations in the temporary side slope.

4.0 SAMPLE COLLECTION AND HANDLING PROCEDURES

4.1. Sediment Core Collection Procedures

Figure 8 presents the sample locations. Table 3 provides coordinates for the proposed sample core locations as well as target penetration depths, sample intervals and sample identification for the Interim Action dredged material characterization.

Sampling will be performed using equipment capable of achieving the target core penetration depth within the Interim Action dredging project area. Sampling will be performed using a sonic drill rig mobilized on a barge. Sediment at each core location will be continuously collected by advancing core barrels in 5-foot increments using sonic drilling methods. The core barrel will be advanced 5-feet into the sediment. After the core barrel is advanced drill casing (with slightly larger diameter than the core barrel) will be advanced to the depth of the bottom of the core barrel. When the drill casing is in place, the core barrel will be pulled up to the barge for sample processing. This process will be repeated in 5-foot or less sections to reach the target depth (e.g., for a 20-feet deep core location 4 core barrels will be collected). Samples will be collected to characterize the stratigraphy and grain size and to collect samples for chemical analysis. A minimum of 75 percent recovery will be required for acceptance of each core (as calculated by the ratio of the recovery length to the drive length of the core). Core intervals with recovery less than 75 percent will be rejected.

Upon retrieval of the core barrel, the core liner will be carefully removed, ends caped and placed upright (mudline upward) prior to processing. Cores achieving the desired penetration depth and recovery percentage will be processed after retrieval.

At each sample core location, a minimum of one core will be advanced to characterize the stratigraphy and grain size and to collect sample material. A second core will be advanced at locations if the target core depth was not achieved, if the percent recovery is insufficient, or if adequate sample material was not recovered in the initial core. Additional cores, if performed, will be located within approximately 10 feet from the initial core location. If multiple cores are performed at a sampling location, each core will be assigned a distinct identifier (for example, if two cores are completed at the sampling location PT-1, then the first core will be identified as PT-1a and the second core will be identified as PT-1b) and a core log will be prepared for each core that is processed. The DMMO will be contacted in the event that the target core penetration depth or recovery cannot be achieved, or where a sampling location needs to be moved more than 10 feet.

4.2. Sampling and Compositing Procedures

Sediment core material will be extruded, photographed, logged and sampled for laboratory testing and archiving. As described in Section 4.1, sediment at each core location will be continuously collected by advancing core barrels in 5-foot increments using sonic drilling methods. Core processing will be conducted for each 5-foot interval. Core processing will be completed on the barge (if work space permits) or at an onshore facility at the Port. The location for core processing will be determined based on consultation with the Port to ensure minimal disturbance to the activities of the Port's or Port's tenant. The following general core processing procedures will be completed for each 5-foot sediment core interval:

- Material in sediment cores meeting acceptability criterion will be extruded by cutting open the core liner length-wise.
- Compaction corrected elevations will be marked on the outside of the core liner for reference during subsampling. Each core will be reconciled for percent recovery and marked with respect to the representative sample interval prior to sampling the one-foot intervals to ensure that the subsurface elevations are correctly sampled[1].
- Photographs will be taken of each core interval. Compaction corrected elevations will be included in the photographs for reference.
- Visually classify sediment core material in general accordance with Unified Soil Classification System. Document detailed descriptions of the core material and observed lithology in exploration logs. Note that one exploration log will be completed for each sediment core location. Each core log will indicate where native sediment was encountered.
- Determine wood debris content by visually estimating amount of wood debris by volume through the sediment core. If wood debris is observed described type of wood (i.e., wood chips, sawdust, etc.). Document wood debris observations in exploration logs.
- Collect discrete samples for sulfides as described in more detail in Section 4.3.

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[1] The percent recovery adjusted sample intervals will be determined based on the sample recovery. For example, if the target dredge depth is 5 feet below ground surface (bgs), but the recovery is 4 feet then percent recovery is 80%. The one-foot sample intervals representing material from 0 to 5 feet bgs will be collected from 0 to 0.8 feet bgs, 0.8 to 1.6 feet bgs, 1.6 to 2.4 feet bgs, 2.4 to 3.2 feet bgs and 3.2 to 4.0 feet bgs.

- Collect continuous discrete samples from the sediment core at 1-foot intervals for archival at the laboratory and for future compositing. To provide adequate volume for physical and chemical analyses and potential biological testing for bioassay analysis all sediment core material will be sampled and be placed in appropriate containers obtained from the laboratory as identified in Table 5. Each 1-foot interval will have a unique sampling identification that will be labeled on the container. The sampling identification will specify the sample core location and the elevation (feet MLLW) of the depth interval of the sample. Figure 12 presents a summary of the sampling approach.
- Place all samples collected in coolers with ice and transport to laboratory as described in Section 4.5.

Sample compositing will not occur during core processing activities. After all sediment cores are collected and processed the sediment core logs will be reviewed to determine if subsurface DMMU boundaries should be modified. Representatives of the DMMP will be consulted if DMMU modifications are requested to get DMMP approval for any DMMU modifications prior to compositing or analyzing sediment samples. Once the DMMU boundaries are finalized, composite samples will be completed in general accordance with DMMP requirements by combining sediment collected in one-foot intervals. The analytical laboratory will conduct compositing as directed prior to analysis of samples representative of the DMMUs. Compositing will be completed by taking an equal portion of material from appropriate 1-foot intervals comprising the composite sample. The composite sample volume will meet minimum requirements for sample analysis volume and will be mixed thoroughly until uniform color and consistency are achieved. After mixing, samples will be placed in appropriate containers for lab analysis. GeoEngineers will provide detailed instructions to the laboratory for preparation of the composite samples and will be present at the laboratory, if allowed by the facility, to observe sample compositing activities. Discrete samples that are not used for compositing and not analyzed to characterize the dredge surface will be archived for potential follow-up analyses (i.e. additional chemical analyses and/or bioassay testing). Samples will be analyzed as described in Section 5.0.

4.3. Sulfides Sampling

Sulfide samples will be taken immediately upon extrusion of cores. To provide adequate sulfide analyses, discrete sulfide samples will be collected in sediment from core locations PT-3, PT-6 and PT-8 at approximately every 4 feet throughout the length of the core to represent all proposed DMMUs (as shown in Figure 12). Sediment which is directly in contact with core liners or sampling device will not be used.

Sulfides samples will be preserved using 5 milliliter (ml) of 2 normal zinc acetate per 30 grams of sediment. Two separate 2-ounce containers (as requested by the testing laboratory) will be filled with sample material and preservative, covered, and shaken vigorously to completely expose the material to the zinc acetate. Each 2-ounce container obtained for sulfide analyses will be preserved with 5 to 6 ml of 2 normal zinc acetate. Adequate space will remain in the sample jars after the sediment and preservative have been added (i.e., the jar will not be completely filled) so that the sediment can be thoroughly mixed with the zinc acetate preservative when the jar is shaken. Sample containers will be clearly labeled with the project name, sample identification, type of analysis to be performed, date and time, and will indicate that zinc acetate has been added as a preservative. Sample locations selected for sulfide analysis will be referenced in the log book.

Samples collected for sulfide analysis will be submitted to the laboratory for analysis immediately following field activities to ensure that sulfide analyses are completed within appropriate holding times (see Table 5).

4.4. Field Documentation

Documentation of the stratigraphy and grain size of material within the dredge prism and Z-layer will be performed for each sediment core location. Logs and field notes of all cores and sample material will be maintained during sampling activities. The following will be included in the logs:

- Sample location designation;
- Number of sampling attempts made at each sampling location. Each sampling attempt will be designated as “failed/discarded” or “successful/retained”;
- Real-time tidal elevation, water depth at the time of sampling and calculated mudline elevation;
- Description of resistance of core advancement;
- Sample identification number assigned for individual core sections;
- Geographic coordinates of the sampling location using GPS;
- Date and time of sample collection;
- Names of field person(s) collecting and logging in the sample;
- The penetration depth, actual length of recovery and calculated percent recovery for each core sample;
- Description of core and sample characteristics including grain size, density, stratification, color, odor, presence of debris, vegetation, biological activity, results of field screening or any observations indicating presence of contaminants (i.e., staining, sheen, etc.);
- Photographs of each core interval with top/bottom elevations visible;
- Type of sampling equipment used;
- Sample preservation (if used);
- Weather conditions; and
- Any deviation from the approved sampling plan.

Sample containers used to collect core samples will be clearly labeled with the following:

- Project name;
- Sample identification number (i.e. core location and depth interval);
- Sample preservation (if used); and
- Sample date and time.

4.5. Sample Custody and Transport Procedures

Chain-of-custody procedures will be used to track sample handling from field collection through delivery of the samples to the laboratory. A chain-of-custody form will be completed for samples being shipped to the laboratory. Information to be included on the chain-of-custody form includes the following:

- Project name and number;
- Sample identification numbers;

- Date and time of sampling;
- Sample matrix (sediment, etc.) and number of containers for each sample;
- Analyses to be performed; and
- Names of sampling personnel.

The original chain-of-custody record will be signed by a member of the field team. Upon transfer of sample possession, the chain-of-custody will be signed by the person relinquishing the samples and by the party receiving the samples. Field personnel shall retain carbon copies and transport the original and remaining copies to the laboratory with the sample shipment. This chain-of-custody will accompany the samples during transit to the laboratory.

The samples will be transported to Analytical Resources Inc. (ARI) laboratory in Tukwila, Washington. Transport of the samples to the laboratory will be performed as follows:

- Samples will be packaged and shipped in accordance with U.S. Department of Transportation regulations as specified in 49 CFR 173.6 and 49 CFR 173.24.
- Sample containers will be placed in plastic bags and packed to prevent breakage.
- Ice will be placed in separate bags and sealed.
- A temperature blank provided by the laboratory will be placed in each cooler.
- The chain-of-custody forms will be enclosed in a plastic bag and taped to the inside lid of the cooler.
- The sample shipment coolers will be clearly labeled with sufficient information (name of project, time and date container was sealed, person sealing the cooler, and GeoEngineers office name and address) to enable positive identification.
- Signed and dated chain-of-custody seals will be placed on all coolers prior to shipping.

The laboratory will follow their standard operating procedures to document sample handling from time of receipt (sample log-in) to reporting.

4.6. Positioning

Sediment core positions will be determined in latitude and longitude referenced to North American Datum of 1983 (NAD83) using a global positioning system (GPS) unit (Trimble GeoExplorer® 3000 Series or similar). The accuracy of measured and recorded horizontal coordinates will be within 2 meters. Latitude and longitude coordinates will be recorded to six decimal places for decimal degrees (DD), four decimal places for degrees-minutes (DM) or two decimal place for degrees-minutes-seconds (DMS). For real-time measurements, the GPS receiver will use a satellite-based augmentation system (SBAS) for providing correction data for visible satellites. Corrections are computed from ground station observations and then uploaded to geostationary satellites. This data is then broadcast on the L1 frequency, and is tracked using a channel on the GPS receiver. For the continental United States and outlying parts of Canada and Mexico, wide area augmentation system (WAAS) is used to improve the accuracy and availability of the basic GPS signals over the coverage area for SBAS. Following return from the field, Trimble Pathfinder Office software will be used to perform a differential correction to the field collected GPS coordinates, utilizing the closest and/or highest integrity base stations. Corrected GPS coordinates will be completed prior to compositing of samples and will be used in the calculation of the elevations at which cores from sampling locations in the side-slope areas intersect the bottom of the dredge prism. These calculations are necessary to determine the depth intervals from side-slope locations that are sampled for DMMUs and Z-layer samples. The base station GPS data used during post processing will be from the National Geodetic Survey (NGS) Continuously Operating Reference Stations (CORS) network, a multi-purpose cooperative endeavor involving government, academic, and private organizations. Differential correction is performed to remove errors, both man-made and natural, that affect the Trimble GPS measurement.

Vertical control will be established relative to survey control points (with known elevation referenced to MLLW) established in the vicinity of the project area. Vertical elevations will be referenced to MLLW. The actual mudline elevation at each coring location will be determined by subtracting the measured depth of the water column from the real-time tidal elevation. The depth of the water column at each coring location will be measured by lowering a weighted tape measure from the sampling barge. Tide boards will be established near the project area and will be referenced to the known elevation of the survey control points and will be used to assess real-time tidal elevations. A predictive tide chart will serve as a backup system.

Vertical elevations at each of the sampling locations will be determined directly based on core penetration depth (corrected for recovery) compared to the mudline elevation. Depths below mudline elevation can typically be determined within approximately 0.1 foot.

4.7. Sampling Equipment Decontamination

All samplers and miscellaneous sampling tools that will come in contact with sample material will be thoroughly cleaned prior to use. Hand tools used for extruding, mixing and compositing sample material will be constructed of stainless steel. The samplers and sampling tools will be cleaned according to the following procedures:

- Rinse with potable water to remove solids;
- Wash with brush and Alconox soap; and
- Triple rinse with distilled water.

After cleaning, sampling equipment that will not be used immediately will be wrapped in aluminum foil and stored in plastic bags. The rule of "potential for contaminants" will be used such that any sampling equipment suspected of contamination will be rejected and decontaminated prior to use.

Disposable nitrile gloves will be used and will be replaced after handling each 1-foot sample interval to prevent sample contamination.

4.8. Health and Safety

Field activities will be performed in accordance with the requirements of the Washington Industrial Safety and Health Act (Revised Code of Washington [RCW] 49.17) and the Federal Occupational Safety and Health Act (29 CFR 1910, 1926). These regulations include requirements that workers are to be protected from exposure to contaminants. A Site-specific health and safety plan (HASP) describing actions that will be taken to protect the health and safety of GeoEngineers personnel is presented in Appendix A. Companies providing services for this project on a subcontracted basis will be responsible for developing and implementing their own HASP.

5.0 LABORATORY ANALYSIS

5.1. Approach for Chemical and Biological Testing

The objectives of this dredged material characterization are to determine the suitability of sediment for open water disposal and to characterize the sediment that will be exposed after dredging is complete. The approach to achieve these objectives in an efficient manner to meet the schedule requirements for the Interim Action is described in the following sections.

5.1.1. Analyses for Determination of Open Water Suitability

As described in Section 4.2, the laboratory will create composite samples representative of the DMMUs after all sediment core logging and core processing is completed and the DMMU configuration is confirmed. Figure 12 presents the compositing plan for each DMMU by core location. Up to 11 composite samples (one sample representing each DMMU) will be analyzed for physical and chemical testing described in Section 5.2.

Figure 13 presents an overview of how chemical and biological testing will be conducted to determine if sediment is suitable for open water disposal. This figure was developed using the site-specific MTCA screening levels and the DMMP guidelines presented in Table 4. The objective of this approach is to determine open water suitability in a timeframe that achieves the schedule requirements for the Interim Action.

The chemical analytical results for DMMU composite sample analyses will be compared to the site-specific MTCA screening levels established by Ecology for the Mill A cleanup project and DMMP guideline chemistry values listed in Table 4 to determine if the dredge material is suitable for open water disposal. The results for the material to be dredged will be compared to the MTCA screening levels, as requested by the DMMP, so that material that does not meet the MTCA criteria is not disposed of at the open water disposal site.

The MTCA screening levels include separate values for protection of benthic organisms and protection of human health and higher trophic level (HH/HTL) ecological receptors as listed in Table 4. For some chemicals the MTCA screening level for protection of benthic organisms depends on the total organic carbon value. For sediment with total organic carbon of 0.5% to 3.5%, the organic-carbon normalized Sediment Cleanup Objective (SCO) will be used as the screening level for protection of benthic organisms. If the total organic carbon is less than 0.5% or greater than 3.5% then the dry-weight Apparent Effects Threshold (AET) criteria will be used as the screening level for protection of benthic organisms. The DMMP guideline chemistry values include screening levels and bioaccumulation triggers and are in dry-weight units.

Chemical analytical results for each of the DMMU composite samples will be independently compared to MTCA screening levels protective of benthic organisms, MTCA screening levels protective of HH/HTL ecological receptors, DMMP screening levels and DMMP bioaccumulation triggers. If concentrations of a DMMU composite sample exceeds any MTCA or DMMP screening levels then bioassay testing will be required for the material to be determined suitable for open water disposal. If the DMMP bioaccumulation trigger is exceeded bioaccumulation testing would be required for the material to be determined open water suitable.

The values listed in Table 4 will be used in the evaluation of the dredged material for open water disposal as follows:

- All screening levels for metals are all in dry weight units. For arsenic, cadmium, lead and mercury the screening levels for protection of HH/HTL ecological receptors will be the maximum allowable concentrations for open water disposal. For other metals tiered testing will be conducted, with the DMMP screening levels used to determine the need for bioassays.
- For PAHs, chlorinated hydrocarbons, phthalates, phenols and miscellaneous extractables he analytical results will be independently compared to DMMP screening levels, MTCA screening levels for protection of benthic organisms and MTCA screening levels for protection of HH/HTL ecological receptors. If concentrations exceed any of these screening levels, then bioassay testing will be required for the material to be determined open water suitable.
- For total PCBs, the MTCA screening level for protection of HH/HTL is the maximum allowable concentration for open-water disposal.
- There are no MTCA screening levels for protection of benthic organisms or DMMP screening levels for total cPAHs and total dioxin-like PCB congeners. For these groups of chemicals, the screening levels for protection of HH/HTL ecological receptors are the maximum allowable concentrations for open-water disposal.
- The MTCA screening level for dioxin (5 ng/kg) is based on the practical quantitation limit and will not be used for determination of open water suitability. The DMMP dioxin guidelines will be used instead.
- For chemicals that do not have MTCA screening levels (e.g. pesticides and TBT), the DMMP guidelines will be used.
- In the event that a DMMP bioaccumulation trigger (BT) is exceeded and the DMMU would otherwise qualify for open water disposal, the Port will determine whether or not to conduct bioaccumulation testing for that DMMU.

Analysis of wood content will be completed under an accelerated turnaround time (48-hours) to determine if bioassay testing will be required. If dry-weight wood content is greater than 25 percent the composite sample for that DMMU will be immediately submitted for bioassay analysis described in Section 5.3.

5.1.2. Analyses to Characterize Z-layer and Exposed Surface for Dredge Cut

Due to this Site’s status as a MTCA cleanup site Ecology’s TCP will have primary responsibility for determining the sediment quality and acceptability of the exposed surface after completion of the Interim Action dredging.

Sediment cores will be completed to penetrate native material in all sample locations including the side slope. This material will be sampled in one-foot intervals and archived. Each core in the side slope area will transect the slope surface and samples collected from the slope surface as well as above and below the slope surface in the cores will be utilized, as necessary based on observed lithology, to characterize sediment quality at various elevations in the temporary side slope. Ecology TCP will be consulted upon completion of sediment core logging and processing to determine which discrete samples will be analyzed for physical and chemical testing described in Section 5.2. It is not expected that bioassay testing will be completed for the Z-layer or side slope area, and limited sample volume will be available to complete bioassays for discrete samples.

The general approach will be to analyze discrete samples to determine the base of the dredged area first because the dredge limit may be modified if contaminated material is found at the base of the proposed dredge prism. It is proposed that one discrete sample be analyzed from four core locations to represent exposed surface at -43 feet MLLW. If required, additional discrete Z-layer samples will be analyzed based on results of the four initial locations and through consultation with Ecology. As shown in Figure 12, core locations PT-2, PT-5, PT-6 and PT-8 are proposed as the four locations for analysis of samples to represent the exposed dredged surface. Note that these locations can be modified based on lithology observed. After the base of the dredge prism is confirmed, discrete side slope samples at each side slope sediment core location will be analyzed to adequately characterize the exposed side slope as presented in Figure 12. The lithology of adjacent sediment cores will be evaluated to determine if distinct sediment layers and/or wood debris are present in the vicinity of the side slope.

Side slope and Z-layer samples will be compared to the site-specific screening levels to identify whether the post-dredge surfaces comply with MTCA requirements. The site-specific screening levels that are to be compared to the results for supplemental samples of the side slope and Z-layer are the Sediment Cleanup Objectives (SCOs) based on organic carbon, AETs based on dry weight and screening levels for protection of human health and higher trophic level ecological receptors to be consistent with MTCA requirements for the Site as identified the RI/FS Work Plan. For chemicals without MTCA screening levels (e.g. TBT), the DMMP antidegradation evaluation guidelines will be used (DMMP, 2008). Table 4 identifies the MTCA screening levels and DMMP guidelines for the post-dredge surfaces that include the temporary side slope and Z-layer.

5.2. Physical and Chemical Testing

The analyses to be performed for this project have been developed to evaluate open-water disposal in general accordance with the DMMP User Manual (USACE, 2013) and additional requirements identified by Ecology for the planning and implementation of the Interim Action.

Representative dredge material composite samples, samples of the side slope and Z-layer samples (as required) will be analyzed for conventional and chemical constituents. The samples will be analyzed for the DMMP standard list of chemicals of concern (COCs) specified in the User Manual as well as non-standard COCs (USACE, 2013). Non-standard COCs will include dioxins and furans and bulk tributyltin ion as there is reason to believe that non-standard COCs may be present in the dredged material based on the results of previous investigations and/or past Site activities.

The dredge material composite samples, samples of the side slope and Z-layer samples will also be analyzed for the potential chemicals of concern specified in the Former Mill A Cleanup Site RI/FS Work Plan for the Interim Action area. The potential COCs specified in the Work Plan were identified based on the results of previous investigations and/or past Site activities.

The analyses that will be performed on the samples include the following:

- Grain Size by PSEP 1986 or ASTM International (ASTM) D-422 Mod;
- Total solids by SM2540G;

- Total volatile solids (TVS) by SM2540G;
- Dry-weight wood content by ASTM D-2974 Method C (with a sample size of 300 g);
- Total organic carbon (TOC) by Plumb 1981 et al.;
- Ammonia by U.S. Environmental Protection Agency (EPA) 350.1M/SM4500-NH3;
- Total sulfides by EPA376.2/SM 4500-S2;
- Metals by EPA Method 6000/7000 series;
- SVOCs (including PAHs) by EPA Method 8270/8270-SIM/8081B;
- PCBs by EPA Method 1668A
- Dioxins and furans by EPA Method 1613;
- Tributyltin Ion (bulk)[2] by EPA Method 8270D-SIM/Krone 1989;
- Pesticides by EPA Method 8081B

The specific analytes for each analysis are presented in Table 4.

Analytical protocols, including sample holding times and reporting limits, will be in accordance with Puget Sound Estuary Program (PSEP) protocols and requirements (PSEP, 1996). Sample size, containers, preservation and holding times are presented on Table 5. The holding times for some of the analytical methods are 7 days (e.g., ammonia) and 14 days (e.g., SVOCs and TOC) as presented in Table 5. Due to the duration of the sediment core collection field effort and the complexity of completing the sample compositing in the laboratory, the DMMP agencies will allow holding time exceedances for analytical methods with holding times of 7 or 14 days except for analysis of total sulfides. Total sulfides will be collected discretely as described in Section 4.3 and analyzed within the 7-day holding time.

Particle grain-size distribution for each composite sample will be determined in accordance with PSEP 1986 or ASTM D 422 (modified). Additional grain-size analysis on the ashed remains from wood content analyses may be completed for bioassay reference sediment matching on composite samples with wood waste. The sand and gravel fraction will be determined using modified EPA sieve numbers 4, 10, 18, 35, 60, 120, and 230. Hydrometer analysis will be used for particle sizes finer than the 230 mesh. Hydrogen peroxide will not be used in preparations for grain-size analysis. Water content will be determined using ASTM D 2216. Sediment will be classified as follows for the PSEP 1986 method:

Grain Type	Phi Size	Sieve Size (No.)	Grain Size (µm)
Gravel	< -1	>10	>2,000
Very Coarse Sand	-1 to 0	10 to 18	2,000 to 1,000
Coarse Sand	0 to 1	18 to 35	1,000 to 500
Medium Sand	1 to 2	35 to 60	500 to 250

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[2] Due to the complexity of the project and the likelihood tha the 7-day holding time for porewater tributyltin analysis will not be met, the DMMP agencies are allowing bulk tributyltin analysis as a replacement. Adsorptive losses from tributyltin in bulk sediment samples during an extended holding time should be less than adsorptive losses from porewater.

Grain Type	Phi Size	Sieve Size (No.)	Grain Size (µm)
Fine Sand	2 to 3	60 to 120	250 to 125
Very Fine Sand	3 to 4	120 to 230	125 to 62.5
Coarse Silt	4 to 5	>230	62.5 to 31
Medium Silt	5 to 6	>230	31 to 15.6
Fine Silt	6 to 7	>230	15.6 to 7.8
Very Fine Silt	7 to 8	>230	7.8 to 3.9
Clay	8 to >10	>230	3.9 to <1
Total Fines	>4	>230	<62.5

A description of the visual grain size observed at the individual sampling locations will be documented on the field logs as described in Section 4.2.

Dry-weight wood content will be determined in accordance with ASTM D-2974 Method C, using a 300 gram sample.

Analytical methods will be completed in accordance with Table 8-3 of the DMMP User's Manual with the exception that PCBs will be analyzed using EPA Method 1668A to analyze for PCB congeners. All 209 PCB congeners will be analyzed and the sum will constitute the total PCBs to be compared against DMMP and site-specific screening levels. Practical quantifications limits will be at or below the DMMP and site-specific sediment screening levels.

Chemical analytical results will be compared to site-specific screening levels developed for the MTCA RI/FS Work Plan and DMMP screening levels and bioaccumulation triggers as described in Section 5.1. Site-specific MTCA screening levels and DMMP guidelines are provided in Table 4.

5.2.1. Sediment Reference Samples

Certified reference material (CRM) will be utilized as part of the laboratory quality assurance/quality control (QA/QC) requirements as specified in Table 6. CRMs will be used by the testing laboratory for semi-volatile, pesticide, metals and TOC analysis. Identification of the CRMs used and acceptance ranges for laboratory quality control are presented in Appendix B[3].

In addition, a Puget Sound Sediment Reference Material (PS-SRM) will be used for PCB and dioxin/furan analysis. The DMMP guidance document for Requesting, Analyzing, Validation and Reporting Data (DMMP, 2013a) will be followed for PS-SRM samples.

5.3. Biological Testing

Bioassay testing may be completed by the Port to continue pursuit of open water disposal (see Figure 13) or evaluate compliance with site-specific screening levels for benthic organisms should the chemical

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[3] CRMs presented in Appendix B are subject to change depending on their availability at the time the project starts. CRMs used for semi-volatile, pesticide, metals and TOC analysis at the time of sampling will be provided by the testing laboratory and included with the final laboratory report.

analytical results be greater than the screening levels. DMMP guidelines include the requirement that sediment with greater than 25 percent wood debris by dry-weight undergo bioassay testing to assess the suitability of the material for open water disposal.

Follow-on biological testing, if elected, would be conducted using the approach presented in Section 5.1.1 on representative DMMU samples that have one or more chemical exceedances. Sufficient sample volume will be collected for bioassay testing however, no sample volume will be collected for bioaccumulation testing during the initial field sampling effort.

The standard suite of bioassays includes both acute and chronic tests to characterize toxicity of whole sediment. Field collection and processing methods, bioassay specific QA/QC, and data reporting procedures will be followed in accordance with Puget Sound Protocols and Guidelines (PSEP, 1995). Bioassay testing for marine evaluations will include:

- 10-day amphipod mortality test (acute toxicity)
- 20-day juvenile infaunal growth test (chronic toxicity)
- Sediment larval test (acute toxicity)

To the maximum extent practicable, chemical results will be obtained to evaluate the need for biological testing decisions within 21 days of sample collection. The remaining 35-day period will allow time for bioassay preparation as well as time for retests, if necessary. The DMMO project manager will be kept informed of analytical progress to support biological testing decisions.

Environ International Corporation, an Ecology-certified laboratory located in Port Gamble, Washington will conduct the bioassay testing (Accreditation No. C2021) and reference sample collection. Bioassay testing requires that test sediments be matched and run with appropriate reference sediment to factor out background conditions and sediment grain size effects on bioassay organisms.

All biological testing will be in compliance with PSEP's recommended protocols (PSEP, 1995), the Sediment Sampling and Analysis plan Appendix ([SAPA] Ecology, 2008) and with appropriate modifications as specified by the Sediment Management Annual Review Meeting (SMARM). Ammonia reference toxicant tests may be conducted if elevated ammonia concentrations are identified in porewater. General biological testing procedures and specific procedures for each sediment bioassay are summarized in the following sections.

5.3.1. Bioassay Species

The DMMP recommended list of species will be used for marine bioassay testing. If the DMMP recommended species are not available for the larval test, the DMMO will be contacted prior to initiating testing with a non-recommended species.

- Recommended species for the 10-day amphipod mortality test include:
    - *Eohaustorius estuarius* – most commonly used species; can be considered for use over grain size distributions ranging from 100 percent sand to 0.6 percent sand, as long as the clay fraction is less than 20 percent, and in interstitial salinities ranging from 2 parts per thousand (ppt) to 28 ppt.
    - *Ampelisca abdita* – recommended if test sediment contains greater than 20 percent clay.

    - *Rhepoxynius abronius* – alternative species for use in coarser-grained sediments (i.e. fines less than 60 percent).

- Recommended species for the 20-day juvenile infaunal growth test include:
    - *Neanthes arenaceodentata* (Los Angeles karyotype).
- Recommended species for the larval test include:
    - Bivalve: *Mytilus galloprovincialis.*
    - Echinoderm: *Dendraster excentricus.*

Bioassay species will be selected by the testing laboratory based on sediment material type and composition and/or seasonal availability. DMMO will be contacted prior to acquiring the selected test species.

5.3.2. Reference Sediments

Bioassay testing requires that test sediments be matched and run with appropriate DMMP approved reference sediment to factor out sediment grain-size effects on bioassay organisms. As noted in Section 5.2 grain size analysis will be completed for the ashed remains from the wood content analysis for composite samples with wood waste. Reference sediment will be collected by the testing laboratory. The location coordinates and water depth of the reference sediment sampling location will be recorded. Reference sediment samples will be collected using a grab-type sampler and processed using the same methods as the test sediment samples. Wet-sieving will be conducted in the field to ensure that reference sediment samples with the appropriate fines content are collected.

5.3.3. Bioassay Laboratory Protocols

Sediment samples for bioassays will be stored at 4°C with no headspace, pending completion of chemical analyses and initiation of any required bioassay testing. Bioassay testing, including retests, will commence within 56 days after collection of the first sediment composite to be analyzed. Chain-of-custody procedures will be maintained by the laboratory throughout biological testing.

Bioassay testing will be planned to initiate appropriate testing as soon as possible after the first chemical results become available and the decision is made to conduct bioassays. This includes obtaining test organisms and control and reference sediment in a timely manner. This approach will support the opportunity for any additional biological testing within the allowable 56-day holding period, if such need arises. As initial chemistry data become available, close coordination will be maintained with the bioassay laboratory and the DMMO to expedite biological testing decisions. DMMO will be provided with the chemistry data including grain-size, ammonia and total sulfides to facilitate biological testing decisions, help determine the grain size for the reference sediment and evaluate the potential for non-treatment effects.

Ammonia and sulfides are potential non-treatment factors that may affect the results of bioassay. Need for purging and/or reference toxicity (Ref Tox) testing prior to the commencement of actual bioassay testing will be determined in accordance with the DMMP User Manual (USACE, 2013), and in consultation with DMMO.

5.3.4. Bioassay Specific Procedures

5.3.4.1. Amphipod 10-day Survival Bioassay

The amphipod mortality test will be run for a 10-day exposure period, followed by counting of the surviving animals. Daily emergence data and the number of amphipods failing to rebury at the end of the test will be recorded.

5.3.4.2. Juvenile Infaunal Growth Bioassay

The sediment juvenile infaunal bioassay will be run for a 20-day exposure period, followed by counting and weighing of the surviving animals (PSEP, 1995). At the end of the test, mean individual growth rate is calculated for each replicate exposure as the difference between final and initial weights divided by the exposure duration. Results will be reported on an ash-free dry-weight (AFDW) basis in accordance with DMMP Neanthes protocol adjustments (DMMP, 2012).

5.3.4.3. Larval Development Bioassay

The sediment larval bioassay has a variable endpoint (not necessarily 48 hours) that is determined by the developmental stage of organisms in a sacrificial seawater control (PSEP, 1995). At the end of the test, larvae from each test sediment replicate exposure are examined to quantify abnormality and mortality.

For the larval bioassay, the standard PSEP protocol will be used. The standard PSEP protocol is applicable for sediment with lower fractions of fines, wood waste or flocculent material. The resuspension procedure is used instead of the standard PSEP protocol to test sediments with high concentrations of fines, wood waste or other flocculent material (DMMP, 2013b). The resuspension procedure can also be elected if there are concerns about false positives due to entrapment. Photographs shall be taken of sediment samples after settling. The decision to use the resuspension protocol will be made in coordination with DMMO for approval before use. If bioassays are performed, it will be ensured that the larval test receives adequate aeration.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

6.1. Project Team Organization and Responsibilities

6.1.1. Project Leadership and Management

The Project Manager for Former Mill A Cleanup Interim Action Dredging Project is John Herzog. The Project Manager has overall responsibility for executing the project in accordance with contractual requirements. The Project Manager is also responsible for selecting project team members, assigning and coordinating project tasks, determining subcontractor participation, establishing and adhering to budgets and schedules, providing technical oversight, and coordinating production and review of project deliverables. The Project Manager is the primary technical representative for characterization activities.

6.1.2. Field Coordinator

The Field Coordinator for the Former Mill A Cleanup Interim Action Dredging Project is Brian Tracy. The Field Coordinator is responsible for the daily management of activities in the field and will be responsible for QA/QC oversight of the laboratory programs.

6.1.3. Quality Assurance Leader

The Quality Assurance (QA) Leader for the Former Mill A Cleanup Interim Action Dredging Project is Mark Lybeer. The QA Leader is responsible for coordinating QA/QC activities as they relate to chemical analytical data. The QA Leader will review laboratory QA/QC data to assure validity of data and conformance to QA/QC requirements and will provide a written QA/QC report.

6.1.4. Laboratory Management

The subcontracted laboratories conducting sample analyses for this project are required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The laboratory's QA Coordinator administers the laboratory QA plan and is responsible for QC. Analytical Resources, Inc. (ARI) of Tukwila, Washington will perform chemical analysis (with the exception of PCB congener analyses which will be subcontracted by ARI) for this project and Cheronne Oreiro is the laboratory's QA Coordinator. If bioassay analysis is deemed necessary, Port Gamble Environmental Sciences of Port Gamble, Washington will perform this analysis for this project.

6.2. Chemical Quality Objectives and Criteria

The quality assurance objective for technical data is to collect environmental monitoring data of known, acceptable, and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for precision, accuracy, representativeness, completeness, and comparability, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures, and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (bias, detection limits, precision, accuracy and completeness) and qualitative factors (representativeness and comparability). The chemistry QA/QC and DMMP warning and action limits requirements summarized in Table 6 and 7 respectively will be followed so that data of adequate quality is generated to support a suitability determination for the dredged material. Detailed QC procedures and acceptance criteria for dioxin and tributyltin analyses are provided in Tables 8 through 10.

6.2.1. Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Although results reported near the MDL provide insight to Site conditions, quality assurance dictates that analytical methods achieve a consistently reliable level of detection known as the limits of quantification (LOQ) or practical quantitation limit (PQL), which is typically demonstrated with the lowest point of a linear calibration. The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL. It will be ensured with the laboratory to take extra care to keep PQLs below the SLs. In cases where the

PQL is observed to be above the SL, the laboratory will report the compound as either detected between the MDL and PQL (with a J qualifier) or not detected at the MDL level.

Laboratory PQLs are presented in Table 4 and are considered target reporting limits (TRLs) because several factors may influence final reporting limits. First, moisture and other physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize Site conditions.

6.2.2. Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses, and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for field samples. This value is calculated by:

$$RPD(\%) = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} X\ 100,$$

Where

D_1 = Concentration of analyte in sample.

D_2 = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates), and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA, 2004) that address criteria exceedances and courses of action. Project RPD goals for conventional and standard COC analyses are detailed in Table 7, unless the primary and duplicate sample results are less than 5 times the MRL, in which case RPD goals will not apply for data quality assessment purposes. QC acceptance criteria for dioxin and tributyltin analyses are presented in Tables 8 through 10.

6.2.3. Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported values versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

For this project, accuracy will be expressed as the percent recovery of a known surrogate spike, matrix spike, or laboratory control sample (blank spike), concentration:

$$Recovery\,(\%) = \frac{Spiked\ Result - Unspiked\ Result}{Known\ Spike\,Concentration}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (USEPA, 2004) that address criteria exceedances and courses of action.

6.2.4. Representativeness

Representativeness expresses the degree to which data accurately and precisely represent the actual Site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the SAP.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative.

Only representative data will be used in subsequent data reduction, validation, and reporting activities.

6.2.5. Completeness

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved an evaluation will be made to determine if the data are adequate to meet study objectives.

$$Completeness = \frac{number\ of\ valid\ measurements}{total\ number\ of\ data\ points\ planned}\ x\ 100$$

6.2.6. Comparability

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

6.2.7. Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field.

If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents may have volatilized from the sample or degraded. Results for that analysis would be qualified as estimated to indicate that the reported results may be lower than actual Site conditions. Holding times are presented in Table 5.

6.2.8. Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include at a minimum, the analysts name or initial, time and date.

6.2.9. Laboratory Calibration Procedures

For analytical chemistry, calibration procedures will be performed in general accordance with the methods cited and laboratory standard operating procedures. Calibration documentation will be retained at the laboratory and readily available for a period of six months.

6.2.10. Laboratory Quality Control

Laboratory QC procedures will be evaluated through a formal data quality assessment process. The analytical laboratory will follow standard analytical method procedures that include specified QC monitoring requirements. These requirements will vary by method, but generally include:

- Method Blank or Equipment Blank Contamination
- Instrument Initial Calibrations (ICALs) and Instrument Continuing Calibrations (CCALs)
- Matrix Spikes/Matrix Spike Duplicates (MS/MSD) Outliers
- Laboratory Control Sample (LCS)/Ongoing Precision and Recovery Sample (OPR) Outliers
- Laboratory Replicates or Duplicates
- Surrogates/Labeled Compounds Outliers
- Standard/Certified Reference Materials
- HRGC/HRMS system performance checks:
    - Mass Calibration and Resolution
    - Selected Ion Monitoring switching times
    - GC Resolution
- Method Detection Limits (MDLs), Contracted Reporting Limits (CRLs), and Estimated Detection Limits (EDLs)

6.2.11. Laboratory Blanks

Laboratory procedures utilize several types of blanks, but the most commonly used blanks for QC monitoring are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process, or reagent (contaminant-free) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. If a substance is detected in a method blank, then one (or more) of the following occurred:

- Sample containers, measurement equipment, and/or analytical instruments were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.
- Volatile substances in ambient laboratory air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. If target analytes are detected in method blanks, data validation guidelines assist in determining which substances in project samples are considered "real," and which ones are attributable to the analytical process. Furthermore, the guidelines state, "... there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

Analytical results for laboratory method or prep blanks will be evaluated in general accordance with the National Functional Guidelines for Organic Review (USEPA, 2008) and National Functional Guidelines for Inorganic Review (USEPA, 2004). In general, whenever evidence suggests that the source of a positive result in a field sample is something other than the environmental media, the analyte is qualified as not-detected (U) or estimated (UJ) with elevated reporting (quantitation) limits.

6.2.12. Calibrations

Several types of instrument calibrations are used, depending on the analytical method, to assess the linearity of the calibration curve and assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations, and continuing calibration verification.

6.2.13. Matrix Spike/Matrix Spike Duplicates (MS/MSD)

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH can affect the results for semivolatile organic compounds (SVOCs). Or, the presence of a particular compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix effects cannot be determined due to dilution and/or high levels of related substances in the sample. A matrix spike is evaluated by spiking a project sample with a known amount of one or more of the target analytes, ideally at a concentration that is 5 to 10 times higher than the sample result. A percent recovery is then calculated by subtracting the un-spiked sample result from the spiked sample result, dividing by the known concentration of the spike, and multiplying by 100.

MS/MSD samples will be analyzed at a frequency of one MS/MSD per analytical batch. The samples for the MS/MSD analyses should be collected from a boring or sampling location that is believed to have only low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for the MS/MSD analyses as required by the laboratory.

6.2.14. Laboratory Control Sample/ Laboratory Control Sample Duplicates (LCS/LCSD)

Also known as blanks spikes, laboratory control samples (LCS) are similar to MS samples in that a known amount of one or more of the target analytes are spiked into a prepared sample medium, and a percent recovery of the spiked substances is calculated. The primary difference between LCS and MS samples is that the LCS uses a contaminant-free sample medium. For example, reagent water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance, and analyst performance.

6.2.15. Laboratory Replicates/Duplicates

Laboratories utilize MS/MSDs, LCS/LCSDs, and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process and most commonly consist of a second analysis on the extracted media.

6.2.16. Surrogates/Labeled Compounds

Surrogate spikes are used to verify proper extraction procedures and the accuracy of the analytical instrument. Surrogates are substances with characteristics similar to the target analytes. A known concentration of surrogate is added to the project sample and passed through the instrument and the percent recovery is calculated. Each surrogate used has acceptance limits (i.e., an acceptable range) for percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified acceptance limits, a possibility of false positives exist, although non-detect results are considered accurate.

6.2.17. Review of Field Documentation and Laboratory Receipt Information

Documentation of field sampling data will be reviewed periodically for conformance with project QC requirements. At a minimum, field documentation will be checked for proper documentation of the following:

- Sample collection information (date, time, location, matrices, etc.);
- Field instruments used and calibration data;
- Sample collection protocol;
- Sample containers, preservation, and volume;
- Field QC samples collected at the frequency specified;
- COC protocols; and
- Sample shipment information.

Sample receipt forms provided by the laboratory will be reviewed for QC exceptions. The final laboratory data package will describe (in the case narrative) the effects that any identified QC exceptions have on data quality. The laboratory will review transcribed sample collection and receipt information for correctness prior to delivering the final data package.

6.2.18. Data Deliverables

Laboratories will report data in formatted hardcopy and digital formats. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, data qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and quantitation limits. Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) requirements will be established by GeoEngineers with the contract laboratory through the Lab Specification GeoEngineers document that is sent to the subcontracted laboratory.

The laboratory will ultimately send final analytical reports to the Project Manager in the form of 1) a PDF file and 2) EDD files. At a minimum, the following will be included in the report:

- Results of the laboratory analyses and QA/QC results
- All special protocols used during analyses
- Chain-of-custody information including explanation of any deviation from those identified herein
- List of internal, laboratory defined qualifiers
- List of sample results, reporting limits and method detection limits

- A list of data qualifier code definitions.
- Sample preparation, extraction, dilution and cleanup logs.
- Instrument tuning data.
- Initial and continuing calibration data, including instrument printouts and quantification summaries, for all analytes.
- Results for method and calibration blanks.
- Results for all QA/QC checks, including surrogate spikes, internal standards, laboratory control samples, matrix spike samples, matrix spike duplicate samples, and laboratory duplicate or triplicate samples.
- Original data quantification reports for all analysis and samples.
- All laboratory worksheets and standards preparation logs.
- QA2 data required by Ecology
- An electronic data deliverable (EDD) in Ecology Information Management System (EIM) format.

6.2.19. Data Review, Verification and Validation

Project decisions, conclusions, and recommendations will be based upon data that has been formally verified and validated. The purpose of data verification/validation is to ensure that data used for subsequent evaluations and calculations are scientifically valid, of known and documented accuracy and precision, and legally defensible. Field data verification will be used to eliminate data not collected or documented. Laboratory data validation will be used to potentially eliminate data points that were obtained using QC parameters that were outside the control limits established in Table 7.

The QA Leader will validate data collected from the sediment investigation to ensure that the data are valid and usable for the purposes of this project. This data quality assessment will help to achieve an acceptable level of confidence in the decisions that are to be made based upon the project data. Data packages will be checked for completeness immediately upon receipt from the laboratory to ensure that data and QA/QC information requested are present. At a minimum, the following items will be reviewed to verify the data as applicable:

- Holding times
- Initial calibrations
- Continuing calibrations
- Method blanks
- Labeled Compound recoveries
- Estimated and Method Detection limits/Contract Required Reporting Limits
- Ongoing Precision and Recovery Samples
- Matrix spike/matrix spike duplicate samples May not need these
- SRM results

An EPA-defined Stage 4 validation will be performed on organic analytical data and Stage 3A will be performed on inorganic analytical data in general accordance with U.S. Environmental Protection Agency (USEPA) Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (USEPA, 2004) and USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review (USEPA, 2008). Data validation will be led by the QA Leader. Additional specifications and professional judgment by the QA Leader may be incorporated when appropriate data from specific matrices and field samples are available.

Following the validation, a report will be prepared to document the overall quality of the data relative to the quality assurance guidelines of the DMMP User Manual. Major components of the data quality assessment report include:

- **Data Validation Summary –** Summarizes the data validation conclusions for all sample delivery groups by analytical method. The summary identifies any systematic problems, data generation trends, general conditions of the data, and reasons for any data qualification.
- **Assessment of Data Quality –** An assessment of the quality of data measured and generated in terms of accuracy, precision, and completeness relative to objectives established for the project.

- **Summary of Data Usability –** Summarizes the usability of data, based on the assessment performed in the three preceding steps.

6.3. Bioassay Data Quality Objectives

Sediment toxicity tests will incorporate standard QA/QC procedures to ensure that the test results are valid. Standard QA/QC procedures include the use of negative controls, positive controls, reference sediment samples, lab replicates, and measurements of water quality during testing. All biological testing will be in strict compliance with standard protocols established by ASTM and EPA. General biological testing procedures and specific procedures for each sediment bioassay are summarized in the following sections.

6.3.1. Negative Controls

Negative control sediment is used in bioassays to check laboratory performance. Negative control sediment are clean sediments in which the test organism normally lives and which are expected to produce low mortality, and thus are collected from the organism collection site for the bioassay.

In the amphipod and juvenile infaunal bioassay tests, control mortality over the exposure period should be less than or equal to 10 percent. This represents a generally accepted level of mortality of test organisms under control conditions, where the bioassay (in terms of test organism health) is still considered a valid measure of effects of the test treatments. If control mortality is greater than 10 percent, the bioassay test will generally have to be repeated. The control must also achieve a mean growth rate of 0.38 mg/individual/day in the juvenile infaunal bioassay. Determination for repeating these tests will be in consultation with the DMMO. For the sediment larval test, the performance standard for the seawater negative control combined endpoint (mortality + abnormality) is 30 percent.

6.3.2. Reference Sediment

Bioassay reference sediment that closely match the grain-size characteristics of the dredged material test sediment will be used for test comparison and interpretations. The reference sediment will be used to account for physical effects of the test sediment. The collection area will be determined based on sample physical characteristics and in coordination with the DMMO. If needed, the reference sample will be analyzed for total solids, total volatile solids, total organic carbon, ammonia, sulfides and grain size.

The wet-sieving protocol will be used in the location of the appropriate reference station. Wet-sieving will be conducted using a 63-micron (number 230) sieve and graduated cylinder; 100 mL (milliliters) of sediment is placed in the sieve and washed until the water runs clear. The volume of sand and gravel remaining is then washed into the graduated cylinder and measured as the coarse fraction. The fines are determined by subtracting the coarse fraction from 100.

6.3.3. Replication

Five laboratory replicates of test sediment, reference sediment, and negative controls will be run for each marine water bioassay (per ASTM and EPA guidance).

6.3.4. Positive Controls

A positive control will be run for each bioassay. Positive controls are chemicals known to be toxic to the test organism and provide an indication of the sensitivity of the particular organisms used in a bioassay.

6.3.5. Water Quality Monitoring

Water quality monitoring will be conducted for the amphipod, larval, and juvenile polychaete bioassays and reference toxicant tests. This consists of daily measurements in each test replicate of salinity, temperature, pH, and dissolved oxygen (DO) for the amphipod and larval tests. These measurements will be made every three days for the juvenile polychaete bioassay, with the exception of DO, which will be measured daily. Ammonia and sulfides in the overlying water will be determined at test initiation and termination for all three tests. Monitoring will be conducted for all test and reference sediments and negative controls (including seawater controls).

6.3.6. Interpretation

Test interpretation consists of endpoint comparisons of test sediments to the measurements observed in the controls and in reference sediments on an absolute percentage basis, as well as statistical comparison between the test and reference endpoints, where appropriate. Test interpretation will follow the guidelines established through the DMMP/SMS review process. DMMO will be contacted immediately in the event that the control or references don’t meet performance standards.

6.3.7. Bioassay Retest

Any bioassay retests will be fully coordinated with, and approved by, the DMMP agencies. The DMMO will be contacted to handle this coordination.

6.3.8. Data Deliverables

The bioassay laboratory for this study will be required to report results that include all information recommended by PSEP protocols for quality assurance review, as follows:

- A description of any deviations from the methodology or problems with the process and procedures of analyses.
- Test methods used for bioassay testing and statistical analyses.
- Results for survival, growth, reburial, abnormalities, water quality parameters, reference toxicant, and statistical analyses. A reference toxicant control chart will be submitted for each test organism showing the temporal changes in the mean and the 95 percent CI or positive and negative 2 STD and include the LC50s at each of 12 previous reference toxicant tests to be acceptable.
- Original data sheets for water quality, survival, growth, reburial, abnormalities, reference toxicant, and statistics.
- COC records.

7.0 REPORTING

A written report shall be prepared to document the activities associated with the dredged material characterization study. The chemical analytical report will be included as an appendix. At a minimum, the following will be included in the Final Characterization Report:

- Type of sampling equipment used.
- Protocols used during sampling and testing and an explanation of any deviations from the sampling plan protocols.
- Logs of the borings showing descriptions of each sample, penetration depth and percent recovery data.
- Methods used to locate the sampling positions within an accuracy of 2 meters.
- Coordinates, measured water depth, tidal elevation at the time of sampling, and calculated mudline elevation (referenced to MLLW) for actual sampling locations and depths of each sample interval (referenced both to the mudline and MLLW) that was composited. Coordinates will be reported in latitude and longitude to the nearest hundredth of a second.
- Description of sampling and composting procedures.
- A plan view of the project showing the target and actual sampling locations and DMMU boundaries.
- Data tables presenting laboratory results, both laboratory and validation qualifiers with definitions of codes used, and MDLs and RLs for non-detects. The data tables will highlight any DMMP guideline exceedances and Former Mill A Site cleanup screening level exceedances. Chemical analytical data of material to be dredged will be evaluated relative to DMMP Guideline and site-specific MTCA cleanup screening level chemistry values presented on Table 4. Chemical analytical data of sediment that will be exposed by dredging will be evaluated relative to site-specific MTCA cleanup screening levels consistent with Sediment Management Standards Chemical Criteria (WAC 173-204). Biological toxicity data, if obtained, will be evaluated relative to DMMP Bioassay Performance Standards and Evaluation Guidelines (USACE, 2013) and Sediment Management Standards Biological Criteria (Washington Administrative Code [WAC] 173-204), as applicable.
- If bioassays are performed, the final characterization report will include summary tables of bioassay results, QA data and interpretations. The bioassay laboratory report will be included as an appendix.
- Data submittal to DMMO in the EIM format, using guidance provided by DMMO.
- Final QA report and laboratory data packages with chain-of-custody forms.
- Approved Dredged Material Characterization SAP, core logs, photographs, QA/validation report included as an appendix. QA2 data will be reported in electronic format only.

8.0 SCHEDULE

The sampling and analysis will be performed following approval of this SAP by the DMMP Agencies. It is anticipated that the sampling will be conducted in early January 2015.

9.0 LIMITATIONS

This SAP has been prepared for the exclusive use of the Port of Everett, their authorized agents and regulatory agencies in their evaluation of the Former Mill A Cleanup Site Interim Action Dredging Project. No other party may rely on the product of our services unless we agree in advance and in writing to such reliance.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Inc. and will serve as the official document of record.

10.0 REFERENCES

Dredged Material Management Program (DMMP, 2008). "DMMP Clarification Paper: Quality of Post-dredge Sediment Surfaces (Updated). Prepared by David Fox (U.S. Army Corps of Engineers), Erika Hoffman (EPA Region 10) and Tom Gries (Washington State Department of Ecology) for the DMMP agencies." Dated June 10, 2008.

Dredged Material Management Program (DMMP, 2013a), "Puget Sound Sediment Reference Material: Requesting, Analyzing, Validation and Reporting Data," Guidance for Distribution and Reporting, revised March 27, 2013.

Dredged Material Management Program (DMMP, 2013b), "Bioassay Endpoint Refinements: Bivalve larval and Neanthes Growth Bioassay. Prepared by David Kendall, (U.S. Army Corps of Engineers) and Russ McMillan, (Washington State Department of Ecology) for the DMMP agencies and SMS Program, and Bill Gardiner, Brian Hester, and Jack D Word (Newfields, LLC)," dated June 5, 2013.

Dredged Material Management Program (DMMP, 2013c), "DMMP Clarification Paper: Modifications to Ammonia and Sulfide Triggers for Purging and Reference Toxicant Testing. Prepared by Laura Inouye, (Washington State Department of Ecology) Erika Hoffman, (U.S. Environmental Protection Agency) and David Fox, (U.S. Army Corps of Engineers) for the DMMP agencies." dated April 29, 2013.

Dredged Material Management Program (DMMP, 2012), "Bioassay Endpoint Refinements: Bivalve Larval and Neanthes Growth Bioassays," DMMP/SMS Clarification Paper, Dated August 28, 2012.

Puget Sound Estuary Program (PSEP, 1995), "Recommended protocols for conducting bioassays in Puget Sound," Prepared for the Puget Sound Estuary Program, U.S. Environmental Protection Agency, Region 10, Office of Puget Sound, Seattle, Washington, 1995.

Puget Sound Estuary Program (PSEP, 1996), "Recommended Protocols for Measuring Selected Environmental Variables in Puget Sound," Prepared for U.S. Environmental Protection Agency

Region 10, Office of Puget Sound, Seattle, WA and U.S. Army Corps of Engineers, Seattle District, Seattle, Washington, 1996.

U.S. Army Corps of Engineers (USACE, 2013), "Dredged Material Evaluation and Disposal Procedures User Manual," Dredged Material Management Program: Corps of Engineers, Seattle District; Environmental Protection Agency, Region 10; Washington State Department of Natural Resources; Washington State Department of Ecology, July 2013.

U.S. Environmental Protection Agency (USEPA, 2004). "Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," OSWER 9240.1-45, EPA 540-R-04-004, dated October 2004.

U.S. Environmental Protection Agency (USEPA, 2008). "Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review," EPA-540-R-08-01, dated June 2008.

Washington State Department of Ecology (Ecology, 2008), "Sediment Sampling and Analysis Plan Appendix, Guidance on the Development of Sediment Sampling and Analysis Plans Meeting the Requirements of the Sediment Management Standards (Chapter 173-204 WAC)," Ecology Publication No. 03-09-043, Sediment Source Control Standards User Manual, Washington Department of Ecology Sediment Management Unit, Revised February 2008.

TABLES

GeoEngineers

Table 1

Estimated In Situ Dredge Volumes

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Dredging Location	Baseline Dredge Volume[1] (CY)	1-Foot Overdredge Allowance (CY)	Uncertainity Factor[2] (CY)	Total Dredge Volume (CY)
Interim Action Cleanup	29,220	2,720	3,200	35,140

Notes:

[1] The baseline dredge volume is calculated to dredge to an elevation of -42 feet mean lower low water (MLLW).

[2] The uncertainty factor is assumed to be 10 percent of the baseline volume estimate to account for additional sediment deposition that may occur before the proposed dredging construction and for any inherent errors in the estimation process as recommended in DMMP Users Manual.

CY = In Situ Cubic Yards

All volumes calculated using bathymetry survey completed between September 8 and 11, 2014.

Table 2

Dredge Area Characterization Approach Summary

Mill A Former Site Interim Action Dredging Project

Everett, Washington

Dredging Location	Dredged Material Ranking	Sediment Classificaiton	Total Dredge Volume (CY)	Number of DMMUs	DMMU Identification	DMMU Boundary Elevations	Total Dredge Volume per DMMU[2] (CY)	Number of Sample Cores	Sampling Layer[3]
Interim Action Cleanup	High	Heterogeneous	35,140	11	D-1	Existing Surface to -22 ft	3,750	5	Surface DMMU
					D-2	-22 to -26 ft	3,680	7	Subsurface DMMU
					D-3A	-26 ft to -30 ft	2,380	3	Subsurface DMMU
					D-3B	-26 ft to -30 ft	2,420	5	Subsurface DMMU
					D-4A	-30 ft to -34 ft	2,710	2	Subsurface DMMU
					D-4B	-30 ft to -34 ft	3,160	6	Subsurface DMMU
					D-5A	-34 ft to -38 ft	3,010	3	Subsurface DMMU
					D-5B	-34 ft to -38 ft	3,810	7	Subsurface DMMU
					D-6A	-38 ft to -43 ft	2,870	3	Subsurface DMMU
									Z-layer
					D-6B	-38 ft to -43 ft	3,520	3	Subsurface DMMU
									Z-layer
					D-6C	-38 ft to -43 ft	3,830	3	Subsurface DMMU
									Z-layer

Notes:

[1] Due to the status of the Site as a MTCA cleanup, the subsurface DMMUs are treated as surface DMMUs with a high ranking as required by the Dredged Material Management Office during the development of this SAP.

[2] DMMU volume include 1-foot overdredge allowance and 10% contingency. Volumes calculated using bathymetry survey completed between September 8 and 11, 2014.

[3] Z-layer samples will also be collected to characterize the dredge prism side slope. 5 core locations will be completed within the side slope area.

CY = In Situ Cubic Yards

DMMU = Dredged Material Management Unit

NA = Not Applicable

Table 3

DMMU Sample Collection Locations and Depth Intervals

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Dredging Location	Proposed Core Location[1]	Proposed Core Location Coordinates[2]	Approximate Mudline Elevation[3] (Feet MLLW)	Design Dredge Depth[4] (Feet below Mudline)	Target Core Penetration Depth[5] (Feet below Mudline)	Sample Interval	DMMU	Sample Layer
Interim Action Cleanup	PT-1	N 47° 58' 37.82" W 122° 13' 34.04"	-35	8	10	0-3	D-5B	Subsurface DMMU
						3-8	D-6C	Subsurface DMMU
						8-10	--	Z-layer
	PT-2	N 47° 58' 38.30" W 122° 13' 33.23"	-30	13	15	0-4	D-4B	Subsurface DMMU
						4-8	D-5B	Subsurface DMMU
						8-13	D-6C	Subsurface DMMU
						13-15	--	Z-layer
	PT-3	N 47° 58' 38.50" W 122° 13' 32.39"	-38	5	7	0-5	D-6B	Subsurface DMMU
						5-7	--	Z-layer
	PT-4	N 47° 58' 37.49" W 122° 13' 33.39"	-27	16	18	0-3	D-3B	Subsurface DMMU
						3-7	D-4B	Subsurface DMMU
						7-11	D-5B	Subsurface DMMU
						11-16	D-6C	Subsurface DMMU
						16-18	--	Z-layer
	PT-5	N 47° 58' 37.71" W 122° 13' 32.29"	-24	19	21	0-2	D-2	Subsurface DMMU
						2-6	D-3B	Subsurface DMMU
						6-10	D-4B	Subsurface DMMU
						10-14	D-5B	Subsurface DMMU
						14-19	D-6B	Subsurface DMMU
						19-21	--	Z-layer
	PT-6	N 47° 58' 36.97" W 122° 13' 31.43"	-16	27	29	0-6	D-1	Surface DMMU
						6-10	D-2	Subsurface DMMU
						10-14	D-3B	Subsurface DMMU
						14-18	D-4B	Subsurface DMMU
						18-22	D-5B	Subsurface DMMU
						22-27	D-6B	Subsurface DMMU
						27-29	--	Z-layer
	PT-7	N 47° 58' 37.45" W 122° 13' 30.78"	-31	12	14	0-3	D-4A	Subsurface DMMU
						3-7	D-5A	Subsurface DMMU
						7-12	D-6A	Subsurface DMMU
						12-14	--	Z-layer
	PT-8	N 47° 58' 36.79" W 122° 13' 30.45"	-23	20	22	0-3	D-2	Subsurface DMMU
						3-7	D-3A	Subsurface DMMU
						7-11	D-4A	Subsurface DMMU
						11-15	D-5A	Subsurface DMMU
						15-20	D-6A	Subsurface DMMU
						20-22	--	Z-layer
	PT-9	N 47° 58' 36.80" W 122° 13' 29.61"	-30	13	15	0-4	D-4A	Subsurface DMMU
						4-8	D-5A	Subsurface DMMU
						8-13	D-6A	Subsurface DMMU
						13-15	--	Z-layer
	PT-10	N 47° 58' 37.12" W 122° 13' 33.98"	-30	6	To Native	0-4	D-4B	Subsurface DMMU
						4-6	D-5B	Subsurface DMMU
						TBD	--	Z-layer for Side Slope
	PT-11	N 47° 58' 36.92" W 122° 13' 32.74"	-20	16	To Native	0-2	D-1	Surface DMMU
						2-6	D-2	Subsurface DMMU
						6-10	D-3B	Subsurface DMMU
						10-14	D-4B	Subsurface DMMU
						14-16	D-5B	Subsurface DMMU
						TBD	--	Z-layer for Side Slope
	PT-12	N 47° 58' 36.55" W 122° 13' 31.37"	-14	16	To Native	0-8	D-1	Surface DMMU
						8-12	D-2	Subsurface DMMU
						12-16	D-3B	Subsurface DMMU
						TBD	--	Z-layer for Side Slope
	PT-13	N 47° 58' 36.31" W 122° 13' 30.22"	-18	11	To Native	0-4	D-1	Surface DMMU
						4-8	D-2	Subsurface DMMU
						8-11	D-3A	Subsurface DMMU
						TBD	--	Z-layer for Side Slope
	PT-14	N 47° 58' 36.32" W 122° 13' 29.49"	-19	10	To Native	0-3	D-1	Surface DMMU
						3-7	D-2	Subsurface DMMU
						7-10	D-3A	Subsurface DMMU
						TBD	--	Z-layer for Side Slope

Notes:

[1] Dredged Material Management Units (DMMU's) and sample core locations are shown on Figures 8 through 10. Figure 11 presents the sampling and compositing plan.

[2] Sample coordinates are provided in latitude and longitude - actual sample locations may be adjusted in the field based on location accessibility and field conditions. Horizontal datum is North American Datum of 1983 (NAD83).

[3] Vertical datum is Mean Lower Low Water (MLLW) Epoch 1983-2001, based on National Oceanic and Atmospheric Administration (NOAA) tidal datum.

[4] Design dredge depth includes an overdredge allowance of 1-foot.

[5] Target core penetration depth at each core location includes core depth required to characterize DMMU layer plus 2 feet below the design dredge depth to characterize the Z-layer. If native material is not encoutered above the target dredge depth, the core will be penetrated beyond the target dredge depth until native material is encountered.

DMMU = Dredged Material Management Unit

ft = feet

Table 4

Method Analysis, DMMP Guideline Values and Mill A Cleanup Sediment Screening Levels

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	DMMP Guideline Chemistry Values[3]			Sediment Screening Level for Protection of Benthic Organisms[4]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[7]
				SL	BT	ML	Sediment Cleanup Objective[5] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[6] (for organic carbon <0.5% or >3.5%)	
Conventionals									
Grain Size (%)	--	PSEP 1986 or ASTM-Mod	--	--	--	--	--	--	--
Total Solids (%)	--	SM2540G	0.1	--	--	--	--	--	--
Total volatile solids (%)	--	SM2540G	0.1	--	--	--	--	--	--
Dry Weight Wood Content (%)	--	ASTM D-2974 Method C	0.1	25%					
Grain Size (%) on ashed debris from wood content analysis	--	PSEP 1986 or ASTM-Mod	--	--	--	--	--	--	--
Total Organic Carbon (%)	--	Plumb 1981 et al.	0.1	--	--	--	--	--	--
Ammonia (mg/kg)	--	EPA 350.1M/SM 4500-NH3	1	--	--	--	--	--	--
Total Sulfides (mg/kg)	--	EPA 376.2/ SM 4500-S2	1	--	--	--	--	--	--
Metals			**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**	**mg/kg**
Antimony	7440-36-0	EPA 6010/6020	5	150	--	200	--	--	--
Arsenic	7440-38-2	EPA 6010/6020	5	57	507.1	700	57	57	11
Cadmium	7440-43-9	EPA 6010/6020	0.2	5.1	11.3	14	5.1	5.1	1
Chromium	7440-47-3	EPA 6010/6020	0.5	260	260	--	260	260	--
Copper	7440-50-8	EPA 6010/6020	0.2	390	1,027	1,300	390	390	69,000
Lead	7439-92-1	EPA 6010/6020	2	450	975	1,200	450	450	21
Mercury	7439-97-6	EPA 7471A	0.05	0.41	1.5	2.3	0.41	0.41	0.2
Selenium	7782-49-2	EPA 6010/6020	0.5	--	3	--	--	--	--
Silver	7440-22-4	EPA 6010/6020	0.3	6.1	6.1	8.4	6.1	6.1	8,700
Zinc	7440-66-6	EPA 6010/6020	1	410	2,783	3,800	410	410	520,000
Polycyclic Aromatic Hydrocarbons (PAHs)			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Naphthalene	91-20-3	EPA 8270-SIM	5	2,100	--	2,400	99	2,100	29,000,000
Acenaphthylene	208-96-8	EPA 8270-SIM	5	560	--	1,300	66	1,300	--
Acenaphthene	83-32-9	EPA 8270-SIM	5	500	--	2,000	16	500	88,000,000
Fluorene	86-73-7	EPA 8270-SIM	5	540	--	3,600	23	540	59,000,000
Phenanthrene	85-01-8	EPA 8270-SIM	5	1,500	--	21,000	100	1,500	--
Anthracene	120-12-7	EPA 8270-SIM	5	960	--	13,000	220	960	440,000,000
2-Methylnaphthalene[8]	91-57-6	EPA 8270-SIM	5	670	--	1,900	38	670	5,900,000
Total LPAH	--	--	5	5,200	--	29,000	370	5,200	--
Polycyclic Aromatic Hydrocarbons (PAHs)				**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Fluoranthene	206-44-0	EPA 8270-SIM	5	1,700	4,600	30,000	160	1,700	59,000,000
Pyrene	129-00-0	EPA 8270-SIM	5	2,600	11,980	16,000	1,000	2,600	44,000,000
Benz(a)anthracene	56-55-3	EPA 8270-SIM	5	1,300	--	5,100	110	1,300	5,000
Chrysene	218-01-9	EPA 8270-SIM	5	1,400	--	21,000	110	1,400	50,000
Benzofluoranthenes (b, j ,k)	205-99-2/205-82-3/207-08-9	EPA 8270-SIM	5	3,200	--	9,900	230	3,200	5,000
Benzo(a)pyrene	50-32-8	EPA 8270-SIM	5	1,600	--	3,600	99	1,600	500
Indeno(1,2,3-c,d)pyrene	193-39-5	EPA 8270-SIM	5	600	--	4,400	34	600	5,000
Dibenz(a,h)anthracene	53-70-3	EPA 8270-SIM	5	230	--	1,900	12	230	5,000
Benzo(g,h,i)perylene	191-24-2	EPA 8270-SIM	5	670	--	3,200	31	670	--
Total HPAH	--	--	5	12,000	--	69,000	960	12,000	--
Carcinogenic PAHs (cPAHs)			**µg/kg**						**µg/kg**
Total cPAHs	--	--	5	--	--	--	--	--	16

Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	DMMP Guideline Chemistry Values[3]			Sediment Screening Level for Protection of Benthic Organisms[4]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[7]
				SL	BT	ML	Sediment Cleanup Objective[5] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[6] (for organic carbon <0.5% or >3.5%)	
Chlorinated Hydrocarbons			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
1,4-Dichlorobenzene	106-46-7	EPA 8270/EPA 8270-SIM	5	110	--	120	3.1	110	680
1,2-Dichlorobenzene	95-50-1	EPA 8270/EPA 8270-SIM	5	35	--	110	2.3	35	130,000
1,2,4-Trichlorobenzene	120-82-1	EPA 8270/EPA 8270-SIM	5	31	--	64	0.81	31	130
Hexachlorobenzene (HCB)	118-74-1	EPA 8081B	1	22	168	230	0.38	22	2.3
Phthalates			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Dimethyl phthalate	131-11-3	EPA 8270	20	71	--	1,400	53	71	--
Diethyl phthalate	84-66-2	EPA 8270	20	200	--	1,200	61	200	--
Di-n-butyl phthalate	84-74-2	EPA 8270	20	1,400	--	5,100	220	1,400	150,000,000
Butyl benzyl phthalate	85-68-7	EPA 8270/EPA 8270-SIM	5	63	--	970	4.9	63	1,900,000
Bis(2-ethylhexyl) phthalate	117-81-7	EPA 8270	50	1,300	--	8,300	47	1,300	260,000
Di-n-octyl phthalate	117-84-0	EPA 8270	20	6,200	--	6,200	58	6,200	15,000,000
Phenols			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**
Phenol	108-95-2	EPA 8270	20	420	--	1,200	420	420	440,000,000
2-Methylphenol	95-48-7	EPA 8270	20	63	--	77	63	63	73,000,000
4-Methylphenol	106-44-5	EPA 8270	20	670	--	3,600	670	670	150,000,000
2,4-Dimethylphenol	105-67-9	EPA 8270/EPA 8270-SIM	25	29	--	210	29	29	29,000,000
Pentachlorophenol	87-86-5	EPA 8270	100	400	504	690	360	360	9,200
Miscellaneous Extractables			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**
Benzyl alcohol	100-51-6	EPA 8270	20	57	--	870	57	57	150,000,000
Benzoic acid	65-85-0	EPA 8270	200	650	--	760	650	650	--
			µg/kg	**µg/kg**	**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Dibenzofuran	132-64-9	EPA 8270/EPA 8270-SIM	5	540	--	1,700	15	540	1,500,000
Hexachlorobutadiene	87-68-3	EPA 8081B	1	11	--	270	3.9	11	47,000
N-Nitrosodiphenylamine	86-30-6	EPA 8270/EPA 8270-SIM	5	28	--	130	11	28	750,000

				DMMP Guideline Chemistry Values[3]			Sediment Screening Level for Protection of Benthic Organisms[4]		Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors[7]
Analysis	CAS Number[1]	Method	Practical Quantification Limit (PQL)[2]	SL	BT	ML	Sediment Cleanup Objective[5] (for organic carbon from 0.5% to 3.5%)	Apparent Effects Threshold Criteria[6] (for organic carbon <0.5% or >3.5%)	
Pesticides			**µg/kg**	**µg/kg**	**µg/kg**	**µg/kg**			
4,4'-DDD	72-54-8	EPA 8081B	1	16	--	--	--	--	--
4,4'-DDE	72-55-9	EPA 8081B	1	9	--	--	--	--	--
4,4'-DDT	50-29-3	EPA 8081B	1	12	--	--	--	--	--
Sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT	--	--	1	--	50	69	--	--	--
Aldrin	309-00-2	EPA 8081B	0.5	9.5	--	--	--	--	--
cis-Chlordane	5103-71-9	EPA 8081B	0.5	--	--	--	--	--	--
trans-Chlordane	5103-74-2	EPA 8081B	0.5	--	--	--	--	--	--
cis-nonachlor	5103-73-1	EPA 8081B	1	--	--	--	--	--	--
trans-nonachlor	39765-80-5	EPA 8081B	1	--	--	--	--	--	--
Oxychlordane	27304-13-8	EPA 8081B	1	--	--	--	--	--	--
Total Chlordane[9]	--	--	1	2.8	37	--	--	--	--
Dieldrin	60-57-1	EPA 8081B	1	1.9	--	1,700	--	--	--
Heptachlor	76-44-8	EPA 8081B	0.5	1.5	--	270	--	--	--
Polychlorinate Bipheyls (PCBs)			**µg/kg**	**µg/kg**	**mg/kg OC**	**µg/kg**	**mg/kg OC**	**µg/kg**	**µg/kg**
Total Dioxin-Like PCB Congeners TEQ[10]	--	EPA 1668A	0.002	--	--	--	--	--	0.002
Total PCBs	--	EPA 1668A	0.002	130	38	3,100	12	130	3.5
Organometallic Compounds			**µg/L**		**µg/L**				
Tributyltin Ion (insterstitial water)	56573-85-4	EPA 8270D-SIM/Krone	0.0052	--	0.15	--	--	--	--
			µg/kg		**µg/kg**				
Tributyltin Ion (bulk)[11]	56573-85-4	EPA 8270-SIM/Krone	3.86	--	73	--	--	--	--
Dixons/Furans			**ng/kg**	**ng/kg**	**ng/kg**		**ng/kg**	**ng/kg**	**ng/kg**
Total TEQ	--	EPA 1613	5	4 - 10 [12]	10	--	5	5	5

Notes:

[1] Chemical abstreact service registry number.

[2] Practicial Quantification Limit (PQL) values from ARI of Tukwila, Washington and Frontier Analytical Laboratory of El Dorado Hills, California.

[3] Sediment Quality Guidelines from the Dredged Material Management Program's (DMMP's) Dredged Material Evaluation and Disposal Procedures User Manual (July, 2013).

[4] The organic carbon normalized Sediment Cleanup Objective (SCO) criteria are applicable to sediment with a total organic carbon (TOC) concentration ranging from 0.5 to 3.5 percent. Sediment with TOC concentrations outside of the 0.5 to 3.5 percent range are screened against the AET Screening Level on a dry weight basis (EPA, 1988).

[5] SCO criteria consistent with Chapter 173-204 WAC.

[6] Lowest value of the Apparent Effects Threshold (AET) Criteria from Table 8-1 of the Draft Sediment Cleanup Users Manual II (Ecology, 2013).

[7] The preliminary screening levels for protection of human health and higher trophic ecological receptors presented in this table are the subtidal sediment screening levels from the Mill A RI/FS Work Plan because the interim action dredge prism is below -3 feet mean lower low water (MLLW).

[8] 2-Methylnaphthalene is not included in the summation for total LPAH.

[9] Total chlordane is the sum of cis-chlordane, trans-chlordane, cis-nonachlor, trans-nonachlor, oxychlordane.

[10] Toxicity equivalent factors (TEFs) for dioxin-like PCB congeners will be used as provided in Table 6-4 of the Draft Sediment Cleanup Users Manual II (Ecology, 2013).

[11] Due to the complexity of the project and the likelihood tha the 7-day holding time for porewater tributyltin analysis will not be met, the DMMP agencies are allowing bulk tributyltin analysis as a replacement. Adsorptive losses from tributyltin in bulk sediment samples during an extended holding time should be less than adsorptive losses from porewater.

[12] Dioxin screening levels differ for dispersive and nondispersive disposal sites. Dioxin guidelines are developed and provided in the Dredged Material Management Program's (DMMP's) Dredged Material Evaluation and Disposal Procedures User Manual (July, 2013)

BT = bioaccumulation trigger

DMMP = Dredged Material Management Program

EPA = U.S. Environmental Protection Agency

mg/kg = miligrams per kilogram

mg/kg OC = milligram per kilogram normalized to organic carbon

ML = maximum level

ng/kg = nanograms per kilogram

PSEP = Puget Sound Estuary Program

SL = screening level

µg/kg = micrograms per kilogram

µg/L = micrograms per liter

Shaded cells indicate units are in mg/kg organic carbon (OC) normalized

Table 5

Analytical Methods, Sample Size, Containers, Preservation and Holding Times

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Parameter	Method	Minimum Sample Size (dry weight)	Container Size and Type	Sample Preservation Technique	Holding Time for Indicated Preservation Technique[1]
Grain size	PSEP, 1986 or ASTM D-422 Mod	300 g	16-oz HDPE or ziploc	Cool ≤ 6°C	6 months
Dry-Weight Wood Content	ASTM D-2974 Method C	300g	16-oz HDPE or ziploc	Cool ≤ 6°C	6 months
Total solids	SM2540G	125 g	8-oz WM-Glass or HDPE	Cool ≤ 6°C	14 days
				Freeze -18°C	6 months
Total volatile solids	SM2540G			Cool ≤ 6°C	14 days
				Freeze -18°C	6 months
Total organic carbon	Plumb 1981 et al.			Cool ≤ 6°C	14 days
				Freeze -18°C	6 months
Total Sulfides	PSEP, EPA 376.2 SM 4500-S2	50 g	2-oz WM-Glass	5 to 6 ml of 2 Normal Zinc Acetate per 2-oz jar, Cool ≤ 6°C	7 days
Ammonia	Plumb, 1981, EPA 350.1M	25 g	from TS/TVS container	Cool ≤ 6°C	7 days
Total Metals (Sb, As, Cd, Cr, Cu, Pb, Se, Ag and Zn)	EPA 6010C/6020	50 g	4-oz WM Glass	Cool ≤ 6°C	6 months
				Freeze -18°C	2 years
Mercury	EPA 7471			Freeze -18°C	28 days
SVOCs (including PAHs)/ Pesticides/ Bulk Tributyltin Ion[2]	EPA 8270D/ 8270SIM/Krone/ 8081	200 g	16-oz WM-Glass	Cool ≤ 6°C	14 days until extraction
				Cool ≤ 6°C	40 days after extraction
				Freeze -18°C	1 year until extraction
PCB Congeners	EPA 1668A	100 g	8-oz WM-Glass	Freeze -18°C	1 year until extraction
Dioxins and Furans	EPA 1613	100 g	8-oz WM Amber Glass	Freeze -18°C	1 year until extraction
Bioassay	PSEP, 1995	5 L	5 x 1L WM-Glass or Polyethylene containers/bags	Cool, 4°C, nitrogen atmosphere or no head space	8 weeks
Archive	NA	1 L	min. 16 oz glass	Freeze -18°C	Variable

Notes:

[1] Due to the duration of the sediment core collection field effort and the complexity of completing the sample compositing in the laboratory, the DMMP agencies will allow holding time exceedances for analytical methods with holding times of 7 or 14 days except for analysis of total sulfides. Total sulfides will be collected discretely as described in the SAP and analyzed within the 7-day holding time.

[2] Due to the complexity of the project and the likelihood tha the 7-day holding time for porewater tributyltin analysis will not be met, the DMMP agencies are allowing bulk tributyltin analysis as a replacement. Adsorptive losses from tributyltin in bulk sediment samples during an extended holding time should be less than adsorptive losses from porewater.

Preservation temperature of ≤ 6°C is referenced by NPDES Updated Rule, DOD, and SW846-Online (EPA).

ASTM = American Society for Testing and Materials

EPA = Environmental Protection Agency

g = gram

HDPE = High-density polyethylene

L = liter

NA = not applicable

oz =ounce

PAHs = Polycyclic Aromatic Hydrocarbons

PCBs = Polychlorinated Biphenyls

PSEP = Puget Sound Estuary Program

SVOC = Semivolatile Organic Compound

WM = wide mouth

Table 6

Laboratory QA/QC Requirements for Conventionals and COCs

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Analysis Type	Method Blanks[1]	Replicates[1]	Triplicates[1]	CRM/RM	MS/MSD[1]	Surrogates[2]
Semivolatiles[3,4]	X[5]	X[6]		X	X	X
Pesticides[3,4]	X[5]	X[6]		X	X	X
PCBs[3,4]	X[5]	X[6]		X[7]	X	X
Metals	X	X		X	X	
Ammonia	X		X			
Total Sulfides	X		X			
Total Organic Carbon	X		X	X		
Total Solids			X			
Total Volatile Solids			X			
Grain Size			X			
Tributyltin[8]	X	X[6]			X	X
Dioxin	See Table 8					

Notes:

[1] Frequency of Analysis (FOA) = 5 percent or one per batch, whichever is more frequent.

[2] Surrogate spikes required for every sample, including matrix spiked samples, blanks, and reference materials.

[3] Initial calibrations required before any samples are analyzed, after each major disruption of equipment, and when ongoing calibration fails to meet criteria.

[4] Ongoing calibration required at the beginning of each work shift, every 10–12 samples or every 12 hours (whichever is more frequent), and at the end of each shift.

[5] FOA = one per extraction batch.

[6] Matrix spike duplicates may be used.

[7] The Puget Sound Sediment Reference Material must be used.

[8] See Table 10 for additional detail on tributyltin QC procedures.

PCBs = polychlorinated biphenyls

CRM = Certified Reference Material

MS/MSD = matrix spike/matrix spike duplicate

RM = Reference Material

QA/QC = quality assurance/quality control

Table 7

DMMP Warning and Action Limits for Conventionals and Standard COCs

Mill A Former Site Interim Action Dredging Project
Everett, Washington

QA Elements	Warning Limits	Action Limits
Precision		
Conventionals:	None	20% coefficient of variation (CV)
Metals:	None	20% relative percent difference (RPD) or CV
Organics:	35% RPD or CV	50% CV or a factor of 2 for duplicates
Accuracy: Matrix Spikes		
Metals:	None	75-125% recovery
Organics:		none (zero percent recovery may be cause for data rejection however)[1]
Volatiles:	70-150% recovery	
Semivolatiles and Pesticides:	50-150% recovery	
Reference Materials		
Metals:	None	95% CI if specified for a particular CRM; 80-120% recovery if not.
Semivolatiles and Pesticides:	None	95% CI for CRMs. No action limit for uncertified RMs.
PCBs:	PS-SRM advisory limits	None at this time
Surrogate Spikes		
Organics:		EPA CLP chemical-specific recovery limits
Volatiles:	85% minimum recovery	
Pesticides:	60% minimum recovery	
Semi-volatiles:	50% minimum recovery	

Notes:

[1] Rigorous control limits are not recommended due to possible matrix effects and interferences.

CI = confidence interval

COC = contaminant of concern

DMMP = Dredged Material Management Program

EPA CLP = Environmental Protection Agency Contract Lab Program

QA = quality assurance

Table 8

Summary of Quality Control Procedures for Dioxin Analysis

Mill A Former Site Interim Action Dredging Project
Everett, Washington

QC Check	Minimum Frequency	Acceptance Criteria	Laboratory Corrective Action*
Ongoing Precision And Recovery	1 per analytical batch (≤ 20 samples)	Recovery within acceptance criteria in Table 8-8 of the QAPP guidance document	1. Check calculations 2. Reanalyze batch
Stable-isotope-labeled compounds	Spiked into each sample for every target analyte	Recovery within limits in Table 8-8	1. Check calculations 2. Qualify all associated results as estimated
		Ion abundance ratios must be within criteria in Table 9 of method 1613B	1. Reanalyze specific samples. 2. Reject all affected results outside the criteria 3. Alternatively, use of secondary ions that meet appropriate theoretical criteria is allowed if interferences are suspect. This alternative must be approved by the DMMP agencies.
Laboratory duplicate	5% or 1 per batch (≤ 20 samples)	Relative percent Difference ≤ 30%	1. Evaluation of the homogenization procedure and evaluation method 2. Reanalyze batch
Method blank	1 per analytical batch (≤ 20 samples)	Detection ≤ minimum level in Table 2 of Method 1613B	1. If the method blank results are greater than the reporting limit, halt analysis and find source of contamination; reanalyze batch. 2. Report project samples as non- detected for results ≤ to the reported method blank values
GC/MS Tune	At the beginnings of each 12 hour shift. Must start and end each analytical sequence.	>10,000 resolving power @ m/z304.9825 Exact mass of 380.9760 within 5 ppm of theoretical value.	1. Re-analyze affected samples 2. Reject all data not meeting method 1613B requirements
Initial Calibration	Initially and when continuing calibration fails.	Five point curve for all analytes. RSD must meet Table 4 requirements for all target compounds and labeled compounds. Signal to noise ratio (S/N) >10. Ion abundance (IA) ratios within method specified limits.	
Window Defining/Column Performance Mix	Before every initial and continuing calibration.	Valley <25% for all peaks near 2378-TCDD/F peaks.	
Continuing Calibration	Must start and end each analytical sequence.	%D must meet Table 4 limits for target compounds & labeled compounds. S/N >10. IA ratios within method specified limits.	
Confirmation of 2,3,7,8- TCDF	For all primary-column detections of 2,3,7,8- TCDF	Confirmation presence of 2,3,7,8-TCDF in accordance with method 1613B requirements	Failure to verify presence of 2,3,7,8-TCDF by second column confirmation requires qualification of associated 2,3,7,8- TCDF results as non-detected at the associated value.
Sample data not achieving target reporting limits or method performance in presence of possibly interfering compounds	Not applicable	Not applicable	Rather than simply dilute an extract to reduce interferences, the lab should perform additional cleanup techniques identified in the method to insure minimal matrix effects and background interference. Thereafter, dilution may occur. If re-analysis is required, the laboratory shall report both initial and re-analysis results.
Puget Sound Sediment Reference Material	One per analytical batch	Result must be within acceptance ranges	1. Extraction and analysis should be evaluated by the lab and re- analysis performed of the entire sample batch once performance criteria can be met. 2. If analysis accompanies several batches with acceptable PS-SRM results, then the laboratory can narrate possible reason for PS- SRM outliers.

Notes:

[1] If re-analysis is required, the laboratory shall report initial and re-analysis results.

Table 9

QC Acceptance Criteria for PCDD/F

Mill A Former Site Interim Action Dredging Project
Everett, Washington

	Test Conc. (ng/mL)[1]	IPR[2]		OPR[3] (%)	I- CAL[4] %	CAL/VER[5] (%) (Coeff. of Variation)	Labeled Compound % Recovery in Sample	
		RSD (%)	Recovery				Warning Limit	Control Limit
Native Compound								
2,3,7,8-TCDD	10	28	83-129	70-130	20	78-129	-	-
2,3,7,8-TCDF	10	20	87-137	75-130	20	84-120	-	-
1,2,3,7,8-PeCDD	50	15	76-132	70-130	20	78-130	-	-
1,2,3,7,8-PeCDF	50	15	86-124	80-130	20	82-120	-	-
2,3,4,7,8-PeCDF	50	17	72-150	70-130	20	82-122	-	-
1,2,3,4,7,8-HxCDD	50	19	78-152	70-130	20	78-128	-	-
1,2,3,6,7,8-HxCDD	50	15	84-124	76-130	20	78-128	-	-
1,2,3,7,8,9-HXCDD	50	22	74-142	70-130	35	82-122	-	-
1,2,3,4,7,8-HxCDF	50	17	82-108	72-130	20	90-112	-	-
1,2,3,6,7,8-HxCDF	50	13	92-120	84-130	20	88-114	-	-
1,2,3,7,8,9-HxCDF	50	13	84-122	78-130	20	90-112	-	-
2,3,4,6,7,8-HxCDF	50	15	74-158	70-130	20	88-114	-	-
1,2,3,4,6,7,8-HpCDD	50	15	76-130	70-130	20	86-116	-	-
1,2,3,4,6,7,8-HpCDF	50	13	90-112	82-122	20	90-110	-	-
1,2,3,4,7,8,9-HpCDF	50	16	86-126	78-130	20	86-116	-	-
OCDD	100	19	86-126	78-130	20	79-126	-	-
OCDF	100	27	74-146	70-130	35	70-130	-	-
Labeled Compounds								
13C12-2,3,7,8-TCDD	100	37	28-134	25-130	35	82-121	40-120	25-130
13C12-2,3,7,8-TCDF	100	35	31-113	25-130	35	71-130	40-120	24-130
13C12-1,2,3,7,8-PeCDD	100	39	27-184	25-150	35	70-130	40-120	25-130
13C12-1,2,3,7,8-PeCDF	100	34	27-156	25-130	35	76-130	40-120	24-130
13C12-2,3,4,7,8-PeCDF	100	38	16-279	25-130	35	77-130	40-120	21-130
13C12-1,2,3,4,7,8-HxCDD	100	41	29-147	25-130	35	85-117	40-120	32-130
13C12-1,2,3,6,7,8-HxCDD	100	38	34-122	25-130	35	85-118	40-120	28-130
13C12-1,2,3,4,7,8-HxCDF	100	43	27-152	25-130	35	76-130	40-120	26-130
13C12-1,2,3,6,7,8-HxCDF	100	35	30-122	25-130	35	70-130	40-120	26-123
13C12-1,2,3,7,8,9-HxCDF	100	40	24-157	25-130	35	74-130	40-120	29-130
13C12-2,3,4,6,7,8-HxCDF	100	37	29-136	25-130	35	73-130	40-120	28-130
13C12-1,2,3,4,6,7,8-HpCDD	100	35	34-129	25-130	35	72-130	40-120	23-130
13C12-1,2,3,4,6,7,8-HpCDF	100	41	32-110	25-130	35	78-129	40-120	28-130
13C12-1,2,3,4,7,8,9-HpCDF	100	40	28-141	25-130	35	77-129	40-120	26-130
13C12-OCDD	200	48	20-138	25-130	35	70-130	25-120	17-130
Cleanup Standard								
37Cl4-2,3,7,8-TCDD	10	36	39-154	31-130	35	79-127	40-120	35-130

Notes:

[1] QC acceptance criteria for IPR, OPR and samples based on a 20 µL extract final volume.

[2] IPR: Initial Precision and Recovery demonstration

[3] OPR: Ongoing Precision and Recovery test run with every batch of samples.

[4] I-CAL: Initial calibration

[5] CAL/VER: Calibration Verification test run at least every 12 hours

Table 10

Summary of Quality Control Procedures for Tributyltin

Mill A Former Site Interim Action Dredging Project
Everett, Washington

QC Check	Minimum Frequency	Acceptance Criteria	Corrective Action
Laboratory Control Sample (LCS) [1]	1 per analytical batch (≤ 20 samples)	Recovery 50 – 150%	1. Check calculations 2. Reanalyze (matrix or injection problems) 3. If still out, re-extract and reanalyze LCS and assoc. samples (if available); If not available flag data.
Matrix spike (MS) and matrix spike duplicate (MSD) [1]	1 MS/MSD pair per analytical batch (≤ 20 samples)	Recovery 50 – 150% and relative percent difference (RPD) ≤ 30%	1. Evaluate for supportable matrix effect. 2. If no interference, re- extract and reanalyze MS/MSD once (if available). 3. If still out, report both sets of data.
Surrogate spike [1] (Tripentyltin recommended)	1 per sample	Recovery 50 – 150%	1. Check calculations. 2. Evaluate for supportable matrix effect 3. If no interference is evident, re-extract and reanalyze affected sample(s) (if available) and flag any outliers.
Method blank[2]	1 per analytical batch (≤ 20 samples)	Target analyte < 3x the reporting limit (RL)	1. Flag if target > 3x RL but less than 0.075 ppb.[3] 2. Rerun batch and ID contamination source if target >0.075 ppb.

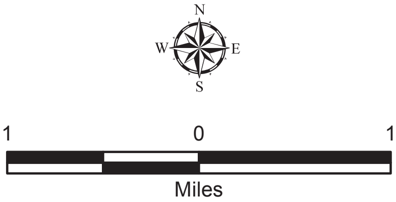
Notes:

[1] All QC samples should be run using the same sample handling as is used on the environmental samples.

[2] Method blank can include centrifugation step or, alternatively a centrifugation blank can be run separately from the analytical method blank.

[3] 0.075 ppb tributyltin (TBT) is used here as a benchmark for evaluating blank performance because it represents a concentration that is one-half the interstitial water screening level (0.15 ppb) that is being used by the DMMP agencies to determine the need for bioaccumulation testing.

FIGURES



Notes:
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Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Vicinity Map

Weyerhaeuser Mill A Former Site
Everett, Washington

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Figure 1

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\067602001_DNR_VicinityMap.mxd   Map Revised: 13 December 2012   amanza

Data Source: Base aerial from Bing Maps, 2011.
Bathymetry from Walker & Associates survey, 2006.

Notes:
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Legend

🟩	Parcel Boundary
▨	Area Managed By the Port of Everett Under PMA No. 20-08-0027 With the DNR
PMA	Port Management Agreement
DNR	Department of Natural Resources

300 0 300
Feet

Property Boundaries

Weyerhaeuser Mill A Former Site
Everett, Washington

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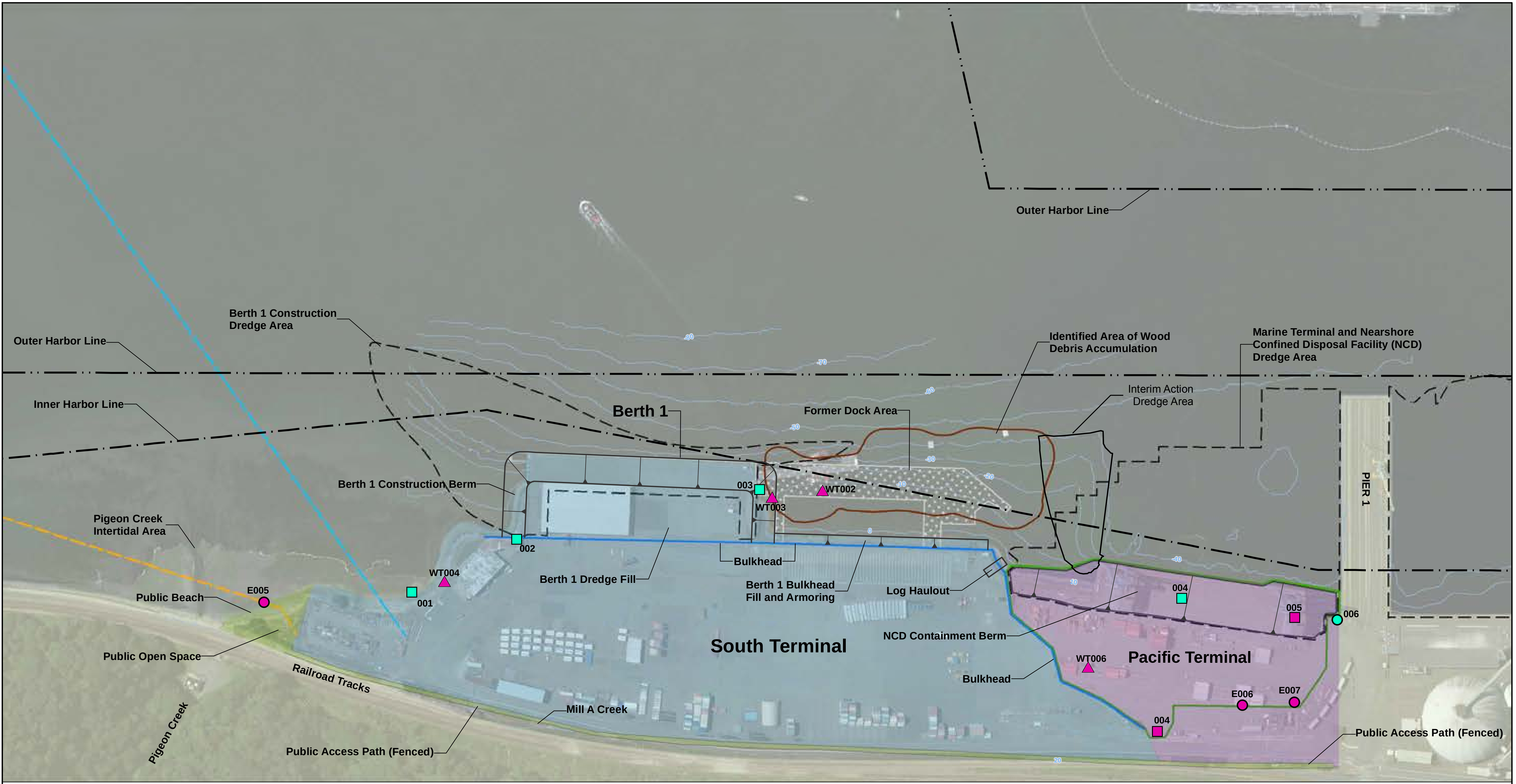
Figure 2

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\067602001_DNR_PropertyLayout.mxd Map Revised: 06 November 2014 cgonzales



Legend

- ▭ South Terminal
- ▭ Pacific Terminal
- ▭ Open Space/Beach/Access Path
- Construction Berm
- ▭ Identified Area of Wood Debris Accumulation
- ▭ Historical Piling Area
- Dredged Area
- ▭ Nearshore Confined Disposal (NCD) Facility
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead
- Bathymetric and Topographic Contour (10ft, MLLW)
- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ○ Current CSO
- □ Current Stormwater Outfall

Data Source: Base aerial from Bing Maps, 2011.
Topography and bathymetry from Walker & Associates Survey, 2006.
Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

300 0 300
Feet

Current Property Conditions

Weyerhaeuser Mill A Former Site
Everett, Washington

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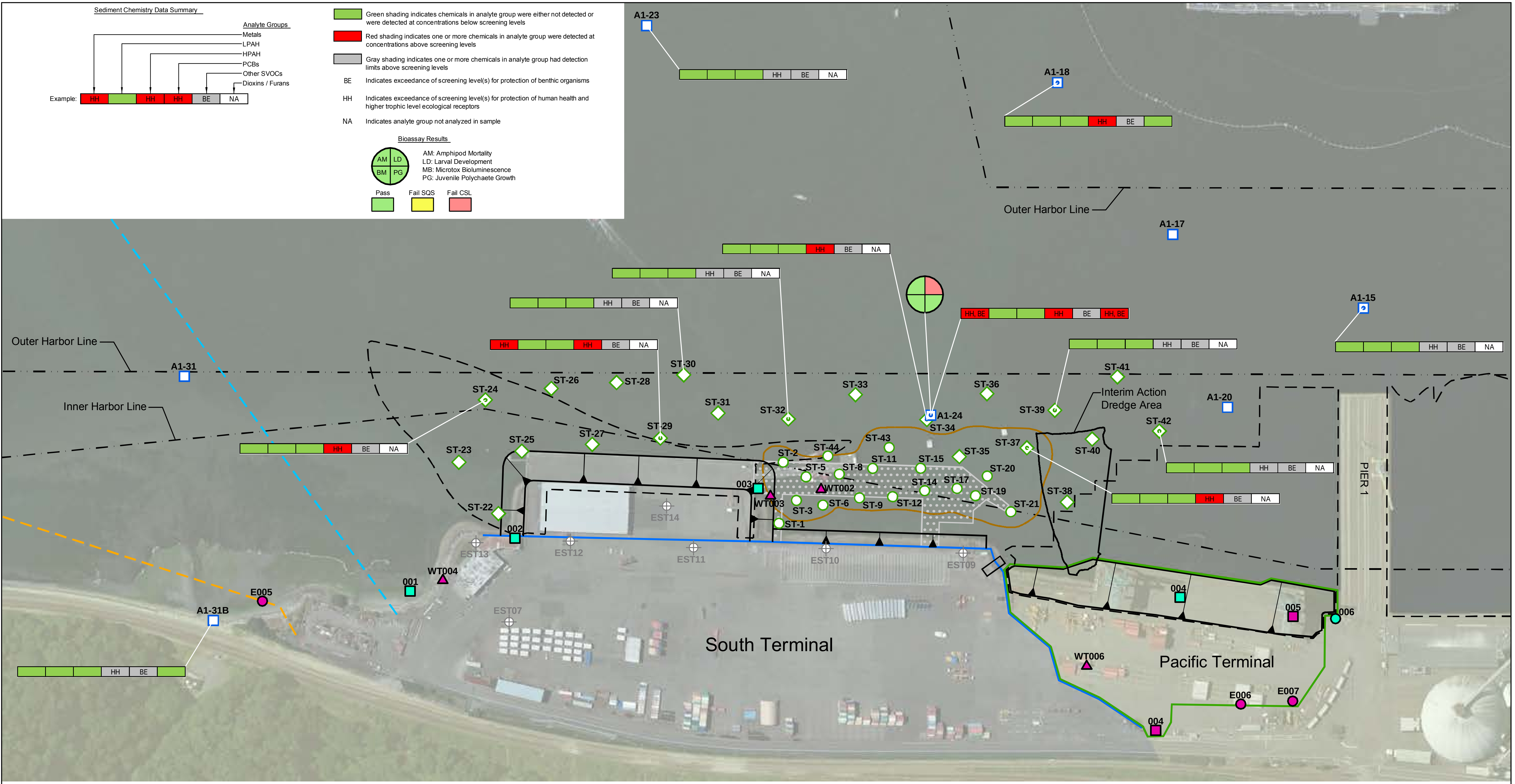
Figure 3

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\0676020001_DNR_CurrentSiteConditions.mxd Map Revised: 06 November 2014 cgonzales

SEAT:IHW : TJM



Sediment Chemistry Data Summary

Analyte Groups
- Metals
- LPAH
- HPAH
- PCBs
- Other SVOCs
- Dioxins / Furans

Example: HH HH HH BE NA

🟩	Green shading indicates chemicals in analyte group were either not detected or were detected at concentrations below screening levels
🟥	Red shading indicates one or more chemicals in analyte group were detected at concentrations above screening levels
⬜	Gray shading indicates one or more chemicals in analyte group had detection limits above screening levels
BE	Indicates exceedance of screening level(s) for protection of benthic organisms
HH	Indicates exceedance of screening level(s) for protection of human health and higher trophic level ecological receptors
NA	Indicates analyte group not analyzed in sample

Bioassay Results

AM | LD
BM | PG

AM: Amphipod Mortality
LD: Larval Development
MB: Microtox Bioluminescence
PG: Juvenile Polychaete Growth

Pass	Fail SQS	Fail CSL
🟩	🟨	🟥

300 0 300
Feet

Data Source: Base aerial from Aerials Express Seattle, 2009.

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Legend

Ecology Port Gardner Sediment Investigation Locations (August 2008)
- □ Surface Sediment Sample Location Only
- ▣ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)
- ◇ Surface Sediment Sample Location Only
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

Port of Everett Mill A Upland Investigation Locations (January 2010)
- ⌖ Soil Boring and Monitoring Well Location

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall
- Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead

Surface Sediment Results Summary

Weyerhaeuser Mill A Former Site
Everett, Washington

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Figure 4

P:\0\0676020\03\CAD\SAP\067602003_F4.dwg\TAB:F18 modified on Dec 10, 2014 - 4:10pm

SEAT:IHW : TJM

P:\0\0676020\03\CAD\SAP\0676020003_F5.dwg\TAB:F19 modified on Dec 10, 2014 - 4:11pm

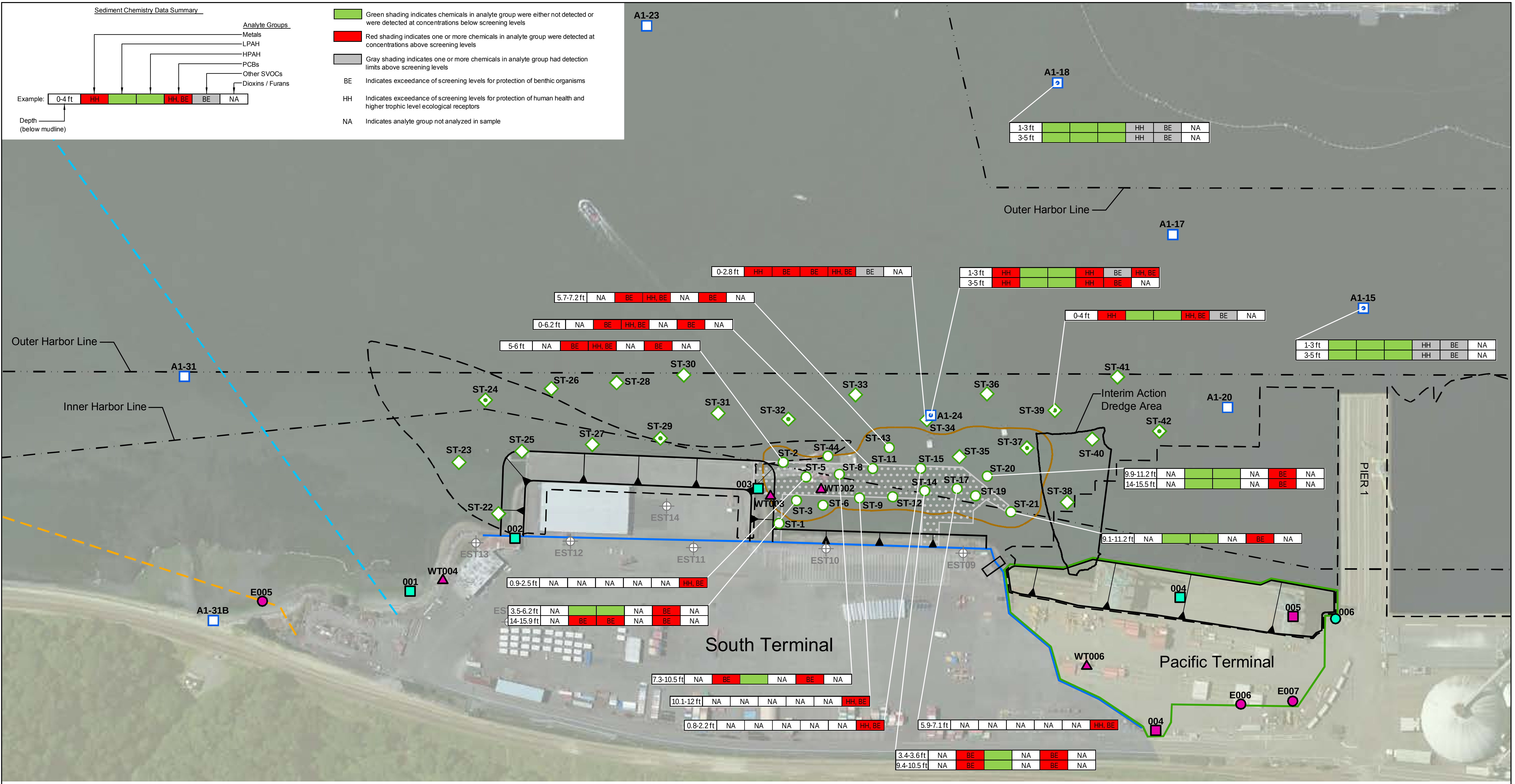
Sediment Chemistry Data Summary

Analyte Groups
- Metals
- LPAH
- HPAH
- PCBs
- Other SVOCs
- Dioxins / Furans

Example:	0-4 ft	HH	🟩	🟩	HH, BE	BE	NA

Depth (below mudline)

🟩	Green shading indicates chemicals in analyte group were either not detected or were detected at concentrations below screening levels
🟥	Red shading indicates one or more chemicals in analyte group were detected at concentrations above screening levels
▨	Gray shading indicates one or more chemicals in analyte group had detection limits above screening levels
BE	Indicates exceedance of screening levels for protection of benthic organisms
HH	Indicates exceedance of screening levels for protection of human health and higher trophic level ecological receptors
NA	Indicates analyte group not analyzed in sample



1-3 ft	🟩	🟩	🟩	HH	BE	NA
3-5 ft	🟩	🟩	🟩	HH	BE	NA

0-2.8 ft	HH	BE	BE	HH, BE	BE	NA

5.7-7.2 ft	NA	BE	HH, BE	NA	BE	NA

0-6.2 ft	NA	BE	HH, BE	NA	BE	NA

5-6 ft	NA	BE	HH, BE	NA	BE	NA

1-3 ft	HH	🟩	🟩	HH	BE	HH, BE
3-5 ft	HH	🟩	🟩	HH	BE	NA

0-4 ft	HH	🟩	🟩	HH, BE	BE	NA

1-3 ft	🟩	🟩	🟩	HH	BE	NA
3-5 ft	🟩	🟩	🟩	HH	BE	NA

9.9-11.2 ft	NA	🟩	🟩	NA	BE	NA
14-15.5 ft	NA	🟩	🟩	NA	BE	NA

9.1-11.2 ft	NA	🟩	🟩	NA	BE	NA

0.9-2.5 ft	NA	NA	NA	NA	NA	HH, BE

3.5-6.2 ft	NA	🟩	🟩	NA	BE	NA
14-15.9 ft	NA	BE	BE	NA	BE	NA

7.3-10.5 ft	NA	BE	🟩	NA	BE	NA

10.1-12 ft	NA	NA	NA	NA	NA	HH, BE

0.8-2.2 ft	NA	NA	NA	NA	NA	HH, BE

5.9-7.1 ft	NA	NA	NA	NA	NA	HH, BE

3.4-3.6 ft	NA	BE	🟩	NA	BE	NA
9.4-10.5 ft	NA	BE	🟩	NA	BE	NA

300 0 300

Feet

Data Source: Base aerial from Aerials Express Seattle, 2009.

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Legend

Ecology Port Gardner Sediment Investigation Locations (August 2008)
- ☐ Surface Sediment Sample Location Only
- ▣ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)
- ◇ Surface Sediment Sample Location Only
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

Port of Everett Mill A Upland Investigation Locations (January 2010)
- ⌖ Soil Boring and Monitoring Well Location

Construction Berm
Identified Area of Wood Debris Accumulation
Historical Piling Area
Dredged Area
Nearshore Confined Disposal (NCD) Facility
Current Kimberly-Clark/City of Everett/City of Marysville Outfall 100 (approximate)
Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
Bulkhead

▲ Historical Industrial Outfall
● Former Combined Sewer Outfall (CSO)
■ Former Stormwater Outfall
● Current CSO
■ Current Stormwater Outfall

Subsurface Sediment Results Summary

Weyerhaeuser Mill A Former Site
Everett, Washington

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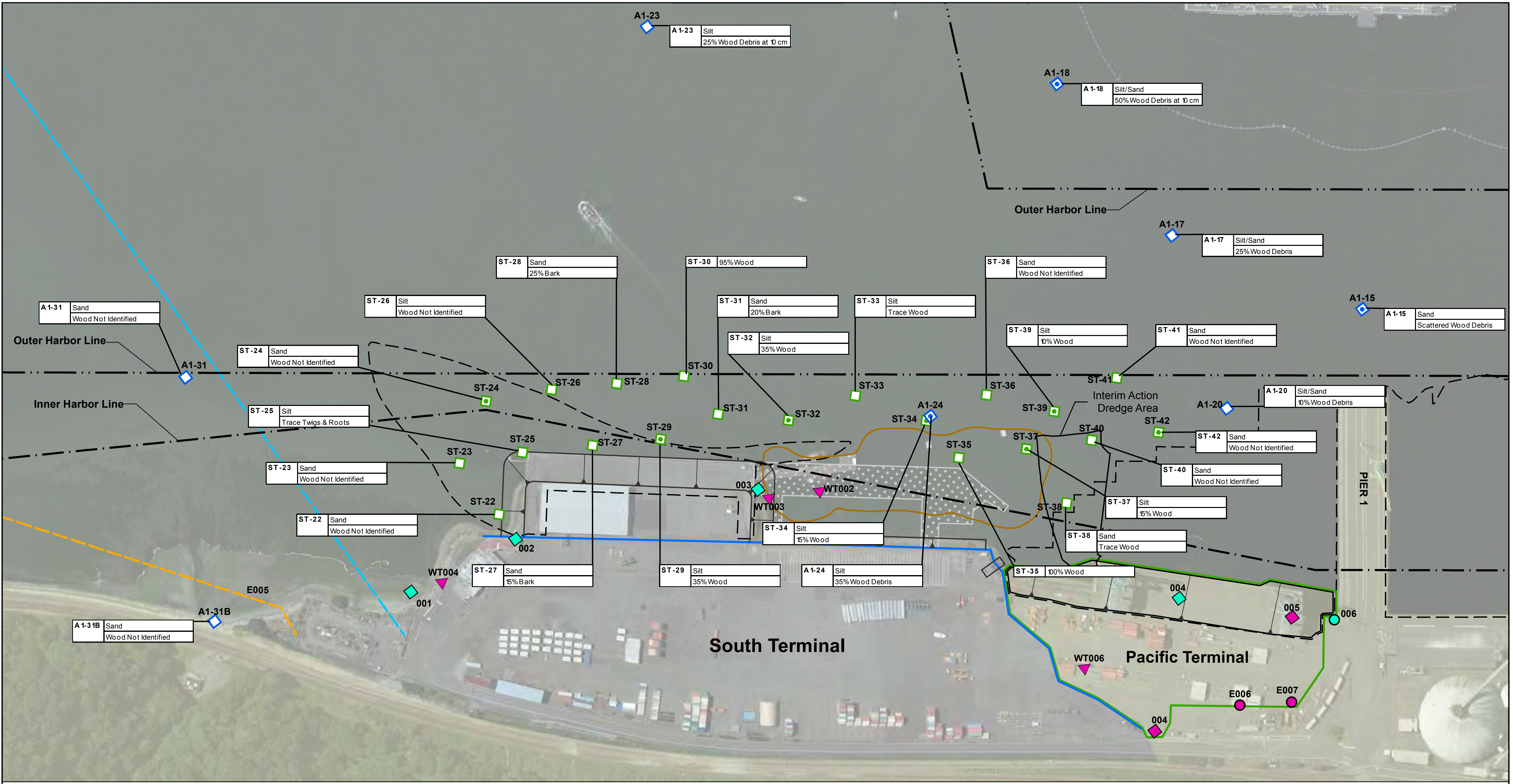
Figure 5



300 0 300
Feet

Data Source: Base aerial from Esri World Imagery; Aerials Express Seattle, 2009.

Notes:
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Legend

Location	Predominant Component of Sample Wood Observation

Ecology Port Gardner Sediment Investigation Locations (August 2008)
- ☐ Surface Sediment Sample Location Only
- ▣ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)
- ◇ Surface Sediment Sample Location Only
- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location

- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Bulkhead
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ○ Current CSO
- ■ Current Stormwater Outfall

Observed Wood Debris in Surface Sediment

Weyerhaeuser Mill A Former Site
Everett, Washington

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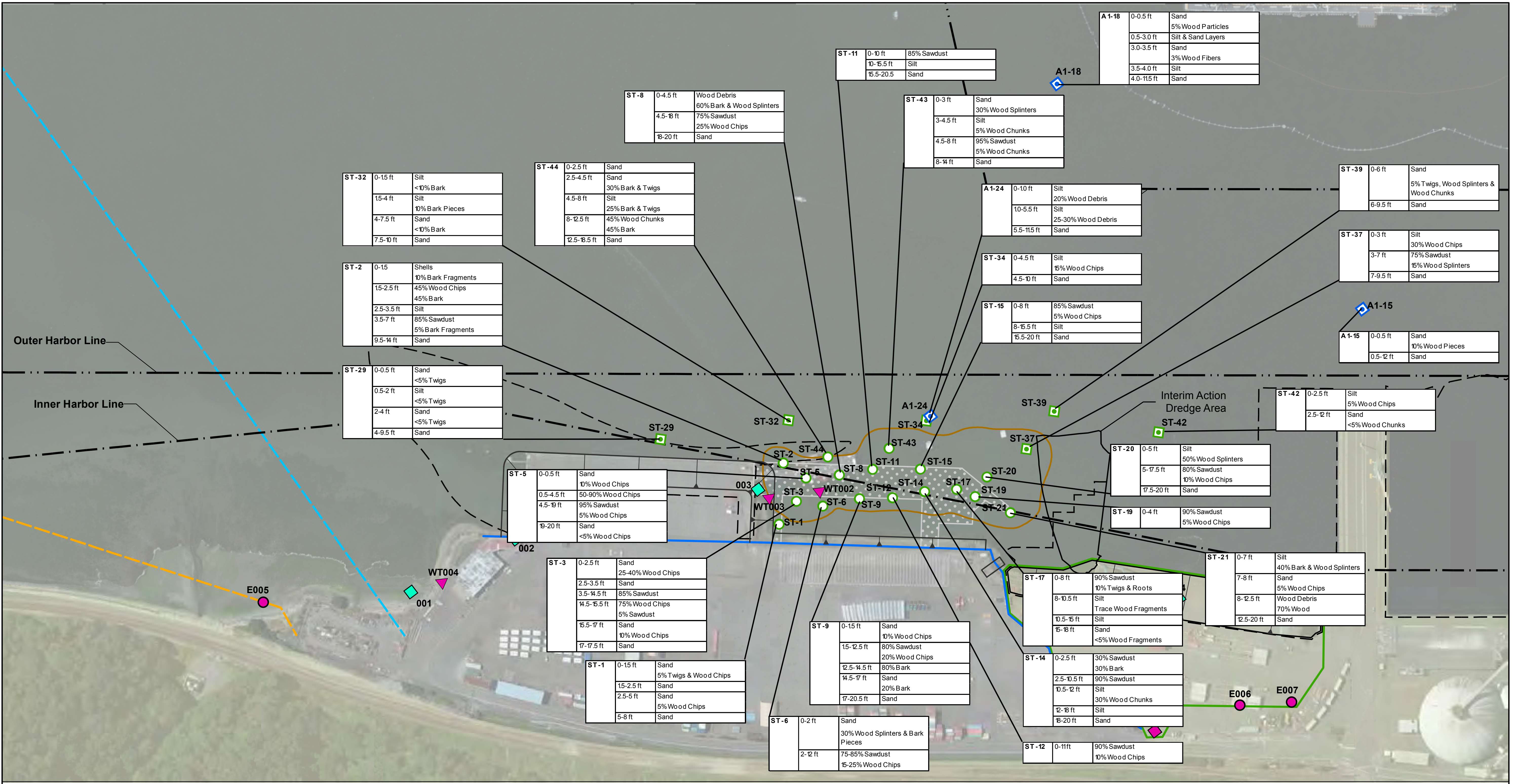
Figure 6

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\067602001_DNR_Wood_SurfaceSediment.mxd Map Revised: 06 November 2014 cgonzales



A 1-18	0-0.5 ft	Sand 5% Wood Particles
	0.5-3.0 ft	Silt & Sand Layers
	3.0-3.5 ft	Sand 3% Wood Fibers
	3.5-4.0 ft	Silt
	4.0-11.5 ft	Sand

ST-11	0-10 ft	85% Sawdust
	10-15.5 ft	Silt
	15.5-20.5	Sand

ST-8	0-4.5 ft	Wood Debris 60% Bark & Wood Splinters
	4.5-18 ft	75% Sawdust 25% Wood Chips
	18-20 ft	Sand

ST-43	0-3 ft	Sand 30% Wood Splinters
	3-4.5 ft	Silt 5% Wood Chunks
	4.5-8 ft	95% Sawdust 5% Wood Chunks
	8-14 ft	Sand

ST-44	0-2.5 ft	Sand
	2.5-4.5 ft	Sand 30% Bark & Twigs
	4.5-8 ft	Silt 25% Bark & Twigs
	8-12.5 ft	45% Wood Chunks 45% Bark
	12.5-18.5 ft	Sand

ST-32	0-1.5 ft	Silt <10% Bark
	1.5-4 ft	Silt 10% Bark Pieces
	4-7.5 ft	Sand <10% Bark
	7.5-10 ft	Sand

ST-39	0-6 ft	Sand 5% Twigs, Wood Splinters & Wood Chunks
	6-9.5 ft	Sand

A 1-24	0-1.0 ft	Silt 20% Wood Debris
	1.0-5.5 ft	Silt 25-30% Wood Debris
	5.5-11.5 ft	Sand

ST-37	0-3 ft	Silt 30% Wood Chips
	3-7 ft	75% Sawdust 15% Wood Splinters
	7-9.5 ft	Sand

ST-34	0-4.5 ft	Silt 15% Wood Chips
	4.5-10 ft	Sand

ST-2	0-1.5	Shells 10% Bark Fragments
	1.5-2.5 ft	45% Wood Chips 45% Bark
	2.5-3.5 ft	Silt
	3.5-7 ft	85% Sawdust 5% Bark Fragments
	9.5-14 ft	Sand

ST-15	0-8 ft	85% Sawdust 5% Wood Chips
	8-15.5 ft	Silt
	15.5-20 ft	Sand

A 1-15	0-0.5 ft	Sand 10% Wood Pieces
	0.5-12 ft	Sand

ST-29	0-0.5 ft	Sand <5% Twigs
	0.5-2 ft	Silt <5% Twigs
	2-4 ft	Sand <5% Twigs
	4-9.5 ft	Sand

ST-42	0-2.5 ft	Silt 5% Wood Chips
	2.5-12 ft	Sand <5% Wood Chunks

ST-20	0-5 ft	Silt 50% Wood Splinters
	5-17.5 ft	80% Sawdust 10% Wood Chips
	17.5-20 ft	Sand

ST-5	0-0.5 ft	Sand 10% Wood Chips
	0.5-4.5 ft	50-90% Wood Chips
	4.5-19 ft	95% Sawdust 5% Wood Chips
	19-20 ft	Sand <5% Wood Chips

ST-19	0-4 ft	90% Sawdust 5% Wood Chips

ST-21	0-7 ft	Silt 40% Bark & Wood Splinters
	7-8 ft	Sand 5% Wood Chips
	8-12.5 ft	Wood Debris 70% Wood
	12.5-20 ft	Sand

ST-3	0-2.5 ft	Sand 25-40% Wood Chips
	2.5-3.5 ft	Sand
	3.5-14.5 ft	85% Sawdust
	14.5-15.5 ft	75% Wood Chips 5% Sawdust
	15.5-17 ft	Sand 10% Wood Chips
	17-17.5 ft	Sand

ST-17	0-8 ft	90% Sawdust 10% Twigs & Roots
	8-10.5 ft	Silt Trace Wood Fragments
	10.5-15 ft	Silt
	15-18 ft	Sand <5% Wood Fragments

ST-9	0-1.5 ft	Sand 10% Wood Chips
	1.5-12.5 ft	80% Sawdust 20% Wood Chips
	12.5-14.5 ft	80% Bark
	14.5-17 ft	Sand 20% Bark
	17-20.5 ft	Sand

ST-1	0-1.5 ft	Sand 5% Twigs & Wood Chips
	1.5-2.5 ft	Sand
	2.5-5 ft	Sand 5% Wood Chips
	5-8 ft	Sand

ST-14	0-2.5 ft	30% Sawdust 30% Bark
	2.5-10.5 ft	90% Sawdust
	10.5-12 ft	Silt 30% Wood Chunks
	12-18 ft	Silt
	18-20 ft	Sand

ST-6	0-2 ft	Sand 30% Wood Splinters & Bark Pieces
	2-12 ft	75-85% Sawdust 15-25% Wood Chips

ST-12	0-11 ft	90% Sawdust 10% Wood Chips

Data Source: Base aerial from Bing Maps, 2011.

Notes:
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Legend

Location	Depth	Predominant Component Wood Observation
	Depth	Predominant Component Wood Observation

Ecology Port Gardner Sediment Investigation Locations (August 2008)

- ▣ Surface Sediment and Sediment Core/Subsurface Sample Location

Port of Everett Mill A Sediment Investigation Locations (May 2007)

- ◈ Surface Sediment and Sediment Core/Subsurface Sample Location
- ○ Sediment Core/Subsurface Sample Location Only

- Construction Berm
- ▭ Identified Area of Wood Debris Accumulation
- ▨ Historical Piling Area
- Dredged Area
- ▭ Nearshore Confined Disposal (NCD) Facility
- — Bulkhead
- – – Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- – – Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)

- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ● Current CSO
- ■ Current Stormwater Outfall

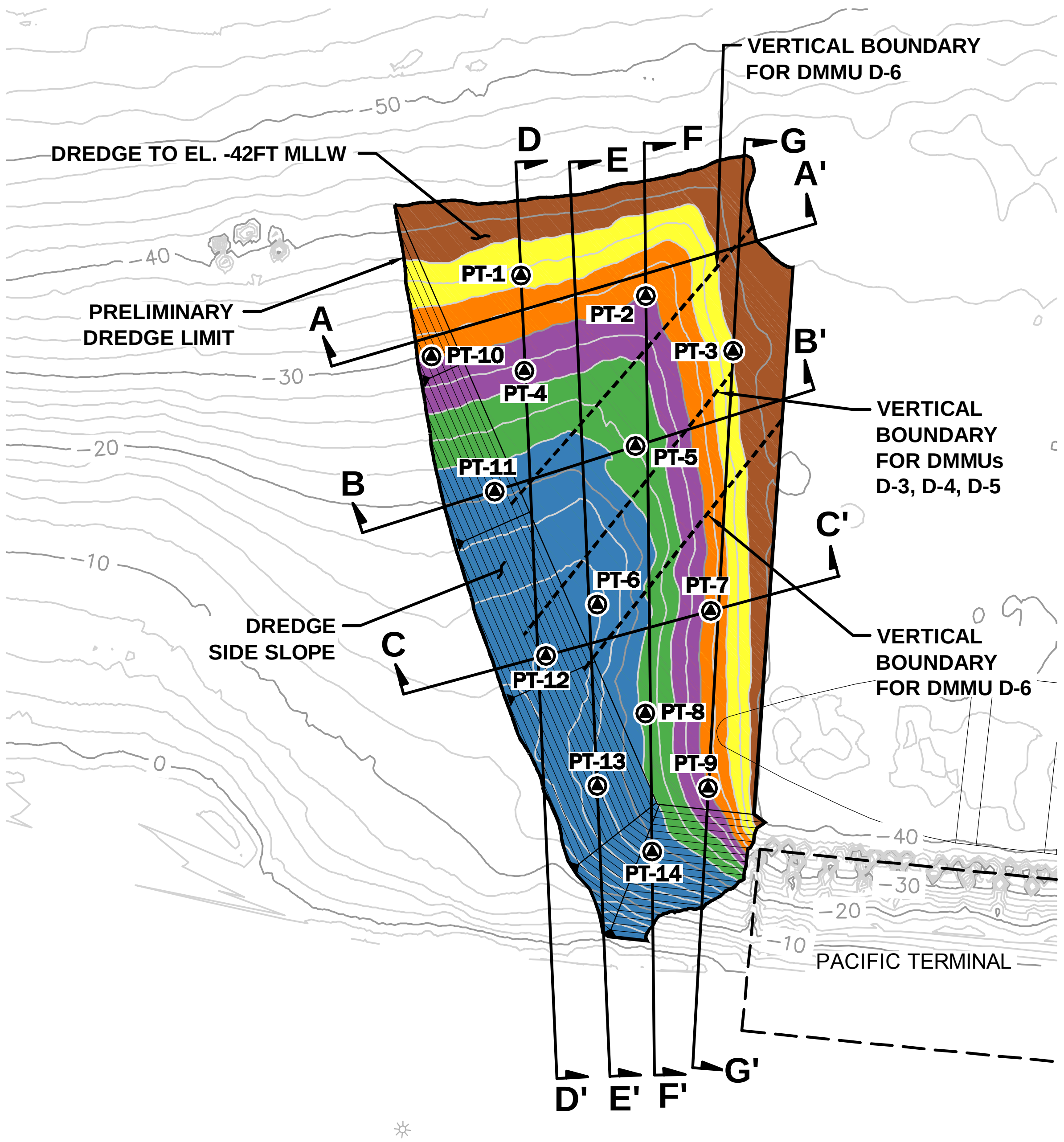
Observed Wood Debris in SubSurface Sediment

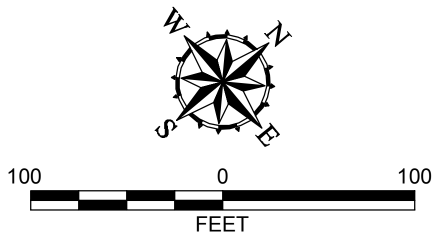
Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 7

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\067602001_DNR_Wood_SubSurfaceSediment.mxd Map Revised: 06 November 2014 cgonzales





Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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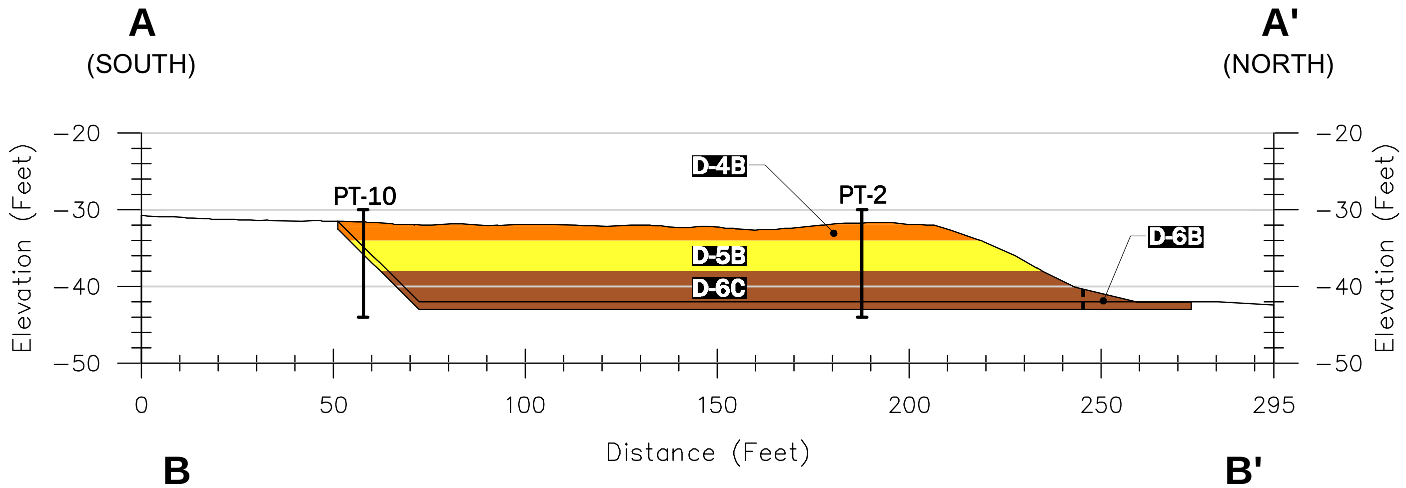
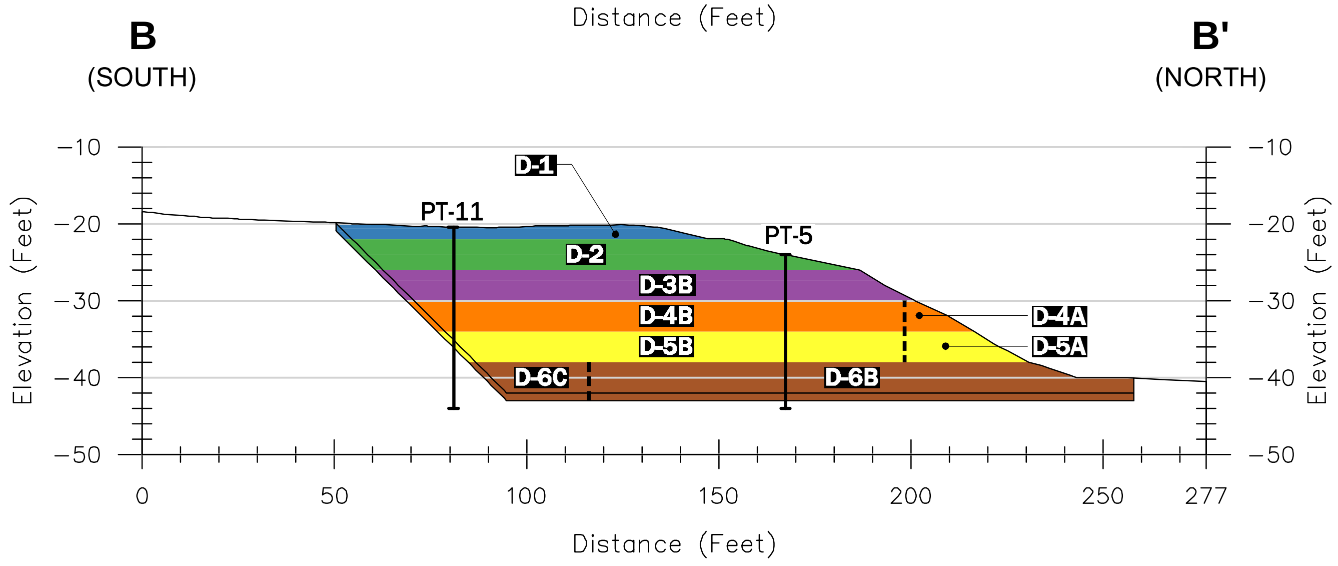
Legend

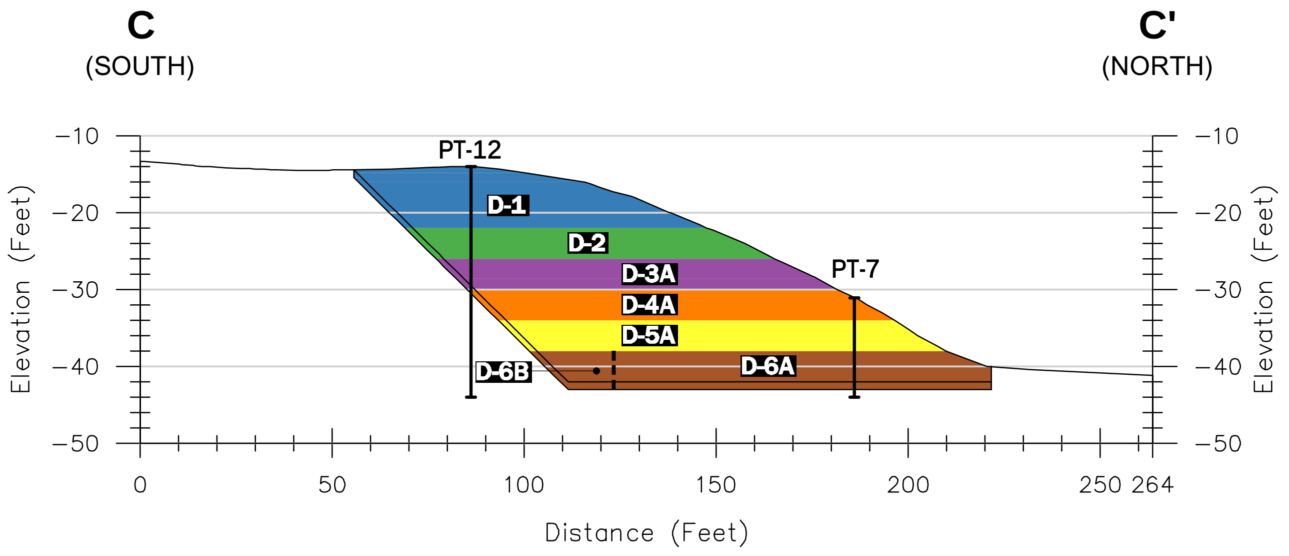
PT-1 ⊛	Proposed Sediment Core Location
- - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
A ⌐ ¬ A'	Cross-Section Location

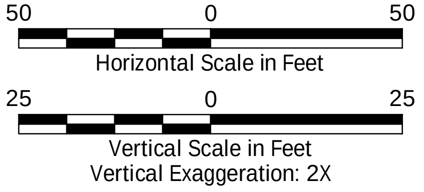
DMMU Elevation Boundaries

🟦	Existing Grade to -22 feet MLLW
🟩	-22 to -26 feet MLLW
🟪	-26 to -30 feet MLLW
🟧	-30 to -34 feet MLLW
🟨	-34 to -38 feet MLLW
🟫	-38 to -43 feet MLLW









Sampling Plan and Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Everett, Washington

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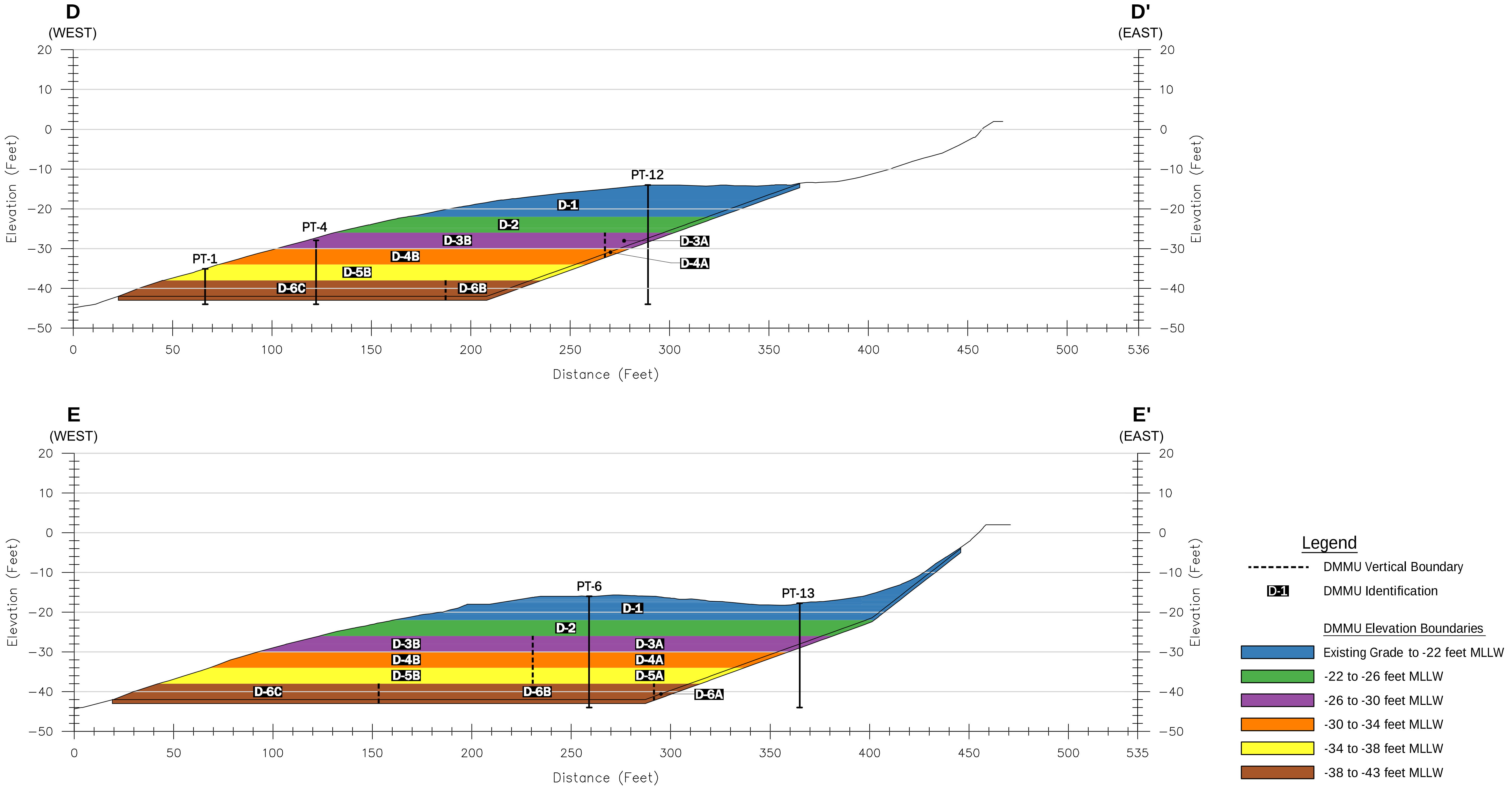
Figure 8

P:\0\0676020\03\CAD\SAP\SAP SITE PLAN AND SECTIONS.DWG\TAB:AA CC MODIFIED BY TMICHAUD ON DEC 16, 2014 - 9:28



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

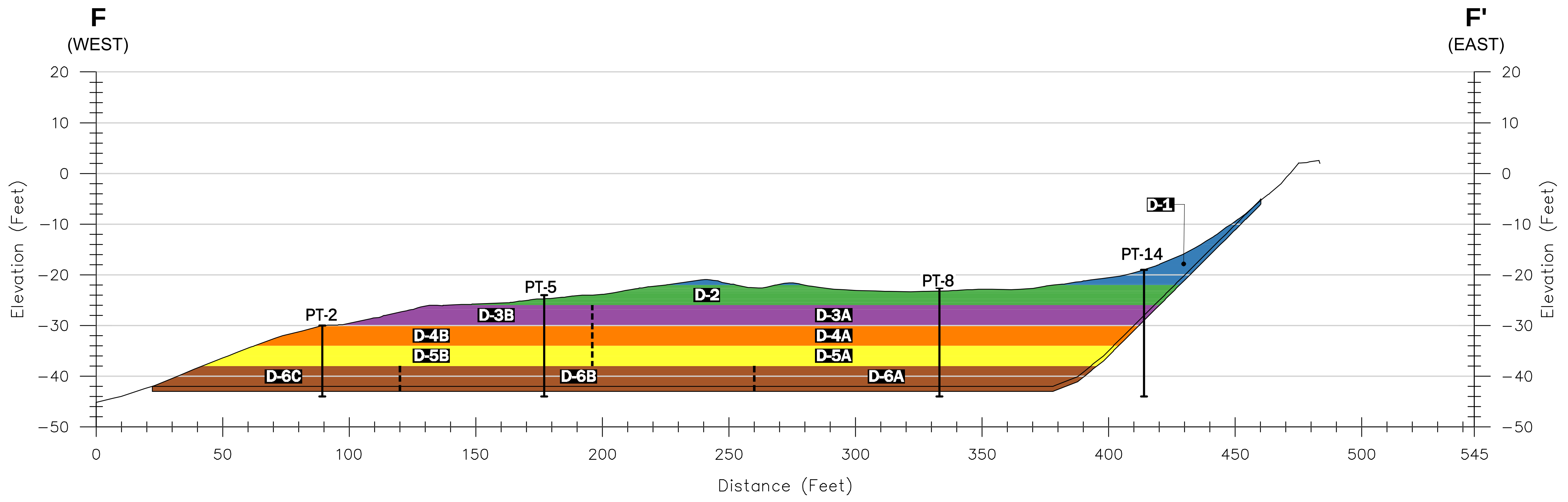
Cross-Sections D-D' and E-E'

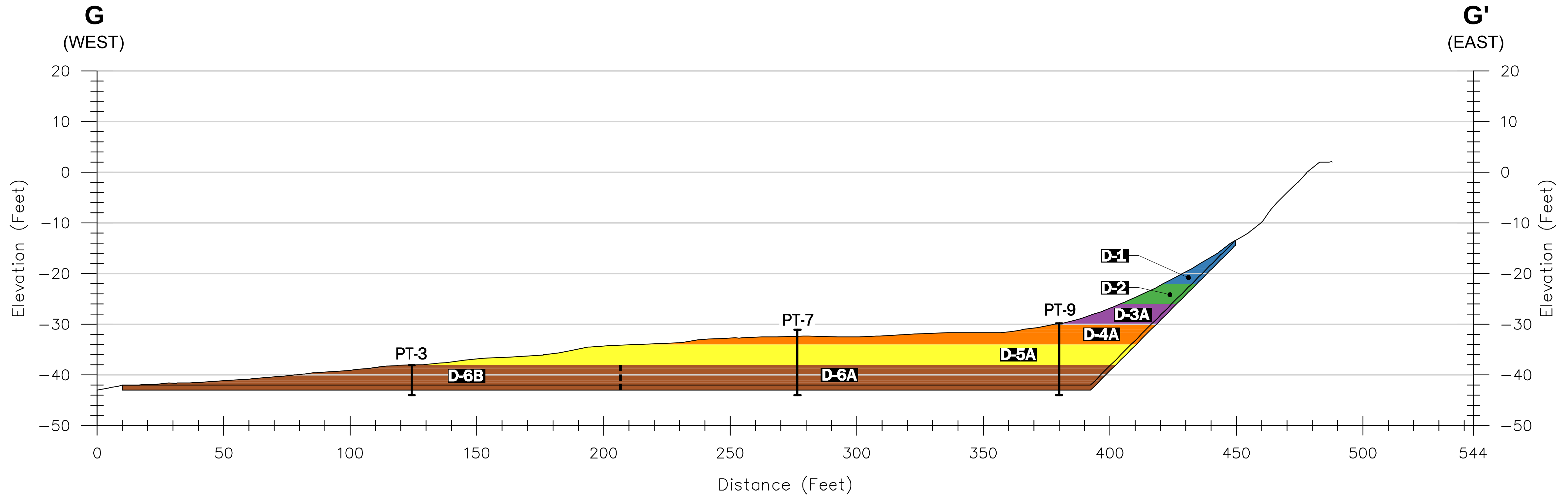
Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure 9

P:\0\0676020\03\CAD\SAP\SAP Site Plan and Sections.dwg\TAB:DD EE modified by tmichaud on Dec 16, 2014 - 9:24





Legend

- - - - DMMU Vertical Boundary

D-1 DMMU Identification

DMMU Elevation Boundaries

🟦 Existing Grade to -22 feet MLLW

🟩 -22 to -26 feet MLLW

🟪 -26 to -30 feet MLLW

🟧 -30 to -34 feet MLLW

🟨 -34 to -38 feet MLLW

🟫 -38 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

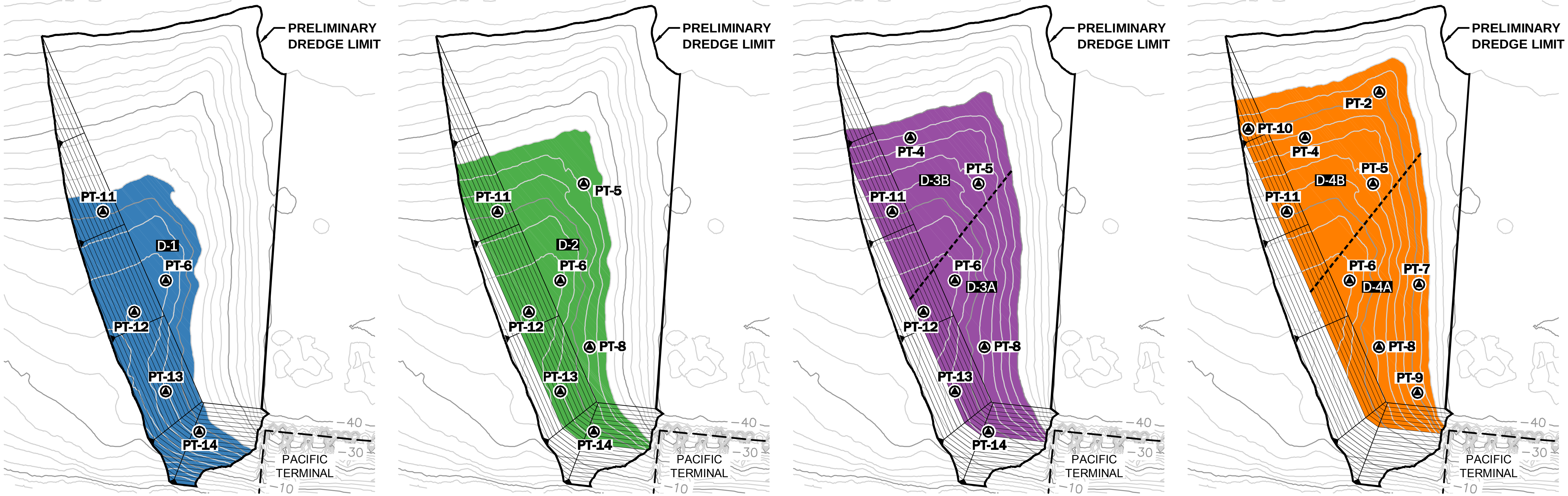
25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

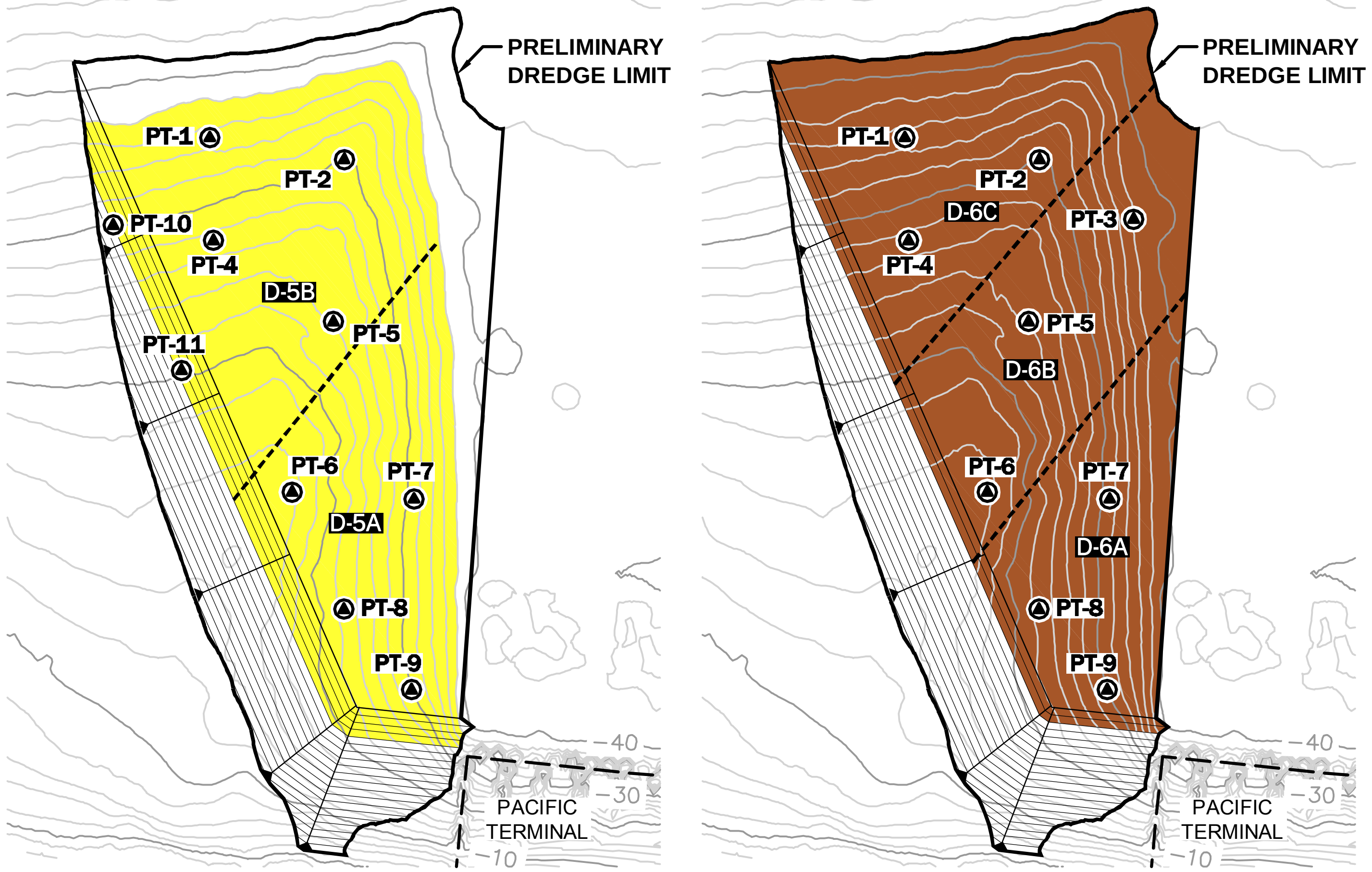
Cross-Sections F-F' and G-G'

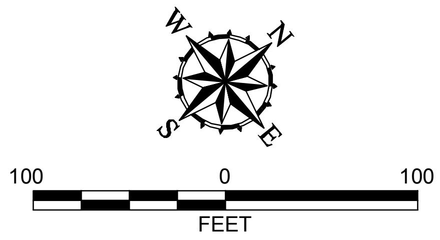
Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure 10







Legend

PT-1 ● Proposed Sediment Core Location
- - - - - DMMU Vertical Boundary
D-1 DMMU Identification

DMMU Elevation Boundaries

🟦 Existing Grade to -22 feet MLLW
🟩 -22 to -26 feet MLLW
🟪 -26 to -30 feet MLLW
🟧 -30 to -34 feet MLLW
🟨 -34 to -38 feet MLLW
🟫 -38 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Plan View of DMMU Boundaries

Weyerhaeuser Mill A Former Site
Everett, Washington

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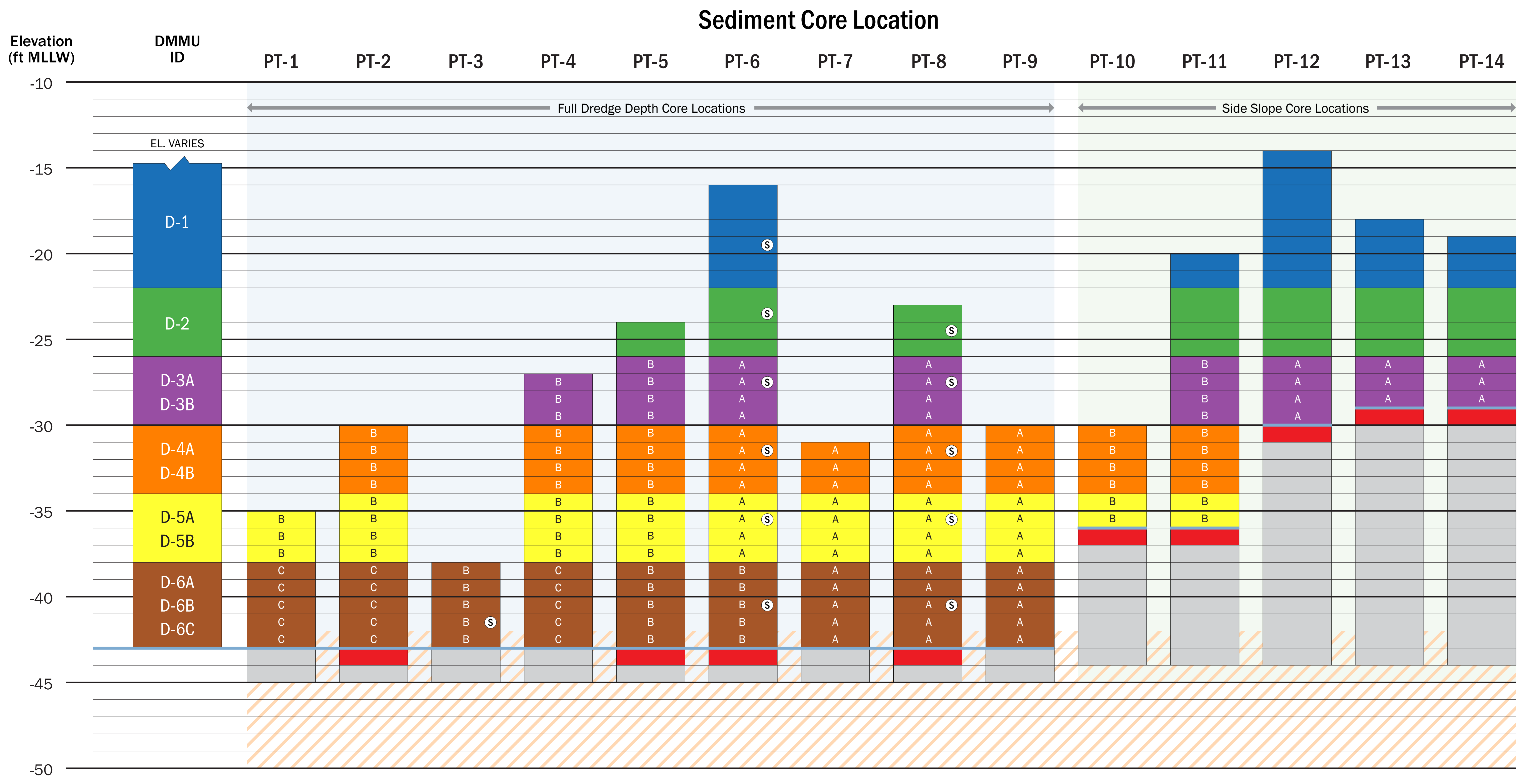
Figure 11

P:\0676020\03\CAD\SAP\PLAN VIEW OF DMMU.DWG\TAB:AA CC MODIFIED BY TMICHAUD ON DEC 16, 2014 - 9:29



Notes:

The top of each sediment core is shown at the existing mudline elevation for the core location.

The assumed native horizon for this graphic is -42 ft MLLW. Each sample core will be penetrated to a minimum depth of 2-ft into the native horizon or 2-ft beyond the over-dredge limit, whichever is deeper.

Sample locations within the dredge prism side slope will be completed to a minimum of 2-ft below the native horizon. If the native horizon is encountered before reaching the anticipated side slope, the sample will be completed a minimum of 10 ft below the anticipated side slope.

DMMU = Dredged Material Management Unit
FT = Feet
MLLW = Mean Lower Low Water

Legend:

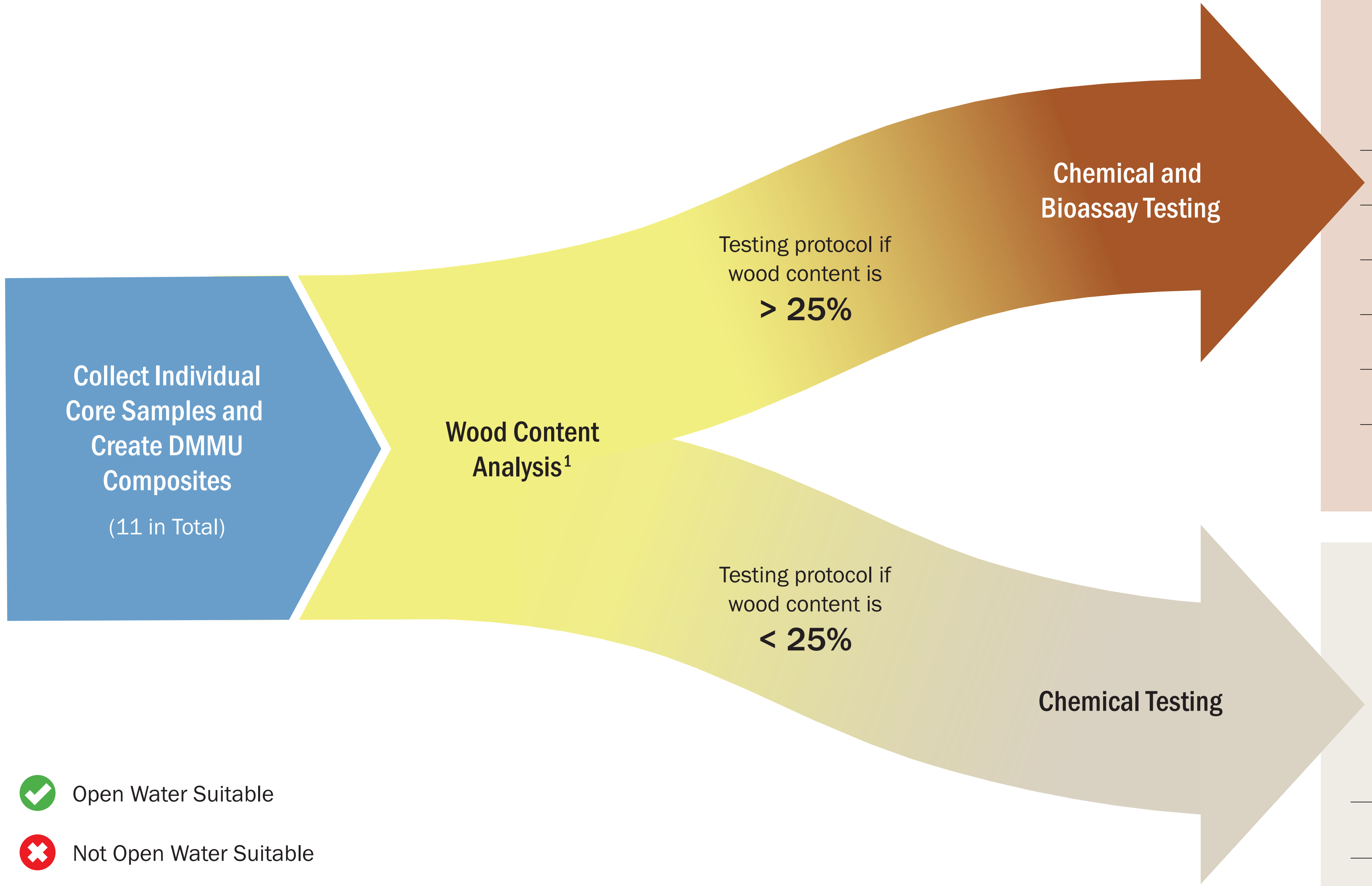
―	Dredge Limit (including overdredge allowance)
▨	Anticipated Native Horizon (assumed at -42 ft MLLW)
🟦🟩🟪🟧🟨🟫	1-ft sample interval to be collected and used as composite material for corresponding color DMMU and individually archived for possible followup analysis
⬜	1-ft sample interval to be collected and archived
🟥	1-ft sample interval to be collected and analyzed for characterization of exposed surface
Ⓢ	Sample to be collected and analyzed for total sulfides

Sediment Core Sampling and Compositing Plan

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure 12



Collect Individual Core Samples and Create DMMU Composites

(11 in Total)

Wood Content Analysis[1]

Testing protocol if wood content is **> 25%**

Chemical and Bioassay Testing

MTCA Bioaccumulative Chemicals[2]	MTCA Non-Bioaccumulative Chemicals	Bioassay	Expected Outcome
< MSL	< SL, < MSL	P	✓
< MSL	> SL, > MSL, < BT	P	✓
< MSL	> SL, > MSL, > BT	P	✗ *
< MSL	< SL, < MSL	F	✗
< MSL	> SL, > MSL	F	✗
> MSL	< SL, < MSL or > SL, > MSL	P/F	✗

Testing protocol if wood content is **< 25%**

Chemical Testing

MTCA Bioaccumulative Chemicals[2]	MTCA Non-Bioaccumulative Chemicals	Expected Outcome
< MSL	< SL, < MSL	✓
> MSL	< SL, < MSL or > SL, > MSL	✗
< MSL	> SL, > MSL, < BT	If Elected
< MSL	> SL, > MSL, > BT	✗ *

Bioassay	Expected Outcome
P	✓
F	✗

✓ Open Water Suitable

✗ Not Open Water Suitable

Notes:

* Bioaccumulative testing required to consider DMMU for open water suitability.

[1] Wood content will be analyzed to determine percentage of dry-weight wood content using ASTM D-2974 Method C.

[2] The MTCA bioaccumulative chemicals are defined in the Former Mill A Cleanup RI/FS Work Plan and include arsenic, cadmium, lead, mercury, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), total polychlorinated biphenyls (PCBs), dioxin-like PCBs and dioxins/furans. MTCA screening levels for these chemicals are natural background or Port Gardner regional background (if available).

SL = DMMP chemical evaluation guidelines.

BT = DMMP bioaccumulation trigger to determine when bioaccumulation testing is required.

MSL = Site-specific MTCA cleanup screening levels developed.

< = Analytical results are less than screening levels or triggers for all analytes.

> = Analytical results are greater than screening levels or triggers for one or more analytes.

P = Bioassay test passed.

F = Bioassay test failed.

DMMU = Dredged Material Management Unit

DMMP = Dredged Material Management Program

MTCA = Model Toxics Control Act

DMMU Sample Analysis and Expected Outcomes

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 13

APPENDICES

GEOENGINEERS

APPENDIX A

Health and Safety Plan

APPENDIX B

Laboratory Reference Material Certificates

I-5764

National Institute of Standards & Technology received 8/6/2010

Certificate of Analysis

Standard Reference Material® 1941b

Organics in Marine Sediment

Standard Reference Material (SRM) 1941b is marine sediment collected at the mouth of the Baltimore Harbor. SRM 1941b is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, and chlorinated pesticides in marine sediment and similar matrices. Information is also provided for total organic carbon, carbon, hydrogen, and nitrogen. All of the constituents for which certified, reference, and information values are provided in SRM 1941b were naturally present in the sediment material before processing. A unit of SRM 1941b consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment material.

Certified Concentration Values: Certified values for concentrations, expressed as mass fractions, for 24 PAHs, 29 PCB congeners, and 7 chlorinated pesticides are provided in Tables 1 through 3. The certified values for the PAHs, PCB congeners, and chlorinated pesticides are based on the agreement of results obtained at NIST from two or more chemically independent analytical techniques along with results from an interlaboratory comparison study [1,2]. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or accounted for by NIST.

Reference Concentration Values: Reference values for concentrations, expressed as mass fractions, are provided for 44 additional PAHs (some in combination), 13 additional PCB congeners, and 2 additional chlorinated pesticides in Tables 4 to 7. A reference value for total organic carbon is provided in Table 8. Reference values are noncertified values that are the best estimate of the true value. However, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods.

Information Concentration Values: Information values for concentrations, expressed as mass fractions, are provided in Table 9 for carbon, hydrogen, and nitrogen. An information value is considered to be a value that will be of interest and use to the SRM user, but insufficient information is available to assess adequately the uncertainty associated with the value or only a limited number of analyses were performed.

Expiration of Certification: The certification of this SRM is valid until **01 March 2012**, within the measurement uncertainties specified, provided the SRM is handled and stored in accordance with the instructions given in this certificate. However, the certification is invalid if the SRM is damaged, contaminated, or modified.

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

The coordination of the technical measurements leading to the certification of this material was under the leadership of M.M. Schantz and S.A. Wise of the NIST Analytical Chemistry Division.

Willie E. May, Chief
Analytical Chemistry Division

Robert L. Watters, Jr., Acting Chief
Measurement Services Division

Gaithersburg, MD 20899
Certificate Issue Date: 16 August 2004
See Certificate Revision History on Page 13

Analytical measurements for the certification of SRM 1941b were performed at NIST by J.R. Kucklick, B.J. Porter, D.L. Poster, M.M. Schantz, P. Schubert, S. Tutschku, and L.L. Yu of the NIST Analytical Chemistry Division. Measurements for percent total organic carbon were provided by a commercial laboratory and T.L. Wade of the Geochemical and Environmental Research Group, Texas A&M University (College Station, TX). The carbon, hydrogen, and nitrogen data were provided by a commercial laboratory. Results were also used from 38 laboratories (see Appendix A) that participated in an interlaboratory comparison exercise coordinated by NIST.

Collection and preparation of SRM 1941b were performed by M.P. Cronise and C.N. Fales of the NIST Measurement Services Division and B.J. Porter and M.M. Schantz of the NIST Analytical Chemistry Division. The sediment material was collected with the assistance of G.G. Lauenstein, J. Collier, and J. Lewis (National Oceanic and Atmospheric Administration).

Consultation on the statistical design of the experimental work and evaluation of the data were provided by S.D. Leigh and J.H. Yen of the NIST Statistical Engineering Division.

The support aspects involved in the issuance of this SRM were coordinated through the NIST Standard Reference Materials Program by B.S. MacDonald of the NIST Measurement Services Division.

NOTICE AND WARNING TO USERS

Storage: SRM 1941b must be stored in its original bottle at temperatures less than 30 °C away from direct sunlight.

Handling: This material is naturally occurring marine sediment from an urban area and may contain constituents of unknown toxicities; therefore, caution and care should be exercised during its handling and use.

INSTRUCTIONS FOR USE

Prior to removal of subsamples for analysis, the contents of the bottle should be mixed. The concentrations of constituents in SRM 1941b are reported on a dry-mass basis. The SRM, as received, contains approximately 2.4 % moisture. The sediment sample should be dried to a constant mass before weighing for analysis; or a separate subsample of the sediment should be removed from the bottle at the time of analysis and dried to determine the concentration on a dry-mass basis. If the constituents of interest are volatile, then the moisture must be determined with a separate subsample.

PREPARATION AND ANALYSIS[1]

Sample Collection and Preparation: The sediment used to prepare this SRM was collected from the Chesapeake Bay at the mouth of the Baltimore (MD) Harbor near the Francis Scott Key Bridge (39°12.3'N and 76°31.4'W). This location is very near the site where SRM 1941 and SRM 1941a were collected. The sediment was collected using a Kynar-coated modified Van Veen-type grab sampler. A total of approximately 3300 kg of wet sediment was collected from the site. The sediment was freeze-dried, sieved at 150 µm (100 % passing), homogenized in a cone blender, radiation sterilized (^{60}Co), and then packaged in screw-capped amber glass bottles each containing approximately 50 g.

Conversion to Dry-Mass Basis: The results for the constituents in SRM 1941b are reported on a dry-mass basis; however, the material "as received" contains residual moisture. The amount of moisture in SRM 1941b was determined by measuring the mass loss after freeze drying subsamples of 1.1 g to 1.3 g for four days at 1 Pa with a -10 °C shelf temperature and a -50 °C condenser temperature. The moisture content in SRM 1941b at the time of the certification analyses was 2.39 % ± 0.08 % (95 % confidence level). Analytical results for the organic constituents were determined on an as-received basis and then converted to a dry-mass basis by dividing by the conversion factor of 0.9761 (g dry mass/g as-received mass).

Polycyclic Aromatic Hydrocarbons: The general approach used for the value assignment of the PAHs in SRM 1941b was similar to that reported for the recent certification of several environmental matrix SRMs [3-6] and is described in detail elsewhere [7]. The approach consisted of combining results from analyses using various combinations of different extraction techniques and solvents, clean-up/isolation procedures, and chromatographic separation and detection

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[1] Certain commercial equipment, instruments, or materials are identified in this certificate in order to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

techniques. This approach consisted of Soxhlet extraction and pressurized-fluid extraction (PFE) using dichloromethane (DCM) or a hexane/acetone mixture, cleanup of the extracts using solid-phase extraction (SPE) or normal-phase liquid chromatography (LC), followed by analysis using the following techniques: (1) reversed-phase liquid chromatography with fluorescence detection (LC-FL) analysis of the total PAH fraction, (2) reversed-phase LC-FL analysis of isomeric PAH fractions isolated by normal-phase LC (i.e., multidimensional LC), (3) gas chromatography/mass spectrometry (GC/MS) analysis of the PAH fraction on three stationary phases of different selectivity, i.e., a 5 % (all column compositions are given as % mole fraction) phenyl-substituted methylpolysiloxane phase, a 50 % phenyl-substituted methylpolysiloxane phase, and a relatively non-polar proprietary phase.

Three sets of GC/MS results, designated as GC/MS (I), GC/MS (II), and GC/MS (III) were obtained using three columns with different selectivities for the separation of PAHs. For GC/MS (I) analyses, duplicate subsamples of approximately 1 g from ten bottles of SRM 1941b were extracted using PFE with DCM [8]. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 2 % DCM in hexane (all solvent concentrations are given as % volume fraction). The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness) (DB-5 MS, J&W Scientific, Folsom, CA). The GC/MS (II) analyses were performed using 5 g subsamples from six bottles of SRM 1941b. These samples were extracted using PFE with DCM. The high molecular mass compounds were removed from the extracts using size exclusion chromatography (SEC) with a preparative-scale divinylbenzene-polystyrene column (10 µm particle size with 100 Å diameter pores), and the sulfur was removed from the extracts by adding copper powder. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The analysis was by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness) (DB-17 MS, J&W Scientific, Folsom, CA). For the GC/MS (III), 9 g subsamples from six bottles of SRM 1941b were Soxhlet extracted for 18 h with 250 mL of a mixture of 50 % hexane/50 % acetone. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase (0.25 µm film thickness) (DB-XLB, J&W Scientific, Folsom, CA).

Two sets of LC-FL results, designated as LC-FL (total) and LC-FL (isomer), were used in the certification process. For the LC-FL (total), subsamples of approximately 1 g from six bottles of SRM 1941b were extracted using PFE with a mixture of 50 % hexane/50 % acetone. The extracts were concentrated and then processed through an aminopropylsilane SPE cartridge using 2 % DCM in hexane to obtain the total PAH fraction. For the LC-FL (isomer), a 5 g subsample from the six bottles was extracted using PFE with DCM and processed through an aminopropylsilane SPE cartridge using 10 % DCM in hexane; the PAH fraction was then fractionated further on a semi-preparative aminopropylsilane column (µBondapak NH_2, 9 mm i.d. × 30 cm, Waters Associates, Milford, MA) to isolate isomeric PAH fractions as described previously [9-12]. The total PAH fraction and the isomeric PAH fractions were analyzed using a 5 µm particle-size polymeric octadecylsilane (C_{18}) column (4.6 mm i.d. × 25 cm, Hypersil-PAH, Keystone Scientific, Inc., Bellefonte, PA) with wavelength programmed fluorescence detection [10,11].

For the GC/MS and LC-FL measurements described above, selected perdeuterated PAHs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [13]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PAHs in SRM 1941b. The laboratories participating in this exercise employed the analytical procedures routinely used in their laboratories to measure PAHs.

Homogeneity Assessment for PAHs: The homogeneity of SRM 1941b was assessed by analyzing duplicate samples of approximately 1 g from ten bottles selected by stratified random sampling. Samples were extracted, processed, and analyzed as described above for GC/MS (I). No statistically significant differences among bottles were observed for the PAHs at this sample size.

PAH Isomers of Molecular Mass 300 and 302: For the determination of the molecular mass 300 and 302 isomers, three subsamples of approximately 5 g each were extracted using PFE with DCM. The extracts were then concentrated with a solvent change to hexane and passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substitued methylpolysiloxane phase (0.25 µm film thickness) (DB-17MS, J&W Scientific, Folsom, CA). Perdeuterated dibenzo[*a,i*]pyrene was added to the sediment prior to extraction for use as an internal standard [14].

PCBs and Chlorinated Pesticides: The general approach used for the determination of PCBs and chlorinated pesticides in SRM 1941b was similar to that reported for the recent certification of several environmental matrix SRMs [4,5,15-17], and consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques. This approach consisted of Soxhlet extraction and PFE using DCM or a hexane/acetone mixture, clean-up/isolation using SPE or LC, followed by analysis using GC/MS and gas chromatography with electron capture detection (GC-ECD) on two columns with different selectivity for the separation of PCBs and chlorinated pesticides. The analytical methods are described in detail elsewhere [7].

Six sets of results were obtained designated as GC-ECD (I) A and B, GC/MS (I) A and B, GC/MS (II), and Interlaboratory Comparison Exercise. For the GC-ECD (I) analyses, approximately 10 g subsamples from six bottles of SRM 1941b were extracted using PFE with DCM. Copper powder was added to the extract to remove elemental sulfur, and SEC, as described above, was used to remove the high molecular mass compounds. The concentrated extract was then fractionated on a semi-preparative aminopropylsilane column to isolate two fractions containing: (1) the PCBs and lower polarity pesticides, and (2) the more polar pesticides. GC-ECD analyses of the two fractions were performed on two columns of different selectivities for PCB separations: 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase, (0.25 µm film thickness, DB-5, J&W Scientific, Folsom, CA), and a 0.25 mm × 60 m fused silica capillary column with a non-polar proprietary phase, (0.25 µm film thickness, DB-XLB, J&W Scientific, Folsom, CA). The results from the 5 % phenyl phase are designated as GC-ECD (IA) and the results from the proprietary phase are designated as GC-ECD (IB). For the GC-ECD analyses, two PCB congeners that are not significantly present in the sediment extract (PCB 103 and PCB 198 [18,19]), and endosulfan I-d_4, 4,4'-DDE-d_8, 4,4'-DD-d_8, and 4,4'-DDT-d_8 were added to the sediment prior to extraction for use as internal standards for quantification purposes.

Two sets of results were obtained by GC/MS. For GC/MS (I), approximately 9 g subsamples from six bottles were Soxhlet extracted with a mixture of 50 % hexane/50 % acetone for approximately 18 h. Copper powder was added to the extract to remove elemental sulfur, and the concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS with two ionization modes, electron impact (EI) and negative ion chemical ionization (NICI). The GC/MS EI method, GC/MS (IA), used a 0.25 mm i.d. × 60 m fused silica capillary column with a relatively non-polar proprietary phase, (0.25 µm film thickness, DB-XLB, J&W Scientific, Folsom, CA). The GC/MS NICI method, GC/MS (IB), used a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase, (0.25 µm film thickness, DB-5MS, J&W Scientific, Folsom, CA). The GC/MS (II) results were obtained in the same manner as the GC/MS (IA) analyses except that three subsamples were Soxhlet extracted with DCM for approximately 18 h. For the GC/MS analyses, selected carbon-13 labeled PCB congeners and chlorinated pesticides were added to the sediment prior to extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1941b was used in an interlaboratory comparison exercise in 1999 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [13]. Results from 38 laboratories that participated in this exercise were used as the sixth data set in the determination of the certified values for PCB congeners and chlorinated pesticides in SRM 1941b. The laboratories participating in this exercise employed the analytical procedures routinely used in their laboratories to measure PCB congeners and chlorinated pesticides.

The reference value for PCB 77 was determined from a separate fraction. The samples were extracted and processed as for GC-ECD (I) above. The first (PCB and lower polarity pesticide) fraction from the semi-preparative aminopropylsilane column was further fractionated using a Cosmosil PYE column (5 µm particle size, 4.6 mm i.d. × 25 cm, Phenomenex, Torrance, CA) [20]. Three fractions were collected: the first fraction contained the pesticides and multi-*ortho* PCBs, the second fraction contained the polychlorinated naphthalenes, non-*ortho* PCB congeners, and some mono-*ortho* PCB congeners, and the third fraction removed the residual planar compounds from the column. The second fraction was analyzed by GC/MS NICI using the same column as GC/MS (IB) above. Carbon-13 labeled PCB 77 was used as an internal standard for quantification purposes.

Total Organic Carbon: Two laboratories provided results for Total Organic Carbon (TOC) using similar procedures. Briefly, subsamples of approximately 200 mg were reacted with 6 N hydrochloric acid and rinsed with deionized water prior to combustion in a gas fusion furnace. The carbon monoxide and carbon dioxide produced were measured and compared to a blank for calculation of the percent TOC. Each laboratory analyzed subsamples from three bottles of SRM 1941b. One of the laboratories also analyzed three subsamples from three bottles of SRM 1941b for carbon, hydrogen, and nitrogen.

Table 1. Certified Concentrations for Selected PAHs in SRM 1941b

PAHs	Mass Fractions (dry-mass basis)[a] µg/kg		
Naphthalene[d,e,f,g,h,i]	848	±	95[b]
Fluorene[d,e,f,g,h,i]	85	±	15[b]
Phenanthrene[d,e,f,g,h,i]	406	±	44[b]
Anthracene[d,e,f,g,h,i]	184	±	18[b]
3-Methylphenanthrene[d,e,f]	105	±	13[b]
2-Methylphenathrene[d,e,f]	128	±	14[b]
1-Methylphenanthrene[d,e,f,i]	73.2	±	5.9[b]
Fluoranthene[d,e,f,g,h,i]	651	±	50[b]
Pyrene[d,e,f,g,h,i]	581	±	39[b]
Benz[*a*]anthracene[d,e,f,g,h,i]	335	±	25[b]
Chrysene[f,h]	291	±	31[b]
Triphenylene[f,h]	108	±	5[c]
Benzo[*b*]fluoranthene[e,g]	453	±	21[b]
Benzo[*k*]fluoranthene[d,e,f,g]	225	±	18[b]
Benzo[*e*]pyrene[d,e,f,i]	325	±	25[b]
Benzo[*a*]pyrene[d,e,f,h,i]	358	±	17[b]
Perylene[d,e,f,h,i]	397	±	45[b]
Benzo[*ghi*]perylene[d,e,f,h,i]	307	±	45[b]
Indeno[1,2,3-*cd*]pyrene[d,e,f,h,i]	341	±	57[b]
Dibenz[*a,j*]anthracene[d,e,f,h]	48.9	±	4.6[b]
Dibenz[*a,c*]anthracene[e,h]	36.7	±	5.2[b]
Dibenz[*a,h*]anthracene[e,h]	53	±	10[b]
Benzo[*b*]chrysene[d,e,f,h]	53	±	12[b]
Picene[d,e,f]	46.6	±	4.7[b]

[a] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Certified values are weighted means of the results from two to six analytical methods [21]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO and NIST Guides [2].

[c] The certified value is an unweighted mean of the results from two analytical methods. The uncertainty listed with the value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [22] with a pooled, within-method variance following the ISO and NIST Guides [2].

[d] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[e] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[f] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] LC-FL (total) of total PAH fraction after PFE with DCM.

[h] LC-FL (isomer) of isomeric PAH fractions after PFE with DCM.

[i] 1999 Interlaboratory Comparison Study [13] with between 21 and 29 laboratories submitting data for each PAH.

Table 2. Certified Concentrations for Selected PCB Congeners[a] in SRM 1941b

PCB Congeners		Mass Fractions (dry-mass basis)[b] µg/kg		
PCB 8	(2,4'-Dichlorobiphenyl)^{e,f,g,h,j}	1.65	±	0.19^{c}
PCB 18	(2,2',5-Trichlorobiphenyl)^{c,f,g,h,i}	2.39	±	0.29^{c}
PCB 28	(2,4,4'-Trichlorobiphenyl)^{c,f,g,h,i}	4.52	±	0.57^{c}
PCB 31	(2,4',5-Trichlorobiphenyl)^{c,g,h}	3.18	±	0.41^{c}
PCB 44	(2,2'3,5'-Tetrachlorobiphenyl)^{e,f,g,h,i}	3.85	±	0.20^{d}
PCB 49	(2,2'4,5'-Tetrachlorobiphenyl)^{e,f,g,h}	4.34	±	0.28^{d}
PCB 52	(2,2',5,5'-Tetrachlorobiphenyl)^{e,f,g,h,i}	5.24	±	0.28^{d}
PCB 66	(2,3',4,4'-Tetrachlorobiphenyl)^{c,g,h,i,j}	4.96	±	0.53^{d}
PCB 87	(2,2',3,4,5'-Pentachlorobiphenyl)^{e,f,h,j}	1.14	±	0.16^{c}
PCB 95	(2,2',3,5',6-Pentachlorobiphenyl)^{c,g,h,i}	3.93	±	0.62^{d}
PCB 99	(2,2',4,4',5-Pentachlorobiphenyl)^{e,f,g,h,j}	2.90	±	0.36^{d}
PCB 101	(2,2',4,5,5'-Pentachlorobiphenyl)^{c,g,h,i,j}	5.11	±	0.34^{d}
PCB 105	(2,3,3',4,4'-Pentachlorobiphenyl)^{e,f,g,h,i,j}	1.43	±	0.10^{d}
PCB 110	(2,3,3',4',6-Pentachlorobiphenyl)^{c,g,h,j}	4.62	±	0.36^{d}
PCB 118	(2,3',4,4',5-Pentachlorobiphenyl)^{e,f,g,h,i,j}	4.23	±	0.19^{d}
PCB 128	(2,2',3,3',4,4'-Hexachlorobiphenyl)^{c,f,g,h,i,j}	0.696	±	0.044^{d}
PCB 138	(2,2',3,4,4',5'-Hexachlorobiphenyl)^{e,g,h,j}	3.60	±	0.28^{d}
PCB 149	(2,2',3,4',5',6-Hexachlorobiphenyl)^{c,f,g,j}	4.35	±	0.26^{c}
PCB 153	(2,2',4,4',5,5'-Hexachlorobiphenyl)^{e,f,g,h,i,j}	5.47	±	0.32^{d}
PCB 156	(2,3,3',4,4',5-Hexachlorobiphenyl)^{c,f,g,h,j}	0.507	±	0.090^{c}
PCB 170	(2,2',3,3',4,4',5-Heptachlorobiphenyl)^{e,f,g,h,i,j}	1.35	±	0.09^{d}
PCB 180	(2,2',3,4,4',5,5'-Heptachlorobiphenyl)^{c,f,g,h,i,j}	3.24	±	0.51^{d}
PCB 183	(2,2',3,4,4',5',6-Heptachlorobiphenyl)^{e,f,g,j}	0.979	±	0.087^{c}
PCB 187	(2,2',3,4',5,5',6-Heptachlorobiphenyl)^{c,f,g,h,i,j}	2.17	±	0.22^{d}
PCB 194	(2,2',3,3',4,4',5,5'-Octachlorobiphenyl)^{e,f,g,j}	1.04	±	0.06^{c}
PCB 195	(2,2',3,3',4,4',5,6-Octachlorbiphenyl)^{c,g,i,j}	0.645	±	0.060^{d}
PCB 201	(2,2',3,3',4,5',6,6'-Octachlorobiphenyl)^{e,g,j}	0.777	±	0.034^{c}
PCB 206	(2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)^{c,g,h,i,j}	2.42	±	0.19^{d}
PCB 209	Decachlorobiphenyl^{e,f,g,h,i,j}	4.86	±	0.45^{d}

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [18] and later revised by Schulte and Malisch [19] to conform with IUPAC rules; for the specific congeners mentioned in this SRM, only PCB 201 and PCB 107 (see Table 5) are different in the numbering systems. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 201 is listed as PCB 200 and the IUPAC PCB 107 is listed as PCB 108.

[b] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [22] with a pooled, within-method variance following the ISO and NIST Guides [2].

[d] Certified values are weighted means of the results from three to six analytical methods [21]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO and NIST Guides [2].

[e] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[f] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[g] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[h] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[i] 1999 Interlaboratory Comparison Study [13] with between 13 and 31 laboratories submitting data for each PCB congener.

[j] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

Table 3. Certified Concentrations for Selected Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions (dry-mass basis)[a] µg/kg
Hexachlorobenzene[d,e,f,g]	5.83 ± 0.38[b]
cis-Chlordane[d,e,f,g,h]	0.85 ± 0.11[c]
trans-Chlordane[d,e,g]	0.566 ± 0.093[b]
cis-Nonachlor[d,g,h]	0.378 ± 0.053[c]
trans-Nonachlor[d,e,f,g,h]	0.438 ± 0.073[b]
4,4'-DDE[d,f,g,h]	3.22 ± 0.28[c]
4,4'-DDD[d,f,g,h]	4.66 ± 0.46[c]

[a] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Certified values are unweighted means of the results from three to five analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [22] with a pooled, within-method variance following the ISO and NIST Guides [2].

[c] Certified values are weighted means of the results from three to five analytical methods [21]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO and NIST Guides [2].

[d] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[e] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[f] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[g] 1999 Interlaboratory Comparison Study [13] with between 13 and 31 laboratories submitting data for each pesticide.

[h] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

Table 4. Reference Concentrations for Selected PAHs in SRM 1941b

PAHs	Mass Fractions (dry-mass basis)[a] μg/kg
1-Methylnaphthalene[d,e,f,i]	127 ± 14[b]
2-Methylnaphthalene[d,e,f,i]	276 ± 53[b]
2,6-Dimethylnaphthalene[d,e,f,i]	75.9 ± 4.5[b]
2,3,5-Trimethylnaphthalene[d,e,f,i]	25.5 ± 5.1[b]
Biphenyl[d,e,f,i]	74.0 ± 8.0[b]
Acenaphthylene[d,e,f,i]	53.3 ± 6.4[b]
Acenaphthene[d,e,f,i]	38.4 ± 5.2[b]
9-Methylphenanthrene[e]	63.5 ± 2.5[c]
4-Methylphenanthrene and 9-Methylphenanthrene[d,f]	80.1 ± 4.8[b]
2-Methylanthracene[e,f]	36 ± 15[b]
8-Methylfluoranthene[d]	49.5 ± 2.7[c]
7-Methylfluoranthene[d]	45.4 ± 1.5[c]
1-Methylfluoranthene[d]	42.4 ± 2.1[c]
3-Methylfluoranthene[d]	28.8 ± 1.3[c]
2-Methylpyrene[d]	78.7 ± 4.0[c]
4-Methylpyrene[d]	66.4 ± 2.6[c]
1-Methylpyrene[d]	52.5 ± 2.3[c]
Acephenanthrene[f]	30.5 ± 1.9[c]
Benzo[*c*]phenanthrene[d,e,f]	58 ± 15[b]
Benzo[*a*]fluoranthene[d,e,f]	73 ± 18[b]
Benzo[*j*]fluoranthene[e]	217 ± 5[c]
Indeno[1,2,3-*cd*]fluoranthene[f]	9.63 ± 0.34[c]
Pentaphene[f]	25.3 ± 1.0[c]

[a] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Reference values are weighted means of the results from two to four analytical methods [21]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance following the ISO and NIST Guides [2].

[c] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is intended to represent, at the level of one standard deviation, the combined standard uncertainty calculated according to the ISO and NIST Guides [2]. The coverage factor, k, is determined from the Student's t-distribution for the appropriate degrees of freedom and 95 % confidence for each analyte.

[d] GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[e] GC/MS (II) on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

[f] GC/MS (III) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] LC-FL (total) of total PAH fraction after PFE with DCM.

[h] LC-FL (isomer) of isomeric PAH fractions after PFE with DCM.

[i] 1999 Interlaboratory Comparison Study [13] with between 14 and 26 laboratories submitting data for each PAH.

Table 5. Reference Concentrations for Selected PAHs of Molecular Weight 300 and 302 in SRM 1941b

PAHs	Mass Fractions (dry-mass basis)[a,b,c] µg/kg
Coronene	72.6 ± 4.7
Dibenzo[*b*,*e*]fluoranthene	10.3 ± 0.3
Naphtho[1,2-*b*]fluoranthene	91.0 ± 3.1
Naphtho[1,2-*k*]fluoranthene and Naphtho[2,3-*j*]fluoranthene	79.8 ± 2.5
Naphtho[2,3-*b*]fluoranthene	23.5 ± 0.3
Dibenzo[*b*,*k*]fluoranthene	95.6 ± 3.1
Dibenzo[*a*,*k*]fluoranthene	26.6 ± 0.4
Dibenzo[*j*,*l*]fluoranthene	63.8 ± 1.8
Dibenzo[*a*,*l*]pyrene	11.1 ± 1.0
Naphtho[2,3-*k*]fluoranthene	10.7 ± 0.6
Naphtho[1,2-*a*]pyrene	16.7 ± 1.4
Naphtho[2,3-*e*]pyrene	33.2 ± 2.3
Dibenzo[*a*,*e*]pyrene	76.1 ± 3.6
Naphtho[2,1-*a*]pyrene	59.2 ± 1.8
Dibenzo[*e*,*i*]pyrene	35.0 ± 2.4
Naphtho[2,3-*a*]pyrene	16.5 ± 0.6
Benzo[*b*]perylene	38.2 ± 1.2
Dibenzo[*a*,*i*]pyrene	25.5 ± 1.0
Dibenzo[*a*,*h*]pyrene	6.94 ± 0.29

[a] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution for the associated degrees of freedom and 95 % confidence level for each analyte.

[c] GC/MS on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM [14].

Table 6. Reference Concentrations for Selected PCB Congeners[a] in SRM 1941b

PCB Congeners		Mass Fractions (dry-mass basis)[b,c] µg/kg		
PCB 45	(2,2',3,6-Tetrachlorobiphenyl)[d,e]	0.73	±	0.12
PCB 56	(2,3,3',4-Tetrachlorobiphenyl)[d,f,g]	1.21	±	0.11
PCB 63	(2,3,4',5-Tetrachlorobiphenyl)[e,f,g]	0.213	±	0.040
PCB 70	(2,3',4',5-Tetrachlorobiphenyl)[e,f,g]	4.99	±	0.29
PCB 74	(2,4,4',5-Tetrachlorobiphenyl)[e,f,g]	2.04	±	0.15
PCB 77	(3,3',4,4'-Tetrachlorobiphenyl)[h]	0.31	±	0.03
PCB 107	(2,3,3',4,5'-Pentachlorobiphenyl)[d,e,f,g]	0.628	±	0.028
PCB 132	(2,2',3,3',4,6'-Hexachlorobiphenyl)[d,f,g]	1.28	±	0.27
PCB 146	(2,2',3,4',5,5'-Hexachlorobiphenyl)[e,f,g]	1.22	±	0.12
PCB 158	(2,3,3',4,4',6-Hexachlorobiphenyl)[d,e,f,g]	0.65	±	0.15
PCB 163	(2,3,3',4',5,6-Hexachlorobiphenyl)[e,f,g]	1.28	±	0.06
PCB 174	(2,2',3,3',4,5,6'-Heptachlorobiphenyl)[d,e,f,g]	1.51	±	0.39
PCB 193	(2,3,3',4',5,5',6-Heptachlorobiphenyl)[d,e,f,g]	0.292	±	0.075

[a] PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [18] and later revised by Schulte and Malisch [19] to conform with IUPAC rules; for the specific congeners mentioned in this SRM, only PCB 201 (see Table 2) and PCB 107 are different in the numbering systems. Under the Ballschmiter and Zell numbering system, the IUPAC PCB 201 is listed as PCB 200 and the IUPAC PCB 107 is listed as PCB 108.

[b] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[c] For these PCB congeners except PCB 77, the reference values are unweighted means of the results from two to four analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [22] with a pooled within-method variance following the ISO and NIST Guides [2]. For PCB 77, the reference value is the mean of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to two degrees of freedom and 95 % confidence level for PCB 77.

[d] GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with DCM.

[e] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[f] GC/MS (IA) on a relatively non-polar proprietary phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

[g] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[h] GC/MS NICI on a 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (I) fractionated using a PYE column.

Table 7. Reference Concentrations for Selected Chlorinated Pesticides in SRM 1941b

Chlorinated Pesticides	Mass Fractions (dry-mass basis)[a,b] µg/kg
2,4'-DDE[c,d]	0.38 ± 0.12
4,4'-DDT[e,f]	1.12 ± 0.42

[a] Concentrations reported on dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] The reference values are unweighted means of the results from two analytical methods. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2, calculated by combining a between-method variance [22] with a pooled, within-method variance following the ISO and NIST Guides [2].

[c] GC/MS (IB) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC/MS (IA).

[d] GC-ECD (IB) on a relatively non-polar proprietary phase; same extracts analyzed as in GC-ECD (IA).

[e] GC/MS (II) on a relatively non-polar proprietary phase after Soxhlet extraction with DCM.

[f] 1999 Interlaboratory Comparison Study [13] with 10 laboratories submitting data for 4,4'-DDT.

Table 8. Reference Value for Total Organic Carbon in SRM 1941b

Total Organic Carbon (TOC)	2.99 % ± 0.24 % mass fraction[a,b]

[a] Concentration is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.

[b] The reference value for total organic carbon is a weighted mean value from routine measurements made by two laboratories [21]. The uncertainty listed is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-method variance. The reporting follows the ISO and NIST Guides [2].

Table 9. Information Values for Carbon, Hydrogen, and Nitrogen in SRM 1941b

Elements	Mass Fractions (dry-mass basis)[a] %
Carbon	3.3
Hydrogen	1.2
Nitrogen	< 0.5

[a] Concentration is reported on a dry-mass basis; material as received contains approximately 2.4 % moisture.

REFERENCES

[1] May, W.E.; Parris, R.M.; Beck, C.M.; Fassett, J.D.; Greenberg, R.R.; Guenther, F.R.; Kramer, G.W.; Wise, S.A.; Gills, T.E.; Colbert, J.C.; Gettings, R.J.; MacDonald, B.S.; *Definitions of Terms and Modes Used at NIST for Value-Assignment of Reference Materials for Chemical Measurements*, NIST Special Publication 260-136; U.S. Government Printing Office: Washington, DC (2000).

[2] ISO; *Guide to the Expression of Uncertainty in Measurements*, ISBN 92-67-10188-9, 1st ed.; International Organization for Standardization: Geneva, Switzerland (1993); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*, NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at http://physics.nist.gov/Pubs.

[3] Wise, S.A.; Schantz, M.M.; Benner, B.A. Jr.; Hays, M.J.; Schiller, S.B.; *Certification of Polycyclic Aromatic Hydrocarbons in a Marine Sediment Standard Reference Material*; Anal. Chem., Vol. 67, pp. 1171-1178 (1995).

[4] Schantz, M.M.; Benner, B.A. Jr.; Hays, M.J.; Kelly, W.R.; Vocke, R.D. Jr.; Demiralp, R.; Greenberg, R.R.; Schiller, S.B.; Lauenstein, G.G.; Wise, S.A.; *Certification of Standard Reference Material (SRM) 1941a, Organics in Marine Sediment*; Fresenius' J. Anal. Chem., Vol. 352, pp. 166-173 (1995).

[5] Schantz, M.M.; Demiralp, R.; Greenberg, R.R.; Hays, M.J.; Parris, R.M.; Porter, B.J.; Poster, D.L.; Sander, L.C.; Schiller, S.B.; Sharpless, K.S.; Wise, S.A.; *Certification of a Frozen Mussel Tissue Standard Reference Material (SRM 1974a) for Trace Organic Constituents*; Fresenius' J. Anal. Chem., Vol. 358, pp. 431-440 (1997).

[6] Wise, S.A.; Sander, L.C.; Schantz, M.M.; Hays, M.J.; Benner, B.A. Jr.; *Recertification of Standard Reference Material (SRM) 1649, Urban Dust, for the Determination of Polycyclic Aromatic Hydrocarbons (PAHs)*; Polycyclic Aromat. Compd., Vol. 13, pp. 419-456 (2000).

[7] Wise, S.A.; Poster, D.L.; Schantz, M.M.; Kucklick, J.R.; Sander, L.C.; Lopez de Alda, M.; Schubert, P.; Parris, R.M.; Porter, B.J.; *Two New Marine Sediment Standard Reference Materials (SRMs) for the Determination of Organic Contaminants*; Anal. Bioanal. Chem., Vol. 378, pp. 1251-1264 (2004).

[8] Schantz, M.M.; Nichols, J.J.; Wise, S.A.; *Evaluation of Pressurized Fluid Extraction for the Extraction of Environmental Matrix Reference Materials*; Anal. Chem., Vol. 69, pp. 4210-4219 (1997).

[9] Wise, S.A.; Chesler, S.N.; Hertz, H.S.; Hilpert, L.R.; May, W.E.; *Chemically-Bonded Aminosilane Stationary Phase for the High Performance Liquid Chromatographic Separation of Polynuclear Aromatic Hydrocarbons*; Anal. Chem., Vol. 49, pp. 2306-2310 (1977).

[10] May W.E.; Wise, S.A.; *Liquid Chromatographic Determination of Polycyclic Aromatic Hydrocarbons in Air Particulate Extracts*; Anal. Chem., Vol. 56, pp. 225-232 (1984).

[11] Wise, S.A.; Benner, B.A.; Byrd, G.D.; Chesler, S.N.; Rebbert, R.E.; Schantz, M.M.; *Determination of Polycyclic Aromatic Hydrocarbons in a Coal Tar Standard Reference Material*; Anal. Chem., Vol. 60, pp. 887-894 (1988).

[12] Wise, S.A.; Deissler, A.; Sander, L.C.; *Liquid Chromatographic Determination of Polycyclic Aromatic Hydrocarbon Isomers of Molecular Weight 278 and 302 in Environmental Standard Reference Materials*; Polycyclic Aromat. Compd., Vol. 3, pp. 169-184 (1993).

[13] Schantz, M.M.; Parris, R.M.; Wise, S.A.; *NIST/NOAA Intercomparison Exercise Program for Organic Contaminants in the Marine Environment: Description and Results of 1999 Organic Intercomparison Exercises*; NOAA Technical Memorandum NOS NCCOS CCMA 146, Silver Spring, MD, July (2000).

[14] Schubert, P.; Schantz, M.M.; Sander, L.C.; Wise, S.A.; *Determination of Polycyclic Aromatic Hydrocarbons with Molecular Mass 300 and 302 in Environmental-Matrix Standard Reference Materials by Gas Chromatography-Mass Spectrometry*; Anal. Chem., Vol. 75, pp. 234-246 (2003).

[15] Schantz, M.M.; Parris, R.M.; Kurz, J.; Ballschmiter, K.; Wise, S.A.; *Comparison of Methods for the Gas-Chromatographic Determination of PCB Congeners and Chlorinated Pesticides in Marine Reference Materials*; Fresenius' J. Anal. Chem., Vol. 346, pp. 766-778 (1993).

[16] Schantz, M.M.; Koster, B.J.; Oakley, L.M.; Schiller, S.B.; Wise, S.A.; *Certification of Polychlorinated Biphenyl Congeners and Chlorinated Pesticides in a Whale Blubber Standard Reference Material*; Anal. Chem., Vol. 67, pp. 901-910 (1995).

[17] Poster, D.L.; Schantz, M.M.; Wise, S.A.; Vangel, M.G.; *Analysis of Urban Particulate Standard Reference Materials for the Determination of Chlorinated Organic Contaminants and Additional Chemical and Physical Properties*; Fresenius' J. Anal. Chem., Vol. 363, pp. 380-390 (1999).

[18] Ballschmiter, K.; Zell, M.; *Analysis of Polychlorinated Biphenyls (PCB) by Glass Capillary Gas Chromatography - Composition of Technical Aroclor- and Clophen-PCB Mixtures*; Fresenius' Z. Anal. Chem., Vol. 302, pp. 20-31 (1980).

[19] Schulte E.; Malisch, R.; *Calculation of the Real PCB Content in Environmental Samples. I. Investigation of the Composition of Two Technical PCB Mixtures*; Fresenius' Z. Anal. Chem., Vol. 314, pp. 545-551 (1983).

[20] Brubaker, W.W., Jr.; Schantz M.M.; Wise, S.A.; *Determination of Non-ortho Polychlorinated Biphenyls in Environmental Standard Reference Materials*; Fresenius' J. Anal. Chem., Vol. 367, pp. 401-406 (2000).

[21] Ruhkin, A.L.; Vangel, M.G.; *Estimation of a Common Mean and Weighted Means Statistics*; J. Am. Statist. Assoc., Vol. 93, pp. 303-308 (1998).

[22] Levenson, M.S.; Banks, D.L.; Eberhardt, K.R.; Gill, L.M.; Guthrie, W.F.; Liu, H.K.; Vangel, M.G.; Yen, J.H.; Zhang, N.F.; *An Approach to Combining Results from Multiple Methods Motivated by the ISO GUM*; J. Res. Natl. Inst. Stand. Technol., Vol. 105, pp. 571-579 (2000).

Certificate Revision History: 16 August 2004 (This revision removes the reference values for the butyl tins and makes editorial changes); 15 July 2002 (Original certificate date).

Users of this SRM should ensure that the certificate in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-6776; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet http://www.nist.gov/srm.

APPENDIX A

The laboratories listed below performed measurements that contributed to the certification of SRM 1941b, Organics in Marine Sediment.

Arthur D. Little, Inc; Cambridge, MA, USA
Axys Analytical Services; Sidney, BC, Canada
B & B Laboratories; College Station, TX, USA
Battelle Ocean Sciences; Duxbury, MA, USA
Bedford Institute of Oceanography; Dartmouth, NS, Canada
California Department of Fish and Game; Rancho Cordova, CA, USA
Central Contra Costa Sanitary District; Martinez, CA, USA
Chesapeake Biological Laboratory; Solomons, MD, USA
Centro de Investigacionies Energeticas Medioambientales y Tecnologicas; Madrid, Spain
City of Los Angeles Environmental Monitoring Division; Playa del Rey, CA, USA
City of San Jose Environmental Services Department; San Jose, CA, USA
Columbia Analytical Services; Kelso, WA, USA
East Bay Municipal Utility District; Oakland, CA, USA
Florida Department of Environmental Protection; Tallahassee, FL, USA
Manchester Environmental Laboratory; Port Orchard, WA, USA
Murray State University; Murray, KY, USA
Massachusetts Water Resources Authority Central Lab; Winthrop, MA, USA
National Research Council of Canada; Ottawa, Ontario, Canada
National Oceanic and Atmospheric Association (NOAA), National Marine Fisheries Service (NMFS), Auke Bay Laboratory; Juneau, AK, USA
NOAA, National Ocean Service/Center for Coastal Environmental Health and Biomolecular Research; Charleston, SC, USA
NOAA, NMFS, Sandy Hook Marine Laboratory; Highlands, NJ, USA
NOAA, NMFS, Northwest Fisheries Science Center; Seattle, WA, USA
Orange County Sanitation District; Fountain Valley, CA, USA
Philip Analytical Services; Burlington, Ontario, Canada
Serv de Hidrografia Naval; Buenos Aires, Argentina
Skidaway Institute of Technology; Savannah, GA, USA
Southwest Laboratory of Oklahoma; Broken Arrow, OK, USA
Severn Trent Knoxville Laboratory; Knoxville, TN, USA
Texas A&M University, Geochemical and Environmental Research Group; College Station, TX, USA
Texas Parks and Wildlife Department; San Marcos, TX, USA
University of California at Los Angeles, Institute of Geophysics and Planetary Physics; Los Angeles, CA, USA
University of Connecticut, Environmental Research Institute; Storrs, CT, USA
University of Rhode Island, Graduate School of Oceanography; Narragansett, RI, USA
US Department of Agriculture, Environmental Chemistry Laboratory; Beltsville, MD, USA
US Environmental Protection Agency, Atlantic Ecology Division; Narragansett, RI, USA
US Geological Survey, National Water Quality Laboratory; Denver, CO, USA
Woods Hole Group Environmental Lab; Raynham, MA, USA
Wright State University; Dayton, OH, USA

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Purchase transaction experience using the online ordering web site						
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Metals in Soil

Catalog No. 540
Issue Date: September 28, 2012
Revision Date: November 27, 2012

Certification

Parameter	Total Concentration [1] (mg/kg)	Certified Value [2] (mg/kg)	Uncertainty [3]	QC PALs™ [4] (mg/kg)	PT PALs™ [5] (mg/kg)
aluminum	68100*	9060	5.2%	4180 - 13900	3860 - 14200
antimony	246	106	7.6%	DL - 232	24.5 - 271
arsenic	215	182	1.9%	151 - 214	129 - 236
barium	561	143	3..5%	119 - 168	104 - 183
beryllium	111	98.3	2.1%	82.5 - 114	73.3 - 123
boron	134	106	2.5%	77.2 - 135	63.6 - 152
cadmium	71.2	60.4	8.4%	50.2 - 70.6	44.2 - 78.1
calcium	24800*	6040	2.8%	5020 - 7050	4450 - 7620
chromium	366	125	1.2%	102 - 147	87.2 - 162
cobalt	195	163	1.9%	138 - 188	121 - 204
copper	101	80.1	7.6%	67.1 - 93.0	59.0 - 104
iron	42900*	12900	4.6%	6550 - 19300	4170 - 21700
lead	148	136	4.2%	114 - 159	99.4 - 173
magnesium	8740	2640	0.2%	1990 - 3280	1690 - 3580
manganese	864	279	2.1%	231 - 328	207 - 352
mercury	9.80	9 25	1.7%	6.63 - 11.9	4.75 - 13.8
molybdenum	60.0	42.3	4.0%	31.8 - 52.7	27.6 - 63.7
nickel	172	128	2.3%	108 - 148	93.6 - 166
potassium	19700*	2820	0.8%	2050 - 3590	1750 - 3890
selenium	102	85.9	4 1%	68.7 - 103	54.9 - 117
silver	70.2	61.3	2.6%	40.6 - 82.0	41.0 - 81.6
sodium	17200*	439	2.9%	324 - 554	212 - 666
strontium	238	110	6 0%	89.4 - 131	77.6 - 143
thallium	171	144	6.9%	117 - 171	98.3 - 190
tin	186	157	3.9%	124 - 189	94.2 - 219
titanium	3280*	241	2.6%	29.4 - 453	0.00 - 559
vanadium	193	104	4 6%	78.5 - 129	68.6 - 139
zinc	232	204	5.6%	167 - 240	142 - 265

Please see footnotes on back

DL = Detection Limit

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I8067

BNAs - Sandy Loam

Number **CRM143-50G**
Lot 016496
Solvent (Matrix) Sandy Loam
Hazard Irritant
Storage &Handling Store at 4ºC.
Expiration Date See Sample Label
Certification Date: October 07, 2009
Certified By: Christopher Rucinski - QA Director

ISO Guide 34
Cert# AR-1470

ISO/IEC 17025
Cert# AT-1467

Analyte	*Units*	*Certified [1,4] Value*	*k*[5]	*Standard [2] Deviation*	*Confidence Interval*	*Prediction Interval*
1,3-Dichlorobenzene	µg/Kg	5520 ± 494	1.96	1600	5000 - 6030	2340 - 8690
1,4-Dichlorobenzene	µg/Kg	7840 ± 716	1.96	2290	7110 - 8570	3290 - 12400
Hexachlorobutadiene	µg/Kg	4280 ± 312	1.96	943	3970 - 4590	2410 - 6160
Hexachloroethane	µg/Kg	6100 ± 542	1.96	1630	5570 - 6630	2860 - 9340
Naphthalene	µg/Kg	4460 ± 255	1.96	843	4200 - 4720	2790 - 6130
Nitrobenzene	µg/Kg	5470 ± 385	1.96	1220	5070 - 5870	3040 - 7900
1,2,4-Trichlorobenzene	µg/Kg	1240 ± 93.4	1.96	286	1150 - 1340	674 - 1810
Acenaphthene	µg/Kg	2030 ± 104	1.96	346	1920 - 2140	1340 - 2720
Acenaphthylene	µg/Kg	4020 ± 166	1.96	543	3850 - 4190	2950 - 5100
Anthracene	µg/Kg	2790 ± 154	1.96	472	2640 - 2930	1850 - 3720
Benzo(a)anthracene	µg/Kg	4000 ± 213	1.96	649	3800 - 4200	2720 - 5290
Benzo(a)pyrene	µg/Kg	3880 ± 220	1.96	748	3650 - 4110	2390 - 5360
Benzo(b)fluoranthene	µg/Kg	3680 ± 252	1.96	816	3420 - 3930	2060 - 5290
Benzo(g,h,i)perylene	µg/Kg	5060 ± 303	1.96	1020	4760 - 5370	3040 - 7080
Benzo(k)fluoranthene	µg/Kg	3890 ± 250	1.96	816	3630 - 4150	2270 - 5510
4-Bromophenyl phenyl ether	µg/Kg	11300 ± 712	1.96	2240	10600 - 12000	6860 - 15800
Butyl benzyl phthalate	µg/Kg	6620 ± 578	1.96	1760	6060 - 7170	3120 - 10100
Carbazole	µg/Kg	1730 ± 94.9	1.96	237	1640 - 1820	1250 - 2200
bis(2-Chloroethoxy)methane	µg/Kg	6790 ± 544	1.96	1830	6190 - 7400	3160 - 10400
bis(2-Chloroethyl) ether	µg/Kg	9750 ± 906	1.96	2890	8760 - 10700	3990 - 15500
4-Chlorophenyl phenylether	µg/Kg	4800 ± 264	1.96	858	4520 - 5070	3090 - 6500
Chrysene	µg/Kg	3590 ± 193	1.96	615	3410 - 3770	2370 - 4810
Dibenzo(a,h)anthracene	µg/Kg	2270 ± 143	1.96	464	2120 - 2410	1350 - 3190
Dibenzofuran	µg/Kg	3830 ± 202	1.96	643	3630 - 4040	2560 - 5110

Analyte	*Units*	*Certified Value*[1,4]	*k*[5]	*Standard Deviation*[2]	*Confidence Interval*	*Prediction Interval*
2,4-Dichlorophenol	µg/Kg	6870 ± 370	1.96	1180	6490 - 7240	4530 - 9200
bis(2-Ethylhexyl) phthalate (DEHP)	µg/Kg	4930 ± 367	1.96	1090	4580 - 5280	2770 - 7090
Diethyl phthalate	µg/Kg	7380 ± 485	1.96	1600	6880 - 7880	4210 - 10600
2,4-Dimethylphenol	µg/Kg	3700 ± 390	1.96	1210	3310 - 4090	1300 - 6100
Dimethyl phthalate	µg/Kg	5910 ± 318	1.96	1070	5580 - 6240	3790 - 8030
2,4-Dinitrophenol	µg/Kg	1630 ± 252	2.12	365	1370 - 1900	814 - 2450
2,4-Dinitrotoluene (2,4-DNT)	µg/Kg	5930 ± 371	1.96	1160	5560 - 6300	3630 - 8230
2,6-Dinitrotoluene (2,6-DNT)	µg/Kg	8770 ± 508	1.96	1510	8270 - 9260	5770 - 11800
Di-n-octyl phthalate	µg/Kg	9960 ± 762	1.96	2540	9170 - 10800	4930 - 15000
Fluoranthene	µg/Kg	6500 ± 415	1.96	1400	6080 - 6920	3720 - 9270
Fluorene	µg/Kg	5390 ± 268	1.96	906	5110 - 5670	3590 - 7190
Indeno(1,2,3-cd) pyrene	µg/Kg	980 ± 115	1.96	328	869 - 1090	328 - 1630
Isophorone	µg/Kg	4560 ± 366	1.96	1230	4160 - 4950	2120 - 6990
2-Methylnaphthalene	µg/Kg	2870 ± 164	1.96	526	2710 - 3040	1830 - 3920
2-Methylphenol (o-Cresol)	µg/Kg	4000 ± 313	1.96	994	3680 - 4330	2030 - 5980
4-Methylphenol (p-Cresol)	µg/Kg	4420 ± 725	2.10	1410	3640 - 5210	1330 - 7520
2-Nitroaniline	µg/Kg	2530 ± 146	1.96	440	2380 - 2670	1650 - 3400
2-Nitrophenol	µg/Kg	5830 ± 441	1.96	1470	5360 - 6290	2910 - 8750
4-Nitrophenol	µg/Kg	4760 ± 521	1.96	1540	4210 - 5310	1690 - 7830
n-Nitrosodiphenylamine	µg/Kg	4480 ± 551	1.96	1630	3900 - 5060	1240 - 7720
Pentachlorophenol	µg/Kg	2920 ± 391	1.96	1280	2510 - 3340	373 - 5480
Phenanthrene	µg/Kg	8090 ± 474	1.96	1470	7630 - 8540	5180 - 11000
Phenol	µg/Kg	7280 ± 565	1.96	1880	6670 - 7880	3550 - 11000
Pyrene	µg/Kg	1440 ± 98.3	1.96	309	1340 - 1540	829 - 2060
2,4,6-Trichlorophenol	µg/Kg	7660 ± 435	1.96	1400	7240 - 8080	4880 - 10400

Additional Information

Sample Description

The sample size provided as a pack of 5 x 10g units of soil.

The soil has been sterilized to minimize degradation of the sample.

The sample has been sized to 100 mesh.

The sample has been intentionally prepared with an apparent headspace.

USEPA Method 8270C was the primary method for certification (GC-MS). Contact RTC for further method details.

Storage

The sample should be stored at 4ºC. It has been determined to be stable for the duration of the expiration date.

After sub-sampling replace cap securely and store remaining sample at 4ºC.

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

BNAs - Sandy Loam

Number	**CRM143-50G**
Lot	016496
Solvent (Matrix)	Sandy Loam
Hazard	Irritant
Storage &Handling	Store at 4ºC.
Expiration Date	See Sample Label
Certification Date:	October 07, 2009
Certified By:	Christopher Rucinski - QA Director

Storage

The shelf life of the product was determined by historic stability of similar CRM's. The expiration date may be extended based on stock and popularity upon successful stability testing by a 17025 accredited laboratory.

Stability and shelf life after opening must be determined by the user, taking into account sampling frequency/volume and all local conditions.

Recommended Preparation

Extract an accurately weighed portion (recommended minimum sample is 10 grams) using SW846 Method 3540C, Soxhlet Extraction; 3541, Automated Soxhlet Extraction; 3550, Ultrasonic Extraction or other technique identified by the method to be acceptable for the analytes of interest.

In addition to the solvent systems listed in Method 3540C,the methylene chloride/acetone (1:1 v/v) system is acceptable.

Note: Sample extracts and calibration solutions should be in the same solvent.

Transfer the entire amount of one vial to your extraction system. Rinse the vial with a 2-5 mL your extraction solvent. Assume 10g for the sampling size. Smaller amounts may be sampled but RTC does not maintain homogeneity for sample sizes less than 10g.

Results based on as provided basis assume each vial contains 10g of dry soil.

Scope and Application

The Base Neutral Acid (BNA) Compounds in Soil Certified Reference Material (CRM) consists of four amber glass sample jar, with a Teflon lined closure containing approximately 10 grams of soil, fortified with 49 semi-volatile organics. Being a natural matrix waste sample the analyst is challenged by the same preparation problems, analytical interferences, etc. as is typical for similar matrices received by the laboratory for analysis. Rigorous analysis identified, quantified, and certified various aliphatic and aromatic banding which are listed on the enclosed Certificate of Analysis. The sample has been analyzed by 41 independent laboratories in a round-robin to meet the requirements specified by the ISO Guides 34 and 35, and ISO 17025.

Evaluation of Results

The Reference Value, 95% confidence interval(C.I.) for the Reference Value and 95% Prediction Interval (P.I.) around the Reference Value were obtained by the methods identified in the 'Scope and Application' section of this Certificate of Analysis. Samples were selected in a random fashion from the beginning to the end of the bottling sequence and sent for analysis by an independent laboratory round-robin. The data produced in the round-robin was used to calculate reference values by the USEPA EMSL-CINN's computer program “BIWEIGHT”.

The generated BIWEIGHT mean, BIWEIGHT standard deviation and BIWEIGHT standard deviation of the mean are used to calculate the 95% Confidence Interval (CI) for the mean and the 95% Prediction Interval (PI). For normally distributed data, the BIWEIGHT 95% CI compares well to the classical calculation method used to generate a 95% CI. For non-Gaussian data sets, the BIWEIGHT method is more robust in data treatment.

BIWEIGHT data are also used to calculate a 95% PI. The 95% PI compares well to a 95% tolerance limit calculated using classical methods. For normally distributed data, the BIWEIGHT 95% PI typically represents approximately a ±2 BIWEIGHT standard deviation window around the BIWEIGHT mean. Again, the BIWEIGHT method is more robust than classical methods when handling non-Gaussian data sets.

Laboratories performing the same analytical procedures on a sample whose values have been determined by the BIWEIGHT method can assume that the true mean, as determined by the method, is within the 95% CI window. Laboratories analyzing the sample should have results within the 95% PI window 19 out of 20 analyses. Laboratories should use the PI as guidance for laboratory performance.

Additional information on the program may be obtained by referring to the reference or by downloading the program from the EMSL-CINN web site. Additionally contact RTC for additional guidance - 1(307)742-5452 - support@rt-corp.com - www.rt-corp.com

Health and Safety Information

All RTC Certified Reference Materials are intended only for professional use by properly trained laboratory personnel. This CRM has been reviewed for both health and safety and shipping risks. It is classified as non hazardous and is not classified as hazardous goods for shipping by road, sea or air transport.

A full international MSDS as a downloadable pdf file is available at www.rt-corp.com

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1 Certified values are the robust statisitical mean when prepared according to instructions from an Interlaboratory Study and internal rigorous testing.
2 The standard deviation is the robust statistical standard deviation from the round robin interlaboratory study.
4 Expanded Uncertainty (Ucrm) - All uncertainty values in this document expressed as ± *value* are expanded uncertainties.
5 ***k*:** Coverage factor derived from a t-distribution table, based on the degrees of freedom of the data set. **Confidence interval = 95%**

TRACEABILITY: The standard was manufactured under an ISO 17025 certified quality system. The balance used to weigh raw materials is accurate to +/- 0.0001g and calibrated regularly using mass standards traceable to NIST. All dilutions were preformed gravimetrically. Additionally, individual analytes are traceable to NIST SRMs where available and specified above.

HOMOGENEITY ASSESSMENT: Between-bottle homogeneity was assessed in accordance with ISO Guide 35. Completed units were sampled over the course of the bottling operation. Samples were taken in the following manner: the units produced in the bottling operation were divided into three chronological groups, those from the Early third, the Middle third, and the Late third (Groups). A pre-determined number of sample units were then randomly selected from each group. A subset of each group was then randomly selected for chemical analysis. The results of the chemical analysis were then compared by Single Factor Analysis of Variance (ANOVA).

UNCERTAINTY STATEMENT: Uncertainty values in this document are expressed as Expanded Uncertainty (Ucrm) corresponding to the 95% confidence interval. Ucrm is derived from the combined standard uncertainty multiplied by the coverage factor k, which is obtained from a *t*-distribution and degrees of freedom. The components of combined standard uncertainty include the uncertainties due to characterization, homogeneity, long term stability, and short term stability (transport). The components due to stability are generally considered to be negligible unless otherwise indicated by stability studies.

THIS PRODUCT WAS DESIGNED, PRODUCED AND VERIFIED FOR ACCURACY AND STABILITY IN ACCORDANCE WITH ISO 17025 (AClass Cert AT-1467) and ISO GUIDE 34 (AClass Cert AR-1470).

MSDS reports for components comprising greater than 1.0% of the solution or 0.1% for components known to be carcinogens are available upon request.

Manufactured and certified by Sigma-Aldrich RTC, Inc.

I-7428

I-7429

I-7430

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

Pesticides - Loamy Sand

Number CRM860-50G
Lot 010760
Solvent (Matrix) Loamy Sand Soil
Hazard Irritant
Storage &Handling Store at 4°C.
Expiration Date See Sample Label
Certification Date: August 23, 2010
Certified By: Christopher Rucinski - QA Director

ISO Guide 34
Cert# AR-1470

ISO/IEC 17025
Cert# AT-1467

Analyte	*Units*	*Certified[1,4] Value*	*k[5]*	*Standard[2] Deviation*	*Confidence Interval*	*Prediction Interval*
Hexachlorobenzene	µg/Kg	83.3 ± 6.09	2.00	18.0	71.2 - 95.4	41.5 - 125
delta-BHC	µg/Kg	65.7 ± 4.57	2.31	13.5	61.2 - 70.2	38.8 - 92.6
alpha-BHC (alpha-Hexachlorocyclohexane)	µg/Kg	115 ± 8.87	2.31	26.2	106 - 124	62.9 - 167
beta-BHC (beta-Hexachlorocyclohexane)	µg/Kg	109 ± 10.8	2.31	31.8	98.7 - 120	45.9 - 172
alpha-Chlordane	µg/Kg	74.0 ± 5.04	2.00	14.9	68.8 - 79.3	44.3 - 104
gamma-Chlordane	µg/Kg	101 ± 6.33	2.00	18.7	94.6 - 107	63.8 - 138
4,4'-DDD	µg/Kg	116 ± 6.13	2.00	18.1	111 - 122	80.4 - 152
4,4'-DDE	µg/Kg	70.8 ± 4.37	2.31	12.9	66.7 - 75.0	45.3 - 96.4
4,4'-DDT	µg/Kg	49.4 ± 4.23	2.00	12.5	45.4 - 53.4	24.6 - 74.2
Dieldrin	µg/Kg	79.7 ± 4.40	2.00	13.0	75.4 - 83.9	53.8 - 106
Endosulfan I	µg/Kg	91.5 ± 6.77	2.31	20.0	74.9 - 98.0	51.7 - 131
Endosulfan II	µg/Kg	111 ± 7.75	2.00	22.9	103 - 118	65.1 - 156
Endosulfan sulfate	µg/Kg	58.6 ± 4.16	2.00	12.3	54.6 - 62.7	34.2 - 83.1
Endrin aldehyde	µg/Kg	50.2 ± 6.09	2.00	18.4	43.9 - 56.5	13.6 - 86.9
Endrin ketone	µg/Kg	119 ± 9.95	2.00	29.4	108 - 130	57.5 - 180
Endrin	µg/Kg	75.3 ± 6.09	2.00	18.0	69.6 - 81.1	39.5 - 111
Heptachlor	µg/Kg	68.1 ± 8.60	2.00	25.4	59.6 - 76.6	17.7 - 119
Heptachlor epoxide	µg/Kg	106 ± 6.43	2.00	19.0	100.00 - 113	68.7 - 144
Methoxychlor	µg/Kg	96.6 ± 8.60	2.00	25.4	88.0 - 105	46.0 - 147

Additional Information

Description, Storage and Handling

The soil has been sterilized to minimize degradation of the sample.

The sample has been sized to 100 mesh.

Required storage condition is 4°C.

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

Pesticides - Loamy Sand

Number	**CRM860-50G**
Lot	010760
Solvent (Matrix)	Loamy Sand Soil
Hazard	Irritant
Storage &Handling	Store at 4°C.
Expiration Date	See Sample Label
Certification Date:	August 23, 2010
Certified By:	Christopher Rucinski - QA Director

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1 Certified values are the robust statisitical mean when prepared according to instructions from an Interlaboratory Study and internal rigorous testing.
2 The standard deviation is the robust statistical standard deviation from the round robin interlaboratory study.
4 Expanded Uncertainty (Ucrm) - All uncertainty values in this document expressed as ± *value* are expanded uncertainties.
5 ***k***: Coverage factor derived from a t-distribution table, based on the degrees of freedom of the data set. **Confidence interval = 95%**

TRACEABILITY: The standard was manufactured under an ISO 17025 certified quality system. The balance used to weigh raw materials is accurate to +/- 0.0001g and calibrated regularly using mass standards traceable to NIST. All dilutions were preformed gravimetrically. Additionally, individual analytes are traceable to NIST SRMs where available and specified above.

HOMOGENEITY ASSESSMENT: Between-bottle homogeneity was assessed in accordance with ISO Guide 35. Completed units were sampled over the course of the bottling operation. Samples were taken in the following manner: the units produced in the bottling operation were divided into three chronological groups, those from the Early third, the Middle third, and the Late third (Groups). A pre-determined number of sample units were then randomly selected from each group. A subset of each group was then randomly selected for chemical analysis. The results of the chemical analysis were then compared by Single Factor Analysis of Variance (ANOVA)

UNCERTAINTY STATEMENT: Uncertainty values in this document are expressed as Expanded Uncertainty (Ucrm) corresponding to the 95% confidence interval. Ucrm is derived from the combined standard uncertainty multiplied by the coverage factor k, which is obtained from a *t*-distribution and degrees of freedom. The components of combined standard uncertainty include the uncertainties due to characterization, homogeneity, long term stability, and short term stability (transport). The components due to stability are generally considered to be negligible unless otherwise indicated by stability studies.

THIS PRODUCT WAS DESIGNED, PRODUCED AND VERIFIED FOR ACCURACY AND STABILITY IN ACCORDANCE WITH ISO 17025 (AClass Cert AT-1467) and ISO GUIDE 34 (AClass Cert AR-1470)

MSDS reports for components comprising greater than 1 0% of the solution or 0 1% for components known to be carcinogens are available upon request.

Manufactured and certified by Sigma-Aldrich RTC, Inc.

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PAHs - Sandy Loam Soil

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

ISO Guide 34
Cert# AR-1470

ISO/IEC 17025
Cert# AT-1467

Number CRM172-100
Lot 013043
Solvent (Matrix) Sandy Loam Soil
Hazard Irritant
Storage &Handling Store at +4° C
Expiration Date See Sample Label
Certification Date: July 28, 2010
Certified By: Christopher Rucinski - QA Director

Analyte	*Units*	*Certified*[1,4] *Value*	*k*[5]	*Standard Deviation*[2]	*Confidence Interval*	*Prediction Interval*
Naphthalene	µg/Kg	140 ± 38.4	2.15	56.7	104 - 177	13.3 - 267
Acenaphthene	µg/Kg	94.9 ± 24.7	2.15	36.4	70.9 - 119	13.2 - 177
Acenaphthylene	µg/Kg	55.6 ± 18.1	2.16	25.1	37.1 - 74.2	0.00 - 113
Anthracene	µg/Kg	17.7 ± 2.67	2.23	2.93	15.1 - 20.3	10.7 - 24.8
Benzo(a)anthracene	µg/Kg	303 ± 47.4	2.15	69.9	258 - 347	146 - 459
Benzo(a)pyrene	µg/Kg	33.9 ± 10.9	2.20	13.0	18.9 - 48.9	1.54 - 66.3
Benzo(b)fluoranthene	µg/Kg	177 ± 25.4	2.15	37.4	153 - 202	93.3 - 261
Benzo(g,h,i)perylene	µg/Kg	452 ± 81.2	2.15	120	365 - 539	181 - 723
Benzo(k)fluoranthene	µg/Kg	62.6 ± 11.2	2.15	16.5	51.3 - 73.8	25.3 - 99.8
Chrysene	µg/Kg	154 ± 20.8	2.15	30.7	133 - 174	84.7 - 223
Dibenzo(a,h)anthracene	µg/Kg	284 ± 30.5	2.15	44.9	254 - 313	183 - 385
Fluoranthene	µg/Kg	634 ± 82.4	2.15	121	560 - 708	363 - 905
Fluorene	µg/Kg	66.4 ± 11.2	2.15	16.5	55.3 - 77.4	29.3 - 103
Indeno(1,2,3-cd) pyrene	µg/Kg	179 ± 28.3	2.15	41.7	148 - 209	84.0 - 273
Phenanthrene	µg/Kg	168 ± 7.62	2.15	11.2	160 - 176	143 - 193
Pyrene	µg/Kg	86.5 ± 13.0	2.15	19.2	73.5 - 99.4	43.4 - 130

Additional Information

Description

The organic sample is a soil containing extractable PAHs for analysis by 8100, 8270, 8310 or equivalent methods.

The sample size provided is 100 g of soil.

The soil has been sterilized to minimize degradation of the sample.

The sample has been sized to 100 mesh.

Required storage condition is 4°C.

The sample has been intentionally prepared with an apparent headspace.

ACLASS ACCREDITED
REFERENCE MATERIAL PRODUCER

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RTC

PAHs - Sandy Loam Soil

CERTIFIED REFERENCE MATERIAL

Number CRM172-100
Lot 013043
Solvent (Matrix) Sandy Loam Soil
Hazard Irritant
Storage &Handling Store at +4° C
Expiration Date See Sample Label
Certification Date: July 28, 2010
Certified By: Christopher Rucinski - QA Director

Storage

The sample should be stored at 4°C. It has been determined to be stable for the duration of the expiration date.

After sub-sampling replace cap securely and store remaining sample at 4°C.

The shelf life of the product was determined by historic stability of similar CRM's. The expiration date may be extended based on stock and popularity upon successful stability testing by a 17025 accredited laboratory.

Stability and shelf life after opening must be determined by the user, taking into account sampling frequency/volume and all local conditions.

Preparation Instructions

Extract an accurately weighed portion using the method for which you are seeking accreditation. Minimum sampling size is 1gram.

Note: Sample extracts and calibration solutions should be in the same solvent.

Determination of the percent moisture content of the material is required.

NOTE for method 8100 and using a packed column gas chromatographic method or cannot adequately resolve the following may coelute in four pairs of compounds: anthracene and phenanthrene; chrysene and benzo(a)anthracene; benzo(b)fluoranthene and benzo(k)fluoranthene; and dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene

Results reported on a dry weight basis.

Scope and Application

The Polyaromatic Hydrocarbons (PAHs) in Soil Certified Reference Material (CRM) consists of a single amber glass sample jar, with a Teflon lined closure containing approximately 100 grams of soil, fortified with 16 PAHs. Being a natural matrix waste sample the analyst is challenged by the same preparation problems, analytical interferences, etc. as is typical for similar matrices received by the laboratory for analysis. Rigorous analyses identified, quantified, and certified various aliphatic and aromatic banding which are listed on the enclosed Certificate of Analysis. The sample has been analyzed by a minimum of 12 independent laboratories in a round-robin to meet the requirements specified by the ISO Guides 34 and 35, and ISO 17025.

Evaluation of Results

The Reference Value, 95% confidence interval(C.I.) for the Reference Value and 95% Prediction Interval (P.I.) around the Reference Value were obtained by the methods identified in the 'Scope and Application' section of this Certificate of Analysis. Samples were selected in a random fashion from the beginning to the end of the bottling sequence and sent for analysis by an independent laboratory round-robin. The data produced in the round-robin was used to calculate reference values by the USEPA EMSL-CINN's computer program "BIWEIGHT".

The generated BIWEIGHT mean, BIWEIGHT standard deviation and BIWEIGHT standard deviation of the mean are used to calculate the 95% Confidence Interval (CI) for the mean and the 95% Prediction Interval (PI). For normally distributed data, the BIWEIGHT 95% CI compares well to the classical calculation method used to generate a 95% CI. For non-Gaussian data sets, the BIWEIGHT method is more robust in data treatment.

BIWEIGHT data are also used to calculate a 95% PI. The 95% PI compares well to a 95% tolerance limit calculated using classical methods. For normally distributed data, the BIWEIGHT 95% PI typically represents approximately a ±2 BIWEIGHT standard deviation window around the BIWEIGHT mean. Again, the BIWEIGHT method is more robust than classical methods when handling non-Gaussian data sets.

Laboratories performing the same analytical procedures on a sample whose values have been determined by the BIWEIGHT method can assume that the true mean, as determined by the method, is within the 95% CI window. Laboratories analyzing the sample should have results within the 95% PI window 19 out of 20 analyses. Laboratories should use the PI as guidance for laboratory performance.

Additional information on the program may be obtained by referring to the reference or by downloading the program from the EMSL-CINN web site. Additionally contact RTC for additional guidance - 1(307)742-5452 - support@rt-corp.com - www.rt-corp.com

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PAHs - Sandy Loam Soil

Certificate of Analysis

CERTIFIED REFERENCE MATERIAL

Number CRM172-100
Lot 013043
Solvent (Matrix) Sandy Loam Soil
Hazard Irritant
Storage &Handling Store at +4° C
Expiration Date See Sample Label
Certification Date: July 28, 2010
Certified By: Christopher Rucinski - QA Director

Health and Safety Information

All RTC Certified Reference Materials are intended only for professional use by properly trained laboratory personnel. This CRM has been reviewed for both health and safety and shipping risks. It is classified as non hazardous and is not classified as hazardous goods for shipping by road, sea or air transport.

A full international MSDS as a downloadable pdf file is available at www.rt-corp.com

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1 Certified values are the robust statisitical mean when prepared according to instructions from an Interlaboratory Study and internal rigorous testing.
2 The standard deviation is the robust statistical standard deviation from the round robin interlaboratory study.
4 Expanded Uncertainty (Ucrm) - All uncertainty values in this document expressed as ± *value* are expanded uncertainties.
5 *k*: Coverage factor derived from a t-distribution table, based on the degrees of freedom of the data set. **Confidence Interval = 95%**

Traceability: The standard was manufactured under an ISO 17025 certified quality system. The balance used to weigh raw materials is accurate to +/- 0.0001g and calibrated regularly using mass standards traceable to NIST. All dilutions were preformed gravimetrically. Additionally, individual analytes are traceable to NIST SRMs where available and specified above.

THIS PRODUCT WAS DESIGNED, PRODUCED AND VERIFIED FOR ACCURACY AND STABILITY IN ACCORDANCE WITH ISO 17025 (AClass Cert AT-1467) and ISO GUIDE 34 (AClass Cert AR-1470).

MSDS reports for components comprising greater than 1.0% of the solution or 0.1% for components known to be carcinogens are available upon request.

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REFERENCE MATERIAL PRODUCER

ACLASS ACCREDITED
TESTING

RTC

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Web: www.RT-Corp.com

I-7391

National Institute of Standards & Technology

Certificate of Analysis

Standard Reference Material® 1944

New York/New Jersey Waterway Sediment

Standard Reference Material (SRM) 1944 is a mixture of marine sediment collected near urban areas in New York and New Jersey. SRM 1944 is intended for use in evaluating analytical methods for the determination of selected polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCB) congeners, chlorinated pesticides, and trace elements in marine sediment and similar matrices. Reference values are also provided for selected polybrominated diphenyl ether (PBDE) congeners, selected dibenzo-*p*-dioxin and dibenzofuran congeners, total organic carbon, total extractable material, and particle size characteristics. Information values are provided for selected polychlorinated naphthalenes (PCNs) and hexabromocyclododecanes (HBCDs). All of the constituents for which certified, reference, and information values are provided in SRM 1944 were naturally present in the sediment before processing. A unit of SRM 1944 consists of a bottle containing 50 g of radiation-sterilized, freeze-dried sediment.

Certified Mass Fraction Values: Certified values for mass fractions of PAHs, PCB congeners, chlorinated pesticides, and trace elements are provided in Tables 1 through 4. A NIST certified value is a value for which NIST has the highest confidence in its accuracy in that all known or suspected sources of bias have been investigated or taken into account [1]. The certified values for the PAHs, PCB congeners, and chlorinated pesticides are based on the agreement of results obtained at NIST using two or more chemically independent analytical techniques. The certified values for the trace elements are based on NIST measurements by one technique and additional results from several collaborating laboratories.

Reference Mass Fraction Values: Reference values are provided for mass fractions of additional PAHs (some in combination) in Tables 5 and 6, additional PCB congeners and chlorinated pesticides in Table 7, PBDE congeners in Table 8, and additional inorganic constituents in Tables 9 and 10. Reference values are provided in Table 11 for the 2,3,7,8-substituted polychlorinated dibenzo-*p*-dioxin and dibenzofuran congeners and total tetra-, penta-, hexa-, and hepta-congeners of polychlorinated dibenzo-*p*-dioxin and dibenzofuran. Reference values for particle size characteristics are provided in Table 12 and 13. Reference values for total organic carbon and percent extractable mass are provided in Table 14. Reference values are noncertified values that are the best estimate of the true value; however, the values do not meet the NIST criteria for certification and are provided with associated uncertainties that may reflect only measurement precision, may not include all sources of uncertainty, or may reflect a lack of sufficient statistical agreement among multiple analytical methods [1].

Information Mass Fraction Values: Information values are provided in Table 15 for mass fractions of additional trace elements, in Table 16 for PCN congeners (some in combination), and in Table 17 for HBCD isomers. An information value is considered to be a value that will be of interest and use to the SRM user, but insufficient information is available to assess the uncertainty associated with the value or only a limited number of analyses were performed [1].

Expiration of Certification: The certification of **SRM 1944** is valid, within the measurement uncertainties specified, until **31 March 2017**, provided the SRM is handled and stored in accordance with the instructions given in this certificate (see "Instructions for Handling, Storage, and Use"). The certification is nullified if the SRM is damaged, contaminated, or otherwise modified.

Stephen A. Wise, Chief
Analytical Chemistry Division

Gaithersburg, MD 20899
Certificate Issue Date: 27 September 2011
Certificate Revision History on Page 20

Robert L. Watters, Jr., Chief
Measurement Services Division

Maintenance of SRM Certification: NIST will monitor this SRM over the period of its certification. If substantive technical changes occur that affect the certification before the expiration of this certificate, NIST will notify the purchaser. Registration (see attached sheet) will facilitate notification.

The coordination of the technical measurements leading to the certification was performed by M.M. Schantz and S.A. Wise of the NIST Analytical Chemistry Division.

Consultation on the statistical design of the experimental work and evaluation of the data were provided by S.D. Leigh, M.G. Vangel, and M.S. Levenson of the NIST Statistical Engineering Division.

Support aspects involved in the issuance of this SRM were coordinated through the NIST Measurement Services Division.

The sediment was collected with the assistance of the New York District of the U.S. Army Corp of Engineers (ACENYD), who provided the expertise in the site selection, the ship, sampling equipment, and personnel. L. Rosman of ACENYD and R. Parris (NIST) coordinated the collection of this sediment. Collection and preparation of SRM 1944 were performed by R. Parris, M. Cronise, and C. Fales (NIST); L. Rosman and P. Higgins (ACENYD), and the crew of the *Gelberman* from the ACE Caven Point facility in Caven Point, NJ.

Analytical measurements for the certification of SRM 1944 were performed at NIST by E.S. Beary, D.A. Becker, R.R. Greenberg, J.M. Keller, J.R. Kucklick, M. Lopez de Alda, K.E. Murphy, R. Olfaz, B.J. Porter, D.L. Poster, L.C. Sander, P. Schubert, M.M. Schantz, S.S. Vander Pol, and L. Walton of the Analytical Chemistry Division. Measurements for percent total organic carbon measurements were provided by three commercial laboratories and T.L. Wade of the Geochemical and Environmental Research Group, Texas A&M University (College Station, TX, USA). The particle-size distribution data were provided by Honeywell, Inc. (Clearwater, FL, USA). Additional results for PBDE congeners were used from ten laboratories (see Appendix A) that participated in an interlaboratory study specifically for PBDEs in Marine Sediment coordinated by H.M. Stapleton of the NIST Analytical Chemistry Division. M. LaGuardia of Virginia Institute of Marine Science (Gloucester Point, VA, USA) provided one set of measurements for the HBCDs.

Values for the polychlorinated dibenzo-*p*-dioxins and dibenzofurans were the results of an interlaboratory comparison study among fourteen laboratories (see Appendix B) coordinated by S.A. Wise of the NIST Analytical Chemistry Division and R. Turle and C. Chiu of Environment Canada Environmental Technology Centre, Analysis and Air Quality Division (Ottawa, ON, Canada). Analytical measurements for selected trace elements were provided by the International Atomic Energy Agency (IAEA, Seibersdorf, Austria) by M. Makarewicz and R. Zeisler. Results were also used from seven laboratories (see Appendix C) that participated in an intercomparison exercise coordinated by S. Willie of the Institute for National Measurement Standards, National Research Council Canada (NRCC; Ottawa, ON, Canada).

INSTRUCTIONS FOR HANDLING, STORAGE, AND USE

Handling: This material is naturally occurring marine sediment from an urban area and may contain constituents of unknown toxicities; therefore, caution and care should be exercised during its handling and use.

Storage: SRM 1944 must be stored in its original bottle at temperatures less than 30 °C away from direct sunlight.

Use: Prior to removal of test portions for analysis, the contents of the bottle should be mixed. The concentrations of constituents in SRM 1944 are reported on a dry-mass basis. The SRM, as received, contains a mass fraction of approximately 1.3 % moisture. The sediment sample should be dried to a constant mass before weighing for analysis or, if the constituents of interest are volatile, a separate test portion of the sediment should be removed from the bottle at the ~~time of analysis and dried to determine the mass fraction on a dry-mass basis.~~

PREPARATION AND ANALYSIS[1]

Sample Collection and Preparation: The sediment used to prepare this SRM was collected from six sites in the vicinity of New York Bay and Newark Bay in October 1994. Site selection was based on contaminant levels measured in previous samples from these sites and was intended to provide relatively high concentrations for a variety of chemical classes of contaminants. The sediment was collected using an epoxy-coated modified Van Veen-type grab sampler designed to sample the sediment to a depth of 10 cm. A total of approximately 2100 kg of wet sediment was collected from the six sites. The sediment was freeze-dried, sieved (nominally 250 µm to 61 µm), homogenized in a cone blender, radiation sterilized at an estimated minimum dose of 32 kilograys (^{60}Co), and then packaged in screw-capped amber glass bottles.

Conversion to Dry-Mass Basis: The results for the constituents in SRM 1944 are reported on a dry-mass basis; however, the material as received contains residual moisture. The amount of moisture in SRM 1944 was determined by measuring the mass loss after freeze drying test portions of 1.6 g to 2.5 g for five days at 1 Pa with a –10 °C shelf temperature and a –50 °C condenser temperature. The mass fraction of moisture in SRM 1944 at the time of the certification analyses was 1.25 % ± 0.03 % (95 % confidence level).

Polycyclic Aromatic Hydrocarbons: The general approach used for the value assignment of the PAHs in SRM 1944 consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques [2]. Techniques and solvents involved were Soxhlet extraction and pressurized fluid extraction (PFE) using dichloromethane (DCM) or a hexane/acetone mixture, clean up of the extracts using solid-phase extraction (SPE), or normal-phase liquid chromatography (LC), followed by analysis using the following techniques: (1) reversed-phase liquid chromatography with fluorescence detection (LC-FL) analysis of the total PAH fraction, (2) reversed-phase LC-FL analysis of isomeric PAH fractions isolated by normal-phase LC (i.e., multidimensional LC), (3) gas chromatography/mass spectrometry (GC/MS) analysis of the PAH fraction on four stationary phases of different selectivity, i.e., a 5 % (mole fraction) phenyl-substituted methylpolysiloxane phase, a 50 % phenyl-substituted methylpolysiloxane phase, a proprietary non-polar polysiloxane phase, and a smectic liquid crystalline stationary phase.

Seven sets of GC/MS results, designated as GC/MS (I), GC/MS (II), GC/MS (III), GC/MS (IV), GC/MS (V), GC/MS (VI), and GC/MS (Sm), were obtained using four columns with different selectivities for the separation of PAHs. For GC/MS (I) analyses, duplicate test portions of 1 g from eight bottles of SRM 1944 were Soxhlet extracted for 24 h with DCM. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through a silica SPE cartridge and eluted with 2 % DCM in hexane. (All extraction and LC solvent compositions are expressed as volume fractions unless otherwise noted.) The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness) (DB-5 MS, J&W Scientific, Folsom, CA). The GC/MS (II) analyses were performed using 1 g to 2 g test portions from three bottles of SRM 1944 and 2 g to 3 g test portions from three bottles of SRM 1944 that had been mixed with a similar amount of water (i.e., a wetted sediment). These test portions were Soxhlet extracted with DCM and processed through the silica SPE as described above; however, the extract was further fractionated using normal-phase LC on a semi-preparative aminopropylsilane column to isolate the PAH fraction. The PAH fraction was then analyzed using the same column as described above for GC/MS (I); however, the test portions were extracted, processed, and analyzed as part of three different sample sets at different times using different calibrations for each set. For the GC/MS (III), 1 g to 2 g test portions from six bottles of SRM 1944 were Soxhlet extracted for 18 h with 250 mL of a mixture of 50 % hexane/50 % acetone. The extracts were then processed and analyzed as described for GC/MS (II). For GC/MS (IV) analyses, 1 g to 2 g test portions from six bottles of SRM 1944 were extracted using PFE with a mixture of 50 % hexane/50 % acetone, and the extracts were processed as described above for GC/MS (II). The GC/MS (V) results were obtained by analyzing three of the same PAH fractions that were analyzed in GC/MS (III) and three of the PAH fractions that were analyzed in GC/MS (IV) using a 50 % (mole fraction) phenyl-substituted methylpolysiloxane stationary phase (0.25 mm i.d. × 60 m, 0.25 µm film thickness) (DB-17MS, J&W Scientific, Folsom, CA). For GC/MS (VI) analyses, three test portions of 0.7 g from one bottle of SRM 1944 were Soxhlet extracted for 24 h with DCM. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through an aminopropyl SPE cartridge and eluted with 20 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a proprietary non-polar polysiloxane phase (0.25 µm film thickness) (DB-XLB, J&W Scientific). For GC/MS (Sm) 1 g to 2 g test portions from six bottles of SRM 1944 were Soxhlet extracted for 24 h with 250 mL of DCM. The extracts were processed as described above for

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[1] Certain commercial equipment, instruments, or materials are identified in this report to adequately specify the experimental procedure. Such identification does not imply recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that the materials or equipment identified are necessarily the best available for the purpose.

GC/MS (I) using an aminopropylsilane SPE cartridge followed by GC/MS analysis using 0.2 mm i.d. × 25 m (0.15 µm film thickness) smectic liquid crystalline phase (SB-Smectic, Dionex, Lee Scientific Division, Salt Lake City, UT).

Two sets of LC-FL results, designated as LC-FL (Total) and LC-FL (Fraction), were used in the certification process. Test portions of approximately 1 g from six bottles of SRM 1944 were Soxhlet extracted for 20 h using 200 mL of 50 % hexane/50 % acetone. The extracts were concentrated and then processed through two aminopropylsilane SPE cartridges connected in series to obtain the total PAH fraction. A second 1 g test portion from the six bottles was Soxhlet extracted and processed as described above; the PAH fraction was then fractionated further on a semi-preparative aminopropylsilane column (µBondapak NH_2, 9 mm i.d. × 30 cm, Waters Associates, Milford, MA) to isolate isomeric PAH fractions. The total PAH fraction and the isomeric PAH fractions were analyzed using a 5-µm particle-size polymeric octadecylsilane (C_{18}) column (4.6 mm i.d. × 25 cm, Hypersil-PAH, Keystone Scientific, Inc., Bellefonte, PA) with wavelength-programmed fluorescence detection. For all of the GC/MS and LC-FL measurements described above, selected perdeuterated PAHs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

Homogeneity Assessment for PAHs: The homogeneity of SRM 1944 was assessed by analyzing duplicate test portions of 1 g from eight bottles selected by stratified random sampling. Test portions were extracted, processed, and analyzed as described above for GC/MS (I). No statistically significant differences among bottles were observed for the PAHs at the 1 g test portion size.

PAH Isomers of Molecular Mass 300 and 302: For the determination of the molecular mass 300 and 302 PAH isomers, three test portions of approximately 5 g each were extracted using PFE with DCM. The extracts were then concentrated with a solvent change to hexane and passed through an aminopropyl SPE cartridge and eluted with 10 % DCM in hexane. The processed extract was then analyzed by GC/MS using a 0.25 mm i.d. × 60 m fused silica capillary column with a 50 % phenyl-substitued methylpolysiloxane phase (0.25 µm film thickness; DB-17MS, J&W Scientific, Folsom, CA). Perdeuterated dibenzo[*a,i*]pyrene was added to the sediment prior to extraction for use as an internal standard.

PCBs and Chlorinated Pesticides: The general approach used for the determination of PCBs and chlorinated pesticides in SRM 1944 consisted of combining results from analyses using various combinations of different extraction techniques and solvents, cleanup/isolation procedures, and chromatographic separation and detection techniques [2]. This approach consisted of Soxhlet extraction and PFE using DCM or a hexane/acetone mixture, clean up/isolation using SPE or LC, followed by analysis using GC/MS and gas chromatography with electron capture detection (GC-ECD) on two columns with different selectivity.

Eight sets of results were obtained designated as GC-ECD (I) A and B, GC-ECD (II) A and B, GC/MS (I), GC/MS (II), GC/MS (III), and QA Exercise. For the GC-ECD (I) analyses, 1 g test portions from four bottles of SRM 1944 were Soxhlet extracted with DCM for 18 h. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The concentrated eluant was then fractionated on a semi-preparative aminopropylsilane column to isolate two fractions containing: (1) the PCBs and lower polarity pesticides and, (2) the more polar pesticides. GC-ECD analyses of the two fractions were performed on two columns of different selectivities for PCB separations: 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness) (DB-5, J&W Scientific, Folsom, CA) and a 0.32 mm × 100 m fused silica capillary column with a 50 % (mole fraction) octadecyl (C18) methylpolysiloxane phase (0.1 µm film thickness) (CPSil 5 C18 CB, Chrompack International, Middelburg, The Netherlands). The results from the 5 % phenyl phase are designated as GC-ECD (IA) and the results from the C18 phase are designated as GC-ECD (IB). A second set of samples was also analyzed by GC-ECD (i.e., GC-ECD IIA and IIB). Test portions of 1 g to 2 g from three bottles of SRM 1944 and 2 g to 3 g test portions from three bottles of SRM 1944 that had been mixed with a similar amount of water (i.e., a wetted sediment) were extracted, processed, and analyzed as described above for GC-ECD (I); however, the test portions were extracted, processed and analyzed as part of three different sample sets at different times using different calibrations for each set.

Three sets of results were obtained by GC/MS. For GC/MS (I), 1 g to 2 g test portions from six bottles were Soxhlet extracted with a mixture of 50 % hexane/50 % acetone. Copper powder was added to the extract to remove elemental sulfur. The concentrated extract was passed through a silica SPE cartridge and eluted with 10 % DCM in hexane. The extract was then analyzed by GC/MS using a 0.25 mm × 60 m fused silica capillary column with a 5 % phenyl-substituted methylpolysiloxane phase (0.25 µm film thickness). The GC/MS (II) results were obtained in the same manner as the GC/MS (I) analyses except that the six test portions were extracted using PFE. The GC/MS (III) analyses were performed on the same extract fractions analyzed in GC-ECD (II) using the 5 % phenyl-substituted methylpolysiloxane phase describe above for GC/MS (I). For both the GC-ECD and GC/MS analyses, two PCB congeners that are not significantly present in the sediment extract (PCB 103 and PCB 198 [3]), and 4,4'-DDT-d_8 were added to the sediment prior to extraction for use as internal standards for quantification purposes.

In addition to the analyses performed at NIST, SRM 1944 was used in an interlaboratory comparison exercise in 1995 as part of the NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment [4]. Results from nineteen laboratories that participated in this exercise were used as the eighth data set in the determination of the certified values for PCB congeners and chlorinated pesticides in SRM 1944. The laboratories participating in this exercise used the analytical procedures routinely used in their laboratories to measure PCB congeners and chlorinated pesticides.

Polybrominated Diphenyl Ethers: Value assignment of the concentrations of eight PBDE congeners was based on the means of results from two interlaboratory studies [5,6] and two sets of data from NIST. The laboratories participating in the interlaboratory exercises (see Appendix A) employed the analytical procedures routinely used in their laboratories to measure PBDEs. For the two methods used at NIST, six test portions (between 1 g and 2 g) were extracted using PFE at 100 °C with DCM. The extracts were cleaned up using an alumina column (5 % deactivated) SPE column. Size exclusion chromatography (SEC) on a divinylbenzene-polystyrene column (10 µm particle size, 10 nm (100 angstrom) pore size, 7.5 mm i.d. × 300 mm, PL-Gel, Polymer Labs, Inc.) was then used to remove the sulfur. The PBDEs, as well as PCBs and pesticides, were quantified using GC/MS in the electron impact mode on a 0.18 mm i.d. × 30 m fused silica capillary column with a 5 % (mole fraction) phenyl methylpolysiloxane phase (0.18 µm film thickness; DB-5MS, Agilent Technologies). The PBDEs were also quantified using GC/MS in the negative chemical ionization mode on a 0.18 mm i.d. × 10 m fused silica capillary column with a 5 % (mole fraction) phenyl methylpolysiloxane phase (0.18 µm film thickness; DB-5MS, Agilent Technologies). Selected Carbon-13 labeled PBDE and PCB congeners were added to the sediment prior to extraction for use as internal standards for quantification purposes.

Polychlorinated Dibenzo-*p*-dioxins and Dibenzofurans: Value assignment of the concentrations of the polychlorinated dibenzo-*p*-dioxin and dibenzofuran congeners and the total tetra- through hepta- substituted polychlorinated dibenzo-*p*-dioxins and dibenzofurans was accomplished by combining results from the analysis of SRM 1944 by fourteen laboratories that participated in an interlaboratory comparison study (see Appendix B). Each laboratory analyzed three test portions (typically 1 g) of SRM 1944 using their routine analytical procedures and high resolution gas chromatography with high resolution mass spectrometry detection (GC-HRMS). The analytical procedures used by all of the laboratories included spiking with ^{13}C-labeled surrogates (internal standards); Soxhlet extraction with toluene; sample extract cleanup with acid/base silica, alumina, and carbon columns; and finally analysis of the cleaned up extract with GC-HRMS. Most of the laboratories used a 5 % phenyl-substituted methylpolysiloxane phase capillary column (DB-5), and about half of the laboratories confirmed 2,3,7,8-tetrachlorodibenzofuran using a 50 % cyanopropylphenyl-substituted methylpolysiloxane (DB-225, J&W Scientific, Folsom, CA) capillary column.

Analytical Approach for Inorganic Constituents: Value assignment for the concentrations of selected trace elements was accomplished by combining results of the analyses of SRM 1944 from NIST, NRCC, IAEA, and seven laboratories that participated in an interlaboratory comparison exercise coordinated by NRCC [7] (see Appendix C). The analytical methods used for the determination of each element are summarized in Table 18. For the certified concentration values listed in Table 4, results were combined from: (1) analyses at NIST using isotope dilution inductively coupled plasma mass spectrometry (ID-ICPMS) or instrumental neutron activation analysis (INAA), (2) analyses at NRCC using ID-ICPMS, graphite furnace atomic absorption spectrometry (GFAAS), and/or inductively coupled plasma optical emission spectroscopy (ICPOES), (3) analyses at IAEA using INAA, and (4) the mean of the results from seven laboratories that participated in the NRCC interlaboratory comparison exercise. The reference mass fraction values in Table 9 were determined by combining results from (1) analyses performed at NIST using INAA; (2) analyses at NRCC using ID-ICPMS, GFAAS, ICPOES, and/or cold vapor atomic absorption spectroscopy (CVAAS); (3) analyses at IAEA using INAA; and (4) the mean of the results from five to seven laboratories that participated in the NRCC interlaboratory comparison exercise. The information concentration values in Table 15 were determined by INAA at NIST and IAEA.

NIST Analyses using ID-ICPMS: Lead, cadmium, and nickel were determined by ID-ICPMS [8]. Test portions (0.4 g to 0.5 g) from six bottles of the SRM were spiked with ^{206}Pb, ^{111}Cd, and ^{62}Ni and wet ashed using a combination of nitric, hydrochloric, hydrofluoric, and perchloric acids. Lead and cadmium were determined in the same test portions; nickel was determined in a second sample set. A small amount of crystalline material remained after the acid dissolution. Lithium metaborate fusion was performed on this residue to confirm that the residue contained insignificant amounts of the analytes. Cadmium and nickel were separated from the matrix material to eliminate the possibility of spectral interferences, and concentrations were determined from the measurement of the $^{112}Cd/^{111}Cd$ and $^{62}Ni/^{60}Ni$ ratios, respectively. The $^{208}Pb/^{206}Pb$ ratios were measured directly because interferences at these masses are negligible.

NIST Analyses using INAA: Analyses were performed in two steps [9]. Elements with short-lived irradiation products (Al, Ca, Cl, K, Mg, Mn, Na, Ti, and V) were determined by measuring duplicate 300 mg test portions from each of ten bottles of SRM 1944. The samples, standards, and controls were packaged in clean polyethylene bags and were individually irradiated for 15 s in the NIST Reactor Pneumatic Facility RT-4. Reactor power was 20 MW, which corresponds to a neutron fluence rate of about 8×10^{13} cm^{-2} s^{-1}. After irradiation, the samples, controls, and standards were repackaged in clean polyethylene bags and counted (gamma-ray spectrometry) three times at different decay intervals. A sample-to-detector distance (counting geometry) of 20 cm was used. Elements with long-lived irradiation products (Ag, As, Br, Co, Cr, Cs, Fe, Rb, Sb, Sc, Se, Th, and Zn) were determined by measuring one 300 mg test portion from each of nine bottles of SRM 1944. The samples, standards, controls, and blank polyethylene bags were irradiated together for a total of 1 h at a reactor power of 20 MW. Approximately four days after irradiation, the polyethylene bags were removed, and each sample, standard, control, and blank was counted at 20 cm from the detector. The samples were then recounted at 10 cm from another detector. After an additional decay time of about one month, the samples, standards, controls, and blanks were counted a third time (at 10 cm) from the second detector.

Homogeneity Assessment for Inorganic Constitutents: For some of the trace elements, most notably Cd, Fe, Pb, Rb, Sb, Sc, and Th, the variations among the test portions measured at NIST (between 0.3 g and 0.5 g) were larger than expected from the measurement process. Based on experience, it was concluded that there is some material inhomogeneity for trace elements in the test portions used. Sample variations among the NIST measurements are used as slightly conservative estimates of the sample inhomogeneities.

Particle Size Information: Dry particle-size distribution measurements for SRM 1944 were obtained as part of a collaborative effort with Honeywell's Particle and Components Measurements Laboratory (Clearwater, FL). A Microtrac particle analyzer, which makes use of light-scattering techniques, was used to measure the particle-size distribution of SRM 1944. Briefly, a reference beam is used to penetrate a field of particles and the light that scatters in the forward direction from the field is measured and the particle-size as a volume distribution is derived via a computer-assisted analysis. From these data, the total volume, average size, and a characteristic width of the particle size distribution are calculated. The system has a working range from 0.7 µm to 700 µm.

Total Organic Carbon and Percent Extractable Mass: Four laboratories provided results for total organic carbon (TOC) using similar procedures. Briefly, test portions of approximately 200 mg were reacted with 6 mol/L hydrochloric acid and rinsed with deionized water prior to combustion in a gas fusion furnace. The carbon monoxide and carbon dioxide produced were measured and compared to a blank for calculation of the percent TOC. Each laboratory analyzed test portions from six bottles of SRM 1944. For the determination of percent extractable mass, six test portions of approximately 1 g to 2 g of SRM 1944 were extracted using Soxhlet extraction for 18 h with DCM. The extraction thimbles were allowed to air dry. After reaching constant mass, the difference in the mass before and after extraction was determined.

Polychlorinated Naphthalenes: Value assignment of PCN congener concentrations was accomplished by combining results from the analysis of SRM 1944 by six laboratories that participated in an interlaboratory comparison study (see Appendix D). Each laboratory analyzed three test portions (typically 1 g to 2 g) of SRM 1944 using their routine analytical procedures that included high-resolution gas chromatography with either high-resolution mass spectrometry detection (GC-HRMS) or low-resolution MS in the negative chemical ionization mode. Calibration mixtures included either Halowax mixtures with known volume fractions of individual congeners or individual PCN congeners.

HBCDs: Value assignment of the concentrations of three HBCD isomers was accomplished by combining results from the analysis of SRM 1944 in two sets from NIST and one set from Virginia Institute of Marine Science. For the two sets analyzed at NIST, the second fraction from an acidified silica SPE clean-up was analyzed by LC/MS/MS for the HBCDs using both electrospray ionization (ESI) and atmospheric pressurized photoionization (APPI). A C18 column (3.0 mm × 150 mm × 3.5 µm column, Eclipse Plus, Agilent Technologies) and YMC Carotenoid S5 C30 column (4.6 mm × 250 mm × 5 µm column) were used with a solvent gradient using 2.5 mmol/L ammonium acetate in 12.5 % water in methanol and acetonitrile at a flow rate of 0.3 mL/min. Carbon-13 labeled HBCDs were added to the sediment prior to solvent extraction for use as internal standards for quantification purposes.

Table 1. Certified Mass Fraction Values for Selected PAHs in SRM 1944 (Dry-Mass Basis)

	Mass Fraction(a,b) (mg/kg)		
Phenanthrene(c,d,e,f,g)	5.27	±	0.22
Fluoranthene(c,d,e,f,g)	8.92	±	0.32
Pyrene(c,d,e,f,g)	9.70	±	0.42
Benzo[*c*]phenathrene(c,d,e,f,h)	0.76	±	0.10
Benz[*a*]anthracene(c,d,e,f,g,h)	4.72	±	0.11
Chrysene(h,k)	4.86	±	0.10(i)
Triphenylene(h,k)	1.04	±	0.27
Benzo[*b*]fluoranthene(g,h,j)	3.87	±	0.42
Benzo[*j*]fluoranthene(h,j)	2.09	±	0.44
Benzo[*k*]fluoranthene(c,d,e,f,g,h,j)	2.30	±	0.20
Benzo[*a*]fluoranthene(c,d,e,f,h,j)	0.78	±	0.12
Benzo[*e*]pyrene(c,d,e,f,h,j)	3.28	±	0.11
Benzo[*a*]pyrene(c,d,e,f,g,h,j)	4.30	±	0.13
Perylene(c,d,e,f,g,h,j)	1.17	±	0.24
Benzo[*ghi*]perylene(c,d,e,f,j,k)	2.84	±	0.10
Indeno[1,2,3-*cd*]pyrene(c,d,e,f,j,k)	2.78	±	0.10
Dibenz[*a,j*]anthracene(c,d,e,f,j,k)	0.500	±	0.044
Dibenz[*a,c*]anthracene(j,k)	0.335	±	0.013
Dibenz[*a,h*]anthracene(j,k)	0.424	±	0.069
Pentaphene(c,d,e,f,j,k)	0.288	±	0.026
Benzo[*b*]chrysene(c,d,e,f,j,k,h)	0.63	±	0.10
Picene(c,d,e,f,j,k)	0.518	±	0.093

(a) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(b) Each certified value is a mean of the means from two or more analytical methods, weighted as described in Paule and Mandel [10]. Each uncertainty, computed according to the Comité International des Poids et Mesures (CIPM) approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty within each analytical method as well as uncertainty due to the drying study. The expanded uncertainty defines a range of values within which the true value is believed to lie, at a level of confidence of approximately 95 %.

(c) Gas chromatography/mass spectrometry (GC/MS) (I) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(d) GC/MS (II) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(e) GC/MS (III) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

(f) GC/MS (IV) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with 50 % hexane/50 % acetone mixture.

~~(g) LC-FL of total PAH fraction after Soxhlet extraction with 50 % hexane/50 % acetone mixture.~~

(h) GC/MS (Sm) using a smectic liquid crystalline phase after Soxhlet extraction with DCM.

(i) The uncertainty interval for chrysene was widened in accordance with expert consideration of the analytical procedures, along with the analysis of the data as a whole, which suggests that the half-widths of the expanded uncertainties should not be less than 2 %.

(j) GC/MS (V) on 50 % phenyl-substituted methylpolysiloxane phase of extracts from GC/MS (III) and GC/MS (IV).

(k) LC-FL of isomeric PAH fractions after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

Table 2. Certified Mass Fraction Values for Selected PCB Congeners(a) in SRM 1944 (Dry-Mass Basis)

		Mass Fraction(b,c) (µg/kg)		
PCB 8	(2,4'-Dichlorobiphenyl)(d,e,f,g,h,i,j,k)	22.3	±	2.3
PCB 18	(2,2',5-Trichlorobiphenyl)(d,e,f,g,h,i,j,k)	51.0	±	2.6
PCB 28	(2,4,4'-Trichlorobiphenyl)(d,e,f,g,j,k)	80.8	±	2.7
PCB 31	(2,4',5-Trichlorobiphenyl)(d,e,f,g,j)	78.7	±	1.6(l)
PCB 44	(2,2'3,5'-Tetrachlorobiphenyl)(d,e,f,g,h,i,j,k)	60.2	±	2.0
PCB 49	(2,2'4,5'-Tetrachlorobiphenyl)(d,e,f,g,h,i,j,k)	53.0	±	1.7
PCB 52	(2,2',5,5'-Tetrachlorobiphenyl)(d,e,f,g,h,i,j,k)	79.4	±	2.0
PCB 66	(2,3',4,4'-Tetrachlorobiphenyl)(e,g,h,i,j)	71.9	±	4.3
PCB 95	(2,2',3,5',6-Pentachlorobiphenyl)(e,g,h,i,j)	65.0	±	8.9
PCB 87	(2,2',3,4,5'-Pentachlorobiphenyl)(d,e,f,g,h,i,j)	29.9	±	4.3
PCB 99	(2,2',4,4',5-Pentachlorobiphenyl)(d,e,f,g,h,i,j,k)	37.5	±	2.4
PCB 101	(2,2',4,5,5'-Pentachlorobiphenyl)(d,e,f,g,h,i,j,k)	73.4	±	2.5
PCB 105	(2,3,3',4,4'-Pentachlorobiphenyl)(e,f,g,h,i,j,k)	24.5	±	1.1
PCB 110	(2,3,3',4',6-Pentachlorobiphenyl)(g,h,i,j)	63.5	±	4.7
PCB 118	(2,3',4,4',5-Pentachlorobiphenyl)(d,e,f,g,h,i,j,k)	58.0	±	4.3
PCB 128	(2,2',3,3',4,4'-Hexachlorobiphenyl)(d,e,f,g,h,i,j,k)	8.47	±	0.28
PCB 138	(2,2',3,4,4',5'-Hexachlorobiphenyl)(d,e,f,g,h,i,j,k)	62.1	±	3.0
PCB 149	(2,2',3,4',5',6-Hexachlorobiphenyl)(d,e,f,g,h,i,j,k)	49.7	±	1.2
PCB 151	(2,2',3,5,5',6-Hexachlorobiphenyl)(d,e,f,g,h,i,j,k)	16.93	±	0.36
PCB 153	(2,2',4,4',5,5'-Hexachlorobiphenyl)(d,e,f,g,h,i,j,k)	74.0	±	2.9
PCB 156	(2,3,3',4,4',5-Hexachlorobiphenyl)(d,e,f,g,h,i,j)	6.52	±	0.66
PCB 170	(2,2',3,3',4,4',5-Heptachlorobiphenyl)(d,e,f,g,h,i,j,k)	22.6	±	1.4
PCB 180	(2,2',3,4,4',5,5'-Heptachlorobiphenyl)(d,e,f,g,h,i,j,k)	44.3	±	1.2
PCB 183	(2,2',3,4,4',5',6-Heptachlorobiphenyl)(d,e,f,g,h,i,j)	12.19	±	0.57
PCB 187	(2,2',3,4',5,5',6-Heptachlorobiphenyl)(d,e,f,g,h,i,j,k)	25.1	±	1.0
PCB 194	(2,2',3,3',4,4',5,5'-Octachlorobiphenyl)(d,e,f,g,h,i,j)	11.2	±	1.4
PCB 195	(2,2',3,3',4,4',5,6-Octachlorbiphenyl)(d,e,f,g,h,i,j,k)	3.75	±	0.39
PCB 206	(2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl)(d,e,f,g,h,i,j,k)	9.21	±	0.51
PCB 209	Decachlorobiphenyl(d,e,f,g,h,i,j,k)	6.81	±	0.33

(a) PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [13] and later revised by Schulte and Malisch [3] to conform with IUPAC rules; for the specific congeners mentioned in this SRM, the Ballschmiter-Zell numbers correspond to those of Schulte and Malisch.

(b) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(c) Each certified value is a mean of the means from two or more analytical methods, weighted as described in Paule and Mandel [10]. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty within each analytical method as well as uncertainty due to the drying study. The expanded uncertainty defines a range of values within which the true value is believed to lie, at a level of confidence of approximately 95 %.

(d) GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(e) GC-ECD (IB) on the 50 % C-18 dimethylpolysiloxane phase; same extracts analyzed as in GC-ECD (IA).

(f) GC-ECD (IIA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(g) GC-ECD (IIB) on the 50 % octadecyl (C-18) methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IIA).

(h) GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

(i) GC/MS (II) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with 50 % hexane/50 % acetone mixture.

(j) GC/MS (III) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IIA).

(k) Results from nineteen laboratories participating in an interlaboratory comparison exercise.

(l) The uncertainty interval for PCB 31 was widened in accordance with expert consideration of the analytical procedures, along with the analysis of the data as a whole, which suggests that the half-widths of the expanded uncertainties should not be less than 2 %.

Table 3. Certified Mass Fraction Values for Selected Chlorinated Pesticides in SRM 1944 (Dry-Mass Basis)

	Mass Fraction$^{(a,b)}$ (μg/kg)
Hexachlorobenzene$^{(c,f,g,h,i,j)}$	6.03 ± 0.35
cis-Chlordane (α-Chlordane)$^{(c,d,e,f,g,h,i,j)}$	16.51 ± 0.83
trans-Nonachlor $^{(c,d,e,f,g,h,i,j)}$	8.20 ± 0.51

(a) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(b) Each certified value is a mean of the means from two or more analytical methods, weighted as described in Paule and Mandel [10]. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty within each analytical method as well as uncertainty due to the drying study. The expanded uncertainty defines a range of values within which the true value is believed to lie, at a level of confidence of approximately 95 %.

(c) GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(d) GC-ECD (IB) on the 50 % octadecyl (C-18) methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IA).

(e) GC-ECD (IIA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(f) GC-ECD (IIB) on the 50 % octadecyl (C-18) methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IIA).

(g) GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

(h) GC/MS (II) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with 50 % hexane/50 % acetone mixture.

(i) GC/MS (III) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IIA).

(j) Results from nineteen laboratories participating in an interlaboratory comparison exercise.

Table 4. Certified Mass Fraction Values for Selected Elements in SRM 1944 (Dry-Mass Basis)

	Degrees of Freedom	Mass Fractions$^{(a,b)}$ (%)
Aluminum$^{(c,d,e)}$	4	5.33 ± 0.49
Iron$^{(c,d,e)}$	6	3.53 ± 0.16
		Mass Fractions$^{(a,b)}$ (mg/kg)
Arsenic$^{(c,d,e,f,g)}$	10	18.9 ± 2.8
Cadmium$^{(c,f,h,i)}$	6	8.8 ± 1.4
Chromium$^{(c,d,f,g,i)}$	9	266 ± 24
Lead$^{(c,h,i)}$	5	330 ± 48
Manganese$^{(c,d,e)}$	8	505 ± 25
Nickel$^{(c,g,h,i)}$	6	76.1 ± 5.6
Zinc$^{(c,d,e,g,i)}$	9	656 ± 75

(a) The certified value is the mean of four results: (1) the mean of NIST INAA or ID-ICPMS analyses, (2) the mean of two methods performed at NRCC, and (3) the mean of results from seven selected laboratories participating in the NRCC intercomparison exercise, and (4) the mean results from INAA analyses at IAEA. The expanded uncertainty in the certified value is equal to $U = ku_c$ where u_c is the combined standard uncertainty and k is the coverage factor, both calculated according to the ISO Guide [11,12]. The value of u_c is intended to represent at the level of one standard deviation the combined effect of all the uncertainties in the certified value. Here u_c accounts for both possible method biases, within-method variation, and material inhomogeneity. The coverage factor, k, is the Student's t-value for a 95 % confidence interval with the corresponding degrees of freedom. Because of the material inhomogeneity, the variability among the measurements of multiple samples can be expected to be greater than that due to measurement variability alone.

(b) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(c) Results from five to seven laboratories participating in the NRCC interlaboratory comparison exercise.

(d) Measured at NIST using INAA.

(e) Measured at NRCC using ICPOES.

(f) Measured at NRCC using GFAAS.

(g) Measured at IAEA using INAA.

(h) Measured at NIST using ID-ICPMS.

(i) Measured at NRCC using ID-ICPMS

Table 5. Reference Mass Fraction Values for Selected PAHs in SRM 1944

	Mass Fractions(a) (mg/kg)
Naphthalene(b)	1.28 ± 0.04(c)
1-Methylnaphthalene(b)	0.47 ± 0.02(c)
2-Methylnaphthalene(b)	0.74 ± 0.06(c)
Biphenyl(b)	0.25 ± 0.02(c)
Acenaphthene(b)	0.39 ± 0.03(c)
Fluorene(b)	0.48 ± 0.04(c)
Dibenzothiophene(b)	0.50 ± 0.03(c)
Anthracene(b)	1.13 ± 0.07(c)
1-Methylphenanthrene(d,e,f,g)	1.7 ± 0.1(h)
2-Methylphenanthrene(d,e,f,g)	1.90 ± 0.06(h)
3-Methylphenanthrene(d,e,f,g)	2.1 ± 0.1(h)
4-Methylphenanthrene and 9-Methylphenanthrene(d,e,f,g)	1.6 ± 0.2(h)
2-Methylanthracene(d,e,f,g)	0.58 ± 0.04(h)
3,5-Dimethylphenanthrene(d)	1.31 ± 0.04(h)
2,6-Dimethylphenanthrene(d)	0.79 ± 0.02(h,i)
2,7-Dimethylphenanthrene(d)	0.67 ± 0.02(h,i)
3,9-Dimethylphenanthrene(d)	2.42 ± 0.05(h,i)
1,6-, 2,9-, and 2,5-Dimethylphenanthrene(d)	1.67 ± 0.03(h,i)
1,7-Dimethylphenanthrene(d)	0.62 ± 0.02(h,i)
1,9- and 4,9-Dimethylphenanthrene(d)	1.20 ± 0.03(h,i)
1,8-Dimethylphenanthrene(d)	0.24 ± 0.01(h,i)
1,2-Dimethylphenanthrene(d)	0.28 ± 0.01(h,i)
8-Methylfluoranthene(d)	0.86 ± 0.02(h,i)
7-Methylfluoranthene(d)	0.69 ± 0.02(h)
1-Methylfluoranthene(b)	0.39 ± 0.01(c)
3-Methylfluoranthene(b)	0.56 ± 0.02(c)
2-Methylpyrene(d)	1.81 ± 0.04(h,i)
4-Methylpyrene(d)	1.44 ± 0.03(h,i)
1-Methylpyrene(d)	1.29 ± 0.03(h)
Anthanthrene(j)	0.9 ± 0.1(h)

(a) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(b) GC/MS (VI) on proprietary non-polar methylpolysiloxane phase after Soxhlet extraction with DCM.

(c) Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to the associated degrees of freedom (df = 2) and 95 % confidence level for each analyte.

(d) GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(e) GC/MS (II) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(f) GC/MS (III) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

(g) GC/MS (IV) on 5 % phenyl-substituted methylpolysiloxane phase after PFE with 50 % hexane/50 % acetone mixture.

(h) The reference value for each analyte is the equally-weighted mean of the means from two or more analytical methods or the mean from one analytical technique. The uncertainty in the reference value defines a range of values that is intended to function as an interval that contains the true value at a level of confidence of 95 %. This uncertainty includes sources of uncertainty within each analytical method, among methods, and from the drying study.

(i)The uncertainty interval for this compound was widened in accordance with expert consideration of the analytical procedures, along with the analysis of the data as a whole, which suggests that the half-widths of the expanded uncertainties should not be less than 2 %.

(j) LC-FL of isomeric PAH fractions after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

Table 6. Reference Mass Fractions for Selected PAHs of Relative Molecular Mass 300 and 302 in SRM 1944 (Dry-Mass Basis)

	Mass Fraction[a,b,c] (mg/kg)		
Coronene	0.53	±	0.04
Dibenzo[*b,e*]fluoranthene	0.076	±	0.008
Naphtho[1,2-*b*]fluoranthene	0.70	±	0.06
Naphtho[1,2-*k*]fluoranthene and Naphtho[2,3-*j*]fluoranthene	0.66	±	0.05
Naphtho[2,3-*b*]fluoranthene	0.21	±	0.01
Dibenzo[*b,k*]fluoranthene	0.75	±	0.06
Dibenzo[*a,k*]fluoranthene	0.22	±	0.02
Dibenzo[*j,l*]fluoranthene	0.56	±	0.03
Dibenzo[*a,l*]pyrene	0.12	±	0.02
Naphtho[2,3-*k*]fluoranthene	0.11	±	0.01
Naphtho[2,3-*e*]pyrene	0.33	±	0.02
Dibenzo[*a,e*]pyrene	0.67	±	0.05
Naphtho[2,1-*a*]pyrene	0.76	±	0.05
Dibenzo[*e,l*]pyrene	0.28	±	0.02
Naphtho[2,3-*a*]pyrene	0.23	±	0.01
Benzo[*b*]perylene	0.43	±	0.04
Dibenzo[*a,i*]pyrene	0.30	±	0.03
Dibenzo[*a,h*]pyrene	0.11	±	0.01

[a] Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

[b] Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to the associated degrees of freedom (df = 2) and 95 % confidence level for each analyte.

[c] GC/MS on 50 % phenyl-substituted methylpolysiloxane phase after PFE with DCM.

Table 7. Reference Mass Fractions for Selected PCB Congeners(a) and Chlorinated Pesticides in SRM 1944 (Dry-Mass Basis)

	Mass Fraction(b) (µg/kg)		
PCB 45 (2,2',3,6-Tetrachlorobiphenyl)(c)	10.8	±	1.4(d)
PCB 146 (2,2',3,4',5,5'-Hexachlorobiphenyl)(c)	10.1	±	1.9(d)
PCB 163 (2,3,3',4',5,6-Hexachlorobiphenyl)(c)	14.4	±	2.0(d)
PCB 174 (2,2',3,3',4,5,6'-Heptachlorobiphenyl)(c)	16.0	±	0.6(d)
α-HCH(f,g,h,i)	2.0	±	0.3(e)
trans-Chlordane (γ-Chlordane)(c)	19.0	±	1.7(d)
cis-Nonachlor(g,h,i,l,m)	3.7	±	0.7(e)
2,4'-DDE(f,g,h,i,j,k,l,m)	19	±	3(e)
2,4'-DDD(h,j,k,l,m)	38	±	8(e)
4,4'-DDE(f,g,h,ihj,k,l,m)	86	±	12(e)
4,4'-DDD (f,g,h,i,j,k,l,m)	108	±	16(e)
4,4'-DDT(c)	170	±	32(d)

(a) PCB congeners are numbered according to the scheme proposed by Ballschmiter and Zell [13] and later revised by Schulte and Malisch [3] to conform with IUPAC rules; for the specific congeners mentioned in this SRM, the Ballschmiter-Zell numbers correspond to those of Schulte and Malisch.

(b) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(c) NIST participation in the 2007 interlaboratory study using GC/MS.

(d) Reference values are the means of results obtained by NIST using one analytical technique. The expanded uncertainty, U, is calculated as $U = ku_c$, where u_c is one standard deviation of the analyte mean, and the coverage factor, k, is determined from the Student's t-distribution corresponding to the associated degrees of freedom (df = 2) and 95 % confidence level for each analyte.

(e) The reference value for each analyte is the equally-weighted mean of the means from two or more analytical methods or he mean from one analytical technique. The uncertainty in the reference value defines a range of values that is intended to function as an interval that contains the true value at a level of confidence of 95 %. This uncertainty includes sources of uncertainty within each analytical method, among methods, and from the drying study.

(f) GC-ECD (IA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(g) GC-ECD (IB) on the 50 % octadecyl (C-18) methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IA).

(h) GC-ECD (IIA) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with DCM.

(i) GC-ECD (IIB) on the 50 % octadecyl (C-18) methylpolysiloxane phase; same extracts analyzed as in GC-ECD (IIA).

(j) GC/MS (I) on 5 % phenyl-substituted methylpolysiloxane phase after Soxhlet extraction with 50 % hexane/50 % acetone mixture.

(k) GC/MS (II) on 5 % phenyl-substituted methylpolysiloxane phase after PFE extraction with 50 % hexane/50 % acetone mixture.

(l) GC/MS (III) on 5 % phenyl-substituted methylpolysiloxane phase; same extracts anlayzed as in GC-ECD (IIA).

(m) Results from nineteen laboratories participating in an interlaboratory comparison exercise.

Table 8. Reference Mass Fraction Values for Selected PBDEs in SRM 1944 (Dry-Mass Basis)

	Mass Fractions(a) (µg/kg)		
PBDE 47 (2,2',4,4'-Tetrabromodiphenyl ether)(c,d,e,f)	1.72	±	0.28(b)
PBDE 99 (2,2',4,4',5-Pentabromodiphenyl ether)(c,d,f)	1.98	±	0.26(b)
PBDE 100 (2,2',4,4',6-Pentabromodiphenyl ether)(c,d)	0.447	±	0.027(b)
PBDE 153 (2,2',4,4',5,5'-Hexabromodiphenyl ether)(c,d,e,f)	6.44	±	0.37(b)
PBDE 154 (2,2',4,4',5,6'-Hexabromodiphenyl ether)(c,d,f)	1.06	±	0.08(b)
PBDE 183 (2,2',3,4,4',5',6-Heptabromodiphenyl ether)(c,d,e,f)	31.8	±	0.1(b)
PBDE 206 (2,2',3,3',4,4',5,5',6-Nonabromodiphenyl ether)(d,e)	6.2	±	1.0(b)
PBDE 209 (Decabromodiphenyl ether) (c,d,e,f)	93.5	±	4.4(b)

(a) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(b) Reference values are weighted means of the results from two to four analytical methods [14]. The uncertainty listed with each value is an expanded uncertainty about the mean, with coverage factor 2 (approximately 95 % confidence), calculated by combining a between-method variance incorporating inter-method bias with a pooled within-source variance following the ISO/NIST Guide to the Expression of Uncertainty in Measurements [11,12].

(c) Results from ten laboratories participating in an interlaboratory study for PBDEs in sediment [12].

(d) Results from four laboratories participating in the 2007 interlaboratory study [13].

(e) NIST participation in the 2007 interlaboratory study using GC/MS.

(f) Data set from NIST for PBDEs using GC/MS following PFE with alumina SPE and SEC clean-up.

Table 9. Reference Mass Fraction Values for Selected Elements in SRM 1944 (Dry-Mass Basis)

	Degrees of Freedom	Mass Fraction(a,b) (%)		
Silicon[c,d]	81	31	±	3
		Mass Fraction(a,b) (mg/kg)		
Antimony(c,e,f,g)	18	4.6	±	0.9
Beryllium(c,h)	17	1.6	±	0.3
Copper(c,d,f)	101	380	±	40
Mercury(c,i)	18	3.4	±	0.5
Selenium(c,e,f)	24	1.4	±	0.2
Silver(c,d,e,g)	8	6.4	±	1.7
Thallium(c,f)	12	0.59	±	0.1
Tin(c,f)	22	42	±	6

(a) The reference value is the equally weighted mean of available results from: (1) NIST INAA analyses, (2) two methods performed at NRCC, (3) results from seven selected laboratories participating in the NRCC intercomparison exercise, and (4) results from INAA analyses at IAEA. The expanded uncertainty in the reference value is equal to $U = ku_c$ where u_c is the combined standard uncertainty and k is the coverage factor, both calculated according to the ISO Guide [11,12]. The value of u_c is intended to represent at the level of one standard deviation the uncertainty in the value. Here u_c accounts for possible method differences, within-method variation, and material inhomogeneity. The coverage factor, k, is the Student's t-value for a 95 % confidence interval with the corresponding degrees of freedom. Because of material inhomogeneity, the variability among the measurements of multiple test portions can be expected to be greater than that due to measurement variability alone.

(b) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

(c) Results from five to seven laboratories participating in the NRCC interlaboratory comparison exercise.

(d) Measured at NRCC using GFAAS.

(e) Measured at NIST using INAA.

(f) Measured at NRCC using ID-ICPMS.

(g) Measured at IAEA using INAA.

(h) Measured at NRCC using ICPOES.

(i) Measured at NRCC using cold vapor atomic absorption spectroscopy (CVAAS).

Table 10. Reference Mass Fraction Values for Elements in SRM 1944 as Determined by INAA (Dry-Mass Basis)

	Effective Degrees of Freedom	Mass Fraction[a,b] (%)		
Calcium	21	1.0	±	0.1
Chlorine	21	1.4	±	0.2
Potassium	21	1.6	±	0.2
Sodium	25	1.9	±	0.1

		Mass Fraction[a,b] (mg/kg)		
Bromine	10	86	±	10
Cesium	11	3.0	±	0.3
Cobalt	10	14	±	2
Rubidium	14	75	±	2
Scandium	37	10.2	±	0.2
Titanium	21	4300	±	300
Vanadium	21	100	±	9

(a) The reference value is based on the results from an INAA study. The associated uncertainty accounts for both random and systematic effects, but because only one method was used, the results should be used with caution. The expanded uncertainty in the reference value is equal to $U = ku_c$ where u_c is the combined standard uncertainty and k is the coverage factor, both calculated according to the ISO Guide [11,12]. The value of u_c is intended to represent at the level of one standard deviation the uncertainty in the value. Here u_c accounts for possible method differences, within-method variation, and material inhomogeneity. The coverage factor, k, is the Student's t-value for a 95 % confidence interval with the corresponding degrees of freedom. Because of material inhomogeneity, the variability among the measurements of multiple test portions can be expected to be greater than that due to measurement variability alone.

(b) Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

Table 11. Reference Mass Fraction Values for Selected Dibenzo-*p*-Dioxin and Dibenzofuran Congeners in SRM 1944 (Dry-Mass Basis)

	Mass Fraction[a,b] (µg/kg)
2,3,7,8-Tetrachlorodibenzo-*p*-dioxin	0.133 ± 0.009
1,2,3,7,8-Pentachlorodibenzo-*p*-dioxin	0.019 ± 0.002
1,2,3,4,7,8-Hexachlorodibenzo-*p*-dioxin	0.026 ± 0.003
1,2,3,6,7,8-Hexachlorodibenzo-*p*-dioxin	0.056 ± 0.006
1,2,3,7,8,9-Hexachlorodibenzo-*p*-dioxin	0.053 ± 0.007
1,2,3,4,6,7,8-Heptachlorodibenzo-*p*-dioxin	0.80 ± 0.07
Octachlorodibenzo-*p*-dioxin	5.8 ± 0.7
2,3,7,8-Tetrachlorodibenzofuran[c]	0.039 ± 0.015[d]
1,2,3,7,8-Pentachlorodibenzofuran	0.045 ± 0.007
2,3,4,7,8-Pentachlorodibenzofuran	0.045 ± 0.004
1,2,3,4,7,8-Hexachlorodibenzofuran	0.22 ± 0.03
1,2,3,6,7,8-Hexachlorodibenzofuran	0.09 ± 0.01
2,3,4,6,7,8-Hexachlorodibenzofuran	0.054 ± 0.006[e]
1,2,3,4,6,7,8-Heptachlorodibenzofuran	1.0 ± 0.1
1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.040 ± 0.006[e]
Octachlorodibenzofuran	1.0 ± 0.1
Total Toxic Equivalents (TEQ)[f]	0.25 ± 0.01
Total Tetrachlorodibenzo-*p*-dioxins	0.25 ± 0.05[e]
Total Pentachlorodibenzo-*p*-dioxins	0.19 ± 0.06
Total Hexachlorodibenzo-*p*-dioxins	0.63 ± 0.09
Total Heptachlorodibenzo-*p*-dioxins	1.8 ± 0.2
Total Tetrachlorodibenzofurans	0.7 ± 0.2
Total Pentachlorodibenzofurans	0.74 ± 0.07
Total Hexachlorodibenzofurans	1.0 ± 0.1
Total Heptachlorodibenzofurans	1.5 ± 0.1
Total Dibenzo-*p*-dioxins[g]	8.7 ± 0.9
Total Dibenzofurans[g]	5.0 ± 0.5

[a] Each reference value is the mean of the results from up to fourteen laboratories participating in an interlaboratory exercise. The expanded uncertainty in the reference value is equal to $U = ku_c$ where u_c is the combined standard uncertainty calculated according to the ISO Guide [11,12] and k is the coverage factor. The value of u_c is intended to represent at the level of one standard deviation the combined effect of all the uncertainties in the reference value. Here u_c is the uncertainty in the mean arising from the variation among the laboratory results. The degrees of freedom is equal to the number of available results minus one (13 unless noted otherwise). The coverage factor, k, is the value from a Student's t-distribution for a 95 % confidence interval.

[b] Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

[c] Confirmation results using a 50 % cyanopropyl phenyl polysiloxane or 90 % *bis*-cyanopropyl 10 % cyanopropylphenyl polysiloxane phase columns.

[d] Degrees of freedom = 7 for this compound.

[e] Degrees of freedom = 12 for this compound.

[f] TEQ is the sum of the products of each of the 2,3,7,8-substituted congeners multiplied by their individual toxic equivalency factors (TEFs) recommended by the North Atlantic Treaty Organization (NATO) [15] With regard to 2,3,7,8-tetrachlorodibenzofuran, the results of the confirmation column were used when available to calculate the TEQ.

[g] Total of tetra- through octachlorinated congeners.

Table 12. Reference Values for Particle Size Characteristics for SRM 1944

Particle Measurement	Value[a]
Mean diameter (volume distribution, MV, µm)[b]	151.2 ± 0.4
Mean diameter (area distribution, µm)[c]	120.4 ± 0.1
Mean diameter (number distribution, µm)[d]	75.7 ± 0.3
Surface Area (m^2/cm^3)[e]	0.050 ± 0.013

[a] The reference value is the mean value of measurements from the analysis of test portions from four bottles. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty. The expanded uncertainty defines a range of values for the reference value within which the true value is believed to lie, at a level of confidence of 95 %.

[b] The mean diameter of the volume distribution represents the center of gravity of the distribution and compensates for scattering efficiency and refractive index. This parameter is strongly influenced by coarse particles.

[c] The mean diameter of the area distribution, calculated from the volume distribution with less weighting by the presence of coarse particles than MV.

[d] The mean diameter of the number distribution, calculated using the volume distribution weighted to small particles.

[e] Calculated specific surface area assuming solid, spherical particles. This is a computation and should not be interchanged with an adsorption method of surface area determination as this value does not reflect porosity or topographical characteristics.

Table 13. Percentage of the Volume That is Smaller Than the Indicated Size

Percentile	Particle Diameter[a] (µm)
95	296 ± 5
90	247 ± 2
80	201 ± 1
70	174 ± 1
60	152 ± 1
50[b]	135 ± 1
40	120 ± 1
30	106 ± 1
20	91 ± 1
10	74 ± 1

[a] The reference value for particle diameter is the mean value of measurements from the analysis of test portions from four bottles. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty. The expanded uncertainty defines a range of values for the reference value within which the true value is believed to lie, at a level of confidence of 95 %.

[b] Median diameter (50 % of the volume is less than 135 µm).

Table 14. Reference Values for Total Organic Carbon and Percent Extractable Mass in SRM 1944

	Mass Fraction (%)		
Total Organic Carbon (TOC)[a,b]	4.4	±	0.3
Extractable Mass[c,d]	1.15	±	0.04

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 1.3 % moisture.

[b] The reference value for total organic carbon is an equally weighted mean value from routine measurements made by three laboratories. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty. The expanded uncertainty defines a range of values for the reference value within which the true value is believed to lie, at a level of confidence of 95 %.

[c] Extractable mass as determined from Soxhlet extraction using DCM.

[d] The reference value for extractable mass is the mean value of six measurements. Each uncertainty, computed according to the CIPM approach as described in the ISO Guide [11,12], is an expanded uncertainty at the 95 % level of confidence, which includes random sources of uncertainty. The expanded uncertainty defines a range of values for the reference value within which the true value is believed to lie, at a level of confidence of 95 %.

Table 15. Information Mass Fraction Values for Selected Elements in SRM 1944
as Determined by INAA (Dry-Mass Basis)

	Mass Fraction[a] (%)
Magnesium[b]	1.0

	Mass Fraction[a] (mg/kg)
Cerium[b]	65
Europium[b]	1.3
Gold[b]	0.10
Lanthanum[b]	39
Thorium[b]	13
Uranium[b]	3.1

[a] Mass fraction is reported on a dry-mass basis; material as received contains approximately 1.3 % moisture

[b] Measured at IAEA using INAA

Table 16. Information Mass Fraction Values for
Selected Polychlorinated Naphthalenes in SRM 1944 (Dry-Mass Basis)

			Mass Fraction[a] (µg/kg)
PCN	19	(1,3,5-Trichloronaphthalene)	1.4
PCN	23	(1,4,5-Trichloronaphthalene)	2.4
PCN	42	(1,3,5,7-Tetrachloronaphthalene)	2.7
PCN	47	(1,4,6,7-Tetrachloronaphthalene)	3.5
PCN	52	(1,2,3,5,7-Pentachloronaphthalene)	2.5
	60	(1,2,4,6,7-Pentachloronaphthalene)	
PCN	50	(1,2,3,4,6-Pentachloronaphthalene)	1.0
PCN	66	(1,2,3,4,6,7-Hexachloronaphthalene)	0.63
	67	(1,2,3,5,6,7-Hexachloronaphthalene)	
PCN	69	(1,2,3,5,7,8-Hexachloronaphthalene)	1.6
PCN	73	(1,2,3,4,5,6,7-Heptachloronaphthalene)	0.51
PCN	75	(Octachloronaphthalene)	0.20

[a] Mass fractions reported on dry-mass basis; material as received contains approximately 1.3 % moisture. Information values are the median of the results from six laboratories participating in an interlaboratory comparison exercise (Appendix D).

Table 17. Information Mass Fraction Values for Three HBCD Isomers in SRM 1944 (Dry-Mass Basis)

	Mass Fraction[a,b] (µg/kg)
alpha-HBCD[b]	2.2
beta-HBCD[b]	1.0
gamma-HBCD[b]	18

[a] The information value is the median of the results from three analytical methods.

[b] Mass fractions are reported on dry-mass basis; material as received contains approximately 1.3 % moisture.

Table 18. Analytical Methods Used for the Measurement of Elements in SRM 1944

Elements	**Analytical Methods**
Aluminum	FAAS, ICPOES, INAA, XRF
Antimony	GFAAS, HGAAS, ICP-MS, ID-ICPMS, INAA
Arsenic	GFAAS, HGAAS, ICPMS, INAA, XRF
Beryllium	GFAAS, ICP-AES, ICPMS
Bromine	INAA
Cadmium	FAAS, GFAAS, ICPMS, ID-ICPMS
Calcium	INAA
Cerium	INAA
Cesium	INAA
Chlorine	INAA
Chromium	FAAS, GFAAS, ICPMS, ID-ICPMS, INAA, XRF
Cobalt	INAA
Copper	FAAS, GFAAS, ICPOES, ICPMS, ID-ICPMS, XRF
Europium	INAA
Gold	INAA
Iron	FAAS, ICPOES, ICPMS, ID-ICPMS, INAA, XRF
Lanthanum	INAA
Lead	FAAS, GFAAS, ICPMS, ID-ICPMS, XRF
Magnesium	INAA
Manganese	FAAS, ICPOES, ICPMS, INAA, XRF
Mercury	CVAAS, ICPMS
Nickel	GFAAS, ICPOES, ICPMS, ID-ICPMS, INAA, XRF
Potassium	INAA
Rubidium	INAA
Scandium	INAA
Selenium	GFAAS, HGAAS, ICPMS, INAA
Silicon	FAAS, ICPOES, XRF
Silver	FAAS, GFAAS, ICPMS, INAA
Sodium	INAA
Thallium	GFAAS, ICPOES, ICPMS, ID-ICPMS,
Thorium	INAA
Tin	GFAAS, ICPMS, ID-ICPMS
Titanium	INAA
Uranium	INAA
Vanadium	INAA
Zinc	FAAS, ICPOES, ICPMS, ID-ICPMS, XRF, INAA

Methods

CVAAS	Cold vapor atomic absorption spectrometry
FAAS	Flame atomic absorption spectrometry
GFAAS	Graphite furnace atomic absorption spectrometry
HGAAS	Hydride generation atomic absorption spectrometry
ICPOES	Inductively coupled plasma optical emission spectrometry
ICPMS	Inductively coupled plasma mass spectrometry
ID-ICPMS	Isotope dilution inductively coupled plasma mass spectrometry
INAA	Instrumental neutron activation analysis
XRF	X-ray fluorescence spectrometry

REFERENCES

[1] May, W.; Parris, R.; Beck, C.; Fassett, J.; Greenberg, R.; Guenther, F.; Kramer, G.; Wise, S.; Gills, T.; Colbert, J.; Gettings, R.; MacDonald, B.; *Definitions of Terms and Modes Used at NIST for Value-Assignment of Reference Materials for Chemical Measurements*; NIST Special Publication 260-136, U.S. Government Printing Office: Gaithersburg, MD (2000); available at http://ts.nist.gov/MeasurementServices/ReferenceMaterials/PUBLICATIONS.cfm (accessed Sep 2011)

[2] Wise, S.A.; Poster, D.L.; Schantz, M.M.; Kucklick, J.R.; Sander, L.C.; Lopez de Alda, M.; Schubert, P.; Parris, R.M.; Porter, B.J.; *Two New Marine Sediment Standard Reference Materials (SRMs) for the Determination of Organic Contaminants;* Anal. Bioanal. Chem., Vol. 378, pp. 1251-1264 (2004).

[3] Schulte E.; Malisch, R.; *Calculation of the Real PCB Content in Environmental Samples. I. Investigation of the Composition of Two Technical PCB Mixtures;* Fresenius Z. Anal. Chem., Vol. 314, pp. 545-551 (1983).

[4] Parris, R.M.; Schantz, M.M.; Wise, S.A.; *NIST/NOAA NS&T/EPA EMAP Intercomparison Exercise Program for Organic Contaminants in the Marine Environment: Description and Results of 1995 Organic Intercomparison Exercises*; NOAA Technical Memorandum NOS ORCA 104, Silver Spring, MD (1996).

[5] Stapleton, H.M.; Keller, J.M.; Schantz, M.M.; Kucklick, J.R.; Wise, S.A.; *NIST Inter-Comparison Exercise Program for Polybrominated Diphenyl Ethers (PBDEs) in Marine Sediment: Description and Results of the 2004 Inter-Comparison Exercise*; NISTIR 7278 (2005).

[6] Schantz, M.M.; Parris, R.M.; Wise, S.A.; *NIST Intercomparison Exercise Program for Organic Contaminants in the Marine Environment: Description and Results of the 2007 Organic Intercomparison Exercises*; NISTIR 7501 (2008).

[7] Willie, S; Berman, S.; *NOAA National Status and Trends Program Tenth Round Intercomparison Exercise Results for Trace Metals in Marine Sediments and Biological Tissue;* NOAA Technical Memorandum NOS ORCA 106, Silver Spring, MD (1996).

[8] Beary, E.S.; Paulson, P.J.; *Selective Application of Chemical Separations to Isotope Dilution Inductively Coupled Plasma Mass Spectrometric Analysis of Standard Reference Materials;* Anal. Chem., Vol. 65, pp. 1602-1608 (1993).

[9] Greenberg, R.R.; Flemming, R.F.; Zeisler, R.; *High Sensitivity Neutron Activation Analysis of Environmental and Biological Standard Reference Materials;* Environ. Intern., Vol. 10, pp. 129-136 (1984).

[10] Paule, R.C.; Mandel, J.; *Consensus Values and Weighting Factors;* J. Res. Nat. Bur. Stand., Vol. 87 pp. 377-385 (1982).

[11] JCGM 100:2008; *Evaluation of Measurement Data — Guide to the Expression of Uncertainty in Measurement* (ISO GUM 1995 with Minor Corrections); Joint Committee for Guides in Metrology (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_100_2008_E.pdf (accessed Sep 2011); see also Taylor, B.N.; Kuyatt, C.E.; *Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results*; NIST Technical Note 1297; U.S. Government Printing Office: Washington, DC (1994); available at http://www.nist.gov/physlab/pubs/index.cfm (accessed Sep 2011).

[12] JCGM 101:2008; *Evaluation of measurement data – Supplement 1 to the Guide to Expression of Uncertainty in Measurement*; Propagation of Distributions Using a Monte Carlo Method; Joint Committee for Guides in Metrology (BIPM, IEC, IFCC, ILAC, ISO, IUPAC, IUPAP and OIML), International Bureau of Weights and Measures (BIPM), Sèvres, France (2008); available at http://www.bipm.org/utils/common/documents/jcgm/JCGM_101_2008_E.pdf (accessed Sep 2011).

[13] Ballschmiter, K.;Zell, M.; *Analysis of Polychlorinated Biphenyls (PCB) by Glass Capillary Gas Chromatography - Composition of Technical Aroclor- and Clophen-PCB Mixtures;* Fresenius Z. Anal. Chem,.Vol 302, pp. 20-31 (1980).

[14] Ruhkin, A.L.;Vangel, M.G. *Estimation of a Common Mean and Weighted Means Statistics;* J. Am. Statist. Assoc., Vol. 93, pp. 303-308 (1998).

[15] *International Toxicity Equivalency Factor (I-TEF) Method of Risk Assessment for Complex Mixtures of Dioxins and Related Compounds*, North Atlantic Treaty Organization Committee on Challenges in the Modern Society, Report No. 176, North Atlantic Treaty Organization (NATO), Brussels, Belgium (1988).

Certificate Revision History: 27 September 2011 (Addition of mass fraction values for PBDE and PCN congeners; change of mass fraction reference values, editorial changes); **22 December 2008** (Extension of certification period); **14 May 1999** (Original certificate date).

Users of this SRM should ensure that the Certificate of Analysis in their possession is current. This can be accomplished by contacting the SRM Program at: telephone (301) 975-2200; fax (301) 926-4751; e-mail srminfo@nist.gov; or via the Internet at http://www.nist.gov/srm.

APPENDIX A

The analysts and laboratories listed below participated in the interlaboratory comparison exercise for the determination of PBDEs in SRM 1944 [4].

D. Hoover and C. Hamilton, AXYS Analytical, Sidney, BC, Canada
S. Klosterhaus and J. Baker, Chesapeake Biological Laboratory, Solomons, MD, USA
S. Backus, Environment Canada, Ecosystem Health Division, Burlington, ON, Canada
E. Sverko, Environment Canada, Canada Centre for Inland Waters, Burlington, ON, Canada
P. Lepom, Federal Environmental Agency, Berlin, Germany
R. Hites and L. Zhu, Indiana University, Bloomington, IN, USA
G. Jiang, Research Center for Eco-Environmental Sciences, Beijing, China
H. Takada, Tokyo University of Agriculture and Technology, Tokyo, Japan
A. Covaci and S. Vorspoels, University of Antwerp, Antwerp, Belgium
A. Li, Universtiy of Illinois at Chicago, Chicago, IL, USA

APPENDIX B

The analysts and laboratories listed below participated in the interlaboratory comparison exercise for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans in SRM 1944.

W.J. Luksemburg, Alta Analytical Laboratory, Inc., El Dorado Hills, CA, USA
L. Phillips, AXYS Analytical Services Ltd., Sidney, British Columbia, Canada
M.J. Armbruster, Battelle Columbus Laboratories, Columbus, OH, USA
G. Reuel, Canviro Analytical Laboratories Ltd., Waterloo, Ontario, Canada
C. Brochu, Environment Québec, Laval, Québec, Canada
G. Poole, Environment Canada Environmental Technology Centre, Ottawa, Ontario, Canada
B. Henkelmann, GSF National Research Center for Environment and Health, Neuherberg, Germany
R. Anderson, Institute of Environmental Chemistry, Umeå University, Umeå, Sweden
C. Lastoria, Maxxam Analytics Inc., Mississauga, Ontario, Canada
E. Reiner, Ontario Ministry of Environment and Energy, Etobicoke, Ontario, Canada
J. Macaulay, Research and Productivity Council, Fredericton, New Brunswick, Canada
T.L. Wade, Texas A&M University, College Station, TX, USA
C. Tashiro, Wellington Laboratories, Guelph, Ontario, Canada
T.O. Tieman, Wright State University, Dayton, OH, USA

APPENDIX C

The analysts and laboratories listed below participated in the interlaboratory comparison exercise for the determination of trace elements in SRM 1944.

A. Abbgy, Applied Marine Research Laboratory, Old Dominion University, Norfolk, VA, USA
A. Scott, Australian Government Analytical Laboratories, Pymble, Australia
H. Mawhinney, Animal Research Institute, Queensland Department of Primary Industries, Queensland, Australia
E. Crecelius, Battelle Pacific Northwest, Sequim, WA, USA
M. Stephenson, California Department of Fish and Game, Moss Landing, CA, USA
B. Presley, Department of Oceanography, Texas A&M University, College Station, TX, USA
K. Elrick, U.S. Geological Survey, Atlanta, GA, USA

APPENDIX D

The analysts and laboratories listed below participated in the interlaboratory comparison exercise for the determination of polychlorinated naphthalenes in SRM 1944.

J. Kucklick, National Institute of Standards and Technology, Charleston, SC, USA
E. Sverko, Environment Canada, Canada Centre for Inland Waters, Burlington, ON, Canada
P. Helm, Ontario Ministry of the Environment, Etobicoke, ON, Canada
N. Yamashita, National Institute of Advanced Industrial Science and Technology (AIST), Tsukuba, Japan
T. Harner, Environment Canada, Meteorological Service of Canada, Toronto, ON, Canada
R. Lega, Ontario Ministry of the Environment, Etobicoke, ON, Canada

Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Standard Record

Standard ID: C002492

Printed: 7/31/2014 11:08:21AM

Description:	Puget Sound reference-SRM	Expires:	25-Jun-2015
Standard Type:	Reference Matei	Prepared:	25-Jun-2014
Solvent:	NA	Prepared By:	Amanda Volgardsen
Final Volume (mls):	30	Department:	QC
Vials:	1	Last Edit:	25-Jun-2014 10:29 by AV
Vendor:	QATS Lab	Lot #:	SR0431
Vendor Catalog #:			

Comments

PSRM0029 Cedar River for Cheronne Oreiro

Analyte	CAS Number	Concentration	Units	SRM Control Limits
1,2,3,7,8-PeCDF	57117-41-6	0.00000123	mg/Kg	50-150
1,2,3,4,6,7,8-HpCDF	67562-39-4	0.0000187	mg/Kg	50-150
1,2,3,4,7,8,9-HpCDF	58200-70-7	0.00000163	mg/Kg	50-150
1,2,3,4,7,8-HxCDD	39227-28-6	0.00000159	mg/Kg	50-150
1,2,3,4,7,8-HxCDF	70648-26-9	0.00000302	mg/Kg	50-150
1,2,3,6,7,8-HxCDD	57653-85-7	0.00000388	mg/Kg	50-150
1,2,3,6,7,8-HxCDF	57117-44-9	0.00000109	mg/Kg	50-150
1,2,3,7,8,9-HxCDD	19408-74-3	0.00000304	mg/Kg	50-150
1,2,3,4,6,7,8-HpCDD	35822-46-9	0.0000906	mg/Kg	50-150
1,2,3,7,8-PeCDD	40321-76-4	0.00000108	mg/Kg	50-150
OCDF	39001-02-0	0.0000584	mg/Kg	50-150
2,3,4,6,7,8-HxCDF	60851-34-5	0.00000183	mg/Kg	50-150
2,3,4,7,8-PeCDF	57117-31-4	0.00000107	mg/Kg	50-150
2,3,7,8-TCDD	1746-01-6	0.00000105	mg/Kg	50-150
2,3,7,8-TCDF	51207-31-9	0.00000111	mg/Kg	50-150
Aroclor 1260	11096-82-5	0.108	mg/Kg	38-167
Aroclor 1260 [2C]	11096-82-5	0.108	mg/Kg	38-167
OCDD	3268-87-9	0.000811	mg/Kg	50-150
1,2,3,7,8,9-HxCDF	72918-21-9	0.000000511	mg/Kg	50-150

Reviewed By Date

Puget Sound Sediment Reference Material: Requesting and Analyzing the SRM, and Reporting Data

Introduction

The Puget Sound Sediment Reference Material (SRM) has been developed to help assess/evaluate measurement accuracy and monitor laboratory performance when analyzing for chlorinated dioxin, furans, and biphenyl compounds in sediment samples collected from the Puget Sound area. The SRM is currently available free of charge, though recipients must pay shipping costs. This document provides instructions for obtaining, analyzing, and reporting on the SRM. The guidance and procedures are intended to ensure that SRM users:

- Report methods used for analysis
- Report QA/QC procedures used to verify and validate results, and
- Report results that can be included in periodic recalculations of acceptance limits

The Puget Sound SRM has been established for chlorinated dibenzo-p-dioxins / chlorinated dibenzofurans (CDD/CDF), and/or chlorinated biphenyl (CB) congener analysis using high resolution gas chromatography / high resolution mass spectrometry (HRGC/HRMS) methods. This SRM is also suitable for Aroclor analysis using gas chromatography/electron capture detection (GC/ECD) methods.

Request procedure

The Seattle District Corps of Engineers, Washington Department of Ecology and US EPA Region 10 have assigned staff to distribute the Puget Sound SRM in support of agency missions, including regulatory programs. The request procedure is as follows:

- Obtain the electronic Puget Sound SRM Request Form from the appropriate agency involved with the project (see agency contact list below), or from the DMMO website
- Return completed form to agency contact
- Agency contact reviews and certifies/signs the bottom of the form as an "authorized agency requester", and then forwards the signed form to the EPA Region 10 SRM Manager (Donald Brown) for processing
- Request is processed, typically within a week

Examples of how the request process works:

1. CWA 404 permit applicants would request from and submit the completed form to the Corps of Engineers DMMO contact

2. A CERCLA PRP would submit the request form via EPA

3. The State of Washington's ambient monitoring program would submit the form via Ecology.

The authorized agency contacts are available to help with any questions about the Request Form. Submission of incomplete forms may delay the request processing.

Authorized Agency Contacts:

Seattle District Corps of Engineers – Dredged Material Management Office (DMMO):

David Kendall (206) 764-3768, david.r.kendall@usace.army.mil

David Fox (206) 764-6083, david.f.fox@usace.army.mil

Lauran Warner (206) 764-6550, lauran.c.warner@usace.army.mil

Kelsey van der Elst (206) 764-6945, kelsey.vanderelst@usace.army.mil

Washington Department of Ecology

Laura Inouye (306) 407-6165, lino461@ecy.wa.gov

Tom Gries (360) 407-6327, tgri461@ecy.wa.gov

US Environmental Protection Agency Region 10

Justine Barton (206) 553-6051, barton.justine@epa.gov

Erika Hoffman (360) 753-9540, hoffman.erika@epa.gov

Donald Brown (206) 553-0717, brown.donaldm@epa.gov

Shipping

~~The Puget Sound SRM is stored at EPA's Quality Assurance Technical Services (QATS)~~ contractor (Shaw Environmental) located in Las Vegas, Nevada. Lab contacts listed on the Request Form should be prepared to confirm shipping details (including UPS or FedEx account number) when contacted by Shaw Environmental. Shaw Environmental will generally ship the SRM within 24 hours of receiving the completed Request Form from the EPA Region 10 SRM Manager. The SRM will arrive with specific instructions on handling and storage requirements, data reporting requirements, as well as chain of custody paperwork.

When the SRM has been shipped, Shaw Environmental will provide a notification email to the EPA Region 10 SRM Manager, the authorized agency contact (as indicated on the Request Form), and the destination laboratory. The email will include the project name as indicated on the Request Form.

SRM storage requirements

Each amber glass bottle contains approximately 30 grams of the Puget Sound SRM.

The SRM contains compounds that are light sensitive and should be protected from light during storage. Store the SRM at 4° C ± 2° C until SRM preparation and analysis.

SRM analysis requirements

The SRM is to be analyzed as described in the appropriate methods employed for the analysis of CDD/CDF and/or CB congener analytes using HRGC/HRMS instrumentation and/or Aroclors using GC/ECD instrumentation.

The following analytical methods may be used in the analysis of the SRM:

- SW846 Method 8082A (or current revision), "Polychlorinated Biphenyls by Gas Chromatography"
- SW846 Method 8290A (or current revision), " Polychlorinated Dibenzo-p-Dioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by High Resolution Gas Chromatography/High Resolution Mass Spectrometry (HRGC/HRMS)"
- Method 1613B (or current revision),"Tetra-through Octa-Chlorinated Dioxins and Furans by Isotope Dilution HRGC/HRMS
- Method 1668C (or current revision),"Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids and Tissue by HRGC/HRMS"

Data verification/validation

SRM users may be held to different data validation requirements, depending on their program ~~and project circumstances. Data must be validated to EPA Stage 2B but it is strongly~~ recommended that Stage 3 or better validation be conducted. For example, the interagency Dredged Material Management Program (DMMP) strongly recommends third party Stage 4 validation for all TCDD/F data. Any validation narrative must indicate the validation stage used. Data validation stages are described in EPA-540-R-08-005 (see References).

Data reporting

Individual laboratories typically provide all project data and validation reports to their clients. The client/project proponent is responsible for ensuring that all information relative to the SRM, including associated QA data, is sent to the original agency requester. For DMMP projects, submittal of the complete validated data package to the DMMO contact fulfills this requirement.

For SRM data meeting established QA requirements, the agency contact will submit the validated electronic data deliverable/data summary sheets (or the equivalent) and validation reports relevant to the SRM to the EPA Region 10 SRM Manager. Changes made by the data validator (e.g. modification of data qualifiers) must be clearly indicated on the data sheets. SRM data not meeting established QA requirements will not be forwarded to Shaw Environmental, however, Shaw Environmental will be notified of the QA failure for their records. Minimum SRM data package deliverables are as follows:

1. Validation Report
   - Confirmation of data verification or third party validation
   - Include validation report if SRM results are affected

2. SRM Sample Data Summary Report including the following information:
   - Identification and quantitation of target analytes including dilution and reanalysis
   - CAS numbers
   - Name of Laboratory
   - Project Number
   - Sample ID number (bottle bar code)
   - Agency Sample number
   - Laboratory Sample number
   - Date SRM received
   - Date and time of analysis
   - For Aroclor data labs must provide reporting limits (RLs) and method detection limits (MDLs)
   - For CB congener and dioxin/furan data labs must provide reporting limits (RLs) and estimated detection limits (EDLs)
   - Laboratory Qualifiers and Definitions
   - Validation Qualifiers

Storage and use of previously opened SRM is not recommended. However, it is requested that any additional data results derived from use of the SRM be submitted to the EPA Region 10 SRM manager.

Performance / Acceptance Limits

The acceptance limits presented below are guidance values based on the original laboratory round robin associated with the development of the SRM. The implications associated with not meeting these acceptance limits will be determined by data reviewers on a case by case basis, based on the goals of their program/project. For upcoming dredging year 2013, the DMMP will review results on a case by case basis and will consider the values advisory.

PCB Aroclors. A twelve-lab round robin testing of the SRM (including commercial and CLP labs), was used to calculate an acceptance limit for Aroclor 1260. The average Aroclor 1260 concentration found during the round robin was 108 ug/kg. The acceptance limit is set at the 95% confidence interval.

- **Aroclor 1260:**
  warning low 41 ug/kg
  warning high 180 ug/kg

CDD/CDF. A ten-lab round robin testing of the SRM (including commercial and CLP labs) was used to calculate an acceptance limit of +- 50% action low and action high for each congener as follows:

Acceptance Limits Source	Analyte	CAS No.	[redacted]	[redacted]	[redacted]
			[redacted]	[redacted]	[redacted]
+/- 50 Percent	[redacted]	35822-46-9	[redacted]	[redacted]	[redacted]
	[redacted]	67562-39-4	[redacted]	[redacted]	[redacted]
	[redacted]	55673-89-7	[redacted]	[redacted]	[redacted]
	[redacted]	39227-28-6	[redacted]	[redacted]	[redacted]
	[redacted]	70648-26-9	[redacted]	[redacted]	[redacted]
	[redacted]	67653-85-7	[redacted]	[redacted]	[redacted]
	[redacted]	57117-44-9	[redacted]	[redacted]	[redacted]
	[redacted]	19408-74-3	[redacted]	[redacted]	[redacted]
	[redacted]	72918-21-9	[redacted]	[redacted]	[redacted]
	[redacted]	40321-76-4	[redacted]	[redacted]	[redacted]
	[redacted]	57117-41-6	[redacted]	[redacted]	[redacted]
	[redacted]	~~60851-34-5~~	[redacted]	[redacted]	[redacted]
	[redacted]	57117-31-4	[redacted]	[redacted]	[redacted]
	[redacted]	1746-01-6	[redacted]	[redacted]	[redacted]
	[redacted]	51207-31-9	[redacted]	[redacted]	[redacted]
	[redacted]	3268-87-9	[redacted]	[redacted]	[redacted]
	[redacted]	39001-02-0	[redacted]	[redacted]	[redacted]

CB Congeners. These values have not yet been reviewed and no acceptance limits have been determined to date.

Recalculation of Acceptance Limits

Shaw Environmental will store the SRM, conduct stability testing, and maintain the SRM database used to recalculate acceptance limits. Depending on the quantity of high quality data received, recalculation may occur annually. It is anticipated that the next recalculation will occur after 30 new data points have been received.

References

Revised Supplemental Information on Polychlorinated Dioxins and Furans (PCDD/F) For Use in Preparing a Quality Assurance Project Plan (QAPP), dated November 8, 2010. EPA-540-R-08-005 Guidance For Labeling Externally Validated Laboratory Analytical Data for Superfund Use, dated January 13, 2009

Attachments

SRM Request Form (this form may be requested and returned in an electronic-fillable form from/to agency contacts listed above). This form is also available on the Seattle District DMMO website.

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APPENDIX B

Exploration (Core) Logs

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOL	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS	GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-SILT MIXTURES
	SAND AND SANDY SOILS	CLEAN SANDS	SW	WELL-GRADED SANDS, GRAVELLY SANDS
			SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50	ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY
			OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS			PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
DEBRIS	WOOD		WD	WOOD DEBRIS, WOOD CHIPS, DIMENSIONAL LOG, SAWDUST

GRAPHIC LOG CONTACS

────	Contact between sediment type
– – – –	Division of sample interval
━━━━	End of boring
════	Sampler core division

SYMBOL DESCRIPTIONS

▓	Sample not recovered
░	Less than 75% sample recovered

SEDIMENT CORING LOG

CORING LOCATION: PT-1

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	39.75	**Latitude:**	N 47° 58' 37.768"
Mudline Elevation (feet MLLW):	-34	**Longitude:**	W 122° 13' 33.965"
Total Coring Depth (feet MLLW):	-49	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		ML + WD	ML + WD	100	PT-1-34-35	Dark brown to gray silt with wood debris (sawdust 30%, wood chips 15%, dimensional lumber 5%)	NS	50	
1					PT-1-35-36				
2					PT-1-36-37				
3					PT-1-37-37				
4					PT-1-38-39				
5		SM	SM	100	PT-1-39-40	Gray silty fine to medium sand with wood debris (wood chips)	NS	10	
						Gray silty fine to medium sand with occasional shell fragments	NS	0	
6					PT-1-40-41				
7					PT-1-41-42				
8					PT-1-42-43				
9					PT-1-43-44				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-1

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	39.75	**Latitude:**	N 47° 58' 37.768"
Mudline Elevation (feet MLLW):	-34	**Longitude:**	W 122° 13' 33.965"
Total Coring Depth (feet MLLW):	-49	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10		SM	SM	100	PT-1-44-45	Gray silty fine to medium sand with occasional shell fragments	NS	0	
11					PT-1-45-46				
12					PT-1-46-47				
13					PT-1-47-48				
14					PT-1-48-49				
15									

SEDIMENT CORING LOG

CORING LOCATION: PT-2

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	38	**Latitude:**	N 47° 58' 38.268"
Mudline Elevation (feet MLLW):	-29.5	**Longitude:**	W 122° 13' 33.139"
Total Coring Depth (feet MLLW):	-49.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		WD	WD	92	PT-2-29.5-30	Dark brown wood debris (wood chips and dimensional lumber) with silt	NS	60	
					PT-2-30-31				
1									
					PT-2-31-32				
2					PT-2-32-33				
3		WD			PT-2-33-34	Light brown wood debris (dimensional lumber)	NS	100	
4			WD		PT-2-34-35				
4.6		▨		▨	▨	▨	▨	▨	▨
5		SM	SM	80	PT-2-34-35	Gray silty fine to medium sand with wood debris (wood chips)	NS	<5	Sluff found in top 1-foot of core
		SM			PT-2-35-36	Gray silty fine to medium sand	NS	0	
			SM						
6					PT-2-36-37				
7					PT-2-37-38				
					PT-2-38-39				
8					PT-2-39-40				
9		▨		▨	▨	▨	▨	▨	▨
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-2

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	38	**Latitude:**	N 47° 58' 38.268"
Mudline Elevation (feet MLLW):	-29.5	**Longitude:**	W 122° 13' 33.139"
Total Coring Depth (feet MLLW):	-49.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SM	SM	80	PT-2-39-40	Gray silty fine to medium sand	NS	0	
					PT-2-40-41				
11					PT-2-41-42				
12					PT-2-42-43				
					PT-2-43-44				
13									
		SM			PT-2-44-45	Gray silty fine to medium sand with occasional shell fragments			
14									
			SM						
15		SM	SM	100	PT-2-44-45	Gray silty fine to medium sand with rare wood debris	NS	0	Piece of dimensional lumber observed at ~15.25 feet below mudline
					PT-2-45-46				
16					PT-2-46-47				
17									
		SM	SM		PT-2-47-48	Gray silty fine to medium sand with occasional shell fragments	NS	0	
18					PT-2-48-49				
19					Discard				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-3

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	42.5	**Latitude:**	N 47° 58' 38.498"
Mudline Elevation (feet MLLW):	-37.5	**Longitude:**	W 122° 13' 32.540"
Total Coring Depth (feet MLLW):	-47.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		SM	SM	80	PT-3-37.5-38 PT-3-38-39	Gray to brown silty fine to medium sand with wood debris	NS	20	
		WD	WD			Dark brown wood debris (sawdust, wood chips) with silty sand	NS	80	
1					PT-3-39-40				
2					PT-3-40-41		NS	80	
3					PT-3-41-42				
		SM			PT-3-42-43	Gray silty fine to medium sand with wood debris (wood chips) and occasional shell fragments	NS	15	
4			SM						
5		SM	SM	100	PT-3-42-43	Gray silty fine to medium sand with occasional shell fragments	NS	0	
					PT-3-43-44				
6					PT-3-44-45				
7					PT-3-45-46				
8					PT-3-46-47				
9					Discard				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-4

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.25	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	36.5	**Latitude:**	N 47° 58' 37.447"
Mudline Elevation (feet MLLW):	-27.25	**Longitude:**	W 122° 13' 33.405"
Total Coring Depth (feet MLLW):	-47.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		ML + WD	ML + WD	100	PT-4-27.25-28	Dark brown to gray silt and wood debris (sawdust 30%, wood chips 15%, dimensional lumber 5%)	NS	50	
					PT-4-28-29				
1									
					PT-4-29-30				
2									
					PT-4-30-31				
3									
					PT-4-31-32				
4									
					PT-4-32-33				
5		ML +WD	ML + WD	100	PT-4-32-33	Dark brown to gray silt and wood debris (sawdust 30%, wood chips 15%, dimensional lumber 5%)	NS	50	
					PT-4-33-34				
6									
		SP-SM	SP-SM			Gray fine to medium sand with silt	NS	0	
					PT-4-34-35				
7									
					PT-4-35-36				
8									
					PT-4-36-37				
9									
					PT-4-37-38				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-4

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.25	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	36.5	**Latitude:**	N 47° 58' 37.447"
Mudline Elevation (feet MLLW):	-27.25	**Longitude:**	W 122° 13' 33.405"
Total Coring Depth (feet MLLW):	-47.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SP-SM	SP-SM	100		Gray fine to medium sand with silt	NS	0	
					PT-4- 38 - 39				
11									
					PT-4-39-40				
12									
					PT-4-40-41				
13		SM	SM			Gray silty fine to medium sand	NS	0	
					PT-4-41-42				
14									
					PT-4-42-43				
15		SM	SM	100	PT-4-42-43	Gray silty fine to medium sand with occasional shell fragments	NS	0	
						A piece of wood observed (tree bark?)			
					PT-4-43-44				
16									
		SM	SM		PT-4-44-45	Gray silty fine to medium sand	NS	0	
17									
					PT-4-45-46				
18									
					PT-4-46-47				
19									
					Discard				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-5

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	33.25	**Latitude:**	N 47° 58' 37.709"
Mudline Elevation (feet MLLW):	-24.25	**Longitude:**	W 122° 13' 32.275"
Total Coring Depth (feet MLLW):	-49.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		ML	ML	100	PT-5-24.25-25	Gray to dark brown silt with wood debris (sawdust 10% and wood chips 10%) and organics (roots)	NS	20	
					PT-5-25-26				
1		WD	WD			Dark brown wood debris (sawdust 40% and wood chips 50%) with silt	NS	90	
2					PT-5-26-27				
3					PT-5-27-28				
4					PT-5-28-29				
					PT-5-29-30				
5		WD	WD	80	PT-5-29-30	Dark brown wood debris (sawdust 40% and wood chips 50%) with silt	NS	90	
					PT-5-30-31				
6									
					PT-5-31-32				
7					PT-5-32-33				
8					PT-5-33-34	Dark brown wood debris (sawdust 40% and wood chips 20%) with silt	NS	60	
		SM				Gray silty fine to medium Sand with occasional wood debris (wood chips)	NS	<5	
					PT-5- 34 - 35				
9									
			SM						
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-5

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	33.25	**Latitude:**	N 47° 58' 37.709"
Mudline Elevation (feet MLLW):	-24.25	**Longitude:**	W 122° 13' 32.275"
Total Coring Depth (feet MLLW):	-49.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SM	SM	100	PT-5- 34 - 35	Gray silty fine to medium sand	NS	0	
					PT-5-35-36				
11									
					PT-5-36-37				
12									
					PT-5-37-38				
13									
		SM	SM		PT-5-38-39	Gray silty fine to medium sand with occasional shell fragments			
14									
					PT-5-39-40				
15		SM	SM	100	PT-5-39-40	Gray silty fine to medium sand with occasional shell fragments	NS	0	
					PT-5-40-41				
16									
					PT-5-41-42				
17									
					PT-5-42-43				
18									
					PT-5-43-44				
19									
					PT-5-44-45				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-5

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	33.25	**Latitude:**	N 47° 58' 37.709"
Mudline Elevation (feet MLLW):	-24.25	**Longitude:**	W 122° 13' 32.275"
Total Coring Depth (feet MLLW):	-49.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
20		SM	SM	100	PT-5-44-45	Gray silty fine to medium sand with occasional shell fragments	NS	0	
21					PT-5-45-46				
22					Discard				
23									
24									
25									

SEDIMENT CORING LOG

CORING LOCATION: PT-6

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	25	**Latitude:**	N 47° 58' 36.952"
Mudline Elevation (feet MLLW):	-15.25	**Longitude:**	W 122° 13' 31.504"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		WD	WD	100	PT-6-15.25-16	Wood debris (sawdust 40%, wood chips 55%) with silt	NS	95	Clam (alive) observed at 0.5 feet below mudline
1					PT-6-16-17				
2					PT-6-17-18				
3					PT-6-18-19				
		SM + WD	SM + WD			Dark brown silt and wood debris (sawdust 25%, wood chips 25% to 50%)	NS	50-75	
4					PT-6-19-20				
		WD	WD			Wood debris (wood chips 90%) with silt	NS	90	
					PT-6-20-21				
5		WD	WD	84	PT-6-20-21	Wood debris (wood chips 50%, sawdust 40%)	NS	90	
					PT-6-21-22				
6							NS	70	
					PT-6-22-23				
7					PT-6-23-24				
8		SM			PT-6-23-24	Gray silty fine to medium sand with trace wood debris (sawdust)	NS	20	
			SM				NS	10	
9					Discard				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-6

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	25	**Latitude:**	N 47° 58' 36.952"
Mudline Elevation (feet MLLW):	-15.25	**Longitude:**	W 122° 13' 31.504"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10 11 12 13 14				20				100	Core rejected due to insufficient recovery
15 16 17 18 19 20		SM	SM	100	PT-6-30.25-31 PT-6-31-32 PT-6-32-33 PT-6-33-34 PT-6-34-35 PT-6- 35 - 36	Gray silty fine to medium sand with occasional shell fragments	NS	0	

SEDIMENT CORING LOG

CORING LOCATION: PT-6

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 13, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	25	**Latitude:**	N 47° 58' 36.952"
Mudline Elevation (feet MLLW):	-15.25	**Longitude:**	W 122° 13' 31.504"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
20		SM	SM	100	PT-6- 35 - 36	Gray silty fine to medium sand with occasional shell fragments	NS	0	
21					PT-6-36-37				
22					PT-6-37-38				
23					PT-6-38-39				
24					PT-6-39-40				
					PT-6- 40 - 41				
25		SM	SM	100	PT-6- 40 - 41	Gray silty fine to medium sand with occasional shell fragments	NS	0	
26					PT-6-41-42				
27		SP-SM	SP-SM		PT-6-41-42	Gray fine to medium sand with trace silt and occasional shell fragments	NS	0	
28					PT-6-43-44				
29					PT-6-44-45				
30					Discard				

SEDIMENT CORING LOG

CORING LOCATION: PT-106

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 16, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	25	**Latitude:**	N 47° 58' 37.038"
Mudline Elevation (feet MLLW):	-17	**Longitude:**	W 122° 13' 31.408"
Total Coring Depth (feet MLLW):	-32	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		WD	WD	100	Discard	Dark brown to gray wood debris (sawdust 50%, wood chips 45%) with silt	NS	95	
1									
2									
3		ML + WD	ML + WD			Dark brown to gray silt and wood debris (sawdust 25% and wood chips 25%)	NS	50	
4		WD	WD			Dark brown wood debris (sawdust 50%, wood chips 45%) with silt	NS	95	
5		WD	WD	100	Discard	Light brown wood debris (pieces of log)	NS	100	
6									
		WD	WD	100	Discard	Light brown wood debris (pieces of log)	NS	100	Approximately 1.5 feet of sluff observed on top of the core.
7									
		WD	WD	88	Discard	Dark brown wood debris (sawdust 60% and wood chips 30%) with silt	NS	90	
8					PT-106-25-26				
9					PT-106-26-27				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-106

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 16, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	25	**Latitude:**	N 47° 58' 37.038"
Mudline Elevation (feet MLLW):	-17	**Longitude:**	W 122° 13' 31.408"
Total Coring Depth (feet MLLW):	-32	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10				5					Core rejected due to insufficient recovery.
11									
12									
13									
14									
15									

SEDIMENT CORING LOG

CORING LOCATION: PT-7

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	40.5	**Latitude:**	N 47° 58' 37.456""
Mudline Elevation (feet MLLW):	-30	**Longitude:**	W 122° 13' 30.776""
Total Coring Depth (feet MLLW):	-45	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		WD	WD	100	PT-7-30-31	Dark brown to gray wood debris (sawdust 60%, wood chips and dimensional lumber 20%)	NS	80	
1					PT-7-31-32				
		SM	SM			Gray silty fine to medium sand with occasiona; shell fragments and wood debris	NS	20	
		SM	SM			Gray silty fine to medium sand with occasional shell fragments	NS	0	
2					PT-7-32-33				
3					PT-7-33-34				
4					PT-7-34-35				
5		SM	SM	100	PT-7-35-36	Gray silty fine to medium Sand with occasional shell fragments	NS	0	
6					PT-7-36-37				
7					PT-7-37-38				
8					PT-7-38-39				
9					PT-7-39-40				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-7

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	40.5	**Latitude:**	N 47° 58' 37.456""
Mudline Elevation (feet MLLW):	-30	**Longitude:**	W 122° 13' 30.776""
Total Coring Depth (feet MLLW):	-45	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SM	SM	100	PT-7-40-41	Gray silty fine to medium sand with occasional shell fragments	NS	0	
11					PT-7-41-42				
12					PT-7-42-43				
13					PT-7-43-44				
14					PT-7-44-45				
15									

SEDIMENT CORING LOG

CORING LOCATION: PT-8

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	11	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34.25	**Latitude:**	N 47° 58' 36.806"
Mudline Elevation (feet MLLW):	-23.25	**Longitude:**	W 122° 13' 30.297"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		SM	SM	100	PT-8-23.25-24	Gray silty fine to medium sand with wood debris (sawdust)	NS	40	
		WD	WD			Dark brown wood debris (sawdust) with sand	NS	90	
1					PT-8-24-25				
					Discard				
2				20		N/A			Core rejected due to insufficient recovery. Refer core log of PT-108.
3									
4									
5									
6									
7		SP-SM	SP-SM	100	PT-8-30.25-31	Gray fine to medium sand with silt	NS	0	
8					PT-8-31-32				
9					PT-8-32-33				
10					PT-8-33-34				

SEDIMENT CORING LOG

CORING LOCATION: PT-8

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	11	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34.25	**Latitude:**	N 47° 58' 36.806"
Mudline Elevation (feet MLLW):	-23.25	**Longitude:**	W 122° 13' 30.297"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10 11		SP-SM	SP-SM		PT-8-33-34 PT-8-34-35 PT-8-35-36	Gray fine to medium sand with silt	NS	0	
12 13 14 15 16		SP-SM	SP-SM	100	PT-8-35-36 PT-8-36-37 PT-8-37-38 PT-8-38-39 PT-8-39-40 PT-8-40-41	Gray fine to medium sand with silt and occasional shell fragments	NS	0	
17 18 19 20		SP-SM	SP-SM	100	PT-8-40-41 PT-8-41-42 PT-8-42-43 PT-8-43-44	Gray fine to medium sand with silt and occasional shell fragments	NS	0	

SEDIMENT CORING LOG

CORING LOCATION: PT-8

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	11	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34.25	**Latitude:**	N 47° 58' 36.806"
Mudline Elevation (feet MLLW):	-23.25	**Longitude:**	W 122° 13' 30.297"
Total Coring Depth (feet MLLW):	-45.25	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
20		SP-SM	SP-SM		PT-8-43-44	Gray fine to medium sand with silt and occasional shell fragments	NS	0	
					PT-8-44-45				
21									
22					Discard				

SEDIMENT CORING LOG

CORING LOCATION: PT-108

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 16, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	31	**Latitude:**	N 47° 58' 36.783"
Mudline Elevation (feet MLLW):	-22	**Longitude:**	W 122° 13' 30.543"
Total Coring Depth (feet MLLW):	-30	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0									Top 3 feet were water jetted to get to the desired sampling depth of 3 feet bml.
1									
2									
3		ML	ML	80	PT-108-25-26	Gray silt with wood debris (wood chips)	NS	20	
					PT-108-26-27				
4									
					PT-108-27-28				
5									
					PT-108-28-29				
		WD				Dark brown to gray wood debris (sawdust 60%, wood chips 25 % and dimensional lumber 5%)	NS	90	
6									
			WD		PT-108-29-30				
7									
8									
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-9

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34	**Latitude:**	N 47° 58' 36.772"
Mudline Elevation (feet MLLW):	-28.5	**Longitude:**	W 122° 13' 29.631"
Total Coring Depth (feet MLLW):	-48.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0				50					Core rejected due to insufficient recovery
1									
2									
3									
4									
5		SP-SM	SP-SM	100	PT-9-33.5-34	Gray fine to medium sand with silt	NS	0	
					PT-9-34-35				
6					PT-9-35-36				
7									
		SP-SM	SP-SM		PT-9-36-37	Gray fine to medium sand with silt with occasional shell fragments			
8					PT-9-37-38				
9					PT-9-38-39				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-9

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34	**Latitude:**	N 47° 58' 36.772"
Mudline Elevation (feet MLLW):	-28.5	**Longitude:**	W 122° 13' 29.631"
Total Coring Depth (feet MLLW):	-48.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10		SP-SM	SP-SM	100	PT-9-38-39	Gray fine to medium sand with silt	NS	0	
					PT-9-39-40				
11									
					PT-9-40-41				
12									
					PT-9-41-42				
13									
					PT-9-42-43				
14									
					PT-9-43-44				
15		SP-SM	SP-SM	100	PT-9-43-44	Gray fine to medium sand with silt	NS	0	
					PT-9-44-45				
16									
					PT-9-45-46				
17									
					PT-9-46-47				
18									
					PT-9-47-48				
19									
					Discard				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-109

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 12, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	5.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	34	**Latitude:**	N 47° 58' 36.737"
Mudline Elevation (feet MLLW):	-28.5	**Longitude:**	W 122° 13' 29.649"
Total Coring Depth (feet MLLW):	-48.5	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		SP-SM	SP-SM	96	PT-9-28.5-29	Gray fine to medium sand with silt, occasional wood debris (wood chips) and gravel	NS	<5	Initial core between 0 to 5 feet bml was rejected due to insufficient (50%) recovery. At the same location, second core was completed which achieved 96% recovery. Second core was accepted, logged and used to collect samples.
		SP-SM	SP-SM		PT-9-29-30	Gray fine to medium sand with silt	NS	0	
1									
					PT-9-30-31				
2									
					PT-9-31-32				
3									
					PT-9-32-33				
4									
					PT-9-33-33.5				
5									
6									
7									
8									
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-10

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	39.5	**Latitude:**	N 47° 58' 37.039"
Mudline Elevation (feet MLLW):	-29	**Longitude:**	W 122° 13' 33.906"
Total Coring Depth (feet MLLW):	-44	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		ML + WD	ML + WD	100	PT-10-29-30	Dr. Brown to gray silt with wood debris (sawdust 30%, wood chips 15%, dimensional lumber 5%)	NS	50	
1					PT-10-30-31				
2					PT-10-31-32				
3					PT-10-32-33				
4					PT-10-33-34				
5		SM	SM	90	PT-10-34-35	Gray silty fine to medium sand with wood debris (wood chips and dimensional lumber)	NS	20	
6					PT-10-35-36				
7		SP-SM	SP-SM		PT-10-36-37 PT-10-37-38	Gray fine to medium sand with silt and occasoinal shell fragments	NS	0	
8					PT-10-38-39				
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-10

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 14, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	39.5	**Latitude:**	N 47° 58' 37.039"
Mudline Elevation (feet MLLW):	-29	**Longitude:**	W 122° 13' 33.906"
Total Coring Depth (feet MLLW):	-44	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10		SM	SM	100		Gray silty fine to medium sand with occasional shell fragments	NS	0	
11					PT-10-38-39				
12					PT-10-38-39				
13					PT-10-38-39				
14					PT-10-38-39				
15									

SEDIMENT CORING LOG

CORING LOCATION: PT-11

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	29.75	**Latitude:**	N 47° 58' 36.822"
Mudline Elevation (feet MLLW):	-20	**Longitude:**	W 122° 13' 32.695"
Total Coring Depth (feet MLLW):	-40	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
0		ML + WD	ML + WD	100	PT-11-20-21	Gray silt and wood debris (sawdust 30%, wood chips 15% and dimensional lumber 5%)	NS	50	
1					PT-11-21-22				
2					PT-11-22-23				
3		WD	WD		PT-11-23-24	Dark brown wood debris (sawdust 90% and wood chips 10%)	MS	100	
4					PT-11-24-25				
5		WD	WD	100	PT-11-25-26	Dark brown wood debris (sawdust 90% and wood chips 10%)	SS	100	
6					PT-11-26-27				
7					PT-11-27-28				
8					PT-11-28-29		MS	100	
		SM	SM			Gray silty fine to medium sand with wood debris (wood chips)	NS	15	
9					PT-11-29-30				
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-11

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	29.75	**Latitude:**	N 47° 58' 36.822"
Mudline Elevation (feet MLLW):	-20	**Longitude:**	W 122° 13' 32.695"
Total Coring Depth (feet MLLW):	-40	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SM	SM	100	PT-11-30-31	Gray silty fine to medium sand with wood debris (wood chips)	NS	<5	
11		SM	SM		PT-11-31-32	Gray silty fine to medium sand with occasional shell fragments	NS	0	
12					PT-11-32-33				
13					PT-11-33-34				
14					PT-11-34-35				
15		SM	SM	100	PT-11-35-36	Gray silty fine to medium sand with occasional shell fragments	NS	0	
16					PT-11-36-37				
17					PT-11-37-38				
18					PT-11-38-39				
19					PT-11-39-40				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-12

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	22	**Latitude:**	N 47° 58' 36.577"
Mudline Elevation (feet MLLW):	-14	**Longitude:**	W 122° 13' 31.431"
Total Coring Depth (feet MLLW):	-39	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		WD	WD	100	PT-12-14-15	Dark brown to gray wood debris (sawdust 40%, wood chips 45% and dimensional lumber 5%)	NS	90	
1					PT-12-15-16				
2					PT-12-16-17				
3					PT-12-17-18	Dark brown wood debris (sawdust 70% and wood chips 20%)	NS	90	
4					PT-12-18-19	Light brown wood debris (wood chips)	NS	100	
5				20					Core rejected due to insufficient recovery. Refer core log of PT-112
6									
7									
8									
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-12

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	22	**Latitude:**	N 47° 58' 36.577"
Mudline Elevation (feet MLLW):	-14	**Longitude:**	W 122° 13' 31.431"
Total Coring Depth (feet MLLW):	-39	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		WD	WD	80	PT-12-24-25	Light brown wood debris (wood chips)	NS	100	
		WD				Dark brown to gray wood debris (sawdust 70% and wood chips 20%)	NS	90	
			WD		PT-12-25-26				
11									
					PT-12-26-27				
12									
					PT-12-27-28				
13									
					PT-12-28-29				
14									
15		WD	WD	100	PT-12-29-30	Dark brown to gray wood debris (sawdust 70% and wood chips 20%)	NS	90	
16		SM	SM		PT-12-30-31	Gray silty fine to medium sand with wood debris	NS	10	
17					PT-12-31-32				
18					PT-12-32-33				
19					PT-12-33-34				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-12

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	8	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	22	**Latitude:**	N 47° 58' 36.577"
Mudline Elevation (feet MLLW):	-14	**Longitude:**	W 122° 13' 31.431"
Total Coring Depth (feet MLLW):	-39	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
20		SM	SM	100	PT-12-34-35	Gray silty fine to medium sand with occasional shell fragments	NS	0	
21					PT-12-35-36				
22					PT-12-36-37				
23					PT-12-37-38				
24					PT-12-38-39				
25									

SEDIMENT CORING LOG

CORING LOCATION: PT-112

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 16, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	9.5	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	24	**Latitude:**	N 47° 58' 36.605"
Mudline Elevation (feet MLLW):	-14.5	**Longitude:**	W 122° 13' 31.454"
Total Coring Depth (feet MLLW):	-24	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)	SAMPLE ID	SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0									Top 4.5 feet were water jetted to get to the desired sampling depth of 3 feet bml.
1									
2									
3									
4									
		WD + ML	WD + ML	100	PT-112-19-20	Dark brown to gray silt and wood debris	NS	50	
5									
		WD	WD			Dark brown wood debris (sawdust 70%, wood chips 20% and dimensional lumber 5%)	NS	95	
					PT-112-20-21				
6									
					PT-112-21-22				
7									
					PT-112-22-23				
8									
					PT-112-23-24				
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-13

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	26.75	**Latitude:**	N 47° 58' 36.314"
Mudline Elevation (feet MLLW):	-16	**Longitude:**	W 122° 13' 30.222"
Total Coring Depth (feet MLLW):	-36	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		SM + WD	SM + WD	80	PT-13-16-17	Dark brown to gray silty fine to medium sand and wood debris (wood chips)	NS	50	
1					PT-13-17-18				
2					PT-13-18-19				
		WD			PT-13-19-20	Reddish brown sawdust 80% and wood chips 10% w/ trace silt	NS	95	
3			WD		PT-13-20-21				
4									
5		WD	WD	90	PT-13-21-22	Dark brown wood debris (sawdust 45%, wood chips 40% and dimensional lumber 5%) with trace silt	NS	95	
6					PT-13-22-23				
		SM	SM			Gray silty fine to medium sand with occasional wood debris (wood chips)	NS	<5	
		SM	SM		PT-13-23-24	Gray silty fine to medium sand with occasional shell fragments	NS	0	
7									
8					PT-13-24-25				
					PT-13-25-26				
9									
10									

SEDIMENT CORING LOG

CORING LOCATION: PT-13

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10.75	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	26.75	**Latitude:**	N 47° 58' 36.314"
Mudline Elevation (feet MLLW):	-16	**Longitude:**	W 122° 13' 30.222"
Total Coring Depth (feet MLLW):	-36	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP	CLASSIFICATION	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
		FEET RECOVERED	FEET DRIVEN						
10		SM	SM	100	PT-13-26-27	Gray silty fine to medium sand with occasional shell fragments	NS	0	
11					PT-13-27-28				
12					PT-13-28-29				
13					PT-13-29-30				
14					PT-13-30-31				
15		SM	SM		PT-13-31-32	Gray silty fine to medium sand with occasional shell fragments	NS	0	
16					PT-13-32-33				
		WD	WD			Light brown wood chips with silty sand	NS	80	
		SM	SM			Gray silty fine to medium sand with occasional shell fragments	NS	0	
17					PT-13-33-34				
18					PT-13-34-35				
19					PT-13-35-36				
20									

SEDIMENT CORING LOG

CORING LOCATION: PT-14

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	28	**Latitude:**	N 47° 58' 36.278"
Mudline Elevation (feet MLLW):	-18	**Longitude:**	W 122° 13' 29.604"
Total Coring Depth (feet MLLW):	-38	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
0		SM	SM	100	PT-14-18-19	Gray silty fine to medium sand with occasional wood debris (wood chips), shell fragments and gravel	NS	20	
1					PT-14-19-20				
2		ML	ML		PT-14-20-21	Gray silt with occasional wood debris (wood chips)	NS	5	
3					PT-14-21-22				
4		SM	SM		PT-14-22-23	Gray silty fine to medium sand with occasional wood debris (wood chips) and gravel	NS	<10	
5		SM	SM	96	PT-14-23-24	Gray silty fine to medium sand with occasional wood debris (wood chips) and shell fragments	NS	<5	
6					PT-14-24-25				
7					PT-14-25-26				
8					PT-14-26-27	A piece of wood debris observed			
9					PT-14-27-28				
10									

SEDIMENT CORING LOG

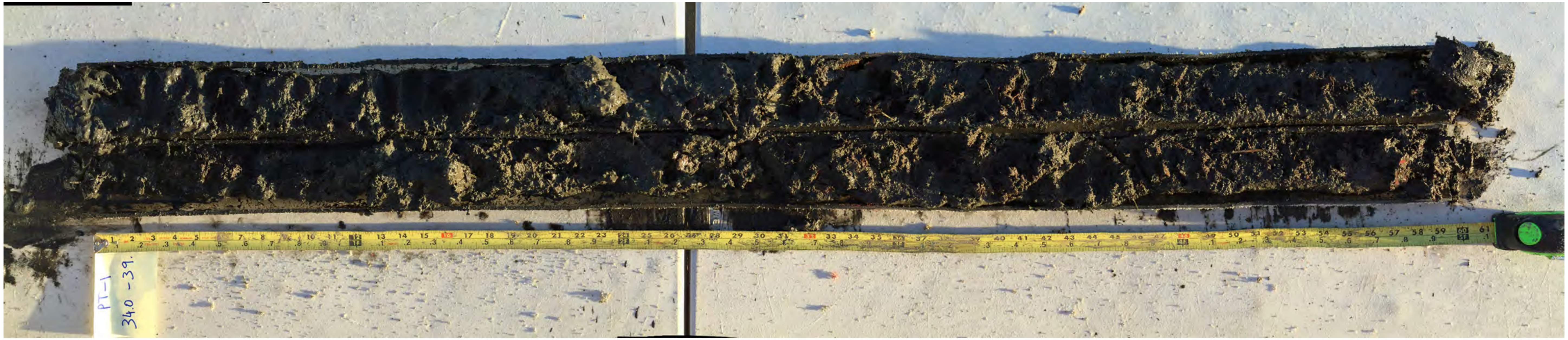
CORING LOCATION: PT-14

Project Name:	Weyerhaeuser Mill A Former Cleanup Site, Everett, Washington		
GeoEngineers, Inc. Project Number:	0676-020-03		
Date:	January 15, 2015	**Coring Performed By:**	Cascade Drilling, L.P.
Water Surface Elevation (feet MLLW):	10	**Coring Method:**	Sonic (Barge Mounted)
Depth of Water Column (feet):	28	**Latitude:**	N 47° 58' 36.278"
Mudline Elevation (feet MLLW):	-18	**Longitude:**	W 122° 13' 29.604"
Total Coring Depth (feet MLLW):	-38	**Horizontal Datum:**	Geographic NAD83

Depth Below Mudline (ft)	Scale	GROUP FEET RECOVERED	CLASSIFICATION FEET DRIVEN	Recovery (%)		SEDIMENT DESCRIPTION	Sheen	Wood Content (%)	COMMENTS
10		SM	SM	100	PT-14-28-29	Gray silty fine to medium sand with occasional shell fragments	NS	0	
11					PT-14-29-30				
12					PT-14-30-31				
13					PT-14-31-32				
14					PT-14-32-33				
15		SM	SM	100	PT-14-33-34	Gray silty fine to medium sand with occasional shell f	NS	0	
16					PT-14-34-35				
17					PT-14-35-36				
18					PT-14-36-37				
19					PT-14-37-38				
20									

APPENDIX C

Core Photographs



PT-1 Elevation **-34** to **-39** ft MLLW

PT-1 Elevation **-39** to **-44** ft MLLW

PT-1 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-1

PT-1 Elevation **-44** to **-49** ft MLLW

PT-1 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-2

PT-2 Elevation **-29.5** to **-34.5** ft MLLW

PT-2 Elevation **-34.5** to **-39.5** ft MLLW

PT-2 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-3

PT-2 Elevation **-39.5** to **-44.5** ft MLLW

PT-2 Elevation **-44.5** to **-49.5** ft MLLW

PT-2 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-4

PT-3 Elevation **-37.5** to **-42.5** ft MLLW

PT-3 Elevation **-42.5** to **-47.5** ft MLLW

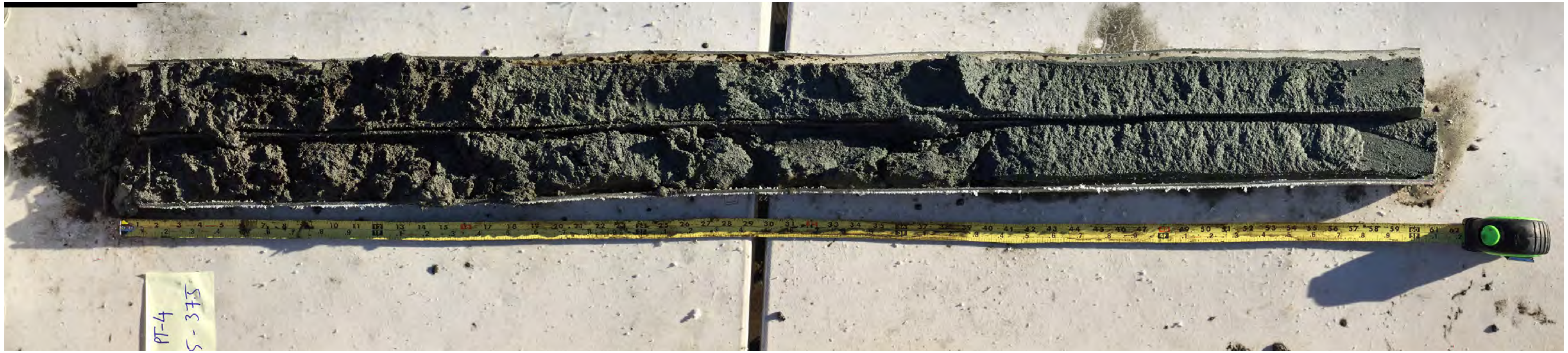
PT-3 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-5

PT-4 Elevation **-27.25** to **-32.25** ft MLLW



PT-4 Elevation **-32.25** to **-37.25** ft MLLW

PT-4 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-6

PT-4 Elevation **-37.25** to **-42.25** ft MLLW

PT-4 Elevation **-42.25** to **-47.25** ft MLLW

PT-4 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-7

PT-5 Elevation **-24.25** to **-29.25** ft MLLW

PT-5 Elevation **-29.25** to **-34.25** ft MLLW

PT-5 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-8

PT-5 Elevation **-34.25** to **-39.25** ft MLLW

PT-5 Elevation **-39.25** to **-44.25** ft MLLW

PT-5 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-9

PT-5 Elevation **-44.25** to **-49.25** ft MLLW

PT-5 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-10

PT-6 Elevation **-15.25** to **-20.25** ft MLLW

PT-6 Elevation **-20.25** to **-25.25** ft MLLW

PT-6 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-11

PT-6 Elevation **-30.25** to **-35.25** ft MLLW

PT-6 Elevation **-35.25** to **-40.25** ft MLLW

PT-6 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-12

PT-6 Elevation **-40.25** to **-45.25** ft MLLW

PT-6 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-13

PT-106 Elevation **-22** to **-23.5** ft MLLW

PT-106 Elevation **-23.5** to **-24.5** ft MLLW

PT-106 Elevation **-24.5** to **-27** ft MLLW

PT-106 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-14

PT-7 Elevation **-30** to **-35** ft MLLW

PT-7 Elevation **-35** to **-40** ft MLLW

PT-7 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-15

PT-7 Elevation **-40** to **-45** ft MLLW

PT-7 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-16

PT-8 Elevation **-23.25** to **-25.25** ft MLLW

PT-8 Elevation **-30.25** to **-35.25** ft MLLW

PT-8 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-17

PT-8 Elevation **-35.25** to **-40.25** ft MLLW

PT-8 Elevation **-40.25** to **-45.25** ft MLLW

PT-8 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-18

PT-108 Elevation **-25** to **-30** ft MLLW

PT-108 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-19

PT-9 Elevation **-33.5** to **-38.5** ft MLLW

PT-9 Elevation **-38.5** to **-43.5** ft MLLW

PT-9 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-20

PT-9 Elevation **-43.5** to **-48.5** ft MLLW

PT-9 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-21

PT-109 Elevation **-28.5** to **-33.5** ft MLLW

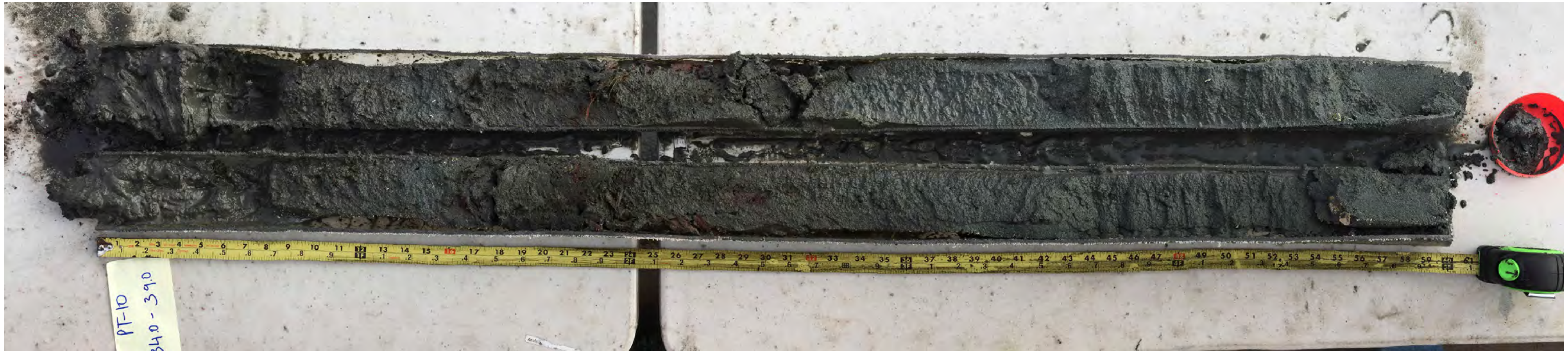
PT-109 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-22

PT-10 Elevation **-29** to **-34** ft MLLW



PT-10 Elevation **-34** to **-39** ft MLLW

PT-10 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-23

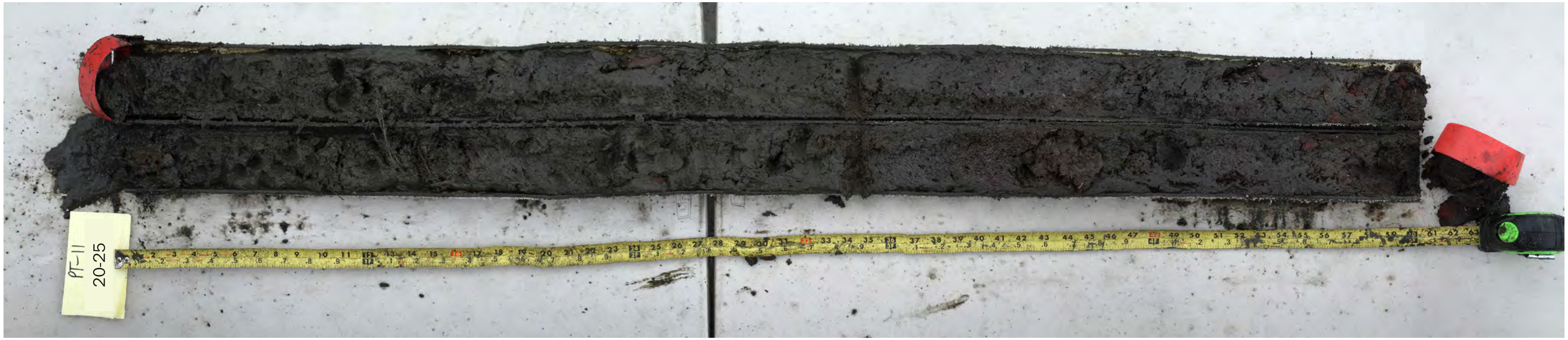
PT-10 Elevation **-39** to **-44** ft MLLW

PT-10 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-24



PT-11 Elevation **-20** to **-25** ft MLLW

PT-11 Elevation **-25** to **-30** ft MLLW

PT-11 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-25

PT-11 Elevation **-30** to **-35** ft MLLW

PT-11 Elevation **-35** to **-40** ft MLLW

PT-11 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-26

PT-12 Elevation **-14** to **-19** ft MLLW

PT-12 Elevation **-24** to **-29** ft MLLW

PT-12 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-27

PT-12 Elevation **-29** to **-34** ft MLLW

PT-12 Elevation **-34** to **-39** ft MLLW

PT-12 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-28

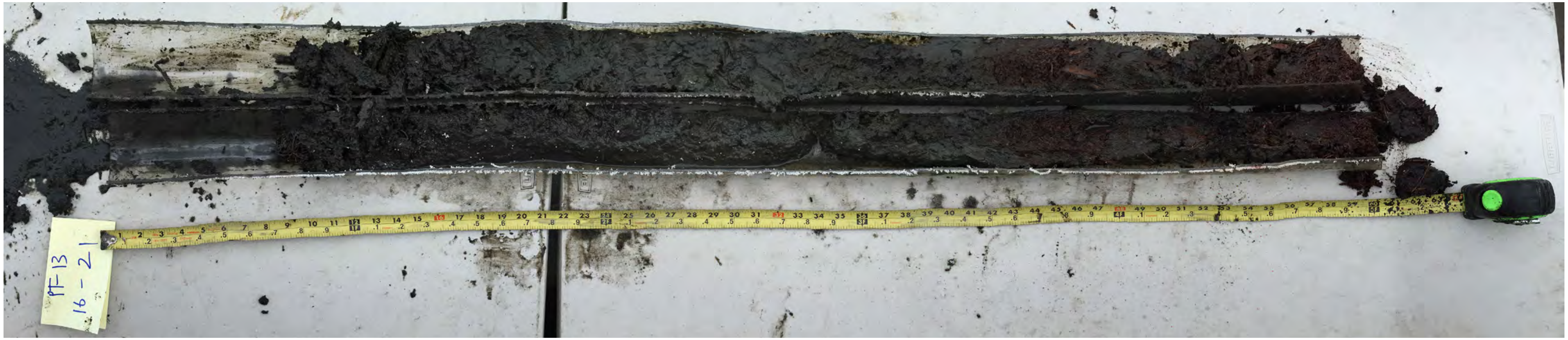
PT-112 Elevation **-19** to **-24** ft MLLW

PT-112 Core Photographs

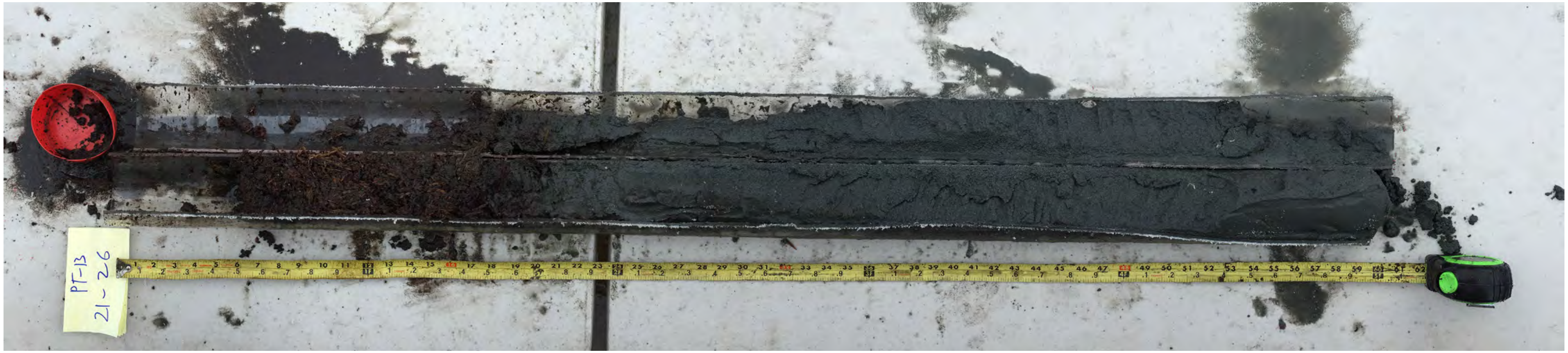
Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-29



PT-13 Elevation **-16** to **-21** ft MLLW



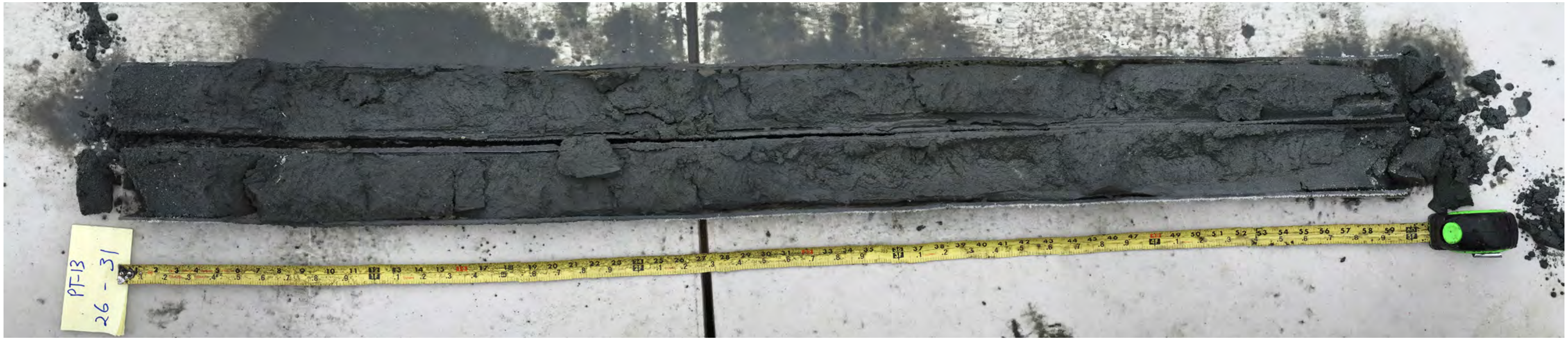
PT-13 Elevation **-21** to **-26** ft MLLW

PT-13 Core Photographs

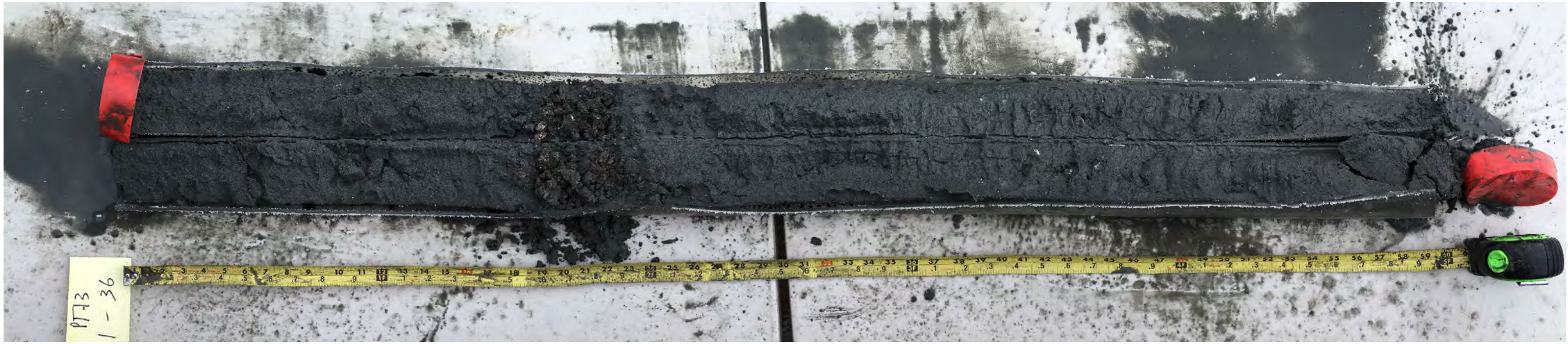
Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-30



PT-13 Elevation **-26** to **-31** ft MLLW



PT-13 Elevation **-31** to **-36** ft MLLW

PT-13 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure C-31

PT-14 Elevation **-18** to **-23** ft MLLW

PT-14 Elevation **-23** to **-28** ft MLLW

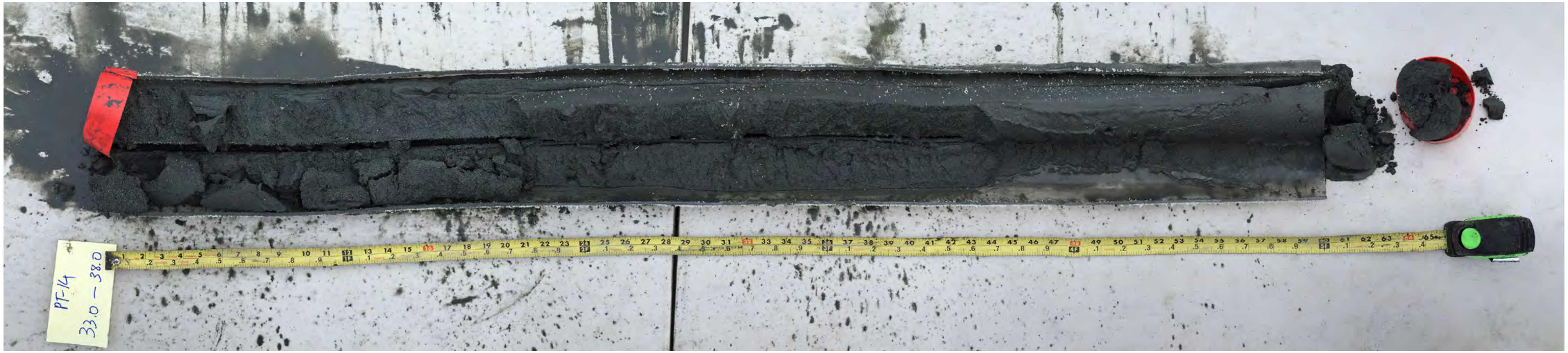
PT-14 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-32

PT-14 Elevation **-28** to **-33** ft MLLW



PT-14 Elevation **-33** to **-38** ft MLLW

PT-14 Core Photographs

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure C-33

APPENDIX D

Laboratory Analytical Report
Provided in a Separate File

APPENDIX E

Data Validation Report
Provided in a Separate File

APPENDIX F

Bioassay Testing Report
Provided in a Separate File

DMMP Suitability Determination Memorandum

CENWS-OD-TS-NR-DMMO

MEMORANDUM FOR: RECORD July 9, 2015

SUBJECT: DETERMINATION REGARDING THE SUITABILITY/UNSUITABILITY OF PROPOSED DREDGED MATERIAL FOR EXPANSION OF THE PORT OF EVERETT'S PACIFIC TERMINAL BERTHING AREA, LOCATED AT THE FORMER SITE OF WEYERHAEUSER MILL A, EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UNCONFINED OPEN-WATER DISPOSAL AT THE PORT GARDNER OPEN-WATER SITE.

1. Introduction. This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability/unsuitability of up to 40,000 cubic yards (cy) of dredged material associated with expansion of the Port of Everett's Pacific Terminal berthing area, located at the former site of Weyerhaeuser Mill A, for disposal at the Port Gardner open-water site.

2. Background. The Port of Everett is proposing expansion of the berthing capacity at Pacific Terminal to support the larger ships anticipated to call on the terminal in the future. Pacific Terminal is the Port's primary marine terminal and is used by the Port for handling and loading of maritime cargo. It was constructed in the mid-1990s as part of a near-shore confined disposal (NCD) facility project. Currently, a 650-foot-long shipping berth operates at the terminal. Pacific Terminal is a part of a larger marine terminal complex, which also includes South Terminal and Pier 1 (GeoEngineers, 2014).

   Pacific Terminal is located on property formerly occupied by Weyerhaeuser's Mill A facility at the southern end of the City of Everett waterfront (Figure 1). Previous sediment investigations found elevated concentrations of metals, semivolatile organics, PCBs and dioxins/furans located offshore of the former mill facility. The contamination led the Department of Ecology (Ecology) to designate the area a cleanup site in 1996. A partial cleanup was accomplished at that time, resulting in construction of the NCD and dredging and sequestration of 130,000 cubic yards of contaminated sediment behind the NCD containment berm. Pacific Terminal was constructed over the NCD and serves as a cap which minimizes rainwater infiltration. The cleanup removed contaminated sediment to the west of Pier 1 and created a berthing area for Pacific Terminal. Other areas of contaminated sediment associated with the Mill A facility remain, including an area of wood debris accumulation adjacent to South and Pacific Terminals.

   Ecology is undertaking a cleanup of the remaining contaminated sediment associated with Mill A under an Agreed Order, but the cleanup is likely to take several years to accomplish. In the meantime, the Port of Everett has an immediate need to expand the berth at Pacific Terminal to facilitate maritime cargo shipping. To accommodate this need, Ecology has agreed to a Model Toxics Control Act (MTCA) Interim Cleanup Action in the berth expansion area under an amendment to the existing Agreed Order. The proposed interim action will expedite part of the environmental cleanup at the former Mill A site while meeting the Port's immediate navigation needs. Figure 2 shows the interim action dredge area in relation to the terminal complex and the area of wood debris accumulation. Also shown is the "Berth 1 Construction Dredge Area". The Port of Everett plans to expand Berth 1 at some future time; however, it is not part of the current proposal. Figure 3 shows the interim action area in more detail and depicts the expansion of the berthing capacity at Pacific Terminal.

3. Sediment Evaluation under DMMP and MTCA. Characterization of the sediment proposed for dredging required the dual application of the DMMP evaluation guidelines and MTCA cleanup standards. To facilitate this characterization, Ecology's Toxics Cleanup Program (TCP) and the DMMP agencies agreed to a joint review of the sampling and analysis plan, in which the combined sediment evaluation framework was developed. The Interim Action Work Plan for the project requires that any sediment identified as cleanup material under MTCA will be disposed of at an appropriate landfill. Only dredged material meeting both the DMMP suitability guidelines and MTCA standards will be taken to the Port Gardner open-water disposal site. The resulting evaluation framework is provided in Figure 4 and summarized in the following bullets:

   - For arsenic, cadmium, lead and mercury the screening levels for protection of human health and higher trophic level ecological receptors would be the maximum allowable concentrations for open-water disposal. For other metals tiered testing would be conducted, with the DMMP screening levels used to determine the need for bioassays.

   - For PAHs, chlorinated hydrocarbons, phthalates, phenols and miscellaneous extractables the analytical results would be independently compared to DMMP screening levels, MTCA screening levels for protection of benthic organisms and MTCA screening levels for protection of human health and higher trophic level ecological receptors. If concentrations exceed any of these screening levels, then bioassay testing would be required for the material to be determined suitable for open-water disposal.

   - For total PCBs, the MTCA screening level for protection of human health and higher trophic level ecological receptors would be the maximum allowable concentration for open-water disposal.

   - For total cPAHs and total dioxin-like PCB congeners there are no MTCA screening levels for protection of benthic organisms or DMMP screening levels. For these groups of chemicals, the screening levels for protection of human health and higher trophic level ecological receptors would be the maximum allowable concentrations for open-water disposal.

   - The MTCA screening level for dioxin (5 ng/kg) is based on the practical quantitation limit and would not be used for determination of open-water suitability. The DMMP dioxin guidelines would be used instead.

   - For chemicals that do not have MTCA screening levels (e.g. pesticides and TBT), the DMMP guidelines would be used.

   - In the event that a DMMP bioaccumulation trigger (BT) were to be exceeded for a DMMU and the DMMU would otherwise qualify for open water disposal, the Port would determine whether or not to conduct bioaccumulation testing for that DMMU. If bioaccumulation testing was not conducted the DMMU would be found unsuitable for open-water disposal.

■ DMMUs with a dry-weight wood-waste content greater than 25% would be subjected to bioassay testing.

This suitability determination memorandum describes the sampling and testing that was performed, presents the results of the sediment evaluation, and documents the determination by the DMMP agencies of the suitability/unsuitability of the dredged material for open-water disposal based on the dual DMMP/MTCA framework.

4. Project Summary. Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	High
Dredging volume	40,000 cubic yards
Proposed dredging depth	-43 feet MLLW within the main navigation area and -48 feet MLLW within the slope protection keyway; both base elevations include one foot of over-dredge allowance
1st draft sampling and analysis plan (SAP) received	November 7, 2014
DMMP comments provided on 1st draft	November 20, 2014
2nd draft SAP received	December 1, 2014
DMMP comments provided on 2nd draft	December 15, 2014
Final SAP received	December 16, 2014
SAP approved	December 20, 2014
Sampling dates	January 12-16, 2015
Draft data report received	May 8, 2015
DMMP comments provided on draft report	May 20, 2015
Final data report received	June 22, 2015
DAIS Tracking number	PEWMA-1-B-F-366
EIM study ID	AODE8979
USACE permit application number	NWS-2014-1083
Recency determination (high rank = 3 years)	January 12, 2018

5. Project Ranking and Sampling Requirements. The Former Mill A site was ranked “high” due to its location in East Waterway (DMMP, 2014).

In a high-ranked area the number of samples and analyses are normally calculated using the following guidelines (DMMP, 2014):

- Maximum volume of sediment represented by each field sample (typically a 4-foot core) = 4,000 cubic yards
- Maximum volume of sediment represented by each analysis in the upper 4-feet of the dredging prism (surface sediment) = 4,000 cubic yards

- Maximum volume of sediment represented by each analysis beyond the upper 4-feet of the dredging prism (subsurface sediment) = 12,000 cubic yards

However, due to the heterogeneity of the site and the site's designation as a MTCA cleanup site, the DMMP agencies limited both surface and subsurface analyses to 4,000 cubic yards.

The total project volume at the time the sampling and analysis plan (SAP) was submitted was 35,140 cubic yards, including a one-foot overdredge allowance and an uncertainty factor of 10%. The project was divided into eleven dredged material management units (DMMUs) in six layers. Figures 4 to 7 show the layers, DMMUs and sampling locations. Figure 8 shows the compositing scheme. A total of 48 individual core sections were to be composited to represent the 11 DMMUs. However, the DMMP agencies agreed to review the core logs prior to compositing in order to take into account the stratigraphy encountered during sampling.

The SAP also included analysis of 9 z-samples. Normally, the z-samples would be collected from the first 2 feet beyond the overdepth. However, to accommodate the needs of TCP, z-samples were restricted to the first foot beyond the dredging overdepth. The purpose of z-sample analysis was to determine the chemical quality of the sediment that would be exposed by dredging. TCP also needed z-sample analysis on the new side slopes to determine sediment composition and slope stability.

6. <u>Sampling</u>. Field sampling took place January 12-16, 2015 using a sonic drill rig mounted on a barge. Tables 2 and 3 present the coring data, including penetration and recovery. Figure 9 shows both the target and actual sampling locations.

   Full penetration was achieved at all sampling locations. The minimum acceptable recovery rate of 75% was also achieved, with the exception of 4 core sections (at sampling stations PT-6, PT-8, PT-9 and PT-12). A second core was collected at these 4 stations in order to replace the core sections with poor recovery. This procedure was successful, except for the -27 to -30.25 MLLW core section at PT-106, which again had poor recovery.

   The core from each sampling station was divided into one-foot core sections and archived. Upon completion of sampling, the core logs and stratigraphy were evaluated to determine if revisions needed to be made to the DMMU configurations and compositing plan. In consultation with the DMMP agencies and TCP, GeoEngineers made two substantive changes upon review of the logs. First, a new DMMU (D-7) was created, consisting of sediment with high wood content that was blanketing the base of the slope in the most offshore portion of the dredging prism. Second, the three DMMUs located between elevations -38 ft and -42 ft MLLW (D-6A, D-6B and D-6C) were consolidated into two DMMUs (D-6A and D-6B).

   Figures 10, 11 and 12 show the stratigraphy encountered during sampling and the revised DMMU configurations. Figure 13 includes the revised compositing plan. In addition to the DMMU modifications, the z-layer sample at PT-3 was substituted for PT-2 because wood debris was observed closer to the dredging limit at this location. This change is evident in Figure 13.

7. <u>Wood-Content Analysis</u>. Due to the fact that wood waste was known to be present in portions of the dredge prism, the DMMP agencies required the fraction of wood waste in each DMMU to be

quantified using a modified total volatile solids (TVS) test on 300-g samples of sediment. According to DMMP guidelines (DMMP, 2014), if the TVS content is greater than 25% (roughly equivalent to 50% wood waste by volume), then bioassays must be run and passed in order for that DMMU to be eligible for open-water disposal.

The results from the wood-content analysis were unexpected. Despite visual evidence of high wood-waste content, none of the DMMUs had greater than 25% TVS. However, out of an abundance of caution and to ensure holding times were met, the Port of Everett chose to conduct bioassays on the 6 DMMUs with the highest wood content, as these were visually estimated to be in excess of 50% wood waste by volume. These DMMUs are indicated in Table 4.

8. Chemical Analysis. The approved SAP was followed and the resulting analytical data were deemed adequate to characterize the proposed dredged material. The sediment conventional and chemistry results can be found in Tables 5 and 6, in which contaminant concentrations are compared to the DMMP guidelines and MTCA preliminary cleanup screening levels respectively. Figures 14-17 show the results of chemical comparisons to DMMP and MTCA.

The total organic carbon content (TOC) of the DMMUs ranged widely, from a low of 0.12% in D-5B to a high of 14.4% in D-1, reflecting the highly variable quantities of wood waste within the dredge prism. The TOC concentrations were either too high (>3.5%) or too low (<0.5%) for carbon-normalization, with the exception of D-7. Total volatile solids covaried with TOC. Sulfide and ammonia were low in most samples.

Grain-size analysis was conducted twice for the DMMUs. The first analysis was the standard DMMP analysis. The second analysis was conducted on the residue of the wood-waste analysis. It was anticipated that the standard analysis would be biased toward the coarser-grained fractions, with larger wood chunks being included with the gravel fraction. This hypothesis proved to be correct, although the effect was relatively subtle. For the DMMUs with the highest wood content, the grain-size results from the standard analysis were skewed toward the coarser fractions.

For bioassay testing, it is assumed that the grain-size results from the ashed residue of the wood-waste analysis better reflect the nature of the sediment that the test organisms would be exposed to. The results from the grain-size analysis conducted on the ashed residue indicate that the sediment in the DMMUs was predominantly silty sand, with relatively low clay content (ranging from 2.6% to 12.5%).

Chemical testing indicated that contamination was greater in the upper layers of sediment, which included a higher wood-waste content, and nearly non-existent in deeper native material, which did not contain appreciable woody material.

Metals were not an issue with respect to the DMMP guidelines in any of the DMMUs, with no exceedances of DMMP screening levels (SLs). The concentrations of chromium and lead were slightly higher than the MTCA site-specific cleanup screening levels in some DMMUs, with chromium exceeding the screening level of 1 mg/kg for the protection of human health and higher trophic ecological receptors in DMMUs D-1 and D-3B, and lead exceeding the screening level of 21 mg/kg for the protection of human health and higher trophic ecological receptors in DMMUs D-1, D-2 and D-3B.

Semivolatile organics were elevated in several DMMUs, with DMMP maximum levels (MLs) exceeded for at least one chemical in DMMUs D-1, D-2, D-3B and D-4B. Semivolatiles exceeding the DMMP SL in at least one DMMU included naphthalene, diethyl phthalate, 2-methylphenol, 4-methylphenol, phenol, 2,4-dimethylphenol, benzoic acid and benzyl alcohol. These same chemicals exceeded the MTCA cleanup screening level for protection of benthic organisms in at least one DMMU.

PCB congener analysis was conducted to comply with MTCA testing requirements, replacing the Aroclor analysis done for typical DMMP projects. Like the metals, PCBs were not an issue in any of the DMMUs when compared to the DMMP guidelines. The highest concentration of total PCBs was 27.1 ug/kg in DMMU D-1, which is well below the DMMP SL of 130 ug/kg. Carbon-normalized, the highest concentration of PCBs was 0.7 mg/kg oc, which is far below the DMMP bioaccumulation trigger (BT) of 38 mg/kg oc. However, when compared to the site-specific MTCA levels, five of the DMMUs (D-1, D-2, D-3A, D-3B and D-4B) exceeded the sediment screening level for protection of human health and higher trophic level ecological receptors of 3.5 ug/kg.

Bulk concentrations of tributyltin (TBT) were mostly undetected. The highest detected concentration was 3.7 ug/kg, which is far below the DMMP BT of 73 ug/kg. There is no MTCA cleanup screening level for TBT.

Dioxin concentrations were elevated in several DMMUs, with D-1, D-2, D-3B, D-4B and D-7 all above the DMMP BT of 10 ng/kg toxic equivalents (TEQ). DMMU D-3A exceeded the DMMP site management objective of 4 ng/kg TEQ. The remaining DMMUs (D-4A, D-5A, D-5B, D-6A and D6B) had TEQs ranging from 0.43 to 1.38 ng/kg. The TEQ calculations are shown in Table 7.

TEQs for carcinogenic polycyclic aromatic hydrocarbons (cPAHs) were calculated for comparison to the site-specific MTCA cleanup screening level of 16 ug/kg for the protection of human health and higher trophic ecological receptors. DMMUs D-1, D-2, D-3A, D-3B and D-4B exceeded this concentration. There are no DMMP guidelines for cPAHs.

Data validation was conducted by GeoEngineers. All of the sample delivery group data packages received EPA Stage 2B validation, with 10 percent of the packages receiving EPA Stage 4 validation. The data and qualifiers presented in Tables 5, 6 and 7 include all modifications made by the validator.

9. Bioassays. As indicated in Section 6, bioassays were run on the six DMMUs with the highest wood content. These same DMMUs were subsequently found to contain at least one contaminant concentration exceeding a DMMP SL. The DMMUs that were not subjected to bioassays (D-4A, D-5A, D-5B, D-6A and D-6B) had no DMMP SL exceedances.

   The standard suite of three bioassay tests (amphipod mortality, larval development, and polychaete growth) was performed. The DMMP interpretation guidelines for non-dispersive disposal sites (DMMP, 2014) and Table IV from the Sediment Management Standards (SMS) (Ecology, 2013) were used to assess the bioassay results. The DMMP and SMS interpretation guidelines are found in Tables 8 and 9 respectively. The reference sediment sample was collected from Carr Inlet on February 24, 2015. The Carr Inlet sediment, with a fines content of only 1.1% (Table 10), was coarser than the test sediments. The fines content of the test samples (from the grain-size analysis of ashed sediment) ranged from 20.6% to 33.7%. Because the bioassays tend to perform better when run with coarse sediment, use of a reference sediment that is coarser than the test sediments makes for an environmentally conservative evaluation. The reference sediment and negative controls met the DMMP performance criteria for all three bioassays.

Amphipod Mortality. The amphipod bioassay was run using *Eohaustorius estuarius* as the test species. Test results are shown in Table 11 and summarized in Tables 14 and 15. The test sediments performed well and there were no hits for any DMMU.

All water quality parameters were within the acceptable limits throughout the duration of the test, with the exception of minor deviations in salinity. Although salinity was recorded slightly above the recommended range of 28 ± 1 ppt, this salinity was still well within the tolerance range for this species.

A reference-toxicant test was performed on the batch of test organisms utilized for this study. The LC50 value was well within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at the bioassay lab (Environ, 2015).

Polychaete Growth. The juvenile polychaete growth test - using *Neanthes arenaceodentata* as the test species - was run with the ash-free dry-weight endpoint. Test results are shown in Table 12 and summarized in Tables 14 and 15. The test sediments performed well and there were no hits for any DMMU.

All water quality parameters were within the acceptable limits throughout the duration of the test. A reference-toxicant test was performed on the batch of test organisms utilized for this study. The LC50 value was well within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at the bioassay lab (Environ, 2015).

Larval Development. The larval development bioassay - using *Mytilus galloprovincialis* - was run with the standard endpoint, which involves carefully decanting the overlying water at the end of the test so as not to disturb the sediment. The results are shown in Table 13 and summarized in Tables 14 and 15.

DMMUs D-1, D-2 and D-4B scored a hit under the two-hit rule for DMMP non-dispersive disposal and exceeded the SMS sediment cleanup objective (SCO). DMMU D-3B scored a hit under the one-hit rule for DMMP unconfined open-water disposal and exceeded the SMS cleanup screening level (CSL).

All water quality parameters were within the acceptable limits throughout the duration of the test, with the exception of minor deviations in salinity. Although salinity was recorded at 30 ppt in the water quality surrogate for several samples on Day 1, this salinity was well within the tolerance range for this species.

A reference-toxicant test was performed on the batch of test organisms utilized for this study.

The LC50 value was well within control chart limits (±2 standard deviations from the laboratory historical mean). This result indicates that the test organisms used in this study were of similar sensitivity to those previously tested at the bioassay lab (Environ, 2015).

A single hit under the DMMP one-hit rule disqualifies a DMMU for open-water disposal. Therefore, DMMU D-3B failed biological testing and is unsuitable for open-water disposal. Under the DMMP two-hit rule, hits must occur in at least two bioassays to disqualify a DMMU for open-water disposal. DMMUs D-1, D-2 and D-4B scored hits under the two-hit rule for the larval test, but there were no corroborating hits in the other bioassays. Therefore, with regard to bioassay testing, these DMMUs are suitable for open-water disposal.

The SMS interpretation of the data yielded the same results. DMMU D-3B exceeded the CSL and is unsuitable for open-water disposal. DMMUs D-1, D-2 and D-4B exceeded the SCO for a single bioassay only and are, therefore, not considered cleanup material with regard to benthic effects.

Figure 18 graphically depicts the outcome of biological testing.

10. Sediment Exposed by Dredging. Ecology's TCP staff evaluated the z-samples taken from the dredge prism base and side slopes. The four z-samples taken from the dredge prism base had no exceedances of DMMP guidelines or MTCA cleanup screening levels. Two of the five z-samples taken from side slopes exceeded DMMP or MTCA screening levels. Exceedances occurred for dioxins/furans, cadmium, lead and cPAHs.

    As part of the MTCA Interim Action, Ecology will require the side slopes to be armored to contain the contaminated material and stabilize the slope. The placement of armor rock necessitated a design change to key the rock into the slope. This resulted in minor modifications of the DMMU layout and associated volumes. The DMMP-approved volume revisions are summarized in Table 16. Figures 10, 11 and 12 show the keyway necessary to construct the armored slope.

11. DMMP Suitability Determination. The chemical and biological testing results were evaluated using the DMMP guidelines and site-specific MTCA preliminary sediment screening levels – in accordance with the SAP – to characterize sediment quality and evaluate suitability of the dredged material for open-water disposal. The results of this dual evaluation are provided in Table 16.

Table 16. Evaluation of Chemical and Biological Testing Results for Open-Water Disposal

DMMU	Volume (cy)	Suitability	Reason
D-1	3,940	unsuitable	D/F>10 ng/kg TEQ with no bioaccumulation testing; cPAH and total PCBs>HH/HTL
D-2	3,750	unsuitable	D/F>10 ng/kg TEQ with no bioaccumulation testing; cPAH and total PCBs>HH/HTL
D-3A	2,450	unsuitable	cPAH and total PCBs>HH/HTL
D-3B	2,420	unsuitable	D/F>10 ng/kg TEQ with no bioaccumulation testing; cPAH and total PCBs>HH/HTL; failed bioassays
D-4A	2,790	suitable	No DMMP or MTCA chemical exceedances
D-4B	3,160	unsuitable	D/F>10 ng/kg TEQ with no bioaccumulation testing; cPAH and total PCBs>HH/HTL

D-5A	2,870	suitable	No DMMP or MTCA chemical exceedances
D-5B	2,710	suitable	No DMMP or MTCA chemical exceedances
D-6A	4,520	suitable	No DMMP or MTCA chemical exceedances
D-6B	4,320	suitable	No DMMP or MTCA chemical exceedances
D-7	4,390	unsuitable	D/F>10 ng/kg TEQ with no bioaccumulation testing; cPAH and total PCBs>HH/HTL; failed bioassays

cPAH = carcinogenic polycyclic aromatic hydrocarbons
D/F = dioxins/furans
HH/HTL = human health and higher trophic level ecological receptors
PCBs = polychlorinated biphenyls
TEQ = toxic equivalents

In summary, six DMMUs (D-1, D-2, D-3A, D-3B, D-4B and D-7), with a combined volume of 20,110 cy, are unsuitable for open-water disposal at the Port Gardner site. Five DMMUs (D-4A, D-5A, D-5B, D-6A and D-6B), with a combined volume of 17,210 cy, are suitable for open-water disposal. The suitable DMMUs all had low dioxin concentrations, with TEQs ranging from 0.43 to 1.38 ng/kg. The volume-weighted average for the suitable DMMUs is well below the DMMP disposal site management objective of 4 pptr TEQ.

In order to provide flexibility to the dredging contractor during project construction and to maintain consistency with the Port's permit applications, the Port of Everett requested that the upper limit on the total dredged material volume be increased to 40,000 cubic yards in the suitability determination. The DMMP agencies agreed to this modification, provided that the dredged material taken to the Port Gardner disposal site is restricted to the 17,210 cubic yards documented in this memorandum as being suitable for open-water disposal.

A pre-dredge meeting with DNR, Ecology, EPA and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting. The dredging quality control plan must clearly show how the unsuitable material will be dredged separately from the suitable material. Dredging, positioning, de-watering, transloading and disposal will all need to be addressed with enough detail to provide assurance to the agencies that the dredge plan will be properly implemented. The unsuitable material must be completely dredged and removed before the suitable material may be dredged and taken to the Port Gardner site. A bathymetric survey will be required after the unsuitable material has been dredged to verify that it has been completely removed.

A DNR site-use authorization must be acquired for open-water disposal. Disposal at the Port Gardner site must be by bottom-dump barge.

This suitability determination does ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

12. References.

DMMP, 2014. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Prepared by the Seattle District Dredged Material Management Office for the Dredged Material Management Program, December 2014.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Environ, 2015. *Biological Testing Results for Weyerhaeuser Mill A Former Cleanup Site Dredged Material Evaluation.* Prepared by Environ International Corporation, Port Gamble, Washington for GeoEngineers, Inc. on behalf of the Port of Everett, April 13, 2015; Revised June 19, 2015.

GeoEngineers, 2014. *Dredged Material Characterization Sampling and Analysis Plan, Weyerhaeuser Mill A Former Cleanup Site, Interim Action Dredging Project, Everett, Washington.* Prepared by GeoEngineers for the Dredged Material Management Office and Washington State Department of Ecology on behalf of the Port of Everett, December 16, 2014.

GeoEngineers, 2015. *Final Dredged Material Characterization Report, Weyerhaeuser Mill A Former Cleanup Site, Interim Action Dredging Project, Everett, Washington.* Prepared by GeoEngineers for the Dredged Material Management Office and Washington State Department of Ecology on behalf of the Port of Everett, June 19, 2015.

13. Agency Signatures.

Concur:

7/9/15 David Fox
Date David Fox, P.E. - Seattle District Corps of Engineers

7/9/15
Date Erika Hoffman - Environmental Protection Agency

07/21/2015 Laura Inouye
Date Laura Inouye, Ph.D. - Washington Department of Ecology

07/21/2015 Celia Barton
Date Celia Barton - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Frank Nichols – Seattle District Regulatory
Graham Anderson – Port of Everett
John Herzog – GeoEngineers

Table 2

Field Sediment Core Locations

Former Mill A Cleanup Interim Action Dredging Project
Everett, Washington

Core Location		Planned Coordinates (Lat/Long)	Actual Coordinates[1] (Northing/Easting)	Date	Time	Tide Elevation[2] (ft MLLW)	Depth to Mudline[2] (ft)	Anticipated Mudline Elevation (ft MLLW)	Actual Mudline Elevation (ft MLLW)	Target Penetration Elevation[3] (ft MLLW)	Actual Penetration Elevation (ft MLLW)
Base of Dredge Prism	PT-1	N 47° 58' 37.82" W 122° 13' 34.04"	N 47° 58' 37.768" W 122° 13' 33.965"	1/14/2015	1510	5.75	39.75	-35	-34.00	-45	-49.00
	PT-2	N 47° 58' 38.30" W 122° 13' 33.23"	N 47° 58' 38.268" W 122° 13' 33.139"	1/14/2015	800	8.50	38.00	-30	-29.50	-45	-49.50
	PT-3	N 47° 58' 38.50" W 122° 13' 32.39"	N 47° 58' 38.498" W 122° 13' 32.540"	1/13/2015	1340	5.00	42.50	-38	-37.50	-45	-47.50
	PT-4	N 47° 58' 37.49" W 122° 13' 33.39"	N 47° 58' 37.447" W 122° 13' 33.405"	1/14/2015	1300	9.25	36.50	-27	-27.25	-45	-47.25
	PT-5	N 47° 58' 37.71" W 122° 13' 32.29"	N 47° 58' 37.709" W 122° 13' 32.275"	1/13/2015	1230	9.00	33.25	-24	-24.25	-45	-49.25
	PT-6	N 47° 58' 36.97" W 122° 13' 31.43"	N 47° 58' 36.952" W 122° 13' 31.504"	1/13/2015	815	9.75	25.00	-16	-15.25	-45	-45.25
	PT-7	N 47° 58' 37.45" W 122° 13' 30.78"	N 47° 58' 37.456" W 122° 13' 30.776"	1/14/2015	955	10.50	40.50	-31	-30.00	-45	-45.00
	PT-8	N 47° 58' 36.79" W 122° 13' 30.45"	N 47° 58' 36.806" W 122° 13' 30.297"	1/12/2015	930	11.00	34.25	-23	-23.25	-45	-45.25
	PT-9	N 47° 58' 36.80" W 122° 13' 29.61"	N 47° 58' 36.772" W 122° 13' 29.631"	1/12/2015	1405	5.50	34.00	-30	-28.50	-45	-48.50
Dredge Transition Slope	PT-10	N 47° 58' 37.12" W 122° 13' 33.98"	N 47° 58' 37.039" W 122° 13' 33.906"	1/14/2015	1135	10.50	39.50	-30	-29.00	-38	-44.00
	PT-11	N 47° 58' 36.92" W 122° 13' 32.74"	N 47° 58' 36.822" W 122° 13' 32.695"	1/15/2015	1330	9.75	29.75	-20	-20.00	-38	-40.00
	PT-12	N 47° 58' 36.55" W 122° 13' 31.37"	N 47° 58' 36.577" W 122° 13' 31.431"	1/15/2015	745	8.00	22.00	-14	-14.00	-32	-39.00
	PT-13	N 47° 58' 36.31" W 122° 13' 30.22"	N 47° 58' 36.314" W 122° 13' 30.222"	1/15/2015	1140	10.75	26.75	-18	-16.00	-31	-36.00
	PT-14	N 47° 58' 36.32" W 122° 13' 29.49"	W 122° 13' 29.604" N 47° 58' 36.278"	1/15/2015	935	10.00	28.00	-19	-18.00	-31	-38.00
Duplicate Cores[4]	PT-106	N 47° 58' 36.97" W 122° 13' 31.43"	N 47° 58' 37.038" W 122° 13' 31.408"	1/16/2015	755	8.00	25.00	-16	-17.00	a	-32.00
	PT-108	N 47° 58' 36.79" W 122° 13' 30.45"	N 47° 58' 36.783" W 122° 13' 30.543"	1/16/2015	925	9.00	31.00	-23	-22.00	a	-30.00
	PT-109	N 47° 58' 36.80" W 122° 13' 29.61"	N 47° 58' 36.737" W 122° 13' 29.649"	1/12/2015	1600	5.50	34.00	-30	-28.50	a	-33.50
	PT-112	N 47° 58' 36.55" W 122° 13' 31.37"	N 47° 58' 36.605" W 122° 13' 31.454"	1/16/2015	1000	9.50	24.00	-14	-14.50	a	-24.00

Notes:

[1] Actual coordinates have been corrected using post-processing software.

[2] Depth of to mudline and tide elevation (from tideboard) measurements were rounded to the nearest 0.25 feet.

[3] Target penetration depths are from Sampling and Analysis Plan (GeoEngineers, 2014)

[4] Duplicate cores were completed to obtain core intervals and samples from elevation where required recovery (75%) was not obtained in the original core.

[a] Target depth in duplicate core dependent on missing interval in primary core

ft = Feet

MLLW = Mean low low water

Table 3

Sediment Core Interval Data and Recovery Measurements

Former Mill A Cleanup Interim Action Dredging Project

Everett, Washington

Sample Location		Date	Total Depth Penetrated (ft below mudline)	Core Starting Elevation (ft MLLW)	Depth Penetrated (ft)	Core Ending Elevation (ft MLLW)	Recovery Measurement (ft)	% Recovery	Core Accepted (Y/N)
Base of Dredge Prism	PT-1	1/14/2015	5.0	-34.00	5.0	-39.00	5.0	100.0%	Yes
			10.0	-39.00	5.0	-44.00	5.0	100.0%	Yes
			15.0	-44.00	5.0	-49.00	5.0	100.0%	Yes
	PT-2	1/14/2015	5.0	-29.50	5.0	-34.50	4.6	92.0%	Yes
			10.0	-34.50	5.0	-39.50	4.0	80.0%	Yes
			15.0	-39.50	5.0	-44.50	4.0	80.0%	Yes
			20.0	-44.50	5.0	-49.50	5.0	100.0%	Yes
	PT-3	1/13/2015	5.0	-37.50	5.0	-42.50	4.0	80.0%	Yes
			10.0	-42.50	5.0	-47.50	5.0	100.0%	Yes
	PT-4	1/14/2015	5.0	-27.25	5.0	-32.25	5.0	100.0%	Yes
			10.0	-32.25	5.0	-37.25	5.0	100.0%	Yes
			15.0	-37.25	5.0	-42.25	5.0	100.0%	Yes
			20.0	-42.25	5.0	-47.25	5.0	100.0%	Yes
	PT-5	1/13/2015	5.0	-24.25	5.0	-29.25	5.0	100.0%	Yes
			10.0	-29.25	5.0	-34.25	4.0	80.0%	Yes
			15.0	-34.25	5.0	-39.25	5.0	100.0%	Yes
			20.0	-39.25	5.0	-44.25	5.0	100.0%	Yes
			25.0	-44.25	5.0	-49.25	5.0	100.0%	Yes
	PT-6	1/13/2015	5.0	-15.25	5.0	-20.25	5.0	100.0%	Yes
			10.0	-20.25	5.0	-25.25	4.2	84.0%	Yes
			15.0	-25.25	5.0	-30.25	1.0	20.0%	No
			20.0	-30.25	5.0	-35.25	5.0	100.0%	Yes
			25.0	-35.25	5.0	-40.25	5.0	100.0%	Yes
			30.0	-40.25	5.0	-45.25	5.0	100.0%	Yes
	PT-106	1/16/2015	10.0	-24.50	2.5	-27.00	2.2	88.0%	Yes
			15.0	-27.00	5.0	-32.00	0.3	5.0%	No
	PT-7	1/14/2015	5.0	-30.00	5.0	-35.00	5.0	100.0%	Yes
			10.0	-35.00	5.0	-40.00	5.0	100.0%	Yes
			15.0	-40.00	5.0	-45.00	5.0	100.0%	Yes
	PT-8	1/12/2015	2.0	-23.25	2.0	-25.25	2.0	100.0%	Yes
			7.0	-25.25	5.0	-30.25	1.0	20.0%	No
			12.0	-30.25	5.0	-35.25	5.0	100.0%	Yes
			17.0	-35.25	5.0	-40.25	5.0	100.0%	Yes
			22.0	-40.25	5.0	-45.25	5.0	100.0%	Yes
	PT-108[a]	1/16/2015	5.0	-25.00	5.0	-30.00	4.0	80.0%	Yes
	PT-9	1/12/2015	5.0	-28.50	5.0	-33.50	2.5	50.0%	No
			10.0	-33.50	5.0	-38.50	5.0	100.0%	Yes
			15.0	-38.50	5.0	-43.50	5.0	100.0%	Yes
			20.0	-43.50	5.0	-48.50	5.0	100.0%	Yes
	PT-109	1/12/2015	5.0	-28.50	5.0	-33.50	4.8	96.0%	Yes

Sample Location		Date	Total Depth Penetrated (ft below mudline)	Core Starting Elevation (ft MLLW)	Depth Penetrated (ft)	Core Ending Elevation (ft MLLW)	Recovery Measurement (ft)	% Recovery	Core Accepted (Y/N)
Dredge Transition Slope	PT-10	1/14/2015	5.0	-29.00	5.0	-34.00	5.0	100.0%	Yes
			10.0	-34.00	5.0	-39.00	4.5	90.0%	Yes
			15.0	-39.00	5.0	-44.00	5.0	100.0%	Yes
	PT-11	1/15/2015	5.0	-20.00	5.0	-25.00	5.0	100.0%	Yes
			10.0	-25.00	5.0	-30.00	5.0	100.0%	Yes
			15.0	-30.00	5.0	-35.00	5.0	100.0%	Yes
			20.0	-35.00	5.0	-40.00	5.0	100.0%	Yes
	PT-12	1/15/2014	5.0	-14.00	5.0	-19.00	5.0	100.0%	Yes
			10.0	-19.00	5.0	-24.00	1.0	20.0%	No
			15.0	-24.00	5.0	-29.00	4.0	80.0%	Yes
			20.0	-29.00	5.0	-34.00	5.0	100.0%	Yes
			25.0	-34.00	5.0	-39.00	5.0	100.0%	Yes
	PT-112[a]	1/16/2015	5.0	-19.00	5.0	-24.00	5.0	100.0%	Yes
	PT-13	1/15/2015	5.0	-16.00	5.0	-21.00	4.0	80.0%	Yes
			10.0	-21.00	5.0	-26.00	4.8	95.0%	Yes
			15.0	-26.00	5.0	-31.00	5.0	100.0%	Yes
			20.0	-31.00	5.0	-36.00	5.0	100.0%	Yes
	PT-14	1/15/2015	5.0	-18.00	5.0	-23.00	5.0	100.0%	Yes
			10.0	-23.00	5.0	-28.00	4.8	96.0%	Yes
			15.0	-28.00	5.0	-33.00	5.0	100.0%	Yes
			20.0	-33.00	5.0	-38.00	5.0	100.0%	Yes

Notes:

[a] Top interval of core was water-jetted to reach core starting elevation.

ft = Feet

MLLW = Mean low low water

Table 4

Wood Content Analytical Results for DMMU

Mill A Former Site Interim Action Dredging Project
Everett, Washington

DMMU	Approx. Average Wood Debris Content Observed in DMMU[1] (% by volume)	Organic Matter by Method ASTM D2974 (% by weight)	Bioassay[2]
D-1	70%	17.03%	X
D-2	50%	11.93%	X
D-3A	40%	5.91%	X
D-3B	70%	13.20%	X
D-4A	10%	0.65%	
D-4B	50%	7.87%	X
D-5A	0%	0.52%	
D-5B	10%	1.14%	
D-6A	0%	0.54%	
D-6B	0%	0.58%	
D-7	50%	7.20%	X

Notes:

[1] Approximate volume of wood debris observed during sediment core collection was determined by evaluating core logs.

[2] Samples were selected for bioassay based on observed wood debris volume to ensure that bioassay holding times were met.

DMMU = Dredged Material Management Unit

Table 5

Interim Action Sediment Chemical Analytical Results Compared to DMMP Guideline Chemistry Values

Mill A Former Site Interim Action Dredging Project
Everett, Washington

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
Conventionals																				
Total Organic Carbon	NE	NE	NE	%	14.4	9.93	5.6	13.3	0.313	8.49	0.152	0.124	0.157	0.176	2.94	2.7	--	0.228	7.76	--
Total Solids	NE	NE	NE	%	45.98	50.15	62.61	44.45	79.68	51.63	81.11	81.14	82.81	81.72	57.21	71.55	--	81.58	61.16	--
Total Volatile Solids	NE	NE	NE	%	21.02	18.9	12.12	31.21	1.31	14.52	1.14	1.05	1.19	0.95	12.15	5.09	--	1.01	10.3	--
Organic Matter	25	NE	NE	%	16.73	11.93	5.91	13.2	0.65	7.87	0.52	1.14	0.54	0.58	7.2	4.39	--	0.43	8.29	--
Preserved Total Solids	NE	NE	NE	%	--	--	--	--	--	--	--	--	--	--	--	--	58.07	--	--	81.39
Sulfide	NE	NE	NE	mg/kg	--	--	--	--	--	--	--	--	1.92 J	4.38 J	112 J	16	205	1.32	4.8	22.3 J
Ammonia	NE	NE	NE	mg/kg	21	30	8.47	45.1	3.93	28.7	9.95	7.88	2.78	6.01	20.2	13.2	--	26.6	42.2	--
Grain Size																				
Gravel (≤ -1)	NE	NE	NE	%	10.2	8.2	1.8	7.2	0.3	5.7	0.1	1.6	0.7	0.1 U	4.6	1.1	--	0.1	0.8	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	4.8	2.4	1.5	3.9	0.3	2.2	0.1	0.6	0.1	0.2	1.9	0.8	--	0.4	1.6	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	6.6	3.7	2.7	5.8	1.1	3.5	0.5	1.6	0.5	1.2	3.8	2.2	--	2.8	2.3	--
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	15	16.1	23	12.1	18.3	12.2	10.4	22.9	27.5	22.5	20.5	20.4	--	10.9	5.2	--
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	19.3	30.2	42	27	49.2	42.5	52.6	55.5	41.8	60.2	34.9	51.2	--	46.3	14.7	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	10.4	11.4	12.6	11.7	20.4	13.3	25.7	7.3	18.5	8.4	8.3	6	--	29.2	23.4	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	4.8	5.2	2.6	5.1	3.7	1.6	3.6	2.7	4.1	2.1	7.9	4	--	4.1	13.6	--
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	6.6	4.6	3	6.3	1.6	4.6	1.7	2	1.5	1.2	4.3	3.3	--	1.6	11.3	--
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	5.4	4.5	2.8	5.1	1.2	3.4	1.2	1.5	1.2	0.8	3.1	2.7	--	1.1	7.9	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	4.4	3.5	2.1	4.4	1	2.9	1	1.1	1.2	0.7	2.6	2	--	0.8	5.3	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	2.8	2.3	1.5	3.2	0.7	2.1	0.7	1	0.8	0.6	2.2	1.8	--	0.7	4	--
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	3	2.8	1.6	2.6	0.7	2	0.8	0.8	0.8	0.7	1.8	1.6	--	0.6	3.5	--
Particle/Grain Size, Phi >10	NE	NE	NE	%	6.7	5.2	2.9	5.7	1.6	4	1.8	1.4	1.3	1.3	4	2.8	--	1.4	6.1	--
Total Fines	NE	NE	NE	%	33.7	28	16.5	32.4	10.4	20.6	10.7	10.4	10.9	7.5	25.9	18.3	--	10.3	51.8	--
Grain Size (Ash Wt.)																				
Gravel (≤ -1)	NE	NE	NE	%	2.1	1.1	1.2	2.8	0.1 U	3.5	0.1 U	0.1 U	0.2	0.1 U	1.5	--	--	--	--	--
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	NE	%	2.0	1.4	0.6	1.9	0.3	1.0	0.1	0.3	0.1	0.2	1.6	--	--	--	--	--
Coarse sand (0 < Phi ≤ 1)	NE	NE	NE	%	3.8	2.5	1.3	2.7	1.3	2.0	0.4	1.2	0.5	1.2	4.1	--	--	--	--	--
Medium sand (1 < Phi ≤ 2)	NE	NE	NE	%	14.6	14.8	21.5	8.6	19.1	9.5	12.9	16.2	26.6	28.2	24.0	--	--	--	--	--
Fine sand (2 < Phi ≤ 3)	NE	NE	NE	%	23.3	35.6	43.6	31.7	46.5	41.6	52.3	61.4	43.9	56.5	41.6	--	--	--	--	--
Very fine sand (3 < Phi ≤ 4)	NE	NE	NE	%	14.8	16.1	13.0	16.8	20.8	14.9	23.8	12.4	18.4	7.2	9.7	--	--	--	--	--
Coarse silt (4 < Phi ≤ 5)	NE	NE	NE	%	8.5	6.6	4.6	6.0	5.6	6.5	4.3	3.2	4.1	2.7	3.1	--	--	--	--	--
Medium silt (5 < Phi ≤ 6)	NE	NE	NE	%	15.6	9.1	4.5	17.7	1.9	11.0	1.6	1.2	2.1	1.0	6.0	--	--	--	--	--
Fine silt (6 < Phi ≤ 7)	NE	NE	NE	%	6.9	4.9	4.0	5.5	1.7	5.5	1.6	1.1	2.4	0.9	3.6	--	--	--	--	--
Very fine silt (7 < Phi ≤ 8)	NE	NE	NE	%	1.9	2.4	1.8	1.2	1.1	1.2	1.2	0.9	0.2	0.5	1.4	--	--	--	--	--
Coarse clay (8 < Phi ≤ 9)	NE	NE	NE	%	0.9	1.4	0.9	0.5	0.4	0.5	0.5	0.5	0.1 U	0.4	0.7	--	--	--	--	--
Medium clay (9 < Phi ≤ 10)	NE	NE	NE	%	0.3	0.6	0.4	0.2	0.1	0.1	0.2	0.4	0.1	0.2	0.1	--	--	--	--	--
Particle/Grain Size, Phi >10	NE	NE	NE	%	5.1	3.4	2.5	4.3	1.3	2.9	1.3	1.1	1.4	0.9	2.5	--	--	--	--	--
Total Fines	NE	NE	NE	%	39.4	28.5	18.8	35.5	12.0	27.6	10.6	8.5	10.3	6.6	17.5	--	--	--	--	--
Metals																				
Antimony	150	NE	200	mg/kg	1.1 J	1.40 J	0.75 J	1.1 J	0.82 J	2.38 J	0.68 J	0.75 J	1.03 J	0.68 J	1.07 J	0.84 J	--	0.77 J	1.46 J	--
Arsenic	57	507	700	mg/kg	10.7 J	6.80 J	5.83 J	9.5 J	4.57 J	6.67 J	5.14 J	4.81 J	5.18 J	4.42 J	7.69 J	6.08 J	--	3.92 J	9	--
Cadmium	5.1	11.3	14	mg/kg	1.3	1	0.6	1.3	0.2	0.7	0.3	0.3	0.220 J	0.210 J	1	0.4	--	0.211 J	1.1	--
Chromium	260	260	NE	mg/kg	35	31.3	24.3	35	28.4	30.3	27.7	25.7	29.9	22.2	31.5	28.2	--	24.2	47.9	--
Copper	390	1,027	1,300	mg/kg	43.9	32.9	18.3	43.2	11	24.8	9.9	9.8	10.2	7.1	33.6	12.8	--	7.6	44.2	--
Lead	450	975	1,200	mg/kg	28	22	9	31	1.86 J	14	1.80 J	5	1.94 J	2.30 J	19	10	--	1.48 J	26	--
Mercury	0.41	1.5	2.3	mg/kg	0.13	0.14	0.0380 J	0.12	0.0120 J	0.14	0.0106 J	0.0159 J	0.02	0.0080 J	0.1	0.08	--	0.0071 J	0.11	--
Selenium	NE	3	NE	mg/kg	0.52 J	0.337 J	0.214 J	0.45 J	0.6 U	0.311 J	0.6 U	0.127 J	0.6 U	0.125 J	0.315 J	0.185 J	--	0.6 U	0.487 J	--
Silver	6.1	6.1	8.4	mg/kg	0.7 U	0.6 U	0.5 U	0.7 U	0.4 U	0.6 U	0.3 U	0.4 U	0.3 U	0.4 U	0.6 U	0.4 U	--	0.3 U	0.5 U	--
Zinc	410	2,783	3,800	mg/kg	76	54	37	69	31	49	31	30	31	27	58	34	--	28	70	--
LPAHs																				
2-Methylnaphthalene	670	NE	1,900	µg/kg	280	190	130	410	5.7	280	3.2 J	5.9	2.5 J	4.8 U	240	75	--	4.7 U	180	--
Acenaphthene	500	NE	2,000	µg/kg	340	210	160	420	4.4 J	410	4.8 U	4.5 J	4.7 U	4.8 U	260	73	--	4.7 U	210	--
Acenaphthylene	560	NE	1,300	µg/kg	57	82	89	210	4.8 U	110	4.8 U	2.4 J	4.7 U	4.8 U	110	53	--	4.7 U	80	--
Anthracene	960	NE	13,000	µg/kg	280	150	99	210	3.4 J	180	4.8 U	6.1	4.7 U	4.8 U	150	100	--	4.7 U	160	--
Fluorene	540	NE	3,600	µg/kg	330	210	160	400	4.8 J	370	4.8 U	5.8	4.7 U	4.8 U	250	89	--	4.7 U	240	--
Naphthalene	2,100	NE	2,400	µg/kg	1,100	1,100	1,200	3,600	33	1,600	8.5	26	4.7 U	6.8	1,300	460	--	3.3 J	1,100	--
Phenanthrene	1,500	NE	21,000	µg/kg	680	600	550	1100	15	900	7.9	18	4.7 U	4.8 U	630	260	--	4.7 U	650	--
Total LPAHs	5,200	NE	29,000	µg/kg	2,787 T	2,352 T	2,258 T	5,940 T	60.6 T	3,570 T	16.4 T	62.8 T	4.7 UT	6.8 T	2,700 T	1,035 T	--	3.3 T	2,440 T	--

Analyte	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
HPAHs																				
Benzo(a)anthracene	1,300	NE	5,100	µg/kg	**140**	**58**	**34**	**52**	4.8 U	**130**	4.8 U	**5.4**	4.7 U	4.8 U	**55**	**59**	--	4.7 U	**71**	--
Benzo(a)pyrene	1,600	NE	3,600	µg/kg	**79**	**34**	**18 J**	**29**	4.8 U	**84**	4.8 U	**3.9 J**	4.7 U	4.8 U	**28**	**51**	--	4.7 U	**49**	--
Benzo(ghi)perylene	670	NE	3,200	µg/kg	**55**	**22 J**	**14 J**	**25**	4.8 U	**58**	4.8 U	**4.2 J**	4.7 U	4.8 U	**20**	**38**	--	4.7 U	**44**	--
Benzofluoranthenes (Sum)	3,200	NE	9,900	µg/kg	**200**	**83**	**45**	**89**	4.8 U	**200**	4.8 U	**7.5**	4.7 U	4.8 U	**76**	**84**	--	4.7 U	**98**	--
Chrysene	1,400	NE	21,000	µg/kg	**230**	**90**	**54**	**83**	**2.8 J**	**140**	4.8 U	**6.1**	4.7 U	4.8 U	**85**	**62**	--	4.7 U	**98**	--
Dibenzo(a,h)anthracene	230	NE	1,900	µg/kg	**16 J**	25 U	24 U	24 U	4.8 U	**12 J**	4.8 U	4.8 U	4.7 U	4.8 U	**4.0 J**	24 U	--	4.7 U	24 U	--
Fluoranthene	1,700	4,600	30,000	µg/kg	**570**	**480**	**360**	**670**	**11**	**640**	**7**	**19**	4.7 U	4.8 U	**420**	**260**	--	4.7 U	**460**	--
Indeno(1,2,3-cd)pyrene	600	NE	4,400	µg/kg	**45**	**18 J**	24 U	**16 J**	4.8 U	**44**	4.8 U	4.8 U	4.7 U	4.8 U	**13**	**27**	--	4.7 U	**25**	--
Pyrene	2,600	11,980	16,000	µg/kg	**440**	**360**	**270**	**460**	**9.5**	**460**	**4.4 J**	**21**	4.7 U	4.8 U	**300**	**240**	--	4.7 U	**430**	--
Total HPAHs	12,000	NE	69,000	µg/kg	**1,775 T**	**1,145 T**	**795 T**	**1,424 T**	**23.3 T**	**1,768 T**	**11.4 T**	**67.1 T**	4.7 UT	4.8 UT	**1,001 T**	**821 T**	--	4.7 UT	**1,275 T**	--
cPAHs																				
Total cPAH TEQ (ND=0.5DL)	NE	NE	NE	µg/kg	**121.4 JT**	**52.1 JT**	**28.8 JT**	**46.7 JT**	**3.4 JT**	**124 JT**	3.4 UT	**5.7 JT**	3.3 UT	3.4 UT	**43.7 JT**	**69.8 T**	--	3.3 UT	**70.6 T**	--
Chlorinated Hydrocarbons																				
Hexachlorobenzene	22	168	230	µg/kg	0.99 U	1.3 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	14 U	0.97 U	--	0.95 U	0.96 U	--
1,2,4-Trichlorobenzene	31	NE	64	µg/kg	4.9 U	4.9 U	4.7 U	**3.5 J**	4.8 U	**8.4**	4.8 U	4.8 U	4.8 U	4.8 U	**2.5 J**	4.9 U	--	4.7 U	4.8 U	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	NE	110	µg/kg	**13**	**7.7**	**3.7 J**	**11**	**3.0 J**	**5.8**	**2.5 J**	4.8 U	4.8 U	4.8 U	**11**	4.9 U	--	4.7 U	4.8 U	--
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	NE	120	µg/kg	**6.3**	**4.6 J**	**3.2 J**	**6.7**	4.8 U	**5.2**	4.8 U	4.8 U	4.8 U	4.8 U	**5.2**	4.9 U	--	4.7 U	4.8 U	--
Phthalates																				
Bis(2-Ethylhexyl) Phthalate	1,300	NE	8,300	µg/kg	**30 J**	49 UJ	47 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	**28 J**	49 U	--	47 U	48 U	--
Di-N-Octyl Phthalate	6,200	NE	6,200	µg/kg	**11 J**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--
Dibutyl Phthalate	1,400	NE	5,100	µg/kg	**65**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--
Diethyl Phthalate	200	NE	1,200	µg/kg	20 U	**380**	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	**34**	--
Dimethyl Phthalate	71	NE	1,400	µg/kg	20 U	20 U	19 U	19 U	19 U	**22**	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--
Butyl benzyl Phthalate	63	NE	970	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**4.8**	**31**	**3.2 J**	4.8 U	**2.5 J**	**2.6 J**	**22**	4.9 U	--	**7.4**	**8.8**	--
Phenols																				
o-Cresol (2-methylphenol)	63	NE	77	µg/kg	**37**	**68**	**45**	**140**	19 U	**81**	19 U	19 U	19 U	19 U	**49**	20 U	--	19 U	**36**	--
p-Cresol (4-methylphenol)	670	NE	3,600	µg/kg	**1,700**	**2,400**	**930**	**1,900**	**34**	**1,000**	19 U	**16 J**	19 U	19 U	**1,200**	20 U	--	**92**	**180**	--
Pentachlorophenol	400	504	690	µg/kg	**46 J**	99 U	94 U	**33 J**	96 U	**33 J**	97 U	97 U	95 U	96 U	96 U	98 U	--	94 U	96 U	--
Phenol	420	NE	1,200	µg/kg	**390**	**430**	**240**	**460**	**29**	**320**	**34**	19 U	19 U	19 U	**250**	20 U	--	**38**	**59**	--
2,4-Dimethylphenol	29	NE	210	µg/kg	**46**	**54**	**26**	**78**	24 U	**56**	24 U	24 U	24 U	24 U	**44**	24 U	--	23 U	**24 J**	--
Miscellaneous Extractables																				
Benzoic Acid	650	NE	760	µg/kg	**790**	**940**	**540**	**1,100**	190 U	**860**	190 U	190 U	190 U	190 U	**720**	200 U	--	**82 J**	**150 J**	--
Benzyl Alcohol	57	NE	870	µg/kg	**30**	**33**	**25**	**59**	19 U	**32**	19 U	19 U	19 U	19 U	**24**	20 U	--	19 U	19 U	--
Dibenzofuran	540	NE	1,700	µg/kg	**300**	**220**	**180**	**410**	**4.8 J**	**340**	4.8 U	**5.8**	4.7 U	4.8 U	**240**	**86**	--	4.7 U	**200**	--
Hexachlorobutadiene	11	NE	270	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
N-Nitrosodiphenylamine (as diphenylamine)	28	NE	130	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**2.9 J**	4.8 U	**3.0 J**	4.8 U	4.8 U	4.8 U	4.8 U	4.9 U	--	4.7 U	4.8 U	--
Pesticides																				
4,4'-DDD	16	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
4,4'-DDE	9	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
4,4'-DDT	12	NE	NE	µg/kg	6.9 U	4.3 U	0.99 U	4.0 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Total DDT (4,4 isomers)	NE	50	69	µg/kg	6.9 UT	4.3 UT	0.99 UT	4 UT	0.98 UT	0.98 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	0.98 UT	0.97 UT	--	0.95 UT	0.96 UT	--
Aldrin	9.5	NE	NE	µg/kg	1.7 U	0.49 U	1.8 U	3.6 U	0.49 U	3.9 U	0.49 U	0.49 U	0.48 U	0.49 U	1.7 U	0.48 U	--	0.48 U	0.48 U	--
alpha-Chlordane (cis)	NE	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	0.49 U	0.48 U	--	0.48 U	0.48 U	--
beta or gamma-Chlordane (trans)	NE	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	1.0 U	0.48 U	--	0.48 U	0.48 U	--
Chlordane (Total)	2.8	37	NE	µg/kg	4.5 UT	1.7 UT	0.99 UT	**2.3 J**	0.98 UT	2.3 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	2.7 UT	0.97 UT	--	0.95 UT	1.6 UT	--
cis-Nonachlor	NE	NE	NE	µg/kg	1.6 U	1.7 U	0.99 U	**2.3 J**	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Dieldrin	1.9	NE	1700	µg/kg	1.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Heptachlor	1.5	NE	270	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.80 U	0.49 U	0.49 U	0.48 U	0.49 U	1.5 U	0.48 U	--	0.48 U	0.48 U	--
Oxychlordane	NE	NE	NE	µg/kg	4.5 U	0.99 U	0.99 U	0.99 U	0.98 U	2.3 U	0.98 U	0.98 U	0.97 U	0.97 U	2.7 U	0.97 U	--	0.95 U	1.6 U	--
trans-Nonachlor	NE	NE	NE	µg/kg	2.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Polychlorinated Biphenyls (PCBs)																				
PCB-001	NE	NE	NE	ng/kg	**18.2**	**18.0**	**20.5**	**5.77**	0.867 U	**5.34**	0.450 U	0.752 U	0.600 U	0.397 U	**9.50**	**1.20 J**	--	0.315 U	**3.28 J**	--
PCB-002	NE	NE	NE	ng/kg	**4.98**	**5.12**	**12.6**	**4.61**	0.973 U	**4.08**	0.544 U	0.856 U	0.696 U	0.461 U	**4.92**	**2.47 J**	--	0.381 U	**6.95**	--
PCB-003	NE	NE	NE	ng/kg	**13.3**	**11.4**	**16.9**	**6.67**	0.937 U	**4.56**	0.558 U	0.833 U	0.689 U	0.458 U	**7.96**	**1.82 J**	--	0.381 U	**5.20**	--
PCB-004	NE	NE	NE	ng/kg	**16.5**	**13.7**	**29.7**	**7.09**	1.62 U	**4.11**	1.63 U	1.21 U	1.39 U	1.39 U	**8.94**	**2.22 J**	--	0.810 U	0.626 U	--
PCB-005	NE	NE	NE	ng/kg	0.572 U	1.82 U	1.99 U	1.77 U	1.43 U	0.928 U	1.49 U	1.07 U	1.26 U	1.35 U	0.617 U	0.735 U	--	0.744 U	0.491 U	--
PCB-006	NE	NE	NE	ng/kg	**9.37**	**9.26**	**16.5**	**6.98**	**2.86 J**	**3.23 J**	1.39 U	0.994 U	1.17 U	1.25 U	**12.5**	**5.07**	--	0.710 U	**2.50 J**	--
PCB-007	NE	NE	NE	ng/kg	**2.94 J**	**3.61 J**	**4.40**	1.68 U	1.39 U	0.900 U	1.45 U	1.04 U	1.22 U	1.31 U	**3.48 J**	0.716 U	--	0.725 U	0.478 U	--
PCB-008	NE	NE	NE	ng/kg	**39.6**	**37.5**	**66.4**	**20.7**	1.45 U	**10.1**	1.52 U	1.09 U	1.28 U	1.37 U	**26.7**	**3.72 J**	--	0.741 U	**2.29 J**	--
PCB-009	NE	NE	NE	ng/kg	**3.61 J**	**2.72 J**	**6.64**	1.78 U	1.45 U	0.943 U	1.52 U	1.09 U	1.28 U	1.37 U	0.627 U	0.746 U	--	0.756 U	0.499 U	--
PCB-010	NE	NE	NE	ng/kg	0.590 U	1.97 U	2.15 U	1.92 U	1.62 U	1.05 U	1.69 U	1.21 U	1.42 U	1.53 U	0.699 U	0.765 U	--	0.776 U	0.512 U	--
PCB-011	NE	NE	NE	ng/kg	**13.0**	**14.4**	**11.8**	**9.70**	**3.91 J**	**5.32**	1.59 U	**3.10 J**	1.33 U	1.43 U	**13.9**	**6.53**	--	**2.91 J**	**4.55**	--
PCB-012	NE	NE	NE	ng/kg	**2.87 J**	**3.61 J**	**7.67**	1.79 U	1.43 U	1.37 U	1.50 U	1.07 U	1.26 U	1.35 U	**3.21 J**	**4.24**	--	0.798 U	**2.56 J**	--
PCB-013	NE	NE	NE	ng/kg	**4.80**	**4.87**	**5.44**	**4.99**	1.59 U	1.52 U	1.66 U	1.19 U	1.40 U	1.50 U	**8.75**	**2.36 J**	--	0.859 U	**1.94 J**	--
PCB-014	NE	NE	NE	ng/kg	0.599 U	1.88 U	2.06 U	1.83 U	1.47 U	0.954 U	1.54 U	1.10 U	1.29 U	1.38 U	0.634 U	0.758 U	--	0.768 U	0.506 U	--
PCB-015	NE	NE	NE	ng/kg	**36.6**	**28.6**	**22.4**	**11.8**	1.47 U	**7.61**	1.58 U	1.10 U	1.32 U	1.47 U	**19.4**	**1.97 J**	--	0.815 U	**1.16 J**	--
PCB-016	NE	NE	NE	ng/kg	**32.6**	**37.1**	**35.3**	**19.4**	1.32 U	**7.75**	0.566 U	1.44 U	0.546 U	0.646 U	**17.9**	0.553 U	--	0.404 U	0.583 U	--
PCB-017	NE	NE	NE	ng/kg	**45.3**	**41.1**	**51.5**	**21.3**	1.38 U	**10.4**	0.590 U	1.50 U	0.569 U	0.673 U	**23.3**	0.614 U	--	0.449 U	1.79 U	--
PCB-018	NE	NE	NE	ng/kg	**120.0**	**107**	**131**	**56.4**	1.53 U	**26.8**	0.654 U	1.66 U	0.631 U	0.747 U	**64.0**	0.681 U	--	0.497 U	1.98 U	--
PCB-019	NE	NE	NE	ng/kg	**10.9**	**11.4**	**12.4**	**5.95**	1.53 U	1.75 U	0.653 U	1.66 U	0.630 U	0.745 U	**5.88**	0.660 U	--	0.482 U	0.696 U	--
PCB-020	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	--	0.843 U	**3.99**	--

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-021	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	–	0.843 U	**3.99**	–
PCB-022	NE	NE	NE	ng/kg	**52.9**	**39.8**	**45.4**	**22.0**	1.13 U	**11.1**	0.873 U	1.52 U	1.02 U	0.772 U	**28.1**	0.911 U	–	0.826 U	1.34 U	–
PCB-023	NE	NE	NE	ng/kg	1.85 U	1.88 U	1.71 U	1.85 U	1.21 U	1.98 U	0.935 U	1.63 U	1.09 U	0.827 U	1.84 U	0.961 U	–	0.871 U	1.41 U	–
PCB-024	NE	NE	NE	ng/kg	**1.77 J**	**4.60**	**2.16 J**	1.50 U	1.02 U	1.17 U	0.437 U	1.11 U	0.422 U	0.499 U	**1.40 J**	0.475 U	–	0.347 U	0.501 U	–
PCB-025	NE	NE	NE	ng/kg	**9.50**	**7.96**	**9.97**	**3.58 J**	0.974 U	1.59 U	0.752 U	1.31 U	0.876 U	0.666 U	**6.23**	0.812 U	–	0.736 U	1.20 U	–
PCB-026	NE	NE	NE	ng/kg	**20.6**	**18.8**	**21.4**	**8.27**	1.12 U	**3.97 J**	0.869 U	1.52 U	1.01 U	0.769 U	**14.0**	0.949 U	–	0.860 U	1.40 U	–
PCB-027	NE	NE	NE	ng/kg	**6.95**	**4.76**	**8.46**	**4.00**	1.04 U	1.20 U	0.446 U	1.13 U	0.431 U	0.510 U	**2.79 J**	0.459 U	–	0.335 U	0.484 U	–
PCB-028	NE	NE	NE	ng/kg	**137**	**115**	**113**	**56.3**	**2.20 J**	**27.8**	0.770 U	**2.60 J**	0.896 U	0.682 U	**76.1**	0.787 U	–	0.713 U	**5.45**	–
PCB-029	NE	NE	NE	ng/kg	1.82 U	1.90 U	1.73 U	1.86 U	1.10 U	1.80 U	0.850 U	1.48 U	0.989 U	0.752 U	1.67 U	0.954 U	–	0.864 U	1.40 U	–
PCB-030	NE	NE	NE	ng/kg	0.637 U	1.70 U	1.20 U	1.42 U	0.991 U	1.13 U	0.424 U	1.08 U	0.409 U	0.484 U	1.44 U	0.440 U	–	0.321 U	0.464 U	–
PCB-031	NE	NE	NE	ng/kg	**138**	**99.8**	**113**	**58.3**	**1.94 J**	**29.6**	0.819 U	**2.37 J**	0.954 U	0.725 U	**44.8**	0.979 U	–	0.887 U	**6.29**	–
PCB-032	NE	NE	NE	ng/kg	**39.0**	**28.7**	**37.3**	**15.0**	1.11 U	**7.47**	0.476 U	1.21 U	0.459 U	0.543 U	**17.1**	0.516 U	–	0.376 U	0.544 U	–
PCB-033	NE	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40.0**	0.930 U	–	0.843 U	**3.99**	–
PCB-034	NE	NE	NE	ng/kg	1.81 U	2.15 U	1.96 U	2.11 U	1.09 U	1.78 U	0.844 U	1.47 U	0.981 U	0.746 U	1.66 U	0.949 U	–	0.860 U	1.40 U	–
PCB-035	NE	NE	NE	ng/kg	1.69 U	1.97 U	1.79 U	1.93 U	1.17 U	1.91 U	0.905 U	1.58 U	1.05 U	0.801 U	1.78 U	0.993 U	–	0.900 U	1.46 U	–
PCB-036	NE	NE	NE	ng/kg	1.63 U	1.88 U	1.71 U	1.84 U	1.10 U	1.79 U	0.847 U	1.48 U	0.986 U	0.750 U	1.67 U	0.931 U	–	0.844 U	1.37 U	–
PCB-037	NE	NE	NE	ng/kg	**39.7**	**24.7**	**28.9**	**14.7**	1.05 U	**8.04**	0.812 U	1.42 U	0.944 U	0.718 U	**20.3**	0.873 U	–	0.791 U	1.28 U	–
PCB-038	NE	NE	NE	ng/kg	1.59 U	1.83 U	1.67 U	1.80 U	1.10 U	1.79 U	0.846 U	1.48 U	0.985 U	0.749 U	1.66 U	0.891 U	–	0.807 U	1.31 U	–
PCB-039	NE	NE	NE	ng/kg	1.68 U	1.94 U	1.76 U	1.90 U	1.13 U	1.84 U	0.870 U	1.52 U	1.01 U	0.770 U	**8.88**	0.954 U	–	0.865 U	1.41 U	–
PCB-040	NE	NE	NE	ng/kg	**40.8**	**32.0**	**27.0**	**20.9**	1.57 U	**9.19**	0.997 U	0.721 U	0.651 U	0.843 U	**18.4**	0.790 U	–	0.613 U	0.809 U	–
PCB-041	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-042	NE	NE	NE	ng/kg	**81.0**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-043	NE	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.90**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-044	NE	NE	NE	ng/kg	**345**	**259**	**185**	**142**	**3.07 J**	**71.0**	0.865 U	**5.67**	0.565 U	0.731 U	**135**	0.686 U	–	0.532 U	**4.96**	–
PCB-045	NE	NE	NE	ng/kg	**42.3**	**25.3**	**25.8**	**15.6**	1.34 U	**7.77**	0.856 U	0.619 U	0.559 U	0.723 U	**15.9**	0.680 U	–	0.527 U	0.880 U	–
PCB-046	NE	NE	NE	ng/kg	**17.6**	**11.8**	**12.5**	**7.45**	1.45 U	**3.42 J**	0.926 U	0.670 U	0.605 U	0.783 U	**7.54**	0.726 U	–	0.563 U	0.940 U	–
PCB-047	NE	NE	NE	ng/kg	**71.3**	**49.8**	**45.1**	**22.7**	0.983 U	**15.0**	0.625 U	**2.04 J**	0.408 U	0.529 U	**16.7**	0.527 U	–	0.408 U	**2.61 J**	–
PCB-048	NE	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-049	NE	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.90**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-050	NE	NE	NE	ng/kg	0.849 U	2.22 U	2.35 U	1.77 U	1.19 U	0.546 U	0.756 U	0.547 U	0.494 U	0.639 U	0.731 U	0.602 U	–	0.467 U	0.780 U	–
PCB-051	NE	NE	NE	ng/kg	**12.2**	**8.76**	**8.73**	**5.64**	1.20 U	**2.70 J**	0.766 U	0.554 U	0.501 U	0.648 U	**5.00**	0.640 U	–	0.496 U	0.828 U	–
PCB-052	NE	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-053	NE	NE	NE	ng/kg	**44.9**	**30.0**	**27.8**	**17.7**	1.25 U	**8.88**	0.798 U	0.577 U	0.522 U	0.675 U	**18.6**	0.659 U	–	0.511 U	0.854 U	–
PCB-054	NE	NE	NE	ng/kg	0.649 U	1.73 U	1.83 U	1.38 U	0.936 U	0.430 U	0.596 U	0.431 U	0.389 U	0.504 U	0.576 U	0.484 U	–	0.375 U	0.627 U	–
PCB-055	NE	NE	NE	ng/kg	**9.62**	**5.25**	**7.78**	**3.94 J**	0.879 U	**2.10 J**	0.559 U	0.404 U	0.365 U	0.473 U	**4.23**	0.448 U	–	0.347 U	0.459 U	–
PCB-056	NE	NE	NE	ng/kg	**212**	**155**	**110.0**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-057	NE	NE	NE	ng/kg	**1.50 J**	1.62 U	1.71 U	1.29 U	0.879 U	0.404 U	0.559 U	0.404 U	0.365 U	0.473 U	0.540 U	0.444 U	–	0.344 U	0.454 U	–
PCB-058	NE	NE	NE	ng/kg	0.630 U	1.60 U	1.70 U	1.28 U	0.929 U	0.427 U	0.591 U	0.427 U	0.386 U	0.500 U	0.571 U	0.457 U	–	0.354 U	0.468 U	–
PCB-059	NE	NE	NE	ng/kg	**81.0**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-060	NE	NE	NE	ng/kg	**212**	**155**	**110.0**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-061	NE	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-062	NE	NE	NE	ng/kg	0.742 U	1.84 U	1.95 U	1.47 U	0.949 U	0.436 U	0.604 U	0.437 U	0.395 U	0.511 U	0.584 U	0.517 U	–	0.401 U	0.529 U	–
PCB-063	NE	NE	NE	ng/kg	**13.8**	**9.31**	**9.41**	**4.69**	0.855 U	**2.51 J**	0.544 U	0.394 U	0.355 U	0.460 U	**6.14**	0.439 U	–	0.340 U	0.450 U	–
PCB-064	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-065	NE	NE	NE	ng/kg	0.651 U	1.79 U	1.89 U	1.43 U	1.00 U	0.461 U	0.638 U	0.462 U	0.417 U	0.540 U	0.617 U	0.469 U	–	0.363 U	0.480 U	–
PCB-066	NE	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140.0**	0.431 U	–	0.334 U	**6.16**	–
PCB-067	NE	NE	NE	ng/kg	**9.97**	**7.14**	**6.44**	**3.85 J**	0.862 U	**1.51 J**	0.548 U	0.397 U	0.358 U	0.464 U	**4.20**	0.453 U	–	0.351 U	0.463 U	–
PCB-068	NE	NE	NE	ng/kg	0.600 U	1.58 U	1.67 U	1.26 U	0.843 U	0.387 U	0.536 U	0.388 U	0.350 U	0.453 U	0.518 U	0.435 U	–	0.337 U	0.445 U	–
PCB-069	NE	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-070	NE	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-071	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-072	NE	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-073	NE	NE	NE	ng/kg	0.662 U	1.79 U	1.90 U	1.43 U	0.886 U	0.407 U	0.563 U	0.407 U	0.368 U	0.476 U	0.545 U	0.502 U	–	0.389 U	0.650 U	–
PCB-074	NE	NE	NE	ng/kg	**179**	**125**	**89.6**	**64.5**	0.818 U	**32.9**	0.520 U	**3.17 J**	0.340 U	0.440 U	**78.7**	0.436 U	–	0.338 U	**4.41**	–
PCB-075	NE	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-076	NE	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140.0**	0.431 U	–	0.334 U	**6.16**	–
PCB-077	NE	NE	NE	ng/kg	**22.9**	**18.2**	**18.4**	**9.78**	1.33 U	**3.66 J**	0.523 U	0.522 U	0.464 U	0.561 U	**9.47**	0.727 U	–	0.662 U	**1.18 J**	–
PCB-078	NE	NE	NE	ng/kg	1.28 U	2.35 U	1.91 U	1.97 U	1.31 U	0.651 U	0.514 U	0.521 U	0.458 U	0.550 U	0.926 U	0.688 U	–	0.607 U	0.632 U	–
PCB-079	NE	NE	NE	ng/kg	**7.14**	**8.56**	**7.22**	**4.95**	1.26 U	**1.62 J**	0.494 U	0.501 U	0.439 U	0.529 U	**4.16**	0.652 U	–	0.575 U	0.599 U	–
PCB-080	NE	NE	NE	ng/kg	0.535 U	1.44 U	1.52 U	1.15 U	0.767 U	0.353 U	0.488 U	0.353 U	0.319 U	0.413 U	0.472 U	0.384 U	–	0.298 U	0.393 U	–
PCB-081	NE	NE	NE	ng/kg	**10.8**	**13.8**	**11.4**	**8.83**	1.21 U	**3.62 J**	0.469 U	0.483 U	0.418 U	0.500 U	**8.53**	0.604 U	–	0.515 U	0.580 U	–
PCB-082	NE	NE	NE	ng/kg	**100.0**	**100.0**	**47.4**	**57.9**	1.29 U	**24.1**	1.02 U	1.05 U	0.779 U	1.14 U	**51.1**	0.555 U	–	0.996 U	**1.43 J**	–
PCB-083	NE	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-084	NE	NE	NE	ng/kg	**328**	**290.0**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-085	NE	NE	NE	ng/kg	**129**	**134**	**59.0**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-086	NE	NE	NE	ng/kg	0.667 U	1.55 U	1.66 U	1.50 U	1.02 U	0.432 U	0.805 U	0.829 U	0.616 U	0.905 U	1.81 U	0.395 U	–	0.711 U	0.523 U	–
PCB-087	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-088	NE	NE	NE	ng/kg	**120.0**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71.0**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-089	NE	NE	NE	ng/kg	**9.27**	**9.67**	**6.42**	**5.15**	1.20 U	**2.14 J**	0.953 U	0.982 U	0.730 U	1.07 U	**3.87 J**	0.475 U	–	0.854 U	0.628 U	–
PCB-090	NE	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-091	NE	NE	NE	ng/kg	**120.0**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71.0**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-092	NE	NE	NE	ng/kg	**328**	**290.0**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–

Analyte	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-093	NE	NE	NE	ng/kg	0.607 U	**99.2**	**136**	**23.6**	0.605 U	1.75 U	0.618 U	0.387 U	0.584 U	0.907 U	1.03 U	0.386 U	--	0.601 U	0.879 U	--
PCB-094	NE	NE	NE	ng/kg	**4.63**	2.71 U	1.75 U	1.64 U	0.613 U	1.77 U	0.625 U	0.392 U	0.591 U	0.918 U	1.05 U	0.429 U	--	0.667 U	0.977 U	--
PCB-095	NE	NE	NE	ng/kg	**718**	**473**	**232**	**76.8**	**2.52 J**	**183**	0.521 U	**6.65**	0.493 U	0.765 U	**114**	**1.08 J**	--	0.560 U	**7.06**	--
PCB-096	NE	NE	NE	ng/kg	**5.17**	**4.58**	**4.25**	**3.29 J**	0.419 U	1.21 U	0.427 U	0.268 U	0.404 U	0.628 U	**2.25 J**	0.286 U	--	0.445 U	0.651 U	--
PCB-097	NE	NE	NE	ng/kg	**221**	**222**	**104**	**123**	1.03 U	**58.9**	0.817 U	**2.95 J**	0.626 U	0.918 U	**121**	0.412 U	--	0.740 U	**2.48 J**	--
PCB-098	NE	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	--	0.580 U	0.848 U	--
PCB-099	NE	NE	NE	ng/kg	**319**	**327**	**156**	**173**	0.991 U	**84.4**	0.786 U	**4.25**	0.602 U	0.884 U	**167**	0.406 U	--	0.730 U	**4.16**	--
PCB-100	NE	NE	NE	ng/kg	**2.55 J**	2.21 U	1.43 U	1.34 U	0.519 U	1.50 U	0.530 U	0.332 U	0.501 U	0.778 U	0.887 U	0.359 U	--	0.558 U	0.817 U	--
PCB-101	NE	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	--	0.767 U	**8.01**	--
PCB-102	NE	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	--	0.580 U	0.848 U	--
PCB-103	NE	NE	NE	ng/kg	**5.40**	2.12 U	**4.27**	1.28 U	0.496 U	1.43 U	0.506 U	0.317 U	0.478 U	0.743 U	**2.71 J**	0.341 U	--	0.531 U	0.777 U	--
PCB-104	NE	NE	NE	ng/kg	0.410 U	1.72 U	1.11 U	1.04 U	0.394 U	1.14 U	0.402 U	0.252 U	0.381 U	0.591 U	0.673 U	0.273 U	--	0.424 U	0.621 U	--
PCB-105	NE	NE	NE	ng/kg	**301**	**285**	**125**	**146**	1.40 U	**72.2**	0.795 U	**3.45 J**	0.516 U	0.648 U	**161**	0.772 U	--	0.672 U	**3.45 J**	--
PCB-106	NE	NE	NE	ng/kg	**765**	**676**	**310.0**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	--	0.719 U	**7.60**	--
PCB-107	NE	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	--	0.662 U	0.681 U	--
PCB-108	NE	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	--	0.662 U	0.681 U	--
PCB-109	NE	NE	NE	ng/kg	0.522 U	1.27 U	1.37 U	1.24 U	0.867 U	0.369 U	0.688 U	0.708 U	0.527 U	0.773 U	1.54 U	0.354 U	--	0.635 U	0.468 U	--
PCB-110	NE	NE	NE	ng/kg	**754**	**759**	**381**	**426**	**3.07 J**	**187**	0.586 U	**8.21**	0.449 U	0.659 U	**430.0**	**1.41 J**	--	0.572 U	**7.60**	--
PCB-111	NE	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10.0**	0.305 U	--	0.549 U	0.404 U	--
PCB-112	NE	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	--	0.751 U	0.553 U	--
PCB-113	NE	NE	NE	ng/kg	0.527 U	**18.3**	1.41 U	**4.04**	0.837 U	0.356 U	0.663 U	0.683 U	0.508 U	0.746 U	1.49 U	0.346 U	--	0.622 U	0.458 U	--
PCB-114	NE	NE	NE	ng/kg	**20.2**	**18.2**	**12.0**	**10.7**	1.34 U	**5.49**	0.831 U	0.568 U	0.585 U	0.708 U	**11.6**	0.838 U	--	0.644 U	0.647 U	--
PCB-115	NE	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10.0**	0.305 U	--	0.549 U	0.404 U	--
PCB-116	NE	NE	NE	ng/kg	**129**	**134**	**59.0**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	--	0.714 U	**1.94 J**	--
PCB-117	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	--	0.682 U	**3.28 J**	--
PCB-118	NE	NE	NE	ng/kg	**765**	**676**	**310.0**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	--	0.719 U	**7.60**	--
PCB-119	NE	NE	NE	ng/kg	**11.0**	**11.7**	**8.31**	**5.39**	0.767 U	**2.66 J**	0.608 U	0.627 U	0.466 U	0.684 U	**5.52**	0.313 U	--	0.563 U	0.415 U	--
PCB-120	NE	NE	NE	ng/kg	0.462 U	**2.29 J**	1.20 U	**2.27 J**	0.719 U	0.306 U	0.570 U	0.587 U	0.437 U	0.641 U	1.28 U	0.300 U	--	0.540 U	0.397 U	--
PCB-121	NE	NE	NE	ng/kg	0.455 U	1.97 U	1.27 U	1.20 U	0.434 U	1.25 U	0.443 U	0.278 U	0.419 U	0.651 U	0.741 U	0.306 U	--	0.475 U	0.696 U	--
PCB-122	NE	NE	NE	ng/kg	**9.52**	**10.8**	**6.81**	**5.60**	1.31 U	**2.32 J**	0.803 U	0.563 U	0.511 U	0.669 U	**5.13**	0.774 U	--	0.643 U	0.661 U	--
PCB-123	NE	NE	NE	ng/kg	**12.0**	**13.1**	**4.87**	**7.36**	1.15 U	**3.21 J**	0.769 U	0.605 U	0.522 U	0.700 U	**6.26**	0.710 U	--	0.544 U	0.604 U	--
PCB-124	NE	NE	NE	ng/kg	**29.5**	**25.6**	**14.1**	**13.4**	1.50 U	**8.69**	0.923 U	0.647 U	0.587 U	0.769 U	**20.3**	0.806 U	--	0.669 U	0.688 U	--
PCB-125	NE	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84.0**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	--	0.682 U	**3.28 J**	--
PCB-126	NE	NE	NE	ng/kg	**4.61**	**3.78 J**	**8.85**	1.59 U	1.60 U	0.541 U	1.10 U	0.646 U	0.577 U	0.878 U	**2.79 J**	0.987 U	--	1.05 U	0.765 U	--
PCB-127	NE	NE	NE	ng/kg	0.944 U	1.92 U	2.09 U	1.52 U	1.34 U	0.518 U	0.826 U	0.579 U	0.525 U	0.688 U	0.804 U	0.845 U	--	0.702 U	0.722 U	--
PCB-128	NE	NE	NE	ng/kg	**162**	**140.0**	**85.1**	**84.0**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	--	0.611 U	**1.52 J**	--
PCB-129	NE	NE	NE	ng/kg	**50.2**	**41.0**	**27.3**	**27.0**	1.36 U	**14.1**	0.750 U	1.57 U	0.698 U	1.37 U	**35.7**	0.859 U	--	0.811 U	0.872 U	--
PCB-130	NE	NE	NE	ng/kg	**61.8**	**44.6**	**34.3**	**29.0**	1.18 U	**15.6**	0.651 U	1.36 U	0.606 U	1.19 U	**46.4**	0.812 U	--	0.766 U	0.824 U	--
PCB-131	NE	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	--	0.685 U	0.737 U	--
PCB-132	NE	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	--	0.607 U	**2.82 J**	--
PCB-133	NE	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	--	0.685 U	0.737 U	--
PCB-134	NE	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	--	0.705 U	0.759 U	--
PCB-135	NE	NE	NE	ng/kg	**144**	**87.2**	**97.3**	**57.5**	1.35 U	**42.6**	0.743 U	1.56 U	0.691 U	1.36 U	**122**	0.711 U	--	0.670 U	0.721 U	--
PCB-136	NE	NE	NE	ng/kg	**146**	**131**	**138**	**117**	0.405 U	**50.3**	0.398 U	0.971 U	0.363 U	0.479 U	**180.0**	0.387 U	--	0.334 U	0.669 U	--
PCB-137	NE	NE	NE	ng/kg	**52.9**	**46.5**	**20.9**	**27.4**	1.24 U	**15.9**	0.682 U	1.43 U	0.635 U	1.24 U	**31.4**	0.756 U	--	0.713 U	0.767 U	--
PCB-138	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	--	0.509 U	**6.81**	--
PCB-139	NE	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270.0**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	--	0.635 U	**5.89**	--
PCB-140	NE	NE	NE	ng/kg	**5.03**	**4.71**	**3.28 J**	2.17 U	1.15 U	0.880 U	0.635 U	1.33 U	0.591 U	1.16 U	**3.10 J**	0.677 U	--	0.639 U	0.687 U	--
PCB-141	NE	NE	NE	ng/kg	**225**	**166**	**176**	**120.0**	1.14 U	**73.7**	0.628 U	**2.11 J**	0.584 U	1.15 U	**204**	0.704 U	--	0.665 U	**1.81 J**	--
PCB-142	NE	NE	NE	ng/kg	0.680 U	2.00 U	1.42 U	2.58 U	1.32 U	1.01 U	0.729 U	1.53 U	0.678 U	1.33 U	0.639 U	0.808 U	--	0.763 U	0.821 U	--
PCB-143	NE	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	--	0.705 U	0.759 U	--
PCB-144	NE	NE	NE	ng/kg	**57.2**	**37.8**	**43.9**	**29.5**	1.18 U	**19.0**	0.651 U	1.36 U	0.606 U	1.19 U	**51.5**	0.687 U	--	0.648 U	0.697 U	--
PCB-145	NE	NE	NE	ng/kg	0.859 U	0.930 U	1.62 U	1.95 U	0.414 U	0.356 U	0.407 U	0.994 U	0.372 U	0.491 U	0.751 U	0.397 U	--	0.343 U	0.686 U	--
PCB-146	NE	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	--	0.582 U	0.627 U	--
PCB-147	NE	NE	NE	ng/kg	**16.0**	**12.5**	**6.26**	**8.24**	1.15 U	**5.29**	0.632 U	1.32 U	0.588 U	1.15 U	**10.1**	0.663 U	--	0.625 U	0.673 U	--
PCB-148	NE	NE	NE	ng/kg	1.14 U	1.20 U	2.09 U	2.52 U	0.468 U	0.402 U	0.460 U	1.12 U	0.420 U	0.555 U	0.849 U	0.494 U	--	0.426 U	0.853 U	--
PCB-149	NE	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270.0**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	--	0.635 U	**5.89**	--
PCB-150	NE	NE	NE	ng/kg	0.840 U	0.886 U	1.54 U	1.86 U	0.400 U	0.344 U	0.394 U	0.960 U	0.359 U	0.474 U	0.726 U	0.392 U	--	0.338 U	0.677 U	--
PCB-151	NE	NE	NE	ng/kg	**125**	**85.3**	**162**	**69.2**	1.19 U	**70.4**	0.658 U	**2.32 J**	0.613 U	1.20 U	**156**	0.709 U	--	0.669 U	**1.79 J**	--
PCB-152	NE	NE	NE	ng/kg	0.817 U	0.887 U	1.54 U	1.86 U	0.399 U	0.342 U	0.392 U	0.956 U	0.357 U	0.472 U	0.723 U	0.380 U	--	0.328 U	0.656 U	--
PCB-153	NE	NE	NE	ng/kg	**962**	**707**	**712**	**509**	**1.89 J**	**313**	0.492 U	**8.18**	0.458 U	0.898 U	**770.0**	**1.32 J**	--	0.564 U	**6.70**	--
PCB-154	NE	NE	NE	ng/kg	**6.71**	**7.47**	**5.92**	2.01 U	0.426 U	**2.06 J**	0.418 U	1.02 U	0.382 U	0.504 U	**5.51**	0.439 U	--	0.379 U	0.758 U	--
PCB-155	NE	NE	NE	ng/kg	0.759 U	0.792 U	1.38 U	1.66 U	0.364 U	0.313 U	0.358 U	0.873 U	0.326 U	0.431 U	0.660 U	0.349 U	--	0.302 U	0.604 U	--
PCB-156	NE	NE	NE	ng/kg	**99.3**	**84.8**	**57.3**	**49.9**	0.837 U	**30.5**	0.447 U	0.972 U	0.415 U	0.833 U	**79.7**	0.524 U	--	0.488 U	0.554 U	--
PCB-157	NE	NE	NE	ng/kg	**20.8**	**19.5**	**11.9**	**10.6**	0.819 U	**5.54**	0.462 U	0.983 U	0.474 U	0.850 U	**13.5**	0.638 U	--	0.571 U	0.594 U	--
PCB-158	NE	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	--	0.500 U	**1.15 J**	--
PCB-159	NE	NE	NE	ng/kg	**11.1**	**7.81**	**11.9**	**7.33**	0.800 U	**4.51**	0.441 U	0.924 U	0.410 U	0.805 U	**8.98**	0.507 U	--	0.478 U	0.514 U	--
PCB-160	NE	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	--	0.500 U	**1.15 J**	--
PCB-161	NE	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	--	0.607 U	**2.82 J**	--
PCB-162	NE	NE	NE	ng/kg	**162**	**140.0**	**85.1**	**84.0**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	--	0.611 U	**1.52 J**	--
PCB-163	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	--	0.509 U	**6.81**	--
PCB-164	NE	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	--	0.509 U	**6.81**	--

	DMMP Guideline Chemistry Values			Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-Z	PT-13
				Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
				Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
Analyte	SL	BT	ML	Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-165	NE	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	--	0.582 U	0.627 U	--
PCB-166	NE	NE	NE	ng/kg	**3.70 J**	1.33 U	**2.86 J**	1.72 U	0.893 U	0.682 U	0.492 U	1.03 U	0.458 U	0.898 U	**2.30 J**	0.569 U	--	0.537 U	0.578 U	--
PCB-167	NE	NE	NE	ng/kg	**38.1**	**30.3**	**22.0**	**18.1**	0.826 U	**12.0**	0.453 U	0.915 U	0.426 U	0.825 U	**32.3**	0.584 U	--	0.503 U	0.547 U	--
PCB-168	NE	NE	NE	ng/kg	0.464 U	1.38 U	**3.38 J**	1.78 U	0.884 U	0.675 U	0.487 U	1.02 U	0.453 U	0.889 U	0.427 U	0.568 U	--	0.535 U	0.576 U	--
PCB-169	NE	NE	NE	ng/kg	0.458 U	1.30 U	**10.0**	1.67 U	0.863 U	0.646 U	0.483 U	0.991 U	0.400 U	0.857 U	0.384 U	0.523 U	--	0.586 U	0.613 U	--
PCB-170	NE	NE	NE	ng/kg	**282**	**186**	**274**	**164**	1.36 U	**142**	0.987 U	**2.42 J**	1.01 U	1.02 U	**337**	0.750 U	--	0.556 U	**2.36 J**	--
PCB-171	NE	NE	NE	ng/kg	**90.9**	**64.3**	**87.2**	**53.4**	1.24 U	**42.7**	0.900 U	0.879 U	0.925 U	0.928 U	**95.6**	0.683 U	--	0.506 U	0.552 U	--
PCB-172	NE	NE	NE	ng/kg	**50.1**	**34.9**	**50.2**	**27.7**	1.30 U	**25.1**	0.943 U	0.921 U	0.969 U	0.973 U	**60.0**	0.704 U	--	0.522 U	0.569 U	--
PCB-173	NE	NE	NE	ng/kg	**7.80**	**6.25**	**8.90**	**5.35**	1.44 U	**3.92 J**	1.05 U	1.02 U	1.08 U	1.08 U	**8.24**	0.770 U	--	0.571 U	0.622 U	--
PCB-174	NE	NE	NE	ng/kg	**305**	**214**	**290.0**	**181**	1.22 U	**137**	0.888 U	**2.66 J**	0.913 U	0.916 U	**297**	0.622 U	--	0.461 U	**2.32 J**	--
PCB-175	NE	NE	NE	ng/kg	**13.8**	**9.95**	**15.1**	**9.06**	1.24 U	**5.95**	0.901 U	0.880 U	0.926 U	0.930 U	**16.3**	0.652 U	--	0.483 U	0.526 U	--
PCB-176	NE	NE	NE	ng/kg	**45.3**	**34.0**	**47.9**	**27.0**	0.934 U	**21.1**	0.679 U	0.663 U	0.697 U	0.700 U	**45.9**	0.480 U	--	0.356 U	0.388 U	--
PCB-177	NE	NE	NE	ng/kg	**182**	**128**	**180.0**	**106**	1.34 U	**84.8**	0.972 U	0.949 U	0.999 U	1.00 U	**177**	0.708 U	--	0.525 U	0.572 U	--
PCB-178	NE	NE	NE	ng/kg	**60.0**	**41.7**	**60.6**	**36.4**	1.28 U	**27.5**	0.928 U	0.907 U	0.954 U	0.958 U	**60.8**	0.699 U	--	0.518 U	0.565 U	--
PCB-179	NE	NE	NE	ng/kg	**126**	**97.9**	**128**	**80.8**	0.892 U	**55.4**	0.648 U	0.633 U	0.666 U	0.669 U	**115**	0.474 U	--	0.352 U	**1.32 J**	--
PCB-180	NE	NE	NE	ng/kg	**630.0**	**416**	**566**	**352**	1.05 U	**315**	0.765 U	**5.10**	0.787 U	0.790 U	**694**	0.589 U	--	0.437 U	**4.59**	--
PCB-181	NE	NE	NE	ng/kg	0.793 U	1.41 U	1.61 U	1.73 U	1.27 U	0.543 U	0.920 U	0.898 U	0.945 U	0.949 U	0.656 U	0.734 U	--	0.544 U	0.593 U	--
PCB-182	NE	NE	NE	ng/kg	**361**	**275**	**350.0**	**220.0**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	--	0.450 U	**3.55 J**	--
PCB-183	NE	NE	NE	ng/kg	**192**	**142**	**192**	**122**	1.11 U	**95.0**	0.807 U	**2.61 J**	0.830 U	0.833 U	**204**	**1.46 J**	--	**1.20 J**	**3.21 J**	--
PCB-184	NE	NE	NE	ng/kg	0.545 U	0.990 U	1.13 U	1.21 U	0.889 U	0.381 U	0.646 U	0.631 U	0.664 U	0.666 U	0.461 U	0.466 U	--	0.346 U	0.377 U	--
PCB-185	NE	NE	NE	ng/kg	**38.3**	**30.8**	**41.7**	**24.5**	1.27 U	**18.8**	0.926 U	0.904 U	0.952 U	0.955 U	**39.8**	0.691 U	--	0.512 U	0.558 U	--
PCB-186	NE	NE	NE	ng/kg	0.600 U	1.06 U	1.20 U	1.30 U	0.960 U	0.412 U	0.698 U	0.681 U	0.717 U	0.720 U	0.498 U	0.494 U	--	0.366 U	0.399 U	--
PCB-187	NE	NE	NE	ng/kg	**361**	**275**	**350.0**	**220.0**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	--	0.450 U	**3.55 J**	--
PCB-188	NE	NE	NE	ng/kg	0.611 U	1.16 U	1.24 U	1.36 U	0.963 U	0.384 U	0.652 U	0.667 U	0.774 U	0.690 U	0.476 U	0.506 U	--	0.371 U	0.439 U	--
PCB-189	NE	NE	NE	ng/kg	**10.8**	**9.23**	**14.0**	**6.49**	0.879 U	**5.72**	0.688 U	0.639 U	0.595 U	0.689 U	**17.5**	0.506 U	--	0.379 U	0.374 U	--
PCB-190	NE	NE	NE	ng/kg	**56.1**	**41.1**	**61.6**	**35.7**	1.01 U	**32.4**	0.732 U	0.715 U	0.752 U	0.755 U	**74.4**	0.536 U	--	0.398 U	0.433 U	--
PCB-191	NE	NE	NE	ng/kg	**13.9**	**9.72**	**14.1**	**7.74**	0.921 U	**6.19**	0.669 U	0.654 U	0.688 U	0.691 U	**16.3**	0.508 U	--	0.377 U	0.411 U	--
PCB-192	NE	NE	NE	ng/kg	0.644 U	1.10 U	1.26 U	1.35 U	1.05 U	0.452 U	0.765 U	0.747 U	0.787 U	0.790 U	0.546 U	0.566 U	--	0.420 U	0.458 U	--
PCB-193	NE	NE	NE	ng/kg	**34.8**	**24.1**	**34.8**	**19.5**	0.944 U	**17.7**	0.686 U	0.670 U	0.705 U	0.708 U	**39.7**	0.510 U	--	0.378 U	0.412 U	--
PCB-194	NE	NE	NE	ng/kg	**157**	**101**	**158**	**96.8**	0.501 U	**79.8**	0.430 U	1.27 U	0.347 U	0.477 U	**291**	0.420 U	--	0.502 U	**2.15 J**	--
PCB-195	NE	NE	NE	ng/kg	**62.9**	**39.3**	**69.5**	**38.3**	0.566 U	**36.4**	0.486 U	1.43 U	0.392 U	0.540 U	**121**	0.465 U	--	0.555 U	0.548 U	--
PCB-196	NE	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	--	0.597 U	**4.26**	--
PCB-197	NE	NE	NE	ng/kg	**7.94**	**5.52**	**10.9**	**6.30**	0.627 U	**4.70**	0.461 U	1.15 U	0.328 U	0.537 U	**13.7**	0.446 U	--	0.445 U	0.518 U	--
PCB-198	NE	NE	NE	ng/kg	**9.16**	**7.36**	**12.5**	**6.34**	0.866 U	**5.52**	0.636 U	1.58 U	0.452 U	0.741 U	**16.7**	0.677 U	--	0.674 U	0.785 U	--
PCB-199	NE	NE	NE	ng/kg	**165**	**115**	**159**	**110.0**	0.912 U	**92.7**	0.670 U	1.67 U	0.476 U	0.781 U	**250.0**	0.645 U	--	0.643 U	**4.79**	--
PCB-200	NE	NE	NE	ng/kg	**19.4**	**13.7**	**20.7**	**13.9**	0.607 U	**11.4**	0.446 U	1.11 U	0.317 U	0.520 U	**30.3**	0.452 U	--	0.450 U	0.524 U	--
PCB-201	NE	NE	NE	ng/kg	**24.2**	**20.2**	**27.4**	**17.5**	0.623 U	**13.7**	0.458 U	1.14 U	0.325 U	0.533 U	**35.1**	0.451 U	--	0.449 U	0.523 U	--
PCB-202	NE	NE	NE	ng/kg	**32.8**	**28.2**	**31.1**	**24.6**	0.613 U	**17.2**	0.451 U	1.12 U	0.320 U	0.525 U	**41.7**	0.463 U	--	0.461 U	**1.57 J**	--
PCB-203	NE	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	--	0.597 U	**4.26**	--
PCB-204	NE	NE	NE	ng/kg	0.335 U	1.70 U	0.803 U	1.41 U	0.619 U	0.416 U	0.455 U	1.13 U	0.323 U	0.530 U	0.399 U	0.449 U	--	0.447 U	0.521 U	--
PCB-205	NE	NE	NE	ng/kg	**7.98**	**5.30**	**13.4**	**4.71**	0.402 U	**4.36**	0.345 U	1.02 U	0.278 U	0.383 U	**16.6**	0.326 U	--	0.389 U	0.384 U	--
PCB-206	NE	NE	NE	ng/kg	**68.5**	**68.0**	**81.0**	**61.1**	0.974 U	**38.7**	0.351 U	0.632 U	0.318 U	0.336 U	**106**	0.412 U	--	0.506 U	**12.4**	--
PCB-207	NE	NE	NE	ng/kg	**9.69**	**10.5**	**14.1**	**7.46**	0.754 U	**5.69**	0.259 U	0.478 U	0.239 U	0.251 U	**16.2**	0.296 U	--	0.376 U	**1.25 J**	--
PCB-208	NE	NE	NE	ng/kg	**18.7**	**21.6**	**25.3**	**16.4**	0.725 U	**10.8**	0.238 U	0.450 U	0.224 U	0.233 U	**21.8**	0.278 U	--	0.364 U	**4.57**	--
PCB-209	NE	NE	NE	ng/kg	**42.4**	**164**	**121**	**120.0**	1.04 U	**27.3**	0.213 U	0.546 U	0.271 U	0.247 U	**30.3**	0.308 U	--	0.272 U	**14.9**	--
Total PCBs	130,000	NE	3,100,000	ng/kg	**27,102 T**	**22,080 T**	**17,935 T**	**13,887 T**	**65.1 T**	**7,913 T**	1.7 UT	**270 T**	1.4 UT	1.5 UT	**19,387 T**	**50.2 T**	--	**4.1 T**	**355 T**	--
Total PCBs	NE	38	NE	mg/kg OC	**0.2**	**0.2**	**0.3**	**0.1**	**0.0**	**0.1**	0.001 U	**0.2**	0.001 U	0.001 U	**0.7**	**0.002**	--	**0.002**	**0.005**	--
Organometallic Compounds																				
Tributyltin Ion	NE	73	NE	µg/kg	**3.7**	**1.8 J**	3.6 U	3.6 U	3.5 U	**2.2 J**	3.5 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	--	3.4 U	3.7 U	--
Dioxins/Furans																				
Total Dioxin/Furan TEQ (ND=0.5DL)	4-10	10	NE	ng/kg	**32.3 JT**	**25.1 JT**	**7.6 JT**	**26.1 JT**	**0.5 T**	**9.8 JT**	**0.3 T**	**0.7 JT**	**0.15 JT**	**0.5 JT**	**14.7 JT**	**0.7 JT**		**0.4 T**	**6.9 JT**	

Notes:

-- = not tested
BT = bioaccumulation trigger
cPAH = carcinogenic polycyclic aromatic hydrocarbon
DL = detection limit
HPAH = high molecular weight polycyclic aromatic hydrocarbon
J = Estimated concentration
JT = Estimated concentration total
LPAH = low molecular weight polycyclic aromatic hydrocarbon
mg/kg = milligram per kilogram
mg/kg OC = milligram per kilogram organic carbon normalized
ML = maximum level
NE = not established
ng/kg = nanogram per kilogram
PCB = polychlorinated biphenyl
SL = screening level
TEQ = toxicity equivalent
U = The analyte is not detected at or above the reported concentration.
µg/kg = microgram per kilogram
Bold indicates the analyte was detected.
Yellow shading indicates exceedance of SL.
Orange shading indicates exceedance of BT.
Red border indicates exceedance of ML.

Table 6

Interim Action Sediment Chemical Analytical Results Compared to MTCA Cleanup Preliminary Screening Levels

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
Conventionals																			
Total Organic Carbon	NE	NE	%	14.4	9.93	5.6	13.3	0.313	8.49	0.152	0.124	0.157	0.176	2.94	2.7	–	0.228	7.76	–
Organic Matter	NE	NE	%	16.73	11.93	5.91	13.2	0.65	7.87	0.52	1.14	0.54	0.58	7.2	4.39	–	0.43	8.29	–
Preserved Total Solids	NE	NE	%	–	–	–	–	–	–	–	–	–	–	–	–	58.07	–	–	81.39
Total Solids	NE	NE	%	45.98	50.15	62.61	44.45	79.68	51.63	81.11	81.14	82.81	81.72	57.21	71.55	–	81.58	61.16	–
Total Volatile Solids	NE	NE	%	21.02	18.9	12.12	31.21	1.31	14.52	1.14	1.05	1.19	0.95	12.15	5.09	–	1.01	10.3	–
Ammonia	NE	NE	mg/kg	21	30	8.47	45.1	3.93	28.7	9.95	7.88	2.78	6.01	20.2	13.2	–	26.6	42.2	–
Sulfide	NE	NE	mg/kg	–	–	–	–	–	–	–	–	1.92 J	4.38 J	112 J	16	205	1.32	4.8	22.3 J
Grain Size																			
Gravel (≤ -1)	NE	NE	%	10.2	8.2	1.8	7.2	0.3	5.7	0.1	1.6	0.7	0.1 U	4.6	1.1	–	0.1	0.8	–
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	4.8	2.4	1.5	3.9	0.3	2.2	0.1	0.6	0.1	0.2	1.9	0.8	–	0.4	1.6	–
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	6.6	3.7	2.7	5.8	1.1	3.5	0.5	1.6	0.5	1.2	3.8	2.2	–	2.8	2.3	–
Medium sand (1 < Phi ≤ 2)	NE	NE	%	15	16.1	23	12.1	18.3	12.2	10.4	22.9	27.5	22.5	20.5	20.4	–	10.9	5.2	–
Fine sand (2 < Phi ≤ 3)	NE	NE	%	19.3	30.2	42	27	49.2	42.5	52.6	55.5	41.8	60.2	34.9	51.2	–	46.3	14.7	–
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	10.4	11.4	12.6	11.7	20.4	13.3	25.7	7.3	18.5	8.4	8.3	6	–	29.2	23.4	–
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	4.8	5.2	2.6	5.1	3.7	1.6	3.6	2.7	4.1	2.1	7.9	4	–	4.1	13.6	–
Medium silt (5 < Phi ≤ 6)	NE	NE	%	6.6	4.6	3	6.3	1.6	4.6	1.7	2	1.5	1.2	4.3	3.3	–	1.6	11.3	–
Fine silt (6 < Phi ≤ 7)	NE	NE	%	5.4	4.5	2.8	5.1	1.2	3.4	1.2	1.5	1.2	0.8	3.1	2.7	–	1.1	7.9	–
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	4.4	3.5	2.1	4.4	1	2.9	1	1.1	1.2	0.7	2.6	2	–	0.8	5.3	–
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	2.8	2.3	1.5	3.2	0.7	2.1	0.7	1	0.8	0.6	2.2	1.8	–	0.7	4	–
Medium clay (9 < Phi ≤ 10)	NE	NE	%	3	2.8	1.6	2.6	0.7	2	0.8	0.8	0.8	0.7	1.8	1.6	–	0.6	3.5	–
Particle/Grain Size, Phi >10	NE	NE	%	6.7	5.2	2.9	5.7	1.6	4	1.8	1.4	1.3	1.3	4	2.8	–	1.4	6.1	–
Total Fines	NE	NE	%	33.7	28	16.5	32.4	10.4	20.6	10.7	10.4	10.9	7.5	25.9	18.3	–	10.3	51.8	–
Grain Size (Ash Wt.)																			
Gravel (≤ -1)	NE	NE	%	2.1	1.1	1.2	2.8	0.1 U	3.5	0.1 U	0.1 U	0.2	0.1 U	1.5	–	–	–	–	–
Very coarse sand (-1 < Phi ≤ 0)	NE	NE	%	2.0	1.4	0.6	1.9	0.3	1.0	0.1	0.3	0.1	0.2	1.6	–	–	–	–	–
Coarse sand (0 < Phi ≤ 1)	NE	NE	%	3.8	2.5	1.3	2.7	1.3	2.0	0.4	1.2	0.5	1.2	4.1	–	–	–	–	–
Medium sand (1 < Phi ≤ 2)	NE	NE	%	14.6	14.8	21.5	8.6	19.1	9.5	12.9	16.2	26.6	28.2	24.0	–	–	–	–	–
Fine sand (2 < Phi ≤ 3)	NE	NE	%	23.3	35.6	43.6	31.7	46.5	41.6	52.3	61.4	43.9	56.5	41.6	–	–	–	–	–
Very fine sand (3 < Phi ≤ 4)	NE	NE	%	14.8	16.1	13.0	16.8	20.8	14.9	23.8	12.4	18.4	7.2	9.7	–	–	–	–	–
Coarse silt (4 < Phi ≤ 5)	NE	NE	%	8.5	6.6	4.6	6.0	5.6	6.5	4.3	3.2	4.1	2.7	3.1	–	–	–	–	–
Medium silt (5 < Phi ≤ 6)	NE	NE	%	15.6	9.1	4.5	17.7	1.9	11.0	1.6	1.2	2.1	1.0	6.0	–	–	–	–	–
Fine silt (6 < Phi ≤ 7)	NE	NE	%	6.9	4.9	4.0	5.5	1.7	5.5	1.6	1.1	2.4	0.9	3.6	–	–	–	–	–
Very fine silt (7 < Phi ≤ 8)	NE	NE	%	1.9	2.4	1.8	1.2	1.1	1.2	1.2	0.9	0.2	0.5	1.4	–	–	–	–	–
Coarse clay (8 < Phi ≤ 9)	NE	NE	%	0.9	1.4	0.9	0.5	0.4	0.5	0.5	0.5	0.1 U	0.4	0.7	–	–	–	–	–
Medium clay (9 < Phi ≤ 10)	NE	NE	%	0.3	0.6	0.4	0.2	0.1	0.1	0.2	0.4	0.1	0.2	0.1	–	–	–	–	–
Particle/Grain Size, Phi >10	NE	NE	%	5.1	3.4	2.5	4.3	1.3	2.9	1.3	1.1	1.4	0.9	2.5	–	–	–	–	–
Total Fines	NE	NE	%	39.4	28.5	18.8	35.5	12.0	27.6	10.6	8.5	10.3	6.6	17.5	–	–	–	–	–
Metals																			
Antimony			mg/kg	1.1 J	1.40 J	0.75 J	1.1 J	0.82 J	2.38 J	0.68 J	0.75 J	1.03 J	0.68 J	1.07 J	0.84 J	–	0.77 J	1.46 J	–
Arsenic	57	11	mg/kg	10.7 J	6.80 J	5.83 J	9.5 J	4.57 J	6.67 J	5.14 J	4.81 J	5.18 J	4.42 J	7.69 J	6.08 J	–	3.92 J	9	–
Cadmium	5.1	1	mg/kg	1.3	1	0.6	1.3	0.2	0.7	0.3	0.3	0.220 J	0.210 J	1	0.4	–	0.211 J	1.1	–
Chromium	260	NE	mg/kg	35	31.3	24.3	35	28.4	30.3	27.7	25.7	29.9	22.2	31.5	28.2	–	24.2	47.9	–
Copper	390	69,000	mg/kg	43.9	32.9	18.3	43.2	11	24.8	9.9	9.8	10.2	7.1	33.6	12.8	–	7.6	44.2	–
Lead	450	21	mg/kg	28	22	9	31	1.86 J	14	1.80 J	5	1.94 J	2.30 J	19	10	–	1.48 J	26	–
Mercury	0.41	0.2	mg/kg	0.13	0.14	0.0380 J	0.12	0.0120 J	0.14	0.0106 J	0.0159 J	0.02	0.0080 J	0.1	0.08	–	0.0071 J	0.11	–
Selenium	NE	NE	mg/kg	0.52 J	0.337 J	0.214 J	0.45 J	0.6 U	0.311 J	0.6 U	0.127 J	0.6 U	0.125 J	0.315 J	0.185 J	–	0.6 U	0.487 J	–
Silver	6.1	8,700	mg/kg	0.7 U	0.6 U	0.5 U	0.7 U	0.4 U	0.6 U	0.3 U	0.4 U	0.3 U	0.4 U	0.6 U	0.4 U	–	0.3 U	0.5 U	–
Zinc	410	520,000	mg/kg	76	54	37	69	31	49	31	30	31	27	58	34	–	28	70	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
LPAHs (OC Normalized)																			
2-Methylnaphthalene	38	NA	mg/kg OC	**1.9**	**1.9**	**2.3**	**3.1**	**1.8**	**3.3**	**2.1**	**4.8**	**1.6**	2.7 U	**8.2**	**2.8**	--	2.1 U	**2.3**	--
Acenaphthene	16	NA	mg/kg OC	**2.4**	**2.1**	**2.9**	**3.2**	**1.4**	**4.8**	3.2 U	**3.6**	3 U	2.7 U	**8.8**	**2.7**	--	2.1 U	**2.7**	--
Acenaphthylene	66	NA	mg/kg OC	**0.4**	**0.83**	**1.6**	**1.6**	1.5 U	**1.3**	3.2 U	**1.9**	3 U	2.7 U	**3.7**	**2**	--	2.1 U	**1**	--
Anthracene	220	NA	mg/kg OC	**1.9**	**1.5**	**1.8**	**1.6**	**1.1**	**2.1**	3.2 U	**4.9**	3 U	2.7 U	**5.1**	**4**	--	2.1 U	**2.1**	--
Fluorene	23	NA	mg/kg OC	**2.3**	**2.1**	**2.9**	**3**	**1.5**	**4.4**	3.2 U	**4.7**	3 U	2.7 U	**8.5**	**3.3**	--	2.1 U	**3.1**	--
Naphthalene	99	NA	mg/kg OC	**7.6**	**11**	**21**	**27**	**11**	**19**	**5.6**	**21**	3 U	**3.9**	**44**	**17**	--	**1.4**	**14**	--
Phenanthrene	100	NA	mg/kg OC	**4.7**	**6**	**9.8**	**8.3**	**4.8**	**10**	**5.2**	**15**	3 U	2.7 U	**21**	**9.6**	--	2.1 U	**8.4**	--
Total LPAHs	370	NA	mg/kg OC	**19.4**	**23.7**	**40.3**	**44.7**	**19.4**	**42**	**10.8**	**50.6**	3 U	**3.9**	**91.8**	**38.3**	--	**1.4**	**31.4**	--
LPAHs																			
2-Methylnaphthalene	670	5,900,000	µg/kg	**280**	**190**	**130**	**410**	**5.7**	**280**	**3.2 J**	**5.9**	**2.5 J**	4.8 U	**240**	**75**	--	4.7 U	**180**	--
Acenaphthene	500	88,000,000	µg/kg	**340**	**210**	**160**	**420**	**4.4 J**	**410**	4.8 U	**4.5 J**	4.7 U	4.8 U	**260**	**73**	--	4.7 U	**210**	--
Acenaphthylene	1,300	NE	µg/kg	**57**	**82**	**89**	**210**	4.8 U	**110**	4.8 U	**2.4 J**	4.7 U	4.8 U	**110**	**53**	--	4.7 U	**80**	--
Anthracene	960	440,000,000	µg/kg	**280**	**150**	**99**	**210**	**3.4 J**	**180**	4.8 U	**6.1**	4.7 U	4.8 U	**150**	**100**	--	4.7 U	**160**	--
Fluorene	540	59,000,000	µg/kg	**330**	**210**	**160**	**400**	**4.8 J**	**370**	4.8 U	**5.8**	4.7 U	4.8 U	**250**	**89**	--	4.7 U	**240**	--
Naphthalene	2,100	29,000,000	µg/kg	**1,100**	**1,100**	**1,200**	**3,600**	**33**	**1,600**	**8.5**	**26**	4.7 U	**6.8**	**1,300**	**460**	--	**3.3 J**	**1,100**	--
Phenanthrene	1,500	NE	µg/kg	**680**	**600**	**550**	**1,100**	**15**	**900**	**7.9**	**18**	4.7 U	4.8 U	**630**	**260**	--	4.7 U	**650**	--
Total LPAHs	5,200	NE	µg/kg	**2,787 T**	**2,352 T**	**2,258 T**	**5,940 T**	**60.6 T**	**3,570 T**	**16.4 T**	**62.8 T**	4.7 UT	**6.8 T**	**2,700 T**	**1,035 T**	--	**3.3 T**	**2,440 T**	--
HPAHs (OC Normalized)																			
Benzo(a)anthracene	110	NE	mg/kg OC	**0.97**	**0.58**	**0.61**	**0.39**	1.5 U	**1.5**	3.2 U	**4.4**	3 U	2.7 U	**1.9**	**2.2**	--	2.1 U	**0.91**	--
Benzo(a)pyrene	99	NE	mg/kg OC	**0.55**	**0.34**	**0.32**	**0.22**	1.5 U	**0.99**	3.2 U	**3.1**	3 U	2.7 U	**0.95**	**1.9**	--	2.1 U	**0.63**	--
Benzo(ghi)perylene	31	NE	mg/kg OC	**0.38**	**0.22**	**0.25**	**0.19**	1.5 U	**0.68**	3.2 U	**3.4**	3 U	2.7 U	**0.7**	**1.4**	--	2.1 U	**0.57**	--
Chrysene	110	NE	mg/kg OC	**1.6**	**0.9**	**0.96**	**0.62**	**0.89**	**1.6**	3.2 U	**4.9**	3 U	2.7 U	**2.9**	**2.3**	--	2.1 U	**1.3**	--
Dibenzo(a,h)anthracene	12	NE	mg/kg OC	**0.11**	0.25 U	0.43 U	0.18 U	1.5 U	**0.14**	3.2 U	3.9 U	3 U	2.7 U	**0.14**	0.89 U	--	2.1 U	0.31 U	--
Fluoranthene	160	NE	mg/kg OC	**4**	**4.8**	**6.4**	**5**	**3.5**	**7.5**	**4.6**	**15**	3 U	2.7 U	**14**	**9.6**	--	2.1 U	**5.9**	--
Indeno(1,2,3-cd)pyrene	34	NE	mg/kg OC	**0.31**	**0.18**	0.43 U	**0.12**	1.5 U	**0.52**	3.2 U	3.9 U	3 U	2.7 U	**0.44**	**1**	--	2.1 U	**0.32**	--
Pyrene	1,000	NE	mg/kg OC	**3.1**	**3.6**	**4.8**	**3.5**	**3**	**5.4**	**2.9**	**17**	3 U	2.7 U	**10**	**8.9**	--	2.1 U	**5.5**	--
Total HPAHs	960.0	NE	mg/kg OC	**12.3**	**11.5**	**14.2**	**10.7**	**7.4**	**20.8**	**7.5**	**54.1**	3 U	2.7 U	**34.1**	**30.4**	--	2.1 U	**16.4**	--
HPAHs																			
Benzo(a)anthracene	1,300	5,000	µg/kg	**140**	**58**	**34**	**52**	4.8 U	**130**	4.8 U	**5.4**	4.7 U	4.8 U	**55**	**59**	--	4.7 U	**71**	--
Benzo(a)pyrene	1,600	500	µg/kg	**79**	**34**	**18 J**	**29**	4.8 U	**84**	4.8 U	**3.9 J**	4.7 U	4.8 U	**28**	**51**	--	4.7 U	**49**	--
Benzo(ghi)perylene	670	NE	µg/kg	**55**	**22 J**	**14 J**	**25**	4.8 U	**58**	4.8 U	**4.2 J**	4.7 U	4.8 U	**20**	**38**	--	4.7 U	**44**	--
Benzofluoranthenes (Sum)	3,200	5,000	µg/kg	**200**	**83**	**45**	**89**	4.8 U	**200**	4.8 U	**7.5**	4.7 U	4.8 U	**76**	**84**	--	4.7 U	**98**	--
Chrysene	1,400	50,000	µg/kg	**230**	**90**	**54**	**83**	**2.8 J**	**140**	4.8 U	**6.1**	4.7 U	4.8 U	**85**	**62**	--	4.7 U	**98**	--
Dibenzo(a,h)anthracene	230	5,000	µg/kg	**16 J**	25 U	24 U	24 U	4.8 U	**12 J**	4.8 U	4.8 U	4.7 U	4.8 U	**4.0 J**	24 U	--	4.7 U	24 U	--
Fluoranthene	1,700	59,000,000	µg/kg	**570**	**480**	**360**	**670**	**11**	**640**	**7**	**19**	4.7 U	4.8 U	**420**	**260**	--	4.7 U	**460**	--
Indeno(1,2,3-cd)pyrene	600	5,000	µg/kg	**45**	**18 J**	24 U	**16 J**	4.8 U	**44**	4.8 U	4.8 U	4.7 U	4.8 U	**13**	**27**	--	4.7 U	**25**	--
Pyrene	2,600	44,000,000	µg/kg	**440**	**360**	**270**	**460**	**9.5**	**460**	**4.4 J**	**21**	4.7 U	4.8 U	**300**	**240**	--	4.7 U	**430**	--
Total HPAHs	12,000	NE	µg/kg	**1,775 T**	**1,145 T**	**795 T**	**1,424 T**	**23.3 T**	**1,768 T**	**11.4 T**	**67.1 T**	4.7 UT	4.8 UT	**1,001 T**	**821 T**	--	4.7 UT	**1,275 T**	--
cPAHs																			
Total cPAH TEQ (ND=0.5DL)	NE	16	µg/kg	**121.4 JT**	**52.1 JT**	**28.8 JT**	**46.7 JT**	**3.4 JT**	**124 JT**	3.4 UT	**5.7 JT**	3.3 UT	3.4 UT	**43.7 JT**	**69.8 T**	--	3.3 UT	**70.6 T**	--
Chlorinated Hydrocarbons (OC Normalized)																			
1,2,4-Trichlorobenzene	0.81	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	**0.026**	1.5 U	**0.099**	3.2 U	3.9 U	3.1 U	2.7 U	**0.085**	0.18 U	--	2.1 U	0.062 U	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	2.3	NE	mg/kg OC	**0.09**	**0.078**	**0.066**	**0.083**	**0.96**	**0.068**	**1.6**	3.9 U	3.1 U	2.7 U	**0.37**	0.18 U	--	2.1 U	0.062 U	--
1,4-Dichlorobenzene (p-Dichlorobenzene)	3.1	NE	mg/kg OC	**0.044**	**0.046**	**0.057**	**0.05**	1.5 U	**0.061**	3.2 U	3.9 U	3.1 U	2.7 U	**0.18**	0.18 U	--	2.1 U	0.062 U	--
Hexachlorobenzene	0.38	NE	mg/kg OC	0.0069 U	0.013 U	0.018 U	0.0074 U	0.31 U	0.012 U	0.64 U	0.79 U	0.62 U	0.55 U	0.48 U	0.036 U	--	0.42 U	0.012 U	--
Chlorinated Hydrocarbons																			
1,2,4-Trichlorobenzene	31	130	µg/kg	4.9 U	4.9 U	4.7 U	**3.5 J**	4.8 U	**8.4**	4.8 U	4.8 U	4.8 U	4.8 U	**2.5 J**	4.9 U	--	4.7 U	4.8 U	--
1,2-Dichlorobenzene (o-Dichlorobenzene)	35	130,000	µg/kg	**13**	**7.7**	**3.7 J**	**11**	**3.0 J**	**5.8**	**2.5 J**	4.8 U	4.8 U	4.8 U	**11**	4.9 U	--	4.7 U	4.8 U	--
1,4-Dichlorobenzene (p-Dichlorobenzene)	110	680	µg/kg	**6.3**	**4.6 J**	**3.2 J**	**6.7**	4.8 U	**5.2**	4.8 U	4.8 U	4.8 U	4.8 U	**5.2**	4.9 U	--	4.7 U	4.8 U	--
Hexachlorobenzene	22	2.3	µg/kg	0.99 U	1.3 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	14 U	0.97 U	--	0.95 U	0.96 U	--
Phthalates (OC Normalized)																			
Bis(2-Ethylhexyl) Phthalate	47	NE	mg/kg OC	**0.2**	0.49 U	0.84 U	0.36 U	15 U	0.57 U	32 U	39 U	31 U	27 U	**0.95**	1.8 U	--	21 U	0.62 U	--
Butyl benzyl Phthalate	4.9	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	0.036 U	**1.5**	**0.37**	**2.1**	3.9 U	**1.6**	**1.5**	**0.75**	0.18 U	--	**3.2**	**0.11**	--
Dibutyl Phthalate	220	NE	mg/kg OC	**0.45**	0.2 U	0.34 U	0.14 U	6.1 U	0.22 U		15 U	12 U	11 U	0.65 U	0.7 U	--	8.3 U	0.24 U	--
Diethyl Phthalate	61	NE	mg/kg OC	0.1 U	**3.8**	0.34 U	0.14 U	6.1 U	0.22 U	13 U	15 U	12 U	11 U	0.65 U	0.7 U	--	8.3 U	**0.44**	--
Dimethyl Phthalate	53	NE	mg/kg OC	0.1 U	0.2 U	0.34 U	0.14 U	6.1 U	**0.26**	13 U	15 U	12 U	11 U	0.65 U	0.7 U	--	8.3 U	0.24 U	--
Di-N-Octyl Phthalate	58	NE	mg/kg OC	**0.076**	0.2 U	0.34 U	0.14 U	6.1 U	0.22 U	13 U	15 U	12 U	11 U	0.65 U	0.7 U	--	8.3 U	0.24 U	--
Phthalates																			
Bis(2-Ethylhexyl) Phthalate	1,300	260,000	µg/kg	**30 J**	49 UJ	47 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	48 UJ	**28 J**	49 U	--	47 U	48 U	--
Butyl benzyl Phthalate	63	1,900,000	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**4.8**	**31**	**3.2 J**	4.8 U	**2.5 J**	**2.6 J**	**22**	4.9 U	--	**7.4**	**8.8**	--
Dibutyl Phthalate	1,400	150,000,000	µg/kg	**65**	20 U	19 U	19 U	19 U	19 U	**19 U**	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--
Diethyl Phthalate	200	NE	µg/kg	20 U	**380**	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	**34**	--
Dimethyl Phthalate	71	NE	µg/kg	20 U	20 U	19 U	19 U	19 U	**22**	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--
Di-N-Octyl Phthalate	6,200	15,000,000	µg/kg	**11 J**	20 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	19 U	20 U	--	19 U	19 U	--

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
Phenols																			
2,4-Dimethylphenol	29	29,000,000	µg/kg	**46**	**54**	**26**	**78**	24 U	**56**	24 U	24 U	24 U	24 U	**44**	24 U	--	23 U	**24 J**	--
o-Cresol (2-methylphenol)	63	73,000,000	µg/kg	**37**	**68**	**45**	**140**	19 U	**81**	19 U	19 U	19 U	19 U	**49**	20 U	--	19 U	**36**	--
p-Cresol (4-methylphenol)	670	150,000,000	µg/kg	**1,700**	**2,400**	**930**	**1,900**	**34**	**1,000**	19 U	**16 J**	19 U	19 U	**1,200**	20 U	--	**92**	**180**	--
Pentachlorophenol	360	9,200	µg/kg	**46 J**	99 U	94 U	**33 J**	96 U	**33 J**	97 U	97 U	95 U	96 U	96 U	98 U	--	94 U	96 U	--
Phenol	420	440,000,000	µg/kg	**390**	**430**	**240**	**460**	**29**	**320**	**34**	19 U	19 U	19 U	**250**	20 U	--	**38**	**59**	--
Miscellaneous Extractables (OC Normalized)																			
Dibenzofuran	15	NE	mg/kg OC	**2**	**2.2**	**3.2**	**3.1**	**1.5**	**4**	3.2 U	**4.7**	3 U	2.7 U	**8.2**	**3.2**	--	2.1 U	**3**	--
Hexachlorobutadiene	3.9	NE	mg/kg OC	0.0069 U	0.01 U	0.018 U	0.0074 U	0.31 U	0.012 U	0.64 U	0.79 U	0.62 U	0.55 U	0.033 U	0.036 U	--	0.42 U	0.012 U	--
N-Nitrosodiphenylamine (as diphenylamine)	11	NE	mg/kg OC	0.034 U	0.049 U	0.084 U	0.036 U	**0.93**	0.057 U	**2**	3.9 U	3.1 U	2.7 U	0.16 U	0.18 U	--	2.1 U	0.062 U	--
Miscellaneous Extractables																			
Benzoic Acid	650	NE	µg/kg	**790**	**940**	**540**	**1,100**	190 U	**860**	190 U	190 U	190 U	190 U	**720**	200 U	--	**82 J**	**150 J**	--
Benzyl Alcohol	57	150,000,000	µg/kg	**30**	**33**	**25**	**59**	19 U	**32**	19 U	19 U	19 U	19 U	**24**	20 U	--	19 U	19 U	--
Dibenzofuran	540	1,500,000	µg/kg	**300**	**220**	**180**	**410**	**4.8 J**	**340**	4.8 U	**5.8**	4.7 U	4.8 U	**240**	**86**	--	4.7 U	**200**	--
Hexachlorobutadiene	11	47,000	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
N-Nitrosodiphenylamine (as diphenylamine)	28	750,000	µg/kg	4.9 U	4.9 U	4.7 U	4.8 U	**2.9 J**	4.8 U	**3.0 J**	4.8 U	4.8 U	4.8 U	4.8 U	4.9 U	--	4.7 U	4.8 U	--
Pesticides																			
4,4'-DDD	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
4,4'-DDE	NE	NE	µg/kg	0.99 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
4,4'-DDT	NE	NE	µg/kg	6.9 U	4.3 U	0.99 U	4.0 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Total DDT (4,4 isomers)	NE	NE	µg/kg	6.9 UT	4.3 UT	0.99 UT	4 UT	0.98 UT	0.98 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	0.98 UT	0.97 UT	--	0.95 UT	0.96 UT	--
Aldrin	NE	NE	µg/kg	1.7 U	0.49 U	1.8 U	3.6 U	0.49 U	3.9 U	0.49 U	0.49 U	0.48 U	0.49 U	1.7 U	0.48 U	--	0.48 U	0.48 U	--
alpha-Chlordane (cis)	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	0.49 U	0.48 U	--	0.48 U	0.48 U	--
beta or gamma-Chlordane (trans)	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.49 U	0.49 U	0.49 U	0.48 U	0.49 U	1.0 U	0.48 U	--	0.48 U	0.48 U	--
Chlordane (Total)	NE	NE	µg/kg	4.5 UT	1.7 UT	0.99 UT	**2.3 J**	0.98 UT	2.3 UT	0.98 UT	0.98 UT	0.97 UT	0.97 UT	2.7 UT	0.97 UT	--	0.95 UT	1.6 UT	--
cis-Nonachlor	NE	NE	µg/kg	1.6 U	1.7 U	0.99 U	**2.3 J**	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Dieldrin	NE	NE	µg/kg	1.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Heptachlor	NE	NE	µg/kg	0.50 U	0.49 U	0.50 U	0.50 U	0.49 U	0.80 U	0.49 U	0.49 U	0.48 U	0.49 U	1.5 U	0.48 U	--	0.48 U	0.48 U	--
Oxychlordane	NE	NE	µg/kg	4.5 U	0.99 U	0.99 U	0.99 U	0.98 U	2.3 U	0.98 U	0.98 U	0.97 U	0.97 U	2.7 U	0.97 U	--	0.95 U	1.6 U	--
trans-Nonachlor	NE	NE	µg/kg	2.2 U	0.99 U	0.99 U	0.99 U	0.98 U	0.98 U	0.98 U	0.98 U	0.97 U	0.97 U	0.98 U	0.97 U	--	0.95 U	0.96 U	--
Polychlorinated Biphenyls (PCBs)																			
PCB-001	NE	NE	ng/kg	**18.2**	**18**	**20.5**	**5.77**	0.867 U	**5.34**	0.450 U	0.752 U	0.600 U	0.397 U	**9.5**	**1.20 J**	--	0.315 U	**3.28 J**	--
PCB-002	NE	NE	ng/kg	**4.98**	**5.12**	**12.6**	**4.61**	0.973 U	**4.08**	0.544 U	0.856 U	0.696 U	0.461 U	**4.92**	**2.47 J**	--	0.381 U	**6.95**	--
PCB-003	NE	NE	ng/kg	**13.3**	**11.4**	**16.9**	**6.67**	0.937 U	**4.56**	0.558 U	0.833 U	0.689 U	0.458 U	**7.96**	**1.82 J**	--	0.381 U	**5.2**	--
PCB-004	NE	NE	ng/kg	**16.5**	**13.7**	**29.7**	**7.09**	1.62 U	**4.11**	1.63 U	1.21 U	1.39 U	1.39 U	**8.94**	**2.22 J**	--	0.810 U	0.626 U	--
PCB-005	NE	NE	ng/kg	0.572 U	1.82 U	1.99 U	1.77 U	1.43 U	0.928 U	1.49 U	1.07 U	1.26 U	1.35 U	0.617 U	0.735 U	--	0.744 U	0.491 U	--
PCB-006	NE	NE	ng/kg	**9.37**	**9.26**	**16.5**	**6.98**	**2.86 J**	**3.23 J**	1.39 U	0.994 U	1.17 U	1.25 U	**12.5**	**5.07**	--	0.710 U	**2.50 J**	--
PCB-007	NE	NE	ng/kg	**2.94 J**	**3.61 J**	**4.4**	1.68 U	1.39 U	0.900 U	1.45 U	1.04 U	1.22 U	1.31 U	**3.48 J**	0.716 U	--	0.725 U	0.478 U	--
PCB-008	NE	NE	ng/kg	**39.6**	**37.5**	**66.4**	**20.7**	1.45 U	**10.1**	1.52 U	1.09 U	1.28 U	1.37 U	**26.7**	**3.72 J**	--	0.741 U	**2.29 J**	--
PCB-009	NE	NE	ng/kg	**3.61 J**	**2.72 J**	**6.64**	1.78 U	1.45 U	0.943 U	1.52 U	1.09 U	1.28 U	1.37 U	0.627 U	0.746 U	--	0.756 U	0.499 U	--
PCB-010	NE	NE	ng/kg	0.590 U	1.97 U	2.15 U	1.92 U	1.62 U	1.05 U	1.69 U	1.21 U	1.42 U	1.53 U	0.699 U	0.765 U	--	0.776 U	0.512 U	--
PCB-011	NE	NE	ng/kg	**13**	**14.4**	**11.8**	**9.7**	**3.91 J**	**5.32**	1.59 U	**3.10 J**	1.33 U	1.43 U	**13.9**	**6.53**	--	**2.91 J**	**4.55**	--
PCB-012	NE	NE	ng/kg	**2.87 J**	**3.61 J**	**7.67**	1.79 U	1.43 U	1.37 U	1.50 U	1.07 U	1.26 U	1.35 U	**3.21 J**	**4.24**	--	0.798 U	**2.56 J**	--
PCB-013	NE	NE	ng/kg	**4.8**	**4.87**	**5.44**	**4.99**	1.59 U	1.52 U	1.66 U	1.19 U	1.40 U	1.50 U	**8.75**	**2.36 J**	--	0.859 U	**1.94 J**	--
PCB-014	NE	NE	ng/kg	0.599 U	1.88 U	2.06 U	1.83 U	1.47 U	0.954 U	1.54 U	1.10 U	1.29 U	1.38 U	0.634 U	0.758 U	--	0.768 U	0.506 U	--
PCB-015	NE	NE	ng/kg	**36.6**	**28.6**	**22.4**	**11.8**	1.47 U	**7.61**	1.58 U	1.10 U	1.32 U	1.47 U	**19.4**	**1.97 J**	--	0.815 U	**1.16 J**	--
PCB-016	NE	NE	ng/kg	**32.6**	**37.1**	**35.3**	**19.4**	1.32 U	**7.75**	0.566 U	1.44 U	0.546 U	0.646 U	**17.9**	0.553 U	--	0.404 U	0.583 U	--
PCB-017	NE	NE	ng/kg	**45.3**	**41.1**	**51.5**	**21.3**	1.38 U	**10.4**	0.590 U	1.50 U	0.569 U	0.673 U	**23.3**	0.614 U	--	0.449 U	1.79 U	--
PCB-018	NE	NE	ng/kg	**120**	**107**	**131**	**56.4**	1.53 U	**26.8**	0.654 U	1.66 U	0.631 U	0.747 U	**64**	0.681 U	--	0.497 U	1.98 U	--
PCB-019	NE	NE	ng/kg	**10.9**	**11.4**	**12.4**	**5.95**	1.53 U	1.75 U	0.653 U	1.66 U	0.630 U	0.745 U	**5.88**	0.660 U	--	0.482 U	0.696 U	--
PCB-020	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	--	0.843 U	**3.99**	--
PCB-021	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	--	0.843 U	**3.99**	--
PCB-022	NE	NE	ng/kg	**52.9**	**39.8**	**45.4**	**22**	1.13 U	**11.1**	0.873 U	1.52 U	1.02 U	0.772 U	**28.1**	0.911 U	--	0.826 U	1.34 U	--
PCB-023	NE	NE	ng/kg	1.85 U	1.88 U	1.71 U	1.85 U	1.21 U	1.98 U	0.935 U	1.63 U	1.09 U	0.827 U	1.84 U	0.961 U	--	0.871 U	1.41 U	--
PCB-024	NE	NE	ng/kg	**1.77 J**	**4.6**	**2.16 J**	1.50 U	1.02 U	1.17 U	0.437 U	1.11 U	0.422 U	0.499 U	**1.40 J**	0.475 U	--	0.347 U	0.501 U	--
PCB-025	NE	NE	ng/kg	**9.5**	**7.96**	**9.97**	**3.58 J**	0.974 U	1.59 U	0.752 U	1.31 U	0.876 U	0.666 U	**6.23**	0.812 U	--	0.736 U	1.20 U	--
PCB-026	NE	NE	ng/kg	**20.6**	**18.8**	**21.4**	**8.27**	1.12 U	**3.97 J**	0.869 U	1.52 U	1.01 U	0.769 U	**14**	0.949 U	--	0.860 U	1.40 U	--
PCB-027	NE	NE	ng/kg	**6.95**	**4.76**	**8.46**	**4**	1.04 U	1.20 U	0.446 U	1.13 U	0.431 U	0.510 U	**2.79 J**	0.459 U	--	0.335 U	0.484 U	--
PCB-028	NE	NE	ng/kg	**137**	**115**	**113**	**56.3**	**2.20 J**	**27.8**	0.770 U	**2.60 J**	0.896 U	0.682 U	**76.1**	0.787 U	--	0.713 U	**5.45**	--
PCB-029	NE	NE	ng/kg	1.82 U	1.90 U	1.73 U	1.86 U	1.10 U	1.80 U	0.850 U	1.48 U	0.989 U	0.752 U	1.67 U	0.954 U	--	0.864 U	1.40 U	--
PCB-030	NE	NE	ng/kg	0.637 U	1.70 U	1.20 U	1.42 U	0.991 U	1.13 U	0.424 U	1.08 U	0.409 U	0.484 U	1.44 U	0.440 U	--	0.321 U	0.464 U	--
PCB-031	NE	NE	ng/kg	**138**	**99.8**	**113**	**58.3**	**1.94 J**	**29.6**	0.819 U	**2.37 J**	0.954 U	0.725 U	**44.8**	0.979 U	--	0.887 U	**6.29**	--

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-032	NE	NE	ng/kg	**39**	**28.7**	**37.3**	**15**	1.11 U	**7.47**	0.476 U	1.21 U	0.459 U	0.543 U	**17.1**	0.516 U	–	0.376 U	0.544 U	–
PCB-033	NE	NE	ng/kg	**67.5**	**59.9**	**73.7**	**29.4**	1.08 U	**15.6**	0.837 U	1.46 U	0.974 U	0.740 U	**40**	0.930 U	–	0.843 U	**3.99**	–
PCB-034	NE	NE	ng/kg	1.81 U	2.15 U	1.96 U	2.11 U	1.09 U	1.78 U	0.844 U	1.47 U	0.981 U	0.746 U	1.66 U	0.949 U	–	0.860 U	1.40 U	–
PCB-035	NE	NE	ng/kg	1.69 U	1.97 U	1.79 U	1.93 U	1.17 U	1.91 U	0.905 U	1.58 U	1.05 U	0.801 U	1.78 U	0.993 U	–	0.900 U	1.46 U	–
PCB-036	NE	NE	ng/kg	1.63 U	1.88 U	1.71 U	1.84 U	1.10 U	1.79 U	0.847 U	1.48 U	0.986 U	0.750 U	1.67 U	0.931 U	–	0.844 U	1.37 U	–
PCB-037	NE	NE	ng/kg	**39.7**	**24.7**	**28.9**	**14.7**	1.05 U	**8.04**	0.812 U	1.42 U	0.944 U	0.718 U	**20.3**	0.873 U	–	0.791 U	1.28 U	–
PCB-038	NE	NE	ng/kg	1.59 U	1.83 U	1.67 U	1.80 U	1.10 U	1.79 U	0.846 U	1.48 U	0.985 U	0.749 U	1.66 U	0.891 U	–	0.807 U	1.31 U	–
PCB-039	NE	NE	ng/kg	1.68 U	1.94 U	1.76 U	1.90 U	1.13 U	1.84 U	0.870 U	1.52 U	1.01 U	0.770 U	**8.88**	0.954 U	–	0.865 U	1.41 U	–
PCB-040	NE	NE	ng/kg	**40.8**	**32**	**27**	**20.9**	1.57 U	**9.19**	0.997 U	0.721 U	0.651 U	0.843 U	**18.4**	0.790 U	–	0.613 U	0.809 U	–
PCB-041	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-042	NE	NE	ng/kg	**81**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-043	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.9**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-044	NE	NE	ng/kg	**345**	**259**	**185**	**142**	**3.07 J**	**71**	0.865 U	**5.67**	0.565 U	0.731 U	**135**	0.686 U	–	0.532 U	**4.96**	–
PCB-045	NE	NE	ng/kg	**42.3**	**25.3**	**25.8**	**15.6**	1.34 U	**7.77**	0.856 U	0.619 U	0.559 U	0.723 U	**15.9**	0.680 U	–	0.527 U	0.880 U	–
PCB-046	NE	NE	ng/kg	**17.6**	**11.8**	**12.5**	**7.45**	1.45 U	**3.42 J**	0.926 U	0.670 U	0.605 U	0.783 U	**7.54**	0.726 U	–	0.563 U	0.940 U	–
PCB-047	NE	NE	ng/kg	**71.3**	**49.8**	**45.1**	**22.7**	0.983 U	**15**	0.625 U	**2.04 J**	0.408 U	0.529 U	**16.7**	0.527 U	–	0.408 U	**2.61 J**	–
PCB-048	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-049	NE	NE	ng/kg	**255**	**193**	**162**	**96.6**	**2.09 J**	**51.9**	0.755 U	**4.9**	0.493 U	0.638 U	**92.9**	0.595 U	–	0.461 U	**4.57**	–
PCB-050	NE	NE	ng/kg	0.849 U	2.22 U	2.35 U	1.77 U	1.19 U	0.546 U	0.756 U	0.547 U	0.494 U	0.639 U	0.731 U	0.602 U	–	0.467 U	0.780 U	–
PCB-051	NE	NE	ng/kg	**12.2**	**8.76**	**8.73**	**5.64**	1.20 U	**2.70 J**	0.766 U	0.554 U	0.501 U	0.648 U	**5**	0.640 U	–	0.496 U	0.828 U	–
PCB-052	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-053	NE	NE	ng/kg	**44.9**	**30**	**27.8**	**17.7**	1.25 U	**8.88**	0.798 U	0.577 U	0.522 U	0.675 U	**18.6**	0.659 U	–	0.511 U	0.854 U	–
PCB-054	NE	NE	ng/kg	0.649 U	1.73 U	1.83 U	1.38 U	0.936 U	0.430 U	0.596 U	0.431 U	0.389 U	0.504 U	0.576 U	0.484 U	–	0.375 U	0.627 U	–
PCB-055	NE	NE	ng/kg	**9.62**	**5.25**	**7.78**	**3.94 J**	0.879 U	**2.10 J**	0.559 U	0.404 U	0.365 U	0.473 U	**4.23**	0.448 U	–	0.347 U	0.459 U	–
PCB-056	NE	NE	ng/kg	**212**	**155**	**110**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-057	NE	NE	ng/kg	**1.50 J**	1.62 U	1.71 U	1.29 U	0.879 U	0.404 U	0.559 U	0.404 U	0.365 U	0.473 U	0.540 U	0.444 U	–	0.344 U	0.454 U	–
PCB-058	NE	NE	ng/kg	0.630 U	1.60 U	1.70 U	1.28 U	0.929 U	0.427 U	0.591 U	0.427 U	0.386 U	0.500 U	0.571 U	0.457 U	–	0.354 U	0.468 U	–
PCB-059	NE	NE	ng/kg	**81**	**53.8**	**53.7**	**28.5**	1.02 U	**16.1**	0.651 U	**1.93 J**	0.425 U	0.550 U	**31.1**	0.517 U	–	0.401 U	**1.85 J**	–
PCB-060	NE	NE	ng/kg	**212**	**155**	**110**	**75.9**	1.34 U	**36.3**	0.523 U	**3.80 J**	0.466 U	0.560 U	**88.6**	0.684 U	–	0.603 U	**5.07**	–
PCB-061	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-062	NE	NE	ng/kg	0.742 U	1.84 U	1.95 U	1.47 U	0.949 U	0.436 U	0.604 U	0.437 U	0.395 U	0.511 U	0.584 U	0.517 U	–	0.401 U	0.529 U	–
PCB-063	NE	NE	ng/kg	**13.8**	**9.31**	**9.41**	**4.69**	0.855 U	**2.51 J**	0.544 U	0.394 U	0.355 U	0.460 U	**6.14**	0.439 U	–	0.340 U	0.450 U	–
PCB-064	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-065	NE	NE	ng/kg	0.651 U	1.79 U	1.89 U	1.43 U	1.00 U	0.461 U	0.638 U	0.462 U	0.417 U	0.540 U	0.617 U	0.469 U	–	0.363 U	0.480 U	–
PCB-066	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140**	0.431 U	–	0.334 U	**6.16**	–
PCB-067	NE	NE	ng/kg	**9.97**	**7.14**	**6.44**	**3.85 J**	0.862 U	**1.51 J**	0.548 U	0.397 U	0.358 U	0.464 U	**4.2**	0.453 U	–	0.351 U	0.463 U	–
PCB-068	NE	NE	ng/kg	0.600 U	1.58 U	1.67 U	1.26 U	0.843 U	0.387 U	0.536 U	0.388 U	0.350 U	0.453 U	0.518 U	0.435 U	–	0.337 U	0.445 U	–
PCB-069	NE	NE	ng/kg	**512**	**437**	**266**	**222**	**3.06 J**	**112**	0.652 U	**7.66**	0.426 U	0.552 U	**213**	**1.20 J**	–	0.376 U	**6.17**	–
PCB-070	NE	NE	ng/kg	**469**	**376**	**221**	**177**	**2.62 J**	**94.9**	0.559 U	**7.65**	0.365 U	0.473 U	**222**	0.437 U	–	0.339 U	**7.51**	–
PCB-071	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-072	NE	NE	ng/kg	**234**	**173**	**138**	**93.7**	**2.46 J**	**46.8**	0.586 U	**5.14**	0.383 U	0.496 U	**89.5**	0.469 U	–	0.363 U	**4.05**	–
PCB-073	NE	NE	ng/kg	0.662 U	1.79 U	1.90 U	1.43 U	0.886 U	0.407 U	0.563 U	0.407 U	0.368 U	0.476 U	0.545 U	0.502 U	–	0.389 U	0.650 U	–
PCB-074	NE	NE	ng/kg	**179**	**125**	**89.6**	**64.5**	0.818 U	**32.9**	0.520 U	**3.17 J**	0.340 U	0.440 U	**78.7**	0.436 U	–	0.338 U	**4.41**	–
PCB-075	NE	NE	ng/kg	**47.8**	**29.9**	**28.7**	**13.6**	0.987 U	**9.91**	0.628 U	**1.46 J**	0.410 U	0.531 U	**14.2**	0.488 U	–	0.378 U	**1.57 J**	–
PCB-076	NE	NE	ng/kg	**313**	**225**	**156**	**104**	**2.08 J**	**58.4**	0.534 U	**5.89**	0.349 U	0.452 U	**140**	0.431 U	–	0.334 U	**6.16**	–
PCB-077	NE	NE	ng/kg	**22.9**	**18.2**	**18.4**	**9.78**	1.33 U	**3.66 J**	0.523 U	0.522 U	0.464 U	0.561 U	**9.47**	0.727 U	–	0.662 U	**1.18 J**	–
PCB-078	NE	NE	ng/kg	1.28 U	2.35 U	1.91 U	1.97 U	1.31 U	0.651 U	0.514 U	0.521 U	0.458 U	0.550 U	0.926 U	0.688 U	–	0.607 U	0.632 U	–
PCB-079	NE	NE	ng/kg	**7.14**	**8.56**	**7.22**	**4.95**	1.26 U	**1.62 J**	0.494 U	0.501 U	0.439 U	0.529 U	**4.16**	0.652 U	–	0.575 U	0.599 U	–
PCB-080	NE	NE	ng/kg	0.535 U	1.44 U	1.52 U	1.15 U	0.767 U	0.353 U	0.488 U	0.353 U	0.319 U	0.413 U	0.472 U	0.384 U	–	0.298 U	0.393 U	–
PCB-081	NE	NE	ng/kg	**10.8**	**13.8**	**11.4**	**8.83**	1.21 U	**3.62 J**	0.469 U	0.483 U	0.418 U	0.500 U	**8.53**	0.604 U	–	0.515 U	0.580 U	–
PCB-082	NE	NE	ng/kg	**100**	**100**	**47.4**	**57.9**	1.29 U	**24.1**	1.02 U	1.05 U	0.779 U	1.14 U	**51.1**	0.555 U	–	0.996 U	**1.43 J**	–
PCB-083	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-084	NE	NE	ng/kg	**328**	**290**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-085	NE	NE	ng/kg	**129**	**134**	**59**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-086	NE	NE	ng/kg	0.667 U	1.55 U	1.66 U	1.50 U	1.02 U	0.432 U	0.805 U	0.829 U	0.616 U	0.905 U	1.81 U	0.395 U	–	0.711 U	0.523 U	–
PCB-087	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-088	NE	NE	ng/kg	**120**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-089	NE	NE	ng/kg	**9.27**	**9.67**	**6.42**	**5.15**	1.20 U	**2.14 J**	0.953 U	0.982 U	0.730 U	1.07 U	**3.87 J**	0.475 U	–	0.854 U	0.628 U	–
PCB-090	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-091	NE	NE	ng/kg	**120**	**94.5**	**55.3**	**55.2**	0.534 U	**29.4**	0.545 U	**1.52 J**	0.516 U	0.801 U	**71**	0.372 U	–	0.578 U	**2.01 J**	–
PCB-092	NE	NE	ng/kg	**328**	**290**	**159**	**171**	1.13 U	**80.3**	0.894 U	**3.54 J**	0.685 U	1.01 U	**147**	0.453 U	–	0.815 U	**2.84 J**	–
PCB-093	NE	NE	ng/kg	0.607 U	**99.2**	**136**	**23.6**	0.605 U	1.75 U	0.618 U	0.387 U	0.584 U	0.907 U	1.03 U	0.386 U	–	0.601 U	0.879 U	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	D-1	D-2	D-3A	D-3B	D-4A	D-4B	D-5A	D-5B	D-6A	D-6B	D-7	PT-10-36.0-37.0	PT-108-25.0-26.0	PT-11-36.0-37.0	PT-12-30.0-31.0	PT-13-27.0-28.0
			Sample Date	01/13/2015	01/12/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/12/2015	01/13/2015	01/13/2015	01/14/2015	01/16/2015	01/15/2015	01/15/2015	01/15/2015
			Sample Depth	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	Various	-36 to -37 ft MLLW	-25 to -26 ft MLLW	-36 to -37 ft MLLW	-30 to -31 ft MLLW	-27 to -28 ft MLLW
PCB-094	NE	NE	ng/kg	**4.63**	2.71 U	1.75 U	1.64 U	0.613 U	1.77 U	0.625 U	0.392 U	0.591 U	0.918 U	1.05 U	0.429 U	–	0.667 U	0.977 U	–
PCB-095	NE	NE	ng/kg	**718**	**473**	**232**	**76.8**	**2.52 J**	**183**	0.521 U	**6.65**	0.493 U	0.765 U	**114**	**1.08 J**	–	0.560 U	**7.06**	–
PCB-096	NE	NE	ng/kg	**5.17**	**4.58**	**4.25**	**3.29 J**	0.419 U	1.21 U	0.427 U	0.268 U	0.404 U	0.628 U	**2.25 J**	0.286 U	–	0.445 U	0.651 U	–
PCB-097	NE	NE	ng/kg	**221**	**222**	**104**	**123**	1.03 U	**58.9**	0.817 U	**2.95 J**	0.626 U	0.918 U	**121**	0.412 U	–	0.740 U	**2.48 J**	–
PCB-098	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-099	NE	NE	ng/kg	**319**	**327**	**156**	**173**	0.991 U	**84.4**	0.786 U	**4.25**	0.602 U	0.884 U	**167**	0.406 U	–	0.730 U	**4.16**	–
PCB-100	NE	NE	ng/kg	**2.55 J**	2.21 U	1.43 U	1.34 U	0.519 U	1.50 U	0.530 U	0.332 U	0.501 U	0.778 U	0.887 U	0.359 U	–	0.558 U	0.817 U	–
PCB-101	NE	NE	ng/kg	**925**	**851**	**523**	**476**	**3.13 J**	**221**	0.814 U	**9.63**	0.623 U	0.915 U	**557**	**1.64 J**	–	0.767 U	**8.01**	–
PCB-102	NE	NE	ng/kg	0.532 U	2.29 U	1.48 U	**197**	0.510 U	1.47 U	0.520 U	0.326 U	0.492 U	0.764 U	**338**	0.373 U	–	0.580 U	0.848 U	–
PCB-103	NE	NE	ng/kg	**5.4**	2.12 U	**4.27**	1.28 U	0.496 U	1.43 U	0.506 U	0.317 U	0.478 U	0.743 U	**2.71 J**	0.341 U	–	0.531 U	0.777 U	–
PCB-104	NE	NE	ng/kg	0.410 U	1.72 U	1.11 U	1.04 U	0.394 U	1.14 U	0.402 U	0.252 U	0.381 U	0.591 U	0.673 U	0.273 U	–	0.424 U	0.621 U	–
PCB-105	NE	NE	ng/kg	**301**	**285**	**125**	**146**	1.40 U	**72.2**	0.795 U	**3.45 J**	0.516 U	0.648 U	**161**	0.772 U	–	0.672 U	**3.45 J**	–
PCB-106	NE	NE	ng/kg	**765**	**676**	**310**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.6**	–
PCB-107	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-108	NE	NE	ng/kg	**50.9**	**48.6**	**26.6**	**24.7**	1.45 U	**12.2**	0.894 U	0.626 U	0.568 U	0.745 U	**26.2**	0.798 U	–	0.662 U	0.681 U	–
PCB-109	NE	NE	ng/kg	0.522 U	1.27 U	1.37 U	1.24 U	0.867 U	0.369 U	0.688 U	0.708 U	0.527 U	0.773 U	1.54 U	0.354 U	–	0.635 U	0.468 U	–
PCB-110	NE	NE	ng/kg	**754**	**759**	**381**	**426**	**3.07 J**	**187**	0.586 U	**8.21**	0.449 U	0.659 U	**430**	**1.41 J**	–	0.572 U	**7.6**	–
PCB-111	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10**	0.305 U	–	0.549 U	0.404 U	–
PCB-112	NE	NE	ng/kg	**33.5**	**32.6**	**18.7**	**18.4**	0.999 U	**8.43**	0.792 U	0.816 U	0.607 U	0.891 U	**17.2**	0.418 U	–	0.751 U	0.553 U	–
PCB-113	NE	NE	ng/kg	0.527 U	**18.3**	1.41 U	**4.04**	0.837 U	0.356 U	0.663 U	0.683 U	0.508 U	0.746 U	1.49 U	0.346 U	–	0.622 U	0.458 U	–
PCB-114	NE	NE	ng/kg	**20.2**	**18.2**	**12**	**10.7**	1.34 U	**5.49**	0.831 U	0.568 U	0.585 U	0.708 U	**11.6**	0.838 U	–	0.644 U	0.647 U	–
PCB-115	NE	NE	ng/kg	**16.3**	**17.3**	**8.88**	**9.35**	0.744 U	**3.83 J**	0.590 U	0.607 U	0.451 U	0.663 U	**10**	0.305 U	–	0.549 U	0.404 U	–
PCB-116	NE	NE	ng/kg	**129**	**134**	**59**	**69.2**	0.915 U	**30.6**	0.726 U	**1.68 J**	0.556 U	0.816 U	**60.7**	0.398 U	–	0.714 U	**1.94 J**	–
PCB-117	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-118	NE	NE	ng/kg	**765**	**676**	**310**	**339**	1.61 U	**176**	0.986 U	**7.97**	0.520 U	0.759 U	**423**	0.781 U	–	0.719 U	**7.6**	–
PCB-119	NE	NE	ng/kg	**11**	**11.7**	**8.31**	**5.39**	0.767 U	**2.66 J**	0.608 U	0.627 U	0.466 U	0.684 U	**5.52**	0.313 U	–	0.563 U	0.415 U	–
PCB-120	NE	NE	ng/kg	0.462 U	**2.29 J**	1.20 U	**2.27 J**	0.719 U	0.306 U	0.570 U	0.587 U	0.437 U	0.641 U	1.28 U	0.300 U	–	0.540 U	0.397 U	–
PCB-121	NE	NE	ng/kg	0.455 U	1.97 U	1.27 U	1.20 U	0.434 U	1.25 U	0.443 U	0.278 U	0.419 U	0.651 U	0.741 U	0.306 U	–	0.475 U	0.696 U	–
PCB-122	NE	NE	ng/kg	**9.52**	**10.8**	**6.81**	**5.6**	1.31 U	**2.32 J**	0.803 U	0.563 U	0.511 U	0.669 U	**5.13**	0.774 U	–	0.643 U	0.661 U	–
PCB-123	NE	NE	ng/kg	**12**	**13.1**	**4.87**	**7.36**	1.15 U	**3.21 J**	0.769 U	0.605 U	0.522 U	0.700 U	**6.26**	0.710 U	–	0.544 U	0.604 U	–
PCB-124	NE	NE	ng/kg	**29.5**	**25.6**	**14.1**	**13.4**	1.50 U	**8.69**	0.923 U	0.647 U	0.587 U	0.769 U	**20.3**	0.806 U	–	0.669 U	0.688 U	–
PCB-125	NE	NE	ng/kg	**326**	**334**	**154**	**189**	0.927 U	**84**	0.735 U	**3.96 J**	0.563 U	0.827 U	**185**	0.379 U	–	0.682 U	**3.28 J**	–
PCB-126	NE	NE	ng/kg	**4.61**	**3.78 J**	**8.85**	1.59 U	1.60 U	0.541 U	1.10 U	0.646 U	0.577 U	0.878 U	**2.79 J**	0.987 U	–	1.05 U	0.765 U	–
PCB-127	NE	NE	ng/kg	0.944 U	1.92 U	2.09 U	1.52 U	1.34 U	0.518 U	0.826 U	0.579 U	0.525 U	0.688 U	0.804 U	0.845 U	–	0.702 U	0.722 U	–
PCB-128	NE	NE	ng/kg	**162**	**140**	**85.1**	**84**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-129	NE	NE	ng/kg	**50.2**	**41**	**27.3**	**27**	1.36 U	**14.1**	0.750 U	1.57 U	0.698 U	1.37 U	**35.7**	0.859 U	–	0.811 U	0.872 U	–
PCB-130	NE	NE	ng/kg	**61.8**	**44.6**	**34.3**	**29**	1.18 U	**15.6**	0.651 U	1.36 U	0.606 U	1.19 U	**46.4**	0.812 U	–	0.766 U	0.824 U	–
PCB-131	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-132	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-133	NE	NE	ng/kg	**28.8**	**19.9**	**18.6**	**14.4**	1.20 U	**7.11**	0.659 U	1.38 U	0.613 U	1.20 U	**22.4**	0.726 U	–	0.685 U	0.737 U	–
PCB-134	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-135	NE	NE	ng/kg	**144**	**87.2**	**97.3**	**57.5**	1.35 U	**42.6**	0.743 U	1.56 U	0.691 U	1.36 U	**122**	0.711 U	–	0.670 U	0.721 U	–
PCB-136	NE	NE	ng/kg	**146**	**131**	**138**	**117**	0.405 U	**50.3**	0.398 U	0.971 U	0.363 U	0.479 U	**180**	0.387 U	–	0.334 U	0.669 U	–
PCB-137	NE	NE	ng/kg	**52.9**	**46.5**	**20.9**	**27.4**	1.24 U	**15.9**	0.682 U	1.43 U	0.635 U	1.24 U	**31.4**	0.756 U	–	0.713 U	0.767 U	–
PCB-138	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-139	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-140	NE	NE	ng/kg	**5.03**	**4.71**	**3.28 J**	2.17 U	1.15 U	0.880 U	0.635 U	1.33 U	0.591 U	1.16 U	**3.10 J**	0.677 U	–	0.639 U	0.687 U	–
PCB-141	NE	NE	ng/kg	**225**	**166**	**176**	**120**	1.14 U	**73.7**	0.628 U	**2.11 J**	0.584 U	1.15 U	**204**	0.704 U	–	0.665 U	**1.81 J**	–
PCB-142	NE	NE	ng/kg	0.680 U	2.00 U	1.42 U	2.58 U	1.32 U	1.01 U	0.729 U	1.53 U	0.678 U	1.33 U	0.639 U	0.808 U	–	0.763 U	0.821 U	–
PCB-143	NE	NE	ng/kg	**55.2**	**40.6**	**36.7**	**27.2**	1.29 U	**17.2**	0.712 U	1.49 U	0.662 U	1.30 U	**44.3**	0.748 U	–	0.705 U	0.759 U	–
PCB-144	NE	NE	ng/kg	**57.2**	**37.8**	**43.9**	**29.5**	1.18 U	**19**	0.651 U	1.36 U	0.606 U	1.19 U	**51.5**	0.687 U	–	0.648 U	0.697 U	–
PCB-145	NE	NE	ng/kg	0.859 U	0.930 U	1.62 U	1.95 U	0.414 U	0.356 U	0.407 U	0.994 U	0.372 U	0.491 U	0.751 U	0.397 U	–	0.343 U	0.686 U	–
PCB-146	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-147	NE	NE	ng/kg	**16**	**12.5**	**6.26**	**8.24**	1.15 U	**5.29**	0.632 U	1.32 U	0.588 U	1.15 U	**10.1**	0.663 U	–	0.625 U	0.673 U	–
PCB-148	NE	NE	ng/kg	1.14 U	1.20 U	2.09 U	2.52 U	0.468 U	0.402 U	0.460 U	1.12 U	0.420 U	0.555 U	0.849 U	0.494 U	–	0.426 U	0.853 U	–
PCB-149	NE	NE	ng/kg	**892**	**633**	**691**	**476**	1.15 U	**270**	0.635 U	**7.42**	0.591 U	1.16 U	**709**	**1.36 J**	–	0.635 U	**5.89**	–
PCB-150	NE	NE	ng/kg	0.840 U	0.886 U	1.54 U	1.86 U	0.400 U	0.344 U	0.394 U	0.960 U	0.359 U	0.474 U	0.726 U	0.392 U	–	0.338 U	0.677 U	–
PCB-151	NE	NE	ng/kg	**125**	**85.3**	**162**	**69.2**	1.19 U	**70.4**	0.658 U	**2.32 J**	0.613 U	1.20 U	**156**	0.709 U	–	0.669 U	**1.79 J**	–
PCB-152	NE	NE	ng/kg	0.817 U	0.887 U	1.54 U	1.86 U	0.399 U	0.342 U	0.392 U	0.956 U	0.357 U	0.472 U	0.723 U	0.380 U	–	0.328 U	0.656 U	–
PCB-153	NE	NE	ng/kg	**962**	**707**	**712**	**509**	**1.89 J**	**313**	0.492 U	**8.18**	0.458 U	0.898 U	**770**	**1.32 J**	–	0.564 U	**6.7**	–
PCB-154	NE	NE	ng/kg	**6.71**	**7.47**	**5.92**	2.01 U	0.426 U	**2.06 J**	0.418 U	1.02 U	0.382 U	0.504 U	**5.51**	0.439 U	–	0.379 U	0.758 U	–
PCB-155	NE	NE	ng/kg	0.759 U	0.792 U	1.38 U	1.66 U	0.364 U	0.313 U	0.358 U	0.873 U	0.326 U	0.431 U	0.660 U	0.349 U	–	0.302 U	0.604 U	–

Analyte	Sediment Screening Level for Protection of Benthic Organisms	Sediment Screening Level for Protection of Human Health and Higher Trophic Level Ecological Receptors	Sample Location	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	Composite	PT-10-Z	PT-8	PT-11-Z	PT-12-A	PT-13
			Sample ID	**D-1**	**D-2**	**D-3A**	**D-3B**	**D-4A**	**D-4B**	**D-5A**	**D-5B**	**D-6A**	**D-6B**	**D-7**	**PT-10-36.0-37.0**	**PT-108-25.0-26.0**	**PT-11-36.0-37.0**	**PT-12-30.0-31.0**	**PT-13-27.0-28.0**
			Sample Date	**01/13/2015**	**01/12/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/12/2015**	**01/13/2015**	**01/13/2015**	**01/14/2015**	**01/16/2015**	**01/15/2015**	**01/15/2015**	**01/15/2015**
			Sample Depth	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**Various**	**-36 to -37 ft MLLW**	**-25 to -26 ft MLLW**	**-36 to -37 ft MLLW**	**-30 to -31 ft MLLW**	**-27 to -28 ft MLLW**
PCB-156	NE	NE	ng/kg	**99.3**	**84.8**	**57.3**	**49.9**	0.837 U	**30.5**	0.447 U	0.972 U	0.415 U	0.833 U	**79.7**	0.524 U	–	0.488 U	0.554 U	–
PCB-157	NE	NE	ng/kg	**20.8**	**19.5**	**11.9**	**10.6**	0.819 U	**5.54**	0.462 U	0.983 U	0.474 U	0.850 U	**13.5**	0.638 U	–	0.571 U	0.594 U	–
PCB-158	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-159	NE	NE	ng/kg	**11.1**	**7.81**	**11.9**	**7.33**	0.800 U	**4.51**	0.441 U	0.924 U	0.410 U	0.805 U	**8.98**	0.507 U	–	0.478 U	0.514 U	–
PCB-160	NE	NE	ng/kg	**128**	**103**	**83.6**	**70.8**	0.844 U	**39.2**	0.465 U	0.974 U	0.433 U	0.849 U	**105**	0.530 U	–	0.500 U	**1.15 J**	–
PCB-161	NE	NE	ng/kg	**298**	**242**	**195**	**169**	1.02 U	**85.4**	0.563 U	**2.57 J**	0.524 U	1.03 U	**234**	0.643 U	–	0.607 U	**2.82 J**	–
PCB-162	NE	NE	ng/kg	**162**	**140**	**85.1**	**84**	0.989 U	**47.5**	0.545 U	1.14 U	0.507 U	0.995 U	**112**	0.647 U	–	0.611 U	**1.52 J**	–
PCB-163	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-164	NE	NE	ng/kg	**1,010**	**786**	**663**	**517**	**2.61 J**	**312**	0.474 U	**8.69**	0.441 U	0.865 U	**834**	**1.63 J**	–	0.509 U	**6.81**	–
PCB-165	NE	NE	ng/kg	**126**	**93.9**	**91.1**	**64.4**	0.984 U	**40.7**	0.542 U	1.14 U	0.505 U	0.990 U	**112**	0.617 U	–	0.582 U	0.627 U	–
PCB-166	NE	NE	ng/kg	**3.70 J**	1.33 U	**2.86 J**	1.72 U	0.893 U	0.682 U	0.492 U	1.03 U	0.458 U	0.898 U	**2.30 J**	0.569 U	–	0.537 U	0.578 U	–
PCB-167	NE	NE	ng/kg	**38.1**	**30.3**	**22**	**18.1**	0.826 U	**12**	0.453 U	0.915 U	0.426 U	0.825 U	**32.3**	0.584 U	–	0.503 U	0.547 U	–
PCB-168	NE	NE	ng/kg	0.464 U	1.38 U	**3.38 J**	1.78 U	0.884 U	0.675 U	0.487 U	1.02 U	0.453 U	0.889 U	0.427 U	0.568 U	–	0.535 U	0.576 U	–
PCB-169	NE	NE	ng/kg	0.458 U	1.30 U	**10**	1.67 U	0.863 U	0.646 U	0.483 U	0.991 U	0.400 U	0.857 U	0.384 U	0.523 U	–	0.586 U	0.613 U	–
PCB-170	NE	NE	ng/kg	**282**	**186**	**274**	**164**	1.36 U	**142**	0.987 U	**2.42 J**	1.01 U	1.02 U	**337**	0.750 U	–	0.556 U	**2.36 J**	–
PCB-171	NE	NE	ng/kg	**90.9**	**64.3**	**87.2**	**53.4**	1.24 U	**42.7**	0.900 U	0.879 U	0.925 U	0.928 U	**95.6**	0.683 U	–	0.506 U	0.552 U	–
PCB-172	NE	NE	ng/kg	**50.1**	**34.9**	**50.2**	**27.7**	1.30 U	**25.1**	0.943 U	0.921 U	0.969 U	0.973 U	**60**	0.704 U	–	0.522 U	0.569 U	–
PCB-173	NE	NE	ng/kg	**7.8**	**6.25**	**8.9**	**5.35**	1.44 U	**3.92 J**	1.05 U	1.02 U	1.08 U	1.08 U	**8.24**	0.770 U	–	0.571 U	0.622 U	–
PCB-174	NE	NE	ng/kg	**305**	**214**	**290**	**181**	1.22 U	**137**	0.888 U	**2.66 J**	0.913 U	0.916 U	**297**	0.622 U	–	0.461 U	**2.32 J**	–
PCB-175	NE	NE	ng/kg	**13.8**	**9.95**	**15.1**	**9.06**	1.24 U	**5.95**	0.901 U	0.880 U	0.926 U	0.930 U	**16.3**	0.652 U	–	0.483 U	0.526 U	–
PCB-176	NE	NE	ng/kg	**45.3**	**34**	**47.9**	**27**	0.934 U	**21.1**	0.679 U	0.663 U	0.697 U	0.700 U	**45.9**	0.480 U	–	0.356 U	0.388 U	–
PCB-177	NE	NE	ng/kg	**182**	**128**	**180**	**106**	1.34 U	**84.8**	0.972 U	0.949 U	0.999 U	1.00 U	**177**	0.708 U	–	0.525 U	0.572 U	–
PCB-178	NE	NE	ng/kg	**60**	**41.7**	**60.6**	**36.4**	1.28 U	**27.5**	0.928 U	0.907 U	0.954 U	0.958 U	**60.8**	0.699 U	–	0.518 U	0.565 U	–
PCB-179	NE	NE	ng/kg	**126**	**97.9**	**128**	**80.8**	0.892 U	**55.4**	0.648 U	0.633 U	0.666 U	0.669 U	**115**	0.474 U	–	0.352 U	**1.32 J**	–
PCB-180	NE	NE	ng/kg	**630**	**416**	**566**	**352**	1.05 U	**315**	0.765 U	**5.1**	0.787 U	0.790 U	**694**	0.589 U	–	0.437 U	**4.59**	–
PCB-181	NE	NE	ng/kg	0.793 U	1.41 U	1.61 U	1.73 U	1.27 U	0.543 U	0.920 U	0.898 U	0.945 U	0.949 U	0.656 U	0.734 U	–	0.544 U	0.593 U	–
PCB-182	NE	NE	ng/kg	**361**	**275**	**350**	**220**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-183	NE	NE	ng/kg	**192**	**142**	**192**	**122**	1.11 U	**95**	0.807 U	**2.61 J**	0.830 U	0.833 U	**204**	**1.46 J**	–	**1.20 J**	**3.21 J**	–
PCB-184	NE	NE	ng/kg	0.545 U	0.990 U	1.13 U	1.21 U	0.889 U	0.381 U	0.646 U	0.631 U	0.664 U	0.666 U	0.461 U	0.466 U	–	0.346 U	0.377 U	–
PCB-185	NE	NE	ng/kg	**38.3**	**30.8**	**41.7**	**24.5**	1.27 U	**18.8**	0.926 U	0.904 U	0.952 U	0.955 U	**39.8**	0.691 U	–	0.512 U	0.558 U	–
PCB-186	NE	NE	ng/kg	0.600 U	1.06 U	1.20 U	1.30 U	0.960 U	0.412 U	0.698 U	0.681 U	0.717 U	0.720 U	0.498 U	0.494 U	–	0.366 U	0.399 U	–
PCB-187	NE	NE	ng/kg	**361**	**275**	**350**	**220**	1.14 U	**172**	0.831 U	**3.10 J**	0.854 U	0.858 U	**354**	0.607 U	–	0.450 U	**3.55 J**	–
PCB-188	NE	NE	ng/kg	0.611 U	1.16 U	1.24 U	1.36 U	0.963 U	0.384 U	0.652 U	0.667 U	0.774 U	0.690 U	0.476 U	0.506 U	–	0.371 U	0.439 U	–
PCB-189	NE	NE	ng/kg	**10.8**	**9.23**	**14**	**6.49**	0.879 U	**5.72**	0.688 U	0.639 U	0.595 U	0.689 U	**17.5**	0.506 U	–	0.379 U	0.374 U	–
PCB-190	NE	NE	ng/kg	**56.1**	**41.1**	**61.6**	**35.7**	1.01 U	**32.4**	0.732 U	0.715 U	0.752 U	0.755 U	**74.4**	0.536 U	–	0.398 U	0.433 U	–
PCB-191	NE	NE	ng/kg	**13.9**	**9.72**	**14.1**	**7.74**	0.921 U	**6.19**	0.669 U	0.654 U	0.688 U	0.691 U	**16.3**	0.508 U	–	0.377 U	0.411 U	–
PCB-192	NE	NE	ng/kg	0.644 U	1.10 U	1.26 U	1.35 U	1.05 U	0.452 U	0.765 U	0.747 U	0.787 U	0.790 U	0.546 U	0.566 U	–	0.420 U	0.458 U	–
PCB-193	NE	NE	ng/kg	**34.8**	**24.1**	**34.8**	**19.5**	0.944 U	**17.7**	0.686 U	0.670 U	0.705 U	0.708 U	**39.7**	0.510 U	–	0.378 U	0.412 U	–
PCB-194	NE	NE	ng/kg	**157**	**101**	**158**	**96.8**	0.501 U	**79.8**	0.430 U	1.27 U	0.347 U	0.477 U	**291**	0.420 U	–	0.502 U	**2.15 J**	–
PCB-195	NE	NE	ng/kg	**62.9**	**39.3**	**69.5**	**38.3**	0.566 U	**36.4**	0.486 U	1.43 U	0.392 U	0.540 U	**121**	0.465 U	–	0.555 U	0.548 U	–
PCB-196	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-197	NE	NE	ng/kg	**7.94**	**5.52**	**10.9**	**6.3**	0.627 U	**4.7**	0.461 U	1.15 U	0.328 U	0.537 U	**13.7**	0.446 U	–	0.445 U	0.518 U	–
PCB-198	NE	NE	ng/kg	**9.16**	**7.36**	**12.5**	**6.34**	0.866 U	**5.52**	0.636 U	1.58 U	0.452 U	0.741 U	**16.7**	0.677 U	–	0.674 U	0.785 U	–
PCB-199	NE	NE	ng/kg	**165**	**115**	**159**	**110**	0.912 U	**92.7**	0.670 U	1.67 U	0.476 U	0.781 U	**250**	0.645 U	–	0.643 U	**4.79**	–
PCB-200	NE	NE	ng/kg	**19.4**	**13.7**	**20.7**	**13.9**	0.607 U	**11.4**	0.446 U	1.11 U	0.317 U	0.520 U	**30.3**	0.452 U	–	0.450 U	0.524 U	–
PCB-201	NE	NE	ng/kg	**24.2**	**20.2**	**27.4**	**17.5**	0.623 U	**13.7**	0.458 U	1.14 U	0.325 U	0.533 U	**35.1**	0.451 U	–	0.449 U	0.523 U	–
PCB-202	NE	NE	ng/kg	**32.8**	**28.2**	**31.1**	**24.6**	0.613 U	**17.2**	0.451 U	1.12 U	0.320 U	0.525 U	**41.7**	0.463 U	–	0.461 U	**1.57 J**	–
PCB-203	NE	NE	ng/kg	**187**	**121**	**186**	**129**	0.783 U	**107**	0.576 U	1.43 U	0.409 U	0.671 U	**317**	0.599 U	–	0.597 U	**4.26**	–
PCB-204	NE	NE	ng/kg	0.335 U	1.70 U	0.803 U	1.41 U	0.619 U	0.416 U	0.455 U	1.13 U	0.323 U	0.530 U	0.399 U	0.449 U	–	0.447 U	0.521 U	–
PCB-205	NE	NE	ng/kg	**7.98**	**5.3**	**13.4**	**4.71**	0.402 U	**4.36**	0.345 U	1.02 U	0.278 U	0.383 U	**16.6**	0.326 U	–	0.389 U	0.384 U	–
PCB-206	NE	NE	ng/kg	**68.5**	**68**	**81**	**61.1**	0.974 U	**38.7**	0.351 U	0.632 U	0.318 U	0.336 U	**106**	0.412 U	–	0.506 U	**12.4**	–
PCB-207	NE	NE	ng/kg	**9.69**	**10.5**	**14.1**	**7.46**	0.754 U	**5.69**	0.259 U	0.478 U	0.239 U	0.251 U	**16.2**	0.296 U	–	0.376 U	**1.25 J**	–
PCB-208	NE	NE	ng/kg	**18.7**	**21.6**	**25.3**	**16.4**	0.725 U	**10.8**	0.238 U	0.450 U	0.224 U	0.233 U	**21.8**	0.278 U	–	0.364 U	**4.57**	–
PCB-209	NE	NE	ng/kg	**42.4**	**164**	**121**	**120**	1.04 U	**27.3**	0.213 U	0.546 U	0.271 U	0.247 U	**30.3**	0.308 U	–	0.272 U	**14.9**	–
Total PCBs (OC Normalized)	12	NA	mg/kg OC	**0.2**	**0.2**	**0.3**	**0.1**	**0.02**	**0.1**	0.001 U	**0.2**	0.001 U	0.001 U	**0.7**	**0.002**	–	**0.002**	**0.005**	–
Total PCBs	130,000	3,500	ng/kg	**27,102 T**	**22,080 T**	**17,935 T**	**13,887 T**	**65.1 T**	**7,913 T**	1.7 UT	**270 T**	1.4 UT	1.5 UT	**19,387 T**	**50.2 T**	–	**4.1 T**	**355 T**	–
Total Dioxin-Like PCBs TEQ (ND=0.5DL)	NE	2	ng/kg	**0.5 T**	**0.4 T**	**1.2 T**	**0.1 T**	0.1 UT	**0.05 T**	0.06 UT	**0.05 T**	0.03 UT	0.06 UT	**0.3 T**	0.06 UT	–	0.06 UT	**0.05 T**	–
Organometallic Compounds																			
Tributyltin Ion	NE	NE	μg/kg	**3.7**	**1.8 J**	3.6 U	3.6 U	3.5 U	**2.2 J**	3.5 U	3.5 U	3.4 U	3.4 U	3.7 U	3.6 U	–	3.4 U	3.7 U	–
Dioxins/Furans																			
Total Dioxin/Furan TEQ (ND=0.5DL)	5	5	ng/kg	**32.3 JT**	**25.1 JT**	**7.6 JT**	**26.1 JT**	**0.5 T**	**9.8 JT**	**0.3 T**	**0.7 JT**	**0.15 JT**	**0.5 JT**	**14.7 JT**	**0.7 JT**		**0.4 T**	**6.9 T**	

Notes:

-- = not tested
BT = bioaccumulation trigger
cPAH = carcinogenic polycyclic aromatic hydrocarbon
DL = detection limit
HPAH = high molecular weight polycyclic aromatic hydrocarbon
J = Estimated concentration
JT = Estimated concentration total
LPAH = low molecular weight polycyclic aromatic hydrocarbon
mg/kg = milligram per kilogram
mg/kg OC = milligram per kilogram organic carbon normalized
ML = maximum level
NA = not applicable because TOC outside of range for comparison to TOC-normalized screening levels
NE = not established
ng/kg = nanogram per kilogram
PCB = polychlorinated biphenyl
SL = screening level
TEQ = toxicity equivalent
U = The analyte is not detected at or above the reported concentration.
µg/kg = microgram per kilogram

Bold indicates the analyte was detected.

Blue border indicates total organic carbon is outside the range of 0.5% to 3.5% and will be compared to dry weight screening levels for protection of benthic organisms.

Orange shading indicates exceedance of screening level protective of benthic organisms

Yellow shading indicates exceedance of screening level protective of human health and higher trophic level ecological receptors

Red shading indicates exceedance of screening levels protective of benthic organisms and protective of human health and higher trophic level ecological receptors.

Light blue shading indicates a non-detect that exceeds any screening level

Table 7

Dioxin/Furan Constituents and Toxic Equivalent Calculations

Mill A Former Site Interim Action Dredging Project
Everett, Washington

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
D-1	1,2,3,4,6,7,8-HpCDD	0.747	190		0.01	1.9	ng/kg	Y
D-1	1,2,3,4,6,7,8-HpCDF	1.1	35.9		0.01	0.359	ng/kg	Y
D-1	1,2,3,4,7,8,9-HpCDF	0.872	2.14		0.01	0.0214	ng/kg	Y
D-1	1,2,3,4,7,8-HxCDD	0.765	4.28		0.1	0.428	ng/kg	Y
D-1	1,2,3,4,7,8-HxCDF	0.711	4.06	J	0.1	0.406	ng/kg	Y
D-1	1,2,3,6,7,8-HxCDD	0.652	11.7		0.1	1.17	ng/kg	Y
D-1	1,2,3,6,7,8-HxCDF	0.273	3.08		0.1	0.308	ng/kg	Y
D-1	1,2,3,7,8,9-HxCDD	0.473	6.57		0.1	0.657	ng/kg	Y
D-1	1,2,3,7,8,9-HxCDF	0.888	1.42		0.1	0.142	ng/kg	Y
D-1	1,2,3,7,8-PeCDD	0.374	4.51		1	4.51	ng/kg	Y
D-1	1,2,3,7,8-PeCDF	0.514	4.31	J	0.03	0.1293	ng/kg	Y
D-1	2,3,4,6,7,8-HxCDF	0.692	3.61	J	0.1	0.361	ng/kg	Y
D-1	2,3,4,7,8-PeCDF	0.667	5.72		0.3	1.716	ng/kg	Y
D-1	2,3,7,8-TCDD	0.173	1.48		1	1.48	ng/kg	Y
D-1	2,3,7,8-TCDF	0.234	183		0.1	18.3	ng/kg	Y
D-1	OCDD	1.73	1390		0.0003	0.417	ng/kg	Y
D-1	OCDF	1.51	53.5		0.0003	0.01605	ng/kg	Y
D-1	**Dioxin/Furan TEQ**		**32.3**	**JT**	**--**	**–**	**ng/kg**	**Y**
D-2	1,2,3,4,6,7,8-HpCDD	0.746	178		0.01	1.78	ng/kg	Y
D-2	1,2,3,4,6,7,8-HpCDF	1.1	29.7		0.01	0.297	ng/kg	Y
D-2	1,2,3,4,7,8,9-HpCDF	0.87	1.77	U	0.01	0.00885	ng/kg	N
D-2	1,2,3,4,7,8-HxCDD	0.763	7.87		0.1	0.787	ng/kg	Y
D-2	1,2,3,4,7,8-HxCDF	0.71	3.08	J	0.1	0.308	ng/kg	Y
D-2	1,2,3,6,7,8-HxCDD	0.651	13.7		0.1	1.37	ng/kg	Y
D-2	1,2,3,6,7,8-HxCDF	0.272	2.56		0.1	0.256	ng/kg	Y
D-2	1,2,3,7,8,9-HxCDD	0.472	9.75		0.1	0.975	ng/kg	Y
D-2	1,2,3,7,8,9-HxCDF	0.887	0.954	J	0.1	0.0954	ng/kg	Y
D-2	1,2,3,7,8-PeCDD	0.373	5.37		1	5.37	ng/kg	Y
D-2	1,2,3,7,8-PeCDF	0.513	3.76	J	0.03	0.1128	ng/kg	Y
D-2	2,3,4,6,7,8-HxCDF	0.691	3.07	J	0.1	0.307	ng/kg	Y
D-2	2,3,4,7,8-PeCDF	0.666	4.11		0.3	1.233	ng/kg	Y
D-2	2,3,7,8-TCDD	0.173	1.6		1	1.6	ng/kg	Y
D-2	2,3,7,8-TCDF	0.234	104		0.1	10.4	ng/kg	Y
D-2	OCDD	1.72	627		0.0003	0.1881	ng/kg	Y
D-2	OCDF	1.51	41.9		0.0003	0.01257	ng/kg	Y
D-2	**Dioxin/Furan TEQ**		**25.1**	**JT**	**--**	**–**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
D-3A	1,2,3,4,6,7,8-HpCDD	0.737	43.3		0.01	0.433	ng/kg	Y
D-3A	1,2,3,4,6,7,8-HpCDF	1.09	9.97		0.01	0.0997	ng/kg	Y
D-3A	1,2,3,4,7,8,9-HpCDF	0.86	0.669	J	0.01	0.00669	ng/kg	Y
D-3A	1,2,3,4,7,8-HxCDD	0.755	2.8		0.1	0.28	ng/kg	Y
D-3A	1,2,3,4,7,8-HxCDF	0.702	1.41	J	0.1	0.141	ng/kg	Y
D-3A	1,2,3,6,7,8-HxCDD	0.644	4.5		0.1	0.45	ng/kg	Y
D-3A	1,2,3,6,7,8-HxCDF	0.269	1.43		0.1	0.143	ng/kg	Y
D-3A	1,2,3,7,8,9-HxCDD	0.467	3.21		0.1	0.321	ng/kg	Y
D-3A	1,2,3,7,8,9-HxCDF	0.877	0.541		0.1	0.0541	ng/kg	Y
D-3A	1,2,3,7,8-PeCDD	0.369	3.15		1	3.15	ng/kg	Y
D-3A	1,2,3,7,8-PeCDF	0.507	2.28	J	0.03	0.0684	ng/kg	Y
D-3A	2,3,4,6,7,8-HxCDF	0.683	1.6	J	0.1	0.16	ng/kg	Y
D-3A	2,3,4,7,8-PeCDF	0.659	2.39		0.3	0.717	ng/kg	Y
D-3A	2,3,7,8-TCDD	0.171	1.08	U	1	0.54	ng/kg	N
D-3A	2,3,7,8-TCDF	0.231	14.1		0.1	1.41	ng/kg	Y
D-3A	OCDD	1.7	241		0.0003	0.0723	ng/kg	Y
D-3A	OCDF	1.49	15.9		0.0003	0.00477	ng/kg	Y
D-3A	**Dioxin/Furan TEQ**		**8.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-3B	1,2,3,4,6,7,8-HpCDD	0.738	141		0.01	1.41	ng/kg	Y
D-3B	1,2,3,4,6,7,8-HpCDF	1.09	34.2		0.01	0.342	ng/kg	Y
D-3B	1,2,3,4,7,8,9-HpCDF	0.861	1.87		0.01	0.0187	ng/kg	Y
D-3B	1,2,3,4,7,8-HxCDD	0.756	6.65		0.1	0.665	ng/kg	Y
D-3B	1,2,3,4,7,8-HxCDF	0.703	3.77	J	0.1	0.377	ng/kg	Y
D-3B	1,2,3,6,7,8-HxCDD	0.645	11.8		0.1	1.18	ng/kg	Y
D-3B	1,2,3,6,7,8-HxCDF	0.27	3.42		0.1	0.342	ng/kg	Y
D-3B	1,2,3,7,8,9-HxCDD	0.468	7.83		0.1	0.783	ng/kg	Y
D-3B	1,2,3,7,8,9-HxCDF	0.878	1.14		0.1	0.114	ng/kg	Y
D-3B	1,2,3,7,8-PeCDD	0.369	7.12		1	7.12	ng/kg	Y
D-3B	1,2,3,7,8-PeCDF	0.508	5.73	J	0.03	0.1719	ng/kg	Y
D-3B	2,3,4,6,7,8-HxCDF	0.684	4.16	J	0.1	0.416	ng/kg	Y
D-3B	2,3,4,7,8-PeCDF	0.659	6.29		0.3	1.887	ng/kg	Y
D-3B	2,3,7,8-TCDD	0.171	2.39		1	2.39	ng/kg	Y
D-3B	2,3,7,8-TCDF	0.231	86		0.1	8.6	ng/kg	Y
D-3B	OCDD	1.7	740		0.0003	0.222	ng/kg	Y
D-3B	OCDF	1.49	57.1		0.0003	0.01713	ng/kg	Y
D-3B	**Dioxin/Furan TEQ**		**26.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-4A	1,2,3,4,6,7,8-HpCDD	0.745	2.07	U	0.01	0.01035	ng/kg	N
D-4A	1,2,3,4,6,7,8-HpCDF	1.1	0.127	U	0.01	0.000635	ng/kg	N
D-4A	1,2,3,4,7,8,9-HpCDF	0.0596	0.0596	U	0.01	0.000298	ng/kg	N
D-4A	1,2,3,4,7,8-HxCDD	0.763	0.129	U	0.1	0.00645	ng/kg	N
D-4A	1,2,3,4,7,8-HxCDF	0.709	0.0576	U	0.1	0.00288	ng/kg	N
D-4A	1,2,3,6,7,8-HxCDD	0.65	0.153		0.1	0.0153	ng/kg	Y
D-4A	1,2,3,6,7,8-HxCDF	0.0437	0.993	U	0.1	0.002185	ng/kg	N
D-4A	1,2,3,7,8,9-HxCDD	0.472	0.211	U	0.1	0.01055	ng/kg	N
D-4A	1,2,3,7,8,9-HxCDF	0.886	0.0735	U	0.1	0.003675	ng/kg	N
D-4A	1,2,3,7,8-PeCDD	0.372	0.0973	U	1	0.04865	ng/kg	N
D-4A	1,2,3,7,8-PeCDF	0.512	0.123	U	0.03	0.001845	ng/kg	N

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
D-4A	2,3,4,6,7,8-HxCDF	0.0477	0.0477	U	0.1	0.002385	ng/kg	N
D-4A	2,3,4,7,8-PeCDF	0.0636	0.0636	U	0.3	0.00954	ng/kg	N
D-4A	2,3,7,8-TCDD	0.173	0.145	U	1	0.0725	ng/kg	N
D-4A	2,3,7,8-TCDF	0.233	0.109	U	0.1	0.00545	ng/kg	N
D-4A	OCDD	1.72	12.7	U	0.0003	0.001905	ng/kg	N
D-4A	OCDF	1.51	0.222	U	0.0003	0.0000333	ng/kg	N
D-4A	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**
D-4B	1,2,3,4,6,7,8-HpCDD	0.737	57.3		0.01	0.573	ng/kg	Y
D-4B	1,2,3,4,6,7,8-HpCDF	1.09	13.4		0.01	0.134	ng/kg	Y
D-4B	1,2,3,4,7,8,9-HpCDF	0.86	0.946	J	0.01	0.00946	ng/kg	Y
D-4B	1,2,3,4,7,8-HxCDD	0.755	2.91		0.1	0.291	ng/kg	Y
D-4B	1,2,3,4,7,8-HxCDF	0.702	1.8	J	0.1	0.18	ng/kg	Y
D-4B	1,2,3,6,7,8-HxCDD	0.644	4.77		0.1	0.477	ng/kg	Y
D-4B	1,2,3,6,7,8-HxCDF	0.269	1.56		0.1	0.156	ng/kg	Y
D-4B	1,2,3,7,8,9-HxCDD	0.467	3.31		0.1	0.331	ng/kg	Y
D-4B	1,2,3,7,8,9-HxCDF	0.877	0.82		0.1	0.082	ng/kg	Y
D-4B	1,2,3,7,8-PeCDD	0.369	3.14		1	3.14	ng/kg	Y
D-4B	1,2,3,7,8-PeCDF	0.507	2.2	J	0.03	0.066	ng/kg	Y
D-4B	2,3,4,6,7,8-HxCDF	0.683	1.82	J	0.1	0.182	ng/kg	Y
D-4B	2,3,4,7,8-PeCDF	0.659	2.6		0.3	0.78	ng/kg	Y
D-4B	2,3,7,8-TCDD	0.171	0.991	U	1	0.4955	ng/kg	N
D-4B	2,3,7,8-TCDF	0.231	31.5		0.1	3.15	ng/kg	Y
D-4B	OCDD	1.7	388		0.0003	0.1164	ng/kg	Y
D-4B	OCDF	1.49	18.9		0.0003	0.00567	ng/kg	Y
D-4B	**Dioxin/Furan TEQ**		**10.2**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-5A	1,2,3,4,6,7,8-HpCDD	0.742	1	U	0.01	0.005	ng/kg	N
D-5A	1,2,3,4,6,7,8-HpCDF	1.1	0.111	U	0.01	0.000555	ng/kg	N
D-5A	1,2,3,4,7,8,9-HpCDF	0.0534	0.0534	U	0.01	0.000267	ng/kg	N
D-5A	1,2,3,4,7,8-HxCDD	0.0475	0.0475	U	0.1	0.002375	ng/kg	N
D-5A	1,2,3,4,7,8-HxCDF	0.0317	0.0317	U	0.1	0.001585	ng/kg	N
D-5A	1,2,3,6,7,8-HxCDD	0.648	0.095	U	0.1	0.00475	ng/kg	N
D-5A	1,2,3,6,7,8-HxCDF	0.271	0.0593		0.1	0.00593	ng/kg	Y
D-5A	1,2,3,7,8,9-HxCDD	0.47	0.194		0.1	0.0194	ng/kg	Y
D-5A	1,2,3,7,8,9-HxCDF	0.882	0.101	U	0.1	0.00505	ng/kg	N
D-5A	1,2,3,7,8-PeCDD	0.371	0.0851		1	0.0851	ng/kg	Y
D-5A	1,2,3,7,8-PeCDF	0.51	0.0653	U	0.03	0.0009795	ng/kg	N
D-5A	2,3,4,6,7,8-HxCDF	0.687	0.0455		0.1	0.00455	ng/kg	Y
D-5A	2,3,4,7,8-PeCDF	0.0376	0.0376	U	0.3	0.00564	ng/kg	N
D-5A	2,3,7,8-TCDD	0.172	0.125	U	1	0.0625	ng/kg	N
D-5A	2,3,7,8-TCDF	0.0336	0.0336	U	0.1	0.00168	ng/kg	N
D-5A	OCDD	1.71	7.41	U	0.0003	0.0011115	ng/kg	N
D-5A	OCDF	1.5	0.346		0.0003	0.0001038	ng/kg	Y
D-5A	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
D-5B	1,2,3,4,6,7,8-HpCDD	0.743	2.11	U	0.01	0.01055	ng/kg	N
D-5B	1,2,3,4,6,7,8-HpCDF	1.1	0.475	U	0.01	0.002375	ng/kg	N
D-5B	1,2,3,4,7,8,9-HpCDF	0.866	0.149	U	0.01	0.000745	ng/kg	N
D-5B	1,2,3,4,7,8-HxCDD	0.76	0.125	U	0.1	0.00625	ng/kg	N
D-5B	1,2,3,4,7,8-HxCDF	0.707	0.107	J	0.1	0.0107	ng/kg	Y
D-5B	1,2,3,6,7,8-HxCDD	0.649	0.248	U	0.1	0.0124	ng/kg	N
D-5B	1,2,3,6,7,8-HxCDF	0.271	0.097	U	0.1	0.00485	ng/kg	N
D-5B	1,2,3,7,8,9-HxCDD	0.47	0.313		0.1	0.0313	ng/kg	Y
D-5B	1,2,3,7,8,9-HxCDF	0.883	0.18	U	0.1	0.009	ng/kg	N
D-5B	1,2,3,7,8-PeCDD	0.371	0.162	U	1	0.081	ng/kg	N
D-5B	1,2,3,7,8-PeCDF	0.511	0.129	U	0.03	0.001935	ng/kg	N
D-5B	2,3,4,6,7,8-HxCDF	0.688	0.0891	U	0.1	0.004455	ng/kg	N
D-5B	2,3,4,7,8-PeCDF	0.663	0.117	U	0.3	0.01755	ng/kg	N
D-5B	2,3,7,8-TCDD	0.172	0.186	U	1	0.093	ng/kg	N
D-5B	2,3,7,8-TCDF	0.233	1.51		0.1	0.151	ng/kg	Y
D-5B	OCDD	1.71	17.4	U	0.0003	0.00261	ng/kg	N
D-5B	OCDF	1.5	0.952		0.0003	0.0002856	ng/kg	Y
D-5B	**Dioxin/Furan TEQ**		**0.4**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-6A	1,2,3,4,6,7,8-HpCDD	0.744	1.37	U	0.01	0.00685	ng/kg	N
D-6A	1,2,3,4,6,7,8-HpCDF	1.1	0.107	U	0.01	0.000535	ng/kg	N
D-6A	1,2,3,4,7,8,9-HpCDF	0.868	0.0456	J	0.01	0.000456	ng/kg	Y
D-6A	1,2,3,4,7,8-HxCDD	0.0516	0.0516	U	0.1	0.00258	ng/kg	N
D-6A	1,2,3,4,7,8-HxCDF	0.0317	0.0317	U	0.1	0.001585	ng/kg	N
D-6A	1,2,3,6,7,8-HxCDD	0.0536	0.0536	U	0.1	0.00268	ng/kg	N
D-6A	1,2,3,6,7,8-HxCDF	0.272	0.0298	U	0.1	0.00149	ng/kg	N
D-6A	1,2,3,7,8,9-HxCDD	0.471	0.131	U	0.1	0.00655	ng/kg	N
D-6A	1,2,3,7,8,9-HxCDF	0.885	0.0853		0.1	0.00853	ng/kg	Y
D-6A	1,2,3,7,8-PeCDD	0.0516	0.0516	U	1	0.0258	ng/kg	N
D-6A	1,2,3,7,8-PeCDF	0.0337	0.0337	U	0.03	0.0005055	ng/kg	N
D-6A	2,3,4,6,7,8-HxCDF	0.689	0.0456	U	0.1	0.00228	ng/kg	N
D-6A	2,3,4,7,8-PeCDF	0.0357	0.0357	U	0.3	0.005355	ng/kg	N
D-6A	2,3,7,8-TCDD	0.0317	0.0317	U	1	0.01585	ng/kg	N
D-6A	2,3,7,8-TCDF	0.0198	0.0198	U	0.1	0.00099	ng/kg	N
D-6A	OCDD	1.72	13.2	U	0.0003	0.00198	ng/kg	N
D-6A	OCDF	1.5	0.518	J	0.0003	0.0001554	ng/kg	Y
D-6A	**Dioxin/Furan TEQ**		**0.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-6B	1,2,3,4,6,7,8-HpCDD	0.741	1.45	U	0.01	0.00725	ng/kg	N
D-6B	1,2,3,4,6,7,8-HpCDF	1.1	0.292	U	0.01	0.00146	ng/kg	N
D-6B	1,2,3,4,7,8,9-HpCDF	0.865	0.241	J	0.01	0.00241	ng/kg	Y
D-6B	1,2,3,4,7,8-HxCDD	0.759	0.107	U	0.1	0.00535	ng/kg	N
D-6B	1,2,3,4,7,8-HxCDF	0.706	0.0909	J	0.1	0.00909	ng/kg	Y
D-6B	1,2,3,6,7,8-HxCDD	0.647	0.15	U	0.1	0.0075	ng/kg	N
D-6B	1,2,3,6,7,8-HxCDF	0.271	0.115	U	0.1	0.00575	ng/kg	N
D-6B	1,2,3,7,8,9-HxCDD	0.469	0.229	U	0.1	0.01145	ng/kg	N
D-6B	1,2,3,7,8,9-HxCDF	0.881	0.14	U	0.1	0.007	ng/kg	N
D-6B	1,2,3,7,8-PeCDD	0.371	0.0988	U	1	0.0494	ng/kg	N

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
D-6B	1,2,3,7,8-PeCDF	0.51	0.081	U	0.03	0.001215	ng/kg	N
D-6B	2,3,4,6,7,8-HxCDF	0.687	0.136	U	0.1	0.0068	ng/kg	N
D-6B	2,3,4,7,8-PeCDF	0.662	0.0711	U	0.3	0.010665	ng/kg	N
D-6B	2,3,7,8-TCDD	0.0336	0.0336	U	1	0.0168	ng/kg	N
D-6B	2,3,7,8-TCDF	0.232	0.0455	U	0.1	0.002275	ng/kg	N
D-6B	OCDD	1.71	19.6	U	0.0003	0.00294	ng/kg	N
D-6B	OCDF	1.5	1.52		0.0003	0.000228	ng/kg	N
D-6B	**Dioxin/Furan TEQ**		**0.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
D-7	1,2,3,4,6,7,8-HpCDD	0.746	108		0.01	1.08	ng/kg	Y
D-7	1,2,3,4,6,7,8-HpCDF	1.1	30.6		0.01	0.306	ng/kg	Y
D-7	1,2,3,4,7,8,9-HpCDF	0.871	1.48		0.01	0.0148	ng/kg	Y
D-7	1,2,3,4,7,8-HxCDD	0.764	3.25		0.1	0.325	ng/kg	Y
D-7	1,2,3,4,7,8-HxCDF	0.71	2.05	J	0.1	0.205	ng/kg	Y
D-7	1,2,3,6,7,8-HxCDD	0.652	6.35		0.1	0.635	ng/kg	Y
D-7	1,2,3,6,7,8-HxCDF	0.273	1.59		0.1	0.159	ng/kg	Y
D-7	1,2,3,7,8,9-HxCDD	0.473	3.77		0.1	0.377	ng/kg	Y
D-7	1,2,3,7,8,9-HxCDF	0.888	0.647		0.1	0.0647	ng/kg	Y
D-7	1,2,3,7,8-PeCDD	0.373	3.09		1	3.09	ng/kg	Y
D-7	1,2,3,7,8-PeCDF	0.513	2.63	J	0.03	0.0789	ng/kg	Y
D-7	2,3,4,6,7,8-HxCDF	0.692	1.98	J	0.1	0.198	ng/kg	Y
D-7	2,3,4,7,8-PeCDF	0.667	3.15		0.3	0.945	ng/kg	Y
D-7	2,3,7,8-TCDD	0.173	1.13		1	1.13	ng/kg	Y
D-7	2,3,7,8-TCDF	0.234	60.3		0.1	6.03	ng/kg	Y
D-7	OCDD	1.72	749	U	0.0003	0.11235	ng/kg	N
D-7	OCDF	1.51	94.3		0.0003	0.02829	ng/kg	Y
D-7	**Dioxin/Furan TEQ**		**14.8**	**JT**	**--**	**--**	**ng/kg**	**Y**
PT-10-36.0-37.0	1,2,3,4,6,7,8-HpCDD	0.743	2.1	U	0.01	0.0105	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,6,7,8-HpCDF	1.1	0.427	U	0.01	0.002135	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,7,8,9-HpCDF	0.866	0.246	U	0.01	0.00123	ng/kg	N
PT-10-36.0-37.0	1,2,3,4,7,8-HxCDD	0.76	0.248		0.1	0.0248	ng/kg	Y
PT-10-36.0-37.0	1,2,3,4,7,8-HxCDF	0.707	0.323	J	0.1	0.0323	ng/kg	Y
PT-10-36.0-37.0	1,2,3,6,7,8-HxCDD	0.649	0.281	U	0.1	0.01405	ng/kg	N
PT-10-36.0-37.0	1,2,3,6,7,8-HxCDF	0.271	0.271	U	0.1	0.01355	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8,9-HxCDD	0.47	0.371		0.1	0.0371	ng/kg	Y
PT-10-36.0-37.0	1,2,3,7,8,9-HxCDF	0.883	0.269	U	0.1	0.01345	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8-PeCDD	0.371	0.317	U	1	0.1585	ng/kg	N
PT-10-36.0-37.0	1,2,3,7,8-PeCDF	0.511	0.41	U	0.03	0.00615	ng/kg	N
PT-10-36.0-37.0	2,3,4,6,7,8-HxCDF	0.688	0.259		0.1	0.0259	ng/kg	Y
PT-10-36.0-37.0	2,3,4,7,8-PeCDF	0.663	0.352	U	0.3	0.0528	ng/kg	N
PT-10-36.0-37.0	2,3,7,8-TCDD	0.172	0.244	U	1	0.122	ng/kg	N
PT-10-36.0-37.0	2,3,7,8-TCDF	0.233	1.09		0.1	0.109	ng/kg	Y
PT-10-36.0-37.0	OCDD	1.71	15.6	U	0.0003	0.00234	ng/kg	N
PT-10-36.0-37.0	OCDF	1.5	0.547	U	0.0003	0.00008205	ng/kg	N
PT-10-36.0-37.0	**Dioxin/Furan TEQ**		**0.6**	**JT**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
PT-11-36.0-37.0	1,2,3,4,6,7,8-HpCDD	0.738	0.747	U	0.01	0.003735	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,6,7,8-HpCDF	1.09	0.0768	U	0.01	0.000384	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8,9-HpCDF	0.0335	0.0335	U	0.01	0.0001675	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8-HxCDD	0.756	0.0453	U	0.1	0.002265	ng/kg	N
PT-11-36.0-37.0	1,2,3,4,7,8-HxCDF	0.0236	0.0236	U	0.1	0.00118	ng/kg	N
PT-11-36.0-37.0	1,2,3,6,7,8-HxCDD	0.645	0.0719		0.1	0.00719	ng/kg	Y
PT-11-36.0-37.0	1,2,3,6,7,8-HxCDF	0.0217	0.0217	U	0.1	0.001085	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8,9-HxCDD	0.468	0.0943		0.1	0.00943	ng/kg	Y
PT-11-36.0-37.0	1,2,3,7,8,9-HxCDF	0.878	0.0906	U	0.1	0.00453	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8-PeCDD	0.369	0.0571	U	1	0.02855	ng/kg	N
PT-11-36.0-37.0	1,2,3,7,8-PeCDF	0.508	0.0559		0.03	0.001677	ng/kg	Y
PT-11-36.0-37.0	2,3,4,6,7,8-HxCDF	0.684	0.0374	U	0.1	0.00187	ng/kg	N
PT-11-36.0-37.0	2,3,4,7,8-PeCDF	0.0394	0.0394	U	0.3	0.00591	ng/kg	N
PT-11-36.0-37.0	2,3,7,8-TCDD	0.0295	0.0295	U	1	0.01475	ng/kg	N
PT-11-36.0-37.0	2,3,7,8-TCDF	0.0236	0.0236	U	0.1	0.00118	ng/kg	N
PT-11-36.0-37.0	OCDD	1.7	7.57	U	0.0003	0.0011355	ng/kg	N
PT-11-36.0-37.0	OCDF	1.49	0.167	U	0.0003	0.00002505	ng/kg	N
PT-11-36.0-37.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-12-30.0-31.0	1,2,3,4,6,7,8-HpCDD	0.746	57.3		0.01	0.573	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,6,7,8-HpCDF	1.1	6.01		0.01	0.0601	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8,9-HpCDF	0.87	1.37		0.01	0.0137	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8-HxCDD	0.763	3.78		0.1	0.378	ng/kg	Y
PT-12-30.0-31.0	1,2,3,4,7,8-HxCDF	0.71	1.92	J	0.1	0.192	ng/kg	Y
PT-12-30.0-31.0	1,2,3,6,7,8-HxCDD	0.651	5.38		0.1	0.538	ng/kg	Y
PT-12-30.0-31.0	1,2,3,6,7,8-HxCDF	0.272	2.12		0.1	0.212	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8,9-HxCDD	0.472	4.57		0.1	0.457	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8,9-HxCDF	0.887	0.866	J	0.1	0.0866	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8-PeCDD	0.373	2.87		1	2.87	ng/kg	Y
PT-12-30.0-31.0	1,2,3,7,8-PeCDF	0.513	1.83	J	0.03	0.0549	ng/kg	Y
PT-12-30.0-31.0	2,3,4,6,7,8-HxCDF	0.691	2.58	J	0.1	0.258	ng/kg	Y
PT-12-30.0-31.0	2,3,4,7,8-PeCDF	0.666	2.53		0.3	0.759	ng/kg	Y
PT-12-30.0-31.0	2,3,7,8-TCDD	0.173	0.672	U	1	0.336	ng/kg	N
PT-12-30.0-31.0	2,3,7,8-TCDF	0.234	3.44		0.1	0.344	ng/kg	Y
PT-12-30.0-31.0	OCDD	1.72	65.8	U	0.0003	0.00987	ng/kg	N
PT-12-30.0-31.0	OCDF	1.51	3.83		0.0003	0.001149	ng/kg	Y
PT-12-30.0-31.0	**Dioxin/Furan TEQ**		**7.1**	**JT**	**--**	**--**	**ng/kg**	**Y**
PT-13-29.0-30.0	1,2,3,4,6,7,8-HpCDD	0.735	1.08	U	0.01	0.0054	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,6,7,8-HpCDF	1.09	0.18	U	0.01	0.0009	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,7,8,9-HpCDF	0.047	0.047	U	0.01	0.000235	ng/kg	N
PT-13-29.0-30.0	1,2,3,4,7,8-HxCDD	0.752	0.104		0.1	0.0104	ng/kg	Y
PT-13-29.0-30.0	1,2,3,4,7,8-HxCDF	0.699	0.0392	U	0.1	0.00196	ng/kg	N
PT-13-29.0-30.0	1,2,3,6,7,8-HxCDD	0.642	0.0725	U	0.1	0.003625	ng/kg	N
PT-13-29.0-30.0	1,2,3,6,7,8-HxCDF	0.268	0.0541		0.1	0.00541	ng/kg	Y
PT-13-29.0-30.0	1,2,3,7,8,9-HxCDD	0.465	0.165	U	0.1	0.00825	ng/kg	N
PT-13-29.0-30.0	1,2,3,7,8,9-HxCDF	0.874	0.0995		0.1	0.00995	ng/kg	Y
PT-13-29.0-30.0	1,2,3,7,8-PeCDD	0.367	0.0627	U	1	0.03135	ng/kg	N
PT-13-29.0-30.0	1,2,3,7,8-PeCDF	0.505	0.0337		0.03	0.001011	ng/kg	Y

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
PT-13-29.0-30.0	2,3,4,6,7,8-HxCDF	0.0313	0.0313	U	0.1	0.001565	ng/kg	N
PT-13-29.0-30.0	2,3,4,7,8-PeCDF	0.0372	0.0372	U	0.3	0.00558	ng/kg	N
PT-13-29.0-30.0	2,3,7,8-TCDD	0.0274	0.0274	U	1	0.0137	ng/kg	N
PT-13-29.0-30.0	2,3,7,8-TCDF	0.0235	0.0235	U	0.1	0.001175	ng/kg	N
PT-13-29.0-30.0	OCDD	1.7	10.7	U	0.0003	0.001605	ng/kg	N
PT-13-29.0-30.0	OCDF	1.48	0.749		0.0003	0.0002247	ng/kg	Y
PT-13-29.0-30.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-14-29.0-30.0	1,2,3,4,6,7,8-HpCDD	0.746	0.836	U	0.01	0.00418	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,6,7,8-HpCDF	1.1	0.0577	U	0.01	0.0002885	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,7,8,9-HpCDF	0.179	0.179	U	0.01	0.000895	ng/kg	N
PT-14-29.0-30.0	1,2,3,4,7,8-HxCDD	0.764	0.0412		0.1	0.00412	ng/kg	Y
PT-14-29.0-30.0	1,2,3,4,7,8-HxCDF	0.0219	0.0219	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	1,2,3,6,7,8-HxCDD	0.652	0.0517	U	0.1	0.002585	ng/kg	N
PT-14-29.0-30.0	1,2,3,6,7,8-HxCDF	0.0219	0.0219	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8,9-HxCDD	0.0398	0.0398	U	0.1	0.00199	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8,9-HxCDF	0.888	0.0756	U	0.1	0.00378	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8-PeCDD	0.0398	0.0398	U	1	0.0199	ng/kg	N
PT-14-29.0-30.0	1,2,3,7,8-PeCDF	0.513	0.0577	U	0.03	0.0008655	ng/kg	N
PT-14-29.0-30.0	2,3,4,6,7,8-HxCDF	0.0219	0.0219	U	0.1	0.001095	ng/kg	N
PT-14-29.0-30.0	2,3,4,7,8-PeCDF	0.0318	0.0318	U	0.3	0.00477	ng/kg	N
PT-14-29.0-30.0	2,3,7,8-TCDD	0.173	0.151	U	1	0.0755	ng/kg	N
PT-14-29.0-30.0	2,3,7,8-TCDF	0.0259	0.0259	U	0.1	0.001295	ng/kg	N
PT-14-29.0-30.0	OCDD	1.72	4.89	U	0.0003	0.0007335	ng/kg	N
PT-14-29.0-30.0	OCDF	0.0637	1.99	U	0.0003	0.000009555	ng/kg	N
PT-14-29.0-30.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-3-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.743	2.02	U	0.01	0.0101	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.1	0.268	U	0.01	0.00134	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.867	0.2	U	0.01	0.001	ng/kg	N
PT-3-43.0-44.0	1,2,3,4,7,8-HxCDD	0.761	0.0894		0.1	0.00894	ng/kg	Y
PT-3-43.0-44.0	1,2,3,4,7,8-HxCDF	0.708	0.0614	U	0.1	0.00307	ng/kg	N
PT-3-43.0-44.0	1,2,3,6,7,8-HxCDD	0.649	0.123	U	0.1	0.00615	ng/kg	N
PT-3-43.0-44.0	1,2,3,6,7,8-HxCDF	0.272	0.0396	U	0.1	0.00198	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8,9-HxCDD	0.471	0.165	U	0.1	0.00825	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8,9-HxCDF	0.0337	0.0337	U	0.1	0.001685	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8-PeCDD	0.0436	0.0436	U	1	0.0218	ng/kg	N
PT-3-43.0-44.0	1,2,3,7,8-PeCDF	0.511	0.0416	U	0.03	0.000624	ng/kg	N
PT-3-43.0-44.0	2,3,4,6,7,8-HxCDF	0.689	0.0496	U	0.1	0.00248	ng/kg	N
PT-3-43.0-44.0	2,3,4,7,8-PeCDF	0.0278	0.0278	U	0.3	0.00417	ng/kg	N
PT-3-43.0-44.0	2,3,7,8-TCDD	0.0337	0.0337	U	1	0.01685	ng/kg	N
PT-3-43.0-44.0	2,3,7,8-TCDF	0.0258	0.0258	U	0.1	0.00129	ng/kg	N
PT-3-43.0-44.0	OCDD	1.72	20.6	U	0.0003	0.00309	ng/kg	N
PT-3-43.0-44.0	OCDF	1.5	1.5		0.0003	0.00045	ng/kg	Y
PT-3-43.0-44.0	**Dioxin/Furan TEQ**		**0.1**	**T**	**--**	**--**	**ng/kg**	**Y**

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
PT-5-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.736	2.45	U	0.01	0.01225	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.09	0.475	U	0.01	0.002375	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.859	0.194	U	0.01	0.00097	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8-HxCDD	0.754	0.173	U	0.1	0.00865	ng/kg	N
PT-5-43.0-44.0	1,2,3,4,7,8-HxCDF	0.701	0.0569	U	0.1	0.002845	ng/kg	N
PT-5-43.0-44.0	1,2,3,6,7,8-HxCDD	0.643	0.179	U	0.1	0.00895	ng/kg	N
PT-5-43.0-44.0	1,2,3,6,7,8-HxCDF	0.269	0.165	U	0.1	0.00825	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8,9-HxCDD	0.466	0.457	U	0.1	0.02285	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8,9-HxCDF	0.875	0.192		0.1	0.0192	ng/kg	Y
PT-5-43.0-44.0	1,2,3,7,8-PeCDD	0.368	0.108	U	1	0.054	ng/kg	N
PT-5-43.0-44.0	1,2,3,7,8-PeCDF	0.506	0.0883	U	0.03	0.0013245	ng/kg	N
PT-5-43.0-44.0	2,3,4,6,7,8-HxCDF	0.682	0.132	U	0.1	0.0066	ng/kg	N
PT-5-43.0-44.0	2,3,4,7,8-PeCDF	0.658	0.0393	U	0.3	0.005895	ng/kg	N
PT-5-43.0-44.0	2,3,7,8-TCDD	0.0334	0.0334	U	1	0.0167	ng/kg	N
PT-5-43.0-44.0	2,3,7,8-TCDF	0.0294	0.0294	U	0.1	0.00147	ng/kg	N
PT-5-43.0-44.0	OCDD	1.7	23.5	U	0.0003	0.003525	ng/kg	N
PT-5-43.0-44.0	OCDF	1.49	2.01	U	0.0003	0.0003015	ng/kg	N
PT-5-43.0-44.0	**Dioxin/Furan TEQ**		**0.2**	**T**	**--**	**--**	**ng/kg**	**Y**
PT-6-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.745	1.21	U	0.01	0.00605	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.1	0.0497	U	0.01	0.0002485	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.869	0.0377	U	0.01	0.0001885	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8-HxCDD	0.763	0.0338	U	0.1	0.00169	ng/kg	N
PT-6-43.0-44.0	1,2,3,4,7,8-HxCDF	0.0179	0.0179	U	0.1	0.000895	ng/kg	N
PT-6-43.0-44.0	1,2,3,6,7,8-HxCDD	0.0397	0.0397	U	0.1	0.001985	ng/kg	N
PT-6-43.0-44.0	1,2,3,6,7,8-HxCDF	0.0179	0.0179	U	0.1	0.000895	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8,9-HxCDD	0.472	0.0775	U	0.1	0.003875	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8,9-HxCDF	0.886	0.0397	U	0.1	0.001985	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8-PeCDD	0.0417	0.0417	U	1	0.02085	ng/kg	N
PT-6-43.0-44.0	1,2,3,7,8-PeCDF	0.0278	0.0278	U	0.03	0.000417	ng/kg	N
PT-6-43.0-44.0	2,3,4,6,7,8-HxCDF	0.0199	0.0199	U	0.1	0.000995	ng/kg	N
PT-6-43.0-44.0	2,3,4,7,8-PeCDF	0.0278	0.0278	U	0.3	0.00417	ng/kg	N
PT-6-43.0-44.0	2,3,7,8-TCDD	0.0357	0.0357	U	1	0.01785	ng/kg	N
PT-6-43.0-44.0	2,3,7,8-TCDF	0.0238	0.0238	U	0.1	0.00119	ng/kg	N
PT-6-43.0-44.0	OCDD	1.72	16.2	U	0.0003	0.00243	ng/kg	N
PT-6-43.0-44.0	OCDF	1.51	0.213	U	0.0003	0.00003195	ng/kg	N
PT-6-43.0-44.0	**Dioxin/Furan TEQ**		**0.1**	**UT**	**--**	**--**	**ng/kg**	**N**
PT-8-43.0-44.0	1,2,3,4,6,7,8-HpCDD	0.74	2.38	U	0.01	0.0119	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,6,7,8-HpCDF	1.09	0.807	U	0.01	0.004035	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8,9-HpCDF	0.863	0.465	U	0.01	0.002325	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8-HxCDD	0.757	0.353	U	0.1	0.01765	ng/kg	N
PT-8-43.0-44.0	1,2,3,4,7,8-HxCDF	0.704	0.41	U	0.1	0.0205	ng/kg	N
PT-8-43.0-44.0	1,2,3,6,7,8-HxCDD	0.646	0.432		0.1	0.0432	ng/kg	Y
PT-8-43.0-44.0	1,2,3,6,7,8-HxCDF	0.27	0.424	U	0.1	0.0212	ng/kg	N

Sample ID	Congener	EDL	Result	Qualifier	TEF	TEQ(a)	Units	Detected?
PT-8-43.0-44.0	1,2,3,7,8,9-HxCDD	0.468	0.758		0.1	0.0758	ng/kg	Y
PT-8-43.0-44.0	1,2,3,7,8,9-HxCDF	0.88	0.465	U	0.1	0.02325	ng/kg	N
PT-8-43.0-44.0	1,2,3,7,8-PeCDD	0.37	0.284	U	1	0.142	ng/kg	N
PT-8-43.0-44.0	1,2,3,7,8-PeCDF	0.509	0.234		0.03	0.00702	ng/kg	Y
PT-8-43.0-44.0	2,3,4,6,7,8-HxCDF	0.685	0.316	U	0.1	0.0158	ng/kg	N
PT-8-43.0-44.0	2,3,4,7,8-PeCDF	0.661	0.147	J	0.3	0.0441	ng/kg	Y
PT-8-43.0-44.0	2,3,7,8-TCDD	0.172	0.148	U	1	0.074	ng/kg	N
PT-8-43.0-44.0	2,3,7,8-TCDF	0.232	0.0592	U	0.1	0.00296	ng/kg	N
PT-8-43.0-44.0	OCDD	1.71	20.4	U	0.0003	0.00306	ng/kg	N
PT-8-43.0-44.0	OCDF	1.5	2.56		0.0003	0.000768	ng/kg	Y
PT-8-43.0-44.0	**Dioxin/Furan TEQ**		**0.5**	**JT**	**--**	**--**	**ng/kg**	**Y**

Notes:

EDL = estimated detection limit

(a) Undetected values are included in the TEQ calculation as half of the EDL, except in cases where the validator reclassified estimated maximum possible concentrations (EMPCs) as not detected. In those cases, the result was elevated to the EMPC and included in the TEQ as half the reported result.

J = estimated
JT = estimated total
N = no
ng/kg = nanogram per kilogram
TEQ = toxicity equivalent
U = not detected
UT = not detected total
Y = yes

Table 8. Marine Bioassay Performance Standards and Evaluation Guidelines

Bioassay	Negative Control Performance Standard	Reference Sediment Performance Standard	Dispersive Disposal Site Interpretation Guidelines		Nondispersive Disposal Site Interpretation Guidelines	
			1-hit rule	2-hit rule	1-hit rule	2-hit rule
Amphipod Mortality	$M_C \leq 10\%$	$M_R - M_C \leq 20\%$	$M_T - M_C > 20\%$ and M_T vs. M_R SS (p=.05) **AND**			
			$M_T - M_R > 10\%$	NOCN	$M_T - M_R > 30\%$	NOCN
Larval Development	$N_C \div I \geq 0.70$	$N_R \div N_C \geq 0.65$	$N_T \div N_C < 0.80$ and N_T/N_C vs. N_R/N_C SS (p=.10) **AND**			
			$N_R/N_C - N_T/N_C > 0.15$	NOCN	$N_R/N_C - N_T/N_C > 0.30$	NOCN
Neanthes Growth	$M_C \leq 10\%$ and $MIG_C \geq 0.38$	$M_R \leq 20\%$ and $MIG_R \div MIG_C \geq 0.80$	$MIG_T \div MIG_C < 0.80$ and MIG_T vs. MIG_R SS (p=.05) **AND**			
			$MIG_T/MIG_R < 0.70$	NOCN	$MIG_T/MIG_R < 0.50$	$MIG_T/MIG_R < 0.70$

M = mortality
N = normal larvae
I = initial count
MIG = mean individual growth rate (mg/individual/day)
SS = statistically significant
NOCN = no other conditions necessary

Subscripts:
R = reference sediment
C = negative control
T = test sediment

Table 9

Table IV

Marine Sediment Cleanup Objectives and Cleanup Screening Levels Biological Criteria

Biological Test/Endpoint	Performance Standard Control	Performance Standard Reference	Sediment Cleanup Objective for each biological test	Cleanup Screening Level for each biological test
Amphipod				
10-day Mortality	$M_C \leq 10\%$	$M_R \leq 25\%$	$M_T > 25\%$ Absolute and M_T vs M_R SD ($p \leq 0.05$)	$M_T - M_R \geq 30\%$ and M_T vs M_R SD ($p \leq 0.05$)
Larval				
Bivalve or Echinoderm Abnormality/Mortality	$N_C / I \geq 0.70$	$N_R/N_C \geq 0.65$	$(N_R - N_T)/N_C > 0.15$ and N_T/N_C vs N_R/N_C SD ($p \leq 0.10$)	$(N_R - N_T)/N_C > 0.30$ and N_T/N_C vs N_R/N_C SD ($p \leq 0.10$)
Juvenile Polychaete				
***Neanthes* 20-day Growth**	$M_C < 10\%$ and $MIG_C > 0.72$ mg/individual/day (or case-by-case)	$MIG_R / MIG_C > 0.80$	$MIG_T/MIG_R < 0.70$ and MIG_T vs MIG_R SD ($p \leq 0.05$)	$MIG_T/MIG_R < 0.50$ and MIG_T vs MIG_R SD ($p \leq 0.05$)
Microtox				
Microtox Decreased Luminescence	case-by-case	case-by-case	$ML_T / ML_R < 0.80$ and ML_T vs ML_R SD ($p = 0.05$)	
Benthic Abundance				
Benthic Abundance	See Table IV legend		$A_T/A_R < 0.50$ For any one of three major taxa Class Crustacea, Phylum Mollusca or Class Polychaeta	$A_T/A_R < 0.50$ For any two of three major taxa Class Crustacea, Phylum Mollusca or Class Polychaeta

Table 10

Summary of Conventional Parameters Associated with Bioassay Results

Mill A Former Site Interim Action Dredging Project

Everett, Washington

	Sample Location	Grab
	Sample ID	CARR-REF
	Sample Date	2/24/2015
Analyte	Sample Depth	10 cm
Conventionals		
Total Organic Carbon	%	**0.195**
Total Solids	%	**72.8**
Grain Size		
Gravel (≤ -1)	%	**0**
Very coarse sand (-1 < Phi ≤ 0)	%	**0.2**
Coarse sand (0 < Phi ≤ 1)	%	**1.4**
Medium sand (1 < Phi ≤ 2)	%	**33.8**
Fine sand (2 < Phi ≤ 3)	%	**60.7**
Very fine sand (3 < Phi ≤ 4)	%	**2.8**
Total sand	%	**98.9**
Coarse silt (4 < Phi ≤ 5)	%	**<1.1**
Medium silt (5 < Phi ≤ 6)	%	**<1.1**
Fine silt (6 < Phi ≤ 7)	%	**<1.1**
Very fine silt (7 < Phi ≤ 8)	%	**<1.1**
Total silt	%	**<1.1**
Coarse clay (8 < Phi ≤ 9)	%	**<1.1**
Medium clay (9 < Phi ≤ 10)	%	**<1.1**
Particle/Grain Size, Phi >10	%	**<1.1**
Total clay	%	**<1.1**
Total Fines	%	**1.1**

Table 11. Test Results for *Eohaustorius estuarius*.

Treatment	Replicate	Number Initiated	Number Surviving	Percentage Survival	Mean Percentage		Standard Deviation
					Survival	Mortality	
Control	1	20	20	100	100	0	0.0
	2	20	20	100			
	3	20	20	100			
	4	20	20	100			
	5	20	20	100			
CARR-REF	1	20	20	100	98	2	2.7
	2	20	20	100			
	3	20	19	95			
	4	20	20	100			
	5	20	19	95			
D-1	1	20	20	100	98	2	2.7
	2	20	20	100			
	3	20	19	95			
	4	20	20	100			
	5	20	19	95			
D-2	1	20	20	100	96	4	6.5
	2	20	19	95			
	3	20	20	100			
	4	20	17	85			
	5	20	20	100			
D-3A	1	20	20	100	97	3	6.7
	2	20	20	100			
	3	20	20	100			
	4	20	20	100			
	5	20	17	85			
D-3B	1	20	20	100	95	5	6.1
	2	20	17	85			
	3	20	19	95			
	4	20	20	100			
	5	20	19	95			
D-4B	1	20	20	100	96	4	2.2
	2	20	19	95			
	3	20	19	95			
	4	20	19	95			
	5	20	19	95			
D-7	1	20	19	95	92	8	7.6
	2	20	20	100			
	3	20	19	95			
	4	20	16	80			
	5	20	18	90			

Table 12. Test Results for *Neanthes arenaceodentata*.

Treatment	Rep	Number Initiated	Survivors	Mean Mortality (%)	Individual Growth (mg/ind/day)					
					Dry Weight	Mean	Std Dev	AFDW	Mean	Std Dev
Control	1	5	5	0	1.102	1.07	0.1	0.523	0.514	0.036
	2	5	5		0.927			0.454		
	3	5	5		1.132			0.519		
	4	5	5		1.103			0.551		
	5	5	5		1.076			0.521		
CARR-REF	1	5	4	4	0.572	0.714	0.1	0.351	0.400	0.075
	2	5	5		0.903			0.495		
	3	5	5		0.619			0.406		
	4	5	5		0.836			0.444		
	5	5	5		0.641			0.306		
D-1	1	5	5	0	0.771	0.731	0.1	0.565	0.527	0.089
	2	5	5		0.587			0.407		
	3	5	5		0.843			0.594		
	4	5	5		0.863			0.611		
	5	5	5		0.591			0.459		
D-2	1	5	5	0	0.761	0.819	0.0	0.526	0.552	0.025
	2	5	5		0.812			0.563		
	3	5	5		0.898			0.590		
	4	5	5		0.817			0.542		
	5	5	5		0.809			0.539		
D-3A	1	5	5	0	0.727	0.872	0.1	0.516	0.557	0.042
	2	5	5		0.926			0.559		
	3	5	5		0.970			0.608		
	4	5	5		0.844			0.513		
	5	5	5		0.895			0.589		
D-3B	1	5	5	0	0.753	0.745	0.1	0.530	0.539	0.049
	2	5	5		0.747			0.538		
	3	5	5		0.636			0.470		
	4	5	5		0.840			0.608		
	5	5	5		0.748			0.550		
D-4B	1	5	5	0	0.855	0.811	0.0	0.553	0.544	0.016
	2	5	5		0.807			0.555		
	3	5	5		0.821			0.553		
	4	5	5		0.822			0.541		
	5	5	5		0.749			0.518		
D-7	1	5	5	0	0.870	0.879	0.1	0.536	0.539	0.039
	2	5	5		0.764			0.500		
	3	5	5		1.010			0.588		
	4	5	5		0.914			0.569		
	5	5	5		0.840			0.502		

Table 13. Test Results for *Mytilus galloprovincialis*.

Treatment	Replicate	Number Normal	Number Abnormal	Mean # Normal	Normalized Combined Normal Survivorship (%)$^{1, 2}$	Mean Combined Normal Survivorship (%)	Std. Dev.
Control	1	257	14	275.8	85.6	91.2	7.7
	2	310	18		100.0		
	3	246	10		81.9		
	4	272	24		90.6		
	5	294	20		97.9		
CARR-REF	1	213	9	228.4	77.2	82.8	5.3
	2	215	9		78.0		
	3	248	5		89.9		
	4	236	8		85.6		
	5	230	8		83.4		
D-1	1	209	6	157.6	75.8	57.1	11.7
	2	131	7		47.5		
	3	170	13		61.6		
	4	138	6		50.0		
	5	140	8		50.8		
D-2	1	174	16	167.2	63.1	60.6	4.2
	2	148	9		53.7		
	3	177	15		64.2		
	4	166	13		60.2		
	5	171	15		62.0		
D-3A	1	211	4	232.0	76.5	84.1	7.0
	2	226	8		81.9		
	3	223	7		80.9		
	4	262	8		95.0		
	5	238	11		86.3		
D-3B	1	99	19	105.6	35.9	38.3	9.5
	2	78	15		28.3		
	3	131	24		47.5		
	4	85	36		30.8		
	5	135	45		48.9		
D-4B	1	159	3	171.8	57.7	62.3	4.3
	2	185	11		67.1		
	3	182	7		66.0		
	4	161	16		58.4		
	5	172	8		62.4		
D-7	1	215	8	229.6	78.0	83.2	3.7
	2	231	7		83.8		
	3	239	5		86.7		
	4	239	16		86.7		
	5	224	5		81.2		

[1] Control normality normalized to stocking density (300.2).

[2] Reference and treatment normal survivorship are normalized to the mean Control normality (275.8).

Table 14. Summary of SMS Evaluation.

Treatment	Sediment Cleanup Objectives			Cleanup Screening Levels		
	Amphipod	Polychaete	Larval	Amphipod	Polychaete	Larval
D-1	Pass	Pass	**Fail**	Pass	Pass	Pass
D-2	Pass	Pass	**Fail**	Pass	Pass	Pass
D-3A	Pass	Pass	Pass	Pass	Pass	Pass
D-3B	Pass	Pass	**Fail**	Pass	Pass	**Fail**
D-4B	Pass	Pass	**Fail**	Pass	Pass	Pass
D-7	Pass	Pass	Pass	Pass	Pass	Pass

Table 15. Summary of DMMP Evaluation.

Treatment	2-Hit			1-Hit			Overall Determination
	Amphipod	Polychaete	Larval	Amphipod	Polychaete	Larval	
D-1	Pass	Pass	**Fail**	Pass	Pass	Pass	Pass
D-2	Pass	Pass	**Fail**	Pass	Pass	Pass	Pass
D-3A	Pass	Pass	Pass	Pass	Pass	Pass	Pass
D-3B	Pass	Pass	**Fail**	Pass	Pass	**Fail**	**Fail**
D-4B	Pass	Pass	**Fail**	Pass	Pass	Pass	Pass
D-7	Pass	Pass	Pass	Pass	Pass	Pass	Pass

Table 16

Revisions to DMMU Volumes

Mill A Former Site Interim Action Dredging Project
Everett, Washington

						Estimated in Agency-approved SAP	Revised as approved by DMMP following sample collection and core log review	Second revision to allow for Ecology-required transition slope armor rock		
Dredging Location	**Dredged Material Ranking[1]**	**Sediment Classification**	**Number of DMMUs**	**DMMU Identification**	**DMMU Boundary Elevations**	**Total Dredge Volume per DMMU[2] (CY)**	**Total Dredge Volume per DMMU[2] (CY)**	**Total Dredge Volume per DMMU[2] (CY)**	**Number of Sample Cores**	**Sampling Layer[3]**
Interim Action Cleanup	High	Heterogeneous	11	D-1	Existing Surface to -22 ft	3,750	3,750	3,940	5	Surface DMMU
				D-2	-22 to -26 ft	3,680	3,680	3,750	7	Subsurface DMMU
				D-3A	-26 ft to -30 ft	2,380	2,380	2,450	3	Subsurface DMMU
				D-3B	-26 ft to -30 ft	2,420	2,420	2,420	5	Subsurface DMMU
				D-4A	-30 ft to -34 ft	2,710	2,710	2,790	2	Subsurface DMMU
				D-4B	-30 ft to -34 ft	3,160	3,160	3,160	6	Subsurface DMMU
				D-5A	-34 ft to -38 ft	3,010	2,800	2,870	3	Subsurface DMMU
				D-5B	-34 ft to -38 ft	3,810	2,710	2,710	7	Subsurface DMMU
				D-6A	-38 ft to -43 ft	2,870	3,920	4,520	3	Subsurface DMMU
										Z-layer
				D-6B	-38 ft to -43 ft	3,520	3,370	4,320	3	Subsurface DMMU
										Z-layer
				D-6C	-38 ft to -43 ft	3,830	Eliminated	Eliminated	--	--
										--
				D-7	Surface in areas from -34 to -43 ft	--	4,240	4,390	3	Subsurface DMMU
										Z-layer
				Total Dredge Volume (CY)		**35,140**	**35,140**	**37,320**		

Notes:

[1] Due to the status of the Site as a MTCA cleanup, the subsurface DMMUs are treated as surface DMMUs with a high ranking as required by the Dredged Material Management Office.

[2] DMMU volume includes 1-foot overdredge allowance and 10% contingency. Volumes calculated using bathymetry survey completed between September 8 and 11, 2014.

[3] Z-layer samples were collected to characterize the dredge-prism side-slope. Five core locations were completed within the side-slope area.

CY = *In situ* cubic yards

DMMP = Dredged Material Management Program

DMMU = Dredged Material Management Unit

NA = Not Applicable

Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD 1983 UTM Zone 10N

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\067602001_DNR_VicinityMap.mxd Map Revised: 13 December 2012 amanza

Vicinity Map

Weyerhaeuser Mill A Former Site
Everett, Washington

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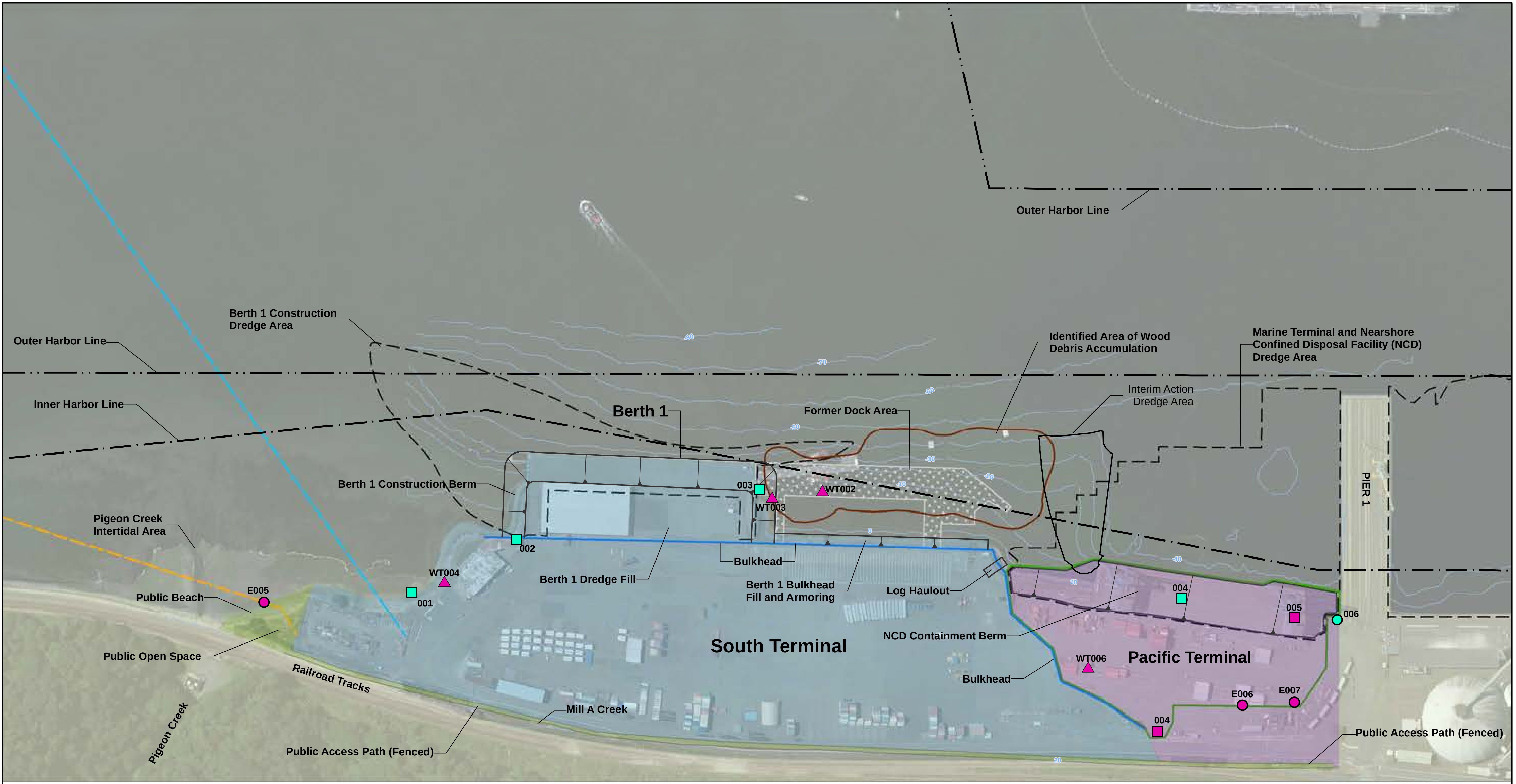
Figure 1



Legend

- South Terminal
- Pacific Terminal
- Open Space/Beach/Access Path
- Construction Berm
- Identified Area of Wood Debris Accumulation
- Historical Piling Area
- Dredged Area
- Nearshore Confined Disposal (NCD) Facility
- Current Kimberly-Clark/City of Everett/ City of Marysville Outfall 100 (approximate)
- Historical Kimberly-Clark/Weyerhaeuser Outfall SW001 (approximate)
- Bulkhead
- Bathymetric and Topographic Contour (10ft, MLLW)
- ▲ Historical Industrial Outfall
- ● Former Combined Sewer Outfall (CSO)
- ■ Former Stormwater Outfall
- ○ Current CSO
- □ Current Stormwater Outfall

Data Source: Base aerial from Bing Maps, 2011.
Topography and bathymetry from Walker & Associates Survey, 2006.
Notes:
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300 0 300
Feet

Current Property Conditions

Weyerhaeuser Mill A Former Site
Everett, Washington

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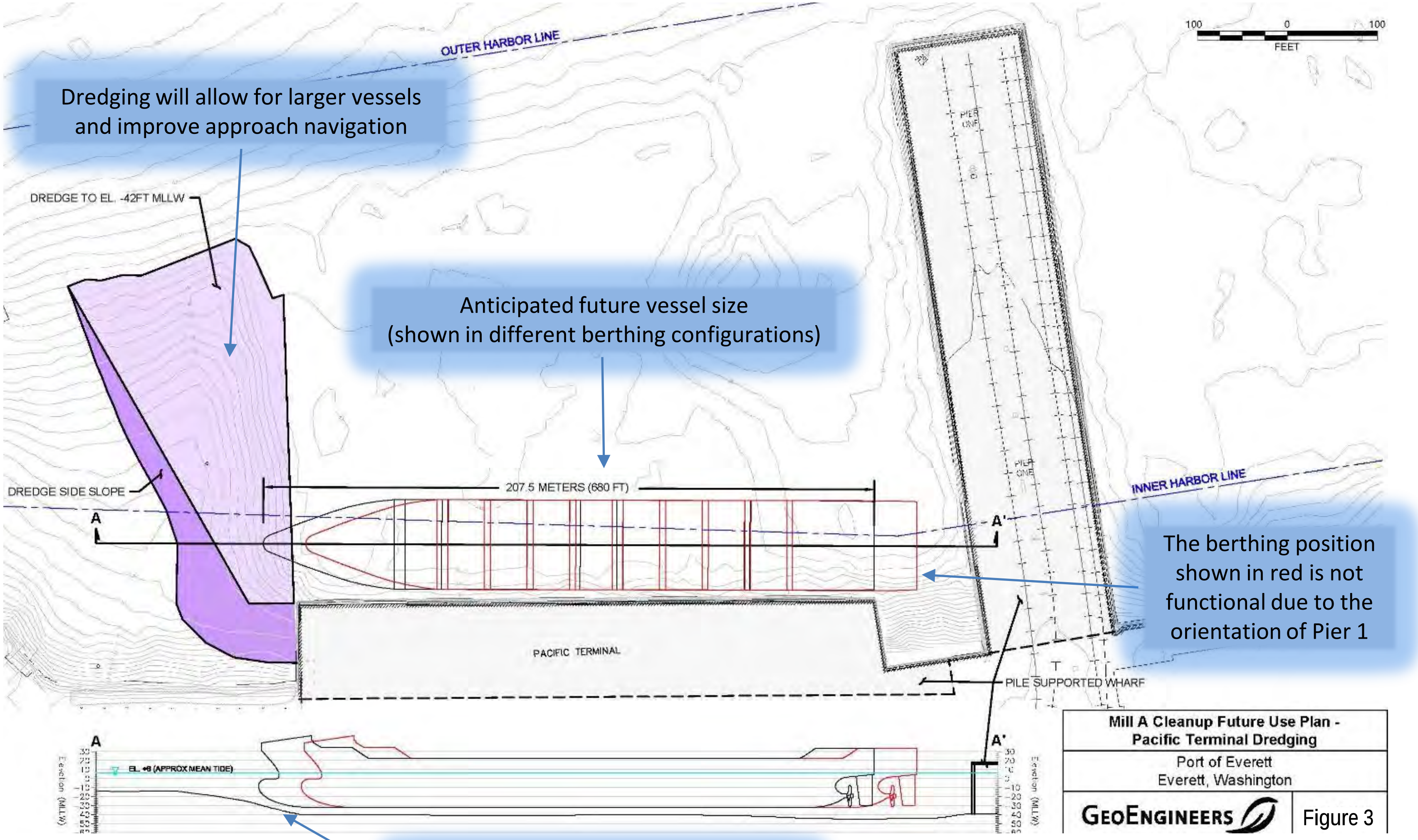
Figure 2

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\0676020001_DNR_CurrentSiteConditions.mxd Map Revised: 06 November 2014 cgonzales

Interim Action (Phase 1) Detail

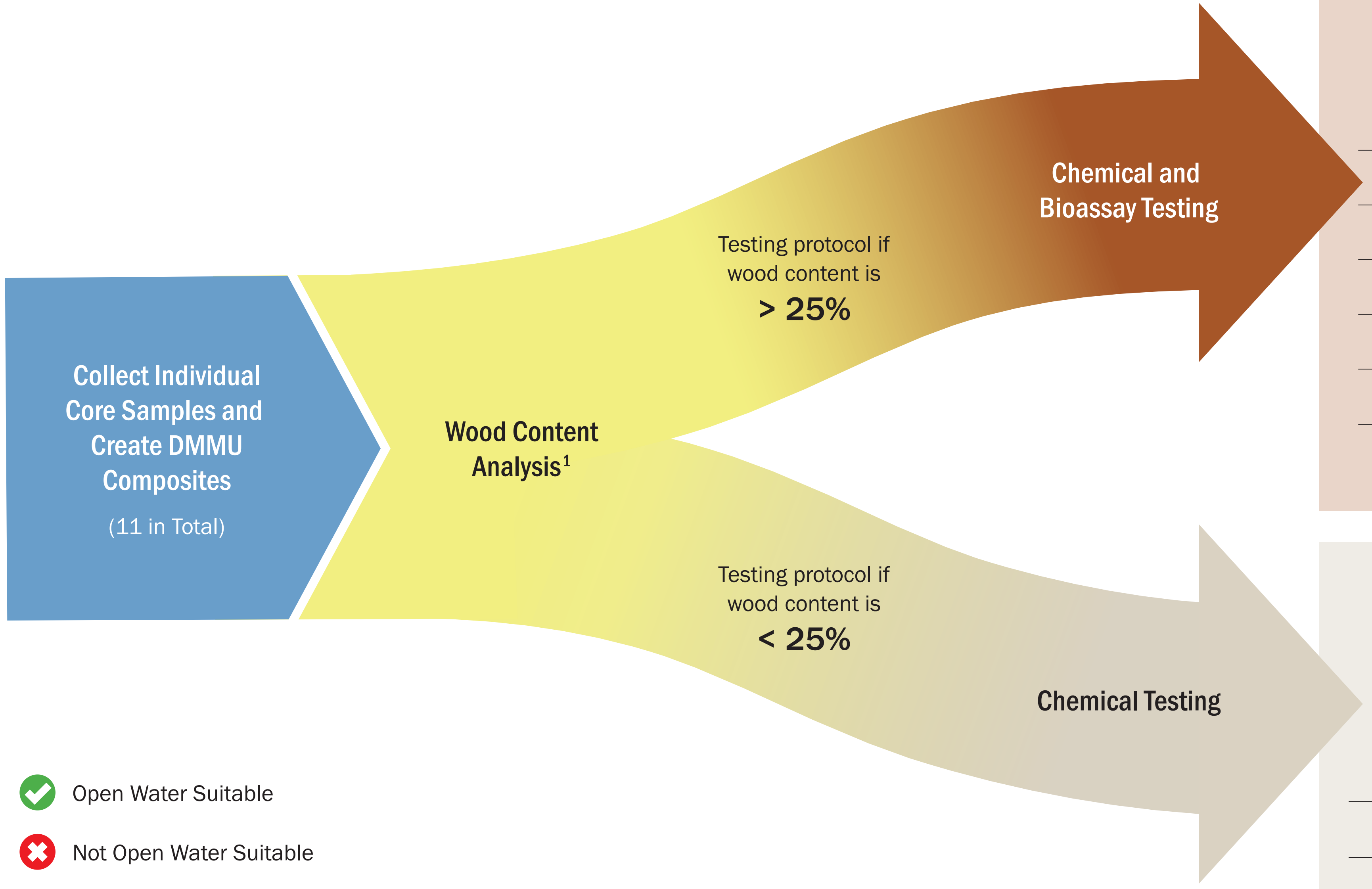


Dredging will allow for larger vessels and improve approach navigation

Anticipated future vessel size (shown in different berthing configurations)

The berthing position shown in red is not functional due to the orientation of Pier 1

Current conditions limit vessel size



Collect Individual Core Samples and Create DMMU Composites

(11 in Total)

Wood Content Analysis[1]

Testing protocol if wood content is **> 25%**

Chemical and Bioassay Testing

MTCA Bioaccumulative Chemicals[2]	MTCA Non-Bioaccumulative Chemicals	Bioassay	Expected Outcome
< MSL	< SL, < MSL	P	✓
< MSL	> SL, > MSL, < BT	P	✓
< MSL	> SL, > MSL, > BT	P	✗ *
< MSL	< SL, < MSL	F	✗
< MSL	> SL, > MSL	F	✗
> MSL	< SL, < MSL or > SL, > MSL	P/F	✗

Testing protocol if wood content is **< 25%**

Chemical Testing

MTCA Bioaccumulative Chemicals[2]	MTCA Non-Bioaccumulative Chemicals	Expected Outcome
< MSL	< SL, < MSL	✓
> MSL	< SL, < MSL or > SL, > MSL	✗
< MSL	> SL, > MSL, < BT	If Elected
< MSL	> SL, > MSL, > BT	✗ *

Bioassay	Expected Outcome
P	✓
F	✗

✓ Open Water Suitable

✗ Not Open Water Suitable

Notes:

* Bioaccumulative testing required to consider DMMU for open water suitability.

[1] Wood content will be analyzed to determine percentage of dry-weight wood content using ASTM D-2974 Method C.

[2] The MTCA bioaccumulative chemicals are defined in the Former Mill A Cleanup RI/FS Work Plan and include arsenic, cadmium, lead, mercury, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), total polychlorinated biphenyls (PCBs), dioxin-like PCBs and dioxins/furans. MTCA screening levels for these chemicals are natural background or Port Gardner regional background (if available).

SL = DMMP chemical evaluation guidelines.

BT = DMMP bioaccumulation trigger to determine when bioaccumulation testing is required.

MSL = Site-specific MTCA cleanup screening levels developed.

< = Analytical results are less than screening levels or triggers for all analytes.

> = Analytical results are greater than screening levels or triggers for one or more analytes.

P = Bioassay test passed.

F = Bioassay test failed.

DMMU = Dredged Material Management Unit

DMMP = Dredged Material Management Program

MTCA = Model Toxics Control Act

DMMU Sample Analysis and Expected Outcomes

Weyerhaeuser Mill A Former Site
Everett, Washington

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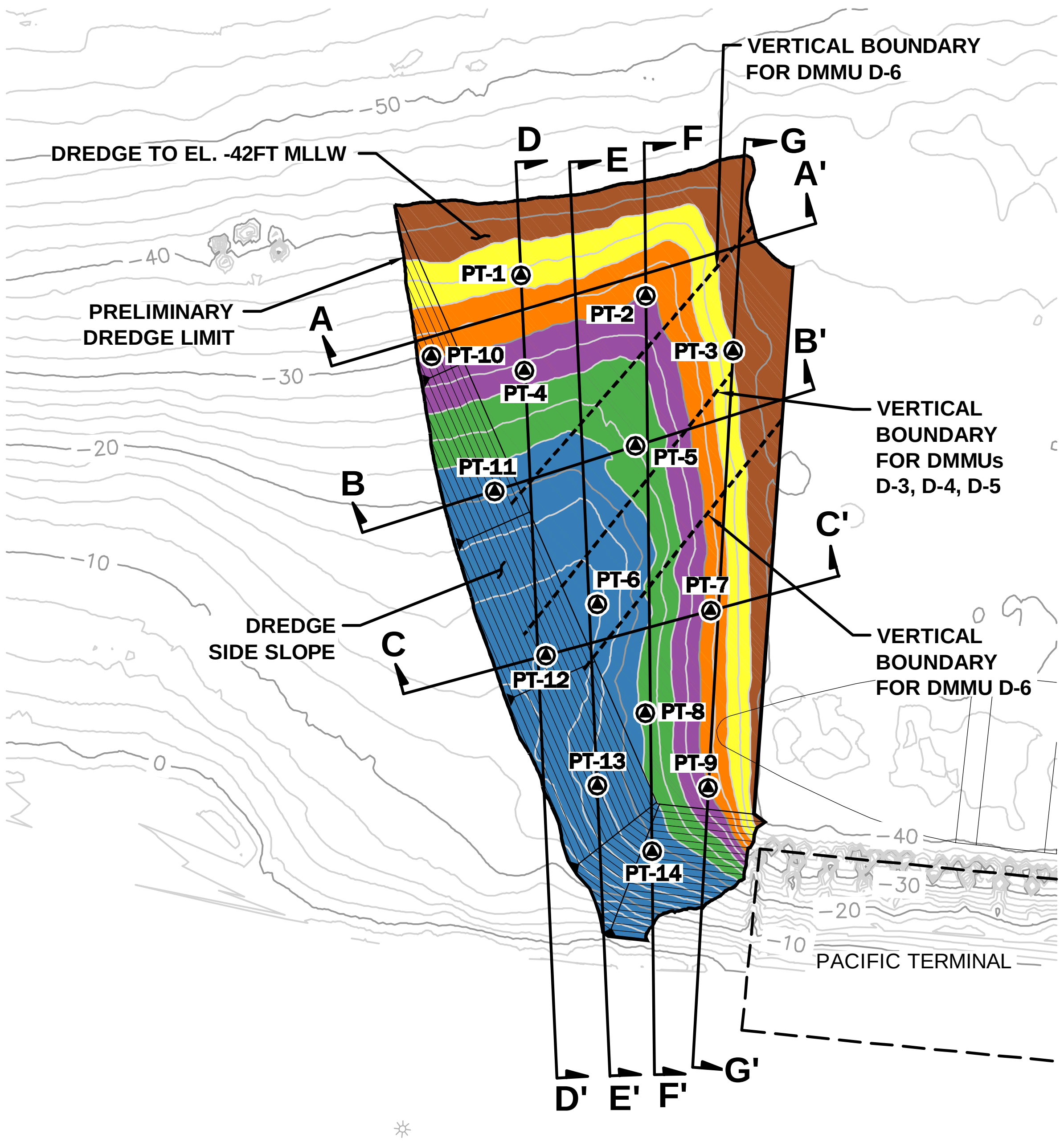
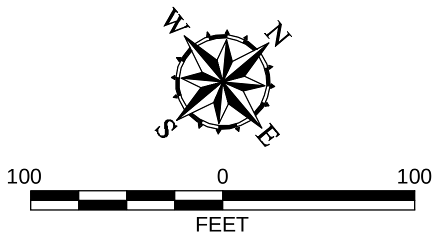
Figure 4





Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Legend

PT-1 ◎ Proposed Sediment Core Location

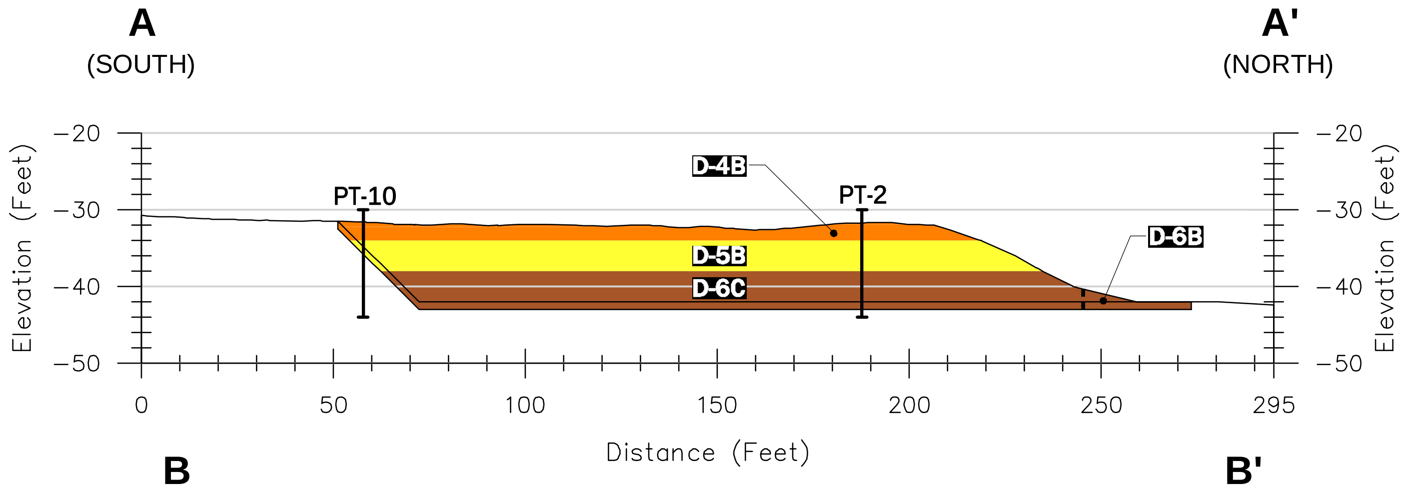
------- DMMU Vertical Boundary

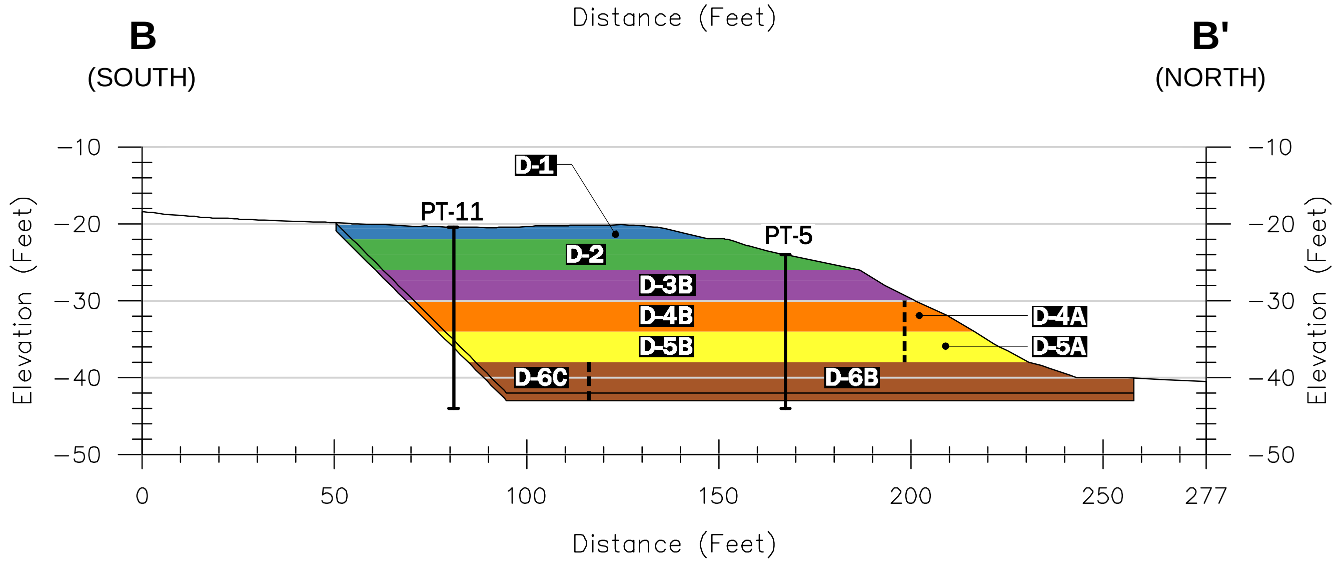
D-1 DMMU Identification

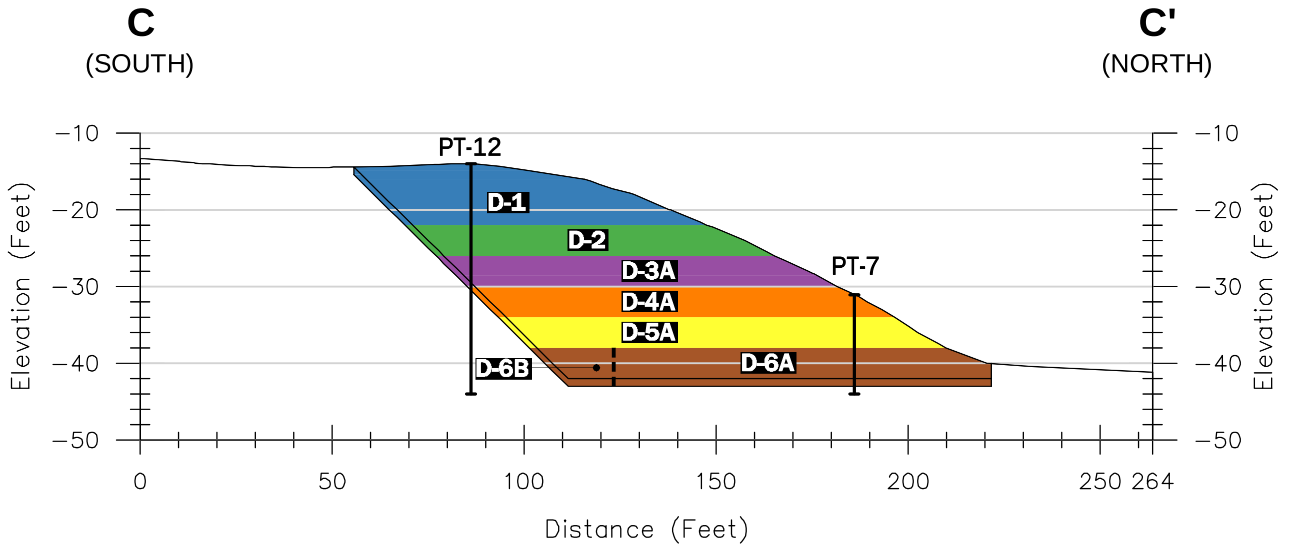
A A' Cross-Section Location

DMMU Elevation Boundaries

- 🟦 Existing Grade to -22 feet MLLW
- 🟩 -22 to -26 feet MLLW
- 🟪 -26 to -30 feet MLLW
- 🟧 -30 to -34 feet MLLW
- 🟨 -34 to -38 feet MLLW
- 🟫 -38 to -43 feet MLLW







50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Sampling Plan and Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Everett, Washington

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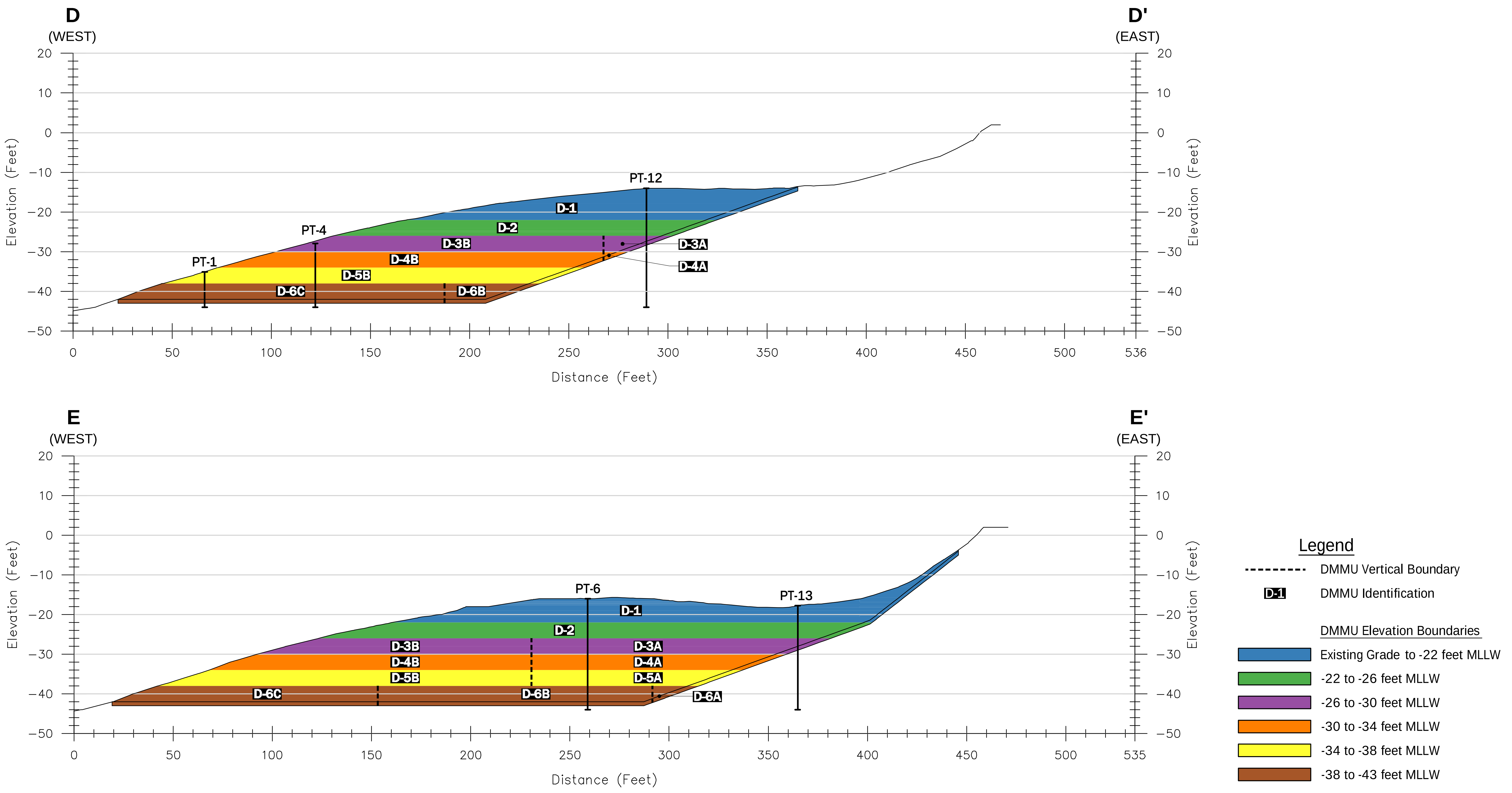
Figure 4



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Everett, Washington

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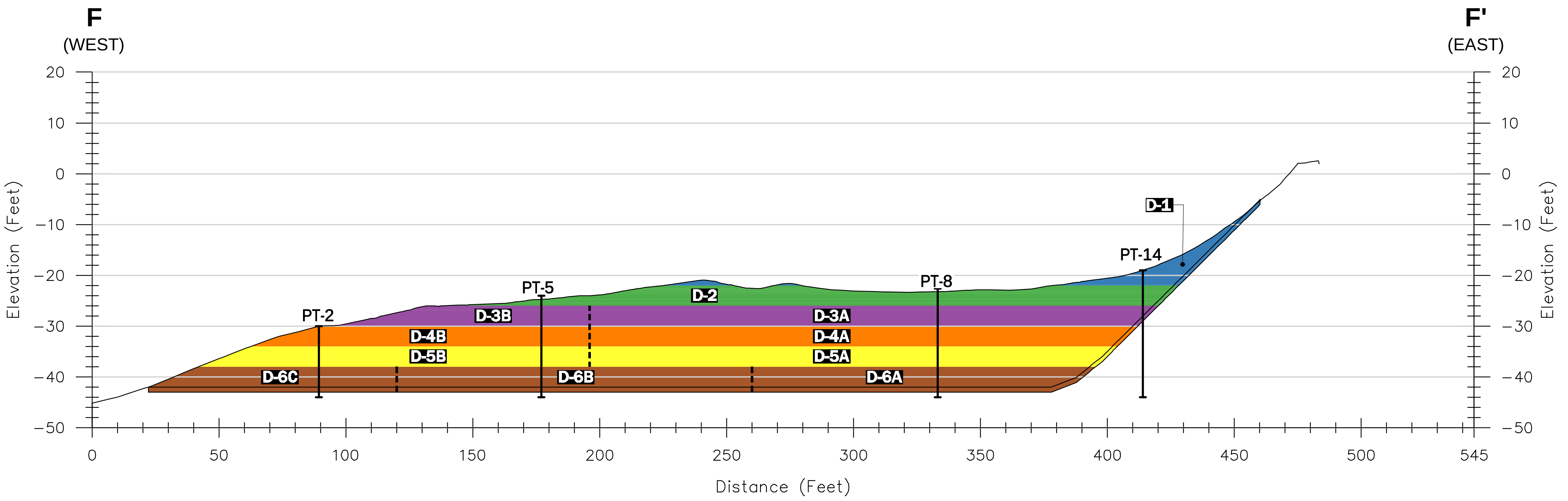
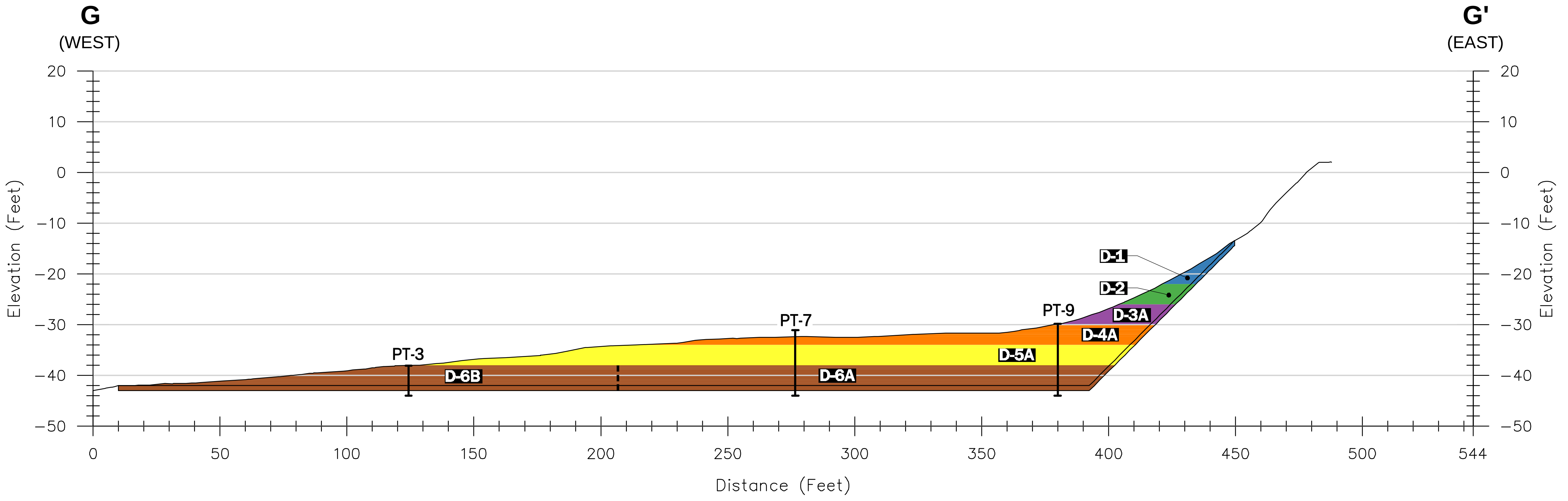
Figure 5

P:\0\0676020\03\CAD\SAP\SAP SITE PLAN AND SECTIONS.DWG\TAB:DD EE MODIFIED BY TMICHAUD ON DEC 16, 2014 - 9:24





Legend

- - - - - DMMU Vertical Boundary

D-1 DMMU Identification

DMMU Elevation Boundaries

🟦 Existing Grade to -22 feet MLLW

🟩 -22 to -26 feet MLLW

🟪 -26 to -30 feet MLLW

🟧 -30 to -34 feet MLLW

🟨 -34 to -38 feet MLLW

🟫 -38 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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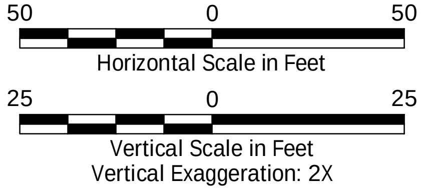


Horizontal Scale in Feet

Vertical Scale in Feet
Vertical Exaggeration: 2X

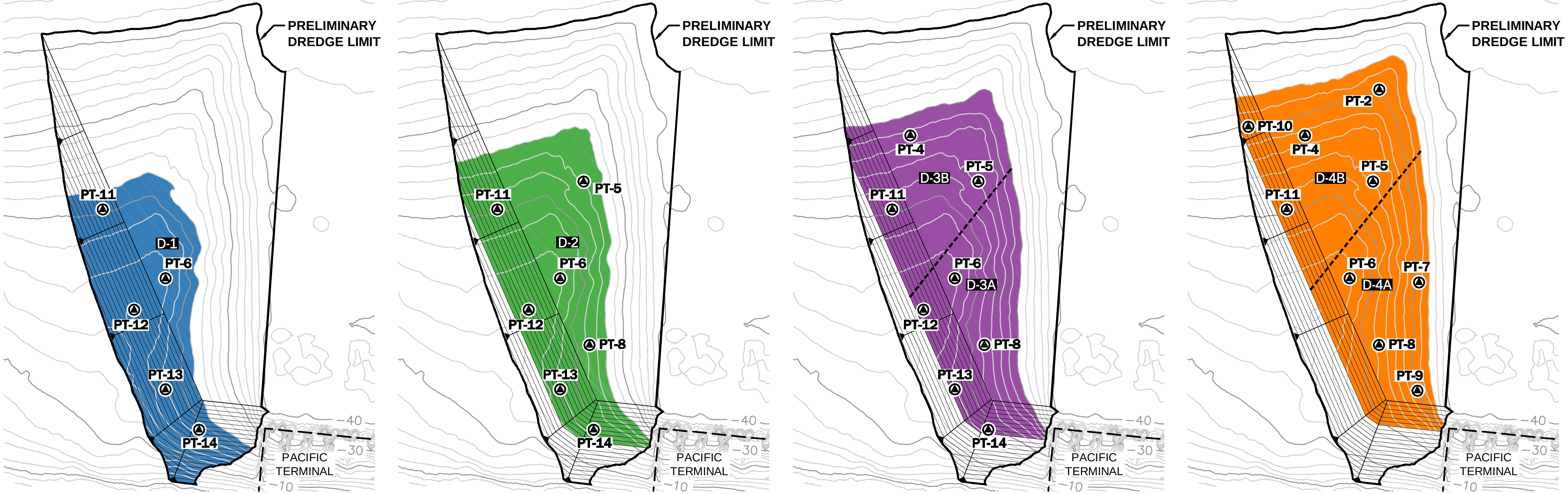
Cross-Sections F-F' and G-G'

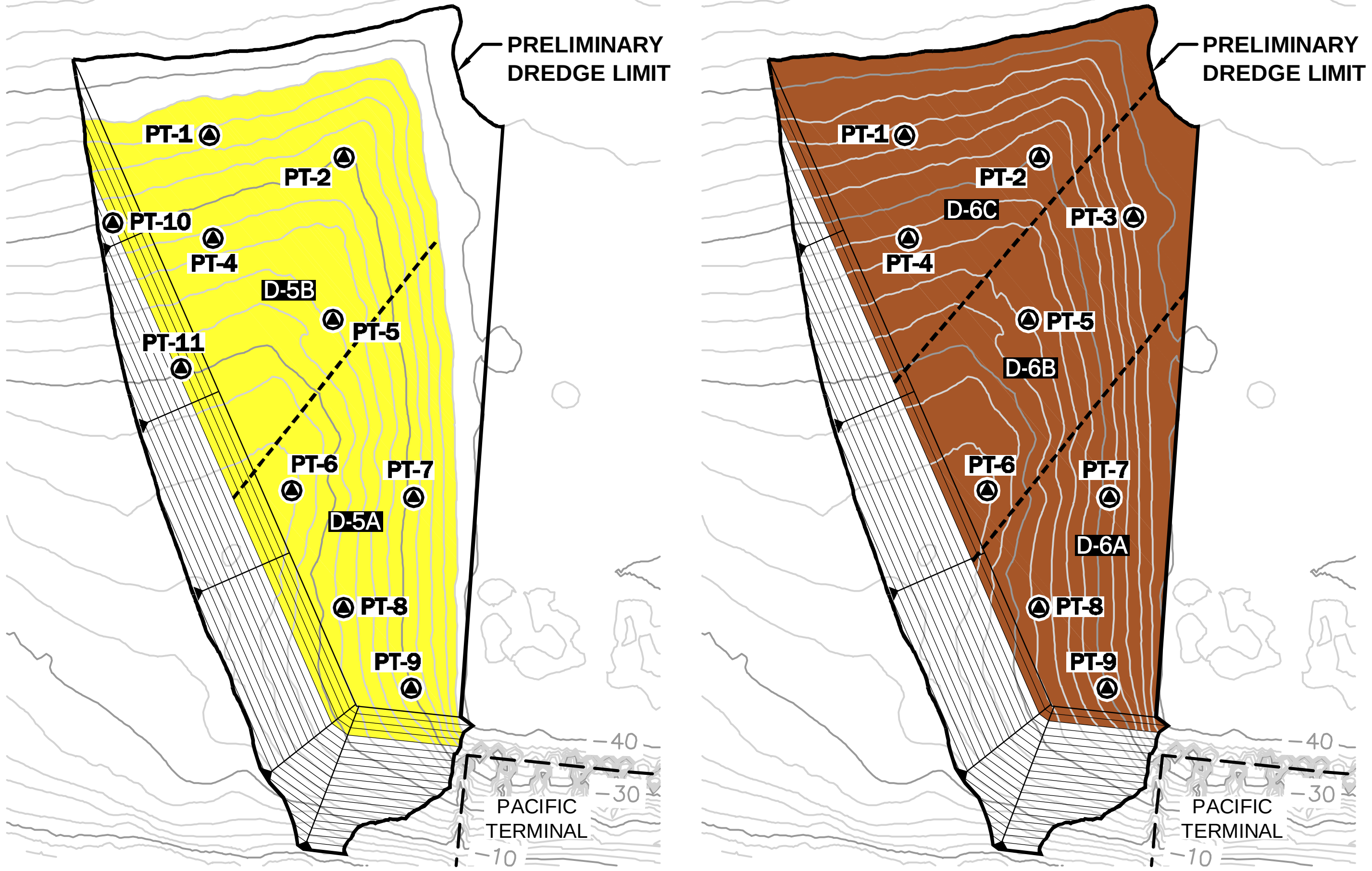
Weyerhaeuser Mill A Former Site
Everett, Washington

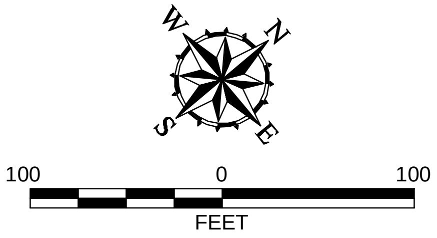
GeoEngineers

Figure 6

P:\0\0676020\03\CAD\SAP\SAP Site Plan and Sections.dwg\TAB:FF GG modified by tmichaud on Dec 16, 2014 - 9:24







Legend

PT-1 ⊛	Proposed Sediment Core Location
- - - - - - - -	DMMU Vertical Boundary
D-1	DMMU Identification

DMMU Elevation Boundaries

🟦	Existing Grade to -22 feet MLLW
🟩	-22 to -26 feet MLLW
🟪	-26 to -30 feet MLLW
🟧	-30 to -34 feet MLLW
🟨	-34 to -38 feet MLLW
🟫	-38 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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Plan View of DMMU Boundaries

Weyerhaeuser Mill A Former Site
Everett, Washington

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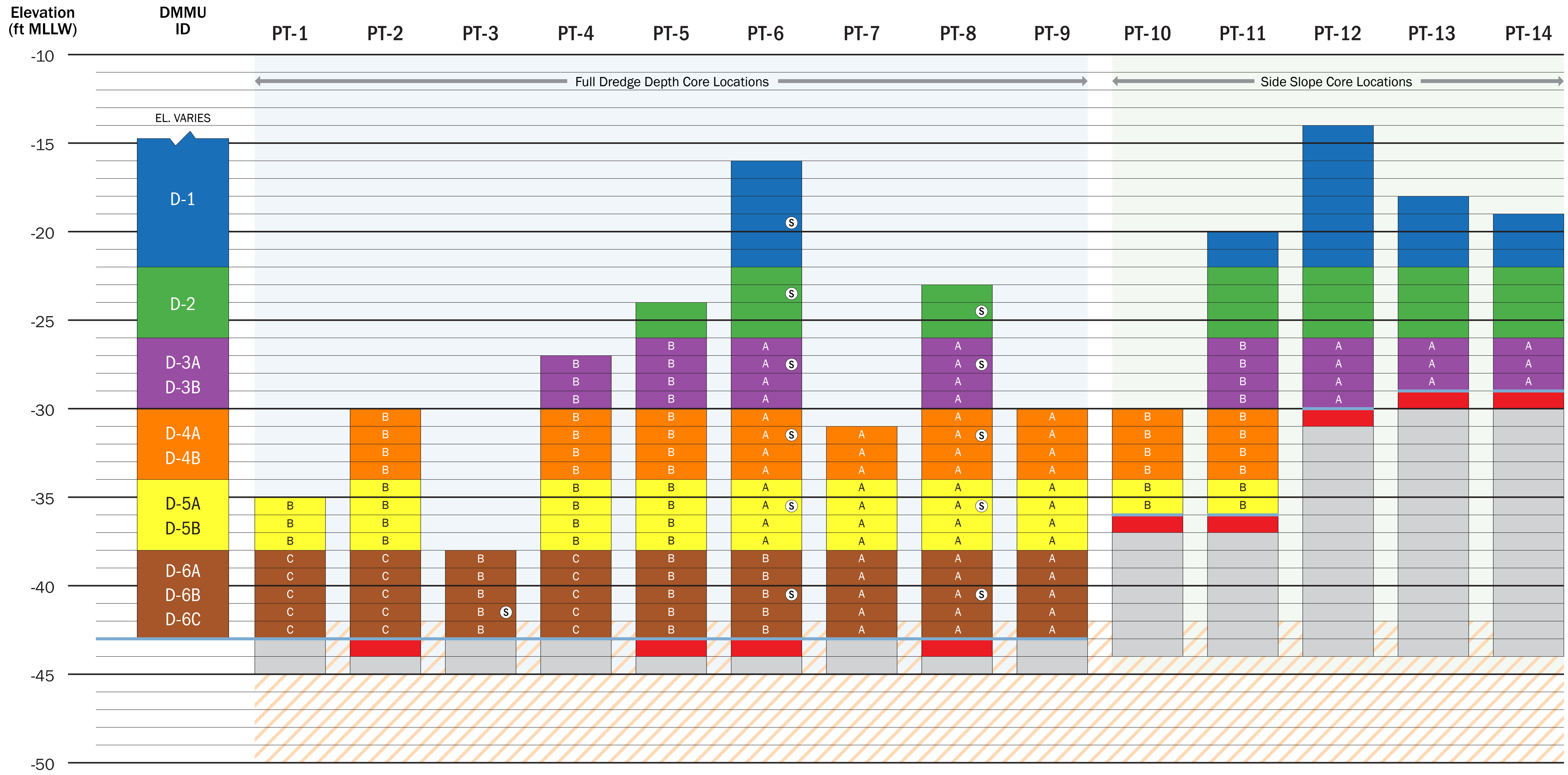
Figure 7

P:\10\0676020\03\CAD\SAP\PLAN VIEW OF DMMU.DWG\TAB:AA CC MODIFIED BY TMICHAUD ON DEC 16, 2014 - 9:29

Sediment Core Location



Notes:

The top of each sediment core is shown at the existing mudline elevation for the core location.

The assumed native horizon for this graphic is -42 ft MLLW. Each sample core will be penetrated to a minimum depth of 2-ft into the native horizon or 2-ft beyond the over-dredge limit, whichever is deeper.

Sample locations within the dredge prism side slope will be completed to a minimum of 2-ft below the native horizon. If the native horizon is encountered before reaching the anticipated side slope, the sample will be completed a minimum of 10 ft below the anticipated side slope.

DMMU = Dredged Material Management Unit
FT = Feet
MLLW = Mean Lower Low Water

Legend:

— Dredge Limit (including overdredge allowance)
▨ Anticipated Native Horizon (assumed at -42 ft MLLW)
🟦🟩🟪🟧🟨🟫 1-ft sample interval to be collected and used as composite material for corresponding color DMMU and individually archived for possible followup analysis
⬜ 1-ft sample interval to be collected and archived
🟥 1-ft sample interval to be collected and analyzed for characterization of exposed surface
Ⓢ Sample to be collected and analyzed for total sulfides

Sediment Core Sampling and Compositing Plan

Weyerhaeuser Mill A Former Site
Everett, Washington

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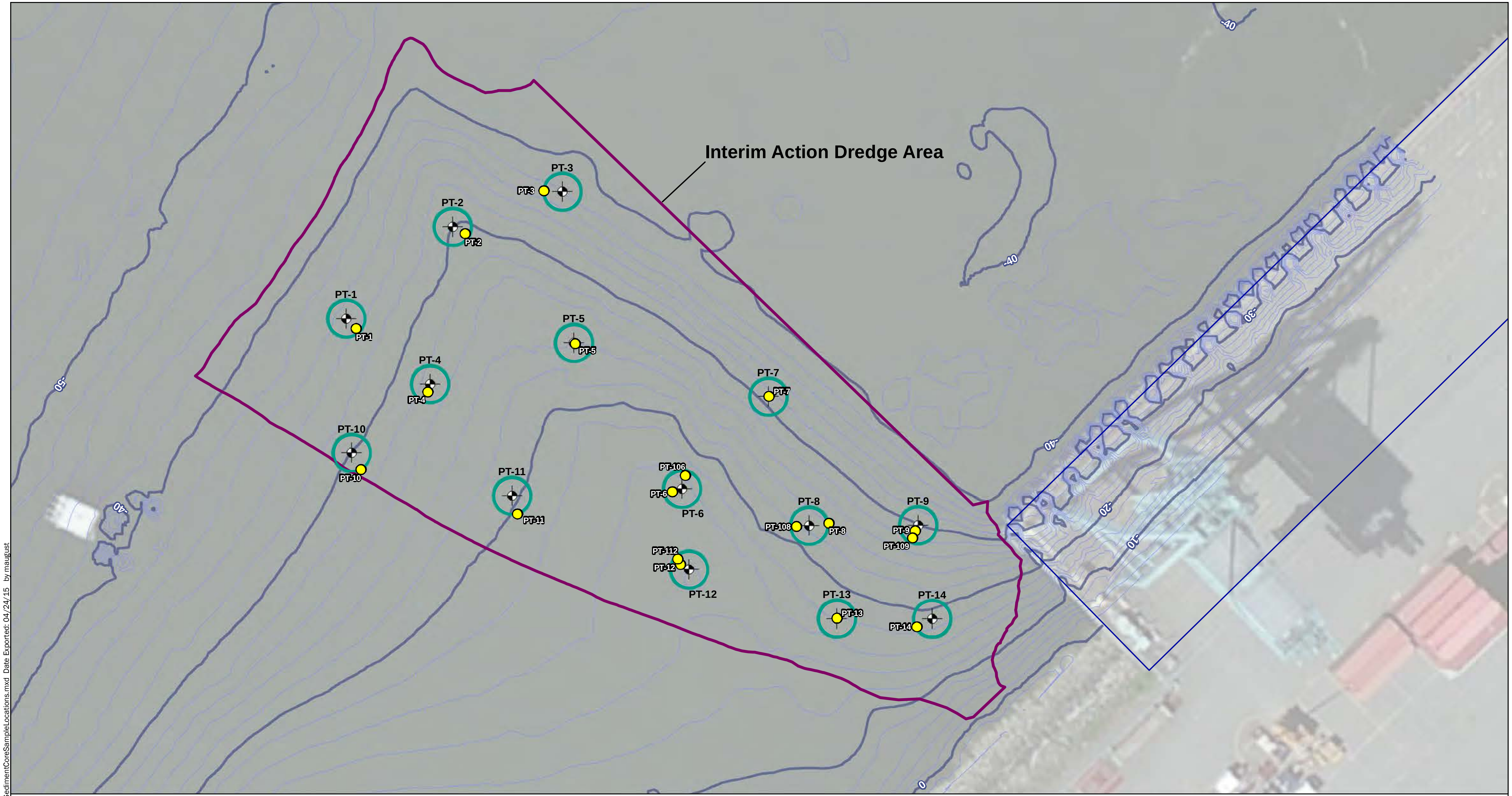
Figure 8



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Data Source:

Projection: NAD 1983 StatePlane Washington North FIPS 4601 Feet

Legend

⊕ Proposed Core Location

● Actual Core Location

○ 10-ft Radius from Proposed Location

N
W E
S

50 0 50
Feet

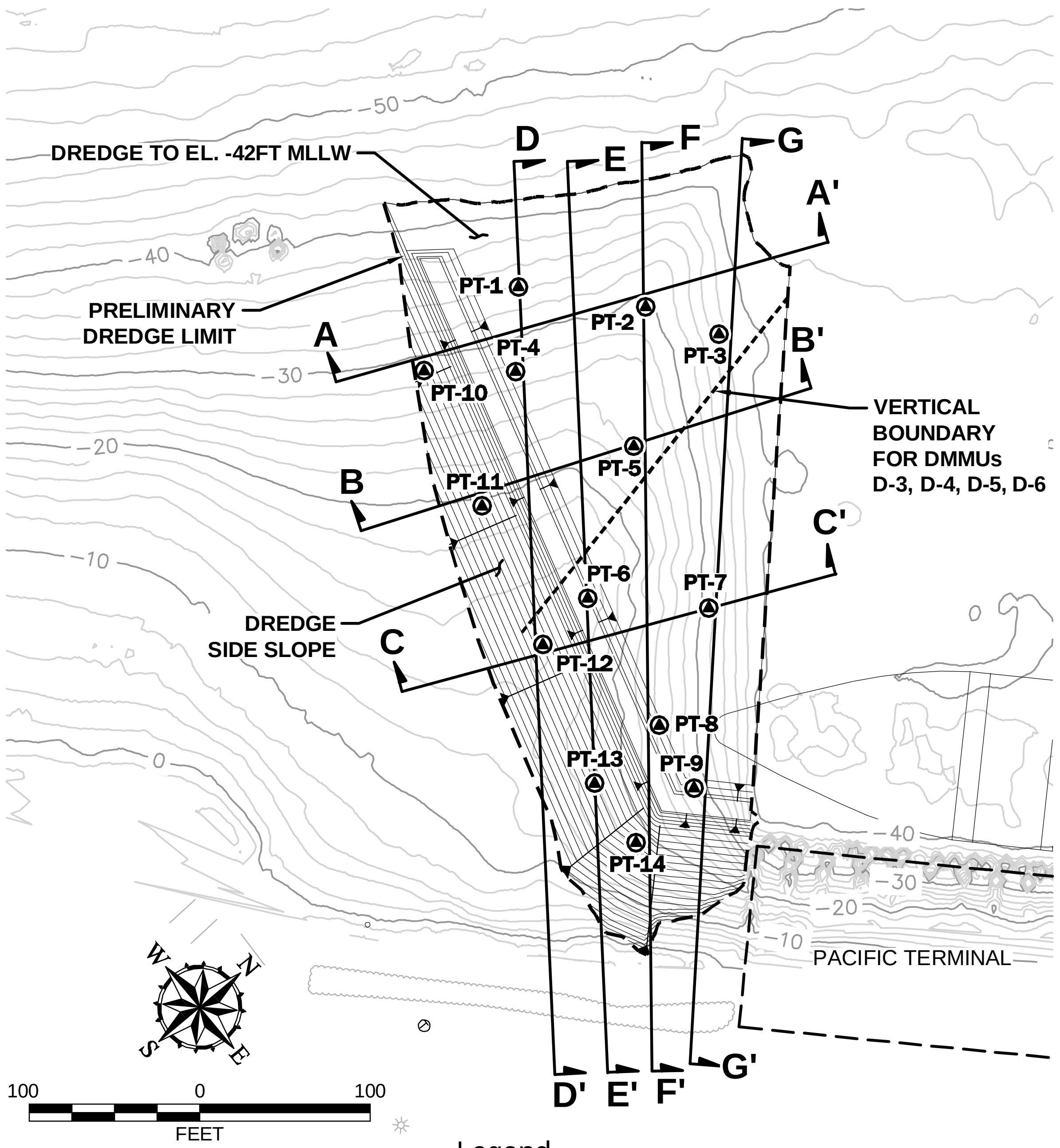
Sediment Core Sample Location

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 9

\\sea\projects\0\0676020\GIS\067602001_SedimentCoreSampleLocations.mxd Date Exported: 04/24/15 by maugust



Legend

PT-1 ● Sediment Core Location

- - - - DMMU Boundary

D-1 DMMU Identification

A A' Cross-Section Location

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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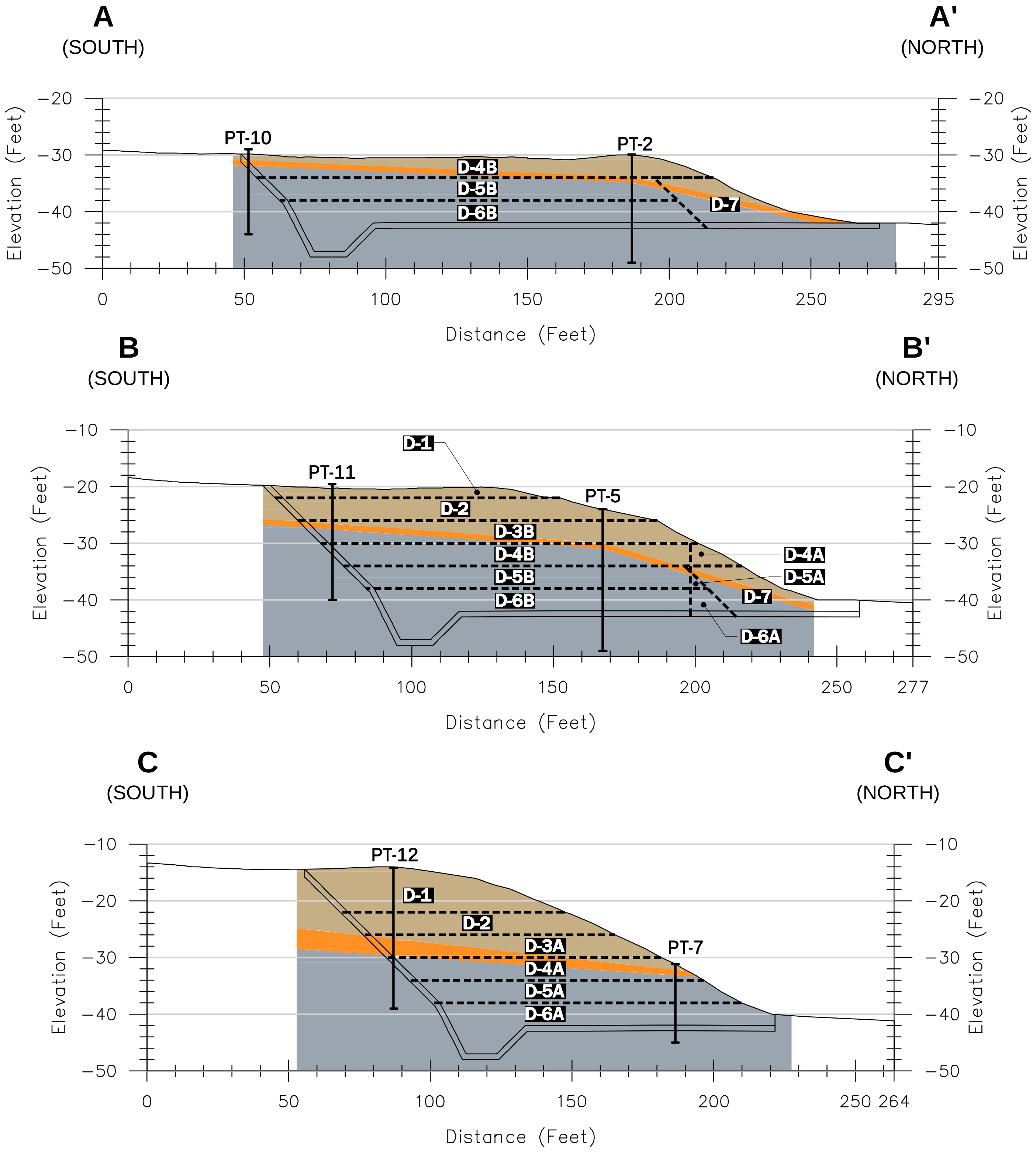

▨	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
▨	Gray silty sand (native material)

50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy - Cross-Sections A-A' through C-C'

Weyerhaeuser Mill A Former Site
Everett, Washington

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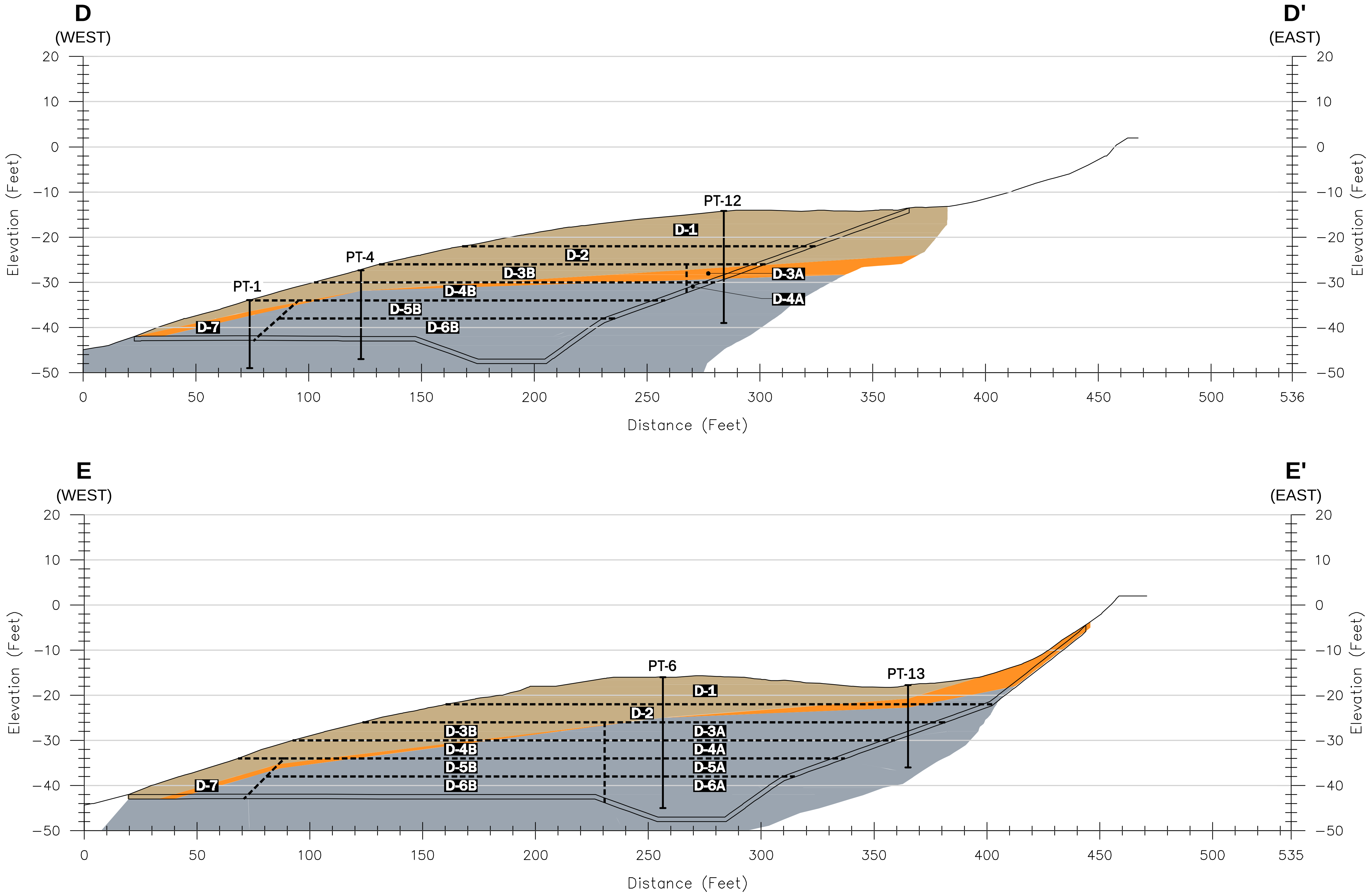
Figure 10

P:\0\0676020\03\CAD\Dredge Material Characterization Report\Figs 3-5 Site Plan and Sections.dwg\TAB:Site Plan AABBCC modified by tmichaud on Jun 02, 2015 - 9:06



Legend

- - - - -	DMMU Boundary
D-1	DMMU Identification
🟫	Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)
🟧	Silt/sand with occasional wood debris (less than 50% by volume)
▩	Gray silty sand (native material)

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Summary of Stratigraphy - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Everett, Washington

GEOENGINEERS

Figure 11

P:\0676020\03\CAD\DREDGE MATERIAL CHARACTERIZATION REPORT\FIGS 3-5 SITE PLAN AND SECTIONS.DWG\TAB:DDEE MODIFIED BY TMICHAUD ON JUN 02, 2015 - 9:07

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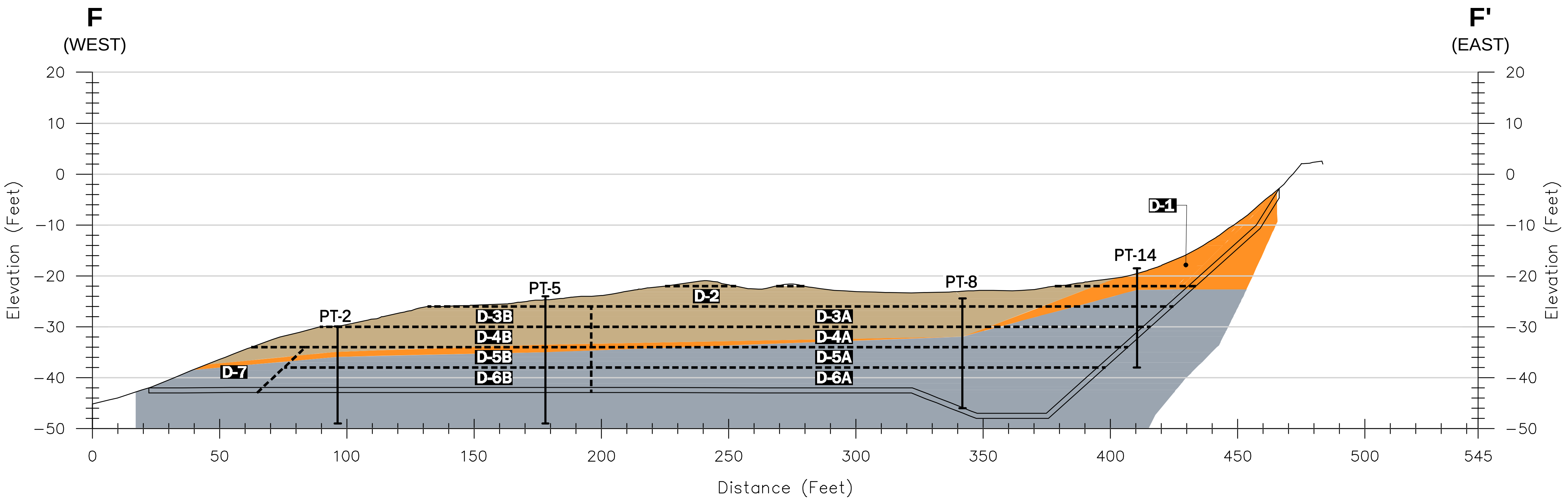

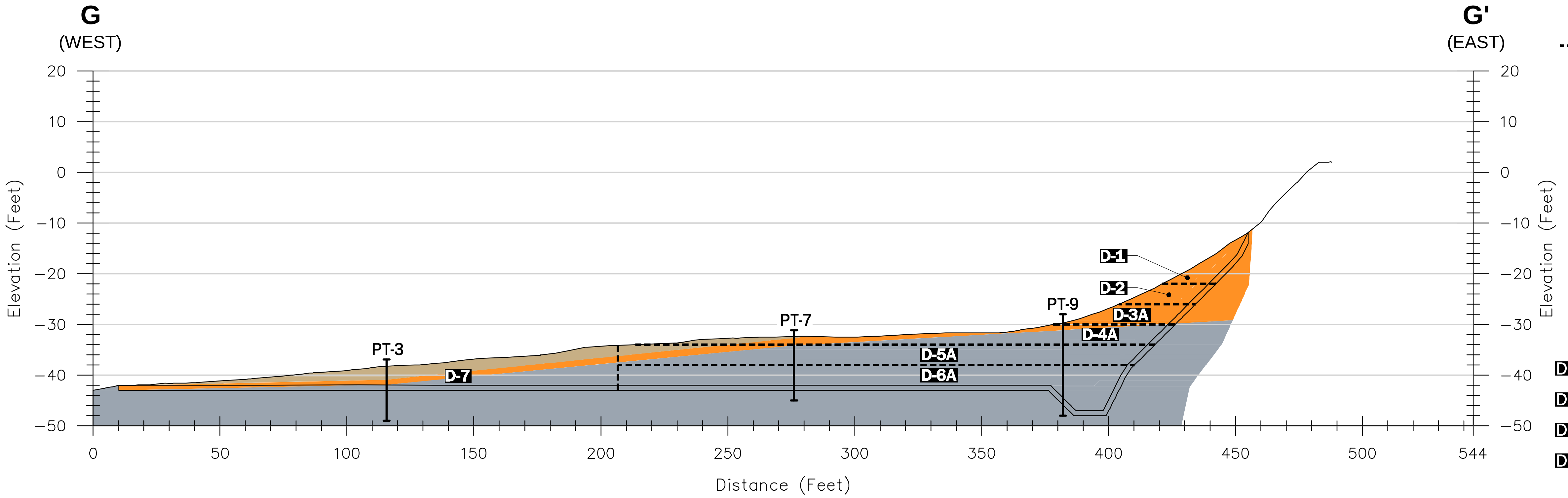

Legend

---- DMMU Boundary

D-1 DMMU Identification

▨ Silt and sand with wood debris greater than 50% by volume (wood debris includes sawdust, fragments of dimensional lumber and wood chips)

▨ Silt/sand with occasional wood debris (less than 50% by volume)

▨ Gray silty sand (native material)

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

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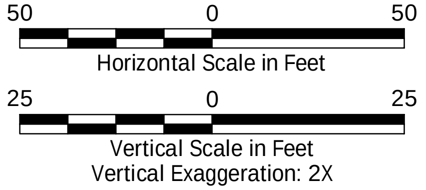
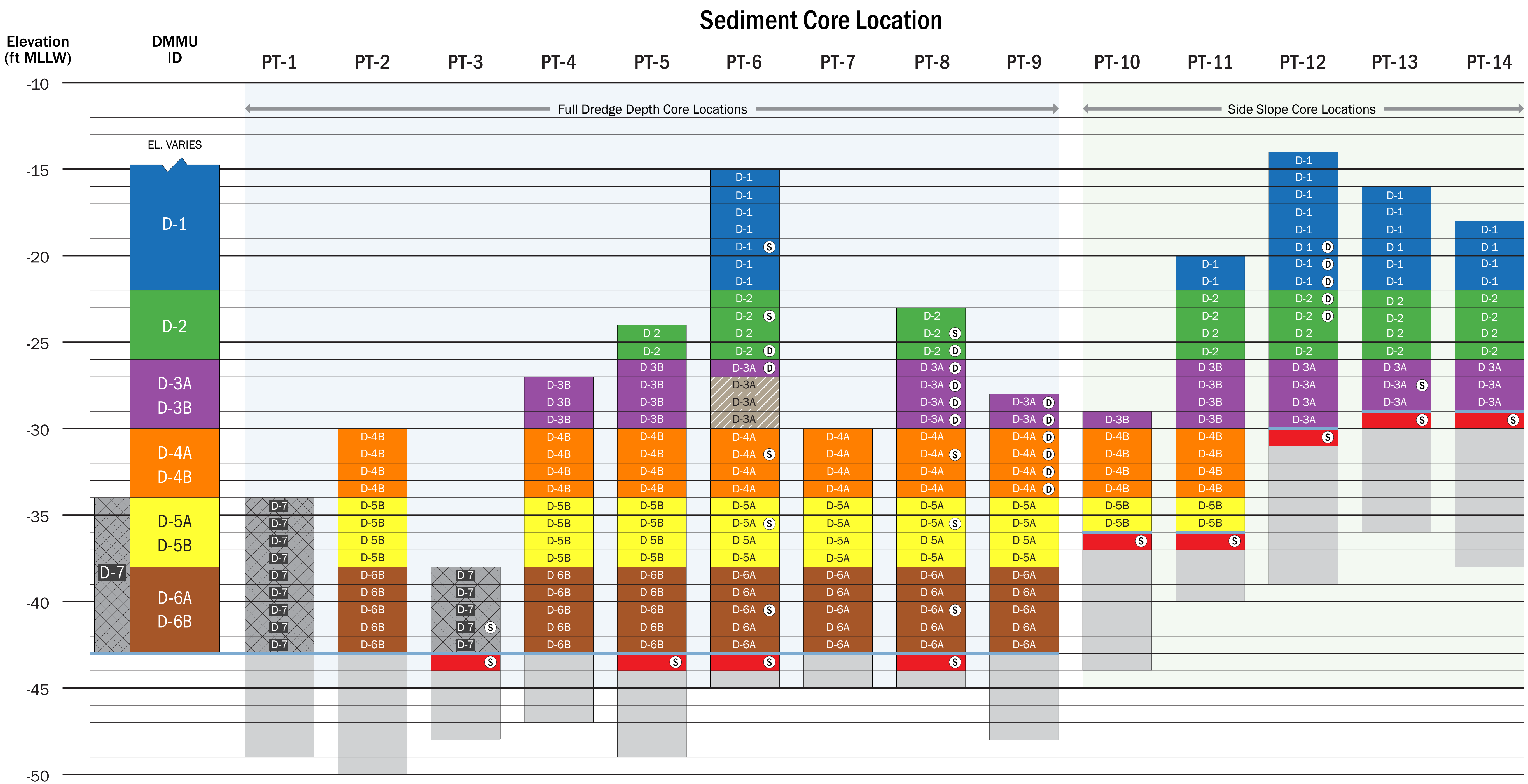


Summary of Stratigraphy - Cross-Sections F-F' and G-G'

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 12



Notes:

The top of each sediment core is shown at the existing mudline elevation for the core location.

Mudline elevations and maximum penetration depths are rounded to the nearest foot.

DMMU = Dredged Material Management Unit
FT = Feet
MLLW = Mean Lower Low Water

Legend:

━	Dredge Limit (including overdredge allowance)
🟦🟩🟪🟧🟨🟫	1-ft sample interval collected and used as composite material for corresponding color DMMU and individually archived
⬜	1-ft sample interval collected and archived
🟥	1-ft sample interval collected and analyzed for characterization of exposed surface (Z-layer)
▨	Sample interval not collected due to poor recovery
Ⓢ	Sample collected and analyzed for total sulfides
Ⓓ	Sample collected from duplicate core (i.e. 106, 108, 109, 112)

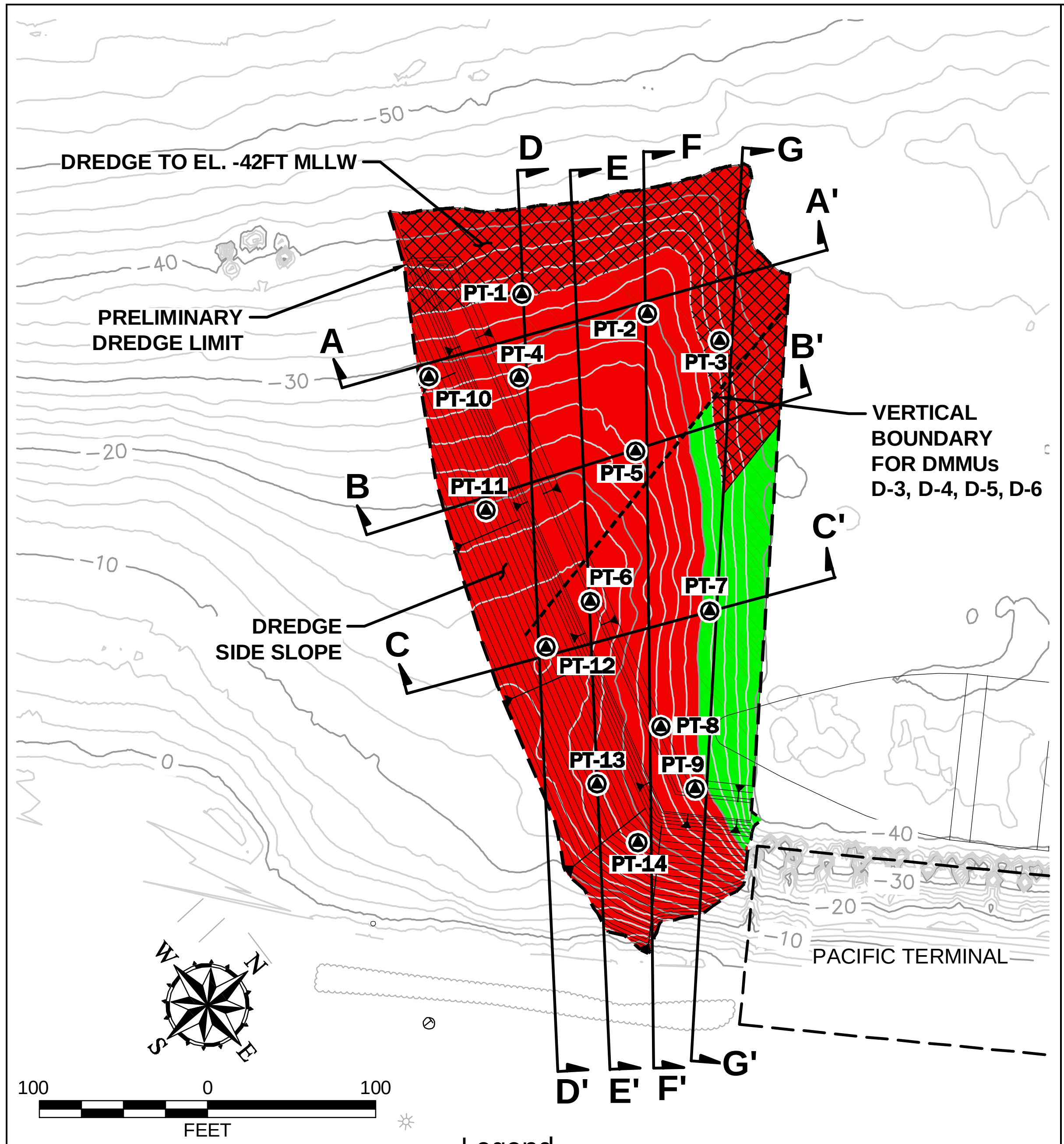
Sediment Core Sampling and DMMU Compositing Summary

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 13

\\sea\projects\0\0676020\03\Figures\Figure 6 Mill-a-sediment-core-sampling-and-dmmu-compositing-summary.ai Date Exported :06-05/15 by spride



Legend

- PT-1 ⓐ Sediment Core Location
- ---- DMMU Boundary
- **D-1** DMMU Identification
- A A' Cross-Section Location
- 🟥 Chemical analytical results indicate one or more analytes exceeding screening levels.
- 🟩 Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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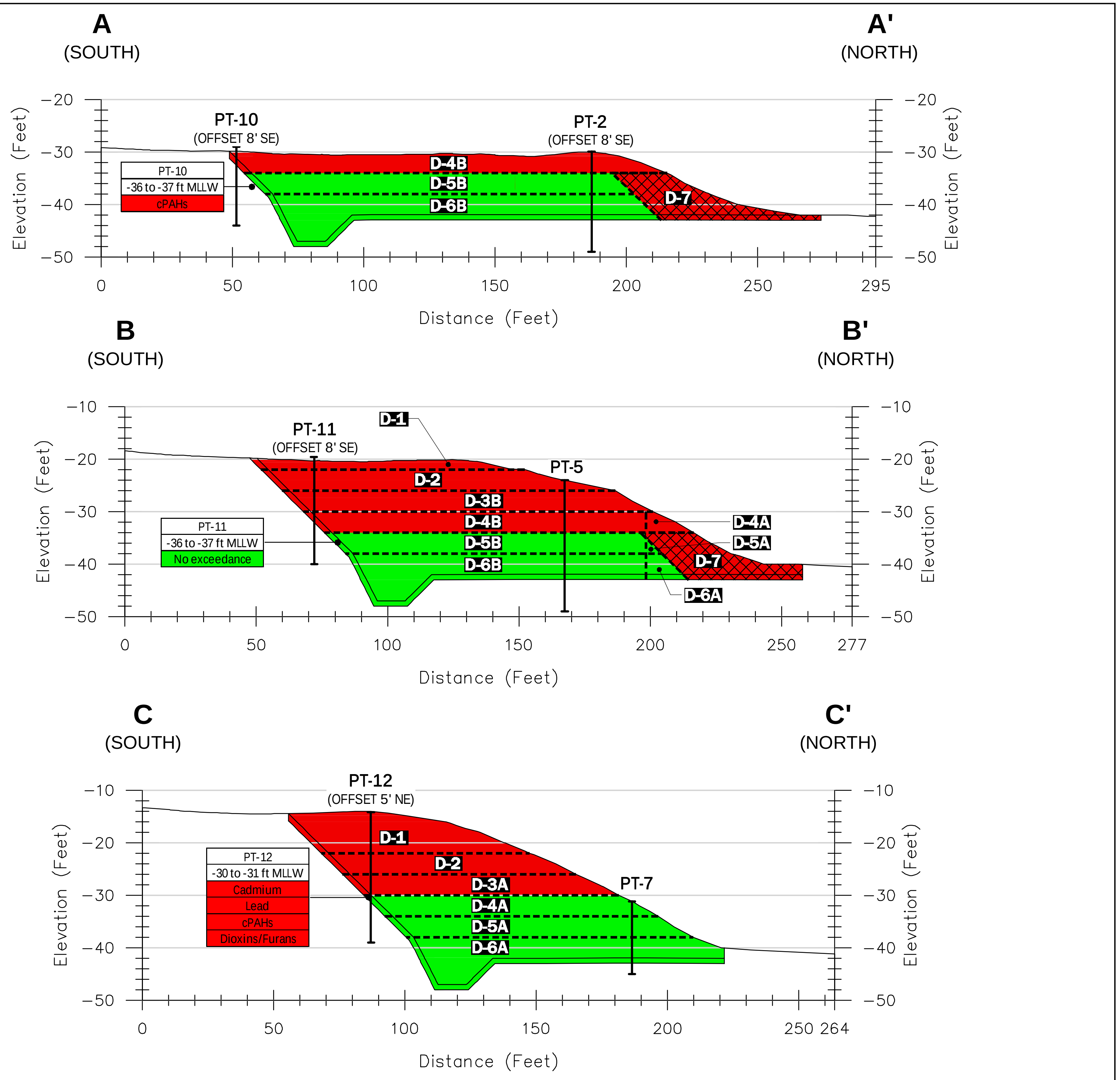


50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections A-A' through C-C'

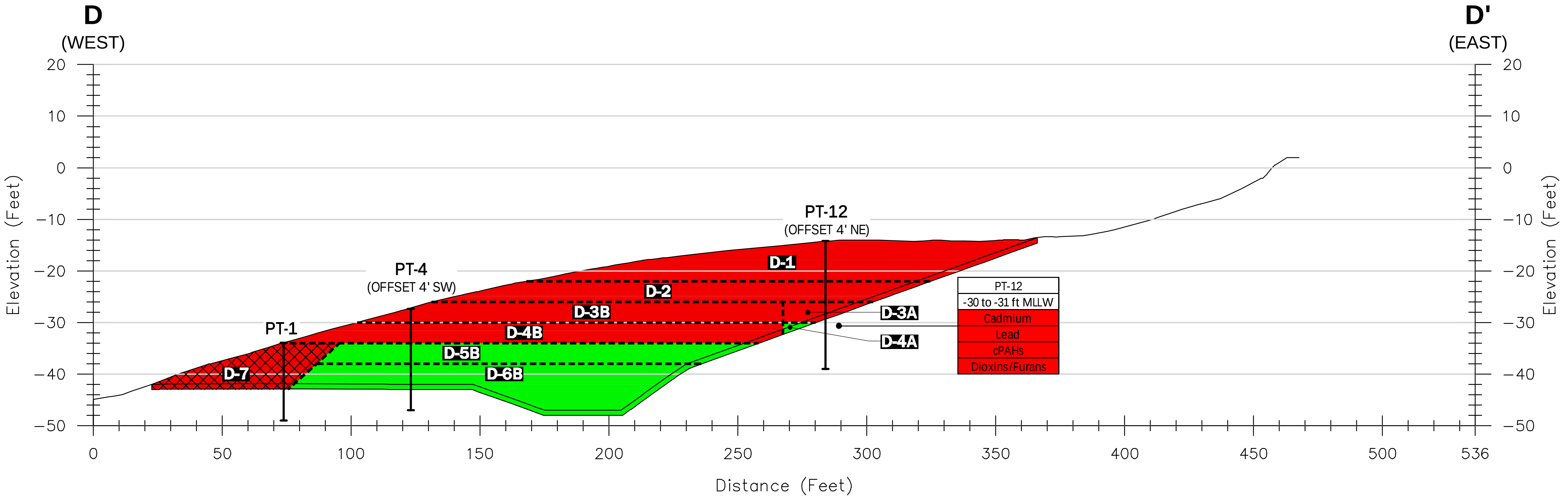
Weyerhaeuser Mill A Former Site
Everett, Washington

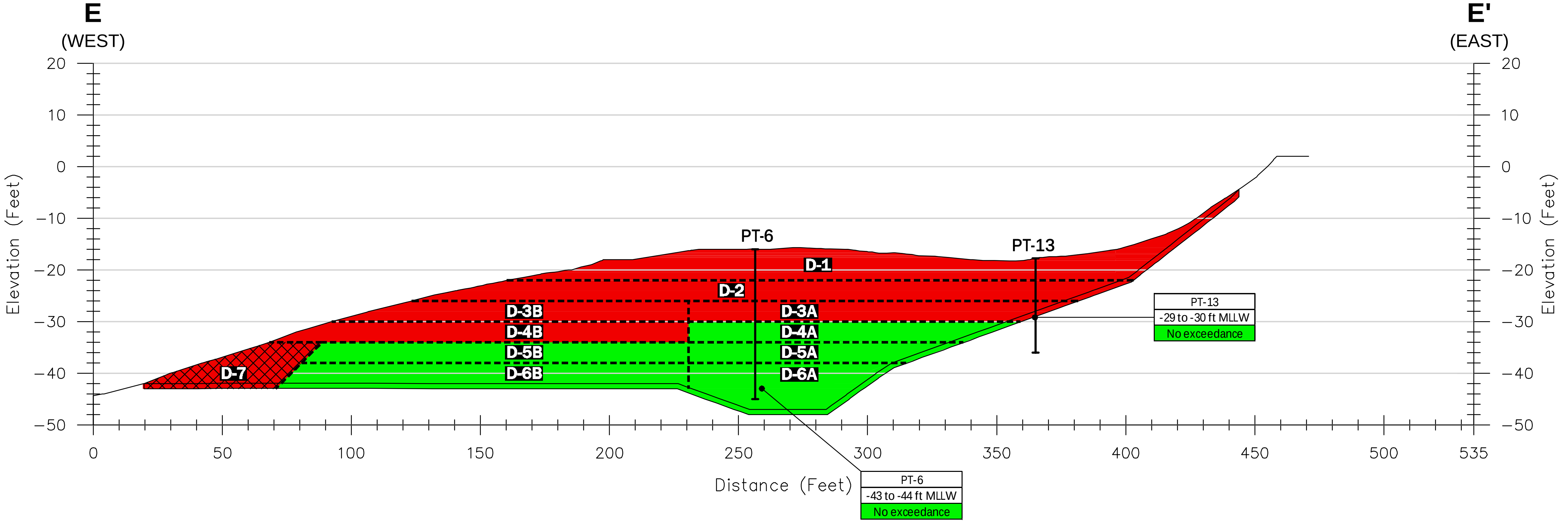
GEOENGINEERS

Figure 14

P:\0\0676020\03\CAD\Dredge Material Characterization Report\Figs 7-9 Sampling Plan Site Plan and Sections.dwg\TAB:Site Plan AABBCC modified by tmichaud on Jun 04, 2015 - 13:42

P:\0676020\03\CAD\Dredge Material Characterization Report\Figs 7-9 Sampling Plan Site Plan and Sections.dwg\TAB:DDEE modified by tmichaud on Jun 04, 2015 - 13:45





Legend

-------- DMMU Boundary

D-1 DMMU Identification

🟥 Chemical analytical results indicate one or more analytes exceeding screening levels.

🟩 Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

1. The locations of all features shown are approximate.
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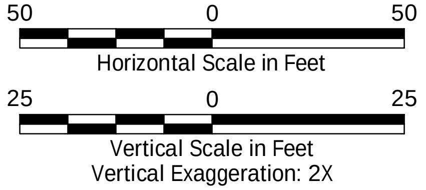
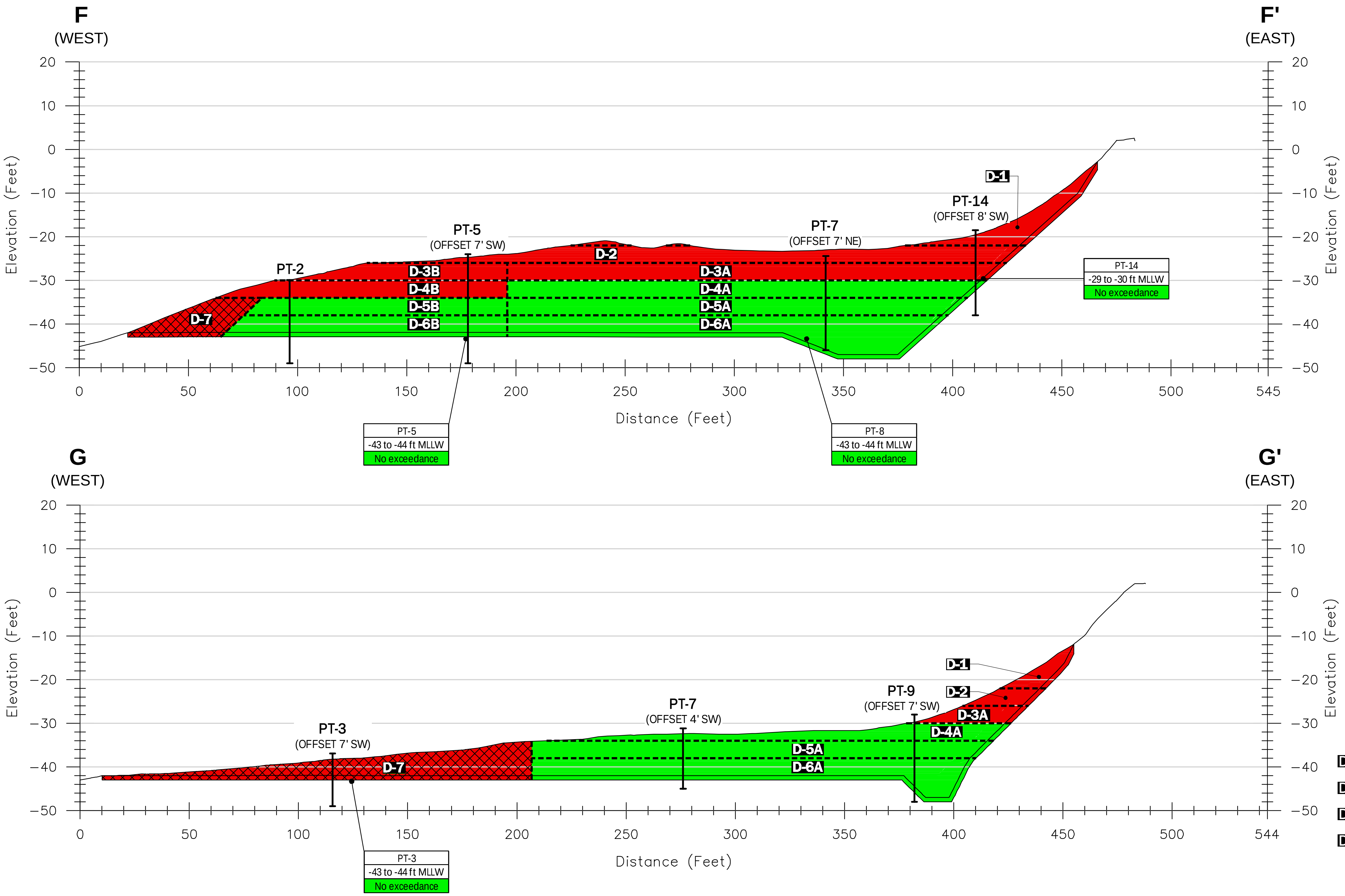


Chemical Analytical Results - Cross-Sections D-D' and E-E'

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 15



Legend

- - - - DMMU Boundary
D-1 DMMU Identification
🟥 Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩 Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW

Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

Notes

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50 0 50
Horizontal Scale in Feet

25 0 25
Vertical Scale in Feet
Vertical Exaggeration: 2X

Chemical Analytical Results - Cross-Sections F-F' and G-G'

Weyerhaeuser Mill A Former Site
Everett, Washington

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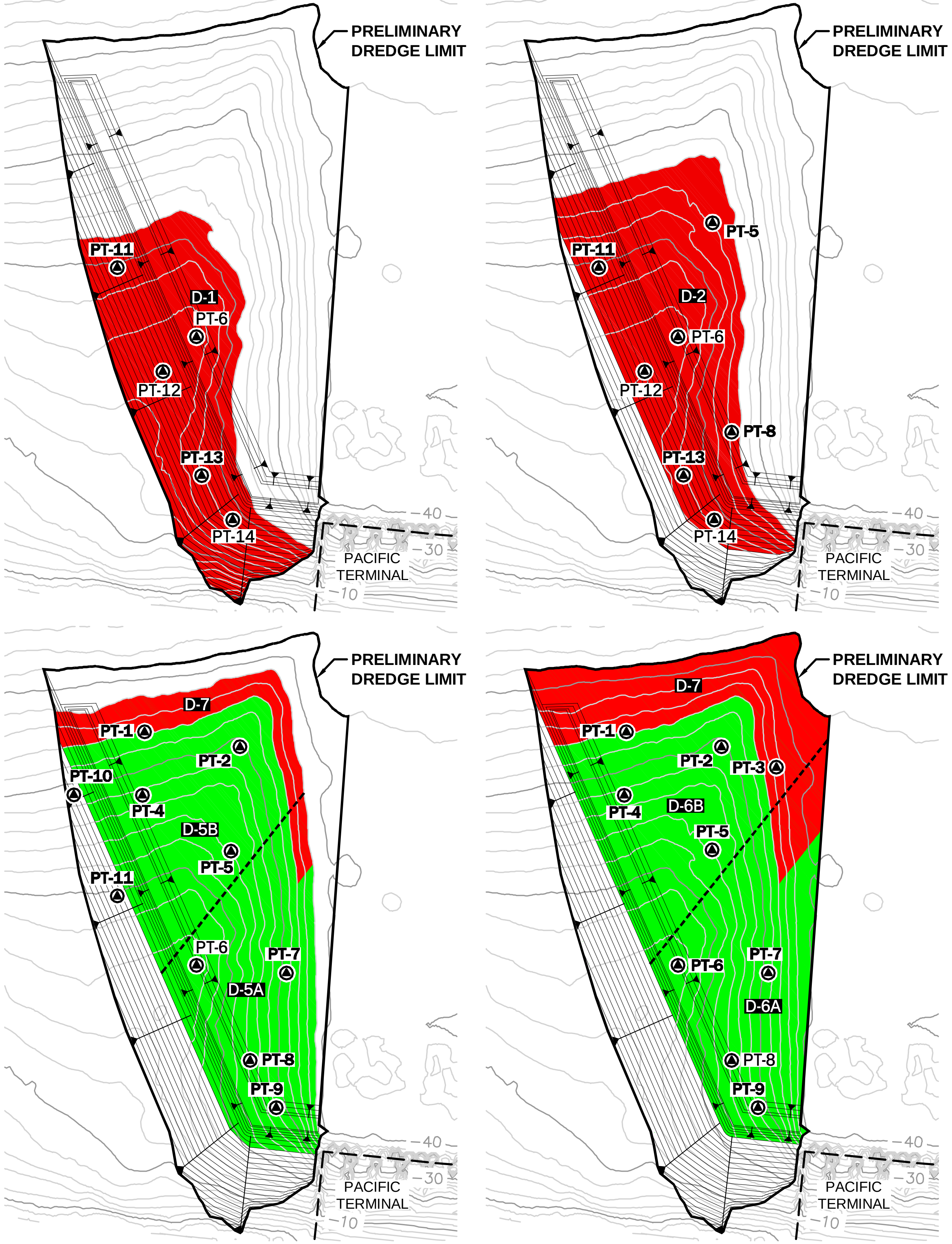
Figure 16

P:\0676020\03\CAD\Dredge Material Characterization Report\Figs 7-9 Sampling Plan Site Plan and Sections.dwg\TAB:FFGG modified by tmichaud on Jun 04, 2015 - 13:54

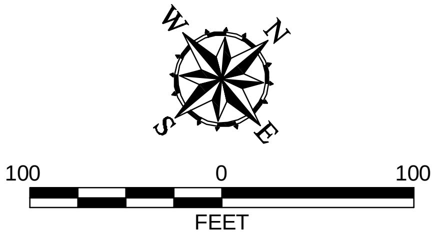


Legend

PT-1 ⊛	Sediment Core Location
- - - - -	DMMU Vertical Boundary
D-1	DMMU Identification
🟥	Chemical analytical results indicate one or more analytes exceeding screening levels.
🟩	Chemical analytical results indicate no exceedances of screening levels.

DMMU Elevation Boundaries

D-1	Existing Grade to -22 feet MLLW
D-2	-22 to -26 feet MLLW
D-3A & D-3B	-26 to -30 feet MLLW
D-4A & D-4B	-30 to -34 feet MLLW
D-5A & D-5B	-34 to -38 feet MLLW
D-6A & D-6B	-38 to -43 feet MLLW
D-7	Surface DMMU -34 to -43 feet MLLW



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

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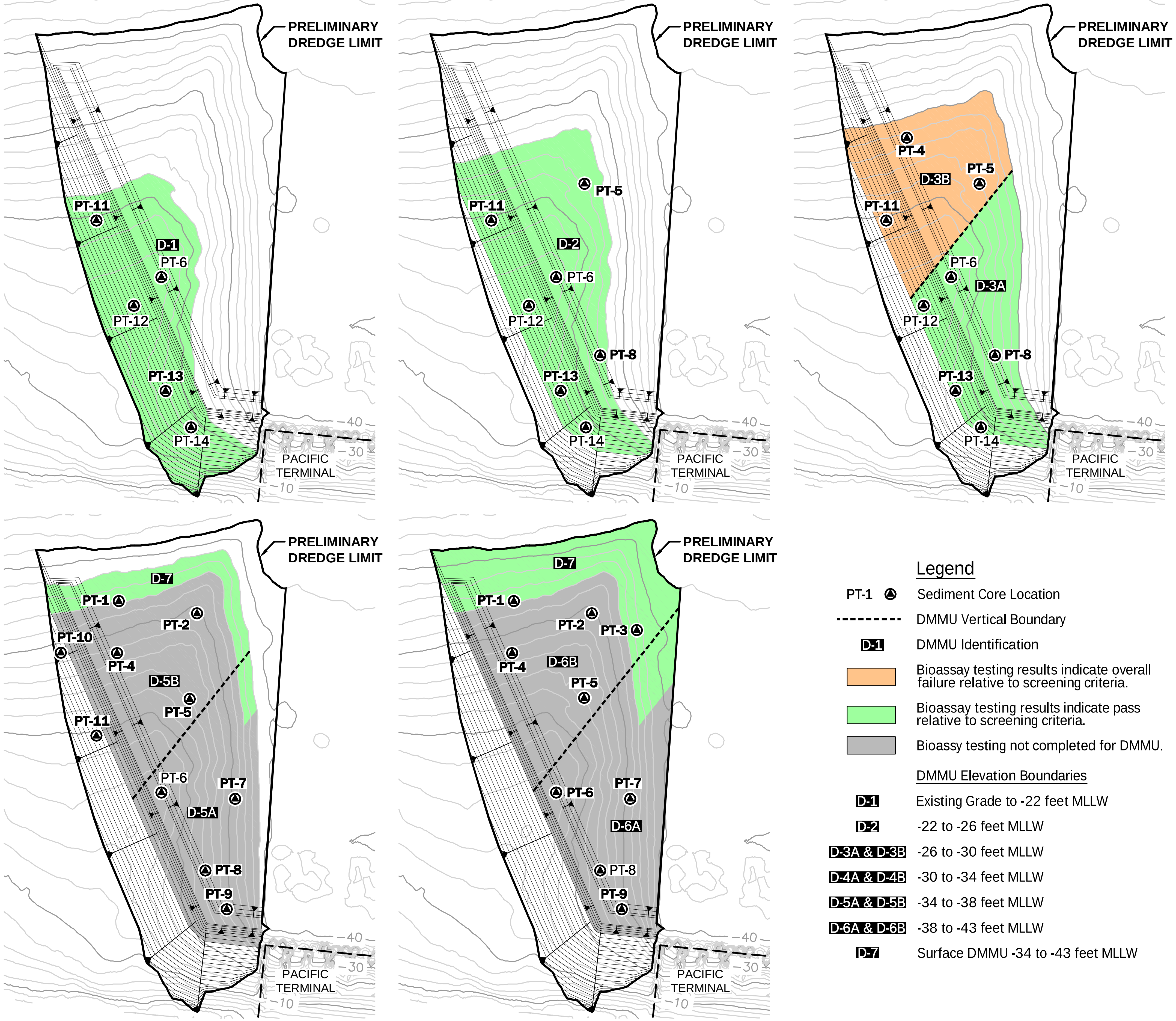
Chemical Analytical Results - Plan View

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 17

P:\0676020\03\CAD\Dredge Material Characterization Report\Figs II Biological Testing Results.dwg\TAB:AA CC Modified by tmichaud on Jun 02, 2015 - 9:09



Data Source: Bathymetry from Pacific Geomatic Services, Inc., Completed September 2014.

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Biological Testing Results - Plan View

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 18

APPENDIX C
Health and Safety Plan (HASP)

Health and Safety Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

for

Washington State Department of Ecology on behalf of Port of Everett

July 29, 2015

GeoEngineers
Plaza 600 Building
600 Stewart Street, Suite 1700
Seattle, Washington 98101
206.728.2674

Health and Safety Plan

Weyerhaeuser Mill A Former Cleanup Site
Interim Action Dredging Project
Everett, Washington

File No. 0676-020-03

July 29, 2015

Approvals:

Signature: Date: 7/29/15

Robert S. Trahan, Senior Environmental Geologist, GeoEngineers

Signature: Iain Wingard Date: 7/29/15

Iain H. Wingard, Associate, GeoEngineers

GEOENGINEERS

Table of Contents

1.0 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared to address anticipated hazards and emergency response procedures for GeoEngineers personnel during interim action dredging that will be performed at the Weyerhaeuser Mill A Former Cleanup Site (Site; Facility Site ID #1884322) located in Everett, Washington. This HASP is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the written safety programs and this HASP constitute the Site safety plan for the Interim Action Dredging Project. This plan is to be used by GeoEngineers personnel and a copy of this plan must be available on Site. If the work entails potential exposures to hazardous substances or unusual situations beyond those identified in this document, the HASP will be amended, as appropriate and will be reviewed by the GeoEngineers Health and Safety Manager for approval. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

Interim action dredging is being performed by the Port of Everett (Port) under the amended Agreed Order (AO) with the Washington State Department of Ecology (Ecology) for the Site (AO No. NE 8979). A detailed description of the Interim Action, including approach and procedures are presented in the Interim Action Work Plan (GeoEngineers, 2015).

GENERAL PROJECT INFORMATION

Project Name	Weyerhaeuser Mill A Former Site Interim Action Dredging Project
GeoEngineers Project Number	0676-020-03
Type of Project	Construction Observation
Project Address	3500 Terminal Avenue, Everett, Snohomish County, Washington
Coordinates	N47°58'43.73", W 122°13'30.79"
Section, Township and Range	NW ¼ of S30 T29N R5E, Willamette Meridian
Start/Completion	Fall 2015
Contractors	TBD
Subcontractors	TBD

Liability Clause: If requested by subcontractors, this HASP may be provided for informational purposes only. In this case, Form 1 shall be signed by the subcontractor. Please be advised that this HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on the Project Site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

2.0 BACKGROUND INFORMATION

Detailed information regarding background information, including Site location, physical description, use history, summary of previous environmental investigations and identification of hazardous substances are presented in the Interim Action Work Plan. This information is summarized in the following sections.

2.1. Site Description

The Site is generally located at the Port's South Terminal area between Pier 1 and Pigeon Creek Road off Terminal Avenue, Everett, Snohomish County, Washington. The South Terminal is located in the northwest quadrant of Section 30, Township 29 North, Range 5 East in Snohomish County, Everett, Washington. The street address is 3500 Terminal Avenue in Everett, Washington. The majority of the South Terminal property is generally flat, paved and contains several buildings that support the terminals operation. Current terminal operations include container and break bulk cargo storage.

2.2. Site History

The area comprising the Weyerhaeuser Mill A Former Site was first developed in the late 1800s. Historical industrial activities at the Site included pulp manufacturing, saw milling, ship building, shingle milling, and log handling. While operating as a sulfite pulp mill, the facility produced about 300 tons of pulp per day. All pulping operations at the Site ceased in 1980. The Port purchased the property in 1983 for development. The Site is currently being used by the Port for break bulk and container cargo storage.

2.3. Contaminants of Concern

Previous environmental investigations conducted at the Site by the Port and other parties have identified the following contaminants of concern (COCs) at concentrations exceeding sediment screening levels:

- Metals (arsenic, cadmium, chromium, copper, lead, mercury, silver, and zinc);
- Semi-volatile organic compounds (SVOCs) (primarily polycyclic aromatic hydrocarbons [PAHs] and dibenzofuran);
- Polychlorinated biphenyls (PCBs); and
- Dioxins and furans.

In addition, wood debris including sawdust, wood chips or fragments, and bark have also been observed at multiple sediment sample locations adjacent to the Interim Action area. The quantity of wood debris in samples collected from locations adjacent to the Interim Action area ranges from trace amounts to 100 percent.

3.0 WORK PLAN

3.1. Project Description

In accordance with the Interim Action Work Plan, dredging will be completed using barge-based clamshell and/or fixed-arm excavation equipment as required to effectively remove the sediment and wood debris. The dredged material will be placed on barges for dewatering within the project work area as allowed by the agency-approved permit conditions. Dredge material that is suitable for open water disposal is expected to be transferred to the Port Gardner open-water disposal site located in Everett, Washington and deposited in accordance with the approved Aquatic Use Authorization. Contaminated dredged material that is unsuitable for open water disposal will be offloaded at an upland transload facility (either at the South Terminal or at an off-site facility appropriate for transloading and materials handling) using land based excavation equipment. Specific details of the interim action dredging is presented in the Interim Action Work Plan.

3.2. Schedule

Dredging and other Interim Action activities will occur within the permitted, allowed in-water work windows. The Interim Action is currently scheduled to be performed within the 2016/2017 in-water work window and is anticipated to occur between August 15, 2016 and February 15, 2017.

3.3. List of Field Activities

As part of the interim action, GeoEngineers will oversee dredging activities and the placement slope armor and habitat materials. Anticipated Field activities to be completed by GeoEngineers personnel include:

- Verifying elevations to confirm that the wood debris and sediment with chemical concentrations greater than Model Toxics Control Act (MTCA) and Dredged Material Management Program (DMMP) criteria as determined by the dredging plan elevations has been removed prior to dredging of the underlying native sand and silt.
- Inspection of the sources of armoring and habitat mix and sampling and analysis of the habitat mix.
- Confirmation of the placement of armoring on the transition slope to cover sediment with chemical concentrations greater MTCA screening levels.
    - Existing sampling and analysis data will be used as a basis to confirm that the exposed surfaces at the design target navigation elevation of -42 feet MLLW meet MTCA screening levels. Sediment sampling and analysis completed as part of the Site remedial investigation in and around the Interim Action area will be used to verify compliance with the final MTCA cleanup criteria.
- General oversight during dredging to verify that the work is being performed in compliance with regulatory and permit requirements and that best management practices (BMPs) are being implemented to protect the environment during construction.

3.4. List of Field Personnel and Training

Anticipated field personnel include the following:

- Abhijit Joshi
- Robert Trahan
- Nathan Solomon
- Garret Leque

Field personnel will have appropriate training (HAZWOPER, first aid, respirator fit test, HAZWOPER supervisor training) and up to date certifications.

3.5. Chain of Command

Key project personnel and GeoEngineers chain of command for the Interim Action Dredge Project is presented in the following table. Functional responsibilities for GeoEngineers personnel during implementation of the interim action are described in the following sections.

KEY PROJECT PERSONNEL AND CHAIN OF COMMAND

Chain of Command	Title	Name	Telephone Numbers
1	Health and Safety Program Manager	Wayne Adams	(o) 253.383.4940 (c) 253.350.4387
2	Project Manager	Iain Wingard	(o) 253.383.4940 (c) 206.595.7402
3	Site Safety Officer (SSO)	Robert Trahan	(o) 206.239.3250 (c) 206.679.1643
4	Field Personnel	Abhijit Joshi Robert Trahan Nathan Solomon Garret Leque	(c) 425.223.9028 (c) 206.240.2300 (c) 253.732.2138 (c) 253.312.7958
5	Client Assigned Site Supervisor	Eric Gerking	(o) 360.757.0011
N/A	Subcontractor(s)	TBD	TBD
N/A	Current Owner	Port of Everett	(o) 800.729.7678

3.5.1. *Health and Safety Program Manager (HSM), Wayne Adams*

GeoEngineers' Health and Safety Program Manager (HSM) is responsible for implementing and promoting employee participation in the program. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons, and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

3.5.2. *Project Manager (PM)*

The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or she is also responsible for assuring that appropriate HASPs complying with this manual are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. The PM shall keep the HSM of the project's health- and safety-related matters as necessary. The PM shall designate the project Site Safety

Officer (SSO) and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the Site Safety Officer (SSO) when appropriate.

3.5.3. Site Safety Officer

The SSO will have the on-site responsibility and authority to modify and stop work, or remove personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation.

The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct safety meetings and site safety inspections as required, coordinate emergency medical care, and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced field work experience and shall be familiar with health and safety requirements specific to the project. The SSO will be First Aid and CPR qualified and current Hazardous Waste Operations and Emergency Response (HAZWOPER) training. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed. Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring compliance with its guidelines by staff.
- Ensuring that GeoEngineers field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with health and safety practices in the field.
- Directing decontamination operations of equipment and personnel.
- Documenting site accidents, illnesses and unsafe activities or conditions, and reporting them to the PM and the HSM.
- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities and consult with the PM and the HSM regarding new or unanticipated site conditions, including emergency response activities.
    - If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, the SSO will notify/consult with the PM.
    - If field monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the SSO will notify/consult with the PM and HSM to identify appropriate corrective actions.

3.5.4. Field Employees

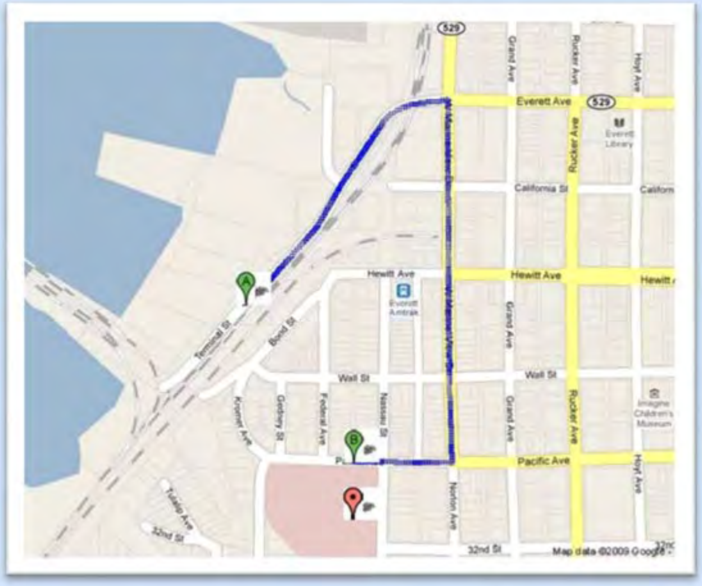
Employees working on-site that have the potential of coming in contact with hazardous substances or physical hazards are responsible for participating in the health and safety program and complying with the site specific health and safety plans. These employees are required to:

- Participate and be familiar with the health and safety program as described in this manual.
- Notify the SSO that when there is need to stop work to address an unsafe situation.
- Comply with the HASP and acknowledge understanding of the plan.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to incidents or accidents that could result in physical injury or exposure to hazardous materials.
- Be current in health and safety training, including initial 40-hour Occupational Safety and Health Administration (OSHA) course, annual 8-hour HAZWOPER refresher, and First Aid/cardiopulmonary resuscitation (CPR) training and participate in the medical surveillance program if applicable.

3.5.5. Contractors Under GeoEngineers Supervision

Contractors working on the site under GeoEngineers supervision or direct control that have the potential of coming in contact with hazardous substances or physical hazards shall have their own health and safety program that is in line with the site specific health and safety plan.

3.6. Emergency Information

Hospital Name	Providence Regional Medical
Hospital Address	Center 916 Pacific Avenue Everett, Washington 98201
Phone Number (Hospital ER)	(425) 258-7123
Driving Distance	0.8 Miles
Driving Directions	1. Head **northeast** on **Terminal** Street 2. Continue onto **Everett Avenue** 3. Turn **right** on **West Marine View Drive** 4. Turn **right** at the 3rd cross street onto **Pacific Avenue** 5. Destination will be on the **left**
Driving Map	

3.6.1. *Standard Emergency Procedures*

- **Get help**
  - Send another worker to phone 9-1-1 (if necessary)
  - As soon as feasible, notify GeoEngineers' SSO and/or PM
- **Reduce risk to injured person**
  - Turn off equipment
  - Move person from injury location (if in life-threatening situation only)
  - Keep person warm
  - Perform CPR (if necessary)

- **Transport injured person to medical treatment facility (if necessary) -**
  - By ambulance (if necessary) or GeoEngineers vehicle
  - Stay with person at medical facility
  - Keep GeoEngineers manager apprised of situation and notify Human Resources Manager of situation

4.0 HAZARD ANALYSIS

This section presents hazards that may be potentially present at the Site. A hazard assessment will be completed at every Site prior to beginning field activities. Updates will be included in the daily log. Anticipated physical, biological, ergonomic and chemical hazards are summarized below.

4.1. Physical Hazards

Physical hazards at the Site may include:

- Backhoe
- Trackhoe
- Front End Loader
- Over-Water Work (see Section 7.0 - Boat, Over-Water and Near Water Safety Program)
- Tripping/puncture hazards (debris on-site, steep slopes or pits)
- Unusual traffic hazard – cargo container and marine traffic
- Heat/Cold, humidity

4.1.1. Safe Work Practices

- High-visibility vests will be worn by on-site personnel to ensure they can be seen by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Personnel will avoid tripping hazards, steep slopes, pits and other hazardous encumbrances.
  - If it becomes necessary to work within 6 feet of the edge of a pit, slope or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety and Health Supervisor in accordance with OSHA/DOSH regulations and the GeoEngineers Health and Safety Program.
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.

- Heat stress control measures required for this site will be implemented according to GeoEngineers Health and Safety Program with water provided on site.

- Excessive levels of noise (exceeding 85 dB) are not anticipated, however, personnel potentially exposed will wear ear plugs or muffs with a noise reduction rating (NRR) of at least 25 dB whenever it becomes difficult to carry on a conversation 3 feet away from a co-worker or whenever noise levels become bothersome. (Increasing the distance from the source will decrease the noise level noticeably.)

4.1.2. Cold Stress Prevention

Working in cold environments presents many hazards to Site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing) or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by Site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

4.1.3. Heat Stress Prevention

State and federal OSHA regulations provide specific requirements for handling employee exposure to heat stress. GeoEngineers' program complies with these requirements and will be implemented in all areas where heat stress is identified as a potential health issue.

General requirements for preventing heat stress apply to outdoor work environments from May 1 through September 30, annually, only when employees are exposed to outdoor heat at or above an applicable temperature listed in the following Table. To determine which temperature applies to each worksite, select the temperature associated with the general type of clothing or personal protective equipment (PPE) each employee is required to wear.

HEAT STRESS

Type of Clothing	Outdoor Temperature Action Levels (Degrees Fahrenheit)
Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52°
Double-layer woven clothes including coveralls, jackets and sweatshirts	77°
All other clothing	89°

Keeping workers hydrated in a hot outdoor environment requires that more water be provided than at other times of the year. GeoEngineers is prepared to supply at least one quart of drinking water per employee per hour. When employee exposure is at or above an applicable temperature listed in the above table, Project Managers shall ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times; and

- All employees have the opportunity to drink at least one quart of drinking water per hour.

4.2. Biological Hazards

Biological hazards can come in the form of wildlife such as rodents, wild animals, insects and spiders. Each of the hazards can present concerns. Exposure can be minimized by following the measures below:

4.2.1. Rodents and Wildlife

Live animals can inflict wounds and can spread diseases such as Rat Bite Fever and Rabies.

- Avoid contact with wild or stray animals. If bitten or scratched, get medical attention immediately.
- Avoid contact with rats or rat-infested buildings. If you can't avoid contact, wear protective gloves and wash your hands regularly.
- Avoid contact with animal and bird droppings. Particles can become airborne and, if inhaled, cause sickness.
- Report dead animals to the proper authorities so they can be disposed of properly.

4.2.2. Insects, Bees and Spiders

Hazardous inspects and spiders include:

- Mosquitoes: Rain and flooding may lead to increased numbers of mosquitoes, which can carry diseases such as West Nile virus or dengue fever.
- Bee stings: If you receive multiple stings seek help immediately. Watch for signs of allergic reaction to stings, which typically happen within the first few hours.
- Spiders: The black widow and brown recluse are poisonous spiders that hide behind objects and in rubble piles. Their bites can be severe, causing pain, nausea, fever, and breathing difficulty.

Protective Measures include:

- Wear long pants, long sleeves, and socks. Tuck pants into boots or socks to provide an insect barrier.
- Be alert when working around abandoned buildings or debris.
- Wear work gloves, and stay on the lookout for spiders.
- Seek medical attention if bitten by a poisonous spider or deer tick or if you experience severe symptoms.
- Avoid scented soaps and perfumes.
- Don't leave food, drinks, and garbage out uncovered.

4.3. Ergonomic Hazards

The following sections provide potential ergonomic hazards and how to mitigate these concerns.

4.3.1. Avoiding Lifting Injuries

Back injuries often result from lifting objects that are too heavy or from using the wrong lifting technique. Keep your back healthy and pain-free by following common sense safety precautions.

- Minimize reaching by keeping frequently used items within arm's reach, moving your whole body as close as possible to the object.
- Avoid overextending by standing up when retrieving objects on shelves.
- Keep your back in shape with regular stretching exercises.
- Get help from a coworker or use a hand truck if the load is too heavy or bulky to lift alone.

4.3.2. Proper Lifting Techniques

- Face the load; don't twist your body. Stand in a wide stance with your feet close to the object.
- Bend at the knees, keeping your back straight. Wrap your arms around the object.
- Let your legs do the lifting.
- Hold the object close to your body as you stand up straight. To set the load down, bend at the knees, not from the waist.

4.4. Chemical Hazards

Chemical hazards that may be potentially encountered at the Site are summarized in the following table.

SUMMARY OF ANTICIPATED CHEMICAL HAZARDS, EXPOSURE ROUTES AND EXPOSURE LIMITS

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Arsenic	PEL 0.05 mg/m^3 IDLH 5.0 mg/m^3	Inhalation, skin absorption, skin and eye contact, ingestion	Ulceration of nasal septum; dermatitis; GI disturbances; peripheral neuropathy; respiratory irritation; hyperpigmentation of skin
Copper	PEL 1 mg/m^3 IDLH 100 mg/m^3	Inhalation, ingestion, skin and eye contact	Irritated eyes, nose, pharynx; nasal septum perforation; metallic taste; dermatitis
Chromium	PEL 1 mg/m^3 IDLH 250 mg/m^3	Inhalation, ingestion, skin and eye contact	Irritated eyes, skin respiratory system
Lead	PEL 0.05 mg/m^3 IDLH 100 mg/m^3	Inhalation, ingestion, skin and eye contact	Lassitude; insomnia; facial pallor; abnormalities; weight loss, malnutrition, constipation, abdominal pain; colic; anemia; gingival lead line; tremors; paralysis of the wrist and ankles; encephalopathy; kidney disease; irritated eyes; hypertension

COMPOUND/ DESCRIPTION	EXPOSURE LIMITS/IDLH	EXPOSURE ROUTES	SYMPTOMS/HEALTH EFFECTS
Mercury	PEL 0.05 mg/m³ IDLH 10 mg/m³	Inhalation, skin absorption, skin and eye contact, ingestion	Irritated eyes, skin; cough, chest pain, dyspnea, bronchitis, pneumonia; tremors, insomnia, irritability, indecision, headache, lassitude; stomatitis, salivation; GI disturbances, abnormalities, low weight; proteinuria
Nickel	IDLH 10 mg/m³	Inhalation, skin and eye contact	Sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]
Zinc	TLV/PEL none Treat as particles not otherwise specified and maintain levels below 3 mg/m³ respirable and 10 mg/m³ inhalable	Inhalation	Metal fume fever (usually onsets at 77-600 mg zinc/m³)
Polycyclic aromatic hydrocarbons (PAH) as coal tar pitch volatiles	PEL 0.2 mg/m³ TLV 0.2 mg/m³ REL 0.1 mg/m³ IDLH 80 mg/m³	Inhalation, ingestion, skin and/or eye contact	Dermatitis, bronchitis, potential carcinogen
PCBs (as Arochlor 1254)—colorless to pale-yellow viscous liquid with a mild, hydrocarbon odor	PEL 0.5 mg/m³ TLV 0.5 mg/m³ REL 0.001 mg/m³ IDLH 5.0 mg/m³	Inhalation (dusts or mists), skin absorption, ingestion, skin and/or eye contact	Irritated eyes, chloracne, liver damage, reproductive effects, potential carcinogen
Dioxins/furans	See below	See below	See below

Notes:

IDLH = immediately dangerous to life or health
OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists
mg/m³ = milligrams per cubic meter
TWA = time-weighted average (Over 8 hrs.)
PEL = permissible exposure limit
TLV = threshold limit value (over 10 hrs)
STEL = short-term exposure limit (15 min)
ppm = parts per million

4.4.1. Dioxins/Furans

Generally, dioxin exposures to humans are associated with increased risk of severe skin lesions such as chloracne and hyperpigmentation, altered liver function and lipid metabolism, general weakness associated with drastic weight loss, changes in activities of various liver enzymes, depression of the immune system, and endocrine- and nervous-system abnormalities. It is a potent teratogenic and fetotoxic chemical in animals. A very potent promoter in rat liver cancers, 2,3,7,8-tetrachlorodibenzo-pdioxin (2,3,7,8-TCDD) causes cancers of the liver and other organs in animals. Populations occupationally or accidentally exposed to chemicals contaminated with dioxin have increased incidences of soft-tissue sarcoma and non-Hodgkin's lymphoma.

Dioxin-contaminated soil may result in dioxins occurring in a food chain. This is especially important for the general population. It has been estimated that about 98% of exposure to dioxins is through the oral route. Exposure as a vapor is normally negligible because of the low vapor pressure typical of these compounds. In the 1980s, a concentration level of 1 ppb 2,3,7,8-TCDD in soil was specified as "a level of concern," based on cancer effects. However, recent studies indicate that end points other than cancer (such as those listed above) are also of concern based on a projected intake from 1 ppb 2,3,7,8-TCDD in soil. Human studies have shown alteration in delayed-type hypersensitivity after exposure to dioxins. NIOSH recommends respiratory protection at the "lowest feasible level." Very little human toxicity data from exposure to tetrachlorodibenzodioxins (TCDDs) and/or polychlorinated dibenzodioxins (PCDDs) are available. Health-effect data obtained from occupational settings in humans are based on exposure to chemicals contaminated with dioxins. It produces a variety of toxic effects in animals and is considered one of the most toxic chemicals known. Most of the available toxicity data are from high-dose oral exposures to animals (including tumor production, immunological dysfunction, and teratogenesis).

Very little dermal and inhalation exposure data are available in the literature. It is important for field personnel to remember that although dioxins are toxic and carcinogenic, most of the information is based on exposure to high doses of liquid product. These products are not very volatile, so the major concern is on skin protection and inhalation/ingestion of soil particles. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a 20 ppm threshold limit value (TLV) for 1,4-dioxane (an example of numerous dioxin compounds), lists it as being absorbed through the skin, and lists it as potentially carcinogenic as well as toxic to liver and kidneys. This is typical of health effects for dioxin/furan compounds. Care should be taken especially in sampling product from drums and wells known to contain detectable levels of dioxins. Emphasis will be on working outside in well-ventilated areas using proper PPE (as discussed later in this plan). There is significant variability in dioxin lethality in animals. The signs and symptoms of dioxin poisoning in humans, however, are analogous to those observed in animals.

4.5. Hazards Reporting/Documentation

Update in Daily Report. Include evaluation of:

- *Physical Hazards* (excavations and shoring, equipment, traffic, tripping, heat stress, cold stress and others)
- *Chemical Hazards* (odors, spills, free product, airborne particulates and others present)
- *Biological Hazards* (snakes, spiders, other animals, discarded needles, poison ivy, pollen, bees/wasps and others present)

5.0 SITE CONTROL PLAN

Work zones will be considered to be within 150 feet of the dredge barge. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach. All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers etc.). For medical assistance, see Section 3.0 above.

A contamination reduction zone should be established for personnel before leaving the Facility or before breaking for lunches etc. The zone should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands at the Facility before eating or leaving the Facility.

5.1. Site Work Zones

Hot zone/exclusion zone will be within 50 feet of the dredging area. A contamination reduction zone will be established around the hot/exclusion zone by the in water silt curtain.

5.2. Buddy System

Personnel on-site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on-site, a buddy system can be arranged with subcontractor/contractor personnel.

5.3. Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on-site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown). In these instances, you should consider suspending work until communication can be restored; if not, the following are some examples for communication:

1. Hand gripping throat: Out of air, can’t breathe.
2. Gripping partner’s wrist or placing both hands around waist: Leave area immediately, no debate.
3. Hands on top of head: Need assistance.
4. Thumbs up: Okay, I’m all right: or I understand.
5. Thumbs down: No, negative.

5.4. Decontamination Procedures

Decontamination consists of removing outer protective Tyvek clothing and washing soiled boots and gloves using bucket and brush provided on-site in the contamination reduction zone. Inner gloves and respirator will then be removed, hands and face will be washed in either a portable wash station or a bathroom facility in the support zone. Employees will perform decontamination procedures and wash prior to eating, drinking or leaving the Site.

Sampling equipment will be decontaminated using wet decontamination procedures:

- Wash and scrub equipment with Alconox/Liquinox and tap water solution
- Rinse with tap water
- Rinse with distilled water

- Repeat entire procedure or any parts of the procedure as necessary.

In addition to wet decontamination procedures, other measures will be taken to prevent cross contamination.

These measures include changing out disposable gloves between each sampling location, using fresh paper towels at each sample location, and maintaining a clean work area.

5.5. Waste Disposal or Storage

Used PPE, disposable field equipment will be discarded in local trash.

5.6. Sampling, Managing and Handling Drums and Containers

Drums and containers used during the cleanup shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupture may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

5.7. Spill Containment Plans (Drum and Container Handling)

Drums will be fitted with secure lids to limit the potential for spills. A spill containment plan will be prepared if required by the client.

5.8. Sanitation

Washrooms are present in nearby retail facilities.

5.9. Lighting

Field work will be generally conducted during daylight hours; artificial lighting is not anticipated to be necessary.

5.10. Emergency Response

Indicate what Site-specific procedures you will implement.

- Personnel on-site should use the “buddy system” (pairs).
- Visual contact should be maintained between “pairs” on site, with the team remaining in proximity to assist each other in case of emergencies.

- If any member of the field crew experiences any adverse exposure symptoms while on-site, the entire field crew should immediately halt work and act according to the instructions provided by the Site Safety and Health Supervisor.
- Wind indicators visible to all on-site personnel should be provided by the Site Safety and Health Supervisor to indicate possible routes for upwind escape. Alternatively, the Site Safety and Health Supervisor may ask on-site personnel to observe the wind direction periodically during Site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety and Health Supervisor and the injured person are to complete, within 24 hours, an Accident Report for submittal to the PM, the Health and Safety Program Manager and Human Resources. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

6.0 PERSONAL PROTECTIVE EQUIPMENT

PPE will consist of standard Level D equipment.

- Level D PPE unless a higher level of protection is required will be worn at all times on the Site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc. Applicable personal protection gear to be used include:
    - Hardhat (if overhead hazards, or client requests)
    - Steel-toed boots (if crushing hazards are a potential or if client requests)
    - Safety glasses (if dust, particles, or other hazards are present or client requests)
    - Hearing protection (if it is difficult to carry on a conversation 3 feet away)
    - Rubber boots (if wet conditions)
    - Life Jackets (for work near/over water)
    - Nitrile gloves
    - Protective clothing include cotton, rain gear (as needed) and layered warm clothing (as needed)
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

6.1. Personal Protective Equipment Inspections

PPE clothing ensembles designated for use during Site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove, or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, Site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

7.0 BOAT, OVER WATER AND NEAR WATER SAFETY PROGRAM

Use of a boat for work requires safe boating practices, good equipment, and training. These procedures are not meant to replace the safety manuals that are provided by the U.S. Coast Guard. Instead they should highlight some of the areas of concern and address specific GeoEngineers, Inc. work procedures. While working near water over waist deep or while on a boat, use a Coast Guard approved flotation device. Remember that being submersed in water increases the chance of hypothermia. Have a dry set of clothes and work with a buddy if you are working around water. If an employee is required to work in the water, they will wear appropriate gear including a wet suit or dry suit if necessary for safe accomplishment of the task.

The U.S. Coast Guard's Federal Requirements state, “All recreational boats must carry one wearable PFD (Type I, II, II, or Type V) for each person aboard… [and that] any boat 16 ft and longer (except canoes and kayaks) must also carry one throwable Type IV PFD.”

GeoEngineers’ Insurance for working over water is covered under the USL&H policy (worker’s comp over water) and is not specific to the individuals participating. For work in arctic waters an additional site safety plan will be created to address the additional hazards of working in extremely cold waters.

For work on barges or boats or areas near water that have an OSHA standard height and strength guardrail, PFDs are not required while working behind the guardrail. The access to the barge or near water area also requires that the gangway be protected by guardrails. If employees are not wearing PFDs, there cannot be a risk of falling in the water. Fall protection rules can be utilized on projects where employees are not within 6 feet of a leading edge and there is no risk of falling in the water.

7.1. Regulatory References

When working near water, over water or on a barge, OSHA has authority. The U.S. Coast Guard has authority 12 miles off shore and until international waters.

Life Jackets ~ Employees wear Coast Guard Approved vests that meet the water conditions (see Section 9.4.2.5) they can wear the self-inflating vests.

This safety program is based on the following state and federal regulations:

- OSHA 1926.106 Working over or near water; 1926.605 Marine operations and equipment; Access to vessels 1915.74 and Access to barges and river towboats 1918.26 (Idaho, Missouri)
- WAC 296-800-160 Personal Protective Equipment for PFD (Washington)

- OR-OSHA 1926 (Oregon)
- AAC Title 8 (Alaska)
- HIOSH Title 12 (Hawaii)
- Cal/OSHA Title 8 (California)

7.2. Procedures for Using Boats

Two people will be involved with the use of the boat. The boat operator should always plan a course of travel that is the safest and minimizes the distance to the shore. As a general courtesy, the boat should be cleaned up by the user after each day.

7.2.1. Maneuvering a Boat

- To move boat from dock, move stern away then bow (but not into waves or wind)
- Try not to depend on fendering, slow down
- Communicate with other person in boat when:
    - increase or decrease speed
    - dramatically change direction
    - approach pilings so hands can come inside boat

7.2.2. Right-of-Way

- Watch out for ferry traffic-- large vessels have right of way and cannot stop
    - Don't cut them off, they move much faster than they appear to. If the boat breaks down in a ferry lane, use radio, flares, and wave and make sure they see you until help arrives.
- Larger vessel has right of way over smaller
- With boats of similar size, sailboat has right of way
- When lights are visible, green has the right of way over red

7.2.3. Load Limits

Cargo should be evenly distributed and there should be a safe amount of freeboard which depends on water conditions. When loading up the boat for travel that goes beyond the protection of the pier, the employee should drive to the end of the pier and check wave conditions before entering.

7.2.4. Engine Use

When using an outboard motor, the boat operator will use the tether kill switch. This will hook to the employee's wrist and turn off the engine if the employee were to be launched into the water.

7.2.5. Personal Floatation Device (PFD)

Type 1 PFDs will be worn in the boats at all times. PFD will be the correct size for the wearer and will be securely fastened. The PFD should be inspected for damage prior to each use.

In water with PFD -- to reduce water from lowering body temperature:

- One person: cross arms pull knees up
- Two persons: huddle together

Chance of swimming 100 yards is not very good, so the best strategy is to stay with the boat. The boat should always be closer to shore than this distance during transport and the employee would be close enough to swim to shore.

7.2.6. Throwing Lines

- Make first two coils larger
- Kneel in boat
- Shoulder pointed to victim
- Throw over their head

7.2.7. Water on Board

- A 5-gallon bucket will always be available on the boat to bale water that comes inside the boat.

7.2.8. Towing

- Take time to set up
- Look at lines
- Stay in step with waves
- For logs, may want to tow from bow. use timber hitch, shackle to weigh down
- Don't overstress lines
- Don't shock load lines
- Sea anchor -- can use to slow down tow, make more controllable. For some situations, a sea anchor is not necessary and could make things worse.

7.2.9. Safety and Signals

- Horn blasts: 5 short signals danger
- Lights: Employees will not be traveling between terminals in the dark. If it becomes dark while working, the operator will moor the boat at that terminal for the night. A flashlight will be available in the waterproof box stored in the workboat.

7.3. Barge or Platform Procedures

Any work within 6 feet of a leading edge will require a life jacket if water is below the leading edge. Railings must be present if a leading edge is above a hard surface. Refer to GeoEngineers' Fall Protection Program for additional details.

Employees shall not be permitted to walk along the sides of covered lighters or barges with coamings more than 5 feet high, unless there is a 3-foot clear walkway, or a grab rail, or a taut hand line is provided. (Coaming is any vertical surface on a ship designed to deflect or prevent entry of water. It usually refers to raised section of deck plating around an opening, such as a hatch. Coamings also provide a frame onto which to fit a hatch cover.)

Employees shall not be permitted to walk over deck loads from rail to coaming unless there is a safe passage. If it is necessary to stand at the outboard or inboard edge of the deck load where less than 24 inches of bulwark, rail, coaming, or other protection exists, all employees shall be provided with a suitable means of protection against falling from the deck load.

The employer shall ensure that there is in the vicinity of each barge in use at least one U.S. Coast Guard-approved 30-inch life ring with not less than 90 feet of line attached, and at least one portable or permanent ladder which will reach the top of the apron to the surface of the water. If the above equipment is not available at the pier, the employer shall furnish it during the time that he is working the barge.

Whenever practicable, a gangway of not less than 20 inches walking surface of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of paragraphs (d)(1) and (2) of this section may be used.

7.3.1. Cranes/Hoists/Cables

Employees need to use caution when working in areas where cranes, hoists and cables are in use. Refer to the GeoEngineers' Drilling and Rigging Safety Program.

7.4. Working Near Water Procedures

GeoEngineers' employees working over or near water, where the danger of drowning exists, shall be provided with U.S. Coast Guard-approved life jacket or buoyant work vests.

Prior to and after each use, the buoyant work vests or life preservers shall be inspected for defects which would alter their strength or buoyancy. Defective units shall not be used.

Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.

At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water.

7.5. Emergency Procedures

The following topics are items that are important for handling an emergency. The boat operator should know these procedures and follow them at all times.

7.5.1. Communication

The Marine Radio will be with the boat operator at all times. Before entering the boat, the operator will call in to the Dispatcher and notify them of the location and destination of the boat. Each time an employee enters or exits the boat, this will be recorded by the Dispatcher. This contact should occur at departure and arrival for long transits.

7.5.2. Engine Problems

In the event of engine problems, contact the Dispatcher and notify them of the situation immediately. Depending on the situation, a rescue could be dispatched by the Coast Guard, another employee or a contractor. If a repair is made in the interim while waiting for the tow, call the Dispatcher again and notify them of the situation.

Spare plugs will be in the waterproof kit for offshore engine problems only. The boat operator will be required to take a spare tank and line for fuel, thus eliminating the need for spare line.

7.5.3. Distress Flares

Are located in the waterproof boxes that the boat operator needs to ensure are on the boat before each travel session. Boat operators should also make sure that they are familiar with the operation of these flares.

7.5.4. Person Overboard / Rescue

Boat operators should be familiar with in water rescue techniques. The Coast Guard recommends that people not try to swim long distances to shore but wait for a rescue. This is because of hypothermia. Please see the section on “Personal Floatation Devices.” Access back into the boat will be from the stern. The engine will be turned off while the employee re-enters the boat.

7.5.5. Fire

Each workboat will be equipped with a 5 lb. ABC fire extinguisher located near the bow. The fire extinguisher should be checked each time the boat is used to ensure that it is ready to operate.

7.5.6. Work Related Injuries

Work related injuries that are not threatening to the safety of the persons on board should be reported to the Supervisor as soon as possible. Any work related injury that impairs operation of the boat should be called in to the GeoEngineers’ office immediately. The office will call for the Coast Guard and or the Fire Department in the event of a serious injury.

7.6. Weather/Tides

If the visibility is very low due to fog, the operator will not take the boat out.

7.6.1. Fog

In fog employees will stay within sight of the shoreline and/or head in and tie up. Whereas the Maritime Training Center (MTC) class instructed employees to drop anchor and use horn alert those nearby, employees are not likely to be caught unexpected in dense fog and should not go out if visibility is not sufficient for travel. Remember, ferry boats can’t pick you up on radar and can’t stop quickly.

7.6.2. Rough Water

- Look for lee, can be another boat
- Head into swells, throttle up when approaching, throttle down when dropping down
- Check wave conditions before taking the boat out

- Head in at 45 degree angle at times, depending on wave size

7.6.3. Tides

Tidal changes in the Puget Sound and northern areas can be significant. Employees should always be aware of the tide changes and plan their work accordingly. There have been several instances where work under the docks became dangerous due to changing tides and lack of planning.

7.7. List of Supplies

In addition to the list of supplies generated in the training at the MTC, the U.S. Coast Guard identified the following items to be critical for safe boating.

Items to be stored with the boat at all times:

- Oars and oarlocks
- Anchor
- Bucket for baling water
- Fire Extinguisher
- One spare fuel tank and line

Items that will be brought onto the boat when in use:

- Marine radio
- Watertight box with: first aid kit, flashlight, flares
- Personal Floatation Device(s)
- Carry a knife with serrated edge
- Tide book
- Spare plugs and wrench

7.8. Personal Floatation Device (PFD) Specifications

Personal Flotation Device (PFD) use applies to terminals and piers and employees working near other bodies of water. It also applies to all activities conducted by GeoEngineers employees at these facilities, including construction, maintenance, inspections, tours and operations. Type 1 PFDs will be worn in the boats at all times. PFD will be the correct size for the wearer and will be securely fastened. The PFD should be inspected for damage prior to each use. Boats longer than 16 feet must carry at least one Type I, II, III, or V PFD for each person on board.

In addition, at least one Type IV (throwable device) must be carried. This is important, you may not use a Type IV "flotation cushion' as your sole PFD in your small rowboat or sailing dingy. Note: If a Type V device is used to count toward requirements, it must be worn. Federal regulations require PFDs on canoes and kayaks of any size; they are not required on racing shells, rowing skulls, or racing kayaks. State laws may vary.

PFDs are required for:

- Any employee in a boat/skiff/barge,
- Any employee is working on top of, or beyond the bull rail (a railing for docking the boat), or
- employees working near water where the danger of drowning exists.

PFDs are not specifically required when:

- Employees are not exposed to the danger of drowning when:
    - Employees are working behind standard height and strength guardrails.
    - Employees are working inside operating cabs or stations that eliminate the possibility of accidentally falling into the water.
    - Employees are wearing an approved safety harness with a lifeline attached that prevents the possibility of accidentally falling into the water.
    - Working behind a guardrail of standard height and strength or other stable restraint.
    - A single person is working more than 6 feet from the edge.
    - Working over shallow water (less than chest deep) where floatation would not be achieved (other protective measures required).

Provide your employees with PFDs approved by the U.S. Coast Guard for use on commercial or merchant vessels. The following are appropriate or allowable United States Coast Guard-approved PFDs:

Type of PFD	General Description
Type I	Off-Shore Life Jacket-effective for all waters or where rescue may be delayed.
Type II	Near-Shore Buoyant Vest- intended for calm, inland water or where there is a good chance of quick rescue.
Type III	Flotation aid- good for calm, inland water, or where there is a good chance of rescue.
Type V	Flotation aids such as boardsailing vests, deck suits, work vests and inflatable PFDs marked for commercial use.

7.8.1. Off-Shore Life Jacket (Type I PFD)

Best for open, rough or remote water, where rescue may be slow coming.

- Advantages
    - Floats person the best.
    - Turns most unconscious wearers face-up in water.
    - Highly visible color.
- Disadvantages
    - Bulky.

7.8.2. Near-Shore Buoyant Vest (Type II PFD)

Good for calm, inland water, or where there is good chance for fast rescue.

- Advantages
  - Turns some unconscious wearers face-up in water.
  - Less bulky, more comfortable than Off-Shore Life Jacket (Type I PFD).
  - Compromise between Type I PFD performance and wearer comfort.
- Disadvantages
  - May be uncomfortable wearing for extended periods.
  - Will not turn as many people face-up as a Type I PFD will.
  - In rough water, a wearer's face may often be covered by waves.
  - Not for extended survival in rough water.

7.8.3. Flotation Aid (Type III PFD)

Good for calm, inland water, or where there is good chance of fast rescue.

- Advantages
  - Generally the most comfortable type for continuous wear.
  - Freedom of movement for water skiing, small boat sailing, fishing, etc.
  - Available in many styles, including vests and flotation coats.
- Disadvantages
  - Not for rough water.
  - Wearer may have to tilt head back to avoid face-down position in water.

Inflatable PFDs come in Types I, II, and III. Although the different “Types” of inflatable PFDs are intended for use in the same areas as inherently buoyant types of PFDs, the characteristics of inflatable PFDs are different. Inflatable PFDs are not inherently buoyant and will not float without inflation. For Types I, II, and III inflatables, the lower the Type number, the better the PFDs performance (e.g., Type I is better than Type II).

Although inflatable PFDs are considered one of the most comfortable PFDs to wear when it's hot, inflatable PFDs require regular maintenance and are not recommended for children or individuals who can't swim. Inflatable PFDs are not for use where water impact is expected as when waterskiing, riding personal watercraft, or whitewater paddling.

7.9. Training

7.9.1. Personnel Using Boats

Each state is specific boat training requirements. In addition the U.S. Coast Guard can also be contacted for local training opportunities. All GeoEngineers employees operating a boat should have documented training.

The topics are copied from the Basic Use section of these Policy and Procedure Training materials provided by MTC are available from the Health and Safety Program Manager to use as a guide for additional training.

- Boat safety
- Boat operations, maneuvering (hands on)
- Towing
- Communications
- Emergency situations
- Rescue (hands on)
- Use of ropes (hands on)

7.9.2. *Personnel Working Over or Near Water*

GeoEngineers employees working over or near water should be trained in the contents of the Boat, Over Water and Near Water Safety Program. At the start of each project in which working over or near water presents a danger of drowning employees should have a tailgate safety meeting and discuss the following:

- The danger of drowning where it exists.
- Use of U.S. Coast Guard-approved life jacket or buoyant work vests.
- Life jacket or buoyant work vests inspections.
- Location of ring buoys for emergency rescue operations.
- Location of a lifesaving skiff for rescue if needed.

8.0 PERSONNEL MEDICAL SURVEILLANCE

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of “Employees Covered” in OSHA 1910.120(f)(2), which states a medical surveillance program is required for the following employees:

- All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year;
- All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations;
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation; and Members of HAZMAT teams.

9.0 DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

The following forms are required for Hazardous Waste Operations and Emergency Response (HAZWOPER) projects:

- Field Log

- Health and safety pre-entry briefing acknowledgment (Form 1)
- Health and Safety Plan acknowledgment by GeoEngineers employees (Form 2)
- Contractor’s Health and Safety Plan Disclaimer (Form 3)
- Conditional forms available at GeoEngineers office: Accident Report

The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

10.0 REFERENCES

GeoEngineers, Inc. (2012a), “Draft Marine Area Remedial Investigation Sampling and Analysis Plan, Weyerhaeuser Mill A Site, Everett, Washington, Ecology Agreed Order No. DE 8979,” prepared for the Washington State Department of Ecology on behalf of the Port of Everett, November 9, 2012.

Washington State Department of Ecology (Ecology), “Agreed Order for Remedial Investigation/ Feasibility Study and Draft Cleanup Action Plan – Weyerhaeuser Mill A Former Site, No. DE 8979,” In the Matter of Remedial Action by: Port of Everett, Weyerhaeuser, and Washington State Department of Natural Resources, Filed August 9, 2012.

FORM 1
HEALTH AND SAFETY PRE-ENTRY BRIEFING
INTERIM ACTION DREDGING PROJECT
FILE NO. 0676-020-03

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started; and
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.

Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks

Update all information to reflect current sight activities and hazards.

All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, Site communications and site hazards.

Company Employee

Date	Topics	Attendee	Name	Initials

FORM 2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
INTERIM ACTION DREDGING PROJECT
FILE NO. 0676-020-03

All GeoEngineers' Site workers shall complete this form, which should remain attached to the Safety Plan and filed with other project documentation.

I hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on Site. I agree to comply with all required, specified safety regulations and procedures.

Print Name	Signature	Date

FORM 3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
INTERIM ACTION DREDGING PROJECT
FILE NO. 0676-020-03

I verify that a copy of the current Site Safety Plan has been provided by GeoEngineers, Inc. to inform me of the hazardous substances on Site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the Site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Print Name Signature Firm Date

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APPENDIX D

Permitting and Substantive Requirements

Mitigated Determination of Non-Significance Letter

SEPA MITIGATED DETERMINATION OF NON-SIGNIFICANCE (MDNS)
PORT OF EVERETT

Mill A Interim Cleanup Action
Port SEPA File No. 2015-04

DESCRIPTION OF PROPOSAL: This Interim Cleanup Action will be conducted under a Model Toxics Control Act (MTCA) Agreed Order (Ref. No. DE 8979) with and under the supervision of the Washington Department of Ecology (Ecology) for the former Weyerhaeuser Mill A site. This Interim Cleanup Action will be conducted to both remove identified contaminated sediment and wood debris and increase navigational access to the Pacific Terminal. The Interim Cleanup Action will be subject to review and approval by Ecology to ensure compliance with MTCA requirements. Within the Interim Cleanup Action area, contaminated and clean sediment will be removed to a depth of -42 feet Mean Lower Low Water (MLLW) with a 1-foot over dredging allowance. The total area of the proposed dredge prism will be approximately 1.7 acres. The estimated dredge volume is 40,000 cubic yards.

A temporary transition slope will be constructed along the dredge area to meet the existing depths to the south. Contamination may be exposed by the dredging on the temporary transition slope. The project includes placement of cover materials over exposed contamination on the transition slope. Based on the sampling and analysis results, the Dredge Material Management Program (DMMP) and Ecology MTCA site managers will determine the appropriate management method for exposed contamination. The required exposed contamination management methods will be implemented as part of the Interim Cleanup Action. It is proposed that a temporary 3-foot thick rock cap will be placed on this slope.

Approximately 1,500 square feet of existing shoreline riprap between elevations of -2 feet and -43 feet MLLW along the shoreline slope will be removed to access the area to be dredged. This material will be replaced after dredge operations are completed. Additionally, approximately 4,200 square feet (SF) of new riprap will be placed along the slope directly south and adjacent to Pacific Terminal to ensure a stable slope from existing riprap to the new navigation dredge base. In total approximately 4,000 cubic yards (CY) of riprap will be placed over an area approximately 23,000 SF along the shoreline and temporary offshore transition slopes. Approximately 200 CY of fish mix gravel will be placed on top of areas of riprap to enhance habitat.

A Dredged Material Characterization Report will be prepared for DMMP and will be used by the regulatory agencies to determine the suitability of the dredged material for open water disposal, to serve as the basis for the permitted disposal options for the project, and to assist Ecology in determining specific MTCA cleanup considerations. Dredged material in the Interim Cleanup Action area that are shown to not contain contamination levels in excess of applicable criteria will be loaded onto barges and disposed of at the Port Gardner Open Water Disposal Site. Dredged materials in the Interim Cleanup Action area that do not meet the open water disposal criteria will be dredged separately and processed for transport to an offsite permitted landfill facility. The Interim Cleanup Action will be subject to review and approval by Ecology to ensure compliance with MTCA requirements.

Project site activities are anticipated to start mid-July 2016 and finish in January 2017.

PROPONENT AND LEAD AGENCY: Port of Everett

LOCATION OF PROPOSAL: The property is located at 3500 Terminal Avenue, Everett, Washington, 98201, in Snohomish County. The Project is located in the NW quarter of Section 30 in Township 29 North, Range 5 East, and NE quarter of Section 30, Township 29 North, Range 5

East, Willamette Meridian. The Snohomish County Tax Parcel Numbers include 29053000201800, 29053000203400, and 29042500400200.

DETERMINATION: The Lead Agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An environmental impact statement (EIS) is not required under RCW 43.21C.030(2)(c). This determination assumes compliance with federal and state law as well as City of Everett ordinances related to general environmental protection. This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public upon request.

Note: Issuance of this threshold determination does not constitute approval of permits. This proposal will be reviewed for compliance with all applicable federal, State and City of Everett codes.

This MDNS is issued under WAC 197-11-340(2) and WAC 197-11-350.

PUBLIC AND AGENCY COMMENT: The lead agency will not act on this proposal until after the public comment period closes 14 calendar days from the published date below. Comments must be submitted in writing by 4:00 PM May 25, 2015 to the Responsible Official as named below. Comments will not be accepted by telephone or personal conversation. For general project related questions or additional information, please contact Graham Anderson, Director of Planning, at 425-388-0703 or email grahama@portofeverett.com.

MITIGATION MEASURES:

1. Prior to start of work, all local, State and Federal permits and authorizations will be obtained and all conditions therein adhered to including in-water work timing restrictions.
2. Water Quality Monitoring will be implemented during construction as part of the MTCA cleanup program and applicable authority.
3. Port of Everett's Environmental Management System (EMS) Best Management Practices (BMPs) shall apply to the project's construction activities.
4. The Port will continue to coordinate with the Ecology MTCA Program to ensure appropriate project BMPs are being instituted to protect human health and the environment, considering this project is located within the study area of the former Mill A site.
5. BMPs for dredging and material handling activities will be implemented to avoid and minimize potential negative impacts to the environment.
6. A contractor-prepared Sediment Removal and Disposal Plan will be reviewed for approval by the Port.
7. Project activity will result in the permanent loss of approximately 700 square feet of shallow water habitat. This will be mitigated for through use of credits from the Port's Union Slough Restoration Site.
8. In the event noise concerns arise, the Port maintains a Noise Compliant Hotline (425-388-0269) that is monitored 24 hours per day, 7 days per week.

Contact Person: Graham E. Anderson, Director of Planning
Phone: (425) 388-0703

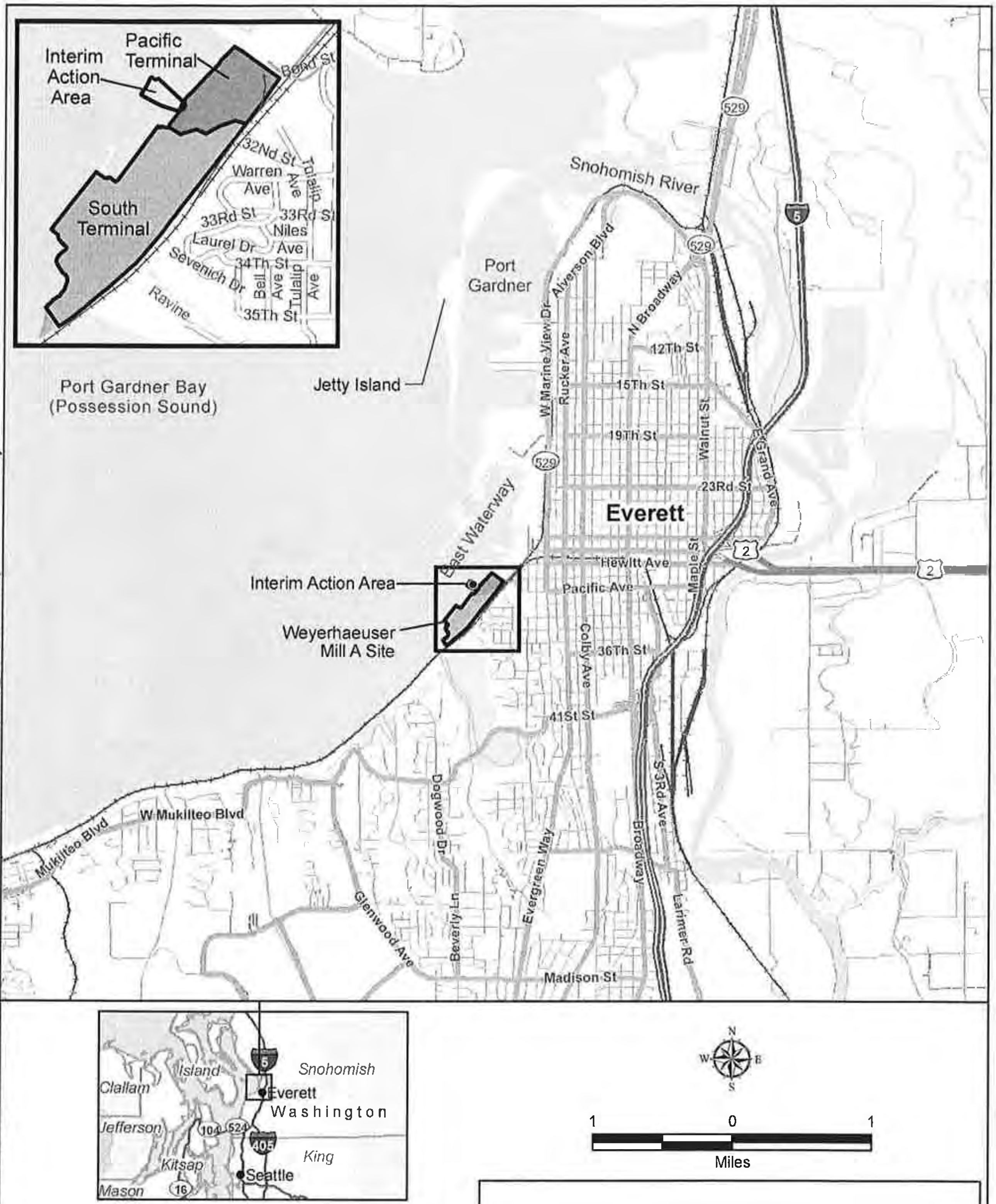
Responsible Official: Les Reardanz
Title: CEO / Executive Director
Address: Port of Everett
PO Box 538
Everett, Washington 98206
Email: SEPAComments@portofeverett.com, subject line: "SEPA Mill A Interim Cleanup Action"

Signature: Les Reardon **Date:** 5/7/15

Published: May 11, 2015
Posted: May 11, 2015
Mailed: May 11, 2015

APPEALS: There is no administrative appeal for this determination per Port of Everett Resolution 614. Procedures for appeal of this SEPA threshold determination are set forth in Chapter 43.21C RCW including, without limitation, RCW 43.21C.060, 43.21C.075, and RCW 43.21C.080 and Chapter 197-11 WAC including, without limitation, WAC 197-11-680.

Path: \\sea\projects\0\0676020\GIS\DNR_Comment_Figures\InterimAction\067602001_DNR_VicinityMap_IAA.mxd Map Revised: 06 May 2015 ccabrera



Vicinity Map

Weyerhaeuser Mill A Former Site
Everett, Washington

GeoEngineers

Figure 1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: ESRI Data & Maps

Projection: NAD83 UTM zone 10N

WDFW Substantive Requirements Letter

State of Washington
Department of Fish and Wildlife
Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

July 6, 2015

Port of Everett
Graham Anderson
PO Box 538
Everett, Washington 98206

Dear Mr. Anderson,

SUBJECT: YOUR MODIFICATION REQUEST FOR MILL A CLEANUP PROJECT INTERIM ACTION, SUBSTANTIVE REQUIREMENTS

On May 28, 2015, I received your request for a modification to the Substantive Requirements for the project described above.

☐ **NO OBJECTION.** See enclosed letter.

X **NO OBJECTION.** We request that our enclosed comments be made a condition of the state coordinated response.

☐ **OBJECTION.** We request that the State of Washington recommend denial of the proposed project due to the concerns expressed in the enclosed letter.

☐ **HOLD.** See enclosed letter.

NOTE: The sediment cleanup is subject to cleanup investigation under a Model Toxics Control Act (MTCA) Agreed Order with the Department of Ecology to complete a Remedial Investigation/Feasibility Study and Cleanup Action for the site with the Port of Everett, Weyerhaeuser and the WA Dept. of Natural Resources.

1. TIMING LIMITATIONS: The project may begin immediately and shall be completed by December 31, 2017, provided, work below the ordinary high water line shall not occur from February 16 through August 14 of any year for the protection of migrating juvenile salmonids.

2. PRE-CONSTRUCTION NOTIFICATION REQUIREMENT: No less than three working days prior to start of work, the applicant or their representative shall notify the Habitat Biologist (HB) listed below by email (Laura.Arber@dfw.wa.gov) or phone (425)379-2306, of the project start date. The notifications shall include the applicants name, project location, starting date of work, and the control number of this HPA.

3. APPROVED PLANS: Work shall be accomplished per plans and specifications submitted and approved by the Washington Department of Fish and Wildlife, entitled "MILL A CLEANUP PROJEC INTERIM ACTION, AGREED ORDER NO. DE 8979", dated (AUGUST 20, 2014), and E-mail entitled, 'RE: "FW: MILL-A SEDIMENT INVESTIGATION LOCATIONS", received on (JUNE 2, 2015), except as modified by this Hydraulic Project Approval. A copy of these plans shall be available on site during all phases of the project proposal.

4. All trash and unauthorized fill, including concrete blocks or pieces, bricks, asphalt, metal, treated wood, glass, floating debris, and paper, below the ordinary high water line (OHWL) in and around the applicant's project area shall be removed and deposited at an approved upland disposal site.

CLEANUP DREDGING

5. Project activities shall include dredging approximately 1.7 acres (85,000 square feet) totaling up to 40,000 cubic yards of varying amounts of wood debris, sawdust, and native silt and sand from the Former Weyerhaeuser Mill A Cleanup Site, as illustrated in the plans, except as modified by this Hydraulic Project Approval.

6. All existing debris or other deleterious materials resulting from dredging activities shall be removed and disposed of upland such that it does not enter waters of the state.

7. As specified in the application, the area shall be dredged to maintain a depth of -42.0 feet MLLW (0.0=MLLW) plus 2 feet of over-dredge allowance.

8. As specified in the plans, a temporary transition slope shall be constructed from the base of the navigation dredging area to meet the existing elevations to the south. The transition slope will be removed as part of future cleanup actions at the site (under a separate permit).

9. Dredging shall be confined to the footprint illustrated in your project plans.

10. The bottom profile for the Mill A Cleanup Project Site shall be dredged to the contours illustrated in your project plans.

11. As specified in the application, unavoidable impacts associated with the Port of Everett's dredging activity at the Mill A Interim Cleanup Action (700 sf) shall be mitigated by the dedication of 700 sf of existing estuarine habitat from the Port of Everett's Union Slough Restoration Site.

12. As specified in the application, approximately 4,000 cy of new armor rock shall be placed over 23,000 sf along the shoreline and temporary offshore transition slopes. Approximately 200 CY of fish mix shall be placed on top of the armored slope over approximately 3,600 sf between elevations of -4 and -20 ft MLLW (0.0= MLLW).

13. If a clamshell dredge is used for dredging, each pass of the clamshell dredge bucket shall be complete.

14. Dredged material shall not be stockpiled below the ordinary high water line. Sweeping the bottom to smooth contours is not permitted.

15. Dredged materials shall be deposited at either an approved designated Department of Natural Resources deep water disposal site or approved upland site.

SEDIMENT SAMPLES

16. As specified in the plans, and email from Graham Anderson on June 2, 2015, sediment core samples may be collected at up to several hundred locations, at depth elevations ranging between -0.0 ft and –100 ft MLLW (0.0=MLLW).

17. Work shall be done in a manner that minimizes turbidity and discharge of silt to the water column.

18. The discharge of turbid or slurry laden process water to state waters is not authorized by these Substantive Requirements.

19. During collection of samples care shall be taken to minimize the suspension of sediment. All excess sediment and water derived during sampling activities shall be placed in proper containers, labeled, characterized, and disposed of by the operators in accordance with the appropriate guidelines.

20. All waste material such as drill spoils and cuttings, construction debris, silt, excess dirt, excess gravel, or overburden resulting from this project shall be deposited above the limits of floodwater in an upland disposal site that has appropriate regulatory approval.

21. Sampling equipment shall be checked daily for leaks and be well maintained and kept in good repair and shall prevent the loss of lubricants, grease, and any other deleterious materials from entering the state waters.

22. If kelp or eelgrass beds are present, vessel operation shall be restricted to tidal elevations adequate to prevent propeller related damage to vegetation.

MARINE HABITAT FEATURES

23. Eelgrass and kelp shall not be adversely impacted due to any project activities (e.g., barge shall not ground, equipment shall not operate, and other project activities shall not occur in eelgrass and kelp).

WATER QUALITY PROVISIONS

24. Project activities shall be conducted to minimize siltation of the beach area and bed.

25. If at any time, as a result of project activities, fish are observed in distress, a fish kill occurs, or water quality problems develop (including equipment leaks or spills), immediate notification shall be made to the Washington Department of Ecology at 1-800-258-5990, and to the Area Habitat Biologist listed below.

26. No petroleum products or other deleterious materials shall enter surface waters.

27. Project activities shall not degrade water quality to the detriment of fish life.

If you have any questions, please contact me at Laura.Arber@dfw.wa.gov or 425-379-2306.

Sincerely,

Laura Arber
Area Habitat Biologist

City of Everett Planning and Community Development – Letter and Email

EVERETT
PLANNING AND COMMUNITY DEVELOPMENT

Allan Giffen
Director

November 24, 2014

Port of Everett
Attn: Graham Anderson, Planning Director
P.O. Box 538
Everett, WA 98206

Re: Former Weyerhaeuser Mill A Cleanup Project – Interim Cleanup Action

Dear Graham,

Thank you for providing the city the background information on the former Weyerhaeuser Mill A cleanup project - interim cleanup action. In your August 20, 2014, Project Description you mentioned the subject property is undergoing cleanup investigations consistent with the Model Toxics Control Act (MTCA) Agreed Order with the Washington State Department of Ecology. As you stated, the Port has identified an urgent need to perform an interim cleanup action at this site to improve navigation at the Pacific Terminal to meet the growing demand on the Boeing supply line for the new 777x production.

This interim action will remove sediments from an area south of the Pacific Terminal to provide increased navigational area for the ships docking at the facility. The end result will be the creation of a temporary transition slope from the base of the navigation dredging area to meet the existing elevations to the south. These improvements will facilitate the Boeing supply line by accommodating larger vessels that will call on the terminal. It is understood that this transition slope is a temporary slope that will be removed during future cleanup actions at the site.

As described, the interim action dredge prism will be characterized in accordance with the Dredged Material Management Program (DMMP) and that the Department of Ecology will review and approve the project specifics to insure compliance with the MTCA requirements. Dredge materials will either disposed of at the Port Gardner disposal site, or materials that exceed in-water disposal standards will be processed for transport to an Ecology-approved landfill facility. Any contamination on the newly exposed slope will properly isolated from the marine environment as determined by the DMMP and MTCA site managers.

The City of Everett Planning and Community Development Department supports the Port's efforts to improve navigation and to provide expanded berthing capabilities to service the Boeing 777x supply needs. We recognize that this project will comply with the regulations contained in RCW 70.105D.090 and that that the project will also comply with all DMMP and MTCA

CITY OF EVERETT • 2930 Wetmore Avenue, Suite 8-A • Everett, WA 98201 • (425) 257-8731 • Fax (425) 257-8742

requirements. This project, as proposed, satisfies the substantive requirements of the City of Everett Shoreline Master Program and is exempt from the City of Everett procedural requirements.

If you have any questions about the City's position related to your interim cleanup action, feel free to contact me at (425) 257-7146.

Sincerely,

Gerry Ervine

Gerry Ervine, Land Use Manager

CC: Allan Giffen
Paul McKee

Laura Gurley

From:	Gerry Ervine <GErvine@everettwa.gov>
Sent:	Wednesday, June 03, 2015 11:56 AM
To:	Laura Gurley
Subject:	RE: POE Mill A Cleanup - Substantive Requirements Letters

Laura,

Thanks for the opportunity to review your more detailed project proposal for the Mill A interim clean up. As proposed, I am satisfied that this project meets the substantive requirements of the City of Everett Shoreline Master Program and is exempt from the City of Everett procedural requirements as discussed in my letter of November 24, 2014.

Regards,
Gerry

From: Laura Gurley [mailto:laurag@portofeverett.com]
Sent: Wednesday, June 03, 2015 10:27 AM
To: Paul McKee; Gerry Ervine
Cc: Graham Anderson
Subject: POE Mill A Cleanup - Substantive Requirements Letters

Good Morning, Gentlemen,

Following up on your conversation with Graham on the upcoming Mill A Interim Cleanup Action project, I have attached the two City-issued Substantive Requirements letters (Planning and Public Works). We are poised to submit the JARPA package to the Army Corps for review, and want to give you the opportunity review the package for concurrence that these letters still adequately address the project. More detailed information is now available (see project description in section 6a, and BMPs in section 8a). If upon your review of the attached Draft JARPA form and drawings, you would like to amend or reissue the letters, and in order to meet our submittal target, we request that you issue any revisions **no later than June 15th**.

Thank you for your help. If you have any questions, please don't hesitate to call Graham or me directly.
Sincerely,

Laura M. Gurley
Port of Everett | Planner
1205 Craftsman Way, Suite 200, Everett, WA 98201
Main: (425) 259-3164 | Dir: (425) 388-0720
Email: Laurag@portofeverett.com | Web: www.PortofEverett.com

City of Everett Public Works – Letter and Email

EVERETT
PUBLIC WORKS

December 16, 2014

Port of Everett
Attn: Graham Anderson, Planning Director
P.O. Box 538
Everett, WA 98206

Re: Former Weyerhaeuser Mill A Site
Interim Cleanup Action under Agreed Order No. DE 8979

Dear Graham,

Thank you for providing notice and narrative of the Port's plans to conduct an interim cleanup action at the former Weyerhaeuser Mill A site under the regulatory oversight of the Washington State Department of Ecology. We recognize that pursuant to Section VIII.P (Compliance with Applicable Laws) of Agreed Order No. DE 8979 and RCW 70.105D.090(1), this work is exempt from the procedural requirements of any laws requiring or authorizing local government permits or approvals for the remedial action.

We support the Port's efforts to remediate the contaminated sediments and soils in a manner consistent with current Best Management Practices and all other applicable regulations.

Please feel free to contact me at (425) 257-8867 with any questions you may have.

Sincerely,

Paul McKee

Paul McKee
Permit Services Manager

cc: Gerry Ervine
Tony Lee
Ryan Sass
Dave Davis

CITY OF EVERETT • 3200 Cedar Street • Everett, WA 98201 • (425) 257-8800 • Fax (425) 257-8882

From: Paul McKee <PMckee@everettwa.gov>
Sent: Thursday, June 18, 2015 9:32 AM
To: Laura Gurley; Gerry Ervine
Cc: Graham Anderson
Subject: RE: POE Mill A Cleanup - Substantive Requirements Letters

Hi Laura,

I have reviewed the additional materials and my previous letter stands.

Thanks,

Paul McKee
Permit Services Manager
City of Everett
3200 Cedar Street
Everett, WA 98201
425-257-8867p
425-257-8857f

From: Laura Gurley [mailto:laurag@portofeverett.com]
Sent: Wednesday, June 03, 2015 10:27 AM
To: Paul McKee; Gerry Ervine
Cc: Graham Anderson
Subject: POE Mill A Cleanup - Substantive Requirements Letters

Good Morning, Gentlemen,

Following up on your conversation with Graham on the upcoming Mill A Interim Cleanup Action project, I have attached the two City-issued Substantive Requirements letters (Planning and Public Works). We are poised to submit the JARPA package to the Army Corps for review, and want to give you the opportunity review the package for concurrence that these letters still adequately address the project. More detailed information is now available (see project description in section 6a, and BMPs in section 8a). If upon your review of the attached Draft JARPA form and drawings, you would like to amend or reissue the letters, and in order to meet our submittal target, we request that you issue any revisions **no later than June 15th**.

Thank you for your help. If you have any questions, please don't hesitate to call Graham or me directly.
Sincerely,

Laura M. Gurley
Port of Everett | Planner
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