



AMENDMENT NO. 2 TO THE PRE-REMEDIAL DESIGN INVESTIGATION PROJECT PLANS

**Central Waterfront Cleanup Site
Bellingham, Washington**

February 24, 2025

Prepared for

**Port of Bellingham
Bellingham, Washington**

**Amendment No. 2 to the
Pre-Remedial Design Investigation Project Plans
Central Waterfront Cleanup Site
Bellingham, Washington**

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LIST OF ABBREVIATIONS AND ACRONYMS

AMD1	Amendment No. 1
AMD2	Amendment No. 2
AO	Agreed Order DE 3441
ASB	Aerated Stabilization Basin
bgs.....	below ground surface
C Street subarea.....	C Street Properties subarea
CAP	Cleanup Action Plan
City	City of Bellingham, Washington
CPOC	conditional point of compliance
CUL	cleanup level
Ecology	Washington State Department of Ecology
EDR.....	Engineering Design Report
EISB	enhanced <i>in situ</i> bioremediation
EPA	US Environmental Protection Agency
ft.....	foot/feet
GIS	Geographic Information System
GPS	Global Positioning System
Hilton Avenue subarea.....	Hilton Avenue Properties subarea
IDW	investigation-derived waste
Landau.....	Landau Associates, Inc.
LandGEM.....	Landfill Gas Emissions Model
LFG	landfill gas
mg/L	milligrams per liter
mg-N/L	milligrams nitrogen per liter
MTCA.....	Model Toxics Control Act
MW	monitoring well
NAD83	North American Datum of 1983
NAPL.....	non-aqueous phase liquid
NAVD88.....	North American Vertical Datum of 1988
NWTPH-Dx	Northwest TPH extended-range diesel analytical method
NWTPH-Gx	Northwest TPH extended-range gasoline analytical method
PAH.....	polycyclic aromatic hydrocarbon
PID.....	photoionization detector
Port	Port of Bellingham
PRDI.....	Pre-Remedial Design Investigation
PSE.....	Puget Sound Energy
PVC.....	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC.....	quality control
RCW.....	Revised Code of Washington
RI/FS	Remedial Investigation/Feasibility Study

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

SAP	Sampling and Analysis Plan
SIM	selected ion monitoring
Site	Central Waterfront Cleanup Site
TGP	temporary gas probe
TPH	total petroleum hydrocarbons
TPH-D	diesel-range total petroleum hydrocarbons
TPH-G	gasoline-range total petroleum hydrocarbons
TPH-O	motor oil-range total petroleum hydrocarbons
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION AND BACKGROUND

This Amendment No. 2 to the Pre-Remedial Design Investigation (PRDI) Project Plans (PRDI AMD2) outlines additional investigative requirements for the Central Waterfront Cleanup Site (Site), located in Bellingham, Washington (Figure 1). PRDI AMD2 has been prepared by Landau Associates, Inc. (Landau) on behalf of the Port of Bellingham (Port) in accordance with Agreed Order DE 3441 (AO), Amendment No. 4, and the final Cleanup Action Plan (CAP; Ecology 2020) issued by the Washington State Department of Ecology (Ecology).

The Site is being cleaned up under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington (RCW), and the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

1.1 Site Background

The Site comprises approximately 51 acres of upland waterfront property in Bellingham, Washington and is bordered to the north by I&J Waterway, to the east by Roeder Avenue, to the south by Whatcom Waterway, and to the west by the Aerated Stabilization Basin (ASB) and Bellingham Bay. Three distinct subareas (Hilton Avenue Properties, C Street Properties, and Landfill Footprint and Perimeter) define the Site, and each subarea has a unique set of cleanup action elements that were presented in the CAP.

Landau conducted a Site-wide PRDI on behalf of the Port in 2020 and 2021, and subsequently prepared a draft Engineering Design Report (EDR). The draft EDR was submitted to Ecology in July 2022 and Ecology provided comments on September 12, 2022. Given the size and complexity of the Site, Ecology recommended that the Port continue to conduct design investigation activities to inform development of a final EDR. The recent AO amendment included a minor modification to the schedule of deliverables to complete two separate PRDI events referenced in PRDI Amendment 1 (PRDI AMD1) and Amendment 2 (PRDI AMD2). Following completion of the activities described in PRDI AMD2, the EDR will be updated in order to transition to development of the cleanup action plans and specifications. The work plan for PRDI AMD1 was finalized on September 29, 2023 (Landau 2023), and work commenced in October 2023. A summary of the activities conducted under PRDI AMD1, including figures and tables showing the locations of work conducted and data collected, is provided in Appendix A. This PRDI AMD2 outlines the plan to collect additional data from the Site's subareas (Figure 2).

1.1.1 Site Features and Use

As described in the CAP, the Site is situated between two ongoing sediment cleanup projects: the Whatcom Waterway and I&J Waterway sites. The Site's remedial design is being developed to be compatible with the cleanup of these adjacent sediment sites and to prevent migration of upland contaminants into adjacent sediments following cleanup activities. In addition, the remedial design is being developed in parallel with ongoing land-use planning activities by the Port and the City of Bellingham (City). A community vision of the future of the Bellingham waterfront (referred to as the

Waterfront District) is being implemented, and the Site plays a vital role in revitalizing a vibrant waterfront community.

The Site extends across several properties, which are owned by the Port, Sanitary Services Company, and Puget Sound Energy (PSE). The State owns adjacent aquatic land in the Whatcom and I&J Waterways that is managed by the Washington State Department of Natural Resources. The City also has rights-of-way within the Site. The adjacent intertidal and sediment areas are not included within the Site boundary, with the exception of the nearshore area of Whatcom Waterway that has impacted sediments, which were addressed as part of the Whatcom Waterway Phase 1 cleanup.

The Site is largely paved, with some portions covered with gravel and others with asphalt or concrete. The grade varies across the Site, with some steep transitions between areas. Several buildings are located on the Site, some of which are owned by the Port and operated by Port tenants, and some are privately owned and operated.

1.1.2 Site History and Operations

The Site's shoreline was initially created during early development of the Whatcom and I&J Waterways. Early dredging activities in the Whatcom and I&J Waterway areas in the early 1900s included shallow channels, with side-casting of the dredged materials behind bulkheads for creation of shoreline fill areas. Additional localized dredging events were conducted between 1961 and 1979 (Ecology 2020).

The ASB, located to the west of the Site, was constructed in 1978 and 1979, along with installation of wastewater pipelines beneath Whatcom Waterway, and installation of an offshore outfall from the ASB (Ecology 2020).

The Site has been used for industrial activities by multiple parties since the 1880s. Industrial structures and operations conducted within the area include, but are not limited to: a lumber mill; truck dispatching; a shallow-water marine area used for log rafting, boat maintenance and storage; bulk fuel terminals; foundry operations; coal storage and shipping; a cement warehouse; electrical equipment operations; seafood distribution; fueling operations with underground storage tank use; a municipal landfill; an olivine rock processing plant; US Naval Reserve facilities; gravel hauling operations; a PSE substation; a disposal company facility; and warehousing operations. Between 1965 and 1974, the Roeder Avenue Landfill was operated as a disposal site for wood waste and other material from the Georgia-Pacific Corporation mill and as the main disposal site for municipal solid waste by the City (Ecology 2020).

1.1.3 Summary of Current Environmental Conditions

Several environmental investigations were conducted within the Site prior to developing the CAP. The Remedial Investigation/Feasibility Study (RI/FS) Report, finalized in 2018, presents the conceptual Site model including the nature and extent of contamination. The summary of Site environmental conditions is based on those prior studies, as presented in the CAP (Ecology 2020). Contaminants of concern within the Landfill Footprint and Perimeter subarea were identified as metals, petroleum hydrocarbons and associated constituents (i.e., gasoline-, diesel-, and motor oil-range total petroleum hydrocarbons

[TPH-G, TPH-D, and TPH-O, respectively], which are collectively referred to as total petroleum hydrocarbons [TPH]), volatile organic compounds (VOCs), benzene, and semivolatile organic compounds. Contaminants of concern within the C Street Properties subarea (C Street subarea) were identified as TPH, benzene, polycyclic aromatic hydrocarbons (PAHs), metals, and VOCs in soil, groundwater, soil vapor, porewater, and sediments (Ecology 2020). Contaminants of concern within the Hilton Avenue Properties subarea (Hilton Avenue subarea) were identified as TPH-G, metals (arsenic and lead), and PAHs in soil. Additional metals (such as nickel, mercury, and silver) did not exceed soil direct contact cleanup levels (CULs) but did exceed sediment criteria and were identified as a potential soil erosion pathway to the I&J Waterway. Soil impacts in this subarea are not a source of groundwater contamination (Ecology 2020).

Two interim cleanup actions have been conducted at the C Street subarea, including underground storage tank decommissioning and petroleum-related contamination cleanup, which removed impacted soils and improved stormwater and utility infrastructure.

1.2 Agreed Order Amendment

AO DE 3441, entered into by Ecology, the Port, and the City in 2006, required completion of an RI/FS. The first amendment (August 2012) required an interim action to excavate and remove non-aqueous phase liquid petroleum and petroleum-contaminated soils and sediment from the former Chevron area. The second amendment (November 2018) required a public review of the draft CAP. The third amendment (February 2020) required the preparation and submittal (for Ecology's review and approval) of the documents necessary to complete the design and permitting phase of the cleanup action described in the final CAP.

The fourth amendment (May 2023) updated the deliverables schedule, which included a revised series of PRDI Project Plans. This PRDI AMD2 (and associated future addenda) has been prepared to address the requirement of the fourth amendment to the AO.

The Scope of Work defined in the AO and its amendments is divided into three major tasks:

- **Task 1: PRDI Project Plans, Addenda, and Implementation.** Describes the work necessary to further investigate the Site to inform effective design of the prescribed remedy. The fourth amendment to the AO requires that this PRDI AMD2 include a description of additional proposed investigation efforts to inform and refine design elements for the prescribed remedy. Specific activities chosen for PRDI AMD2 include additional groundwater and vapor sampling, additional refinements of the surface condition assessment, and a potential expansion of the enhanced *in situ* bioremediation (EISB) pilot study that was commenced during the implementation of PRDI AMD1.
- **Task 2: Engineering Design Report (EDR).** Preparation of revised Ecology review draft and final EDRs that provide sufficient information to develop 30 percent design-level details and specifications.
- **Task 3: Construction Plans and Specifications.** Preparation of Ecology review and final construction plans and specifications based on the final EDR.

2.0 ELEMENTS OF THE PRE-REMEDIAL DESIGN INVESTIGATION, AMENDMENT 2

Approximately 30 years of environmental investigations have been conducted under Ecology direction to characterize the nature and extent of contamination at the Site, which were summarized in the final RI/FS report (Anchor QEA 2018). As previously described, additional PRDI activities have been conducted by Landau, including investigation elements conducted in 2023 and 2024, based on PRDI AMD1, with the objective of addressing data gaps necessary to inform the preparation of remedial design documents.

PRDI AMD1 involved a number of pre-design characterization activities, including:

- Additional soil quality characterization (C Street subarea and Hilton Avenue subarea)
- Groundwater monitoring and analyses (C Street subarea, Hilton Avenue subarea and proximal to the ASB)
- A field pilot study to evaluate the performance of EISB (C Street subarea)
- A survey of surface conditions in the vicinity of areas identified by the final CAP as requiring containment and/or capping (C Street subarea and Hilton Avenue subarea)
- Landfill gas (LFG) and indoor air monitoring (Landfill Footprint and Perimeter subarea).

Results and PRDI field documentation are further presented in figure and tabular format in Appendix A, as appropriate. An Activities Summary is included in Appendix A describing the various activities conducted as part of PRDI AMD1, with supporting tables and figures depicting the results of those activities. Based on a review of the results of PRDI AMD1, the following investigation elements are proposed to be included as part of PRDI AMD2 activities:

- **C Street Subarea – EISB Pilot Study (Groundwater Treatment).** PRDI AMD1 activities included collection of soil and groundwater quality data to establish a baseline understanding of environmental conditions prior to the implementation of the EISB field pilot study, and ongoing collection of soil and groundwater data to evaluate the performance of the EISB field pilot study and to inform final remedial design requirements. Performance monitoring of the EISB system included collection of groundwater and seawater samples and the evaluation of groundwater hydraulic conditions including slug testing and tidal studies to inform the final design.

The field pilot study started during PRDI AMD1 will continue as part of PRDI AMD2, with potential modifications to the program based on ongoing evaluation of observations made and data collected during PRDI AMD1. Additional soil and groundwater quality data will be collected to inform potential locations of additional treatment, if required.

- **Hilton Avenue Subarea – Groundwater Quality Evaluation.** PRDI AMD1 activities included evaluation of hydraulic conditions near the shoreline, and at the interface between the Landfill Footprint and Perimeter subarea and the ASB, including a tidal study. Porewater and surface water sampling was conducted immediately offshore of the subarea to assess if detected contaminants in the local groundwater aquifer are affecting Bellingham Bay; a review of the analytical results indicated that no contaminants were detected at levels of concern. PRDI AMD2 will include collection of limited additional groundwater quality data.

- **ASB – Hydraulic Dynamics and Potential Groundwater Controls.** The final CAP identified that the clay berm located between the ASB and the Landfill Footprint and Perimeter subarea was acting as a physical diversion for groundwater. As changes to the Whatcom Waterway Phase 2 cleanup action related to the ASB configuration have been determined, additional evaluation of groundwater hydraulics along the clay berm was conducted during PRDI AMD 1 to inform future groundwater management strategies within the Landfill Footprint and Perimeter subarea and potential discharge points around the berm.

PRDI AMD2 will include the collection of limited additional groundwater monitoring data (e.g., water elevations) to be used to support an understanding of groundwater flow associated with work conducted in neighboring investigation areas (e.g., Hilton Avenue and C Street subareas).

- **Site-Wide – Surface Conditions Assessment.** The final CAP identified the installation of new and/or maintenance of existing physical barrier and reduced-permeability caps at various locations at the Site to address the soil pathway for direct contact and erosion of soils. A survey of surface conditions was conducted during PRDI AMD1 in these areas to define the nature of these barriers and caps.

Additional assessment will be completed to supplement data gaps identified during PRDI AMD1 to continue to develop an appropriate final engineering design strategy.

- **Landfill Gas Quality and Indoor Air Assessment.** PRDI AMD1 activities included an LFG evaluation and indoor air monitoring to address air quality and soil vapor data gaps.

An additional LFG evaluation will be conducted as part of PRDI AMD2 to assess conditions in the dry season, as well as to collect additional data on LFG quality that will be used to inform the design of final LFG controls.

3.0 PRE-REMEDIAL DESIGN INVESTIGATION AMENDMENT 2 ACTIVITIES

This section summarizes the data gaps to be addressed and investigation activities planned to support further development of the Site’s remedial design. Section 4 includes additional details on the means, methods, and procedures to be used to implement the PRDI activities discussed in this section.

Landau anticipates that Site PRDI AMD2 activities will be implemented across multiple mobilizations as new Site data are evaluated and additional focused activities are planned and undertaken.

The initial PRDI Project Plans (including PRDI AMD1) included several guidance documents that were prepared to support execution of the planned investigation activities, management of the resulting data, and support remedy design. These documents, which consisted of the initial and supplemental Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), Site Health and Safety Plan, and Inadvertent Discovery Plan, will continue to support the investigation activities discussed herein, with updates via addenda included as appendices to this documentation, as appropriate (Landau 2020, 2023).

3.1 Site Reconnaissance and Utility Locate

A Site reconnaissance will be completed prior to conducting additional investigation activities that require subsurface disturbance, such as the advancement of borings for well installation elements of the investigation. Site visits are anticipated to plan and implement the various elements described in this PRDI AMD2. These Site visits will involve evaluating potential access issues by noting Site features and/or tenant materials that overlie or impede drilling access to proposed and existing investigation locations.

As appropriate, proposed investigation locations will be marked in white paint per RCW 19.122.030 and a public utility locate request will be submitted through the Washington Utility Notification Center. A private underground utility locate will also be conducted following the Site reconnaissance visit. Investigation locations described elsewhere in this PRDI AMD2 may be moved based on the results of the Site reconnaissance to avoid subsurface utilities or other infrastructure.

3.2 Site Survey

The location, top-of-casing, and ground surface elevation of wells installed as part of the proposed PRDI AMD2 activities in the C Street subarea (Section 3.3.2) will be surveyed by a land surveyor licensed in the State of Washington. The survey will reference the NAD83¹ horizontal datum and the NAVD88² vertical datum. Surveyed top-of-casing elevations will be used to calculate groundwater elevations at each monitoring well to evaluate groundwater flow direction.

¹ North American Datum of 1983

² North American Vertical Datum of 1988

3.3 C Street Properties Subarea

The selected cleanup action for the C Street subarea included removal of hotspot soils, monitored natural attenuation of groundwater, and installation of a containment system to prevent direct contact with subarea contamination. Initial PRDI results determined that removal of hotspot soils was no longer warranted; however, elevated levels of groundwater contamination in the C Street subarea identified during initial PRDI activities required further evaluation, including consideration of potential groundwater treatment strategies.

The investigation activities detailed below will be conducted to continue to support and inform the implementation of EISB in the C Street subarea, monitor performance of the field pilot study, and inform eventual remedy selection during development of the EDR.

3.3.1 Bioremediation Field Pilot Study

A bioremediation field pilot study is part of the PRDI AMD1 activities with the goal of demonstrating that a bioremediation strategy (specifically, EISB) could be used to effectively treat groundwater to achieve Site CULs and may represent an appropriate final cleanup remedial option. Monitoring wells CWF-CW-1 and CWF-CW-2, located at the west and east ends of the Whatcom Waterway seawall, respectively (Figure 3), were selected as conditional points of compliance (CPOCs) for groundwater quality in the C Street subarea in PRDI AMD1.

3.3.1.1 Enhanced *In Situ* Bioremediation Field Pilot Study Initial Results

The EISB field pilot study is designed to supplement and enhance natural attenuation of petroleum contamination in groundwater within the C Street subarea. Natural attenuation through anaerobic bioremediation is occurring within approximately 100 feet (ft) of the shoreline where sulfate (electron acceptor for biodegradation) from seawater mixes with groundwater due to tidal influence as described in Appendix A of PRDI AMD1. Biodegradation is enhanced during the pilot test through injection of electron acceptors to contaminated portions of the shallow aquifer through a series of six infiltration trenches (Trenches A through F, installed in October 2023 as shown on Figure 3 and detailed in Appendix A). Sulfate, present in seawater from the adjacent Whatcom Waterway, was the primary source of electron acceptor for monthly injection events, which are summarized in Appendix A.

Approximately 400,000 gallons of seawater has been introduced into the subsurface through six monthly infiltration events completed at the infiltration trenches through June 2024 (Appendix A, Table A-9), with tested sulfate concentrations in the infiltrated seawater typically ranging from 1,500 milligrams per liter (mg/L) to 2,200 mg/L. This concentration range was less than the anticipated 2,800 mg/L used in developing the design considerations for the field pilot study as described in PRDI AMD1 (Landau 2023); however, following the two initial monthly application events in December 2023 and January 2024 and review of the slug testing results, it was determined that the volume of seawater that could be applied during this event could be increased over the initial design considerations by up to 50 percent. Subsequent events beginning in February 2024 have applied this 50 percent greater volume, which results in a similar mass of sulfate being applied as anticipated in the design considerations.

Based on a review of groundwater sampling data collected through June 2024 (following 6 months of sulfate applications) as included in Appendix A, it appears that while sulfate concentrations in groundwater have increased over the November 2023 baseline conditions, a decrease in TPH concentrations has not been observed. At monitored wells, average sulfate in June has largely increased compared to the November 2023 levels. June TPH concentrations have increased or remained stable over prior PRDI results, including at CPOCs. Increasing TPH concentrations during these initial stages of bioremediation injections are not unexpected due to aquifer disturbance from the infiltration events, resulting in enhanced dissolution of non-aqueous phase liquid (NAPL) and enhanced desorption of sorbed mass.

3.3.1.2 Field Pilot Study Work Plan Addendum

The Bioremediation Field Pilot Study Work Plan was included as Appendix A of PRDI AMD1. That document noted that nitrate could be used as an additional electron acceptor based on EISB performance, including if TPH degradation is not proceeding as quickly as desired. Sulfate and nitrate electron acceptors are both used by naturally-occurring bacteria to obtain energy for the destruction of TPH, and nitrate is typically a more effective acceptor and is preferred by aquifer bacteria as it provides more energy than sulfate and is often depleted in areas of TPH contamination. Groundwater monitoring data from PRDI wells indicate that nitrate concentrations in the treatment area are very low to not detected, indicating that added nitrate would be effectively used by Site bacteria for degradation of TPH.

Initial evaluation of TPH and sulfate concentrations in groundwater through June 2024 indicates that the addition of nitrate, as described in Appendix A of PRDI AMD1, may be needed to further enhance EISB. Injection of sulfate (seawater) will continue through the September 2024 sampling event. TPH and sulfate data from this event were evaluated, and nitrate will be added to the EISB pilot program in October as TPH concentrations did not show sufficient reduction. Nitrate will be added to the infiltrated seawater, providing a combination of nitrate and sulfate electron acceptors for subsequent infiltration events.

An email work plan addendum detailing the proposed changes was submitted to Ecology on October 14, 2024; the addendum was approved on October 22, 2024 per e-mail response from the agency on that date.

At other Washington sites, Landau applies nitrate as a concentrated solution of ammonium nitrate, which is diluted during injection to concentrations ranging from 225 to 4,500 milligrams nitrogen per liter (mg-N/L) for TPH bioremediation. Although a drinking water maximum contaminant level (MCL) exists for nitrate at 10 mg-N/L, drinking water is not a beneficial use of shallow groundwater at the Site and, therefore, the MCL does not apply. The highest beneficial use for Site groundwater is the discharge to the marine surface water; however, no marine surface water criteria are established for nitrate.

Initial nitrate additions would be targeted to the three central trenches in the C Street subarea (Trenches A, B, and D) to address the elevated TPH concentrations found in those areas and to reduce the potential that nitrate would migrate to the surface water. The remaining trenches (C, E, and F) may

be considered for potential future nitrate additions if groundwater and surface water sampling indicate application to Trenches A, B, and D is necessary. As groundwater and surface water performance monitoring (detailed in Sections 4.1.4 and 4.1.5) is conducted, results will be evaluated to refine the field pilot study program through the adaptive management practices described in PRDI AMD1.

Monthly application events are anticipated to continue through March 2025, at which point data collected to date will be evaluated and additional modifications to the field pilot study will be evaluated, which may include a reduction in event frequency or increases in nitrate concentrations in the applied seawater. Landau will provide an addendum email to Ecology for review if such changes are proposed.

3.3.1.3 Monitoring Well Installation

To evaluate the continued effectiveness of the EISB field pilot study, additional groundwater well installation and monitoring are required to inform potential future EISB system adaptation/ expansion and final remedial strategies. Three new groundwater monitoring wells will be installed during the PRDI AMD2 activities (i.e., CS-MW-12, CS-MW-13, and CS-MW-14) for EISB performance monitoring and to inform the eventual design of the final remedy, which may include installation of additional trenches, and incorporating those new trenches into the EISB treatment program. Planned locations for the new groundwater wells are shown on Figure 3. Field screening and soil sampling will be conducted during monitoring well installation activities as detailed in Sections 4.1.1 through 4.1.4.

3.3.1.4 Performance Monitoring

For continued evaluation of the EISB field pilot study, up to 21 groundwater monitoring wells (18 existing and 3 newly installed) in the C Street subarea will be sampled using peristaltic pumps. Dedicated tubing will be used to sample each well to prevent cross-contamination between wells. Low-flow sampling techniques will be used for purging and sample collection as described in Section 4.1.4. Additional information on the methods and techniques to be used for groundwater sampling is provided in the SAP (PRDI Project Plan; Appendix A) and QAPP (PRDI Project Plan; Appendix B) documents included in the initial PRDI Project Plan (Landau 2020), and in Appendix B of PRDI AMD1.

An email work plan addendum detailing the proposed changes to the groundwater performance monitoring was submitted to Ecology on November 8, 2024; the addendum was approved on November 11, 2024 per email response from the agency on that date. Wells were subsequently sampled in November 2024 and will be sampled on a quarterly basis. Monthly performance sampling of five selected representative wells (CWF-CW-1, CS-MW-2, CS-MW-3, CS-MW-7, and CS-MW-9) commenced in May 2024. These wells have been sampled and analyzed on a monthly basis for TPH, sulfate, and lead. This program would continue monthly throughout implementation of PRDI AMD2 if necessary to inform EISB field pilot study management, and the analytical suite will expand to include nitrate and nitrite if nitrate is added to infiltration events.

3.3.1.5 Baseline and Compliance Surface Water Sampling

As described in PRDI AMD1, Appendix A, Landau is currently conducting nitrate injections to enhance TPH biodegradation at a Port site at Blaine Marina in Blaine, Washington. At that site, 20 mg-N/L is the

Ecology-approved benchmark limit for nitrogen in marine surface water from the combined contributions of nitrate and nitrite (i.e., 20 mg-N/L of nitrate plus nitrite). Nitrate and nitrite are monitored in marine surface water adjacent to Blaine Harbor and results have consistently been well below the benchmark. If nitrate is added to the infiltration program, nitrate plus nitrite surface water testing will be implemented for comparison to the same benchmark of 20 mg-N/L of nitrate plus nitrite.

Surface water would be sampled from the three approximate locations shown on Figure 3, with samples collected from each location at low tide. One round of sampling has occurred as a baseline prior to implementation of nitrate as part of the EISB field pilot study. Beginning the first quarter of 2025, quarterly sampling will be conducted. The frequency of sampling may be increased to monthly if the 20 mg-N/L concentration is exceeded.

Surface water sampling will be conducted in accordance with the procedures described in Section 4.1.5. Additional information on the methods and techniques to be used for surface water sampling is provided in the SAP/QAPP document in Appendix B of PRDI AMD1.

3.3.2 Groundwater Dynamics Evaluation (C Street Subarea)

Groundwater-level elevation measurements will be used to evaluate current groundwater flow dynamics. This evaluation will include flow directions and gradients in conjunction with hydraulic conductivity and tidal study results from PRDI AMD1 to further assess influence on groundwater dynamics from tides and injection events.

The following activities will be used collectively to evaluate local groundwater flow dynamics in the C Street subarea:

- Depth-to-groundwater measurements at the 18 existing (including ASB-MW-6) and up to 3 new PRDI monitoring wells will be collected using the procedures and methods detailed in Section 4.1.4 during groundwater monitoring activities. Results and their evaluation will include:
 - Synoptic groundwater elevation data (converted from depth-to-water measurements referenced to surveyed measuring point elevation data) at all wells
 - Estimated hydraulic gradients throughout the C Street subarea, as documented in representative groundwater elevation contour maps showing interpolated groundwater elevations during the dry and wet seasons.

3.4 End of Hilton Avenue Properties Subarea

The cleanup action for the Hilton Avenue subarea includes maintenance of existing and/or placement of new physical barrier elements (e.g., soil/gravel with underlying layer and/or hard surface) to address protection against direct contact with and erosion of potentially contaminated soils. The initial PRDI activities included additional groundwater sampling within and adjacent to this subarea, with results from two wells (i.e., HH-MW-1 and ASB-MW-1) indicating contaminant concentrations exceeding Site CULs, which merited further evaluation.

The final remedy in this subarea, as established in the CAP, will include, at a minimum, repair and/or replacement of the existing gravel surfacing to meet the direct contact barrier requirement within the overlapping Landfill Footprint and Perimeter subarea. The existing gravel surfacing may be replaced or overlaid with asphalt or concrete paving in some areas. Placement of paving or gravel may extend beyond areas requiring remedy to promote smooth transitions between different surfacing types and tenant use of operational areas.

3.4.1 Ongoing Groundwater Evaluation

As part of the PRDI AMD1 activities, four new monitoring wells (i.e., HH-MW-2 through HH-MW-5) were installed in the subarea to evaluate groundwater hydraulic dynamics and contaminant concentrations to inform potential needs and strategies for groundwater treatment design. Groundwater sampling results, included on Figure A-9 and in Table A-5 in Appendix A, indicate that groundwater in select portions of the Hilton Avenue subarea contained contaminant concentrations exceeding Site CULs, though they appear to fluctuate based on season.

To support the assessment of potential design requirements for a groundwater treatment system or other control measures within the subarea, one existing monitoring well in the Hilton Avenue subarea (HH-MW-2) will be sampled for chemical analysis using the procedures and methods detailed in Section 4.1.4. on a semiannual basis (November 2024 and May 2025). HH-MW-5 will also be sampled in May 2025, as it was not included in the November 2024 event. Samples from both wells will be analyzed for TPH-G, and TPH-D both with and within the silica-gel cleanup step added, to evaluate for the presence of non-polar hydrocarbons. Additional information on the methods and techniques to be used for groundwater sampling is provided in the SAP and QAPP documents provided in the initial PRDI Project Plan (Landau 2020), and in Appendix B of PRDI AMD1.

3.4.2 Groundwater Dynamics Evaluation (Hilton Avenue Subarea and Aerated Stabilization Basin)

Groundwater wells were installed within the Hilton Avenue subarea and adjacent to the ASB during the initial and subsequent PRDI to further evaluate the potential influence of surface water elevations in the ASB on local groundwater elevations within the adjacent Landfill Footprint and Perimeter subarea. Seven wells were installed to assess water quality and seasonal groundwater-level fluctuations: HH-MW-1 and ASB-MW-1 (along the northern edge of the ASB), ASB-MW-2 through ASB-MW-5 (directly adjacent to the ASB), and ASB-MW-6 (along the southern edge of the ASB). All seven wells were installed within the footprint of the former landfill. During implementation of PRDI AMD1, an additional four monitoring wells (HH-MW-2 through HH-MW-5) were installed.

Groundwater-level elevation measurements will be used to evaluate current groundwater flow dynamics. This evaluation will include flow directions and gradients in conjunction with hydraulic conductivity and tidal study results from PRDI AMD1 to further assess influence on groundwater dynamics from tides and from the presence of the constructed clay berm between the ASB and the landfill.

The following activities will be used collectively to evaluate local groundwater flow dynamics in the Hilton Avenue subarea and the areas adjacent to the ASB:

- Depth-to-groundwater measurements at the 10 existing PRDI monitoring wells (not including ASB-MW-6, which has now been added to the C Street Properties subarea evaluation as it is closer to that subarea) will be collected using the procedures and methods detailed in Section 4.1.4 during groundwater monitoring activities. Results and their evaluation will include:
 - Synoptic groundwater elevation data (converted from depth-to-water measurements referenced to surveyed measuring point elevation data) at all wells
 - Estimated hydraulic gradients throughout the Hilton Avenue subarea and the area adjacent to the ASB, as documented in representative groundwater elevation contour maps showing interpolated groundwater elevations during the dry and wet seasons.

3.5 Surface Condition Assessment

As depicted on Figure 2, many of the elements of the final CAP's selected remedy consist of physical separation (i.e., containment or reduced permeability) of subsurface contamination to remain-in-place via maintenance or installation of physical barriers (e.g., caps) and other associated institutional controls. An evaluation of the current status and condition of existing surfaces at the Site was conducted during PRDI AMD1 activities to inform final design considerations and potential options for physical barrier placement.

A preliminary assessment was conducted of the existing surface conditions, quality, and composition throughout the Site. Visual evaluations were conducted by walking the Site to assess the condition and composition of existing surfaces, including visual inspection and documentation of existing impermeable or low-permeability areas (e.g., asphalt, concrete, buildings, and other visible surface features). Landau noted general conditions, damage or deterioration, and took photographs to document the observations. The locations and approximate extent of surface feature types and the relative transition between compositions and grades were documented during the Site reconnaissance, including collection of GPS information. The results of this assessment were uploaded into a GIS database, visually depicted on Figure 4.

Additional information, either from historical sources or the field investigation conducted as part of this investigation, about select surface areas is needed to understand the depth of contamination in areas with soil/gravel capping. This information will be used to develop protective measures for hard surfaces and soil/gravel capping to be incorporated into the remedial design that are substantively equivalent to the level of protectiveness described in the final CAP, but may not require the specific thicknesses detailed in the final CAP in all locations. Additional surface condition evaluation activities for PRDI AMD2 include review of available reference documents and pertinent reports, and a field investigation to assess current conditions.

Further details on the surface condition assessment elements included as part of PRDI AMD2 are as follows:

- Available reference documents will be reviewed to evaluate depth to contamination in areas of soil/gravel capping. Reference documents may include record drawings, photographs, sketches, previous inspection reports, environmental reports, and other information available, as applicable to the scope of the surface condition assessment.
- Based on results of the document review, a field investigation will be conducted to determine the existing thickness of existing surface conditions in undefined areas. This field investigation may include hand augering, soil coring, or use of a roto-hammer drill depending on the nature of the surface. Existing thickness characteristics will be used to inform the design of the cap and any monitoring/maintenance requirements for the final remedy.

3.6 Landfill Gas Evaluation

As part of the final cleanup action for the Site, LFG must be mitigated to protect Site workers and visitors from potential exposure, prevent offsite migration of LFG, protect indoor air quality, and prevent the accumulation of LFG to unsafe or unhealthy levels beneath impermeable surfaces. Initial PRDI activities in 2020 through 2024 have included field investigation and computer modeling to evaluate the quantity and quality of the LFG currently being generated at the Site, which included several rounds of LFG quality measurements and indoor air monitoring. The results of these activities indicated that methane concentrations remained high in most LFG locations sampled; however, an evaluation of indoor air quality at the Site did not indicate a current threat to worker health and safety from LFG (and in particular, methane) emissions at the Site (Landau 2022). LFG monitoring results collected during the PRDI to date are included in Table A-7 of Appendix A, and Figure 5.

A review of these monitoring results indicate that there appears to be some seasonal fluctuation in LFG monitoring results. Consequently, additional LFG monitoring is included in planned PRDI AMD2 activities. The additional LFG assessment data will be combined with previous results to update the model that estimates current LFG production and emissions information necessary to continue to inform design strategies, permitting requirements, and construction of the final cleanup remedy.

The following subsections summarize the proposed approach to addressing existing data gaps and providing current LFG data to support evaluation of long-term LFG management requirements; additional details related to conducting the field assessment are provided in Section 4.2 and in the previous (Landau 2020) and amended SAP/QAPP (PRDI AMD1).

3.6.1 Landfill Gas Evaluation

Soil gas will be evaluated during a single event planned for early summer 2025 for the presence of LFG at the 13 existing temporary gas probes (TGPs; TGP-1 through TGP-12, and TGP-14) and three existing monitoring wells [MW-5(B), RMW-12D, and RMW-16] to assess the status of lateral migration and allow for further assessment of required compliance monitoring strategies. TGP-13 was unable to be located during recent monitoring events and will be reinstalled prior to these activities in accordance with the procedures detailed in the previous PRDI (Landau 2020). The locations of the TGPs and cumulative results from PRDI soil gas monitoring are shown on Figure 5.

The primary tool for evaluating soil gas for the presence of LFG will be a handheld LFG analyzer (Landtec™ GEM 2000 or 5000). The analyzer measures methane, oxygen, carbon dioxide, carbon monoxide, hydrogen sulfide, differential pressure, and static pressure, all of which can be elevated in areas where LFG is produced and not readily ventilated.

During PRDI AMD1 monitoring, a photoionization detector (PID) was used to identify the presence of non-methane volatile organic compounds (VOCs) in soil gas. Given the seasonal fluctuations in LFG concentrations at the Site, additional VOC monitoring will be conducted as part of the PRDI AMD2 activities. The cumulative PRDI data will be evaluated to identify up to six TGP locations where soil vapor samples will be collected and submitted to a laboratory for analysis for VOCs by US Environmental Protection Agency (EPA) Method TO-15, to determine whether other compounds are present that will require treatment, and to support air permitting considerations. Selected ion monitoring will be conducted for vinyl chloride to achieve the lowest possible reporting limits. Sampling and analysis procedures are described further in Section 4.2 and in the previous SAP (Landau 2020).

3.6.2 Landfill Gas Production Modeling

As part of previous PRDI activities, levels of LFG production were estimated using modeling software (Landfill Gas Emissions Model [LandGEM]) developed by the EPA to provide a consistent approach for landfill owners to estimate the rate of LFG production and evaluate potential emissions. Existing LFG production models prepared by Landau during earlier phases of the PRDI will be updated for further evaluation in support of final remedy design.

The model is commonly used to estimate LFG production to inform LFG control system design and to support air permitting requirements. LandGEM assumes a first-order decay to model the process of anaerobic decomposition of organic waste, which produces LFG. The model uses emission factors compiled from landfills nationwide (EPA 1995) for some parameters, which can result in overestimates of concentrations and emissions of VOCs for older landfills, such as the Roeder Avenue Landfill in Bellingham.

As a result, additional field data collection is necessary to supplement and calibrate the existing modeling information for Site-specific use. Updated modeling results will be combined with the existing and newly collected field data and further documented to support the basis and rationale for the design of the LFG control system during development of the EDR.

4.0 FIELD METHODS AND LABORATORY ANALYSES

This section provides further details on the means, methods, and procedures to be used during the PRDI AMD2 activities discussed in Section 3. Information on specific sampling and analysis procedures, quality assurance/quality control (QA/QC) requirements, and analytical laboratory control information is provided in the SAP and QAPP documents included in the initial PRDI Project Plan (Landau 2020), and as supplemented by PRDI AMD1 (Landau 2023), when appropriate. In addition to the information included herein, these two documents, along with the Health and Safety Plan and Inadvertent Discovery Plan included with the initial PRDI Project Plan documentation (Landau 2020), will be the guidance documents used to implement the PRDI AMD2 activities.

4.1 Environmental

Methods, procedures, and related laboratory analytical information for the environmental investigations discussed in Section 3 are described in further detail in the following subsections.

4.1.1 Drilling

Borings for installation of new monitoring wells will be completed using hollow-stem auger or direct-push drilling methods. Drilling will be conducted by a driller licensed in the State of Washington. All drilling locations will be cleared with public and private utility locates prior to mobilization (Section 3.1), but locations will also be hand-cleared (e.g., with a vacuum truck, using hand-augers) down to 5 ft below ground surface (bgs) prior to ground penetration with the drill rig.

Regardless of the media being sampled or the final boring completion, lithology in all PRDI borings will be characterized and logged according to the Unified Soil Classification System by a trained environmental professional. Soil samples will be collected every 4 to 5 ft using a split-spoon sampler or acetate sleeve (or similar) and soil density estimates will be made using blow counts for every sampling interval, unless borings are completed using direct-push methods. Boring logs and as-built diagrams will be prepared to document subsurface explorations; this documentation will be reviewed by a licensed geologist for accuracy prior to publication.

Upon completion of logging and sampling, the subsurface explorations will be decommissioned in accordance with the requirements in Chapter 173-160 WAC.

4.1.2 Field Screening and Soil Grab Sampling

Soil samples from borings will be field-screened during lithologic logging (Section 4.1.1). Field-screening techniques include visual inspection for staining, olfactory evaluation for presence and strength of petroleum odors, sheen testing, and soil core/sample scanning using a PID. Field-screening results will be recorded on boring logs and related field documentation.

Field-screening results will also be used to determine the soil sampling interval in each PRDI soil boring. If field screening indicates the potential presence of contamination, a grab sample will be collected from the 1-ft interval with the strongest evidence of contamination (e.g., presence of sheen, strongest odor,

highest PID reading). If field screening *does not* indicate contamination, a grab sample will be collected from the 1-ft interval located at the groundwater table, as indicated by moisture in the soil core. Soil grab samples collected during PRDI activities will be analyzed for gasoline-range TPH (TPH-G) using the Northwest TPH extended-range gasoline analytical method (NWTPH-Gx), diesel- and oil-range (TPH-D and TPH-O) using the Northwest TPH extended-range diesel analytical method (NWTPH-Dx), and benzene, toluene, ethylbenzene, and total xylenes using EPA Method 5035/8260, as shown in Table 1.

4.1.3 Monitoring Well Installation and Development

Monitoring wells will be installed in borings drilled using hollow-stem auger methods. New wells will be constructed according to the same specifications as recently-installed wells. They will be installed to a maximum depth of 15 ft bgs and constructed using 2-inch-diameter polyvinyl chloride (PVC). They will feature 10-ft-long Schedule 40 PVC screens (0.010-inch slot size) and flush-mount protective monuments.

New monitoring wells will be developed using a surge block and centrifugal pump until the purged water runs clear, or until 10 well casing volumes have been removed. For the purposes of development, “clear” means that the measured turbidity in the purged water is approximately 10 nephelometric turbidity units or less.

4.1.4 Groundwater Monitoring Well Sampling

Groundwater monitoring wells will be gauged prior to sampling with an oil/water interface probe to determine the a) approximate depth to water; b) potential presence of light NAPL petroleum in the well; and c) total well depth (which will be compared to well installation logs [as available] to confirm well construction details and determine if well redevelopment is necessary). Depths-to-water will be measured to the nearest 0.01 ft from the top of the well casing.

Wells will be sampled using peristaltic pumps with dedicated tubing for each well to prevent cross-contamination between wells. Low-flow sampling techniques will be used for purging and sample collection. Additional information on the methods and techniques to be used for groundwater sampling is provided as discussed in the SAP and QAPP documents included in the initial PRDI Project Plan (Landau 2020). Samples will be collected shortly after low tide, to the extent practicable, and will be retained in laboratory-supplied sample containers and put on ice prior to transport to the analytical laboratory.

Based on the area of investigation and as outlined in Table 2, groundwater samples will be analyzed for:

- All PRDI AMD2 wells:
 - Benzene, metals,³ TPH-G, TPH-D, and TPH-O
- Additionally, samples collected from the Hilton Avenue subarea well will be analyzed for selected landfill contaminants of concern including:

³ Metals to include arsenic, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc. As noted above, samples from the ASB and Hilton Avenue subarea wells will additionally be analyzed for hexavalent and trivalent chromium.

- Bis(2-ethylhexyl)phthalate
- Polycyclic aromatic hydrocarbons (PAHs)
- Hexavalent and trivalent chromium
- Alkalinity.
- C Street subarea wells will be analyzed for EISB assessment parameters including:
 - Dissolved oxygen, pH, oxidation-reduction potential, and temperature (with a YSI field meter)
 - Ferrous (dissolved) iron with field test kits
 - Nitrate/nitrite and sulfate/sulfide.

C Street subarea wells will be sampled quarterly, with a sub-set sampled on a monthly basis in accordance with Section 3.3.1.4. The Hilton Avenue subarea well will be sampled semiannually during the PRDI AMD2 activities to evaluate for seasonal flux.

4.1.5 Surface Water Sampling

As noted in Section 3.3.1.5, baseline surface water samples have been collected along the intertidal shoreline adjacent to the C Street subarea to assess baseline conditions of nitrate and nitrite prior to the transition to nitrate injection. Additional samples will be collected as described in Section 3.3.1.5.

The surface water samples will be collected from locations shown on Figure 3 at low tide—to understand the potential variability of concentrations along the shoreline. The surface water sampling locations may vary, in an attempt to collect the water from within 6 inches of the top surface of the water, and within 6 inches of the underlying sediment.

As shown in greater detail in Table 3, surface water samples will be analyzed for nitrate and nitrite.

4.2 Landfill Gas Monitoring

As summarized in Section 3.6, additional information is needed to support the remedial design for mitigating LFG conditions at the Site. The information needed for design includes updating the understanding of the estimated rate of LFG production, additional characterization data to understand the concentrations of potentially hazardous components of the LFG, and a further refined understanding of the extent of LFG distribution in the subsurface. This section provides further details for conducting the evaluation; sampling and data quality-related information is provided in the SAP and QAPP documents included in the initial PRDI Project Plan (Landau 2020).

4.2.1 Landfill Gas Monitoring and Soil Vapor Analyses

LFG monitoring of the 13 existing TGP, one missing TGP to be reinstalled, and three monitoring wells (depending on the current condition of the TGP at the time the PRDI AMD2 activities are implemented) will be conducted during one discrete field event in late summer 2024. The monitoring event will be

scheduled to occur when barometric pressure is decreasing to prevent air intrusion into the cover, potentially diluting the sample.

The handheld LFG analyzer and PID will be used during the first monitoring event. At each monitoring location, field personnel will verify an airtight seal at the wellhead, connect the analyzer, and measure static pressure above current atmospheric conditions. The PID will then be used to measure VOC concentrations in parts per million. Afterwards, the probe or well casing will be purged of air using the LFG analyzer, removing air that may have accumulated in well casings or within the monitoring equipment. No minimum purge volume is required for the temporary monitoring probes, only that the LFG concentration readings are stabilized. When concentrations are stable, the data will be recorded onto a field form (initial PRDI SAP; Landau 2020). Field personnel will record the time of data collection, static and differential pressure, depth to groundwater (if any), LFG concentrations, and other relevant observations or notes.

In addition to collecting LFG data with the handheld analyzers, up to six soil vapor samples will be collected during this event and submitted to a certified laboratory for analysis for VOCs using the EPA TO-15 Method. The VOC data will be used to evaluate for the presence of other compounds potentially present in the LFG that could require treatment as part of the final cleanup remedy, and to support future air permitting considerations.

Soil vapor samples (and two to three additional QA/QC samples of ambient air) will be collected into pre-evacuated Summa canisters, each individually-certified clean of contamination by the laboratory. Samples will be collected using dedicated Teflon® tubing through a stainless-steel flow regulator set by the laboratory to collect the sample over a ½-hour period to prevent overdrawing the sampling points and diluting the sample. The ambient air sample will be collected in an upwind location to provide background air quality data for QA purposes.

Selected ion monitoring (SIM) will be conducted for vinyl chloride to achieve the lowest possible reporting limits using the EPA TO-15 SIM Method. Sampling and analysis procedures are further described in the SAP and QAPP documents included in the initial PRDI Project Plan (Landau 2020).

4.3 Investigation-Derived Waste

Investigation-derived waste (IDW) from the environmental investigations will be managed as detailed in the initial PRDI SAP (Landau 2020). IDW, including soil cuttings and water generated during boring advancement, drilling, and sampling, and waste/wastewater generated during sample purge and equipment decontamination, will be collected and managed in 55-gallon steel drums provided by the drilling subcontractors. Drums will be stored at a pre-approved temporary storage location at the Site per direction from the Port. After analytical results are received, Landau will coordinate with the Port to arrange appropriate disposal at a facility licensed by the State of Washington to accept the waste materials.

5.0 INVESTIGATION AND REPORTING SCHEDULE

The table below presents a schedule for implementation of the planned field events included in the PRDI AMD2 activities. As the results of the investigation elements associated with the initial mobilizations will inform the next steps in the investigation process, this schedule has been prepared only to highlight the major steps of the PRDI activities. The actual schedule and sequencing of necessary field activities are likely to change. An updated schedule will be provided in future addenda or separate reporting, as appropriate.

Investigation Element	Field Activities	Duration	Notes
Site Reconnaissance	Mark locations for utility locates	1 day	Requires coordination with Port and tenant
Surface Conditions Assessment	- Desktop exercise to review contaminant depths in areas of soil/gravel cap - Site reconnaissance to evaluate condition, quality, and make-up of existing surface conditions	2 weeks 2 days in the field	Field activity requires coordination with Port and tenant
Reinstallation of TGP-13	Reinstall one LFG probe	1 day	Requires advance tenant coordination
Soil Vapor Evaluation	- Monitor LFG from 14 probe locations - Collect soil vapor samples from up to six locations, with up to three ambient air samples	2-3 days	Requires advance tenant coordination
C STREET PROPERTIES SUBAREA			
Monitoring Well Installation	Install three field pilot study groundwater monitoring wells	1 days	Final locations contingent on underground utilities and tenant access requirements
Elevation Survey	Survey top-of-casing and ground surface elevations at two new monitoring wells	1 days	Conducted by professional surveyor
Groundwater Evaluation	Monitor and sample 3 new wells and 18 existing wells (including one ASB well)	3 days each event	Quarterly beginning in November 2024
Surface Water Sampling	Collect six surface water samples from three locations	1 day each event	Dependent on tide
Bioremediation Field Pilot Study	- Monitor and sample five wells - Inject nitrate and sulfate in Trenches A, B, and D - Sulfate only in Trenches C, E, and F	3 days each event	Monthly
Groundwater Hydraulic Dynamics Evaluation	Conduct groundwater elevation survey at existing PRDI monitoring wells	N/A	Concurrent with sampling events

HILTON AVENUE PROPERTIES SUBAREA AND ASB			
Groundwater Evaluation	Monitor and sample two wells (HH-MW-2 and HH-MW-5) semiannually, monitor five ASB wells and four HH wells quarterly.	Up to 2 days	Semiannually, quarterly

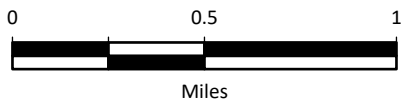
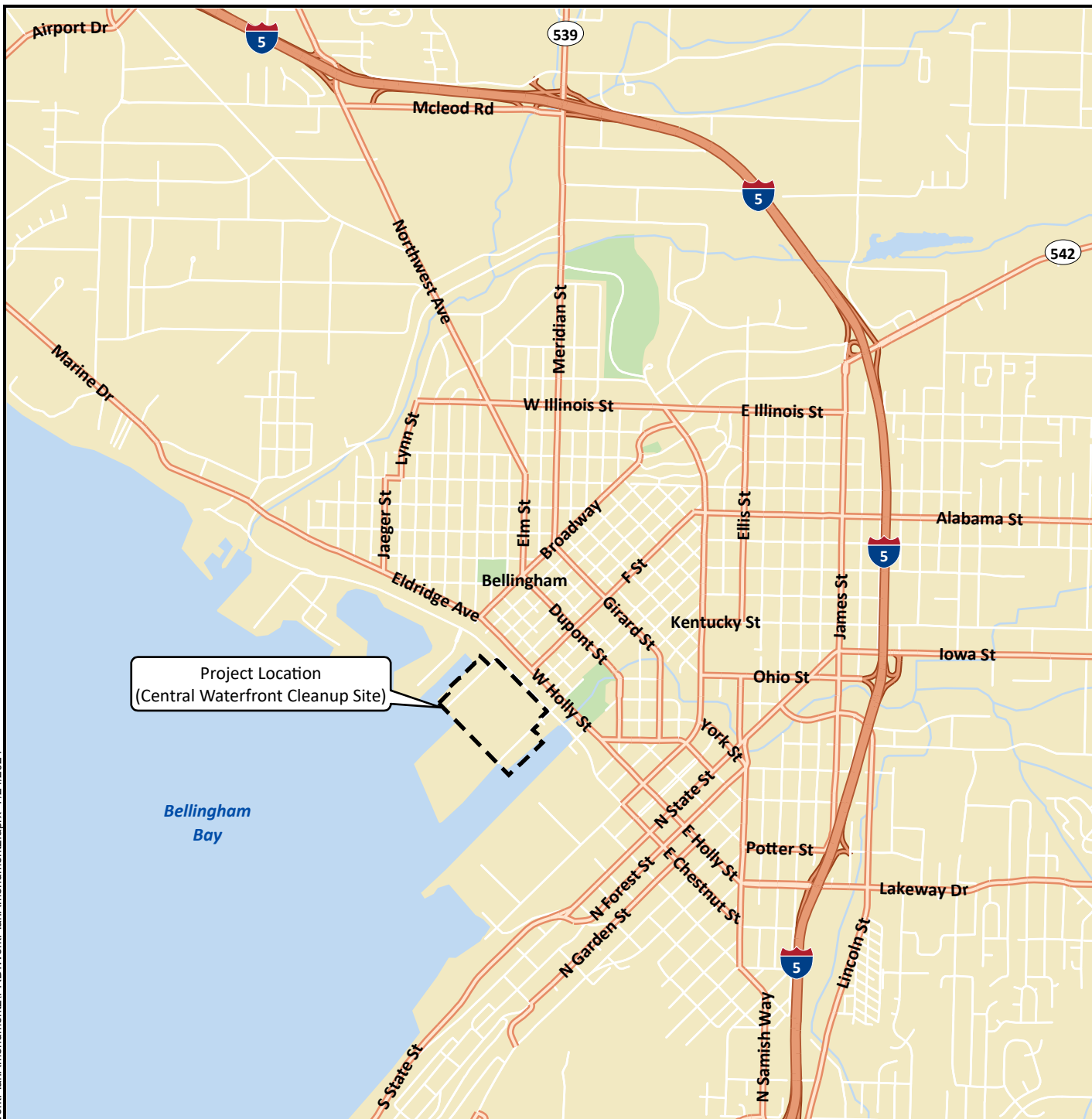
6.0 USE OF THIS PLANNING DOCUMENT

This Amendment No. 2 to the Pre-Remedial Design Investigation Project Plans has been prepared for the exclusive use of the Port of Bellingham for specific application to the Central Waterfront Cleanup Site Remedial Design and Permitting project. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau, shall be at the user's sole risk. Landau warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. Landau makes no other warranty, either express or implied.

7.0 REFERENCES

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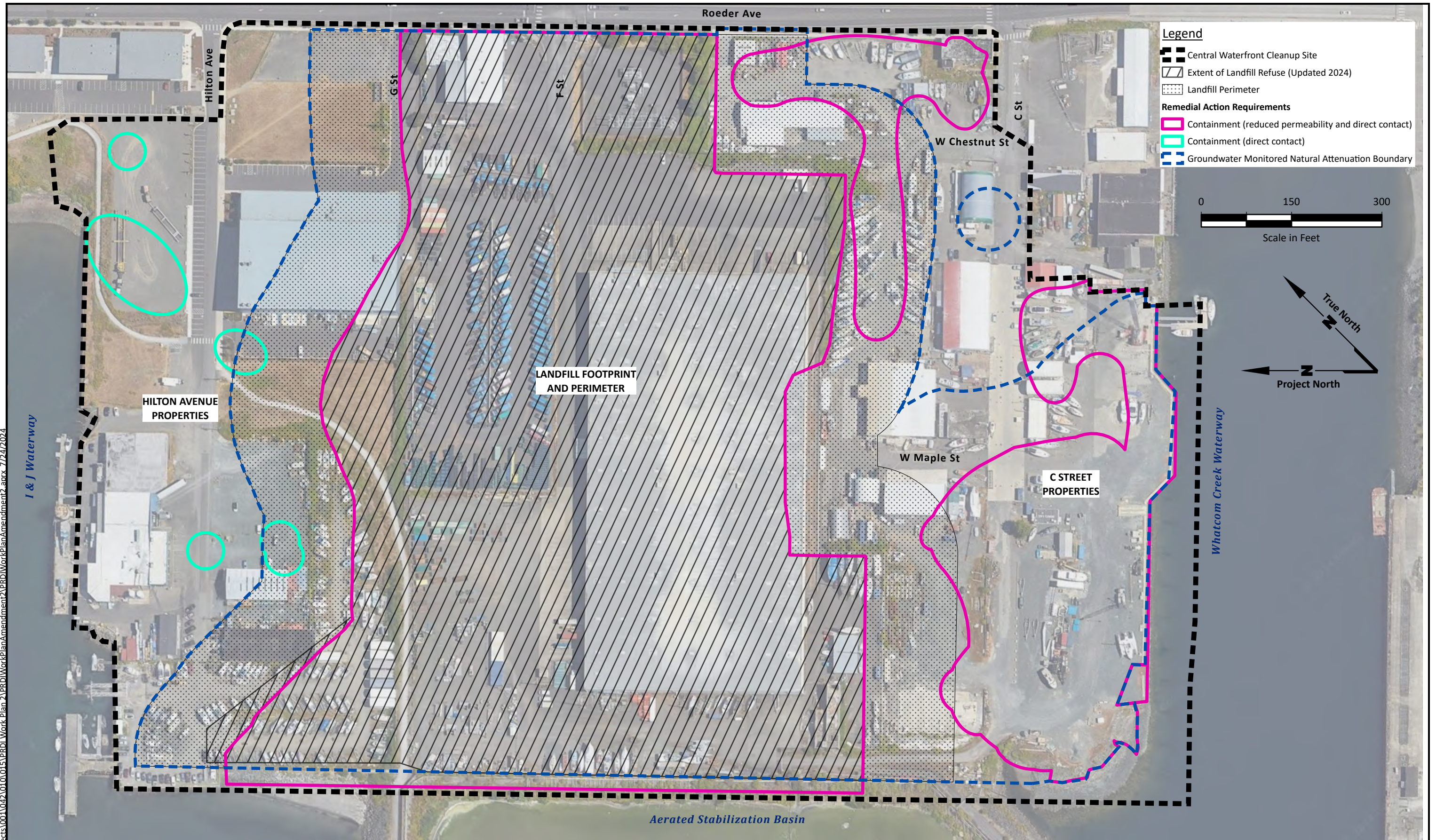


Central Waterfront Cleanup Site
Bellingham, Washington

Vicinity Map

Figure
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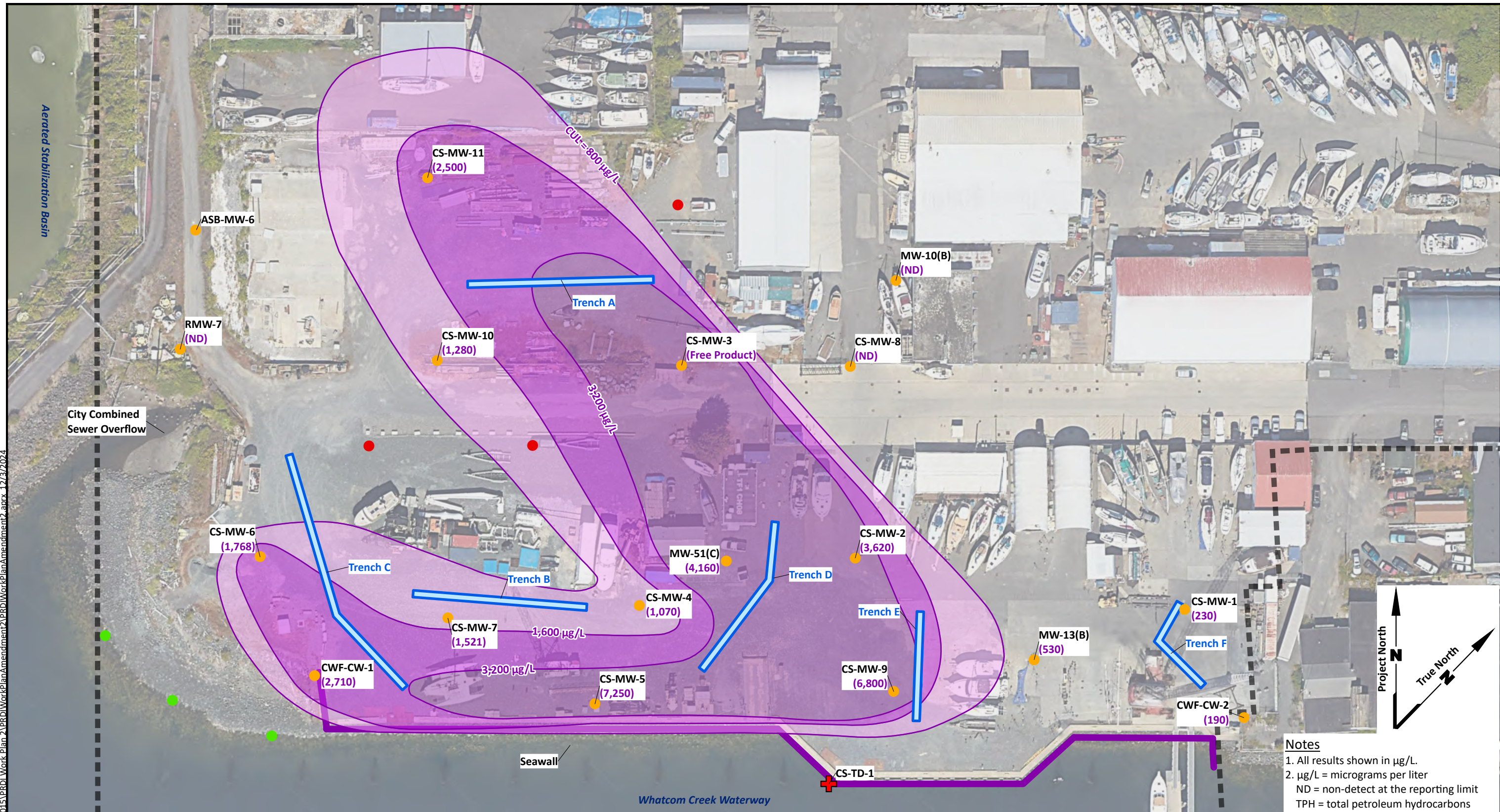
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Note

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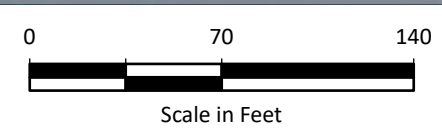


Legend

- Existing Monitoring Well Location
- Proposed Monitoring Well Location
- Marine Pressure Transducer
- Proposed Surface Water Sample Location
- Infiltration Trench Location
- Central Waterfront Cleanup Site
- Whatcom Waterway Seawall
- Maximum TPH Concentration in Groundwater (µg/L)

TPH Concentrations (Approximate)

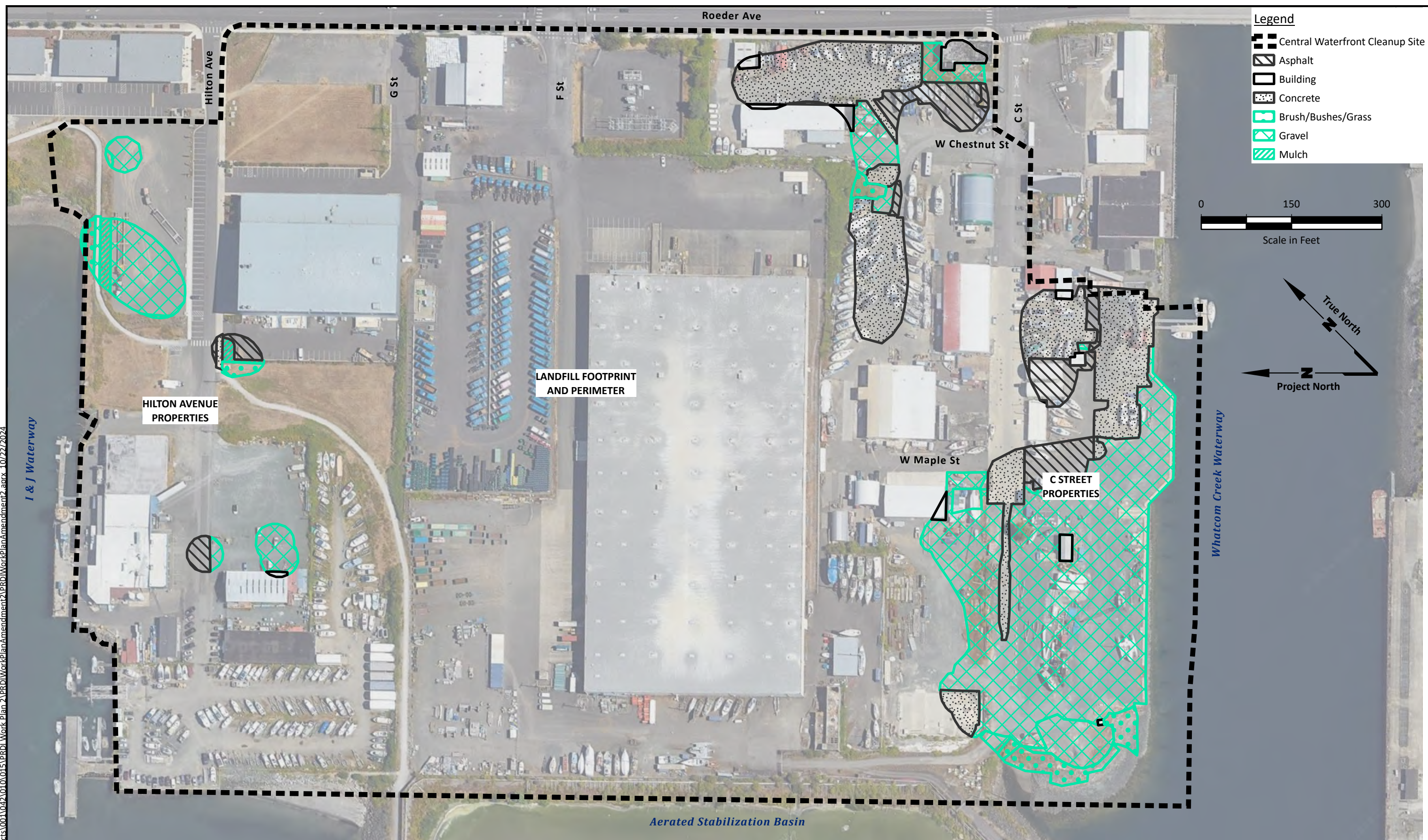
- >800 µg/L
- >1,600 µg/L
- >3,200 µg/L



Notes

1. All results shown in µg/L.
2. µg/L = micrograms per liter
ND = non-detect at the reporting limit
TPH = total petroleum hydrocarbons
3. TPH concentrations equal the total of TPH-G, TPH-D, and TPH-O.
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Table 1
Environmental Investigation Summary – Soil Borings
PRDI Project Plans, Amendment No. 2
Central Waterfront Cleanup Site – Bellingham, Washington

Location ID	Subarea	Type	Status	SOIL				
				Sample ID Prefix ¹	Sample Interval ²	TPH-G (NWTPH-Gx)	TPH-D and TPH-O (NWTPH-Dx)	BTEX (EPA Method 5035/8260D)
CS-MW-12	C Street	Split Spoon	Proposed	CS-MW-012-S	TBD	X	X	X
CS-MW-13	C Street	Split Spoon	Proposed	CS-MW-013-S	TBD	X	X	X
CS-MW-14	C Street	Split Spoon	Proposed	CS-MW-014-S	TBD	X	X	X
Field Duplicates	N/A	Split Spoon	N/A	Not proposed	N/A			
Trip Blanks	N/A	N/A	Proposed	Trip Blank	N/A	X		X
TOTAL				---	---	4	3	4

Notes:

- (1) Sample IDs for soil will contain a depth interval following the prefix shown on the table. For example, the sample ID for a soil sample collected at location CS-MW-12 from 6 to 7 feet bgs would be "CS-MW-12-S-6-7."
- (2) Sampling interval TBD based on results of field screening. If evidence of contamination is present, samples will be collected from the 1-foot interval with the most evidence (e.g., strongest odor, highest PID detection). If evidence of contamination is not present, samples will be collected from the 1-foot interval that crosses the groundwater table, indicated by the transition from moist to wet soil in the soil core.

Abbreviations and Acronyms:

bgs = below ground surface
 BTEX = benzene, toluene, ethylbenzene, and total xylenes
 EPA = US Environmental Protection Agency
 ID = identification
 N/A = not applicable
 NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method
 NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method
 PID = photoionization detector
 TBD = to be determined
 TPH-D = diesel-range total petroleum hydrocarbons
 TPH-G = gasoline-range total petroleum hydrocarbons

Table 2
Environmental Investigation Summary – Groundwater Monitoring Locations
PRDI Project Plans, Amendment No. 2
Central Waterfront Cleanup Site – Bellingham, Washington

Table 2: Groundwater Monitoring Locations
Page 1 of 2

Location ID	Subarea	Type	Status	ACTIVITIES				GROUNDWATER SAMPLING													
				Collect Elevation Data	Water Sampling	Survey	Install/Develop	Sample ID Prefix ¹	Sample Interval	Sampling Frequency	TPH-G (NWTPH-Gx)	TPH-D and TPH-O (NWTPH-Dx)	TPH-D and TPH-O (NWTPH-Dx) with silica gel cleanup	BTEX (EPA Method 8260D)	Bis(2-ethylhexyl)phthalate (EPA 8270E)	PAHs (EPA 8270E SIM)	Total and Dissolved Metals ³	Hexavalent and Trivalent Chromium ⁴	YSI Meter (pH, DO, ORP, Temp)	Ferrous (dissolved) Iron (Hach)	Nitrate, Nitrite, Sulfide, & Sulfate (EPA 300.0)
CS-MW-1	C Street	Monitoring Well	Existing	X	X			CS-MW-1-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-2	C Street	Monitoring Well	Existing	X	X			CS-MW-2-GW	Middle of screen	Quarterly ²	X	X	S	X			X		X	X	X
CS-MW-3	C Street	Monitoring Well	Existing	X	X			CS-MW-3-GW	Middle of screen	Quarterly ²	X	X	S	X			X		X	X	X
CS-MW-4	C Street	Monitoring Well	Existing	X	X			CS-MW-4-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-5	C Street	Monitoring Well	Existing	X	X			CS-MW-5-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-6	C Street	Monitoring Well	Existing	X	X			CS-MW-6-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-7	C Street	Monitoring Well	Existing	X	X			CS-MW-7-GW	Middle of screen	Quarterly ²	X	X	S	X			X		X	X	X
CS-MW-8	C Street	Monitoring Well	Existing	X	X			CS-MW-8-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-9	C Street	Monitoring Well	Existing	X	X			CS-MW-9-GW	Middle of screen	Quarterly ²	X	X	S	X			X		X	X	X
CS-MW-10	C Street	Monitoring Well	Existing	X	X			CS-MW-10-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-11	C Street	Monitoring Well	Existing	X	X			CS-MW-11-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-12	C Street	Monitoring Well	Proposed	X	X	X	X	CS-MW-12-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-13	C Street	Monitoring Well	Proposed	X	X	X	X	CS-MW-13-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CS-MW-14	C Street	Monitoring Well	Proposed	X	X	X	X	CS-MW-14-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
CWF-CW-1	C Street	Monitoring Well	Existing	X	X			CWF-CW-1-GW	Middle of screen	Quarterly ²	X	X	S	X			X		X	X	X
CWF-CW-2	C Street	Monitoring Well	Existing	X	X			CWF-CW-2-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
MW-10(B)	C Street	Monitoring Well	Existing	X	X			MW-10(B)-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
MW-13(B)	C Street	Monitoring Well	Existing	X	X			MW-13(B)-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
MW-51(C)	C Street	Monitoring Well	Existing	X	X			MW-51(C)-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
RWM-7	C Street	Monitoring Well	Existing	X	X			RWM-1-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
HH-MW-1	Hilton	Monitoring Well	Existing	X				None													
HH-MW-2	Hilton	Monitoring Well	Existing	X	S			HH-MW-2-GW	Middle of screen	Semi-Annual	S	S	S	S	S	S	S	S			
HH-MW-3	Hilton	Monitoring Well	Existing	X				None													
HH-MW-4	Hilton	Monitoring Well	Existing	X				None													
HH-MW-5	Hilton	Monitoring Well	Existing	X	S			HH-MW-5-GW	Middle of screen	Semi-Annual	S	S	S						S		
ASB-MW-1	Hilton/ASB	Monitoring Well	Existing	X				None													
ASB-MW-2	ASB	Monitoring Well	Existing	X				None													
ASB-MW-3	ASB	Monitoring Well	Existing	X				None													
ASB-MW-4	ASB	Monitoring Well	Existing	X				None													
ASB-MW-5	ASB	Monitoring Well	Existing	X				None													
ASB-MW-6	C Street/ASB	Monitoring Well	Existing	X	X			ASB-MW-6-GW	Middle of screen	Quarterly	X	X	S	X			X		X	X	X

Table 2
Environmental Investigation Summary – Groundwater Monitoring Locations
PRDI Project Plans, Amendment No. 2
Central Waterfront Cleanup Site – Bellingham, Washington

Table 2: Groundwater Monitoring Locations
Page 2 of 2

Location ID	Subarea	Type	Status	ACTIVITIES				GROUNDWATER SAMPLING													
				Collect Elevation Data	Water Sampling	Survey	Install/Develop	Sample ID Prefix ¹	Sample Interval	Sampling Frequency	TPH-G (NWTPH-Gx)	TPH-D and TPH-O (NWTPH-Dx)	TPH-D and TPH-O (NWTPH-Dx) with silica gel cleanup	BTEX (EPA Method 8260D)	Bis(2-ethylhexyl)phthalate (EPA 8270E)	PAHs (EPA 8270E SIM)	Total and Dissolved Metals ³	Hexavalent and Trivalent Chromium ⁴	YSI Meter (pH, DO, ORP, Temp)	Ferrous (dissolved) Iron (Hach)	Nitrate, Nitrite, Sulfide, & Sulfate (EPA 300.0)
Field Duplicates	All	Monitoring Well	N/A		X			DUP01	Middle of screen	Quarterly	X	X	S	X			X		X	X	X
Trip Blanks ⁶	All	Laboratory Supplied	N/A					Trip Blank													
TOTAL PER EVENT (QUARTERLY)				31	22	3	3	---	---	---	22	22	0	22	0	0	22	0	22	22	22
TOTAL PER EVENT (SEMI-ANNUALLY)				31	24	3	3	---	---	---	24	24	24	23	1	1	23	1	24	22	22

- Notes:**
- (1) Sample IDs for groundwater will contain a date following the prefix shown on the table. For example, the sample ID for a groundwater sample collected at location HH-MW-1 on September 15, 2024 would have a sample ID of "HH-MW-1-GW-20240915."
- (2) Monitoring wells CWF-CW-1, CS-MW-2, CS-MW-3, CS-MW-7, and CS-MW-9 will be sampled on a monthly basis for TPH-Gx, TPH-Dx, sulfate, nitrate/nitrite, and ferrous iron; other analyses will occur only on a quarterly basis.
- (3) Metals to include arsenic, cadmium, total chromium, copper, lead, nickel, selenium, silver, and zinc by EPA Method 6020B UCT or 200.8; and mercury by EPA Method 7470A.
- (4) Total and dissolved Hexavalent chromium by SM 3500; and trivalent chromium will be quantified through calculation.
- (5) Total samples including Field Duplicate samples.
- (6) Trip blanks consist of one for TPH-G/BTEX per cooler containing volatile analyses, and are not included in the "totals per event" tally.

Abbreviations and Acronyms:

ASB = Aerated Stabilization Basin

BTEX = benzene, toluene, ethylbenzene, and total xylenes

DO = dissolved oxygen

EPA = US Environmental Protection Agency

ID = identification

N/A = not applicable

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

PAHs = polycyclic aromatic hydrocarbons

ORP = oxidation reduction potential

S = Semiannual Sampling (silica gel cleanup analyses and sampling of HH-MW-5 will occur only during the May 2025 semiannual event).

SIM = selected ion monitoring

Temp = temperature

TPH-D = diesel-range total petroleum hydrocarbons

TPH-G = gasoline-range total petroleum hydrocarbons

TPH-O = oil-range total petroleum hydrocarbons

Table 3
Environmental Investigation Summary – Surface Water Samples
PRDI Project Plans, Amendment No. 2
Central Waterfront Cleanup Site – Bellingham, Washington

Location ID	Subarea	Type	Status	WATER SAMPLING ANALYSIS			
				Sample ID Prefix ¹	Sample Interval	Sampling Frequency	Nitrate and Nitrite (EPA 300.0)
CS-SW-1	C Street	Surface Water	Proposed	CS-SW-1-LT	6 inches from the bottom of the water column	Twice	X
CS-SW-2	C Street	Surface Water	Proposed	CS-SW-2-LT	6 inches from the bottom of the water column	Twice	X
CS-SW-3	C Street	Surface Water	Proposed	CS-SW-3-LT	6 inches from the bottom of the water column	Twice	X
Field Duplicates	C Street	N/A	N/A	Not proposed	N/A	None	
Trip Blanks	C Street	N/A	Proposed	Not proposed	N/A	None	
TOTAL				---	---		6

Notes:

(1) Sample IDs for surface water will contain a date following the prefix shown on the table. For example, a surface water sample collected at location CW-SW-1 during low-tide conditions on September 20, 2024 would have the sample ID "CW-SW-1-LT-20240920."

Abbreviations and Acronyms:

EPA = US Environmental Protection Agency

ID = identification

LT = low tide

N/A = not applicable

Pre-Remedial Design Investigation Project Plans Amendment No. 1 Results

APPENDIX A SUMMARY AND CONTENTS

Appendix A summarizes data collected as part of Amendment No. 1 to the Pre-Remedial Design Investigation (PRDI) Project Plans (PRDI AMD 1). The following are the contents of this Appendix.

Activities Summary

The attached *Activities Summary* includes an outline of sampling events conducted or planned to be conducted during PRDI AMD 1 including the general date, description, and relevance to the remedial design, as well as any deviations from the approved PRDI Project Plans to date. Data from these events are presented in the included figures and documentation detailed below.

Figures

Soil Investigation Locations

- Figure A-1: C Street – Direct-Push Investigation Locations – October 2023
- Figure A-2: Hilton Avenue – Direct-Push Investigation Locations – October 2023

Groundwater Investigation Results

- Figure A-3: C Street – TPH Concentrations in Groundwater – November 2023
- Figure A-4: C Street – TPH Concentrations in Groundwater – February 2024
- Figure A-5: C Street – TPH Concentrations in Groundwater – May 2024
- Figure A-6: C Street – TPH Concentrations in Groundwater – August 2024
- Figure A-7: C Street – Groundwater Contours – November 20, 2023
- Figure A-8: C Street – Groundwater Contours – February 13, 2024
- Figure A-9: C Street – Groundwater Contours – May 6, 2024
- Figure A-10: C-Street – Groundwater Contours – August 20, 2024
- Figure A-11: Hilton Avenue TPH Groundwater/Porewater/Surface Water Results – 2024
- Figure A-12: Hilton Avenue Metals Groundwater/Porewater/Surface Water Results – February 2024

Tidal Study Results

- Figure A-13: C Street – Groundwater Elevation Contours – High Tide November 29, 2023 8:50 am
- Figure A-14: C Street – Groundwater Elevation Contours – Low Tide November 29, 2023 1:40 am
- Figure A-15: Hilton Avenue – Groundwater Elevation Contours – High Water Level November 29, 2023 5:50 pm
- Figure A-16: Hilton Avenue – Groundwater Elevation Contours – Low Water Level November 23, 2023 9:50 am

Surface Conditions Assessment:

- Figure A-17: C Street East – Surface Conditions
- Figure A-18: C Street West – Surface Conditions
- Figure A-19: Hilton Avenue – Surface Conditions

Data Tables

- Table A-1: C Street Soil Investigation Results
- Table A-2: Hilton Avenue Soil Investigation Results
- Table A-3: Direct-Push Boring Groundwater Results – October 2023
- Table A-4: Water-Level Elevations
- Table A-5: Groundwater Field Parameters
- Table A-6: C Street Groundwater Investigation Results
- Table A-7: ASB and Hilton Avenue Groundwater Investigation Results
- Table A-8: ASB and Hilton Avenue Porewater and Surface Water Investigation Results
- Table A-9: Landfill Gas Investigation Results
- Table A-10: Indoor Air Investigation Results
- Table A-11: C Street Subarea Field Pilot Study Injection Volumes

Slug Testing Activities Summary and Results

The attached *Slug Testing Activities Summary and Results* details the slug testing conducted in four groundwater monitoring wells in the C Street subarea, two in the Hilton Avenue subarea, and one ASB well. A detailed analysis of the data collected during this testing is provided, as well as the results of the analysis related to hydraulic conductivity estimates and permeability values. The summary includes 14 figures graphically depicting the results from each slug test.

Geophysical Report

Landau subcontracted with Global Geophysics to conduct geophysical testing in the Hilton Avenue subarea to provide data to support an understanding of the extents and thickness of the landfill material in that subarea. This work was conducted on October 9 and 10, 2023, and the methods, testing, and results are described in the attached *Report for the Geophysical Survey at Port of Bellingham, Bellingham, Washington* prepared by Global Geophysics, dated October 17, 2023.

Boring Logs

- Figure AB-1: Soil Classification System and Key
- Figures AB-2 through AB-16: Boring Logs for Temporary Borings CS-014 through CS-028
- Figures AB-17 through AB-20: Boring Logs for Temporary Borings HH-01 through HH-04

- Figures AB-21 through AB-25: Boring Logs for Monitoring Wells CS-MW-07 through CS-MW-11
- Figures AB-26 through AB-29: Boring Logs for Monitoring Wells HH-MW-02 through HH-MW-05

Activities Summary

Amendment No. 1 to the Pre-Remedial Design Investigation Project Plans
Activities Summary
Central Waterfront Cleanup Project
Bellingham, Washington

Date	Activity	Remedial Design Element, Results, and Deviations from Proposed Project Plans
October 2023	C Street boring installation and sampling (locations CS-014 through CS-028)	Further interpretation of nature and extent of C Street area to evaluate for enhanced <i>in situ</i> bioremediation (EISB) treatment. Soil and groundwater grab samples collected. Data presented on Figure A-1, Tables A-1 and A-3, and boring log Figures AB-1 through AB-15. <i>No critical deviations from Proposed Project Plans.</i>
	Hilton Avenue soil investigation (HH-001 through HH-004)	Further interpretation of nature and extent of Hilton Avenue subsurface conditions to inform potential requirements for groundwater treatment design. Soil and groundwater grab samples collected. Data presented on Figure A-2, Tables A-2 and A-3, and boring log Figures AB-16 through AB-19. <i>No critical deviations from Proposed Project Plans.</i>
	Construction of C Street bioremediation pilot study infiltration trenches	Pilot study to evaluate and inform design of remediation of total petroleum hydrocarbons in groundwater using EISB treatment via sulfate injections from the adjacent waterway (seawater). <i>No critical deviations from Proposed Project Plans.</i>
	Hilton Avenue geophysical evaluation (electrical resistance tomography [ERT] and induced polarization tomography [IPT] survey)	Further define the lateral and vertical extent of landfill refuse. Results presented in Geophysical Report. <i>Proposed Project Plans indicated the use of ERT only. However, due to the presence of significant water in the subsurface, both ERT and IPT were used.</i>
November 2023	Indoor air sampling (structures C St-20, C St-22, Roeder-11)	Measurements of indoor air quality to assess potential intrusion of methane and other vapors in previously inaccessible Site buildings and workspaces. Results depicted on Figure 6 in PRDI AMD 2. <i>Roeder 11 remained inaccessible; other structures were successfully accessed.</i>
	C Street monitoring well installation (CS-MW-7 through CS-MW-11)	Installation of groundwater monitoring wells in additional locations to assess the effectiveness of the bioremediation pilot study. Soil data presented in Table A-1, boring logs are presented on Figures AB-20 through AB-24. <i>Groundwater monitoring well CS-MW-12 was not installed, as historical groundwater monitoring well RWM-7 was located nearby and determined to be installed appropriately to serve as a monitoring well in this location.</i>
	C Street baseline groundwater monitoring (CS-MW-1, CS-MW-2, CS-MW-3, CS-MW-4, CS-MW-5, CS-MW-6, CS-MW-7, CS-MW-8, CS-MW-9, CS-MW-10, CS-MW-11, CWF-CW-1, CWF-CW-2, MW-10B, MW-13B, MW-50C, RMW-7)	Baseline groundwater data to use in evaluation of the effectiveness of bioremediation pilot study. Groundwater data presented on Figures A-3 and A-6, and in Table A-4. <i>No critical deviations from Proposed Project Plans.</i>

Amendment No. 1 to the Pre-Remedial Design Investigation Project Plans
Activities Summary
Central Waterfront Cleanup Project
Bellingham, Washington

Date	Activity	Remedial Design Element, Results, and Deviations from Proposed Project Plans
	C Street groundwater flow dynamics evaluation and tidal study – semi-continuous water level monitoring (CS-MW-3, CS-MW-5, CS-MW-6, CWF-CW-1, CWF-CW-2, CS-TD-1)	Measurement of groundwater hydraulics to inform ongoing remedy evaluation. Tidal study results are shown on Figures A-10 through A-11. <i>No critical deviations from Proposed Project Plans.</i>
	C Street groundwater flow dynamics evaluation and tidal study – slug testing (CS-MW-6, CWF-CW-2, MW-51(c), CS-MW-3)	Measurement of groundwater hydraulics to inform ongoing remedy evaluation. Results presented in the attached Slug Testing Activities Summary and Results. <i>No critical deviations from Proposed Project Plans</i>
	Landfill gas monitoring at 14 existing temporary gas probes (TGPs) and three wells, [MW-5(B), RMW-12D, RMW-16, TGP-1 through TGP-14]	Further characterization of lateral migration of landfill gas (LFG) to further assess required compliance monitoring strategies. Results depicted on Figure 6 in PRDI AMD 2. <i>RMW-16 and MW-5(B) were not sampled. TGP-13 could not be located and was not sampled. No soil vapor samples were collected for analysis by Method TO-15.</i>
	Hilton Avenue monitoring well installation (HH-MW-2 through HH-MW-5)	Installation of monitoring wells to evaluate groundwater hydraulic dynamics and nature and extent of contamination to evaluate potential needs and strategies for groundwater treatment design. Soil data presented in Table A-2, boring logs are presented on Figures AB-25 through AB-28. <i>No critical deviations from Proposed Project Plans</i>
	Hilton Avenue groundwater monitoring and sampling (HH-MW-1 through HH-MW-5)	Measurement of current groundwater chemistry to inform ongoing remedy evaluation. Groundwater sampling results are presented in Table A-5. <i>No critical deviations from Proposed Project Plans</i>
	Hilton Avenue and Aerated Stabilization Basin (ASB) groundwater flow dynamics evaluation and tidal study – semi-continuous water-level monitoring (HH-MW-1 through HH-MW-5, HH-TD-1, ASB-MW-1 through ASB-MW-6)	Measurement of groundwater hydraulics to inform ongoing remedy evaluation. Tidal study results are shown on Figures A-12 through A-13. <i>No critical deviations from Proposed Project Plans</i>
	Hilton Avenue groundwater flow dynamics evaluation and tidal study – slug testing (ASB-MW-1, HH-MW-1, HH-MW-2)	Measurement of groundwater hydraulics to inform ongoing remedy evaluation. Results presented in the attached Slug Testing Activities Summary and Results. <i>No critical deviations from Proposed Project Plans</i>
December 2023	Initial C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>

Amendment No. 1 to the Pre-Remedial Design Investigation Project Plans
Activities Summary
Central Waterfront Cleanup Project
Bellingham, Washington

Date	Activity	Remedial Design Element, Results, and Deviations from Proposed Project Plans
January 2024	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
February 2024	C Street performance groundwater monitoring (CS-MW-1, CS-MW-2, CS-MW-3, CS-MW-4, CS-MW-5, CS-MW-6, CS-MW-7, CS-MW-8, CS-MW-9, CS-MW-10, CS-MW-11, CWF-CW-1, CWF-CW-2, MW-10B, MW-13B, MW-50C, RMW-7)	Evaluation of the effectiveness of bioremediation pilot study. Groundwater data are presented on Figures A-4 and A-7, and in Table A-4. <i>No critical deviations from Proposed Project Plans.</i>
	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
	Hilton Avenue groundwater monitoring (ASB-MW-1, HH-MW-1 through HH-MW-5)	Measurement of current groundwater to inform ongoing remedy evaluation. Groundwater data are presented on Figure A-9 and Table A-5. <i>No critical deviations from Proposed Project Plans.</i>
	Hilton Avenue porewater and surface water sampling (HH-PW-1 through HH-PW-3 and HH-SS-1 through HH-SW-3)	Further investigation of nature and extent of potential migration of contaminated groundwater to adjacent marine surface water. Porewater and surface water data are presented on Figure A-9 and Table A-6. <i>No critical deviations from Proposed Project Plans.</i>
March 2024	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
April 2024	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
May 2024	C Street performance groundwater monitoring (CS-MW-1, CS-MW-2, CS-MW-4, CS-MW-3, CS-MW-5, CS-MW-6, CS-MW-7, CS-MW-8, CS-MW-9, CS-MW-10, CS-MW-11, CWF-CW-1, CWF-CW-2, MW-10B, MW-13B, MW-50C, RMW-7)	Evaluation of the effectiveness of bioremediation pilot study. Groundwater data are presented on Figures A-5 and A-8, and in Table A-4. <i>No critical deviations from Proposed Project Plans.</i>
	Hilton Avenue groundwater monitoring (ASB-MW-1, HH-MW-1 through HH-MW-5)	Measurement of current groundwater to inform ongoing remedy evaluation. Groundwater data are presented in Table A-5. <i>No critical deviations from Proposed Project Plans.</i>

Amendment No. 1 to the Pre-Remedial Design Investigation Project Plans
Activities Summary
Central Waterfront Cleanup Project
Bellingham, Washington

Date	Activity	Remedial Design Element, Results, and Deviations from Proposed Project Plans
	LFG at 14 existing TGP's and three wells, [MW-5(B), RMW-12D, RMW-16, TGP-1 through TGP-14]	Further characterization of lateral migration of LFG to further assess required compliance monitoring strategies. Results depicted on Figure 6 in PRDI AMD2. <i>TGP-13 could not be located and was not sampled. No soil vapor samples were collected for analysis by Method TO-15.</i>
	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
June 2024	C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
July 2024	Planned C Street injection of sulfate/seawater	Bioremediation pilot study. Volumes applied are presented in Table A-9. <i>No critical deviations from Proposed Project Plans.</i>
August 2024	Planned C Street injection of sulfate/seawater	Bioremediation pilot study. Not yet complete at time of report.
	Planned C Street performance groundwater monitoring (CS-MW-1, CS-MW-2, CS-MW-4, CS-MW-3, CS-MW-5, CS-MW-6, CS-MW-7, CS-MW-8, CS-MW-9, CS-MW-10, CS-MW-11, CWF-CW-1, CWF-CW-2, MW-10B, MW-13B, MW-50C, RMW-7)	Evaluation of the effectiveness of bioremediation pilot study. Not yet complete at time of report.
	Planned Hilton Avenue groundwater monitoring (HH-MW-1 through HH-MW-5)	Measurement of current groundwater to inform ongoing remedy evaluation. Not yet complete at time of report.
September 2024	Planned C Street injection of sulfate/seawater	Bioremediation pilot study. Not yet complete at time of report.
October 2024	Planned C Street injection of sulfate/seawater	Bioremediation pilot study. Not yet complete at time of report.
November 2024	Planned C Street injection of sulfate/seawater	Bioremediation pilot study. Not yet complete at time of report.
End of PRDI AMD 1 Planned Activities		

Figures



Legend

- Monitoring Well Location
- Direct-Push Boring Location
- Infiltration Trench Location
- Central Waterfront Cleanup Site
- Whatcom Waterway Seawall



Note

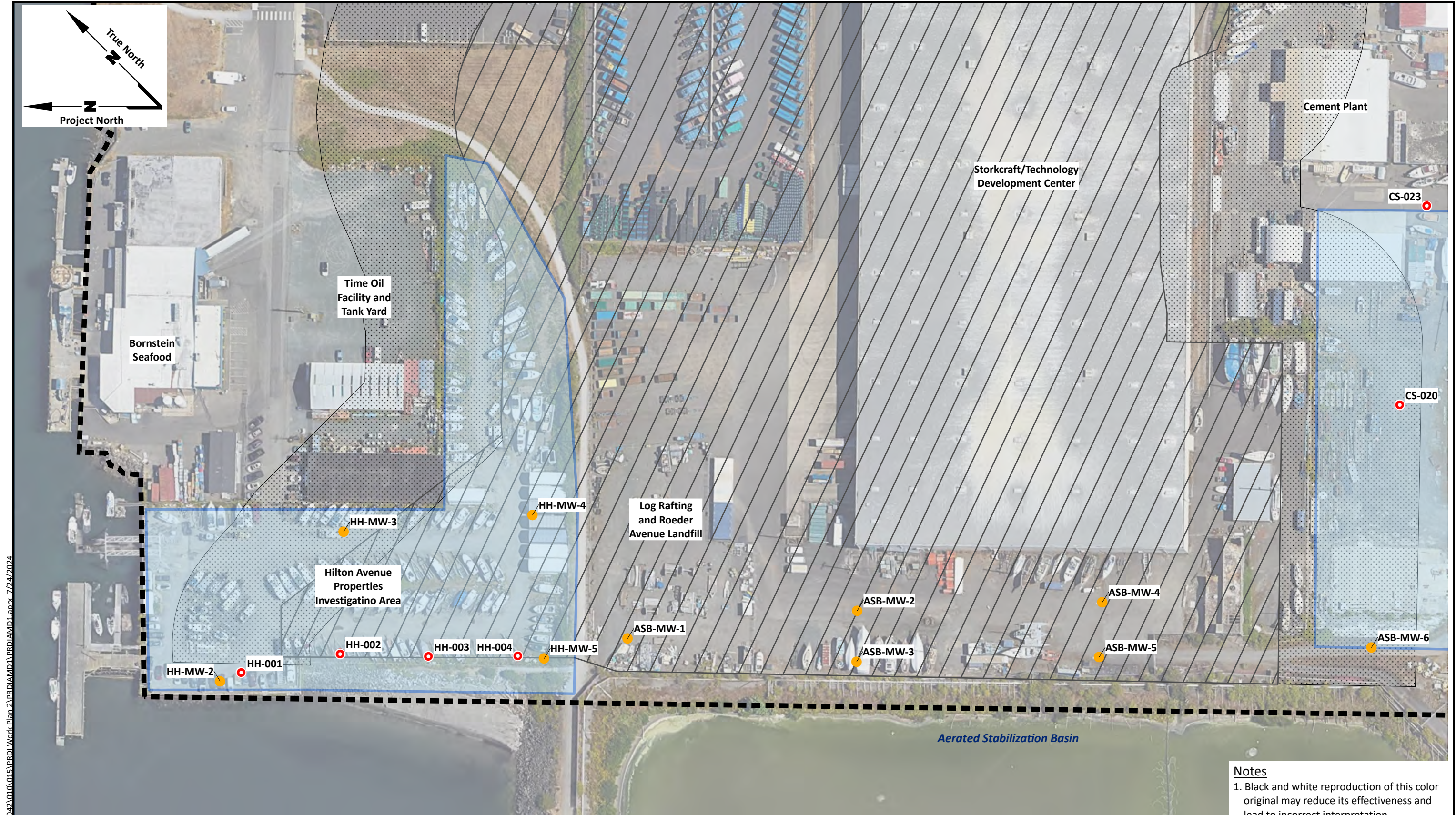
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

**C Street -
Direct-Push Investigation Locations
October 2023**

Figure
A-1

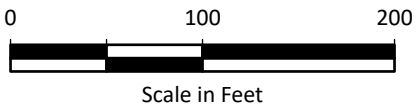
Data Source: Google Earth Pro.



Notes
 1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

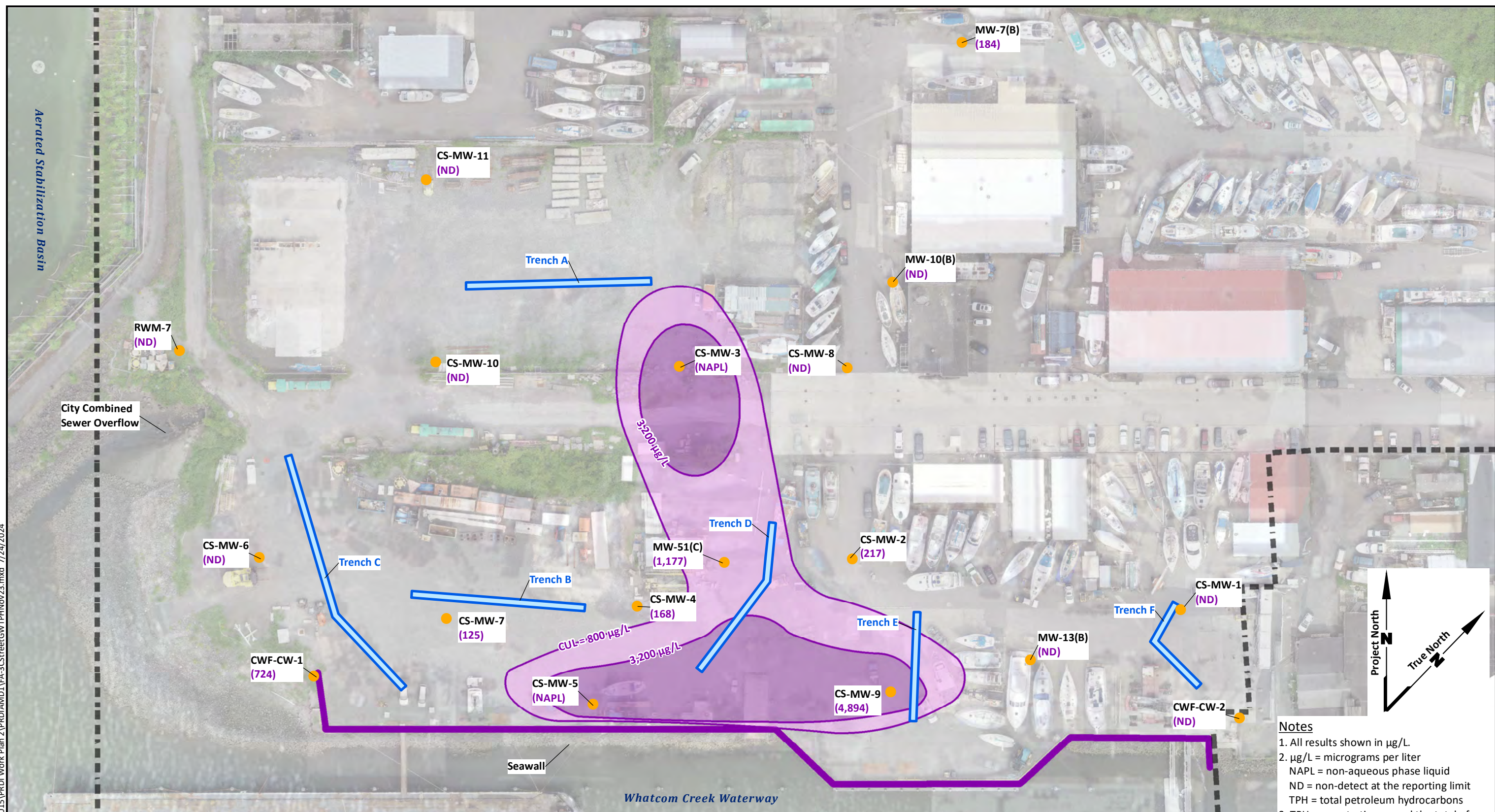
Legend

- Monitoring Well Location Extent of Landfill Refuse (Updated 2024)
- Direct-Push Boring Location Landfill Perimeter
- Central Waterfront Cleanup Site



Central Waterfront Cleanup Site PRDI AMD 2 - Appendix A Bellingham, Washington	Hilton Avenue - Direct-Push Investigation Locations October 2023	Figure A-2
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Legend

● Existing Monitoring Well Location

■ Central Waterfront Cleanup Site

■ Infiltration Trench Location

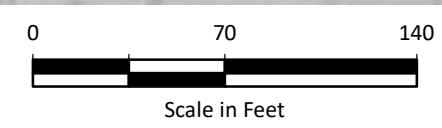
■ Whatcom Waterway Seawall

(472) Maximum TPH Concentration in Groundwater (µg/L)

TPH Concentrations (Approximate)

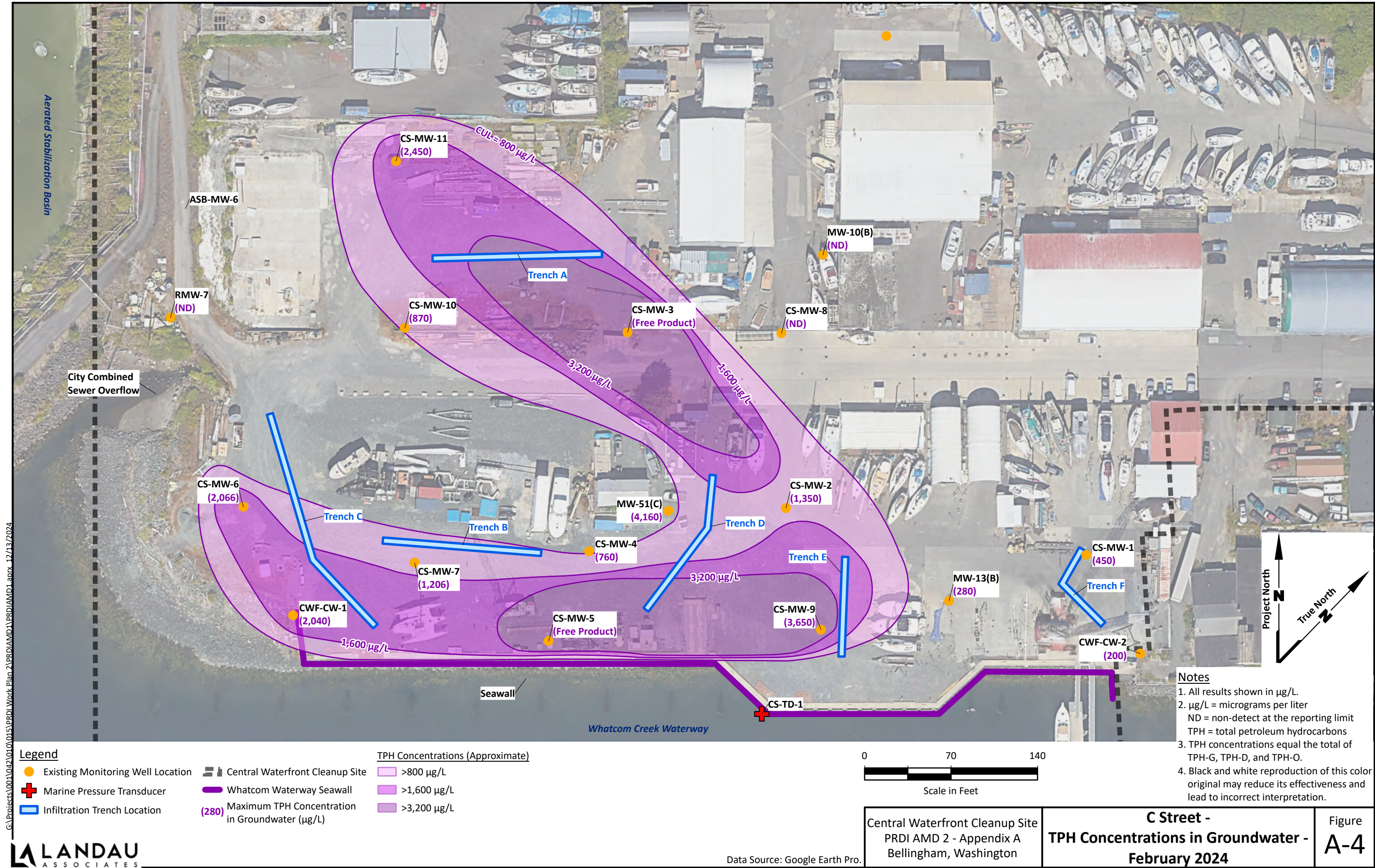
>800 µg/L

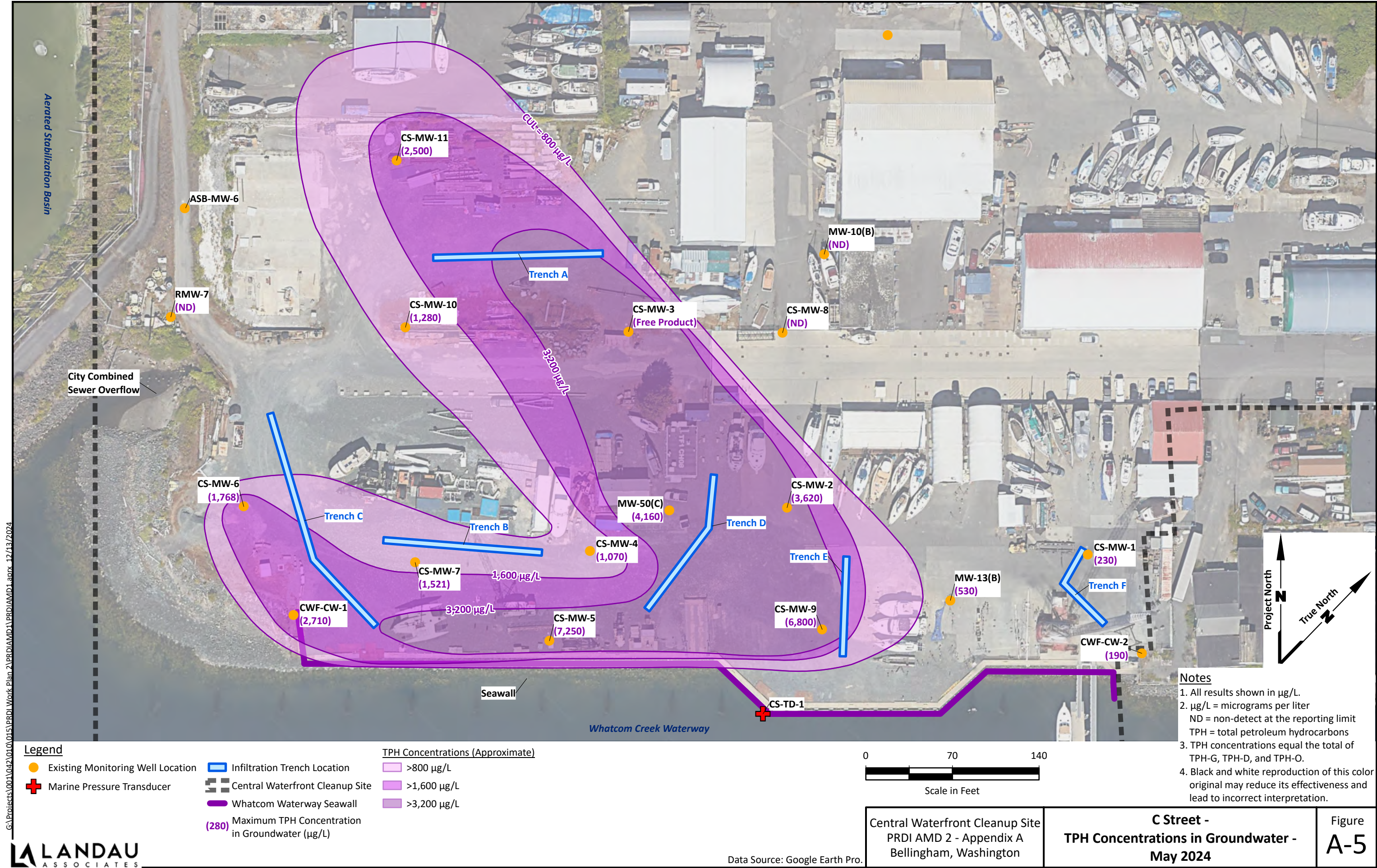
>3,200 µg/L

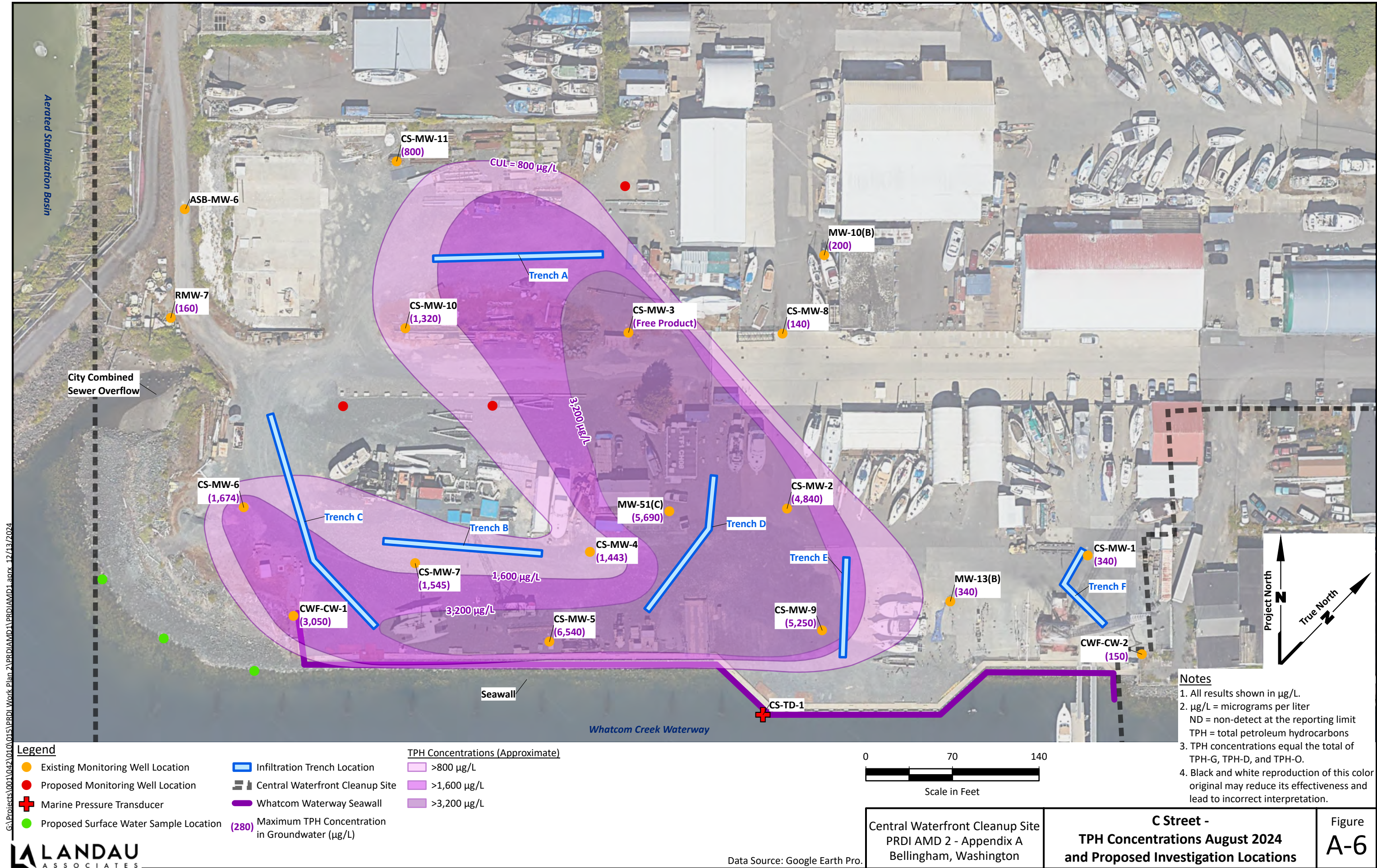


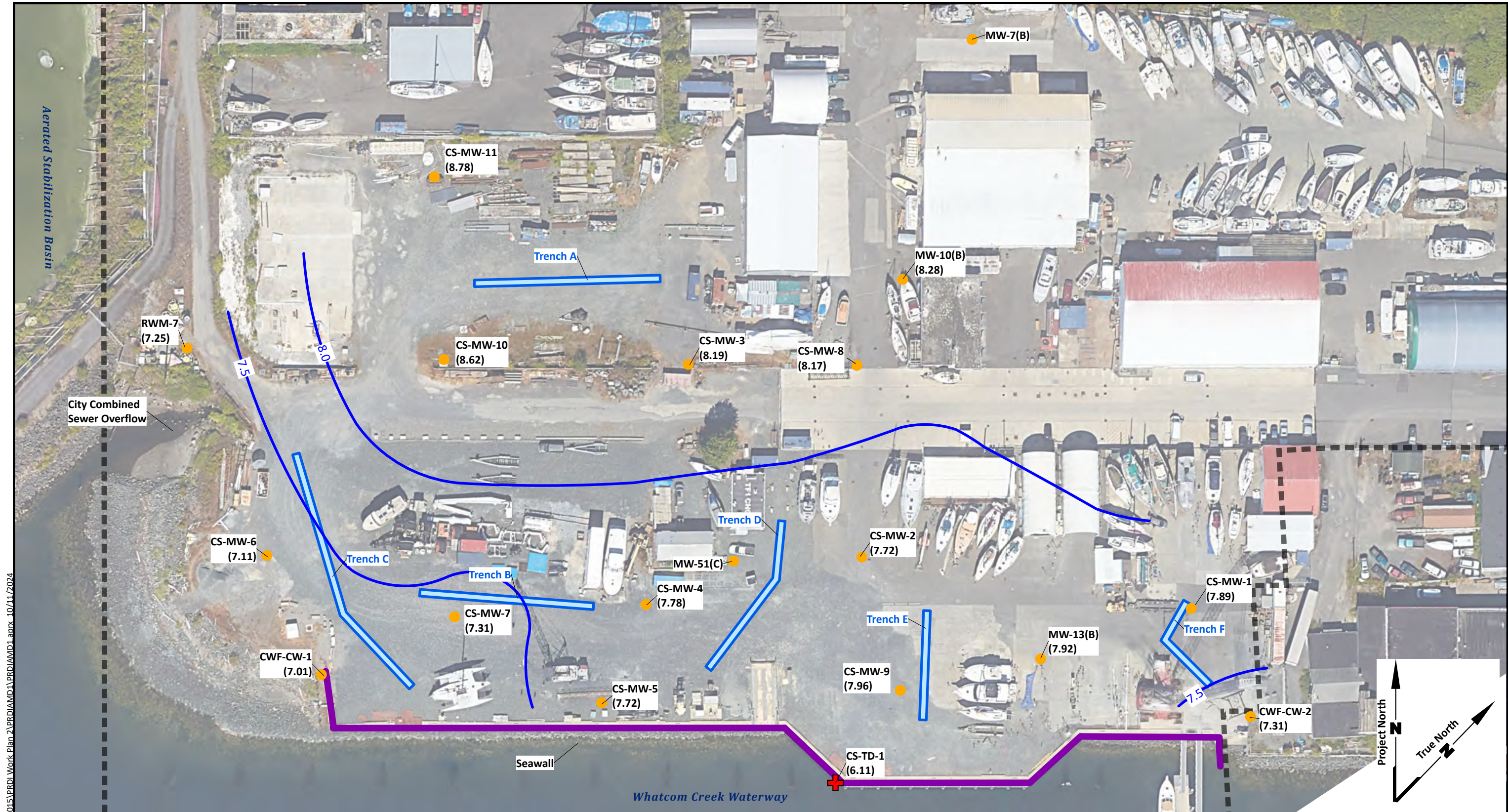
- Notes**
1. All results shown in µg/L.
 2. µg/L = micrograms per liter
NAPL = non-aqueous phase liquid
ND = non-detect at the reporting limit
TPH = total petroleum hydrocarbons
 3. TPH concentrations equal the total of TPH-G, TPH-D, and TPH-O.
 4. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.









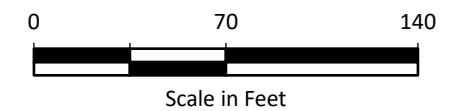


Legend

- Existing Monitoring Well Location
- ✚ Marine Pressure Transducer
- ▭ Infiltration Trench Location
- ▣ Central Waterfront Cleanup Site
- Whatcom Waterway Seawall
- Groundwater Elevation Contour (ft MLLW)
- (7.24) Groundwater Elevation (ft MLLW)

Notes

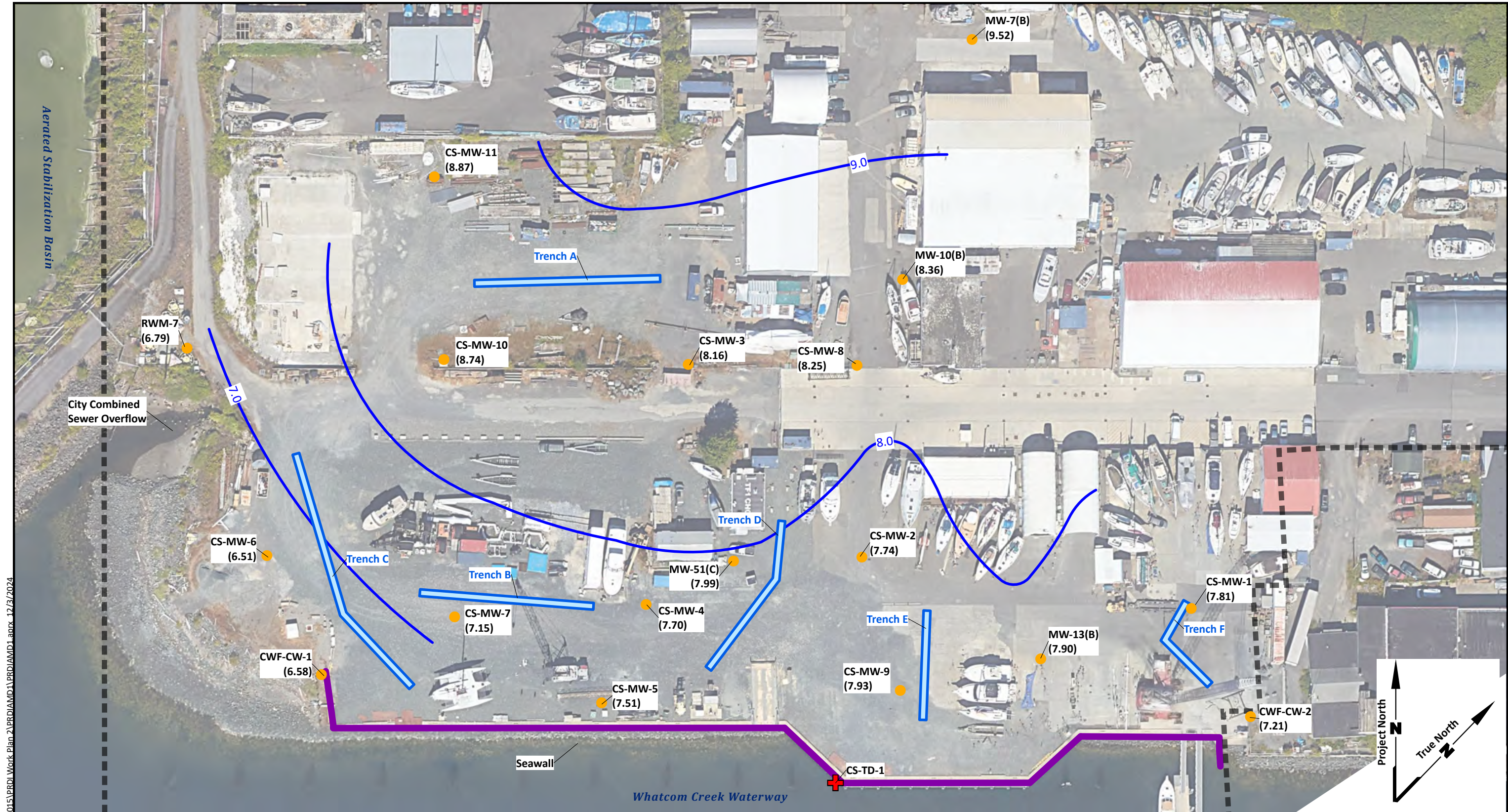
1. ft = feet
MLLW = mean lower low water.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

C Street
Groundwater Contours
November 20, 2023

Figure
A-7

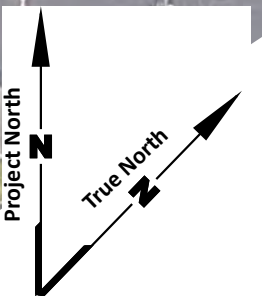
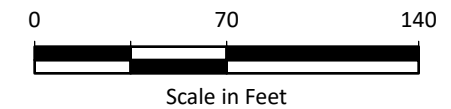


Legend

- Existing Monitoring Well Location
- + Marine Pressure Transducer
- Infiltration Trench Location
- Central Waterfront Cleanup Site
- Whatcom Waterway Seawall
- Groundwater Elevation Contour (ft MLLW)
- 7.24 Groundwater Elevation (ft MLLW)

Notes

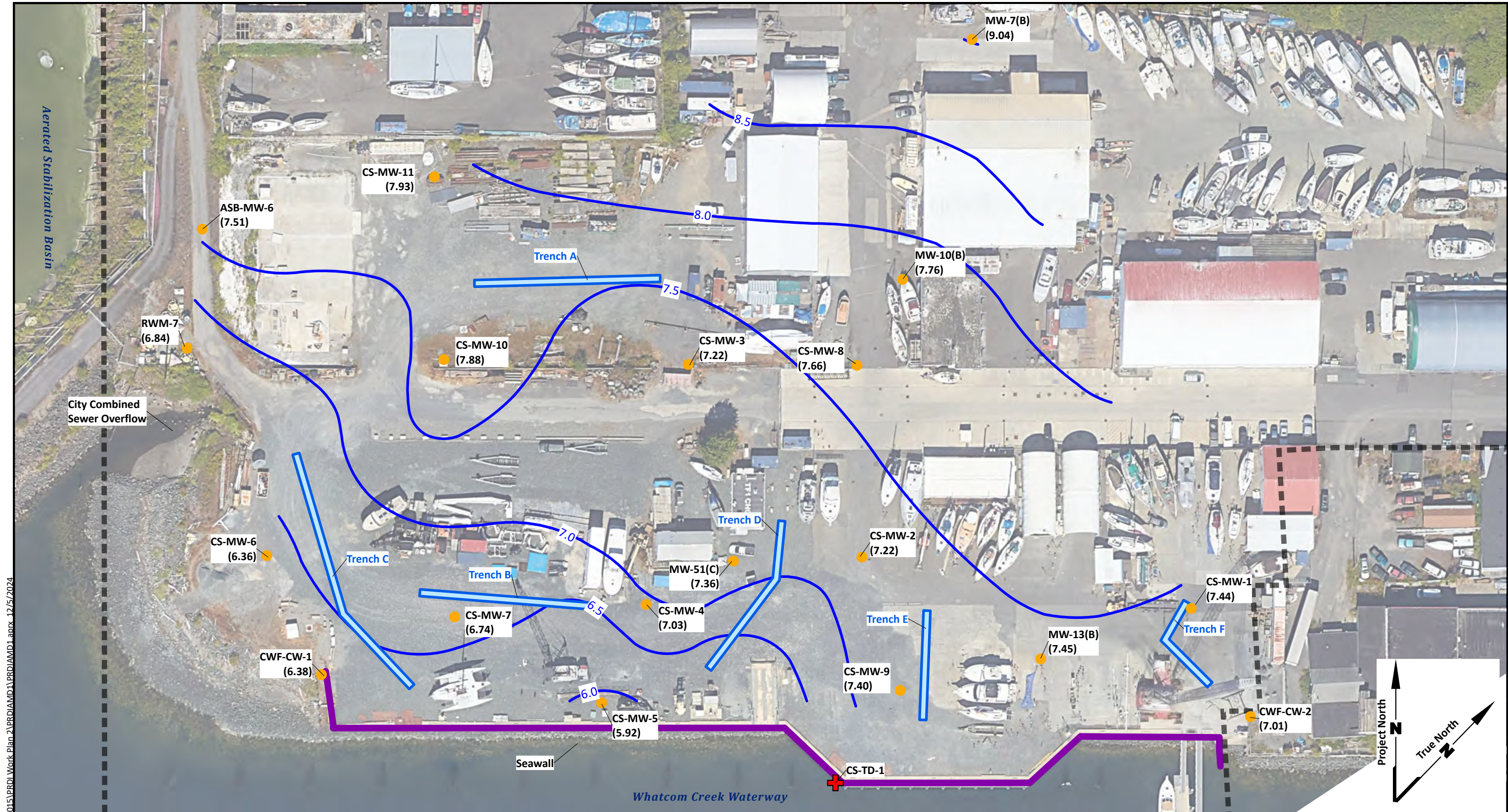
1. ft = feet
MLLW = mean lower low water.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

C Street
Groundwater Contours
May 6, 2024

Figure
A-9



Legend

- Existing Monitoring Well Location
- + Marine Pressure Transducer
- Infiltration Trench Location
- Central Waterfront Cleanup Site
- Whatcom Waterway Seawall
- Groundwater Elevation Contour (ft MLLW)
- 7.24 Groundwater Elevation (ft MLLW)

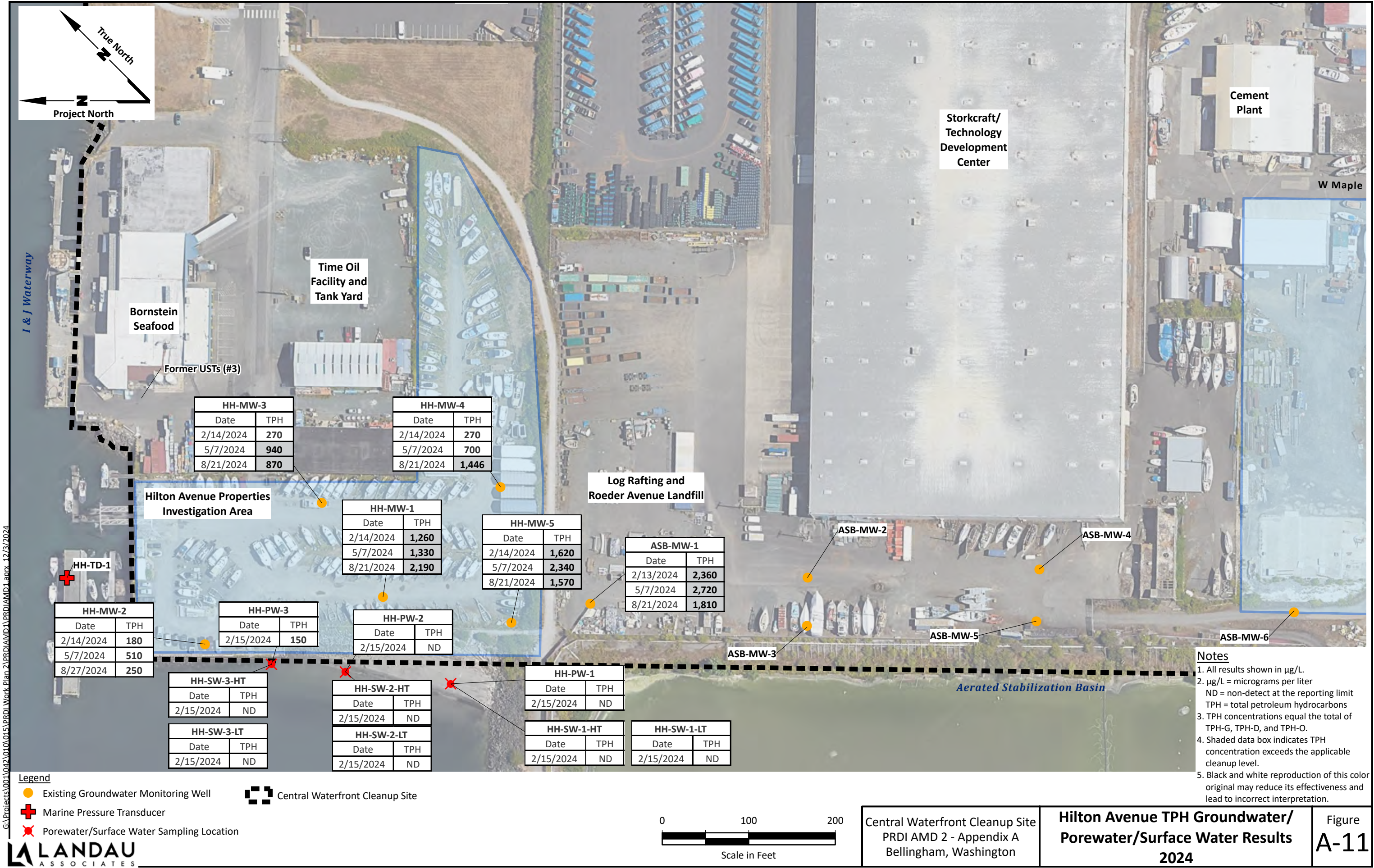
Notes

1. ft = feet
MLLW = mean lower low water.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

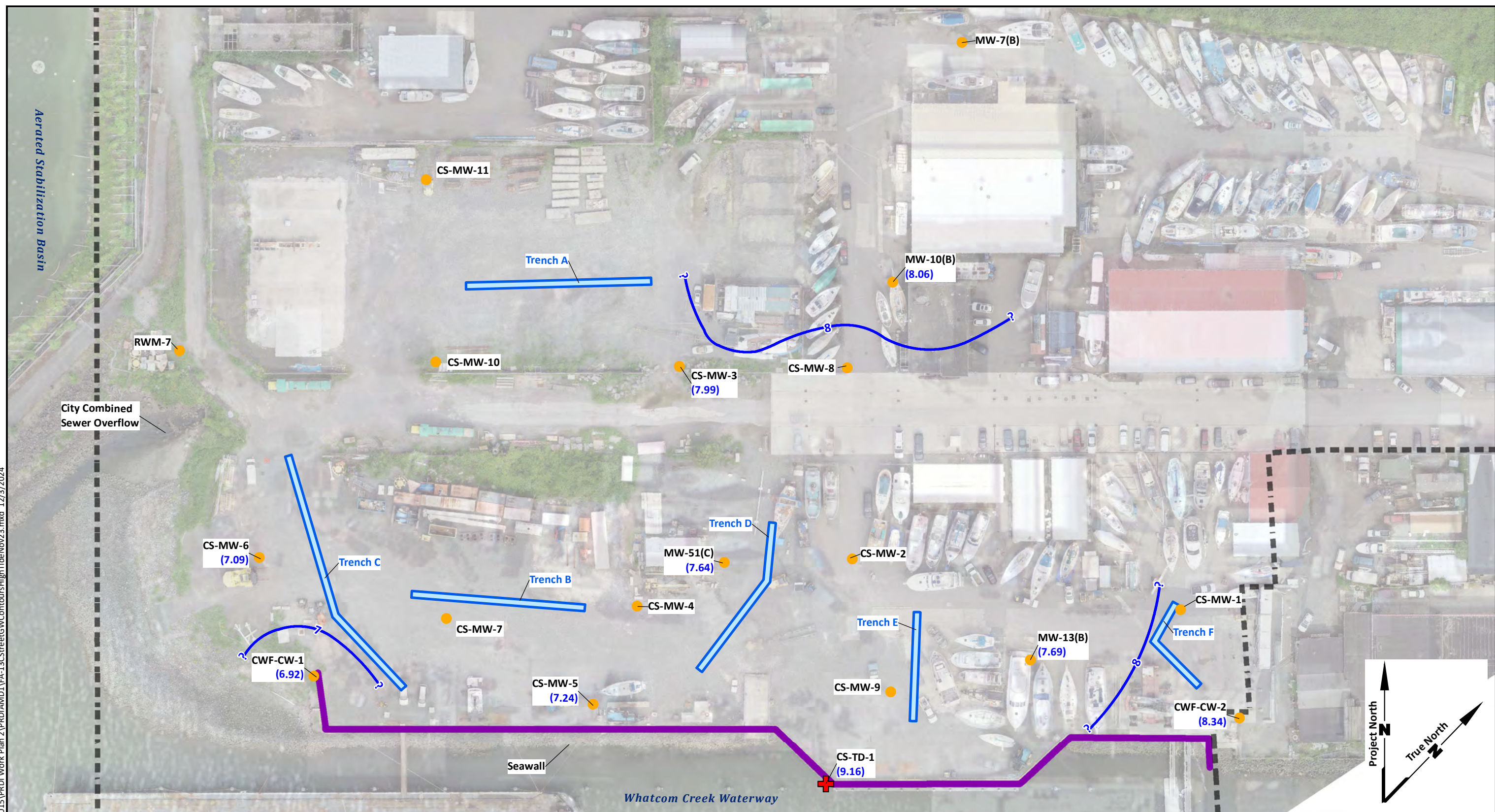
C Street
Groundwater Contours
August 20, 2024

Figure
A-10



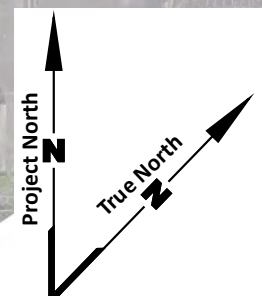
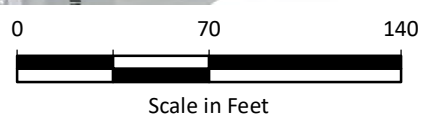
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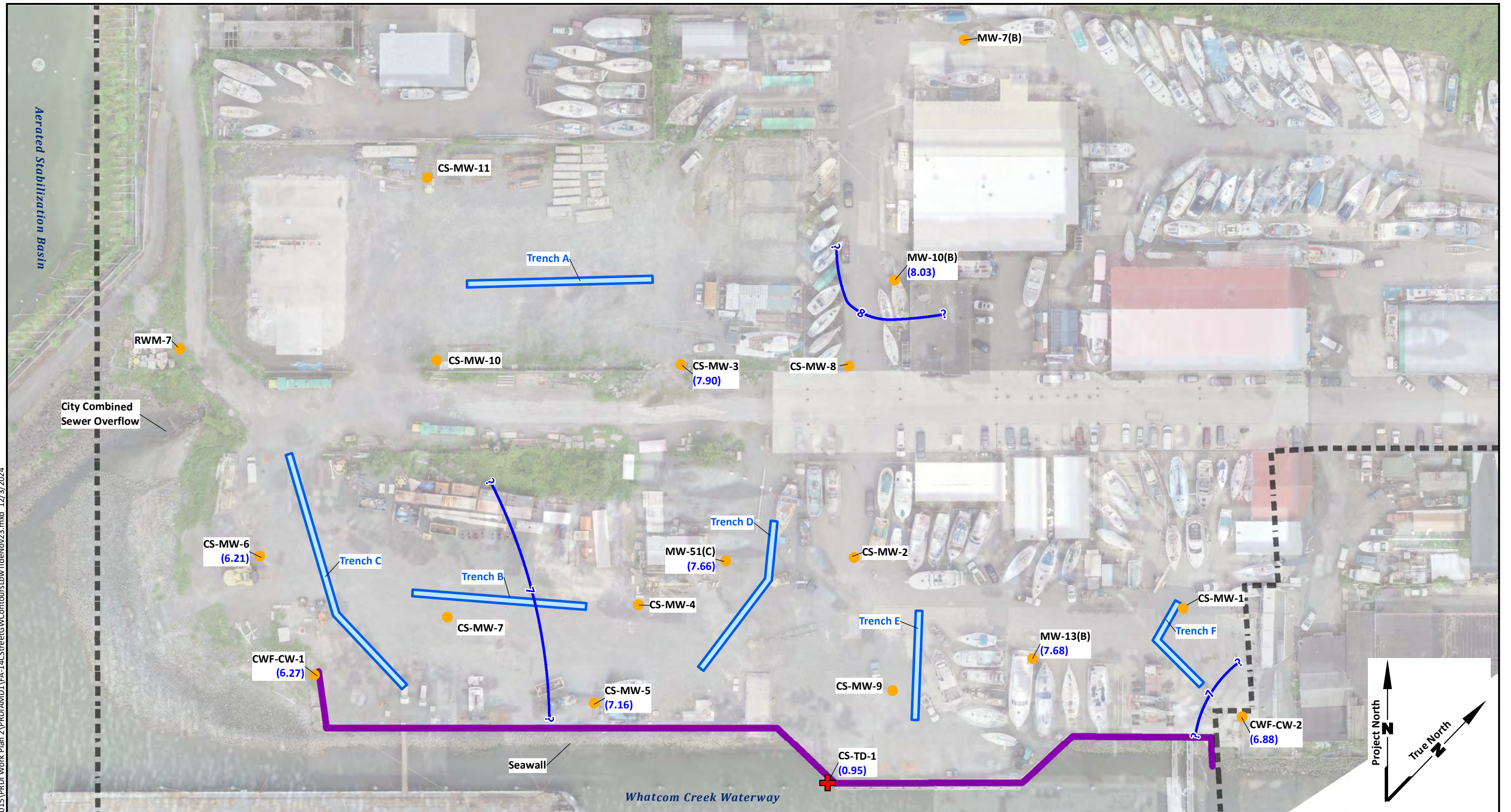


- Legend**
- Existing Monitoring Well Location
 - Marine Pressure Transducer
 - Groundwater Elevation Contour (ft MLLW)
 - Infiltration Trench Location
 - Central Waterfront Cleanup Site
 - Whatcom Waterway Seawall

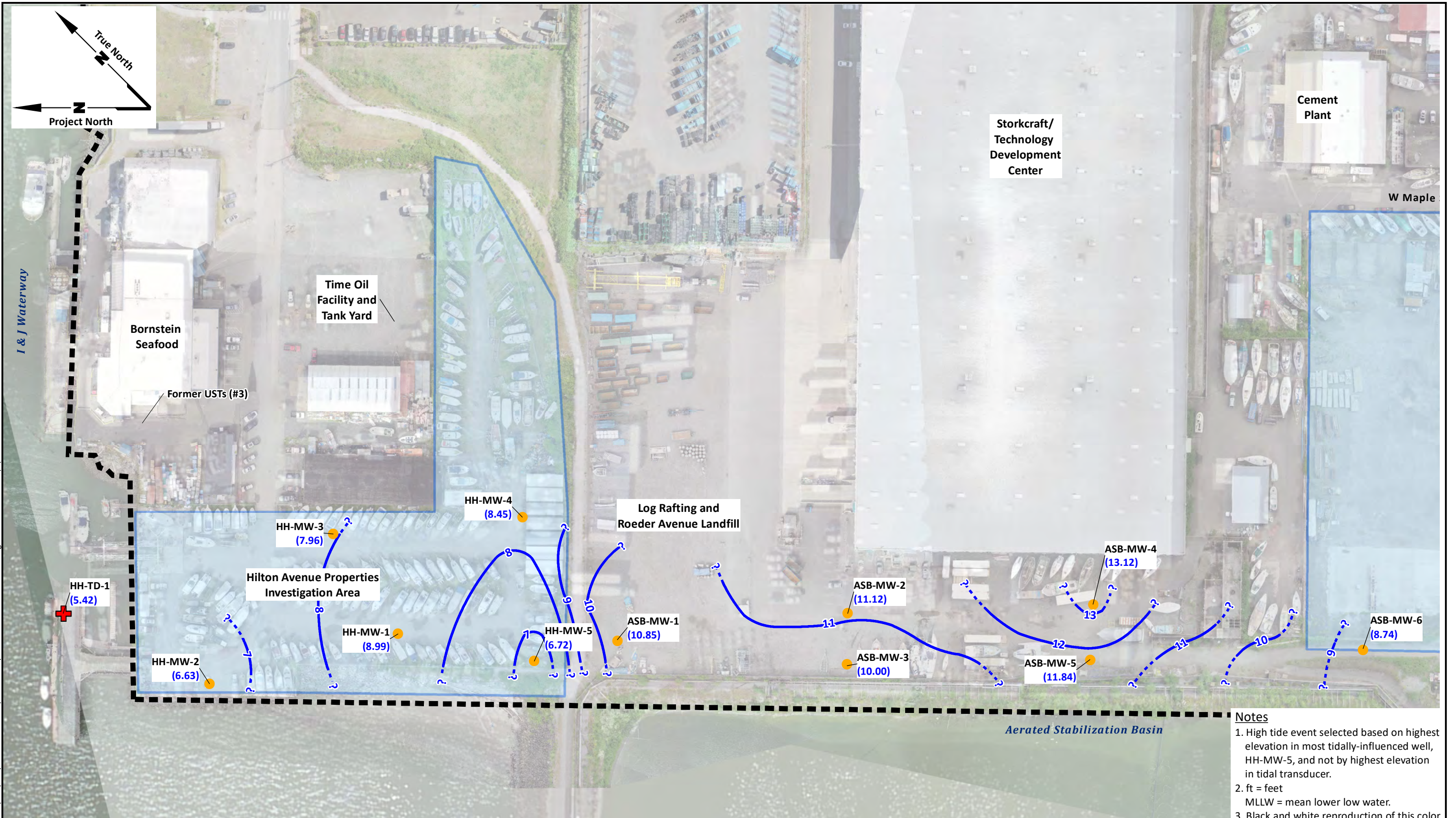
- Notes**
1. ft = feet
MLLW = mean lower low water.
 2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



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Legend

- Existing Groundwater Monitoring Well
- Marine Pressure Transducer
- Groundwater Elevation Contour (ft MLLW)
- Central Waterfront Cleanup Site
- Groundwater Elevation (ft MLLW)



Notes

1. High tide event selected based on highest elevation in most tidally-influenced well, HH-MW-5, and not by highest elevation in tidal transducer.
2. ft = feet
MLLW = mean lower low water.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

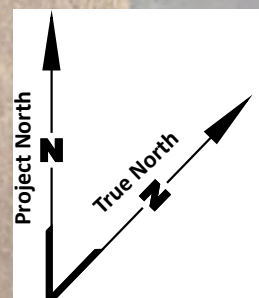
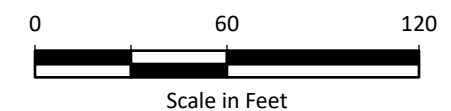


Legend

- ⊕ Temporary Gas Probe
- Test Pit
- ▨ Asphalt
- ▭ Building
- ▤ Concrete
- ▦ Brush/Bushes/Grass
- ▧ Gravel
- ▨ Mulch
- ▣ Central Waterfront Cleanup Site

Notes

1. ft = feet
in = inches.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

Hilton Avenue - Surface Conditions

Figure
A-16

Data Source: Google Earth Pro.

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ASSOCIATES

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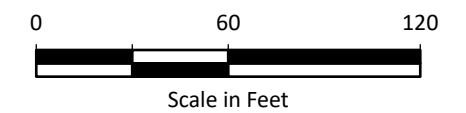


Legend

- | | | |
|-----------------------|----------------------|-----------------------------------|
| ⊕ Temporary Gas Probe | ▨ Asphalt | ▣ Central Waterfront Cleanup Site |
| ■ Test Pit | ▭ Building | |
| | ▨ Concrete | |
| | ▨ Brush/Bushes/Grass | |
| | ▨ Gravel | |

Notes

1. ft = feet
in = inches.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

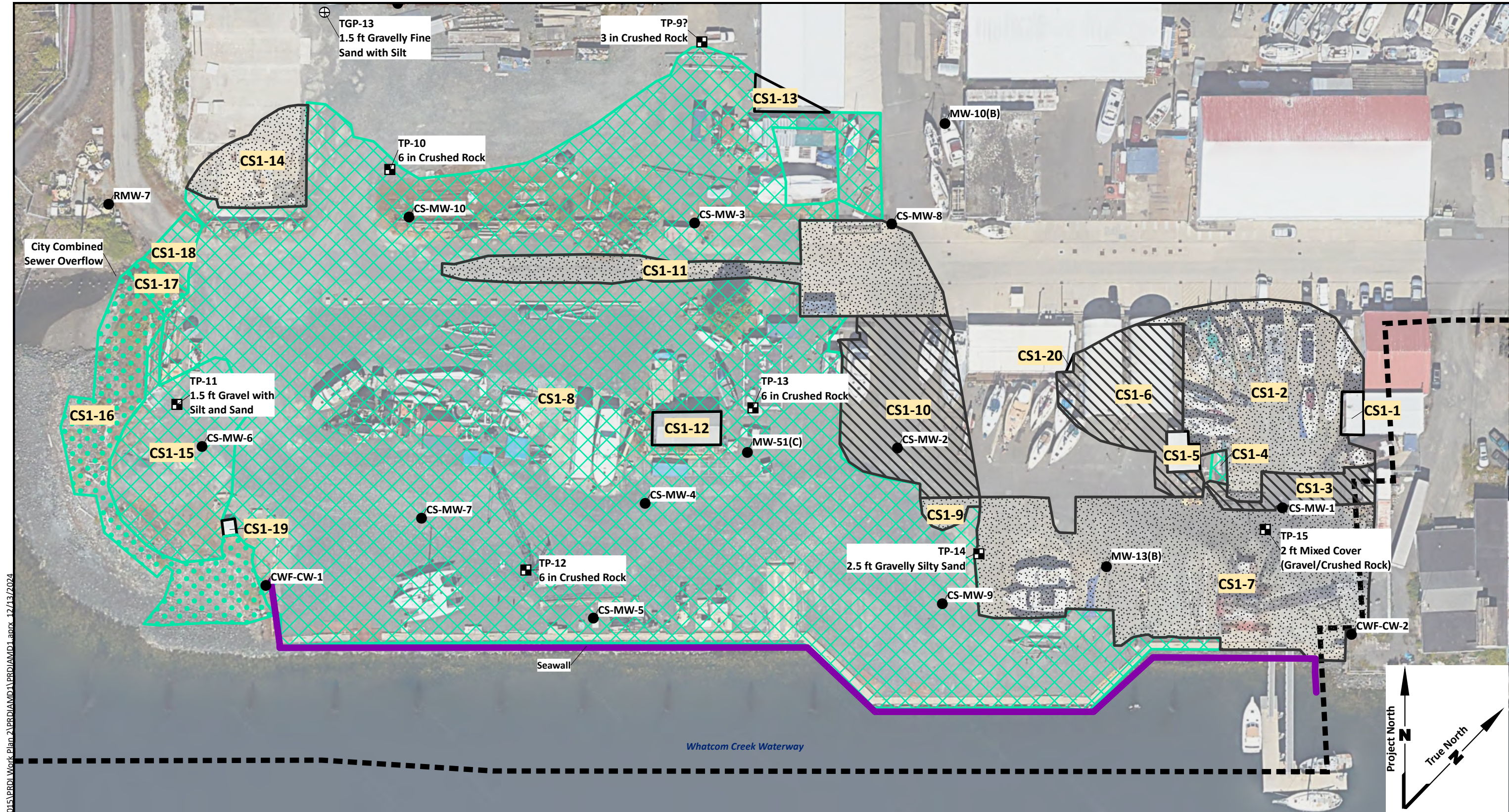


Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

C Street East - Surface Conditions

Figure
A-17

Data Source: Google Earth Pro.

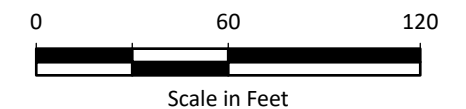


Legend

- Existing Monitoring Well Location
- Temporary Gas Probe
- Test Pit
- Asphalt
- Building
- Concrete
- Brush/Bushes/Grass
- Gravel
- Central Waterfront Cleanup Site
- Whatcom Waterway Seawall

Notes

1. ft = feet
in = inches.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.



Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

C Street West - Surface Conditions

Figure
A-18



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Legend

⊕

Temporary Gas Probe

■

Test Pit

Asphalt

Building

Concrete

Brush/Bushes/Grass

Gravel

Mulch

Central Waterfront Cleanup Site

LANDAU

ASSOCIATES

Notes

1. ft = feet
in = inches.

2. Black and white reproduction of this color
original may reduce its effectiveness and
lead to incorrect interpretation.

Central Waterfront Cleanup Site
PRDI AMD 2 - Appendix A
Bellingham, Washington

Hilton Avenue - Surface Conditions

Figure
A-19

Data Source: Google Earth Pro.

Data Tables

Table A-1
C Street Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Site CUL for Unrestricted Land Use - Unsaturated Soil	Site CUL for Unrestricted Land Use - Saturated Soil	Sampling Location, Sampling Date, Laboratory Sample ID						
			CS-014-S-6-7	CS-015-S-9-10	CS-016-S-9-10	CS-017-S-6-7	CS-018-S12-13	CS-019-S-7-8	CS-020-S-8-9
			10/11/2023	10/10/2023	10/10/2023	10/11/2023	10/9/2023	10/10/2023	10/9/2023
			EV23100076-09	EV23100058-11	EV23100058-13	EV23100076-07	EV23100058-05	EV23100058-15	EV23100058-07
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Gx, -Dx)									
Gasoline-Range Organics	30	30	5.0 U	250 J	400 J	5.0 U	5.0 U	79 J	250 J
Diesel-Range Organics	2,000	2,000	5.0 U	12,000	9,700	5.0 U	6.3	670	9,900
Oil-Range Organics	2,000	2,000	10 U	1,900 J	1,800 J	10 U	10 U	660	540 J
Total TPH	2,000	2,000	ND	14,150	11,900	ND	6.3	1,409	10,690
Volatiles (mg/kg; SW-846 8260D)									
Benzene	0.034	0.005	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NL	NL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethylbenzene	NL	NL	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
m, p-Xylene	NL	NL	--	--	--	--	--	--	--
o-Xylene	NL	NL	--	--	--	--	--	--	--
Total Xylenes	NL	NL	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Total Metals (mg/kg; SW-846 6020A, 7471B)									
Arsenic	7	7	--	--	--	--	--	--	--
Barium	NL	NL	--	--	--	--	--	--	--
Cadmium	1.2	1	--	--	--	--	--	--	--
Chromium	5,200	260	--	--	--	--	--	--	--
Copper	NL	NL	--	--	--	--	--	--	--
Lead	250	81	--	--	--	--	--	--	--
Mercury	2	0.1	--	--	--	--	--	--	--
Nickel	NL	NL	--	--	--	--	--	--	--
Selenium	7.4	1	--	--	--	--	--	--	--
Silver	0.32	0.02	--	--	--	--	--	--	--
Zinc	NL	NL	--	--	--	--	--	--	--

Table A-1
C Street Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Site CUL for Unrestricted Land Use - Unsaturated Soil	Site CUL for Unrestricted Land Use - Saturated Soil	Sampling Location, Sampling Date, Laboratory Sample ID						
			CS-021-S-9-11	CS-022-S-7-8	CS-023-S-5-6	CS-024-S-7-8	CS-025-S-10-11	CS-026-S-6-7	CS-027-S-6-7
			10/10/2023	10/10/2023	10/9/2023	10/11/2023	10/11/2023	10/9/2023	10/11/2023
			EV23100058-18	EV23100058-20	EV23100058-03	EV23100076-02	EV23100076-01	EV23100058-01	EV23100076-05
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Gx, -Dx)									
Gasoline-Range Organics	30	30	1,400 J	2,900 J	5.0 U	4,600 J	420 J	5.0 U	5.0 U
Diesel-Range Organics	2,000	2,000	3,500	3,200	5.0 U	2,200	1,800	5.0 U	8.3 J
Oil-Range Organics	2,000	2,000	100 U	100 U	10 U	93 U	75	10 U	42
Total TPH	2,000	2,000	4,900	6,100	ND	6,800	2,295	ND	50.3
Volatiles (mg/kg; SW-846 8260D)									
Benzene	0.034	0.005	0.05 UJ	0.36	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Toluene	NL	NL	0.05 UJ	0.67	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Ethylbenzene	NL	NL	36	51	0.05 U	30	0.05 U	0.05 U	0.05 U
m, p-Xylene	NL	NL	--	--	--	--	--	--	--
o-Xylene	NL	NL	--	--	--	--	--	--	--
Total Xylenes	NL	NL	0.1 UJ	0.1 U	0.1 U	2 J	0.1 U	0.1 U	0.1 U
Total Metals (mg/kg; SW-846 6020A, 7471B)									
Arsenic	7	7	--	--	--	--	--	--	--
Barium	NL	NL	--	--	--	--	--	--	--
Cadmium	1.2	1	--	--	--	--	--	--	--
Chromium	5,200	260	--	--	--	--	--	--	--
Copper	NL	NL	--	--	--	--	--	--	--
Lead	250	81	--	--	--	--	--	--	--
Mercury	2	0.1	--	--	--	--	--	--	--
Nickel	NL	NL	--	--	--	--	--	--	--
Selenium	7.4	1	--	--	--	--	--	--	--
Silver	0.32	0.02	--	--	--	--	--	--	--
Zinc	NL	NL	--	--	--	--	--	--	--

Table A-1
C Street Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Site CUL for Unrestricted Land Use - Unsaturated Soil	Site CUL for Unrestricted Land Use - Saturated Soil	Sampling Location, Sampling Date, Laboratory Sample ID					
			CS-028-S-5-6	CS-MW-10-6-7	CS-MW-11-5-6	CS-MW-7-11.5- 12.5	CS-MW-8-5-6	CS-MW-9-6.5-7.5
			10/9/2023	11/8/2023	11/8/2023	11/8/2023	11/9/2023	11/9/2023
			EV23100058-09	23K0337	23K0337	23K0337	23K0337	23K0337
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Gx, -Dx)								
Gasoline-Range Organics	30	30	5.0 U	6.36 U	5.96 U	108	7.18 U	4,480
Diesel-Range Organics	2,000	2,000	5.0 U	5.83 U	23.5	722	6.77 U	2,730
Oil-Range Organics	2,000	2,000	10	11.7 U	81.2	731	13.5 U	103
Total TPH	2,000	2,000	10	ND	105	1561	ND	7,313
Volatiles (mg/kg; SW-846 8260D)								
Benzene	0.034	0.005	0.05 U	0.00090 U	0.00098 U	0.00189	0.00089 U	0.0602 U
Toluene	NL	NL	0.05 U	0.00090 U	0.00036 J	0.00396	0.00089 U	0.0602 U
Ethylbenzene	NL	NL	0.05 U	0.00090 U	0.00098 U	0.00057 J	0.00089 U	1.41
m, p-Xylene	NL	NL	--	0.00179 U	0.00196 U	0.00355	0.00178 U	0.152
o-Xylene	NL	NL	--	0.00090 U	0.00098 U	0.00131	0.00089 U	0.0611
Total Xylenes	NL	NL	0.1 U	0.00179 U	0.00196 U	0.00486	0.00178 U	0.213
Total Metals (mg/kg; SW-846 6020A, 7471B)								
Arsenic	7	7	--	22.2	8.17 J	6.30	3.42	2.32
Barium	NL	NL	--	--	--	--	--	--
Cadmium	1.2	1	--	0.22	0.20	0.40	0.12 J	0.06 J
Chromium	5,200	260	--	12.1	23.4	18.0	12.4	13.3
Copper	NL	NL	--	5.53	25.5	16.2	4.46	6.06
Lead	250	81	--	0.89	6.50	51.7	0.88	8.90
Mercury	2	0.1	--	0.0288 J	0.0744 J-	0.0778	0.00905 J	0.00790 J
Nickel	NL	NL	--	7.98	23.5	37.3	9.97	8.34
Selenium	7.4	1	--	0.37 J	0.94	0.27 J	0.46 J	0.41 J
Silver	0.32	0.02	--	0.23 U	0.12 J	0.06 J	0.27 U	0.03 J
Zinc	NL	NL	--	14.8	56.0	81.5	55.7	24.5

Table A-1
C Street Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Notes:

Bold text indicates detected analyte.

Gray shading indicates detected analyte exceeds applicable cleanup level.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

J- = The result is an estimated quantity and the result may be biased low.

Abbreviations and Acronyms:

CUL = cleanup level

ID = identification

mg/kg = milligrams per kilogram

ND = not detected

NL = not listed

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

TPH = total petroleum hydrocarbons expressed as the sum total of detected concentrations of TPH-G, TPH-D and TPH-O

TPH-D = diesel-range total petroleum hydrocarbons

TPH-G = gasoline-range total petroleum hydrocarbons

TPH-O = oil-range total petroleum hydrocarbons

Table A-2
Hilton Avenue Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Site CUL for Unrestricted Land Use - Unsaturated Soil	Site CUL for Unrestricted Land Use - Saturated Soil	Sampling Location, Sampling Date, Laboratory Sample ID							
			HH-001-S-8-9	HH-002-S-10-11	HH-003-S-5-6	HH-004-S-10-11	HH-MW-2-7.4-8.4	HH-MW-3-7.8-8.8	HH-MW-4-5-6	HH-MW-5-10-11
			10/12/2023	10/12/2023	10/12/2023	10/12/2023	11/10/2023	11/9/2023	11/9/2023	11/9/2023
			EV23100076-11	EV23100076-14	EV23100076-13	EV23100076-12	23K0337	23K0337	23K0337	23K0337
Total Petroleum Hydrocarbons (mg/kg; NWTPH-Gx, -Dx)										
Gasoline-Range Organics	30	30	5.0 U	5.0 U	48 J	5.0 U	5.42 U	6.37 U	118	5.16 U
Diesel-Range Organics	2,000	2,000	5.0 U	5.0 U	11 J	5.0 U	5.64 U	6.10 U	337	5.72 U
Oil-Range Organics	2,000	2,000	10 U	10 U	45	10 U	11.3 U	12.2 U	1,480	19.4
Total TPH	2,000	2,000	ND	ND	104	ND	ND	ND	1,935	19.4
Volatiles (mg/kg; SW-846 8260D)										
Benzene	0.034	0.005	0.05 U	0.05 U	0.05 U	0.05 U	0.00260	0.00087 U	0.00143	0.00032 J
Toluene	NL	NL	0.05 U	0.05 U	0.05 U	0.05 U	0.00040 J	0.00087 U	0.00155	0.00025 J
Ethylbenzene	NL	NL	0.05 U	0.05 U	0.05 U	0.05 U	0.00094 U	0.00087 U	0.00249	0.00094 U
m, p-Xylene	NL	NL	--	--	--	--	0.00188 U	0.00175 U	0.00893	0.00188 U
o-Xylene	NL	NL	--	--	--	--	0.00094 U	0.00087 U	0.00628	0.00094 U
Total Xylenes	NL	NL	0.1 U	0.1 U	0.1 U	0.1 U	0.00188 U	0.00175 U	0.0152	0.00188 U
Total Metals (mg/kg; SW-846 6020A, 7471B)										
Arsenic	7	7	--	--	--	--	2.57	3.83	7.52	3.35
Barium	NL	NL	--	--	--	--	--	--	--	--
Cadmium	1.2	1	--	--	--	--	0.08 J	0.12	0.88	0.14
Chromium	5,200	260	--	--	--	--	12.9	32.8	62.2	33.8
Copper	NL	NL	--	--	--	--	5.58	23.1	59.5	26.9
Lead	250	81	--	--	--	--	1.02	2.72	121	4.21
Mercury	2	0.1	--	--	--	--	0.00745 J	0.0428	0.0560	0.0557
Nickel	NL	NL	--	--	--	--	13.7	36.1	27.0	37.9
Selenium	7.4	1	--	--	--	--	0.51 J	0.99	1.49 U	0.76
Silver	0.32	0.02	--	--	--	--	0.04 J	0.09 J	0.32	0.08 J
Zinc	NL	NL	--	--	--	--	20.5	45.4	327	48.5
Semivolatile Organic Compounds (mg/kg; SW-846 8270E SIM)										
1-Methylnaphthalene	NL	NL	--	--	--	--	0.00499 U	0.00459 J	0.632	0.00258 J
2-Chloronaphthalene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0750 U	0.00500 U
2-Methylnaphthalene	NL	NL	--	--	--	--	0.00499 U	0.00728	1.04	0.00272 J
Acenaphthene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.241	0.00109 J

Table A-2
Hilton Avenue Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Site CUL for Unrestricted Land Use - Unsaturated Soil	Site CUL for Unrestricted Land Use - Saturated Soil	Sampling Location, Sampling Date, Laboratory Sample ID							
			HH-001-S-8-9	HH-002-S-10-11	HH-003-S-5-6	HH-004-S-10-11	HH-MW-2-7.4-8.4	HH-MW-3-7.8-8.8	HH-MW-4-5-6	HH-MW-5-10-11
			10/12/2023	10/12/2023	10/12/2023	10/12/2023	11/10/2023	11/9/2023	11/9/2023	11/9/2023
			EV23100076-11	EV23100076-14	EV23100076-13	EV23100076-12	23K0337	23K0337	23K0337	23K0337
Acenaphthylene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0629 J	0.00500 U
Anthracene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.107	0.00500 U
Benzo(a)anthracene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.133	0.00191 J
Benzo(a)pyrene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.108	0.00259 J
Benzo(b)fluoranthene	NL	NL	--	--	--	--	0.00499 U	0.00143 J	0.0885	0.00293 J
Benzo(g,h,i)perylene	NL	NL	--	--	--	--	0.00499 U	0.00463 J	0.0915	0.00385 J
Benzo(j)fluoranthene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0473 J	0.00156 J
Benzo(k)fluoranthene	NL	NL	--	--	--	--	0.00499 U	0.00110 J	0.0562 J	0.00182 J
Carbazole	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0652 J	0.00500 U
Chrysene	NL	NL	--	--	--	--	0.00499 U	0.00271 J	0.195	0.00325 J
Dibenzo(a,h)anthracene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0750 U	0.00500 U
Dibenzofuran	NL	NL	--	--	--	--	0.00499 U	0.00148 J	0.226	0.00138 J
Fluoranthene	NL	NL	--	--	--	--	0.00063 J	0.00126 J	0.466	0.00646
Fluorene	NL	NL	--	--	--	--	0.00499 U	0.00157 J	0.269	0.00150 J
Indeno(1,2,3-cd)pyrene	NL	NL	--	--	--	--	0.00499 U	0.00500 U	0.0699 J	0.00220 J
Naphthalene	NL	NL	--	--	--	--	0.00157 J	0.00422 J	1.17	0.00922
Perylene	NL	NL	--	--	--	--	0.00499 U	0.00797	0.125	0.00500 U
Phenanthrene	NL	NL	--	--	--	--	0.00086 J	0.00753	0.712	0.00708
Pyrene	NL	NL	--	--	--	--	0.00499 U	0.00331 J	0.513	0.00545
Total Benzofluoranthenes	NL	NL	--	--	--	--	0.00998 U	0.0100 U	0.191	0.00618 J
Semivolatile Organic Compounds mg/kg; SW-846 8270E)										
bis(2-Ethylhexyl) Phthalate	NL	NL	--	--	--	--	0.0500 U	0.0499 U	18	0.0164 J

Table A-2
Hilton Avenue Soil Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Notes:

Bold text indicates detected analyte.

Gray shading indicates detected analyte exceeds applicable cleanup level.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

Abbreviations and Acronyms:

CUL = cleanup level

ID = identification

mg/kg = milligrams per kilogram

ND = not detected

NL = not listed

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

SIM = selected ion monitoring

TPH = total petroleum hydrocarbons expressed as the sum total of detected concentrations of TPH-G, TPH-D and TPH-O

TPH-D = diesel-range total petroleum hydrocarbons

TPH-G = gasoline-range total petroleum hydrocarbons

TPH-O = oil-range total petroleum hydrocarbons

Table A-3
Direct-Push Boring Groundwater Results – October 2023
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

[illegible]

Table A-3
Direct-Push Boring Groundwater Results – October 2023
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG					
	CS-023	CS-024	CS-025	CS-026	CS-027	CS-028
	CS-023-GW-20231009	CS-024-GW-20231011	CS-025-GW-20231011	CS-026-GW-20231009	CS-027-GW-20231011	CS-028-GW-20231009
	N	N	N	N	N	N
	10/9/2023	10/11/2023	10/11/2023	10/9/2023	10/11/2023	10/9/2023
Total Petroleum Hydrocarbon	EV23100058	EV23100076	EV23100076	EV23100058	EV23100076	EV23100058
	Gasoline-Range Organics	100 U	3,100	2,900	100 U	100 U
	Diesel-Range Organics	120 U	990 J	15,000	120 U	1,500 J
Volatiles (µg/L; SW-846 8260)	Oil-Range Organics	200 U	200 U	1,000 U	200 U	5,000
Benzene	1.0 U	1.0 U	18 J	1.0 U	1.0 U	1.0 U
Ethylbenzene	1.0 U	100	1.7 J	1.0 U	1.0 U	1.0 U
Toluene	1.0 U	1.0 U	4.5 J	1.0 U	1.0 U	1.0 U
Xylenes, Total	2.0 U	4.3	4.7 J	2.0 U	2.0 U	2.0 U

Notes:

Bold text indicates detected analyte.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

Abbreviations and Acronyms:

ID = identification

FD = field duplicate

µg/L = micrograms per liter

N = primary sample

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

SDG = sample delivery group

TPH = total petroleum hydrocarbons expressed as the sum total of detected concentrations of TPH-G, TPH-D and TPH-O

TPH-D = diesel-range total petroleum hydrocarbons

TPH-G = gasoline-range total petroleum hydrocarbons

TPH-O = oil-range total petroleum hydrocarbons

Table A-4
Water-Level Elevations
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location	Top of Casing Elevation (ft NAVD 88)	Date Measured	Depth to Groundwater (ft bgs)	Depth to NAPL (ft bgs)	NAPL Thickness (ft)	Groundwater Elevation (ft NAVD 88)	Notes
C Street							
CS-MW-1	12.47	11/20/23	4.58	--	--	7.89	
		02/13/24	4.02	--	--	8.45	
		05/06/24	4.66	--	--	7.81	
		08/20/24	5.03	--	--	7.44	
CS-MW-2	12.77	11/20/23	5.05	--	--	7.72	
		02/13/24	4.34	--	--	8.43	
		05/06/24	5.03	--	--	7.74	
		08/20/24	5.55	--	--	7.22	
CS-MW-3	13.39	11/20/23	5.20	--	--	8.19	Odor observed. No product measured.
		02/13/24	4.33	4.32	0.01	9.05	
		05/06/24	5.23	5.13	0.10	8.08	
		08/20/24	5.99	5.77	0.22	7.22	
CS-MW-4	12.77	11/20/23	4.99	--	--	7.78	
		02/13/24	4.01	--	--	8.76	
		05/06/24	5.07	--	--	7.70	
		08/20/24	5.74	--	--	7.03	
CS-MW-5	12.62	11/20/23	4.90	--	--	7.72	Odor observed. No product measured.
		02/13/24	3.98	3.93	0.05	8.60	
		05/06/24	5.11	--	--	7.51	
		08/20/24	6.70	--	--	5.92	
CS-MW-6	13.87	11/20/23	6.76	--	--	7.11	
		02/14/24	6.63	--	--	7.24	
		05/06/24	7.36	--	--	6.51	
		08/20/24	7.51	--	--	6.36	
CS-MW-7	13.13	11/20/23	5.82	--	--	7.31	
		02/13/24	4.92	--	--	8.21	
		05/06/24	5.98	--	--	7.15	
		08/20/24	6.39	--	--	6.74	

Table A-4
Water-Level Elevations
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location	Top of Casing Elevation (ft NAVD 88)	Date Measured	Depth to Groundwater (ft bgs)	Depth to NAPL (ft bgs)	NAPL Thickness (ft)	Groundwater Elevation (ft NAVD 88)	Notes
CS-MW-8	13.26	11/20/23	5.09	--	--	8.17	
		02/13/24	4.35	--	--	8.91	
		05/06/24	5.01	--	--	8.25	
		08/20/24	5.60	--	--	7.66	
CS-MW-9	12.39	11/20/23	4.43	--	--	7.96	
		02/13/24	3.75	--	--	8.64	
		05/06/24	4.46	--	--	7.93	
		08/20/24	4.99	--	--	7.40	
CS-MW-10	14.57	11/20/23	5.95	--	--	8.62	
		02/13/24	4.93	--	--	9.64	
		05/06/24	5.83	--	--	8.74	
		08/20/24	6.69	--	--	7.88	
CS-MW-11	14.84	11/20/23	6.06	--	--	8.78	
		02/13/24	5.00	--	--	9.84	
		05/06/24	5.97	--	--	8.87	
		08/20/24	6.91	--	--	7.93	
RMW-7	14.33	11/20/23	7.08	--	--	7.25	
		02/13/24	6.54	--	--	7.79	
		05/06/24	7.54	--	--	6.79	
		08/20/24	7.49	--	--	6.84	
CWF-CW-1	10.80	11/20/23	3.79	--	--	7.01	Hydrocarbon-like odor. No product measured.
		02/13/24	3.09	--	--	7.71	
		05/06/24	4.22	--	--	6.58	
		08/20/24	4.42	--	--	6.38	
CWF-CW-2	12.40	11/20/23	5.09	--	--	7.31	
		02/13/24	4.37	--	--	8.03	
		05/06/24	5.19	--	--	7.21	
		08/20/24	5.39	--	--	7.01	

Table A-4
Water-Level Elevations
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location	Top of Casing Elevation (ft NAVD 88)	Date Measured	Depth to Groundwater (ft bgs)	Depth to NAPL (ft bgs)	NAPL Thickness (ft)	Groundwater Elevation (ft NAVD 88)	Notes
MW-7(B)	13.03	11/20/23	NM	--	--	--	Stabilized water level not available.
		02/13/24	3.12	--	--	9.91	
		05/06/24	3.51	--	--	9.52	
		08/20/24	3.99	--	--	9.04	
MW-10(B)	12.58	11/20/23	4.30	--	--	8.28	
		02/13/24	3.54	--	--	9.04	
		05/06/24	4.22	--	--	8.36	
		08/20/24	4.82	--	--	7.76	
MW-13(B)	12.57	11/20/23	4.65	--	--	7.92	
		02/13/24	4.03	--	--	8.54	
		05/06/24	4.67	--	--	7.90	
		08/20/24	5.12	--	--	7.45	
MW-51(C)	14.27	11/20/23	NM	--	--	NM	Unable to locate well.
		02/13/24	5.39	--	--	8.88	
		05/06/24	6.28	--	--	7.99	
		08/20/24	6.91	--	--	7.36	
Hilton Avenue							
HH-MW-1	13.27	05/05/21	3.83	--	--	9.44	
		09/08/21	4.76	--	--	8.51	
		11/20/23	4.30	--	--	8.97	
		02/13/24	3.46	--	--	9.81	
		05/06/24	3.72	--	--	9.55	
		08/20/24	4.29	--	--	8.98	
HH-MW-2	14.05	11/20/23	7.18	--	--	6.87	
		02/13/24	6.62	--	--	7.43	
		05/06/24	7.72	--	--	6.33	
		08/20/24	7.87	--	--	6.18	
HH-MW-3	14.77	11/20/23	6.90	--	--	7.87	
		02/13/24	1.60	--	--	13.17	
		05/06/24	4.20	--	--	10.57	
		08/20/24	7.20	--	--	7.57	

Table A-4
Water-Level Elevations
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location	Top of Casing Elevation (ft NAVD 88)	Date Measured	Depth to Groundwater (ft bgs)	Depth to NAPL (ft bgs)	NAPL Thickness (ft)	Groundwater Elevation (ft NAVD 88)	Notes
HH-MW-4	15.20	11/20/23	4.75	--	--	10.45	
		02/13/24	2.41	--	--	12.79	
		05/06/24	3.23	--	--	11.97	
		08/20/24	4.86	--	--	10.34	
HH-MW-5	15.16	11/20/23	8.63	--	--	6.53	
		02/13/24	7.45	--	--	7.71	
		05/06/24	8.40	--	--	6.76	
		08/20/24	7.48	--	--	7.68	
ASB							
ASB-MW-1	23.03	05/05/21	11.31	--	--	11.72	
		09/08/21	12.93	--	--	10.10	
		11/20/23	12.72	--	--	10.31	Hydrocarbon-like odor. No product measured.
		02/13/24	10.56	--	--	12.47	
		05/06/24	11.01	--	--	12.02	
		08/20/24	11.78	--	--	11.25	
ASB-MW-2	22.01	05/05/21	10.55	--	--	11.46	
		09/08/21	12.27	--	--	9.74	
		11/20/23	11.10	--	--	10.91	
		02/13/24	9.13	--	--	12.88	
		05/06/24	9.91	--	--	12.10	
		08/20/24	11.11	--	--	10.90	
ASB-MW-3	22.25	05/05/21	11.53	--	--	10.72	
		09/08/21	13.04	--	--	9.21	
		11/20/23	12.34	--	--	9.91	
		02/13/24	10.91	--	--	11.34	
		05/06/24	11.56	--	--	10.69	
		08/20/24	12.49	--	--	9.76	

Table A-4
Water-Level Elevations
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location	Top of Casing Elevation (ft NAVD 88)	Date Measured	Depth to Groundwater (ft bgs)	Depth to NAPL (ft bgs)	NAPL Thickness (ft)	Groundwater Elevation (ft NAVD 88)	Notes
ASB-MW-4	21.18	05/05/21	8.00	--	--	13.18	
		09/08/21	9.32	--	--	11.86	
		11/20/23	7.93	--	--	13.25	
		02/13/24	6.91	--	--	14.27	
		05/06/24	7.71	--	--	13.47	
		08/20/24	7.76	--	--	13.42	
ASB-MW-5	21.92	05/05/21	9.48	--	--	12.44	
		09/08/21	12.00	--	--	9.92	
		02/13/24	9.27	--	--	12.65	
		05/06/24	10.13	--	--	11.79	
		08/20/24	11.25	--	--	10.67	
ASB-MW-6	17.10	05/05/21	9.45	--	--	7.65	
		09/08/21	10.32	--	--	6.78	
		11/20/23	8.79	--	--	8.31	
		02/13/24	8.12	--	--	8.98	
		05/06/24	8.52	--	--	8.58	
		08/20/24	9.59	--	--	7.51	
HH-TD-1	17.13	11/20/23	10.66	--	--	6.47	
CS-TD-1	13.02	11/20/23	6.91	--	--	6.11	

Notes:

-- = data not provided or not available

NM = not measured

ft NAVD 88 = elevation in feet, relative to North American Vertical Datum of 1988

ft bgs = feet below ground surface

NAPL = non-aqueous phase liquid

Table A-5
Water Field Parameters
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Well ID	Measurement Date	Ferrous Iron (mg/L)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH (SU)	ORP (mV)	Comments/Observations
C Street								
CS-MW-1	11/21/23	4.2	15.7	0.17	1,945	6.90	-124.1	
	02/14/24	4.0	10.2	0.55	4,671	7.13	-102.2	
	08/20/24	7.0	21.0	1.89	12,980	6.82	-76.7	
CS-MW-2	11/21/23	0.5	14.3	2.11	1,934	7.03	-218.4	
	02/14/24	1.0	10.1	0.88	1,463	7.25	-102.4	
	05/06/24	0.0	13.4	0.18	1,421	6.97	-46.1	
	08/21/24	0.0	19.3	1.80	1,425	6.90	-207.1	
CS-MW-3	11/21/23	1.4	15.0	0.15	981	6.84	-66.9	
	02/13/24	1.3	11.8	0.65	1,231	6.76	-77.3	
	05/06/24	1.0	12.4	0.17	1,340	6.69	78.3	
	08/21/24	1.2	17.4	0.42	1,903	6.58	-68.2	
CS-MW-4	11/20/23	0.0	13.3	3.94	1,299	6.77	-80.5	
	02/14/24	0.0	9.6	2.21	721	6.78	63.2	
	05/08/24	NM	13.5	0.53	653	6.56	-3.2	
	08/22/24	1.3	16.2	1.57	827	6.70	-109.5	
CS-MW-5	11/21/23	0.8	13.2	0.06	1,241	7.04	-91.2	
	02/14/24	0.0	8.2	0.99	560	7.78	-99.1	
	05/08/24	NM	13.3	1.04	787	7.12	-73.2	
	08/20/24	0.0	16.1	0.72	3,365	7.55	-338.3	
CS-MW-6	11/20/23	0.6	13.8	0.75	2,923	6.87	-270.2	
	02/14/24	0.5	10.9	0.31	1,248	6.88	-130.0	
	05/07/24	1.0	13.0	0.49	1,825	6.82	-87.4	
	08/22/24	0.6	16.0	0.12	4,725	6.78	-227.5	
CS-MW-7	11/21/23	0.0	13.0	2.03	1,466	7.14	-308.0	
	02/13/24	0.0	10.6	1.28	5,566	6.87	-2.3	
	05/08/24	NM	15.1	0.27	13,866	6.96	-111.2	
	08/22/24	4.0	17.6	1.23	14,181	7.14	-249.2	

Table A-5
Water Field Parameters
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Well ID	Measurement Date	Ferrous Iron (mg/L)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH (SU)	ORP (mV)	Comments/Observations
CS-MW-8	11/21/23	1.6	14.5	0.30	747	6.78	128.6	
	02/13/24	0.2	11.1	1.15	540	6.85	-30.9	
	05/06/24	1.8	13.5	0.25	593	6.93	110.1	
	08/20/24	3.4	18.7	1.70	630	7.07	-20.7	
CS-MW-9	11/21/23	3.0	13.3	2.15	1,781	6.93	-209.0	
	02/14/24	3.0	10.0	0.51	1,355	6.79	-31.1	
	05/08/24	NM	12.7	0.10	5,177	6.73	-215.4	
	08/20/24	0.5	18.3	0.39	17,060	7.01	-233.4	
CS-MW-10	11/20/23	1.0	13.0	4.90	859	6.91	-109.4	
	02/13/24	2.0	9.7	0.70	922	6.90	23.3	
	05/06/24	NM	11.7	2.70	1,835	6.69	13.0	
	08/20/24	5.2	17.9	1.04	7,276	6.85	1.8	
CS-MW-11	11/20/23	7.0	10.0	0.91	1,918	6.37	-104.6	
	02/13/24	7.0	9.2	1.27	1,118	6.52	30.6	
	05/07/24	1.5	15.2	0.15	16,693	6.68	67.5	
	08/20/24	5.2	18.9	0.99	2,217	6.67	-43.7	
CWF-CW-1	11/20/23	0.0	13.9	0.25	1,252	6.97	-360.8	
	02/13/24	0.0	11.5	0.12	1,849	6.89	-72.9	
	05/07/24	1.0	13.4	0.36	6,503	6.86	-217.1	
	08/22/24	0.0	16.1	0.25	7,573	6.87	-244.4	
CWF-CW-2	11/21/23	3.0	15.4	0.23	3,009	6.93	-128.5	
	02/13/24	6.5	11.5	0.68	9,367	6.81	-105.2	
	05/07/24	2.5	14.7	0.33	7,025	6.87	65.4	
	08/20/24	7.0	19.1	1.47	15,026	6.83	-71.7	

Table A-5
Water Field Parameters
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Well ID	Measurement Date	Ferrous Iron (mg/L)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH (SU)	ORP (mV)	Comments/Observations
MW-10(B)	11/21/23	NM	14.8	0.10	784	6.75	128.5	
	02/13/24	0.1	9.7	3.04	461	6.89	-28.1	
	05/06/24	1.0	13.8	0.26	935	7.01	96.1	
	08/20/24	2.2	18.4	0.56	930	7.12	-7.0	
MW-13(B)	11/21/23	3.2	13.4	0.26	1,129	7.08	-145.8	
	02/14/24	1.6	9.6	0.69	1,098	7.34	-62.9	
	05/08/24	NM	12.7	0.52	747	6.90	125.7	
	08/20/24	5.0	18.8	1.01	803	7.00	-74.2	
MW-51(C)	11/21/23	1.0	14.0	0.82	660	6.33	-209.2	
	02/14/24	0.0	9.7	1.81	453	6.43	53.9	
	05/08/24	NM	12.7	1.14	605	6.59	-92.5	
	08/21/24	5.0	18.2	1.57	7,051	6.55	-169.9	
RMW-7	11/21/23	0.0	11.0	5.91	39,281	7.41	135.5	
	02/13/24	0.0	9.7	5.64	19,506	7.33	25.4	
	05/06/24	NM	11.7	1.91	17,215	7.35	-42.9	
	08/21/24	0.8	19.8	0.34	29,344	7.08	-124.8	
Avenue								
HH-MW-1	11/22/23	NM	14.4	0.13	1,847	6.40	77.5	
	02/14/24	1.6	9.1	1.45	2,535	6.56	5.1	
	05/07/24	NM	14.7	0.10	2,246	6.48	8.2	
	08/21/24	4.0	18.4	0.62	2,032	6.39	-84.2	
HH-MW-2	11/22/23	NM	12.9	0.20	1,360	6.86	60.3	
	02/14/24	2.8	10.6	1.31	1,435	6.79	11.7	
	05/07/24	NM	11.3	0.78	1,005	6.83	-43.6	
	08/27/24	0.0	17.3	2.36	1,320	6.78	5.5	
HH-MW-3	11/22/23	NM	14.6	2.95	880	7.25	19.9	
	02/14/24	0.0	9.2	1.34	631	8.04	4.4	
	05/07/24	NM	12.4	0.44	487	7.21	3.5	
	08/21/24	1.0	17.5	0.47	909	6.97	86.4	

Table A-5
Water Field Parameters
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Well ID	Measurement Date	Ferrous Iron (mg/L)	Temperature (°C)	Dissolved Oxygen (mg/L)	Conductivity (µS/cm)	pH (SU)	ORP (mV)	Comments/Observations
HH-MW-4	11/22/23	4.0	12.8	0.18	1,796	6.62	104.2	
	02/13/24	2.5	8.5	1.48	961	6.40	8.3	
	05/07/24	NM	11.0	0.34	696	6.23	54.3	
	08/21/24	3.4	15.3	0.75	1,455	6.53	-60.9	
HH-MW-5	11/22/23	NM	14.5	0.57	2,326	6.59	-94.2	
	02/14/24	3.5	11.5	1.38	944	6.18	8.2	
	05/09/24	NM	13.5	0.15	1,584	6.39	27.4	
	08/21/24	6.2	16.2	0.09	2,130	6.54	-55.4	
ASB								
ASB-MW-1	11/22/23	NM	15.2	0.25	4,148	6.96	-131.4	
	02/13/24	1.5	12.9	0.17	2,637	6.60	0.4	Final stabilization parameters not shown due to field technical difficulties. Stabilization was achieved, but parameters shown represent data collected during sampling activities.
	05/07/24	NM	12.7	0.10	1,976	6.55	7.5	
	08/21/24	0.0	15.5	1.85	2,632	6.61	-112.6	
ASB-MW-6	11/13/24	3.5	15.4	0.28	1,013	6.81	25.6	

Abbreviations and Acronyms:

°C = degrees Celsius

mg/L = milligrams per liter

ft = feet

µS/cm = microSiemens per centimeter

MV = millivolts

NM = not measured

ORP = oxidation reduction potential

SU = standard units

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CFW-CW-1	CFW-CW-2	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-2
			CFW-CW-1-210908	CFW-CW-2-210907	CS-MW-1-210203	CS-MW-1-210504	CS-MW-1-210907	CS-MW-1-GW-231121	CS-MW-1-GW-20240214	CS-MW-1-GW-240507	CS-MW-1-GW-240820	CS-MW-2-210203
			N	N	N	N	N	N	N	N	N	N

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		CFW-CW-1	CFW-CW-2	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-1	CS-MW-2
		CFW-CW-1-210908	CFW-CW-2-210907	CS-MW-1-210203	CS-MW-1-210504	CS-MW-1-210907	CS-MW-1-GW-231121	CS-MW-1-GW-20240214	CS-MW-1-GW-240507	CS-MW-1-GW-240820	CS-MW-2-210203
		N	N	N	N	N	N	N	N	N	N
		9/8/2021	9/7/2021	2/3/2021	5/4/2021	9/7/2021	11/21/2023	2/14/2024	5/7/2024	8/20/2024	2/3/2021
		21I0096	21I0079			21I0079	23K0589 (a)	EV24020115 (b)	EV24050075	EV24080158	
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	1.23 U	1.23 UJ	1.23 U	--	1.23 UJ	1.23 U	--	--	--	7.98
Ethene	NL	1.14 U	1.14 UJ	1.14 U	--	1.14 UJ	1.14 U	--	--	--	0.24 U
Methane	NL	2,910	767 J	5,310	4,280	4,220 J	5,660	2,300	--	--	5,120
General Chemistry											
Hardness (µg/L; SM 2340)	NL	445,000	1,300,000	787,000	607,000	577,000	--	--	--	--	782,000
Alkalinity, total (µg/L; SM 2320B)	NL	290,000	871,000	1,130,000	811,000	981,000	787,000	1,200,000	--	--	657,000
Total Organic Carbon (µg/L; SM 5310B)	NL	5,880	27,420	36,020	14,930	19,550	19,410	40,000	--	--	15,110
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	--	--	--	--	100 U	140 R	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	100 U	100 U	154	108	100 U	190	150 R	--	--	349
Sulfate (µg/L; EPA 300.0)	NL	153,000	232,000	9,230	16,600	12,500	9,350	55,000	870,000	430,000	105,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	--	--	--	--	1,150	50 U	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG										
			CS-MW-2 DUP-1-210504 FD 5/4/2021	CS-MW-2 CS-MW-2-210504 N 5/4/2021	CS-MW-2 DUP-1-210908 FD 9/8/2021 21I0096	CS-MW-2 CS-MW-2-210908 N 9/8/2021 21I0096	CS-MW-2 CS-MW-2-GW-231121 N 11/21/2023 23K0589 (a)	CS-MW-2 CS-MW-2-GW-20240214 N 2/14/2024 EV24020115 (b)	CS-MW-2 CS-MW-2-GW-240506 N 5/6/2024 EV24050061	CS-MW-2 CS-MW-2-GW-240821 N 8/21/2024 EV24080164	CS-MW-3 CS-MW-3-210203 N 2/3/2021	CS-MW-3 High Tide CS-MW-3-210203 N 2/3/2021	CS-MW-3 CS-MW-3-210505 N 5/5/2021
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)													
Gasoline-Range Organics	800	4,540	4,540	4,750	4,870	217	230	360 H26	690 J, H41	1,040	--	296	
Diesel-Range Organics	500	2,050	2,080	1,340	1,450	100 U	630 J	2,500 H29	3300 H30	931	--	3,660	
Oil-Range Organics	500	200 U	220	200 U	200 U	200 U	250 U	760 H43	850 H42	200 U	--	200 U	
TPH	800	6,590	6,840	6,090	6,320	217	860 J	3,620	4,840	1,971	--	3,956	
Volatile Organic Compounds (µg/L; SW-846 8260D)													
Benzene	2.4	--	--	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	--	--	
Ethylbenzene	NL	--	--	--	--	0.88	3.3	7.0	16	0.20 U	--	--	
m-&p-Xylenes	NL	--	--	--	--	0.40 U	4.0 U	4.0 U	4.0 U	0.40 U	--	--	
o-Xylene	NL	--	--	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	--	--	
Toluene	NL	--	--	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	--	--	
Xylenes, Total	NL	--	--	--	--	0.60 U	4.0 U	--	--	0.60 U	--	--	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)													
Arsenic	5	--	--	--	--	0.850	3.1	2.5 J	2.3	0.283	--	--	
Cadmium	8.8	--	--	--	--	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	--	--	
Chromium, Total	260	--	--	--	--	23.8	5.2	3.2 J	4.6	10.3	--	--	
Chromium, Trivalent	93,700	--	--	--	--	--	--	--	--	10.3	--	--	
Chromium, Hexavalent	50	--	--	--	--	--	--	--	--	13 U	--	--	
Copper	3.1	--	--	--	--	1.00 U	2.0 U	2.0 U	2	0.340 U	--	--	
Iron	NL	--	--	--	--	--	--	--	--	609	--	--	
Lead	8.1	--	--	--	--	0.210	1.0 U	1.8 J	3.9	0.0680 U	--	--	
Manganese	NL	69.8	70.1	35.7	36.0	126	93	--	--	539	--	1,050	
Mercury	0.059	--	--	--	--	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	
Nickel	8.2	--	--	--	--	1.27	2.0 U	2.0 U	2.0 U	0.0500 U	--	--	
Selenium	71	--	--	--	--	1.00 U	4.0 U	4.0 U	4.0 UJ	0.440 U	--	--	
Silver	1.9	--	--	--	--	0.400 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	
Zinc	81	--	--	--	--	12.0 U	2.5 U	3.6 J	2.5 U	0.820 U	--	--	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)													
Arsenic	5	--	--	--	--	1.06	3.6	2.6	2.1	0.304	--	--	
Cadmium	8.8	--	--	--	--	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	--	--	
Calcium	NL	311,000	283,000	220,000	242,000	--	--	--	--	156,000	--	222,000	
Chromium, Total	260	--	--	--	--	40.7	7.3	3.4	4.4	15.1	--	--	
Copper	3.1	--	--	--	--	0.500 U	3.6	2.2	4.1	0.340 U	--	--	
Iron	NL	--	--	--	--	--	--	--	--	709	--	--	
Lead	8.1	--	--	--	--	0.492	3.1	2.5	6	0.0680 U	--	--	
Magnesium	NL	16,200	15,200	12,800	14,200	--	--	--	--	17,600	--	25,100	
Manganese	NL	--	--	--	--	--	--	--	--	514	--	--	
Mercury	0.059	--	--	--	--	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	
Nickel	8.2	--	--	--	--	1.12	2.0 U	2.0 U	2.0 U	0.0500 U	--	--	
Selenium	71	--	--	--	--	0.787	4.0 U	4.0 U	4.0 UJ	0.440 U	--	--	
Silver	1.9	--	--	--	--	0.200 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	
Zinc	81	--	--	--	--	6.00 U	2.6	2.5 UJ	2.5 U	0.820 U	--	--	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG										
		CS-MW-2 DUP-1-210504 FD 5/4/2021	CS-MW-2 CS-MW-2-210504 N 5/4/2021	CS-MW-2 DUP-1-210908 FD 9/8/2021 21I0096	CS-MW-2 CS-MW-2-210908 N 9/8/2021 21I0096	CS-MW-2 CS-MW-2-GW-231121 N 11/21/2023 23K0589 (a)	CS-MW-2 CS-MW-2-GW-20240214 N 2/14/2024 EV24020115 (b)	CS-MW-2 CS-MW-2-GW-240506 N 5/6/2024 EV24050061	CS-MW-2 CS-MW-2-GW-240821 N 8/21/2024 EV24080164	CS-MW-3 CS-MW-3-210203 N 2/3/2021	CS-MW-3 High Tide CS-MW-3-210203 N 2/3/2021	CS-MW-3 CS-MW-3-210505 N 5/5/2021
Dissolved Gases (µg/L; RSK-175)												
Ethane	NL	--	--	8.18	7.93	5.17	--	--	--	1.23 U	--	--
Ethene	NL	--	--	1.14 U	1.14 U	1.14 U	--	--	--	1.14 U	--	--
Methane	NL	3,010	3,080	4,750	4,570	7,390	570	--	--	1,550	--	13,100
General Chemistry												
Hardness (µg/L; SM 2340)	NL	843,000	769,000	602,000	662,000	--	--	--	--	462,000	--	657,000
Alkalinity, total (µg/L; SM 2320B)	NL	507,000	513,000	513,000	511,000	702,000	580,000	--	--	368,000	--	732,000
Total Organic Carbon (µg/L; SM 5310B)	NL	9,630	9,670	7,510	7,550	17,990	7,600	--	--	8,220	--	10,650
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	--	--	--	100 U	190 J-	--	--	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	181	186	100 U	100 U	100 U	5,700 J-	--	--	125	--	100 U
Sulfate (µg/L; EPA 300.0)	NL	269,000	263,000	150,000	146,000	65,600	150,000	160,000	160,000	5,050	4,660	600 U
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--	7,660	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	--	--	--	50 U	1,100	--	--	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--	292,000	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CS-MW-3	CS-MW-3	CS-MW-3	CS-MW-3	CS-MW-3	CS-MW-4	CS-MW-4 High Tide	CS-MW-4	CS-MW-4	CS-MW-4
			CS-MW-3-210908	CS-MW-3-GW-231121	CS-MW-3-GW-20240213	CS-MW-3-GW-240506	CS-MW-3-GW-240821	CS-MW-4-210203	CS-MW-4-210203	CS-MW-4-210505	CS-MW-4-210907	CS-MW-DUP-231121
			N	N	N	N	N	N	N	N	N	FD
		9/8/2021	11/21/2023	2/13/2024	5/6/2024	8/21/2024	2/3/2021	2/3/2021	5/5/2021	9/7/2021	11/21/2023	
		21I0096	23K0589 (a)	EV24020115 (b)	EV24050061	EV24080164				21I0079	23K0589 (a)	
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	100 U	161	910 H15	98 H26	190 J, H26	427	--	362	613	185	
Diesel-Range Organics	500	726	--	6,100	800 H29	1,300 H30	641	--	700	710	100 U	
Oil-Range Organics	500	202 U	--	500 U	280 H43	400 H42	200 U	--	200 U	200 U	200 U	
TPH	800	726	161	7,010	1,178	1,890	1,068	--	1,062	1,323	185	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	--	--	2.0 U	2.0 U	2.0 U	0.20 U	--	--	--	0.35 J+	
Ethylbenzene	NL	--	--	2.0 U	2.0 U	2.0 U	0.20 U	--	--	--	0.20 U	
m-&p-Xylenes	NL	--	--	4.0 U	4.0 U	4.0 U	0.40 U	--	--	--	0.53 J+	
o-Xylene	NL	--	--	2.0 U	2.0 U	2.0 U	0.20 U	--	--	--	0.20 U	
Toluene	NL	--	--	2.0 U	2.0 U	2.0 U	0.20 U	--	--	--	0.37 J+	
Xylenes, Total	NL	--	--	4.0 U	--	--	0.60 U	--	--	--	0.60 U	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	--	0.400 U	1.0 U	1.0 U	1.0 U	0.336	--	--	--	1.32	
Cadmium	8.8	--	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	--	--	--	0.100 U	
Chromium, Total	260	--	26.0	25	30	35	0.130 U	--	--	--	6.40	
Chromium, Trivalent	93,700	--	--	--	--	--	0.130 U	--	--	--	--	
Chromium, Hexavalent	50	--	--	--	--	--	13 U	--	--	--	--	
Copper	3.1	--	1.00 U	2.0 U	2.0 U	2.0 U	0.340 U	--	--	--	1.00 U	
Iron	NL	--	--	--	--	--	1,740	--	--	--	--	
Lead	8.1	--	0.100 U	1.0 U	1.0 U	1.0 U	0.0680 U	--	--	--	0.100 U	
Manganese	NL	1,040	934	1100	--	--	57.7	--	70.7	40.2	18.8	
Mercury	0.059	--	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	--	--	
Nickel	8.2	--	1.00 U	2.0 U	2.0 U	2.0 U	2.68	--	--	--	1.50	
Selenium	71	--	1.00 U	4.0 U	4.0 U	4.0 U	1.22	--	--	--	1.00 U	
Silver	1.9	--	0.200 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	--	0.400 U	
Zinc	81	--	12.0 U	2.5 U	2.9	2.5 U	0.820 U	--	--	--	12.0 U	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	--	0.200 U	1.0 U	1.0 U	1.0 U	0.447	--	--	--	1.30	
Cadmium	8.8	--	0.100 U	1.0 U	1.0 U	1.0 U	0.176	--	--	--	0.100 U	
Calcium	NL	191,000	--	--	--	--	264,000	--	248,000	180,000	--	
Chromium, Total	260	--	38.9	34	37	41	0.904	--	--	--	8.47	
Copper	3.1	--	0.500 U	2.0 U	2.0 U	2.0 U	0.340 U	--	--	--	0.500 U	
Iron	NL	--	--	--	--	--	2,250	--	--	--	--	
Lead	8.1	--	0.100 U	1.0 U	1.0 U	1.0 U	0.0680 U	--	--	--	0.100 U	
Magnesium	NL	21,100	--	--	--	--	9,860	--	6,180	6,120	--	
Manganese	NL	--	--	--	--	--	57.4	--	--	--	--	
Mercury	0.059	--	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	--	--	
Nickel	8.2	--	0.500 U	2.0 U	2.0 U	2.0 U	3.49	--	--	--	1.61	
Selenium	71	--	0.615	4.0 U	4.0 U	4.0 U	1.02	--	--	--	0.500 UJ	
Silver	1.9	--	0.200 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	--	0.200 U	
Zinc	81	--	26.7	2.5 U	3.1	2.5 U	0.820 U	--	--	--	7.96	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		CS-MW-3 CS-MW-3-210908 N 9/8/2021 21I0096	CS-MW-3 CS-MW-3-GW-231121 N 11/21/2023 23K0589 (a)	CS-MW-3 CS-MW-3-GW-20240213 N 2/13/2024 EV24020115 (b)	CS-MW-3 CS-MW-3-GW-240506 N 5/6/2024 EV24050061	CS-MW-3 CS-MW-3-GW-240821 N 8/21/2024 EV24080164	CS-MW-4 CS-MW-4-210203 N 2/3/2021	CS-MW-4 High Tide CS-MW-4-210203 N 2/3/2021	CS-MW-4 CS-MW-4-210505 N 5/5/2021	CS-MW-4 CS-MW-4-210907 N 9/7/2021 21I0079	CS-MW-4 CS-MW-DUP-231121 FD 11/21/2023 23K0589 (a)
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	1.23 U	1.23 U	--	--	--	1.23 U	--	--	1.40	4.59
Ethene	NL	1.14 U	1.14 U	--	--	--	1.14 U	--	--	1.14 U	1.14 U
Methane	NL	11,600	8,430	1,400	--	--	27.6	--	49.5	1,840	3,200 J
General Chemistry											
Hardness (µg/L; SM 2340)	NL	563,000	--	--	--	--	699,000	--	645,000	476,000	--
Alkalinity, total (µg/L; SM 2320B)	NL	647,000	527,000	630,000	--	--	131,000	--	104,000	344,000	435,000
Total Organic Carbon (µg/L; SM 5310B)	NL	13,010	10,430	13,000	--	--	3,190	--	3,150	4,480	8,080 J
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	100 U	140 R	--	--	--	--	--	--	100 U
Nitrate (µg/L; EPA 300.0)	NL	1000 UJ	100 U	2,800 J-	--	--	855	--	100 U	100 U	282 J
Sulfate (µg/L; EPA 300.0)	NL	100 U	132	3,600	1,100	18,000	477,000	472,000	504,000	125,000	98,000 J
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	17,100	--	--	123,000 J
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	67	50 U	--	--	--	--	--	--	8,940
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	996,000	--	--	759,000

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CS-MW-4	CS-MW-4	CS-MW-4	CS-MW-4	CS-MW-5	CS-MW-5 High Tide	CS-MW-5	CS-MW-5	CS-MW-5	CS-MW-5
			CS-MW-4-GW-231121	CS-MW-4-GW-20240214	CS-MW-4-GW-240508	CS-MW-4-GW-240822	CS-MW-5-210203	CS-MW-5-210203	CS-MW-5-210504	CS-MW-5-210907	CS-MW-5-GW-231121	CS-MW-5-GW-20240214
			N	N	N	N	N	N	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	168	50 U	50 U	73 J, H26	2,910	--	2,150	3,740	330	280 H15	
Diesel-Range Organics	500	100 U	460	450 H29	820 H29	3,700	--	1,160	1,380	--	48,000	
Oil-Range Organics	500	200 U	300	620 H43	550 H43	487	--	227	206	--	6,600 H12	
TPH	800	168	760	1,070	1,443	7,097	--	3,537	5,326	330	54,880	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	0.33	2.0 U	2.0 U	2.0 U	0.41	--	--	--	--	2.0 U	
Ethylbenzene	NL	0.20 U	2.0 U	2.0 U	2.0 U	72.6	--	--	--	--	2.0 U	
m-&p-Xylenes	NL	0.46	4.0 U	4.0 U	4.0 U	45.1	--	--	--	--	4.0 U	
o-Xylene	NL	0.20 U	2.0 U	2.0 U	2.0 U	3.00	--	--	--	--	2.0 U	
Toluene	NL	0.33	2.0 U	2.0 U	2.0 U	2.32	--	--	--	--	2.0 U	
Xylenes, Total	NL	0.60 U	--	--	--	48.1	--	--	--	--	4.0 U	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	1.28	1.0 U	1.0 U	1.0 U	0.599	--	--	--	1.39	1.3	
Cadmium	8.8	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	--	--	--	0.100 U	1.0 U	
Chromium, Total	260	6.88	2.0 U	2.0 U	2	1.69	--	--	--	0.544	2.0 U	
Chromium, Trivalent	93,700	--	--	--	--	1.69	--	--	--	--	--	
Chromium, Hexavalent	50	--	--	--	--	13 U	--	--	--	--	--	
Copper	3.1	1.00 U	2.0 U	3.7	2.0 U	0.340 U	--	--	--	1.00 U	2.0 U	
Iron	NL	--	--	--	--	154	--	--	--	--	--	
Lead	8.1	0.100 U	1.0 U	1.0 U	1.0 U	1.02	--	--	--	0.467	1.0 U	
Manganese	NL	18.4	4.8	--	--	39.2	--	19.8	11.9	14.4	2.0 U	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	--	--	0.20 U	
Nickel	8.2	1.40	2.3	4.8	2.0 U	0.0500 U	--	--	--	1.00 U	2.0 U	
Selenium	71	1.00 U	4.0 U	4.0 U	4.0 U	0.440 U	--	--	--	1.00 U	4.0 U	
Silver	1.9	0.400 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	--	0.200 U	1.0 U	
Zinc	81	12.0 U	2.5 U	2.5 U	2.5 U	0.820 U	--	--	--	12.0 U	16 J	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	1.40	1.0 U	1.0 U	1.0 U	0.723	--	--	--	1.92	1.1	
Cadmium	8.8	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	--	--	--	0.123	1.0 U	
Calcium	NL	--	--	--	--	136,000	--	145,000	98,800	--	--	
Chromium, Total	260	8.66	2.0 U	2.0 U	2.0 U	3.05	--	--	--	0.861	2.0 U	
Copper	3.1	0.500 U	2.0 U	2.8	2.0 U	0.340 U	--	--	--	0.640	7.2	
Iron	NL	--	--	--	--	577	--	--	--	--	--	
Lead	8.1	0.100 U	1.0 U	1.0 U	1.0 U	1.69	--	--	--	0.824	1.0 U	
Magnesium	NL	--	--	--	--	27,000	--	34,900	29,400	--	--	
Manganese	NL	--	--	--	--	40.9	--	--	--	--	--	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	0.010 U	--	--	--	--	0.20 U	
Nickel	8.2	1.83	2.1	5.5	2.2	0.543	--	--	--	0.825	2.0 U	
Selenium	71	0.500 U	4.0 U	4.0 U	4.0 U	0.440 U	--	--	--	0.500 U	4.0 U	
Silver	1.9	0.200 U	1.0 U	1.0 U	1.0 U	0.0170 U	--	--	--	0.200 U	1.0 U	
Zinc	81	6.00 U	2.5 U	4.4	4.7	4.06	--	--	--	13.4	2.5 UJ	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		CS-MW-4	CS-MW-4	CS-MW-4	CS-MW-4	CS-MW-5	CS-MW-5 High Tide	CS-MW-5	CS-MW-5	CS-MW-5	CS-MW-5
		CS-MW-4-GW-231121	CS-MW-4-GW-20240214	CS-MW-4-GW-240508	CS-MW-4-GW-240822	CS-MW-5-210203	CS-MW-5-210203	CS-MW-5-210504	CS-MW-5-210907	CS-MW-5-GW-231121	CS-MW-5-GW-20240214
		N 11/21/2023 23K0589 (a)	N 2/14/2024 EV24020115 (b)	N 5/8/2024 EV24050075	N 8/22/2024 EV24080164	N 2/3/2021	N 2/3/2021	N 5/4/2021	N 9/7/2021 21I0079	N 11/21/2023 23K0589 (a)	N 2/14/2024 EV24020115 (b)
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	4.79	--	--	--	1.23 U	--	--	3.55	1.23 U	--
Ethene	NL	1.14 U	--	--	--	1.14 U	--	--	1.14 U	1.14 U	--
Methane	NL	2370 J	10 U	--	--	254	--	536	2,000	73.7	10 U
General Chemistry											
Hardness (µg/L; SM 2340)	NL	--	--	--	--	452,000	--	506,000	368,000	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	391,000	220,000	--	--	153,000	--	365,000	463,000	138,000	130,000
Total Organic Carbon (µg/L; SM 5310B)	NL	5,810 J	2,800	--	--	6,080	--	21,500	20,760	2,800	2,700
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	100 U	710 R	--	--	--	--	--	--	100 U	140 R
Nitrate (µg/L; EPA 300.0)	NL	477 J	15,000 J-	--	--	100 U	--	100 U	100 U	100 U	1,400 J-
Sulfate (µg/L; EPA 300.0)	NL	131,000 J	270,000	180,000	180,000	287,000	296,000	285,000	174,000	320,000	150,000
Chloride (µg/L; EPA 300.0)	NL	74,200 J	32,000	--	--	--	33,300	--	--	--	6,100
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	7,360	50 U	--	--	--	--	--	--	1,710	770
Total Dissolved Solids (µg/L; SM 2540C)	NL	799,000	680,000	--	--	--	710,000	--	--	--	390,000

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CS-MW-5	CS-MW-5	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-7
			CS-MW-5-GW-240508	CS-MW-5-GW-240820	CS-MW-6-210203	CS-MW-6-210505	CS-MW-6-210908	CS-MW-6-231120	CS-MW-6-GW-20240214	CS-MW-6-GW-240507	CS-MW-6-GW-240822	CS-MW-7-GW-231121
			N	N	N	N	N	N	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	150 JH15	440 H41	251	259	193	100 U	76	78 JH26	74 J, H26	125	
Diesel-Range Organics	500	5,500 JH30	4,900 H31	1,310	1,500	1,810	100 UJ	1,600	1,200 JH31	1,100 H31	100 U	
Oil-Range Organics	500	1,600 H42	1,200 H42	238	200 U	329	200 U	390	490 H42	500 H42	200 U	
TPH	800	7,250	6,540	1,799	1,759	2,332	ND	2,066	1,768	1,674	125	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	2.0 U	2.0 U	0.20 U	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	
Ethylbenzene	NL	2.3	46	0.20 U	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	
m-&p-Xylenes	NL	4.0 U	4.0 U	0.40 U	--	--	0.40 U	4.0 U	4.0 U	4.0 U	0.40 U	
o-Xylene	NL	2.0 U	2.0 U	0.20 U	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	
Toluene	NL	2.0 U	2.0 U	0.20 U	--	--	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	
Xylenes, Total	NL	--	--	0.60 U	--	--	0.60 U	4.0 U	--	--	0.60 U	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	1.0 U	2.2	0.402	--	--	0.334	--	1.0 U	1.0 U	0.592	
Cadmium	8.8	1.0 U	1.0 U	0.0300 U	--	--	0.100 U	--	1.0 U	1.0 U	0.100 U	
Chromium, Total	260	2.0 U	22	6.81	--	--	8.55	--	9.1	12	1.79	
Chromium, Trivalent	93,700	--	--	6.81	--	--	--	--	--	--	--	
Chromium, Hexavalent	50	--	--	13 U	--	--	--	--	--	--	--	
Copper	3.1	5.7	2.0 U	0.340 U	--	--	2.50 U	--	2.3	2.0 U	1.00 U	
Iron	NL	--	--	1,180	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	1.5	0.0680 U	--	--	0.100 U	--	1.0 U	1.0 U	0.100 U	
Manganese	NL	--	--	370	391	320	330	--	--	--	179	
Mercury	0.059	0.20 U	0.2 U	0.010 U	--	--	0.017 U	--	0.20 U	0.2 U	--	
Nickel	8.2	2.2	2.0 U	0.521	--	--	0.500 U	--	2.0 U	2.0 U	1.00 U	
Selenium	71	4.0 U	4.0 U	0.713	--	--	0.543	--	4.0 U	4.0 U	1.00 U	
Silver	1.9	1.0 U	1.0 U	0.0170 U	--	--	0.400 U	--	1.0 U	1.0 U	0.400 U	
Zinc	81	6.2	2.5 U	0.820 U	--	--	6.00 U	--	2.8	2.5 U	12.0 U	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	1.0 U	2.4	0.469	--	--	0.421	--	1.0 U	1.0 U	0.645	
Cadmium	8.8	1.0 U	1.0 U	0.0300 U	--	--	0.100 U	--	1.0 U	1.0 U	0.100 U	
Calcium	NL	--	--	172,000	170,000	172,000	--	--	--	--	--	
Chromium, Total	260	4.2	33	9.57	--	--	12.4	--	12	15	1.96	
Copper	3.1	2.0 U	2.5	0.340 U	--	--	0.500 U	--	2.0 U	2.0 U	0.500 U	
Iron	NL	--	--	1,510	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	2.4	0.0680 U	--	--	0.100 U	--	1.0 U	1.0 U	0.100 U	
Magnesium	NL	--	--	32,600	39,600	35,700	--	--	--	--	--	
Manganese	NL	--	--	403	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.2 U	0.010 U	--	--	0.020 U	--	0.20 U	0.2 U	--	
Nickel	8.2	2.0 U	2.0 U	0.816	--	--	2.10	--	2.0 U	2.0 U	0.500 U	
Selenium	71	4.0 U	4.0 U	0.690	--	--	0.869	--	4.0 U	4.0 U	0.500 U	
Silver	1.9	1.0 U	1.0 U	0.0170 U	--	--	0.200 U	--	1.0 U	1.0 U	0.200 U	
Zinc	81	20	13	0.820 U	--	--	6.00 U	--	3.6	3.4	6.00 U	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		CS-MW-5	CS-MW-5	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-6	CS-MW-7
		CS-MW-5-GW-240508	CS-MW-5-GW-240820	CS-MW-6-210203	CS-MW-6-210505	CS-MW-6-210908	CS-MW-6-231120	CS-MW-6-GW-20240214	CS-MW-6-GW-240507	CS-MW-6-GW-240822	CS-MW-7-GW-231121
		N 5/8/2024 EV24050075	N 8/20/2024 EV24080158	N 2/3/2021	N 5/5/2021	N 9/8/2021 21I0096	N 11/20/2023 23K0552	N 2/14/2024 EV24020128 (b)	N 5/7/2024 EV24050075	N 8/22/2024 EV24080164	N 11/21/2023 23K0589 (a)
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	--	--	1.23 U	--	1.23 UJ	1.23 U	--	--	--	1.50
Ethene	NL	--	--	1.14 U	--	1.14 UJ	1.14 U	--	--	--	1.14 U
Methane	NL	--	--	3,110	3,980	4250 J	6,500	1,400	--	--	2,240
General Chemistry											
Hardness (µg/L; SM 2340)	NL	--	--	563,000	587,000	577,000	--	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	--	--	536,000	599,000	666,000	656,000	680,000	--	--	366,000
Total Organic Carbon (µg/L; SM 5310B)	NL	--	--	9,950	10,320	12,970	10,630	10,000	--	--	6,040
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	--	--	--	--	100 U	140 R	--	--	100 U
Nitrate (µg/L; EPA 300.0)	NL	--	--	100 U	100 U	100 U	100 U	3,100 J-	--	--	100 U
Sulfate (µg/L; EPA 300.0)	NL	230,000	200,000	7,260	22,400	9,920	15,100	4,300	29,000	110,000	378,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	--	--	--	--	14,100	4600 H	--	--	18,700
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
			CS-MW-7	CS-MW-7	CS-MW-7	CS-MW-8	CS-MW-8	CS-MW-8	CS-MW-8	CS-MW-9	CS-MW-9
			CS-MW-7-GW-20240213	CS-MW-7-GW-240508	CS-MW-7-GW-240822	CS-MW-8-GW-231121	CS-MW-8-GW-20240213	CS-MW-8-GW-240506	CS-MW-8-GW-240820	CS-MW-9-GW-231121	CS-MW-9-GW-20240214
			N	N	N	N	N	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)											
Gasoline-Range Organics	800	96	81 JH26	75 J, H26	100 U	50 U	50 U	50 U	4,200	950	
Diesel-Range Organics	500	810	1,000 H30	1,700 H31	100 U	130 U	130 U	140 H29	694	2,700	
Oil-Range Organics	500	300 H12	440 H42	770 H42	200 U	250 U	250 U	250 U	200 U	250 U	
TPH	800	1,206	1,521	2,545	ND	ND	ND	140	4,894	3,650	
Volatile Organic Compounds (µg/L; SW-846 8260D)											
Benzene	2.4	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	1.99 J+	2.0 U	
Ethylbenzene	NL	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	156 J+	17	
m-&p-Xylenes	NL	4.0 U	4.0 U	4.0 U	0.40 U	4.0 U	4.0 U	4.0 U	29.5 J+	4.0 U	
o-Xylene	NL	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	0.48 J+	2.0 U	
Toluene	NL	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.48 J+	2.0 U	
Xylenes, Total	NL	4.0 U	--	--	0.60 U	4.0 U	--	--	30.0 J+	4.0 U	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)											
Arsenic	5	1.0 U	5.0 U	5.0 U	2.41	1.5	3.3	7.1	1.07	9.8	
Cadmium	8.8	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	
Chromium, Total	260	2.4	10 U	10 U	4.01	2.0 U	5.1	9	1.14	2.0 U	
Chromium, Trivalent	93,700	--	--	--	--	--	--	--	--	--	
Chromium, Hexavalent	50	--	--	--	--	--	--	--	--	--	
Copper	3.1	2.0 U	10 U	10 U	1.00 U	2.0 U	2.2 J	2.0 U	1.00 U	2.0 U	
Iron	NL	--	--	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	1.0 U	2.28	2.1	
Manganese	NL	460	--	--	85.7	44	--	--	153	97	
Mercury	0.059	0.20 U	0.20 U	0.2 U	--	0.20 U	0.20 U	0.2 U	--	0.20 U	
Nickel	8.2	2.0 U	10 U	10 U	1.74	2.0 U	2.0 U	2.0 U	1.00 U	2.0 U	
Selenium	71	4.0 U	20 U	20 U	1.00 U	4.0 U	4.0 U	4.0 U	1.00 U	4.0 U	
Silver	1.9	1.0 U	5.0 U	5.0 U	0.400 U	1.0 U	1.0 U	1.0 U	0.400 U	1.0 U	
Zinc	81	2.5 U	12 U	12 U	12.0 U	2.5 U	4.1 J	2.5 U	12.0 U	2.5 U	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)											
Arsenic	5	1.0 U	5.0 U	5.0 U	3.46	4.2	5.1	71	1.05	12	
Cadmium	8.8	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	
Calcium	NL	--	--	--	--	--	--	--	--	--	
Chromium, Total	260	3.2	10 U	10 U	6.12	2.0 U	5.2	13	1.63	2.0 U	
Copper	3.1	2.0 U	10 U	10 U	0.500 U	2.0 U	2.4	2.0 U	0.500 U	2.0 U	
Iron	NL	--	--	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	1.0 U	2.48	3.4	
Magnesium	NL	--	--	--	--	--	--	--	--	--	
Manganese	NL	--	--	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.20 U	0.2 U	--	0.20 U	0.20 U	0.2 U	--	0.20 U	
Nickel	8.2	2.0 U	10 U	10 U	1.63	2.0 U	2.0	2.0 U	0.500 U	2.0 U	
Selenium	71	4.0 U	20 U	20 U	0.500 U	4.0 U	4.0 U	4.0 U	0.500 U	4.0 U	
Silver	1.9	1.0 U	5.0 U	5.0 U	0.200 U	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	
Zinc	81	4.2	12 U	12 U	6.00 U	2.5 U	3.2 J	3.4	6.00 U	3.4	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
		CS-MW-7	CS-MW-7	CS-MW-7	CS-MW-8	CS-MW-8	CS-MW-8	CS-MW-8	CS-MW-9	CS-MW-9
		CS-MW-7-GW-20240213	CS-MW-7-GW-240508	CS-MW-7-GW-240822	CS-MW-8-GW-231121	CS-MW-8-GW-20240213	CS-MW-8-GW-240506	CS-MW-8-GW-240820	CS-MW-9-GW-231121	CS-MW-9-GW-20240214
		N 2/13/2024 EV24020115 (b)	N 5/8/2024 EV24050075	N 8/22/2024 EV24080164	N 11/21/2023 23K0589 (a)	N 2/13/2024 EV24020100 (b)	N 5/6/2024 EV24050061	N 8/20/2024 EV24080158	N 11/21/2023 23K0589 (a)	N 2/14/2024 EV24020115 (b)
Dissolved Gases (µg/L; RSK-175)										
Ethane	NL	--	--	--	1.23 U	--	--	--	11.9	--
Ethene	NL	--	--	--	1.14 U	--	--	--	1.14 U	--
Methane	NL	330	--	--	348	10 U	--	--	7,800	140
General Chemistry										
Hardness (µg/L; SM 2340)	NL	--	--	--	--	--	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	290,000	--	--	353,000	280,000	--	--	676,000	340,000
Total Organic Carbon (µg/L; SM 5310B)	NL	6,000	--	--	3,390	2,500	--	--	3,540	8,800
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	140 R	--	--	100 U	140 R	--	--	100 U	140 R
Nitrate (µg/L; EPA 300.0)	NL	1,700 J-	--	--	100 U	3,400 J-	--	--	100 U	1,200 J-
Sulfate (µg/L; EPA 300.0)	NL	350,000	900,000	720,000	40,900	36,000	29,000	16,000	191,000	420,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	96,300	190,000
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	9,000	--	--	50 U	50 U	--	--	710	160
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	1,100,000	1,300,000

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CS-MW-9 CS-MW-9-GW-240508 N 5/8/2024 EV24050075	CS-MW-9 CS-MW-DUP-GW-240508 FD 5/8/2024 EV24050075	CS-MW-9 CS-MW-9-GW-240820 N 8/20/2024 EV24080158	CS-MW-9 CS-MW-DUP-GW-240820 FD 8/20/2024 EV24080158	CS-MW-10 CS-MW-10-231120 N 11/20/2023 23K0552	CS-MW-10 CS-MW-10-GW-20240213 N 2/13/2024 EV24020115 (b)	CS-MW-10 CS-MW-10-GW-240506 N 5/6/2024 EV24050061	CS-MW-10 CS-MW-10-GW-240820 N 8/20/2024 EV24080158	CS-MW-11 CS-MW-11-231120 N 11/20/2023 23K0552	
			Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)									
Gasoline-Range Organics	800	1,500 JH41	1,500 JH41	1,600 H41	1,400 H41	100 U	50 U	50 U	50 U	100 UJ		
Diesel-Range Organics	500	4,400 JH30	3700 JH30	3,300 H30	3,500 H30	100 UJ	870	830 H29	800 H31	100 UJ		
Oil-Range Organics	500	900 H42	740 H42	350 H42	440 H42	200 U	250 U	450 H43	520 H42	200 U		
TPH	800	6,800	5,940	5,250	5,340	ND	870	1,280	1,320	ND		
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	4.7	4.6	5.7	5.1	0.20 U	2.0 U	2.0 U	2.0 U	0.20 UJ		
Ethylbenzene	NL	12	12	21	19	0.20 U	2.0 U	2.0 U	2.0 U	0.20 UJ		
m-&p-Xylenes	NL	4.0 U	4.0 U	4.0 U	4.0 U	0.40 U	4.0 U	4.0 U	4.0 U	0.40 UJ		
o-Xylene	NL	2.0 U	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	0.20 UJ		
Toluene	NL	2.0 U	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	0.20 UJ		
Xylenes, Total	NL	--	--	--	--	0.60 U	4.0 U	--	--	0.60 UJ		
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	5.0 U	1.8	5.0 U	5.0 U	4.18	6.5	6.1	4	19.0		
Cadmium	8.8	5.0 U	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	2.0 U	0.200 U		
Chromium, Total	260	10 U	2.4	10 U	10 U	1.11	2.6	2.2	7.1	0.500 U		
Chromium, Trivalent	93,700	--	--	--	--	--	--	--	--	--		
Chromium, Hexavalent	50	--	--	--	--	--	--	--	--	--		
Copper	3.1	10 U	2.7	10 U	10 U	1.32	2.0 U	2.9 J	4.0 U	2.50 U		
Iron	NL	--	--	--	--	--	--	--	--	--		
Lead	8.1	5.0 U	2.8	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	2.0 U	0.500 U		
Manganese	NL	--	--	--	--	35.1	99	--	--	2,540		
Mercury	0.059	0.20 U	0.20 U	0.2 U	0.2 U	0.018 U	0.20 U	0.20 U	0.2 U	0.014 U		
Nickel	8.2	10 U	2.0 U	10 U	10 U	0.663	2.0 U	2.0 U	4.0 U	2.98		
Selenium	71	20 U	4.0 U	20 U	20 U	2.58	4.0 U	4.0 U	8.0 U	2.50 U		
Silver	1.9	5.0 U	1.0 U	5.0 U	5.0 U	0.200 U	1.0 U	1.0 U	2.0 U	0.400 U		
Zinc	81	12 U	2.5 U	12 U	12 U	6.00 U	2.5 U	5.1	5.0 U	30.0 U		
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	5.0 U	1.9	5.0 U	5.0 U	4.56	8.5	7.4	4.5	20.4		
Cadmium	8.8	5.0 U	1.0 U	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	2.0 U	0.100 U		
Calcium	NL	--	--	--	--	--	--	--	--	--		
Chromium, Total	260	10 U	3.1	10 U	10 U	1.30	4.3	2.4	9	1.00 U		
Copper	3.1	10 U	2.0 U	10 U	10 U	1.28	2.0 U	4.4	4.0 U	1.00 U		
Iron	NL	--	--	--	--	--	--	--	--	--		
Lead	8.1	5.0 U	4.1	5.0 U	5.0 U	0.100 U	1.0 U	1.0 U	2.0 U	0.104		
Magnesium	NL	--	--	--	--	--	--	--	--	--		
Manganese	NL	--	--	--	--	--	--	--	--	--		
Mercury	0.059	0.20 U	0.20 U	0.2 U	0.2 U	0.020 U	0.20 U	0.20 U	0.2 U	0.015 U		
Nickel	8.2	10 U	2.0 U	10 U	10 U	1.00 U	2.0 U	2.0 U	4.0 U	2.61		
Selenium	71	20 U	4.0 U	20 U	20 U	2.92	4.0 U	4.0 U	8.0 U	1.00 U		
Silver	1.9	5.0 U	1.0 U	5.0 U	5.0 U	0.200 U	1.0 U	1.0 U	2.0 U	0.200 U		
Zinc	81	12 U	2.5 U	12 U	12 U	39.4	2.5 U	5.2	5.0 U	12.0 U		

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
		CS-MW-9 CS-MW-9-GW-240508 N 5/8/2024 EV24050075	CS-MW-9 CS-MW-DUP-GW-240508 FD 5/8/2024 EV24050075	CS-MW-9 CS-MW-9-GW-240820 N 8/20/2024 EV24080158	CS-MW-9 CS-MW-DUP-GW-240820 FD 8/20/2024 EV24080158	CS-MW-10 CS-MW-10-231120 N 11/20/2023 23K0552	CS-MW-10 CS-MW-10-GW-20240213 N 2/13/2024 EV24020115 (b)	CS-MW-10 CS-MW-10-GW-240506 N 5/6/2024 EV24050061	CS-MW-10 CS-MW-10-GW-240820 N 8/20/2024 EV24080158	CS-MW-11 CS-MW-11-231120 N 11/20/2023 23K0552
Dissolved Gases (µg/L; RSK-175)										
Ethane	NL	--	--	--	--	1.23 U	--	--	--	1.23 U
Ethene	NL	--	--	--	--	1.14 U	--	--	--	1.14 U
Methane	NL	--	--	--	--	16.2	10 U	--	--	5,550
General Chemistry										
Hardness (µg/L; SM 2340)	NL	--	--	--	--	--	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	--	--	--	--	302,000	490,000	--	--	385,000
Total Organic Carbon (µg/L; SM 5310B)	NL	--	--	--	--	3,960	7,600	--	--	11,090
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	--	--	--	100 U	140 R	--	--	100 U
Nitrate (µg/L; EPA 300.0)	NL	--	--	--	--	919	6,700 J-	--	--	100 U
Sulfate (µg/L; EPA 300.0)	NL	470,000	460,000	870,000	850,000	131,000	150,000	240,000	430,000	853,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	--	--	--	50 U	50 U	--	--	50 U
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
			CS-MW-11	CS-MW-11	CS-MW-11	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-2
			CS-MW-11-GW-20240213	CS-MW-11-GW-240506	CS-MW-11-GW-240820	CWF-CW-1-210504	CWF-CW-GW-1-231120	CWF-CW-1-GW-20240213	CWF-CW-1-GW-240507	CWF-CW-1-GW-240822	CWF-CW-2-210504
			N	N	N	N	N	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)											
Gasoline-Range Organics	800	50 U	50 U	50 U	397	354	340	410 JH26	360 J, H26	100 U	
Diesel-Range Organics	500	1,700	1,400 H29	500 H29	1,940	370 J-	1,700	1,700 JH30	2,100 H30	263	
Oil-Range Organics	500	750	1,100 H43	300 H43	227	200 U	250 U	600 H42	590 H42	200 U	
TPH	800	2,450	2,500	800	2,564	354	2,040	2,710	3,050	263	
Volatile Organic Compounds (µg/L; SW-846 8260D)											
Benzene	2.4	2.0 U	2.0 U	2.0 U	--	0.20 U	2.0 U	2.0 U	2.0 U	--	
Ethylbenzene	NL	2.0 U	2.0 U	2.0 U	--	0.20 U	2.0 U	2.0 U	2.0 U	--	
m-&p-Xylenes	NL	4.0 U	4.0 U	4.0 U	--	0.40 U	4.0 U	4.0 U	4.0 U	--	
o-Xylene	NL	2.0 U	2.0 U	2.0 U	--	0.20 U	2.0 U	2.0 U	2.0 U	--	
Toluene	NL	2.0 U	2.0 U	2.0 U	--	0.20 U	2.0 U	2.0 U	2.0 U	--	
Xylenes, Total	NL	4.0 U	--	--	--	0.60 U	4.0 U	--	--	--	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)											
Arsenic	5	9.4	25	18	--	1.62	1.1	5.0 U	2.0 U	--	
Cadmium	8.8	1.0 U	1.0 U	1.0 U	--	0.100 U	1.0 U	5.0 U	2.0 U	--	
Chromium, Total	260	2.0 U	22	110	--	0.500 U	2.0 U	10 U	4.0 U	--	
Chromium, Trivalent	93,700	--	--	--	--	--	--	--	--	--	
Chromium, Hexavalent	50	--	--	--	--	--	--	--	--	--	
Copper	3.1	2.0 U	2.0 U	2.0 U	--	0.500 U	2.0 U	10	4.0 U	--	
Iron	NL	--	--	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	1.0 U	1.0 U	--	0.100 U	1.0 U	5.0 U	2.0 U	--	
Manganese	NL	1,100	--	--	54.7	36.1	89	--	--	932	
Mercury	0.059	0.20 U	0.20 U	0.2 U	--	0.016 U	0.20 U	0.20 U	0.2 U	--	
Nickel	8.2	5.7	3.8	2.0 U	--	0.500 U	2.0 U	10 U	4.0 U	--	
Selenium	71	4.0 U	4.0 U	11 J	--	0.500 U	4.0 U	20 U	8.0 U	--	
Silver	1.9	1.0 U	1.0 U	1.0 U	--	0.200 U	1.0 U	5.0 U	2.0 U	--	
Zinc	81	2.5 U	7.1	3.3	--	6.00 U	2.5 U	12 U	5.0 U	--	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)											
Arsenic	5	9.5	25	17	--	1.84	1.3	5.0 U	2.0 U	--	
Cadmium	8.8	1.0 U	1.0 U	1.0 U	--	0.100 U	1.0 U	5.0 U	2.0 U	--	
Calcium	NL	--	--	--	136,000	--	--	--	--	267,000	
Chromium, Total	260	2.0 U	26	130	--	1.00 U	2.0 U	10 U	4.0 U	--	
Copper	3.1	2.0 U	3.1	2.0 U	--	0.500 U	2.0 U	14	4.0 U	--	
Iron	NL	--	--	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	1.0 U	1.0 U	--	0.100 U	1.0 U	5.0 U	2.0 U	--	
Magnesium	NL	--	--	--	25,900	--	--	--	--	121,000	
Manganese	NL	--	--	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.20 U	0.2 U	--	0.016 U	0.20 U	0.20 U	0.2 U	--	
Nickel	8.2	5.8	4.7	2.0 U	--	1.00 U	2.0 U	10 U	4.0 U	--	
Selenium	71	4.0 U	4.0 U	4.0 UJ	--	0.500 U	4.0 U	20 U	8.0 U	--	
Silver	1.9	1.0 U	1.0 U	1.0 U	--	0.200 U	1.0 U	5.0 U	2.0 U	--	
Zinc	81	2.9	19	8	--	224	2.5 U	12 U	5.0 U	--	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
		CS-MW-11	CS-MW-11	CS-MW-11	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-1	CWF-CW-2
		CS-MW-11-GW-20240213	CS-MW-11-GW-240506	CS-MW-11-GW-240820	CWF-CW-1-210504	CWF-CW-GW-1-231120	CWF-CW-1-GW-20240213	CWF-CW-1-GW-240507	CWF-CW-1-GW-240822	CWF-CW-2-210504
		N	N	N	N	N	N	N	N	N
		2/13/2024	5/6/2024	8/20/2024	5/4/2021	11/20/2023	2/13/2024	5/7/2024	8/22/2024	5/4/2021
		EV24020115 (b)	EV24050061	EV24080158		23K0552	EV24020115 (b)	EV24050075	EV24080164	
Dissolved Gases (µg/L; RSK-175)										
Ethane	NL	--	--	--	--	1.23 U	--	--	--	--
Ethene	NL	--	--	--	--	1.14 U	--	--	--	--
Methane	NL	330	--	--	2,290	1,480	330	--	--	10,400
General Chemistry										
Hardness (µg/L; SM 2340)	NL	--	--	--	446,000	--	--	--	--	1,170,000
Alkalinity, total (µg/L; SM 2320B)	NL	250,000	--	--	289,000	439,000	270,000	--	--	1,050,000
Total Organic Carbon (µg/L; SM 5310B)	NL	14,000	--	--	5,650	8,230	5,200	--	--	32,050
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	140 R	--	--	--	100 U	140 R	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	150 R	--	--	100 U	100 U	1,100 J-	--	--	100 U
Sulfate (µg/L; EPA 300.0)	NL	690,000	400,000	5,000	185,000	187,000	210,000	450,000	330,000	58,200
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	50 U	--	--	--	79,500	37,000	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			CWF-CW-2	CWF-CW-2	CWF-CW-2	CWF-CW-2	MW-7B	MW-7B	MW-10B	MW-10B High Tide	MW-10B	MW-10B
			CWF-CW-2-GW-231121	CWF-CW-2-GW-20240213	CWF-CW-2-GW-240507	CWF-CW-2-GW-240820	MW-7B-210505	MW-7B-210908	MW-10(B)-210203	MW-10(B)-210203	MW-10B-210505	MW-10B-210908
			N	N	N	N	N	N	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	100 U	50 U	50 U	50 U	100 U	100 U	13.6 U	--	100 U	100 U	
Diesel-Range Organics	500	100 U	200	190 H29	150 H29	177	184	33 U	--	105 U	100 U	
Oil-Range Organics	500	200 U	250 U	250 U	250 U	200 U	200 U	56 U	--	211 U	200 U	
TPH	800	ND	200	190	150	177	184	ND	--	ND	ND	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	0.20 U	2.0 U	2.0 U	2.0 U	--	--	0.20 U	--	--	--	
Ethylbenzene	NL	0.20 U	2.0 U	2.0 U	2.0 U	--	--	0.20 U	--	--	--	
m-&p-Xylenes	NL	0.40 U	4.0 U	4.0 U	4.0 U	--	--	0.40 U	--	--	--	
o-Xylene	NL	0.20 U	2.0 U	2.0 U	2.0 U	--	--	0.20 U	--	--	--	
Toluene	NL	0.20 U	2.0 U	2.0 U	2.0 U	--	--	0.20 U	--	--	--	
Xylenes, Total	NL	0.60 U	4.0 U	--	--	--	--	0.60 U	--	--	--	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)												
Arsenic	5	0.436	1.0 U	1.0 U	5.0 U	--	--	0.600	--	--	--	
Cadmium	8.8	0.100 U	1.0 U	1.0 U	5.0 U	--	--	0.125	--	--	--	
Chromium, Total	260	19.1	7.5	3.4	10 U	--	--	1.52	--	--	--	
Chromium, Trivalent	93,700	--	--	--	--	--	--	1.52	--	--	--	
Chromium, Hexavalent	50	--	--	--	--	--	--	13 U	--	--	--	
Copper	3.1	1.00 U	2.0 U	2.0 U	10 U	--	--	1.27	--	--	--	
Iron	NL	--	--	--	--	--	--	132	--	--	--	
Lead	8.1	0.100 U	1.0 U	1.0 U	5.0 U	--	--	0.0680 U	--	--	--	
Manganese	NL	558	1700	--	--	152	170	13.8	--	120	105	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	--	--	0.010 U	--	--	--	
Nickel	8.2	3.80	2.0 U	2.0 U	10 U	--	--	0.912	--	--	--	
Selenium	71	1.00 U	4.0 U	4.0 U	20 U	--	--	0.856	--	--	--	
Silver	1.9	0.400 U	1.0 U	1.0 U	5.0 U	--	--	0.0170 U	--	--	--	
Zinc	81	12.0 U	3.0	2.5 U	12 U	--	--	0.820 U	--	--	--	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)												
Arsenic	5	0.549	1.0 U	1.0 U	5.0 U	--	--	6.32	--	--	--	
Cadmium	8.8	0.100 U	1.0 U	1.0 U	5.0 U	--	--	0.391	--	--	--	
Calcium	NL	--	--	--	--	73,300	78,800	93,700	--	115,000	123,000	
Chromium, Total	260	35.9	12	5.6	10 U	--	--	16.5	--	--	--	
Copper	3.1	18.9	7.4	3.8	10 U	--	--	10.0	--	--	--	
Iron	NL	--	--	--	--	--	--	5,800	--	--	--	
Lead	8.1	0.898	1.0 U	1.0 U	5.0 U	--	--	0.461	--	--	--	
Magnesium	NL	--	--	--	--	20,600	22,800	6,340	--	16,700	22,600	
Manganese	NL	--	--	--	--	--	--	44.8	--	--	--	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	--	--	0.010 U	--	--	--	
Nickel	8.2	3.90	2.0 U	2.0 U	10 U	--	--	1.59	--	--	--	
Selenium	71	0.817	4.0 U	4.0 U	20 U	--	--	0.935	--	--	--	
Silver	1.9	0.200 U	1.0 U	1.0 U	5.0 U	--	--	0.0170 U	--	--	--	
Zinc	81	6.43	2.5 U	2.5 U	12 U	--	--	5.12	--	--	--	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		CWF-CW-2 CWF-CW-2-GW-231121 N 11/21/2023 23K0589 (a)	CWF-CW-2 CWF-CW-2-GW-20240213 N 2/13/2024 EV24020115 (b)	CWF-CW-2 CWF-CW-2-GW-240507 N 5/7/2024 EV24050075	CWF-CW-2 CWF-CW-2-GW-240820 N 8/20/2024 EV24080158	MW-7B MW-7B-210505 N 5/5/2021	MW-7B MW-7B-210908 N 9/8/2021 21I0096	MW-10B MW-10(B)-210203 N 2/3/2021	MW-10B High Tide MW-10(B)-210203 N 2/3/2021	MW-10B MW-10B-210505 N 5/5/2021	MW-10B MW-10B-210908 N 9/8/2021 21I0096
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	1.23 U	--	--	--	--	1.23 U	1.23 U	--	--	1.23 U
Ethene	NL	1.14 U	--	--	--	--	1.14 U	1.14 U	--	--	1.14 U
Methane	NL	3,020	80	--	--	16,300	14,900	223	--	4,620	4,940
General Chemistry											
Hardness (µg/L; SM 2340)	NL	--	--	--	--	268,000	291,000	260,000	--	356,000	400,000
Alkalinity, total (µg/L; SM 2320B)	NL	651,000	380,000	--	--	374,000	371,000	227,000	--	401,000	484,000
Total Organic Carbon (µg/L; SM 5310B)	NL	20,080	7,200	--	--	7,650	9,700	3,680	--	10,440	12,610
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	100 U	290 J-	--	--	--	--	--	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	100 U	3,400 J-	--	--	100 U	100 UJ	2,890	--	100 U	100 UJ
Sulfate (µg/L; EPA 300.0)	NL	34,000	360,000	370,000	670,000	3,790	135	23,000	22,500	7,490	6,620
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	9,950	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	110	50 U	--	--	--	--	--	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	344,000	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			MW-10B	MW-10B	MW-10B	MW-10B	MW-13B	MW-13B	MW-13B	MW-13B	MW-13B	MW-13B
			MW-10(B)-GW-231121	MW-10(B)-GW-20240213	MW-10(B)-GW-240506	MW-10(B)-GW-240820	MW-13(B)-210203	DUP1-210203	MW-13B-210504	MW-13B-210907	MW-13(B)-GW-231121	MW-13(B)-GW-20240214
			N	N	N	N	N	FD	N	N	N	N
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	100 U	50 U	50 U	50 U	100 U	100 U	100 U	100 U	100 U	50 U	
Diesel-Range Organics	500	100 U	130 U	130 U	200 H29	262	301	265	134	100 U	280	
Oil-Range Organics	500	200 U	250 U	250 U	250 U	200 U	200 U	200 U	200 U	200 U	250 U	
TPH	800	ND	ND	ND	200	262	301	265	134	ND	280	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	0.20 U	--	--	0.20 U	2.0 U	
Ethylbenzene	NL	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	0.20 U	--	--	0.20 U	2.0 U	
m-&p-Xylenes	NL	0.40 U	4.0 U	4.0 U	4.0 U	0.40 U	0.40 U	--	--	0.40 U	4.0 U	
o-Xylene	NL	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	0.20 U	--	--	0.20 U	2.0 U	
Toluene	NL	0.20 U	2.0 U	2.0 U	2.0 U	0.20 U	0.20 U	--	--	0.20 U	2.0 U	
Xylenes, Total	NL	0.60 U	4.0 U	--	--	0.60 U	0.60 U	--	--	0.60 U	4.0 U	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)												
Arsenic	5	0.552	1.0 U	1.0 U	1.8	0.767	0.754	--	--	3.95	2.7	
Cadmium	8.8	0.100 U	1.0 U	1.0 U	1.0 U	0.0300 U	0.108	--	--	0.100 U	1.0 U	
Chromium, Total	260	3.54	2.0 U	9.4	32	1.03	1.03	--	--	1.90	4.5 J	
Chromium, Trivalent	93,700	--	--	--	--	1.03	1.03	--	--	1.90	--	
Chromium, Hexavalent	50	--	--	--	--	13 U	13 U	--	--	--	--	
Copper	3.1	1.00 U	2.0 U	3.6 J	2.0 U	0.755	0.737	--	--	1.00 U	2.6	
Iron	NL	--	--	--	--	1,350	1,130	--	--	--	--	
Lead	8.1	0.100 U	1.0 U	1.0 U	1.0 U	0.0680 U	0.0680 U	--	--	0.100 U	1.0 U	
Manganese	NL	54.9	21	--	--	127	121	93.7	152	441	200	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	0.010 U	0.010 U	--	--	--	0.20 U	
Nickel	8.2	1.00 U	2.0 U	2.0 U	2.0 U	1.64	1.63	--	--	1.48	2.0 U	
Selenium	71	1.00 U	4.0 U	4.0 U	4.0 U	0.660	0.683	--	--	1.08 J	4.0 U	
Silver	1.9	0.400 U	1.0 U	1.0 U	1.0 U	0.0170 U	0.0170 U	--	--	0.400 U	1.0 U	
Zinc	81	12.0 U	2.5 U	2.5 U	2.5 U	0.820 U	0.820 U	--	--	12.0 U	2.5 U	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, 7470B, 7470C, 7470D, 7470E, 7470F, 7470G, 7470H, 7470I, 7470J, 7470K, 7470L, 7470M, 7470N, 7470O, 7470P, 7470Q, 7470R, 7470S, 7470T, 7470U, 7470V, 7470W, 7470X, 7470Y, 7470Z)												
Arsenic	5	0.798	3.6	3.7	2.8	0.837	0.893	--	--	4.32	2.0	
Cadmium	8.8	0.121	1.0 U	1.0 U	1.0 U	0.0300 U	0.0300 U	--	--	0.100 U	1.0 U	
Calcium	NL	--	--	--	--	174,000	178,000	168,000	161,000	--	--	
Chromium, Total	260	5.67	12	21	45	1.42	1.63	--	--	3.13	2.3 J	
Copper	3.1	0.909	3.5	5.3	2.4	0.868	0.820	--	--	1.17	2.0 U	
Iron	NL	--	--	--	--	1,130	1,330	--	--	--	--	
Lead	8.1	0.100 U	1.0 U	1.0 U	1.0 U	0.0680 U	0.0680 U	--	--	0.100 U	1.0 U	
Magnesium	NL	--	--	--	--	15,800	16,400	11,300	13,200	--	--	
Manganese	NL	--	--	--	--	117	122	--	--	--	--	
Mercury	0.059	--	0.20 U	0.20 U	0.2 U	0.010 U	0.010 U	--	--	--	0.20 U	
Nickel	8.2	1.17	2.0 U	2.0 U	2.0 U	1.73	1.76	--	--	1.42	2.0 U	
Selenium	71	0.500 U	4.0 U	4.0 U	4.0 U	0.440 U	0.440 U	--	--	0.842 J	4.0 U	
Silver	1.9	0.200 U	1.0 U	1.0 U	1.0 U	0.0170 U	0.0170 U	--	--	0.200 U	1.0 U	
Zinc	81	7.24	2.5 U	4.0	7.9	0.820 U	0.820 U	--	--	6.00 U	2.5 U	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		MW-10B	MW-10B	MW-10B	MW-10B	MW-13B	MW-13B	MW-13B	MW-13B	MW-13B	MW-13B
		MW-10(B)-GW-231121	MW-10(B)-GW-20240213	MW-10(B)-GW-240506	MW-10(B)-GW-240820	MW-13(B)-210203	DUP1-210203	MW-13B-210504	MW-13B-210907	MW-13(B)-GW-231121	MW-13(B)-GW-20240214
		N 11/21/2023 23K0589 (a)	N 2/13/2024 EV24020100 (b)	N 5/6/2024 EV24050061	N 8/20/2024 EV24080158	N 2/3/2021	FD 2/3/2021	N 5/4/2021	N 9/7/2021 21I0079	N 11/21/2023 23K0589 (a)	N 2/14/2024 EV24020115 (b)
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	1.23 U	--	--	--	1.23 U	1.23 U	--	1.23 U	1.23 U	--
Ethene	NL	1.14 U	--	--	--	1.14 U	1.14 U	--	1.14 U	1.14 U	--
Methane	NL	715	10 U	--	--	1,570	1,390	0.65 U	223 J	2,580	180
General Chemistry											
Hardness (µg/L; SM 2340)	NL	--	--	--	--	500,000	513,000	466,000	456,000	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	352,000	210,000	--	--	520,000	516,000	441,000	464,000	494,000	400,000
Total Organic Carbon (µg/L; SM 5310B)	NL	4,200	3,700	--	--	5,220	5,340	4,700	4,480	7,220	4,500
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	100 U	140 R	--	--	--	--	--	--	100 U	710 R
Nitrate (µg/L; EPA 300.0)	NL	2,460	9,200 J-	--	--	213	172	840	519	635	9,200 J-
Sulfate (µg/L; EPA 300.0)	NL	13,900	26,000	20,000	8,300	35,000	34,100	55,900	63,000	48,100	86,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	50,100	53,000
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	50 U	50 U	--	--	--	--	--	--	50 U	50 U
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	671,000	670,000

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte		Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
			MW-13B	MW-13B	MW-50C	MW-50C High Tide	MW-50C	MW-50C	MW-51C	MW-51C	MW-51C	MW-51C
			MW-13(B)-GW-240508	MW-13(B)-GW-240820	MW-50(C)-210203	MW-50(C)-210203	MW-50C-210505	MW-50C-210907	MW-51C-GW-231121	CS-MW-51(C)-GW-20240214	MW-51(C)-GW-240508	MW-51(C)-GW-240821
			N	N	N	N	N	N	N	N	N	N
5/8/2024		8/20/2024	2/3/2021	2/3/2021	5/5/2021	9/7/2021	11/21/2023	2/14/2024	5/8/2024	8/21/2024		
EV24050075		EV24080158				21I0079	23K0589 (a)	EV24020115 (b)	EV24050075	EV24080164		
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)												
Gasoline-Range Organics	800	50 U	50 U	100 U	--	6,710	2,960	1,040	50 U	1,400 JH41	1,400 J, H26	
Diesel-Range Organics	500	210 JH29	340 H29	458	--	884	681	137	500	2,000 JH30	3,600 H30	
Oil-Range Organics	500	320 H43	250 U	241	--	211 U	200 U	200 U	290	760 H42	690 H42	
TPH	800	530	340	699	--	7,594	3,641	1,177	790	4,160	5,690	
Volatile Organic Compounds (µg/L; SW-846 8260D)												
Benzene	2.4	2.0 U	2.0 U	0.20 U	--	--	--	1.12 J+	2.0 U	2.6	7.7	
Ethylbenzene	NL	2.0 U	2.0 U	0.20 U	--	--	--	33.8 J+	2.0 U	110	61	
m-&p-Xylenes	NL	4.0 U	4.0 U	0.40 U	--	--	--	23.9 J+	4.0 U	110	64	
o-Xylene	NL	2.0 U	2.0 U	0.20 U	--	--	--	1.07 J+	2.0 U	3.3	2.6	
Toluene	NL	2.0 U	2.0 U	0.20 U	--	--	--	1.42 J+	2.0 U	2.7	6	
Xylenes, Total	NL	--	--	0.60 U	--	--	--	25.0 J+	4.0 U	--	--	
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	1.2	4.8	0.435	--	--	--	0.970	1.0 U	1.4	5.0 U	
Cadmium	8.8	1.0 U	1.0 U	0.221	--	--	--	0.100 U	1.1	1.0 U	5.0 U	
Chromium, Total	260	2.0 U	2.0 U	0.130 U	--	--	--	2.30	2.0 U	2.0 U	10 U	
Chromium, Trivalent	93,700	--	--	0.130 U	--	--	--	--	--	--	--	
Chromium, Hexavalent	50	--	--	13 U	--	--	--	--	--	--	--	
Copper	3.1	2.5	2.0 U	1.64	--	--	--	1.00 U	28 J	2.5	10 U	
Iron	NL	--	--	192	--	--	--	--	--	--	--	
Lead	8.1	1.0 U	1.0 U	0.0680 U	--	--	--	0.100 U	2.5 J	1.0 U	5.0 U	
Manganese	NL	--	--	2.27	--	14.7	14.5	55.3	12	--	--	
Mercury	0.059	0.20 U	0.2 U	0.010 U	--	--	--	--	0.20 U	0.20 U	0.2 U	
Nickel	8.2	2.0 U	2.0 U	6.31	--	--	--	1.00 U	7.1	2.0 U	10 U	
Selenium	71	4.0 U	4.0 U	2.84	--	--	--	1.00 U	7.6	4.0 U	20 U	
Silver	1.9	1.0 U	1.0 U	0.0170 U	--	--	--	0.200 U	1.0 U	1.0 U	5.0 U	
Zinc	81	2.5 U	2.5 U	27.6	--	--	--	12.0 U	45	2.5 U	12 U	
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)												
Arsenic	5	2.9	5.6	1.31	--	--	--	1.16	1.0 U	2.5	5.0 U	
Cadmium	8.8	1.0 U	1.0 U	--	--	--	--	0.100 U	1.0	1.0 U	5.0 U	
Calcium	NL	--	--	91,100	--	150,000	176,000	--	--	--	--	
Chromium, Total	260	3.7	2.3	0.624	--	--	--	2.62	2.0 U	2.5	10 U	
Copper	3.1	11	2.0 U	3.78	--	--	--	0.975	11 J	33	24	
Iron	NL	--	--	1,130	--	--	--	--	--	--	--	
Lead	8.1	2.1	1.1	0.896	--	--	--	0.233	1.0 UJ	4.3	5.0 U	
Magnesium	NL	--	--	3,170	--	5,690	15,000	--	--	--	--	
Manganese	NL	--	--	3.04	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.2 U	0.010 U	--	--	--	--	0.20 U	0.20 U	0.2 U	
Nickel	8.2	2.0 U	2.0 U	7.30	--	--	--	0.600	6.0	2.6	10 U	
Selenium	71	4.0 U	4.0 U	3.14	--	--	--	0.500 U	6.8	4.0 U	20 U	
Silver	1.9	1.0 U	1.0 U	0.0170 U	--	--	--	0.200 U	1.0 U	1.0 U	5.0 U	
Zinc	81	3.3	2.5 U	63.9	--	--	--	6.00 U	38	36	23	

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
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Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG									
		MW-13B	MW-13B	MW-50C	MW-50C High Tide	MW-50C	MW-50C	MW-51C	MW-51C	MW-51C	MW-51C
		MW-13(B)-GW-240508	MW-13(B)-GW-240820	MW-50(C)-210203	MW-50(C)-210203	MW-50C-210505	MW-50C-210907	MW-51C-GW-231121	CS-MW-51(C)-GW-20240214	MW-51(C)-GW-240508	MW-51(C)-GW-240821
		N	N	N	N	N	N	N	N	N	N
		5/8/2024	8/20/2024	2/3/2021	2/3/2021	5/5/2021	9/7/2021	11/21/2023	2/14/2024	5/8/2024	8/21/2024
		EV24050075	EV24080158				21I0079	23K0589 (a)	EV24020115 (b)	EV24050075	EV24080164
Dissolved Gases (µg/L; RSK-175)											
Ethane	NL	--	--	1.23 U	--	--	4.68 J	5.84	--	--	--
Ethene	NL	--	--	1.14 U	--	--	1.14 UJ	1.14 U	--	--	--
Methane	NL	--	--	0.65 U	--	2,940	3820 J	2,060	10 U	--	--
General Chemistry											
Hardness (µg/L; SM 2340)	NL	--	--	240,000	--	397,000	502,000	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	--	--	157,000	--	333,000	545,000	213,000	220,000	--	--
Total Organic Carbon (µg/L; SM 5310B)	NL	--	--	3,700	--	4,930	8,800	7,580	4,900	--	--
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	100 U	140 R	--	--
Nitrate (µg/L; EPA 300.0)	NL	--	--	3,380	--	100 U	100 U	100 U	20,000 J-	--	--
Sulfate (µg/L; EPA 300.0)	NL	110,000	93,000	88,100	83,300	71,600	47,500	66,600	77,000	42,000	440,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	8,640	--	--	30,200	22,000	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	--	--	--	--	--	--	2,620	50 U	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	312,000	--	--	426,000	410,000	--	--

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG			
		RWM-7	RWM-7	RWM-7	RWM-7
		RMW-7-231121	RWM-7-GW-20240213	R-MW-7-GW-240506	RMW-7-GW-240821
		N	N	N	N
		11/21/2023	2/13/2024	5/6/2024	8/21/2024
		23K0589 (a)	EV24020100 (b)	EV24050061	EV24080164
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)					
Gasoline-Range Organics	800	100 U	50 U	50 U	50 U
Diesel-Range Organics	500	100 U	130 U	130 U	160 H29
Oil-Range Organics	500	200 U	250 U	250 U	250 U
TPH	800	ND	ND	ND	160
Volatile Organic Compounds (µg/L; SW-846 8260D)					
Benzene	2.4	0.20 U	2.0 U	2.0 U	2.0 U
Ethylbenzene	NL	0.20 U	2.0 U	2.0 U	2.0 U
m-&p-Xylenes	NL	0.40 U	4.0 U	4.0 U	4.0 U
o-Xylene	NL	0.20 U	2.0 U	2.0 U	2.0 U
Toluene	NL	0.20 U	2.0 U	2.0 U	2.0 U
Xylenes, Total	NL	0.60 U	--	--	--
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)					
Arsenic	5	4.00 U	5.0 U	5.0 U	10 U
Cadmium	8.8	2.00 U	5.0 U	5.0 U	10 U
Chromium, Total	260	10.0 U	10 U	10 U	20 U
Chromium, Trivalent	93,700	--	--	--	--
Chromium, Hexavalent	50	--	--	--	--
Copper	3.1	10.0 U	10 U	10 U	20 U
Iron	NL	--	--	--	--
Lead	8.1	2.00 U	5.0 U	5.0 U	10 U
Manganese	NL	11.0	10	--	--
Mercury	0.059	--	0.20 U	0.20 U	0.2 U
Nickel	8.2	10.0 U	10 U	10 U	20 U
Selenium	71	11.9	20 U	20 U	40 U
Silver	1.9	4.00 U	5.0 U	5.0 U	10 U
Zinc	81	120 U	12 U	12 U	25 U
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, S)					
Arsenic	5	4.00 U	5.0 U	5.0 U	10 U
Cadmium	8.8	2.00 U	5.0 U	5.0 U	10 U
Calcium	NL	--	--	--	--
Chromium, Total	260	10.0 U	10 U	10 U	20 U
Copper	3.1	10.0 U	12	10 U	20 U
Iron	NL	--	--	--	--
Lead	8.1	2.00 U	5.0 U	5.0 U	10 U
Magnesium	NL	--	--	--	--
Manganese	NL	--	--	--	--
Mercury	0.059	--	0.20 U	0.20 U	0.2 U
Nickel	8.2	10.0 U	10 U	10 U	20 U
Selenium	71	10.0 U	20 U	20 U	40 U
Silver	1.9	4.00 U	5.0 U	5.0 U	10 U
Zinc	81	120 U	12 U	12 U	25 U

Table A-6
C Street Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG			
		RWM-7	RWM-7	RWM-7	RWM-7
		RMW-7-231121	RWM-7-GW-20240213	R-MW-7-GW-240506	RMW-7-GW-240821
		N	N	N	N
		11/21/2023	2/13/2024	5/6/2024	8/21/2024
		23K0589 (a)	EV24020100 (b)	EV24050061	EV24080164
Dissolved Gases (µg/L; RSK-175)					
Ethane	NL	1.23 U	--	--	--
Ethene	NL	1.14 U	--	--	--
Methane	NL	3.17	10 U	--	--
General Chemistry					
Hardness (µg/L; SM 2340)	NL	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	127,000	210,000	--	--
Total Organic Carbon (µg/L; SM 5310B)	NL	1,880	2,000	--	--
Nitrogen, Nitrite (µg/L; EPA 300.0)	NL	10,000 U	7,500 J-	--	--
Nitrate (µg/L; EPA 300.0)	NL	367	760 R	--	--
Sulfate (µg/L; EPA 300.0)	NL	1,870,000	1,300,000	1,000,000	1,300,000
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--
Sulfide, Total (µg/L; SM 4500-S2-D)	NL	50 U	50 U	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--

Notes:

a) Samples in SDG 23K0589 were run with sulfuric acid cleanup.

b) Filters used during field-filtering for dissolved metals have noted performance issues; dissolved metals results from February 2024 sampling event may not be representative of groundwater conditions.

Bold text indicates detected analyte.

Gray shading indicates detected analyte exceeds applicable cleanup level.

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or incorrect.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

R = The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria. The analyte may or may not be present in the sample.

J- = The result is an estimated quantity and the result may be biased low.

J+ = The result is an estimated quantity and the result may be biased high.

H12 = The laboratory noted the oil range result is estimated due to overlap from the diesel range result.

H15 = The laboratory noted the gasoline range result is estimated due to semivolatile range product overlap.

H26 = The laboratory noted the sample likely contains highly weathered gasoline.

H29 = The laboratory noted the sample likely contains an unidentified diesel range product.

H30 = The laboratory noted the sample likely contains weathered diesel.

H31 = The laboratory noted the sample likely contains highly weathered diesel.

H41 = The laboratory noted the sample likely contains weathered gasoline.

H42 = The laboratory noted an unidentified oil range product. Oil range product results biased high due to diesel range product overlap.

H43 = The laboratory noted an unidentified oil range product.

Abbreviations and Acronyms:

EPA = US Environmental Protection Agency

FD = field duplicate

ID = identification

µg/L = micrograms per liter

N = primary sample

ND = not detected

NL = not listed

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

SDG = sample delivery group

SM = Standard Methods

TPH = total petroleum hydrocarbons

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Sample Type, Sampling Date, Laboratory Sample ID															
		ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-2 N	ASB-MW-3 N	ASB-MW-4 N	ASB-MW-5 N	ASB-MW-6 N	HH-MW-1 N	HH-MW-1 N	HH-MW-1 N	HH-MW-1 FD	
		2/4/2021	9/8/2021	11/22/2023	2/13/2024	5/7/2024	8/21/2024	2/4/2021	2/4/2021	2/4/2021	2/4/2021	2/4/2021	2/4/2021	9/8/2021	11/22/2023	11/22/2023	
		21B0105-02	21I0092-01, -03	23K0615	EV24020101	EV24050060	EV24080159	21B0105-04	21B0105-05	21B0105-07	21B0105-08	21B0105-01	21B0105-06	21I0092-02, -04	23K0615	23K0615	
Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)																	
Gasoline-Range Organics	800	2,020	2,150	1000 U	430 H15	330 H26	390 H15, H26	157	213	142	136	100 U	500 U	1,000 U	105	104	
Diesel-Range Organics	500	2,480	234	R	1400 J	1,600 J, H29	960 J, H29	778	674	369	610	103	985	8,110 J	100 UJ	R	
Oil-Range Organics	500	2,000 U	200 U	R	530 J	790 H43	460 H43	453	348	255	327	200 U	541	3,590 J	200 UJ	R	
TPH	800	4,500	2,384	ND	2,360	2,720	1,810	1,388	1,235	766	1,073	103	1,526	11,700 J	105	104	
Volatile Organic Compounds (µg/L; SW-846 8260D)																	
Benzene	2.4	11.3	7.78	5.18	20 U	3.3 J	4	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.00 U	2.00 U	0.22	0.21	
Ethylbenzene	NL	--	2.00 U	2.00 U	20 U	2.0 U	2.00 U	--	--	--	--	--	--	2.00 U	0.20 U	0.20 U	
m-&p-Xylenes	NL	--	4.25	4.00 U	40 U	6.9 J	4.00 U	--	--	--	--	--	--	4.00 U	0.40 U	0.40 U	
o-Xylene	NL	--	2.00 U	2.00 U	20 U	2.2 J	2.00 U	--	--	--	--	--	--	2.00 U	0.22	0.20 U	
Toluene	NL	--	2.00 U	2.00 U	20 U	2.0 U	2.00 U	--	--	--	--	--	--	2.00 U	0.20 U	0.20 U	
Xylenes, Total	NL	--	6.04	6.00 U	40 U	--	--	--	--	--	--	--	--	6.00 U	0.22	0.60 U	
Dissolved Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B, 7470A, SM 3500-Cr-D)																	
Arsenic	5	45.6	29.6	29.9	24	22	30	0.728	3.17	0.351	0.423	3.15	5.35	3.84	1.90	1.53	
Cadmium	8.8	2.00 U	20.0 U	10.0 U	5.0 U	1.1	1.6	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.500 U	2.00 U	0.200 U	0.200 U	
Chromium, Total	260	18,000	14,100	10,500	8,500	8,800	9,900	44.6	24.1	35.7	93.0	3.68	1,250	729	275	246	
Chromium, Trivalent	93,700	18,000	--	--	--	8,800	9,900	44.6	24.1	35.7	93.0	3.68	1,250	--	--	--	
Chromium, Hexavalent	50	13 U	--	--	--	10 U	--	13 U	13 U	13 U	13 U	13 U	13 U	--	--	--	
Copper	3.1	48.3	32.2	37.1	32	28	36	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	5.17	3.85	2.77 J	1.59 J	
Iron	NL	--	29,000	--	--	--	--	--	--	--	--	--	--	34,500	--	--	
Lead	8.1	489	236	365	250	290 J	400	0.111	0.100 U	0.100 U	0.100 U	0.100 U	20.9	17.9	11.8 J	6.06 J	
Manganese	NL	--	256	--	--	--	--	--	--	--	--	--	--	219	--	--	
Mercury	0.059	0.333	0.242	0.395	0.20 U	0.27	0.3	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.035	0.054	0.045 J	0.031 J	
Nickel	8.2	37.2	27.4	26.6	20	21	25	1.25	1.06	1.47	0.845	0.500 U	6.22	5.58	3.67	3.29	
Selenium	71	10.0 U	5.00 U	10.0 U	20 U	4.0 U	4.0 U	0.500 U	0.500 U	0.500 U	0.500 U	0.500 U	2.50 U	2.50 U	1.00 U	1.00 U	
Silver	1.9	4.00 U	2.00 U	4.00 U	5.0 U	1.0 U	1.0 U	0.200 U	0.200 U	0.200 U	0.200 U	0.200 U	1.00 U	1.00 U	0.400 U	0.400 U	
Zinc	81	313	173	300	160	140 J	200	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	56.6	35.3	26.2	16.2	
Total Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B, 7470A, SM 3500-Cr-D)																	
Arsenic	5	49.0	32.5	32.9	25	20	32	0.895	3.49	0.489	0.500	3.46	6.04	5.30	2.29	2.31	
Cadmium	8.8	3.16	50.0 U	10.0 U	5.0 U	1.1	1.9	0.100 U	0.100 U	0.100 U	0.100 U	0.100 U	0.610	5.00 U	0.500 U	0.500 U	
Calcium	NL	--	78,400	--	--	--	--	--	--	--	--	--	--	71,200	--	--	
Chromium, Total	260	18,700	14,200	11,800	8,400 J	8,100	10,000	57.6	33.7	65.2	161	4.23	1,330	825	341	327	
Chromium, Trivalent	93,700	--	--	--	8,400 J	8,100	10,000	--	--	--	--	--	--	--	--	--	
Chromium, Hexavalent	50	--	R	R	10 U	10 U	10 U	--	--	--	--	--	--	13 U	R	R	
Copper	3.1	57.7	44.7	43.6	47	28	41	0.500 U	0.654	0.500 U	1.00 U	0.926	8.47	10.8	5.02	4.96	
Iron	NL	--	32,100	--	--	--	--	--	--	--	--	--	--	36,500	--	--	
Lead	8.1	730	363	528	370	310 J	520	2.87	0.788	0.326	0.846	10.0	47.5	63.5	30.5	30.1	
Magnesium	NL	--	87,000	--	--	--	--	--	--	--	--	--	--	58,900	--	--	
Manganese	NL	--	287	--	--	--	--	--	--	--	--	--	--	229	--	--	
Mercury	0.059	0.462	0.383	0.618	0.20 U	0.27	0.37	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.085	0.134	0.075 J	0.078 J	
Nickel	8.2	43.0	33.3	50.0 U	33	18	26	1.33	1.61	1.73	1.06	0.713	7.35	8.48	4.56	5.07	
Selenium	71	10.0 U	5.00 U	5.00 U	20 U	4.0 U	4.0 U	0.500 U	0.500 U	0.500 U	1.00 U	0.500 U	2.50 U	2.50 U	1.00 U	1.00 U	
Silver	1.9	4.00 U	2.00 U	2.00 U	5.0 U	1.0 U	1.0 U	0.200 U	0.200 U	0.200 U	0.400 U	0.200 U	1.00 U	1.00 U	0.400 U	0.400 U	
Zinc	81	343	269	282	230	140	240	8.24	4.00 U	4.00 U	9.92	5.47	85.1	119	61.8	63.2	

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sampling Location, Sample Type, Sampling Date, Laboratory Sample ID																
		ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-1 N	ASB-MW-2 N	ASB-MW-3 N	ASB-MW-4 N	ASB-MW-5 N	ASB-MW-6 N	HH-MW-1 N	HH-MW-1 N	HH-MW-1 N	HH-MW-1 FD	
		2/4/2021	9/8/2021	11/22/2023	2/13/2024	5/7/2024	8/21/2024	2/4/2021	2/4/2021	2/4/2021	2/4/2021	2/4/2021	2/4/2021	2/4/2021	9/8/2021	11/22/2023	11/22/2023	
		21B0105-02	21I0092-01, -03	23K0615	EV24020101	EV24050060	EV24080159	21B0105-04	21B0105-05	21B0105-07	21B0105-08	21B0105-01	21B0105-06	21I0092-02, -04	23K0615	23K0615		
Semivolatile Organic Compounds (µg/L; SW-846 8270E SIM)																		
1-Methylnaphthalene	NL	3.01	2.17	2.39 J-	2.5 J	2.4 J	4.1 J	0.357	0.999	0.337	1.24	0.010 U	2.24	2.18	0.401 J-	0.358 J-		
2-Chloronaphthalene	NL	0.100 U	0.010 U	0.024 J-	--	--	--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 UJ	0.010 UJ		
2-Methylnaphthalene	NL	4.04	2.76	3.37 J-	3.7 J	3.2 J	5.3 J	0.401	0.599	0.361	1.19	0.010 U	3.02	2.75	0.463 J-	0.414 J-		
Acenaphthene	3.3	0.514	0.312	0.488 J-	0.56 J	0.45 J	0.64 J	0.069	0.217	0.308	0.385	0.010 U	1.89	2.10	0.194 J-	0.175 J-		
Acenaphthylene	NL	0.100 U	0.013	0.035 J-	0.020 UJ	0.028 J	0.02 UJ	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.016	0.038	0.010 UJ	0.010 UJ		
Anthracene	9.6	0.474	0.175	0.255 J-	0.18 J	0.12 J	0.25 J	0.018	0.013	0.020	0.019	0.010 U	0.288	0.324	0.028 J-	0.025 J-		
Benzo(a)anthracene	0.02	0.334	0.143	0.101 J-	0.11 J	0.069 J	0.17 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.072	0.109	0.010 UJ	0.010 UJ		
Benzo(a)pyrene	0.02	0.157	0.067	0.037 J-	0.070 J	0.066 J	0.078 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.021	0.036	0.010 UJ	0.010 UJ		
Benzo(b)fluoranthene	0.02	0.159	0.065	0.037 J-	0.074 J	0.065 J	0.090 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.021	0.034	0.010 UJ	0.010 UJ		
Benzo(g,h,i)perylene	NL	0.103	0.043	0.018 J-	0.087 J	0.064	0.066 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.011	0.014	0.010 UJ	0.010 UJ		
Benzo(j)fluoranthene	NL	0.100 U	0.026	0.015 J-	--	--	--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.012 J	0.015	0.010 UJ	0.010 UJ		
Benzo(k)fluoranthene	0.02	0.100 U	0.031	0.017 J-	0.032 J	0.021 J	0.045 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.012	0.020	0.010 UJ	0.010 UJ		
Benzofluoranthenes, Total (b+k+j)	NL	0.321	0.122	0.069 J-	--	--	--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.045	0.069	0.020 UJ	0.020 UJ		
Carbazole	NL	0.287	0.154	0.177 J-	--	--	--	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.099	0.095	0.010 UJ	0.010 UJ		
Chrysene	0.02	0.589	0.245	0.167 J-	0.14 J	0.16 J	0.23 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.072	0.100	0.010 J-	0.010 UJ		
Dibenzo(a,h)anthracene	0.02	0.100 U	0.010 U	0.010 UJ	0.051 J	0.025 J	0.044 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 UJ	0.010 UJ		
Dibenzofuran	NL	0.287 J	0.143	0.207 J-	--	--	--	0.019 J	0.047 J	0.100 J	0.115 J	0.010 U	0.831 J	0.819	0.089 J-	0.081 J-		
Fluoranthene	3.3	1.64	0.549	0.680 J-	0.56 J	0.48 J	0.74 J	0.017	0.013	0.023	0.026	0.010 U	0.554	0.612	0.059 J-	0.053 J-		
Fluorene	3	0.887	0.438	0.645 J-	0.57 J	0.47 J	0.69 J	0.055	0.127	0.176	0.199	0.010 U	1.66	1.83	0.150 J-	0.137 J-		
Indeno(1,2,3-cd)pyrene	0.02	0.100 U	0.019	0.010 UJ	0.048 J	0.027 J	0.050 J	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010	0.010 UJ	0.010 UJ		
Naphthalene	83	1.92	0.833	0.583 J-	2.6 J	2.4 J	2.0 J	0.177	0.053	0.203	0.368	0.010 U	1.31	0.760	0.042 J-	0.038 J-		
Perylene	NL	0.100 U	0.017	0.010 UJ	--	--	--	0.010 U	0.006 U	0.006 U	0.006 U	0.010 U	0.010 U	0.010 U	0.010 UJ	0.010 UJ		
Phenanthrene	NL	3.29	1.77	1.80 J-	1.7	1.3 J	2.7 J	0.066	0.071	0.185	0.143	0.010 U	2.31	2.50	0.207 J-	0.187 J-		
Pyrene	15	1.65	0.583	0.688 J-	0.46 J	0.40 J	0.80 J	0.016	0.013	0.014	0.022	0.010 U	0.390	0.442	0.057 J-	0.043 J-		
cPAH TEQ	0.02	0.227	0.0958	0.0552 J-	0.102 J	0.088 J	0.1202 J	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.033	0.055	0.0076 J-	0.0076 UJ		
Semivolatile Organic Compounds (µg/L; SW-846 8270E)																		
bis(2-Ethylhexyl) Phthalate	1	30.0 U	4.4	9.0 U	2.0 UJ	2.0 UJ	3.8 J	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U		
Dissolved Gases (µg/L; RSK-175)																		
Ethane	NL	--	1.23 UJ	--	--	--	--	--	--	--	--	--	--	1.23 UJ	--	--		
Ethene	NL	--	1.14 UJ	--	--	--	--	--	--	--	--	--	--	1.14 UJ	--	--		
Methane	NL	--	10,800 J	--	--	--	--	--	--	--	--	--	--	10,500 J	--	--		
General Chemistry																		
Hardness (µg/L; SM 2340)	NL	--	554,000	--	--	--	--	--	--	--	--	--	--	420,000	--	--		
Alkalinity, total (µg/L; SM 2320B)	NL	--	1,900,000	--	--	--	--	--	--	--	--	--	--	1,180,000	--	--		
Total Organic Carbon (µg/L; SM 5310B)	NL	--	1,215,000	--	--	--	--	--	--	--	--	--	--	116,900	--	--		
Nitrate (µg/L; EPA 300.0)	NL	--	1,000 U	--	--	--	--	--	--	--	--	--	--	1,000 U	--	--		
Sulfate (µg/L; EPA 300.0)	NL	--	720	--	--	--	3,100	--	--	--	--	--	--	126	--	--		
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
Salinity (ppt; SM 2520B)	NL	--	2.20	--	--	--	--	--	--	--	--	--	--	1.30	--	--		

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sample Location, Sample Type, Sample Date, Laboratory Sample ID															
		HH-MW-1	HH-MW-1	HH-MW-1	HH-MW-2	HH-MW-2	HH-MW-2	HH-MW-2	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-4	HH-MW-4	HH-MW-4
		N	N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N
		2/14/2024	5/7/2024	8/21/2024	11/22/2023	2/14/2024	5/7/2024	8/27/2024	11/22/2023	2/14/2024	5/7/2024	5/7/2024	5/7/2024	8/21/2024	11/22/2023	2/14/2024	5/7/2024
		EV24020117 (a)	EV24050060	EV24080159	23K0615	EV24020117 (a)	EV24050060	EV24080196	23K0615	EV24020117 (a)	EV24050060	EV24050060	EV24080159	23K0615	EV24020117 (a)	EV24050060	
Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)																	
Gasoline-Range Organics	800	140	120 H26	110 H26	100 UJ	50 U	50 U	50 U	100 U	50 U	50 U	50 U	50 U	123	50 U	50 U	
Diesel-Range Organics	500	830	740 H29	1,200 H29	100 U	180	250 H29	250 H29	100 U	270	500 H29	450 H29	440 H29	100 UJ	270	360 H29	
Oil-Range Organics	500	290	470 H43	880 H50	200 U	250 U	260 H43	250 U	200 U	250 U	440 H43	370	430 H43	200 UJ	250 U	340 H43	
TPH	800	1,260	1,330	2,190	ND	180	510	250	ND	270	940	820	870	123	270	700	
Volatile Organic Compounds (µg/L; SW-846 8260D)																	
Benzene	2.4	2.0 U	2.0 U	2.0 U	0.20 UJ	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.07	2.0 U	2.0 U
Ethylbenzene	NL	2.0 U	2.0 U	2.0 U	0.20 UJ	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U
m-&p-Xylenes	NL	4.0 U	4.0 U	4.0 U	0.40 UJ	4.0 U	4.0 U	4.0 U	0.40 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	0.40 U	4.0 U	4.0 U
o-Xylene	NL	2.0 U	2.0 U	2.0 U	0.20 UJ	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U
Toluene	NL	2.0 U	2.0 U	2.0 U	0.20 UJ	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	0.20 U	2.0 U	2.0 U
Xylenes, Total	NL	4.0 U	--	--	0.60 UJ	4.0 U	--	--	0.60 U	4.0 U	--	--	--	--	0.60 U	4.0 U	--
Dissolved Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B,																	
Arsenic	5	2.7	2.8	2.3	0.400 U	1.0 U	1.0 U	1.0 U	15.3	36	21	22 J	22	2.17	5.9	1.7	
Cadmium	8.8	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	1.0 U	
Chromium, Total	260	820	810	440	0.500 UJ	2.0 U	2.0 U	2.0 U	0.554	2.0 U	2.0 U	2.0 U	2.0 U	53.0	5.7	5.9	
Chromium, Trivalent	93,700	--	810	440	--	--	2.0 U	--	--	--	2.0 U	10 U	2.0 U	--	--	5.9	
Chromium, Hexavalent	50	--	10 U	--	--	--	10 U	--	--	--	10 U	2.0 U	--	--	--	10 U	
Copper	3.1	2.0 U	2.2	2.0 U	1.00 U	2.0 U	2.0 U	2.0 U	1.73	2.0 U	3.0	2.0 U	2.0 U	1.00 U	2.0 U	2.0 U	
Iron	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lead	8.1	3.5	5.4	3.6	0.100 U	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	1.0 U	0.714	1.0 U	1.0 U	
Manganese	NL	250	--	--	--	630	--	--	--	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.20 U	0.2 U	0.017 U	0.20 U	0.20 U	0.2 U	0.017 U	0.20 U	0.20 U	0.20 U	0.2 U	0.019 U	0.20 U	0.20 U	
Nickel	8.2	5.7	5.1	3.8	3.93	2.7	2.4	2.0 U	13.5	12	8.7	8.8	7.5	2.08	6.7	2.0 U	
Selenium	71	4.0 U	4.0 U	4.0 U	1.00 U	4.0 U	4.0 U	4.0 U	1.00 U	4.0 U	4.0 U	4.0 U	4.0 U	1.00 U	4.0 U	4.0 U	
Silver	1.9	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	1.0 U	0.400 U	1.0 U	1.0 U	
Zinc	81	9.5	16	10	12.0 U	2.5 U	2.5 U	4	6.00 U	5.5	4.8	2.5 U	4.5	14.8	52	10	
Total Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B, 7470																	
Arsenic	5	3.8	3.7	3.2	0.286	1.0 U	1.0 U	1.1	15.0	39	24 J	16 J	22	2.51	6.2	1.8	
Cadmium	8.8	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	1.0 U	
Calcium	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Chromium, Total	260	1,000	970	570	1.00 U	2.0 U	5.6	2.0 U	0.972	2.5	2.6	2.0 U	2.0 U	77.1	7.5	7.2	
Chromium, Trivalent	93,700	1,000	970	570	--	2.0 U	510	2.0 U	--	2.5	2.6	2.0 U	2.0 U	--	7.5	7.2	
Chromium, Hexavalent	50	10 R	10 U	10 U	R	10 R	10 U	10 U	R	10 R	10 U	10 U	10 U	R	10 R	10 U	
Copper	3.1	4.1	4.7	6.2	0.500 U	2.0 U	2.0 U	2.0 U	3.56	10	3.5	2.8	4.5	2.34	2.6	2.8	
Iron	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Lead	8.1	21	18	17	0.100 U	1.0 U	1.0 U	1.0 U	0.538	2.5	1.0 U	1.0 U	1.0 U	8.67	1.3	1.5	
Magnesium	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Manganese	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
Mercury	0.059	0.20 U	0.20 U	0.2 U	0.014 U	0.20 U	0.20 U	0.2 U	0.020 U	0.20 U	0.20 U	0.20 U	0.2 U	0.036 J	0.20 U	0.20 U	
Nickel	8.2	7.4	6.9	5.6	3.66	2.7	2.2	2.0 U	14.4	22	12	14	8.1	2.24	7.1	2.0 U	
Selenium	71	4.0 U	4.0 U	4.0 U	0.500 U	4.0 U	4.0 U	4.0 U	0.500 U	4.0 U	4.0 U	4.0 U	4.0 U	1.00 U	4.0 U	4.0 U	
Silver	1.9	1.0 U	1.0 U	1	0.200 U	1.0 U	1.0 U	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	1.0 U	0.400 U	1.0 U	1.0 U	
Zinc	81	52	57	46	6.00 U	2.5 U	2.5 U	8	6.00 U	8.3	5.2	4.9	170	37.4	110	35	

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	Sample Location, Sample Type, Sample Date, Laboratory Sample ID														
		HH-MW-1	HH-MW-1	HH-MW-1	HH-MW-2	HH-MW-2	HH-MW-2	HH-MW-2	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-3	HH-MW-4	HH-MW-4	HH-MW-4
		N	N	N	N	N	N	N	N	N	N	FD	N	N	N	N
		2/14/2024	5/7/2024	8/21/2024	11/22/2023	2/14/2024	5/7/2024	8/27/2024	11/22/2023	2/14/2024	5/7/2024	5/7/2024	8/21/2024	11/22/2023	2/14/2024	5/7/2024
		EV24020117 (a)	EV24050060	EV24080159	23K0615	EV24020117 (a)	EV24050060	EV24080196	23K0615	EV24020117 (a)	EV24050060	EV24050060	EV24080159	23K0615	EV24020117 (a)	EV24050060
Semivolatile Organic Compounds (µg/L; SW-846 8270E SIM)																
1-Methylnaphthalene	NL	0.89	1.9	0.88	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 UJ	0.020 UJ	0.86	0.02 U	0.549 J-	0.51	0.74
2-Chloronaphthalene	NL	--	--	--	0.010 U	--	--	--	0.010 U	--	--	--	--	0.011 J-	--	--
2-Methylnaphthalene	NL	1.2	2.2	0.85	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.749 J-	0.059	0.23
Acenaphthene	3.3	0.52	0.95	0.26	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 UJ	0.23 J	0.02 U	0.067 J-	1.3	1.6
Acenaphthylene	NL	0.020 U	0.032	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.036	0.02 U	0.010 UJ	0.023	0.020 U
Anthracene	9.6	0.10	0.17	0.062	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.015 J-	0.077	0.10
Benzo(a)anthracene	0.02	0.034	0.039	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Benzo(a)pyrene	0.02	0.020 U	0.027	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Benzo(b)fluoranthene	0.02	0.020 U	0.032	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Benzo(g,h,i)perylene	NL	0.020 U	0.025	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Benzo(j)fluoranthene	NL	--	--	--	0.010 U	--	--	--	0.010 U	--	--	--	--	0.010 UJ	--	--
Benzo(k)fluoranthene	0.02	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Benzo(a)fluoranthenes, Total (b+k+j)	NL	--	--	--	0.020 U	--	--	--	0.020 U	--	--	--	--	0.020 UJ	--	--
Carbazole	NL	--	--	--	0.010 U	--	--	--	0.010 U	--	--	--	--	0.010 J-	--	--
Chrysene	0.02	0.021	0.054	0.02 U	0.011	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.012 J-	0.020 U	0.020 U
Dibenzo(a,h)anthracene	0.02	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Dibenzofuran	NL	--	--	--	0.010 U	--	--	--	0.010 U	--	--	--	--	0.018 J-	--	--
Fluoranthene	3.3	0.27	0.35	0.11	0.072	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.036 J-	0.17	0.26
Fluorene	3	0.49	0.83	0.26	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 UJ	0.24 J	0.02 U	0.060 J-	1.1	1.5
Indeno(1,2,3-cd)pyrene	0.02	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.010 UJ	0.020 U	0.020 U
Naphthalene	83	0.020 U	0.20	0.076	0.010 U	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 UJ	0.084 J	0.02 U	0.105 J-	0.020 U	0.027
Perylene	NL	--	--	--	0.010 U	--	--	--	0.010 U	--	--	--	--	0.010 UJ	--	--
Phenanthrene	NL	0.83	0.99	0.46	0.067 J	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.114 J-	0.39	0.67
Pyrene	15	0.17	0.23	0.11	0.040	0.020 U	0.020 U	0.02 U	0.010 U	0.020 U	0.020 U	0.020 U	0.02 U	0.044 J-	0.095	0.13
cPAH TEQ	0.02	0.18	0.038	0.0151 U	0.0076	0.015 U	0.015 U	0.0151 U	0.0076 U	0.015 U	0.015 U	0.015 U	0.015 U	0.0151 U	0.0076 J-	0.015 U
Semivolatile Organic Compounds (µg/L; SW-846 8270E)																
bis(2-Ethylhexyl) Phthalate	1	2.0 U	2.0 U	2.0 U	3.0 U	2.0 U	2.0 U	2.0 U	3.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	3.7	2.0 U
Dissolved Gases (µg/L; RSK-175)																
Ethane	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ethene	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methane	NL	3,000	--	--	--	1,900	--	--	--	--	--	--	--	--	--	--
General Chemistry																
Hardness (µg/L; SM 2340)	NL	480,000	--	--	--	490,000	--	--	--	--	--	--	--	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	1,100,000	--	--	--	600,000	--	--	--	--	--	--	--	--	--	--
Total Organic Carbon (µg/L; SM 5310B)	NL	70,000	--	--	--	4,800	--	--	--	--	--	--	--	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	750 HT06	--	--	--	2600 HT06	--	--	--	--	--	--	--	--	--	--
Sulfate (µg/L; EPA 300.0)	NL	590	--	260 U	--	32,000	--	560	--	--	--	--	7,600	--	--	--
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Salinity (ppt; SM 2520B)	NL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use						
		HH-MW-4 N	HH-MW-5 N	HH-MW-5 N	HH-MW-5 N	HH-MW-5 N	HH-MW-5 FD
		8/21/2024 EV24080159	11/22/2023 23K0615	2/14/2024 EV24020117 (a)	5/7/2024 EV24050060	8/21/2024 EV24080159	8/21/2024 EV24080159
Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)							
Gasoline-Range Organics	800	96 H26	100 U	130	50 U	50 U	50 U
Diesel-Range Organics	500	800 H29	100 UJ	1,100	1,600 H29	720 J, H29	940 J, H29
Oil-Range Organics	500	550 H43	200 UJ	390	740 H43	480 H50	630 H50
TPH	800	1,446	ND	1,620	2,340	1,200	1,570
Volatile Organic Compounds (µg/L; SW-846 8260D)							
Benzene	2.4	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U
Ethylbenzene	NL	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U
m-&p-Xylenes	NL	4.0 U	0.40 U	4.0 U	4.0 U	4.0 U	4.0 U
o-Xylene	NL	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U
Toluene	NL	2.0 U	0.20 U	2.0 U	2.0 U	2.0 U	2.0 U
Xylenes, Total	NL	--	0.60 U	4.0 U	--	--	--
Dissolved Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B,							
Arsenic	5	2.7	0.956	3.6	3.4	2.8	2.8
Cadmium	8.8	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	1.0 U
Chromium, Total	260	21	74.6	23	65	100	120
Chromium, Trivalent	93,700	21	--	--	65	100	120
Chromium, Hexavalent	50	--	--	--	10 U	--	--
Copper	3.1	2.0 U	1.00 U	2.3	2.0 U	2.0 U	2.0 U
Iron	NL	--	--	--	--	--	--
Lead	8.1	1.0 U	0.100 U	1.0 U	1.0 U	1.0 U	1.0 U
Manganese	NL	--	--	3700	--	--	--
Mercury	0.059	0.2 U	0.018 U	0.20 U	0.20 U	0.2 U	0.2 U
Nickel	8.2	2.0 U	2.37	4.8	3.6	2.5	2.3
Selenium	71	4.0 U	1.00 U	4.0 U	4.0 U	4.0 U	4.0 U
Silver	1.9	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	81	2.5 U	12.0 U	2.5 U	2.5 U	2.5 U	2.5 U
Total Metals (µg/L; EPA 200.8, SW-846 6010C, 6010D, 6020B, 7470C							
Arsenic	5	3.1	1.16	5.0	4.6	4.2	3.9
Cadmium	8.8	1.0 U	0.500 U	1.0 U	1.0 U	1.0 U	1.0 U
Calcium	NL	--	--	--	--	--	--
Chromium, Total	260	36	152	24	73	120	130
Chromium, Trivalent	93,700	36	--	24	73	120	130
Chromium, Hexavalent	50	10 U	R	10 R	10 U	10 U	10 U
Copper	3.1	5.8	1.07	23	4.1	3.5	4
Iron	NL	--	--	--	--	--	--
Lead	8.1	7.9	0.347	5.5	1.1	1.0 U	1.0 U
Magnesium	NL	--	--	--	--	--	--
Manganese	NL	--	--	--	--	--	--
Mercury	0.059	0.2 U	0.019 U	0.20 U	0.20 U	0.2 U	0.2 U
Nickel	8.2	2.0 U	2.46	5.7	4.4	2.9	2.8
Selenium	71	4.0 U	0.783	4.0 U	4.0 U	4.0 U	4.0 U
Silver	1.9	1.0 U	0.200 U	1.0 U	1.0 U	1.0 U	1.0 U
Zinc	81	26	6.00 U	17	41	15	13

Table A-7
Aerated Stabilization Basin and Hilton Avenue Groundwater Results
Central Waterfront Cleanup Site
Port of Bellingham, Washington – Bellingham, Washington

Analyte	Groundwater Cleanup Level for Unrestricted Land Use	HH-MW-4	HH-MW-5	HH-MW-5	HH-MW-5	HH-MW-5	HH-MW-5
		N	N	N	N	N	FD
		8/21/2024	11/22/2023	2/14/2024	5/7/2024	8/21/2024	8/21/2024
		EV24080159	23K0615	EV24020117 (a)	EV24050060	EV24080159	EV24080159
Semivolatile Organic Compounds (µg/L; SW-846 8270E SIM)							
1-Methylnaphthalene	NL	0.87	0.012 J-	1.5	0.020 U	0.21	0.22
2-Chloronaphthalene	NL	--	0.010 UJ	--	--	--	--
2-Methylnaphthalene	NL	0.86	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Acenaphthene	3.3	0.98	0.010 UJ	0.43	0.020 U	0.077	0.074
Acenaphthylene	NL	0.02 U	0.010 UJ	0.086	0.020 U	0.02 U	0.02 U
Anthracene	9.6	0.059	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(a)anthracene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(a)pyrene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(b)fluoranthene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NL	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(j)fluoranthene	NL	--	0.010 UJ	--	--	--	--
Benzo(k)fluoranthene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Benzo(a)fluoranthenes, Total (b+k+j)	NL	--	0.020 UJ	--	--	--	--
Carbazole	NL	--	0.010 UJ	--	--	--	--
Chrysene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Dibenzo(a,h)anthracene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Dibenzofuran	NL	--	0.010 UJ	--	--	--	--
Fluoranthene	3.3	0.11	0.010 UJ	0.029	0.020 U	0.02 U	0.02 U
Fluorene	3	0.92	0.010 UJ	0.40	0.020 U	0.076	0.084
Indeno(1,2,3-cd)pyrene	0.02	0.02 U	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Naphthalene	83	0.087	0.013 J-	0.020 U	0.020 U	0.041	0.048
Perylene	NL	--	0.010 UJ	--	--	--	--
Phenanthrene	NL	0.46	0.010 UJ	0.020 U	0.020 U	0.02 U	0.02 U
Pyrene	15	0.081	0.013 J-	0.031	0.020 U	0.02 U	0.02 U
cPAH TEQ	0.02	0.0151 U	0.0076 U	0.015 U	0.015 U	0.0151 U	0.0151 U
Semivolatile Organic Compounds (µg/L; SW-846 8270E)							
bis(2-Ethylhexyl) Phthalate	1	2.0 U	3.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved Gases (µg/L; RSK-175)							
Ethane	NL	--	--	--	--	--	--
Ethene	NL	--	--	--	--	--	--
Methane	NL	--	--	1,200	--	--	--
General Chemistry							
Hardness (µg/L; SM 2340)	NL	--	--	350,000	--	--	--
Alkalinity, total (µg/L; SM 2320B)	NL	--	--	460,000	--	--	--
Total Organic Carbon (µg/L; SM 5310B)	NL	--	--	40,000	--	--	--
Nitrate (µg/L; EPA 300.0)	NL	--	--	2400 HT06	--	--	--
Sulfate (µg/L; EPA 300.0)	NL	270	--	3,600	--	260 U	260 U
Chloride (µg/L; EPA 300.0)	NL	--	--	--	--	--	--
Total Dissolved Solids (µg/L; SM 2540C)	NL	--	--	--	--	--	--
Salinity (ppt; SM 2520B)	NL	--	--	--	--	--	--

Notes:

a) Filters used during field-filtering for dissolved metals have noted performance issues; dissolved metals results from February 2024 sampling event may not be representative of groundwater conditions.

Bold text indicates detected analyte

Gray shading indicates detected analyte exceeds applicable cleanup level

U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

UJ = The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample

J- = The result is an estimated quantity and the result may be biased low.

R = The data are unusable. The sample results are rejected due to serious deficiencies in meeting quality control criteria.

The analyte may or may not be present in the sample.

HT06 = Sample was analyzed outside of the holding time due to instrument problems. Results should be considered estimated.

H15 = The laboratory noted the gasoline range result is estimated due to semivolatile range product overlap.

H26 = The laboratory noted the sample likely contains highly weathered gasoline.

H29 = The laboratory noted the sample likely contains an unidentified diesel range product.

H43 = The laboratory noted an unidentified oil range product.

H50 = The laboratory noted the sample likely contains light oil.

Abbreviations and Acronyms:

EPA = US Environmental Protection Agency

FD = field duplicate

ID = identification

µg/L = micrograms per liter

N = primary sample

ND = not detected

NL = not listed

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

ppt = parts per thousand

SIM = selected ion monitoring

SM = Standard Methods

TPH = total petroleum hydrocarbons

Table A-8
Aerated Stabilization Basin and Hilton Avenue – Porewater and Surface Water Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
	HH-PW-1	HH-PW-2	HH-PW-3	HH-SW-1-HT	HH-SW-1-LT	HH-SW-2-HT	HH-SW-2-LT	HH-SW-3-HT	HH-SW-3-LT
	HH-PW-1-20240215	HH-PW-2-20240215	HH-PW-3-20240215	HH-SW-1-HT-20240215	HH-SW-1-LT-20240215	HH-SW-2-HT-20240215	HH-SW-2-LT-20240215	HH-SW-3-HT-20240215	HH-SW-3-LT-20240215
	N	N	N	N	N	N	N	N	N
	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024
	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133
Total Petroleum Hydrocarbons (µg/L; NWTPH-Gx, -Dx)									
Gasoline-Range Organics	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Diesel-Range Organics	130 U	130 U	150	130 U	130 U	130 U	130 U	130 U	130 U
Oil-Range Organics	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
TPH	ND	ND	150	ND	ND	ND	ND	ND	ND
Volatile Organic Compounds (µg/L; SW-846 8260D)									
Benzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Ethylbenzene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
m-&p-Xylenes	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U
o-Xylene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Toluene	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Dissolved Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, SM 3500-Cr-D)									
Arsenic	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, Total	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Copper	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Lead	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	10 U	12	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Selenium	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Silver	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Zinc	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U
Total Metals (µg/L; SW-846 6010C, 6010D, 6020B, 7470A, SM 3500-Cr-D)									
Arsenic	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, Total	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chromium, Trivalent	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chromium, Hexavalent	10 UHT01	10 UHT01	10 UHT01	10 UHT01	10 UHT01	10 UHT01	10 UHT01	10 UHT01	15 UHT01
Copper	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Hardness (as CaCO3)	5,500	5,100	5,600	6,000	5,800	5,800	5,700	5,800	5,700
Lead	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Mercury	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel	10 U	13	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Selenium	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
Silver	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Zinc	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U	12 U

Table A-8
Aerated Stabilization Basin and Hilton Avenue – Porewater and Surface Water Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Analyte	Sampling Location, Field Sample ID, Sample Type, Sampling Date, Laboratory SDG								
	HH-PW-1	HH-PW-2	HH-PW-3	HH-SW-1-HT	HH-SW-1-LT	HH-SW-2-HT	HH-SW-2-LT	HH-SW-3-HT	HH-SW-3-LT
	HH-PW-1-20240215	HH-PW-2-20240215	HH-PW-3-20240215	HH-SW-1-HT-20240215	HH-SW-1-LT-20240215	HH-SW-2-HT-20240215	HH-SW-2-LT-20240215	HH-SW-3-HT-20240215	HH-SW-3-LT-20240215
	N	N	N	N	N	N	N	N	N
	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024	2/15/2024
	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133	EV24020133
Semivolatile Organic Compounds (µg/L; SW-846 8270E SIM)									
1-Methylnaphthalene	0.031	0.054	0.034	0.048	0.020 U	0.030	0.020 U	0.020 U	0.020 U
2-Methylnaphthalene	0.053	0.091	0.055	0.059	0.020 U	0.043	0.020 U	0.020 U	0.020 U
Acenaphthene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Acenaphthylene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Anthracene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzo(a)anthracene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzo(a)pyrene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzo(b)fluoranthene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzo(g,h,i)perylene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Benzo(k)fluoranthene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
bis(2-Ethylhexyl) Phthalate	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U
Chrysene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Dibenzo(a,h)anthracene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Fluoranthene	0.020 U	0.020 U	0.038	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.025
Fluorene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Indeno(1,2,3-cd)pyrene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Naphthalene	0.020 U	0.028	0.035	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Phenanthrene	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
Pyrene	0.020 U	0.020 U	0.032	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U
General Chemistry									
Alkalinity, total (µg/L; SM 2320B)	160 HT05	130 HT05	160 HT05	100 HT05	90 HT05	100 HT05	98 HT05	110 HT05	110 HT05
Nitrate (µg/L; EPA 300.0)	8.0 HT06	8.1 HT06	9.1 HT06	9.6 HT06	12 HT06	9.6 HT06	9.8 HT05	9.5 HT06	9.4 HT06

Notes:

- Bold** text indicates detected analyte.
- U = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- HT05 = Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.
- HT06 = Sample was analyzed outside of the holding time due to instrument problems. Results should be considered estimated.
- UHT01 = The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit. Sample was analyzed outside of the holding time due to laboratory error. Sample results should be considered estimated.

Abbreviations and Acronyms:

- EPA = US Environmental Protection Agency

ID = identification

µg/L = micrograms per liter

N = primary sample

ND = not detected

NWTPH-Dx = Northwest total petroleum hydrocarbon extended-range diesel analytical method

NWTPH-Gx = Northwest total petroleum hydrocarbon extended-range gasoline analytical method

SDG = sample delivery group

SIM = selected ion monitoring

SM = Standard Method
- TPH = total petroleum hydrocarbons expressed as the sum total of detected concentrations of TPH-G, TPH-D and TPH-O

TPH-D = diesel-range total petroleum hydrocarbons

TPH-G = gasoline-range total petroleum hydrocarbons

TPH-O = oil-range total petroleum hydrocarbons

Table A-9
Landfill Gas Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location ID	Total Depth (ft)	Casing Diameter (inches)	Date of Measurement	Depth to Water (ft bgs)	Barometric Pressure (in Hg)	Static Pressure (in WC)	LFG Result (by % volume)					VOC (ppm)	Notes
							Methane		Carbon Dioxide	Oxygen	Balance Gas		
							% LEL	% Volume					
MW-5(B)	15	2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			NM	NM	NM	NM	NM	NM	NM	NM	NM		
			11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM		
			5/23/2024	2.45	29.71	0.25	7	0.3	0.2	20.8	78.7	NM	Sample collected 1.5 hours after encountering water during purge
RMW-12D	40	2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			5/23/2024	4.31	29.71	-0.19	99	0.0	0.2	21.5	78.3	0.2	
RMW-16	15	2	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			11/20/2023	NM	NM	NM	NM	NM	NM	NM	NM	NM	
			5/23/2024	5.51	29.71	-0.17	0	0.0	15.1	4.8	80.1	0.0	
TGP-1	5	0.75	1/27/2021	NM	29.50	-0.23	NM	90.2	3.2	0.0	6.5	NM	
			5/5/2021	NM	30.10	NM	NM	71.2	26.2	0.2	2.4	NM	
			11/20/2023	NM	30.40	0.02	NM	30.5	32.6	0.0	36.9	NM	
			5/23/2024	DRY	29.71	-0.18	99	61.5	37.8	0.2	0.5	0.2	
TGP-2	5	0.75	10/29/2020	NM	30.00	NM	NM	NM	NM	NM	NM	NM	Car parked over monument
			11/16/2020	NM	30.00	0.23	NM	66.0	21.8	0.0	11.9	NM	
			11/20/2023	NM	30.40	0.02	NM	9.6	20.4	0.0	70.0	NM	
			5/23/2024	3.51	29.71	-0.15	99	68.7	27.4	0.1	3.7	0.9	
TGP-3	5	0.75	10/29/2020	NM	30.00	-0.10	NM	0.7	1.4	13.2	85.0	NM	
			11/16/2020	NM	30.00	-0.21	NM	1.4	10.4	1.2	86.9	NM	
			11/20/2023	NM	30.40	1.64	NM	0.4	7.8	12.7	79.1	NM	
			5/23/2024	3.07	29.71	-0.17	0	4.2	10.8	6.4	78.6	0.4	
TGP-4	5	0.75	1/27/2021	NM	29.50	-0.15	NM	70.6	29.3	0.0	0.0	NM	
			5/5/2021	NM	30.10	NM	NM	67.8	31.1	0.2	0.9	NM	
			11/20/2023	NM	30.40	0.01	NM	33.0	26.1	0.0	40.9	NM	
			5/23/2024	DRY	29.71	-0.19	99	67.4	32.3	0.3	0.0	0.9	
TGP-5	5	0.75	1/27/2021	NM	29.50	-0.28	NM	65.1	34.6	0.1	0.0	NM	
			5/5/2021	NM	30.10	NM	NM	67.2	32.6	0.2	0.0	NM	
			11/20/2023	NM	30.40	-0.01	NM	31.9	31.2	0.0	36.8	NM	
			5/23/2024	DRY	29.71	-0.21	99	66.1	33.9	0.1	0.0	0.3	
TGP-6	5	0.75	10/29/2020	NM	30.00	0.03	NM	20.0	2.5	0.0	77.7	NM	
			11/16/2020	NM	30.00	0.38	NM	17.9	4.3	0.0	77.9	NM	
			11/20/2023	NM	30.40	0.00	NM	8.0	4.5	0.7	86.9	NM	
			5/23/2024	DRY	29.71	-0.18	99	16.2	4.8	0.1	78.9	0.7	
TGP-7	5	0.75	10/29/2020	NM	30.00	0.02	NM	90.6	8.7	0.7	0.0	NM	
			11/16/2020	NM	30.00	0.23	NM	90.8	9.1	0.1	0.0	NM	
			11/20/2023	NM	30.40	0.01	NM	49.2	8.5	0.0	42.3	NM	
			5/23/2024	DRY	29.71	-0.19	63	89.7	10.2	0.1	0.0	409.7	
TGP-8	5	0.75	10/29/2020	NM	30.00	0.02	NM	48.9	6.1	0.0	45.3	NM	
			11/16/2020	NM	30.00	0.19	NM	49.1	7.8	0.0	43.2	NM	
			11/20/2023	NM	30.40	0.00	NM	9.0	4.7	11.3	74.9	NM	
			5/23/2024	DRY	29.71	-0.16	99	21.6	10.3	0.6	67.5	40.1	

Table A-9
Landfill Gas Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Location ID	Total Depth (ft)	Casing Diameter (inches)	Date of Measurement	Depth to Water (ft bgs)	Barometric Pressure (in Hg)	Static Pressure (in WC)	LFG Result (by % volume)					VOC (ppm)	Notes
							Methane		Carbon Dioxide	Oxygen	Balance Gas		
							% LEL	% Volume					
TGP-9	5	0.75	10/29/2020	NM	30.00	0.05	NM	55.8	0.0	0.0	44.1	NM	
			11/16/2020	NM	30.00	-1.21	NM	71.7	0.0	0.2	28.1	NM	
			11/20/2023	NM	30.40	0.08	NM	26.0	0.1	2.9	71.1	NM	
			5/23/2024	2.82	29.71	-0.15	99	23.5	0.0	1.0	75.5	1.0	
TGP-10	5	0.75	10/29/2020	NM	30.00	-0.03	NM	81.0	18.7	0.2	0.0	NM	
			11/16/2020	NM	30.00	0.28	NM	75.3	10.4	0.0	13.4	NM	
			11/20/2023	NM	30.40	0.03	NM	33.8	16.3	0.8	49.1	NM	
			5/23/2024	DRY	29.71	-0.05	99	63.1	18.8	2.3	15.8	0.0	
TGP-11	5	0.75	10/29/2020	NM	30.00	0.00	NM	18.0	8.0	3.0	71.0	NM	
			11/16/2020	NM	30.00	0.28	NM	75.3	10.4	0.0	13.4	NM	
			11/20/2023	NM	30.40	-2.63	NM	15.1	5.8	3.3	75.7	NM	
			5/23/2024	3.90	29.71	-0.16	99	67.7	9.0	3.3	20.0	1.1	
TGP-12	5	0.75	10/29/2020	NM	30.00	0.00	NM	10.1	17.0	0.2	82.1	NM	
			11/16/2020	NM	30.00	0.00	NM	3.8	17.2	0.0	79.1	NM	
			11/20/2023	NM	30.40	-0.04	NM	0.5	15.5	0.0	83.9	NM	
			5/23/2024	DRY	29.71	-0.15	16	1.1	19.7	0.1	79.1	89.3	
TGP-13	5	0.75	10/29/2020	NM	30.00	0.05	NM	24.0	13.3	0.5	62.1	NM	
			11/16/2020	NM	30.00	-0.10	NM	19.1	14.2	0.0	66.8	NM	
			11/20/2023	NM	30.40	NM	NM	NM	NM	NM	NM	NM	Unable to locate
			5/23/2024	NM	29.71	NM	NM	NM	NM	NM	NM	NM	Unable to locate
TGP-14	5	0.75	10/29/2020	NM	30.00	0.02	NM	0.0	1.0	19.1	79.9	NM	
			11/16/2020	NM	30.00	0.14	NM	0.9	0.8	20.0	78.3	NM	
			11/20/2023	NM	30.40	0.01	NM	0.0	0.6	0.9	78.5	NM	
			5/23/2024	3.78	29.71	-0.18	0	0.5	0.4	20.0	79.1	95.5	

Abbreviations and Acronyms:
bgs = below ground surface
ft = feet
ID = identification
in Hg = inches mercury
in WC = inches water column
LEL = lower explosive limit
LFG = landfill gas
NM = not measured
ppm = parts per million
VOCs = volatile organic compounds

Table A-10
Indoor Air Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Building Identification	Date	Maximum Methane Detections (ppm)	Notes
Hilton Harbor Buildings			
Hilton-1 (AAM)	11/16/2020	10	Conducted indoor air monitoring throughout each room in the building. Detections: Minor detections in the Electrical room - only within an inch from the electrical conduit penetrations - maximum detection is zero at any greater distance. Although the detection does not indicate air quality or safety is impacted, a follow-up recommendation will likely ensue to seal the annular space around the conduit with butyl caulk.
Hilton-2	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None
Hilton-3	11/16/2020	0	Conducted crawlspace air monitoring through vents on all four sides of building. Detections: None
Hilton-4	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None Tenants note that "natural gas" odors are noticed occasionally outside of the building.
Hilton-5	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None Detected methane in floor crack - confirmed source as fish offal by crawlspace monitoring and discussion with tenant. No action needed.
Roeder Avenue Buildings			
Roeder-5	12/22/2020	0	Conducted indoor air monitoring throughout building. Detections: None
Roeder-6	11/17/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None
Roeder-7	11/17/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None
Roeder-8	11/17/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None

Table A-10
Indoor Air Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Building Identification	Date	Maximum Methane Detections (ppm)	Notes
Roeder-9	11/17/2020	100-600	Conducted indoor air monitoring throughout each room in the building. Detections: Methane detections in the Technical Development Center and in the SilFab solar panel storage area. -These detections appear related to the heating systems in these areas and NOT from LFG. This needs to be further evaluated to confirm. -Monitoring conducted at all building mitigation vents - most are disconnected from sub-slab collection system - repairs needed.
Roeder-9	12/20/2021	50-400	Follow-up monitoring conducted in areas of the Technology Development Center, including in areas previously inaccessible. Detections: Entry-way: 50 - 60 ppm Classroom: 90 - 100 ppm Office: 90 - 100 ppm Cracks in floor slabs: 300 - 400 ppm Heating system operated in Technology Development Center and monitored - no methane detected. Monitoring indicated methane source is the cracks in the floors near former truck bays Additional monitoring in Silfab office shows slight detection of between 60 and 70 ppm
Roeder-10	-	-	Temporary structure (tent on ecology blocks) not sealed to the ground surface - no indoor air monitoring required)
Roeder-11	*	*	* Building inaccessible during two attempts to conduct indoor air monitoring.
Roeder-12	-	-	Building demolished.
C Street Buildings			
C St-12	-	-	Building outside of Landfill perimeter area. LFG migration in this area not suspected. Indoor air monitoring not required.
C St-13	-	-	Temporary structure (tent on ecology blocks) not sealed to the ground surface - no indoor air monitoring required)
C St-14	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None
C St-15	-	-	Tent with open wall on one side - no indoor air monitoring required
C St-16	-	-	Tent with open wall on one side - no indoor air monitoring required
C St-17	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None

Table A-10
Indoor Air Investigation Results
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Building Identification	Date	Maximum Methane Detections (ppm)	Notes
C St-18	11/16/2020	0	Conducted crawlspace air monitoring through vents on all four sides of building. Detections: None
C St-19	11/16/2020	0	Structure on ecology blocks, one open wall
C St-20	11/20/2023	0 - 0.2	Building is under renovations, exposed plumbing and flooring. Sawdust in eastern half of building. Person renovating said oil/product has been on the ground/floor. SE corner - 0.2 ppm All other areas - 0.0 ppm Basement - 0.0 ppm
C St-21	11/16/2020	0	Conducted indoor air monitoring throughout each room in the building. Detections: None
C St-22	11/20/2023	1.6 - 11	1st floor - Floor is in good condition. One crack going N-S ~0.5", not entirely through the slab. SW corner - 1.9 ppm SE corner - 1.6 ppm Middle East wall - 11 ppm - (Near middle, trash can with paint and chemicals) NE corner - 1.7 ppm Middle North wall - 1.5 ppm NW corner - 1.5 ppm Middle West wall - 1.5 ppm 2nd floor Near gas containers, no odor inside container. - 2.0 ppm

Abbreviations and Acronyms:

LFG = landfill gas

ppm = parts per million

Table A-11
C Street Subarea Field Pilot Study Injection Quantities
Central Waterfront Cleanup Site
Port of Bellingham – Bellingham, Washington

Volume of Injected Seawater (gallons)

Event	Trench A	Trench B	Trench C	Trench D	Trench E	Trench F	Total
December 2023	9,655	8,499	8,327	8,530	6,124	4,049	45,184
January 2024	11,549	9,197	9,765	6,434	6,500	4,879	48,324
February 2024	13,775	10,952	13,885	10,971	8,789	5,920	64,292
March 2024	12,828	11,843	12,442	8,773	8,137	6,059	60,082
April 2024	14,078	12,800	14,177	8,268	9,035	6,860	65,218
May 2024	12,893	11,821	11,562	8,836	8,332	5,933	59,377
June 2024	14,459	12,439	13,096	8,558	8,845	6,259	63,656
July 2024	15,770	13,424	13,728	9,491	9,239	7,535	69,187
August 2024	25,936	16,495	12,773	8,841	8,801	6,619	79,465
Total	130,943	107,470	109,755	78,702	73,802	54,113	554,785

Note:

Volume of injected seawater based on totalizer readings collected during injection events.

Slug Testing Activities Summary and Results

Slug Testing Activities Summary and Results

This section describes the slug tests completed at select Hilton Avenue and C Street monitoring wells and the associated analysis Landau Associates, Inc. (Landau) completed to develop estimates of hydraulic conductivity of the screened material based on the results of the slug tests. Landau completed slug testing for the following wells:

- CWF-CW-2
- CS-MW-3
- CS-MW-6
- MW-51C
- ASB-MW-1
- HH-MW-1
- HH-MW-2.

Methods

Slug tests were completed by Landau staff on November 30, 2023. Pressure transducers were temporarily installed during slug testing and programmed to measure hydrostatic pressure (i.e., water level above the transducer) every half second throughout the testing of each well. Prior to each slug test, a static water-level measurement was obtained at the well. A falling head test was conducted as a slug—a 4.66-foot length of 0.055-inch steel pipe—was lowered into the well to be fully submerged below the static water level, causing the water level to immediately rise (initial displacement), followed by the recovery of the water level back to static conditions. After the water level re-stabilized at static level, a rising head test was conducted by rapidly pulling the slug out of the well, causing the water level to drop (initial displacement), followed by the recovery of the water level back to static conditions once more.

Two rising and two falling head tests were generally conducted at each well.¹ For wells that had a well screen fully submerged, Landau selected one representative rising head and one falling head test to analyze for each well. For wells that had well screens that were not fully submerged (i.e., where the screen was only partially saturated), Landau analyzed only the two rising head tests for each well.² In all tests, the water levels recovered in under 3 minutes following initial displacement. The water level data recorded by the transducer were post-processed in Microsoft Excel (to convert the data to displacement magnitude over time for individual tests) and analyzed with the AQTESOLV curve-fitting software (Duffield 2007) to obtain estimates of hydraulic conductivity. The pressure transducer data were uncompensated for barometric pressure (which is acceptable for analysis of relative changes in water levels, as in slug testing) and were not corrected for any tidal variations or background water-level trends (which is acceptable for the short duration monitoring during the slug testing). However, if the pressure transducer was accidentally moved during slug lowering/raising, the offset in the sensor depth was corrected. Landau estimated hydraulic conductivity using the Hvorslev (1951) and Bouwer and Rice (1976) solutions. Figures depicting the analysis graphically are attached as Figures ST-1 through ST-14.

¹ Except for CFW-CW-2, where the first two tests did not have the slug fully submerged.

² Falling head slug tests are not appropriate for wells with partially submerged screens because of confounding effects related to the unsaturated sand pack around the well screen.

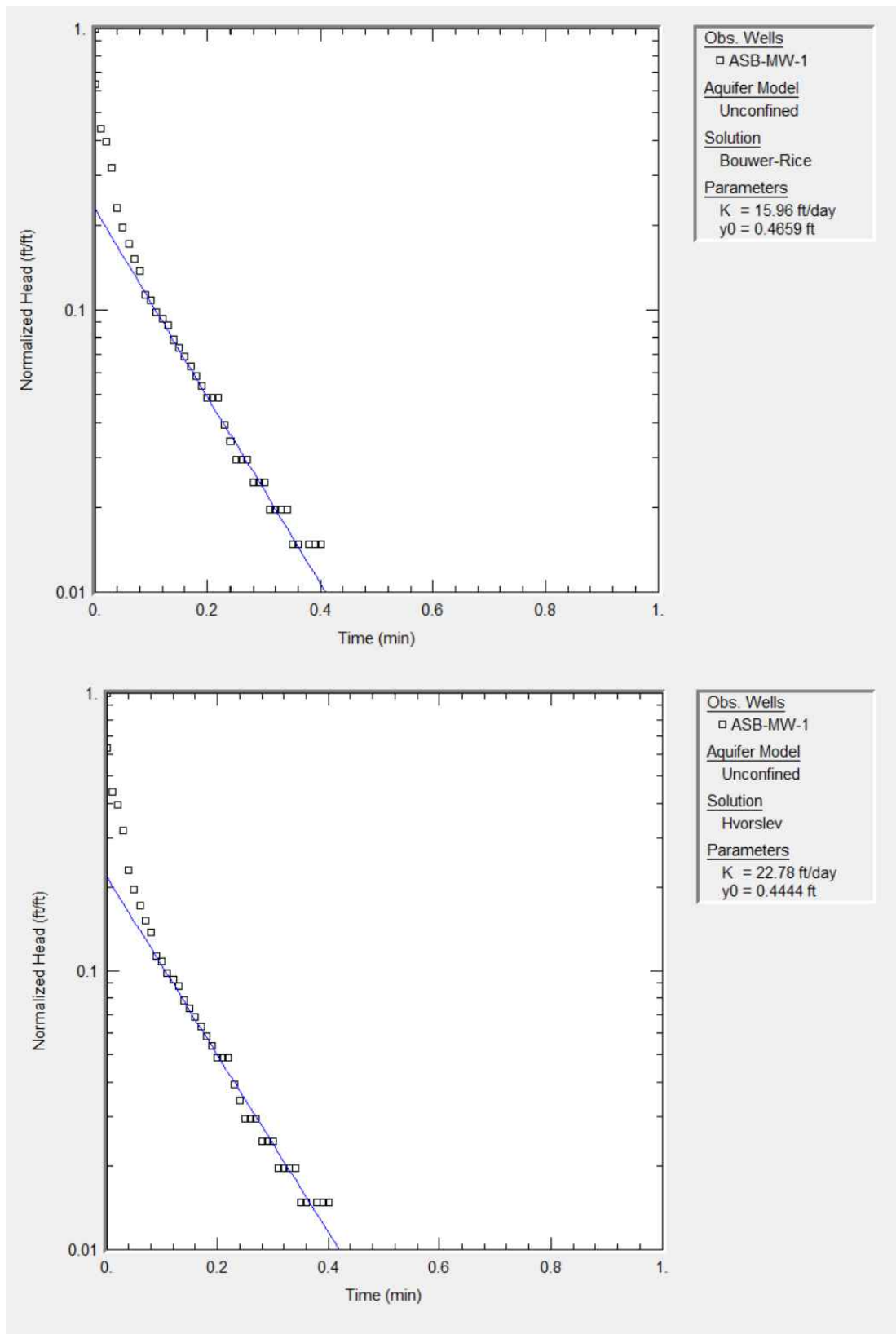
Results

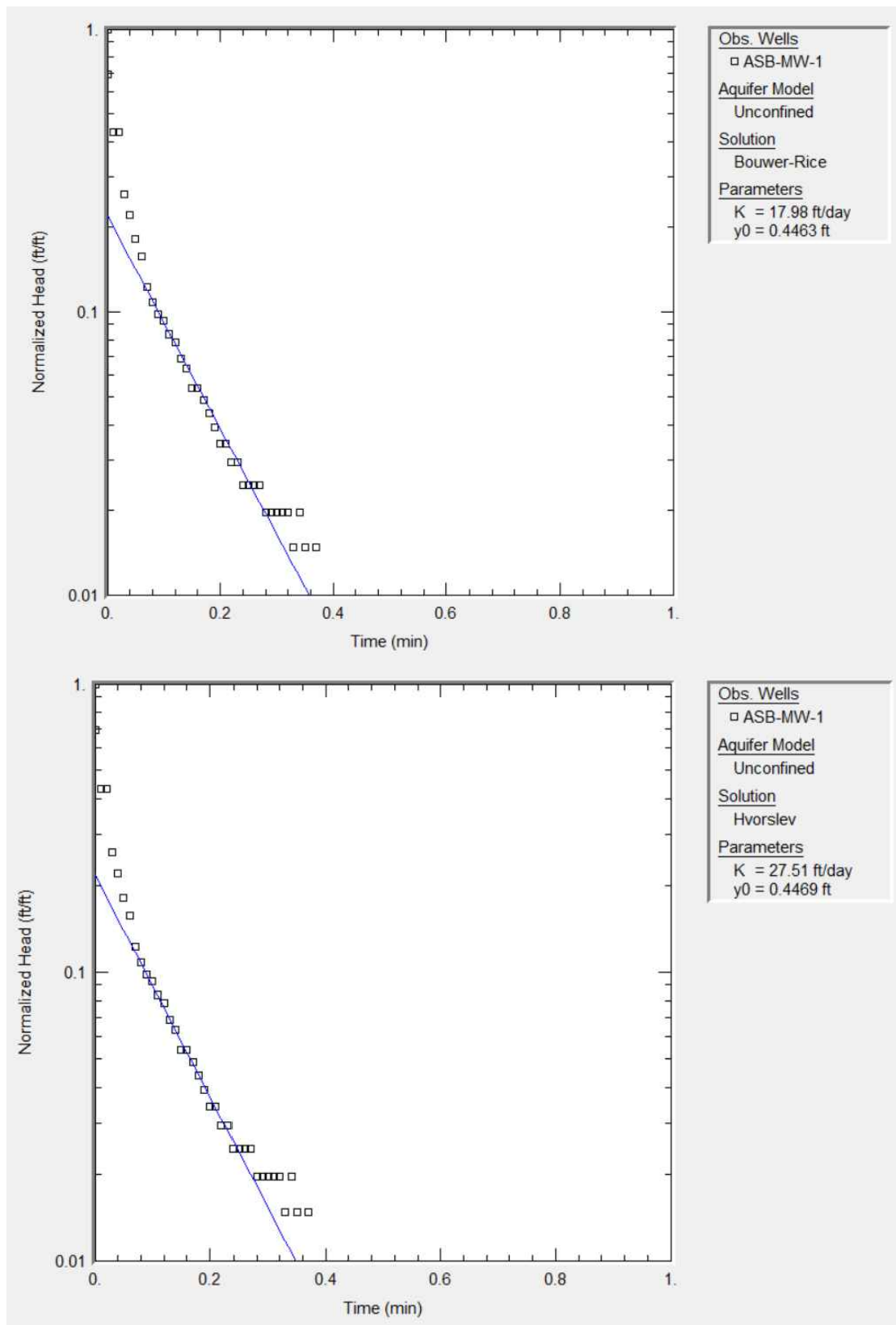
Preliminary analysis of the slug test results indicated hydraulic conductivity estimates of approximately 2 to 32 feet per day (ft/day), which is within the range of typical hydraulic conductivity documented in the literature (e.g., Fetter 2001; Freeze and Cherry 1979) for the soil texture of the screened material (predominantly sand). Slug tests are not typically appropriate for high-permeability material; the subsurface material in which the tested wells are screened is likely moderately high-permeability. Therefore, the results of the slug tests should be considered approximate and accurate to the order of magnitude only. The table below summarizes the hydraulic conductivity estimates for all tested wells:

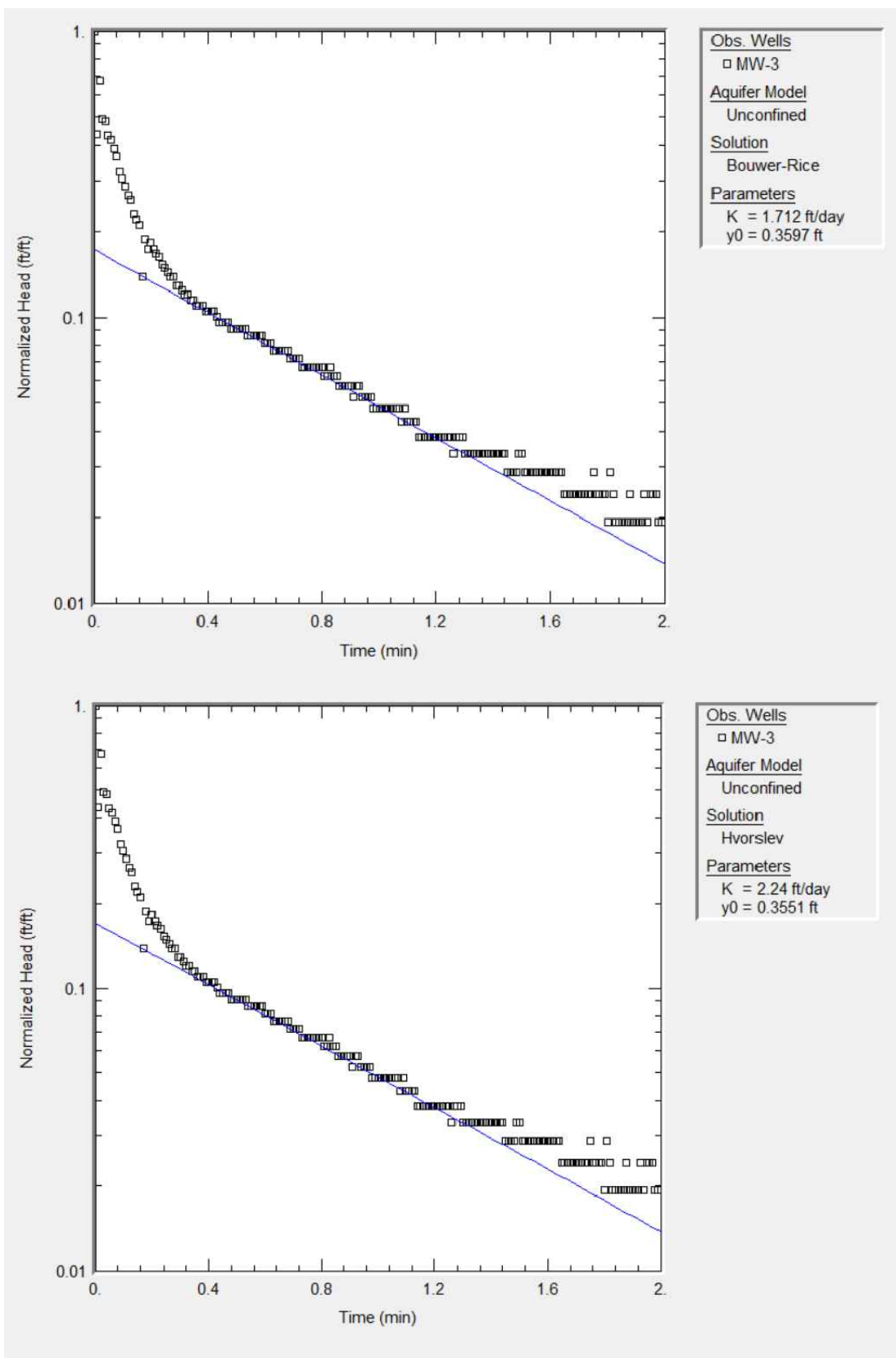
Well Name	Test	Bouwer & Rice K (ft/day)	Hvorslev (ft/day)
CW-2	3rd Rising Head	4	6
	4th Falling Head	7	10
MW-6	1st Rising Head	4	4
	2nd Rising Head	3	4
MW-3	1st Rising Head	2	2
	2nd Rising Head	2	2
MW-51('C)	1st Rising Head	4	5
	2nd Rising Head	4	6
ASB-MW-1	1st Rising Head	16	23
	2nd Rising Head	18	28
HH-MW-1	1st Falling Head	20	23
	2nd Rising Head	15	20
HH-MW-2	1st Rising Head	20	32
	2nd Rising Head	20	31

References

- Bouwer, H., and R.C. Rice. 1976. "A Slug Test Method for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells." *Water Resources Research*. 12 (3):423-428.
- Duffield, Glenn M. 2007. AQTESOLV™ for Windows User's Guide. Version 4.5. HydroSOLVE, Inc.
- Fetter, C.W. 2001. *Applied Hydrogeology*. 4th ed. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Freeze, R.A., and J.A. Cherry. 1979. *Groundwater*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- Hvorslev, Mikael Juul. 1951. Time Lag and Soil Permeability in Ground-Water Observations. Bulletin No. 36. Waterways Experiment Station, US Army Corps of Engineers. April.
<https://health.hawaii.gov/heer/files/2021/07/Hvorslev1951.pdf>.



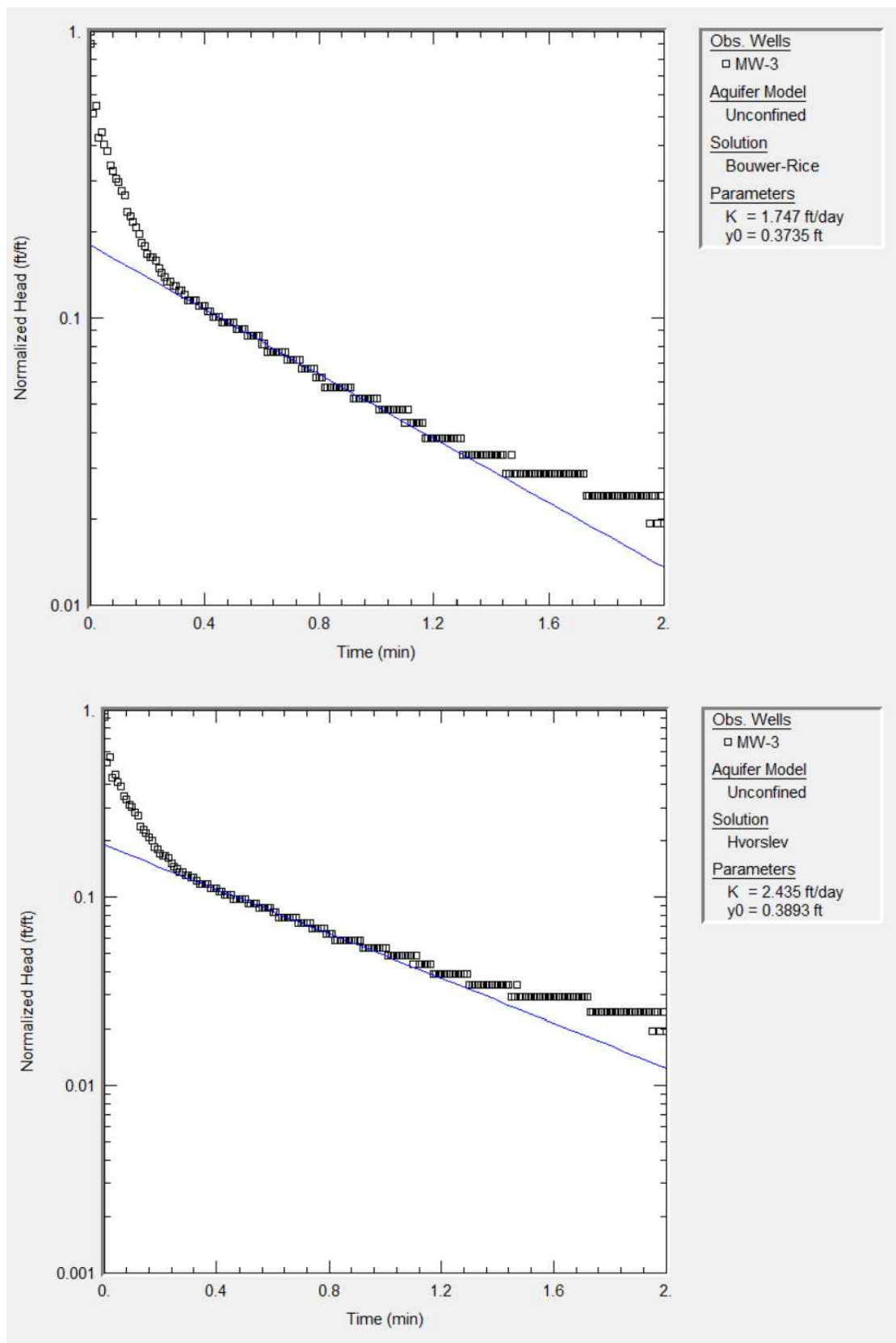


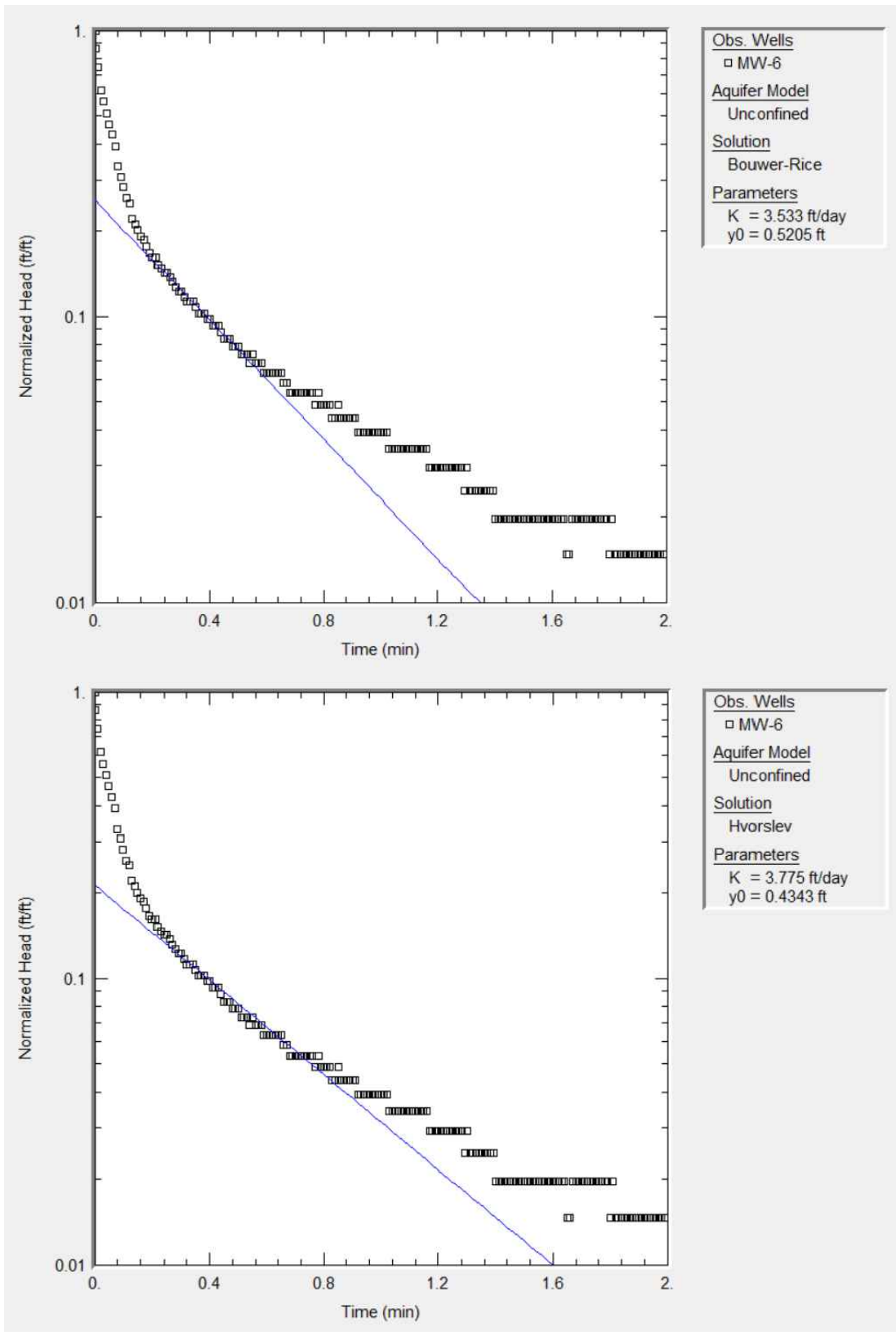


Port of Bellingham

CS-MW-3
Slug Test Analysis

Figure
ST-3

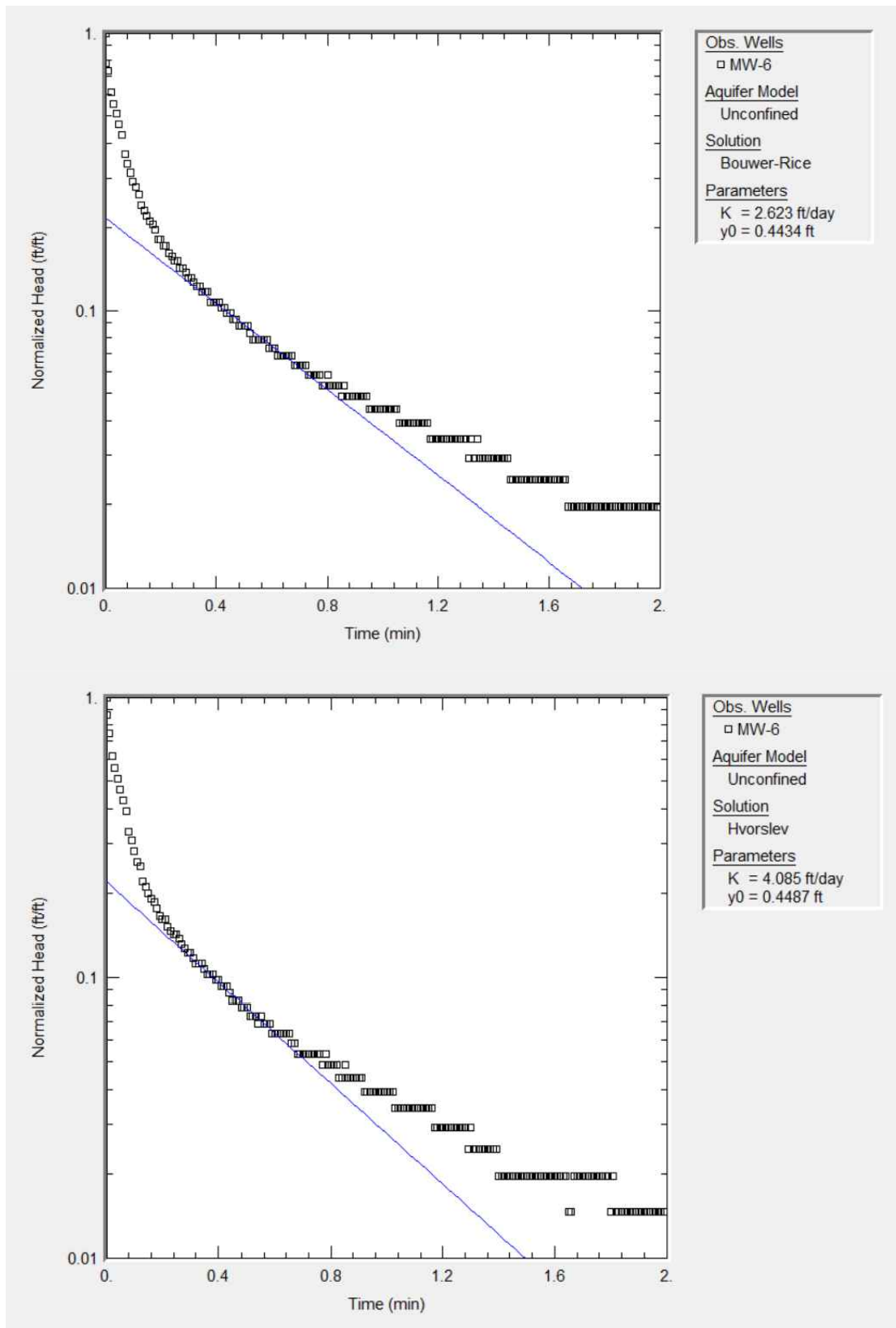




Port of Bellingham

CS-MW-6
Slug Test Analysis

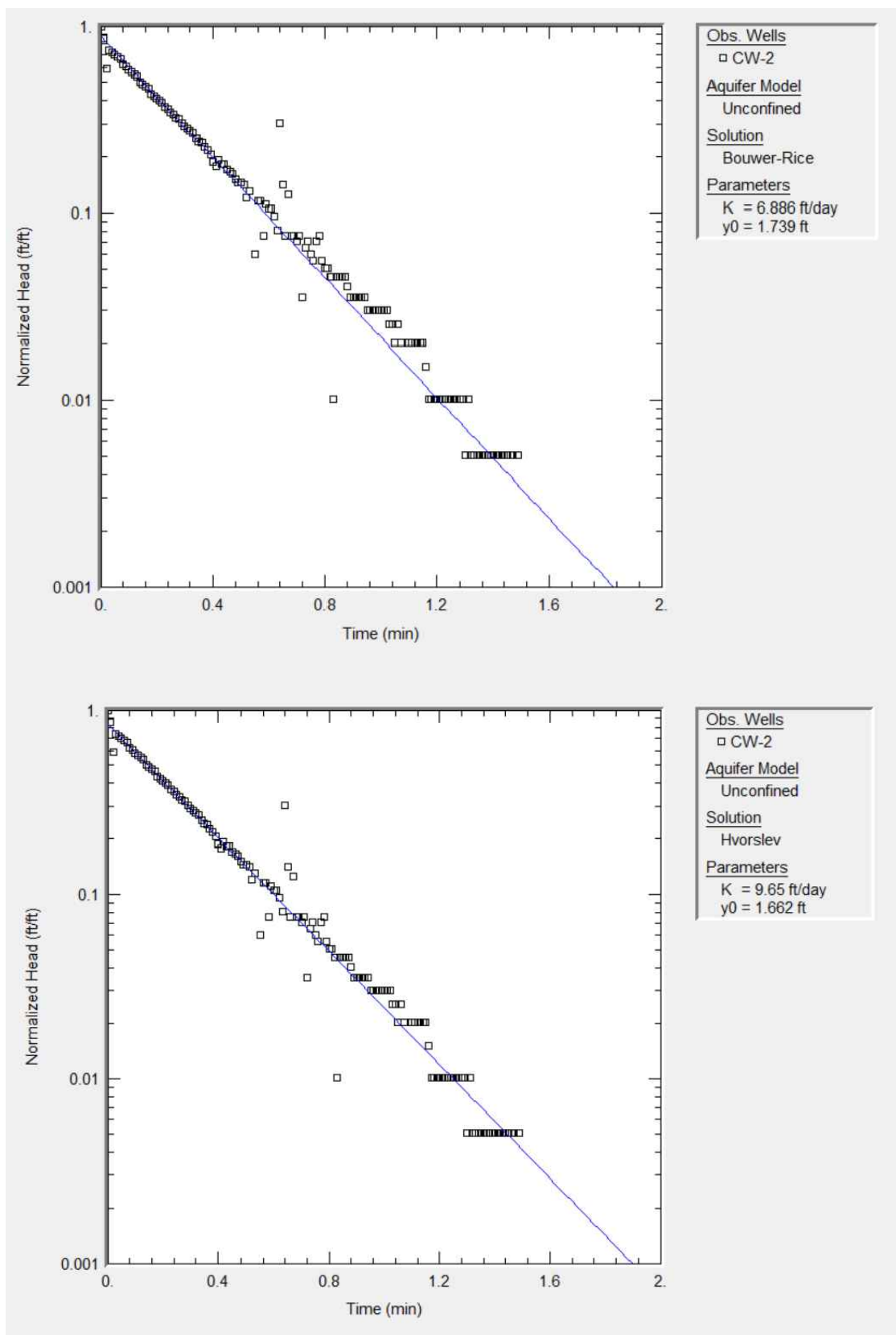
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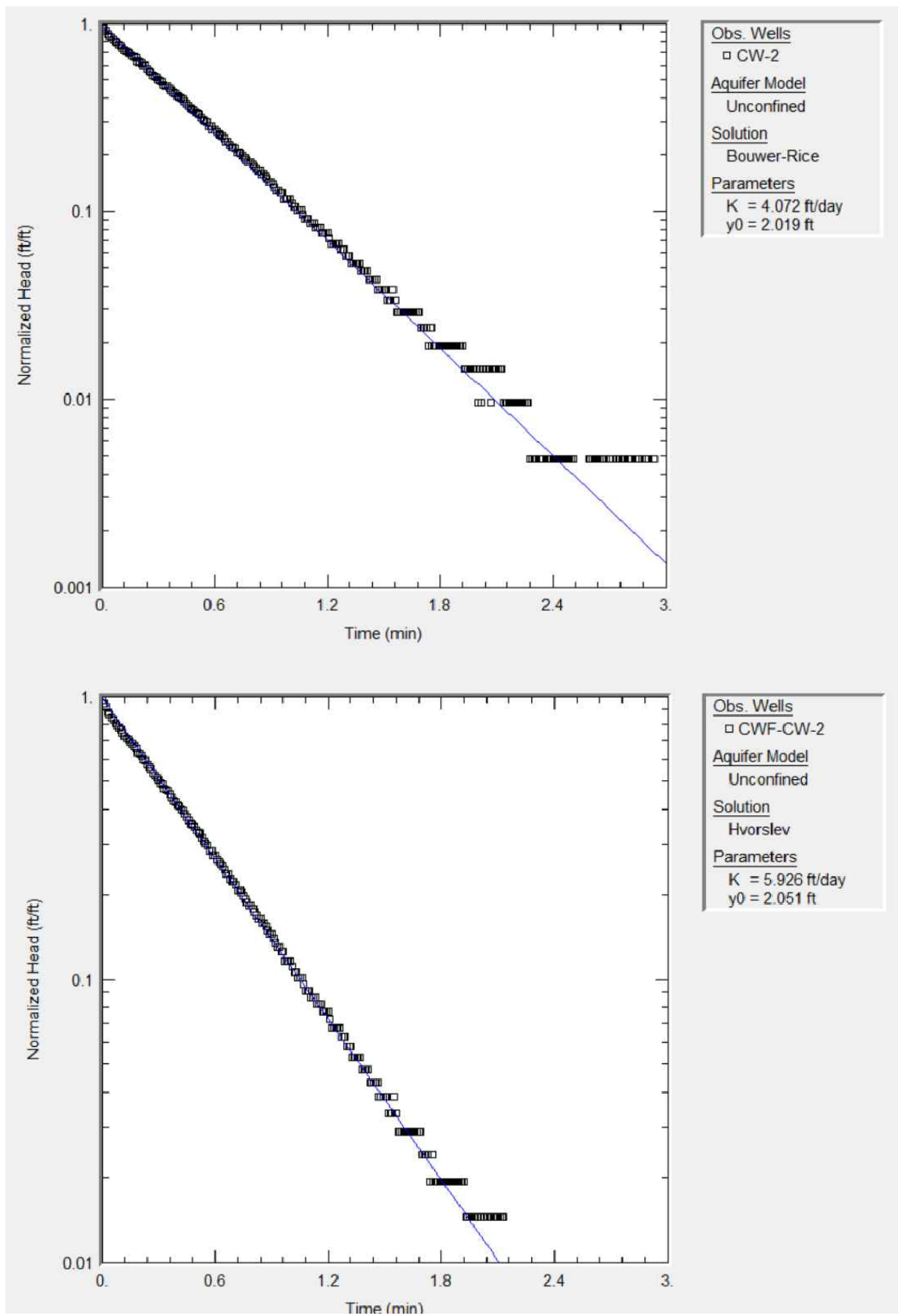


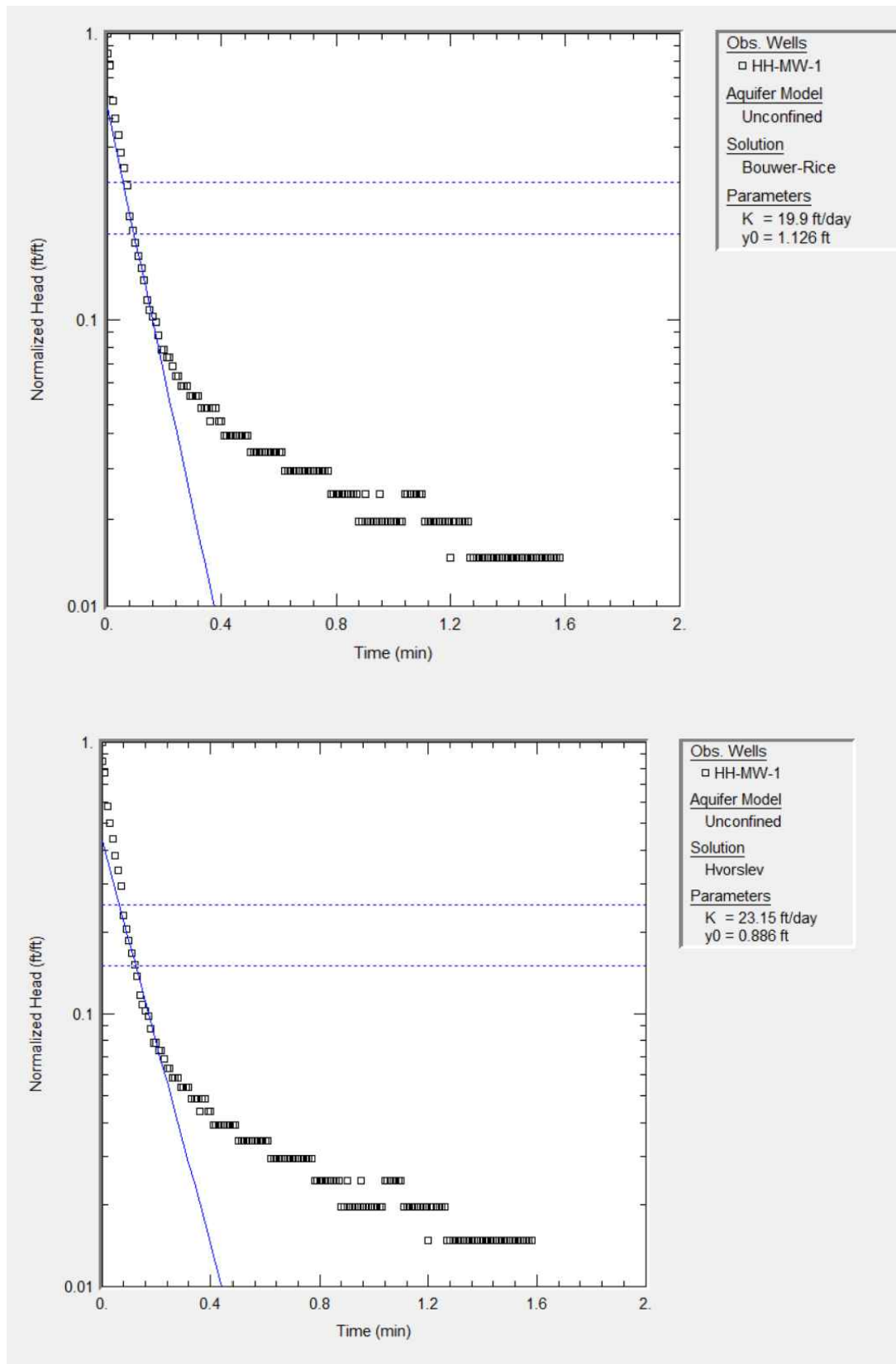
Port of Bellingham

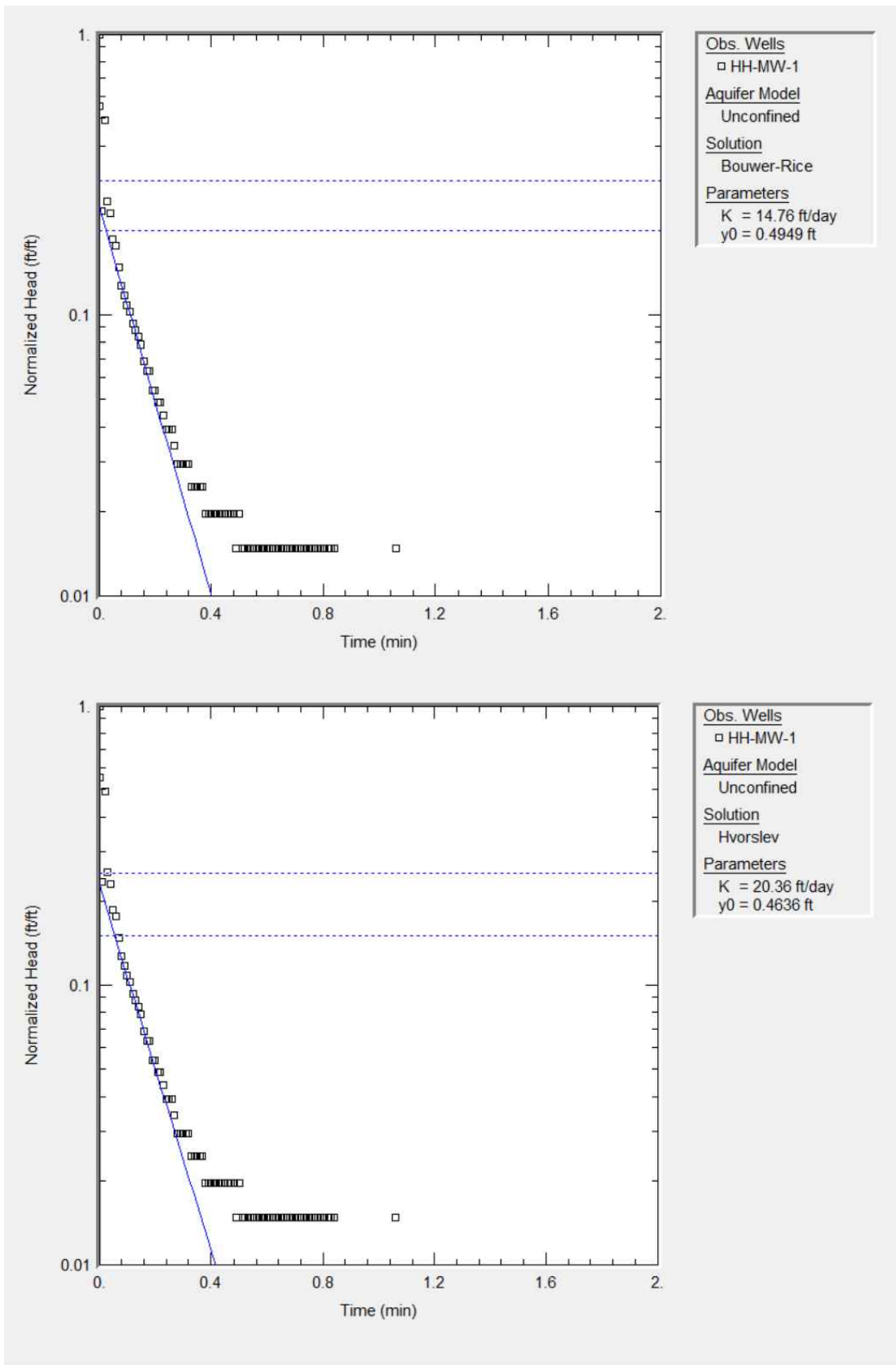
CS-MW-6
Slug Test Analysis

Figure
ST-6





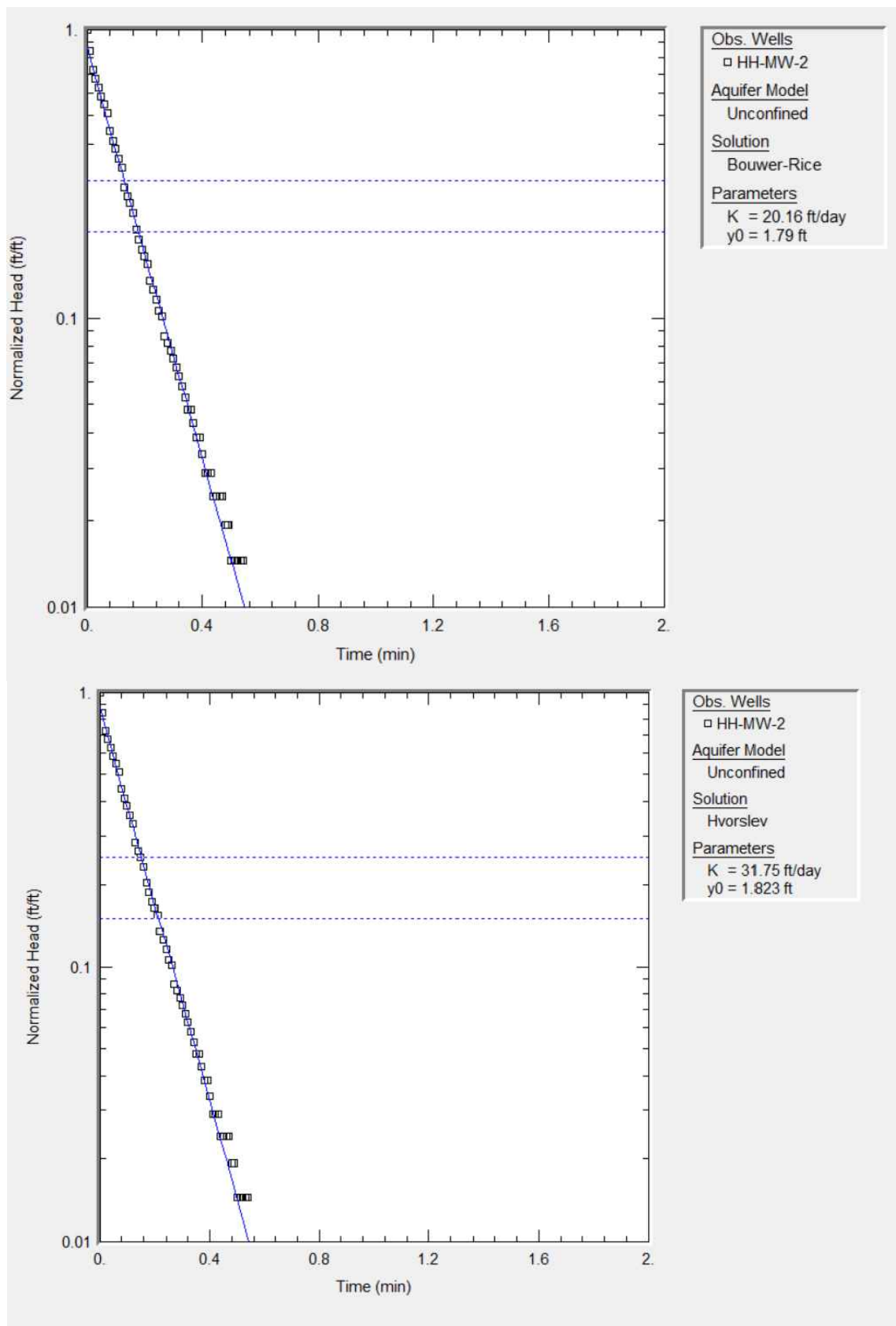


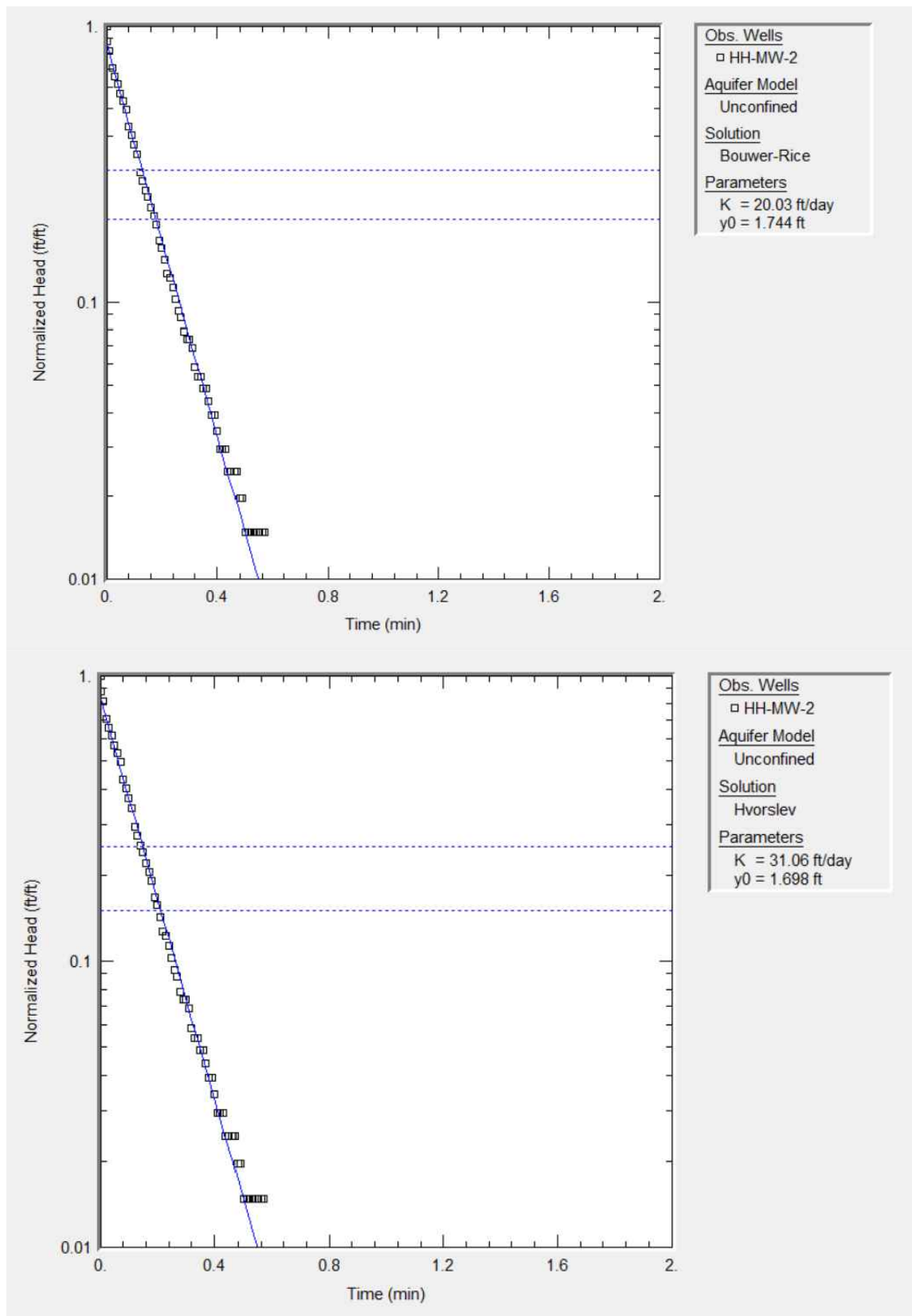


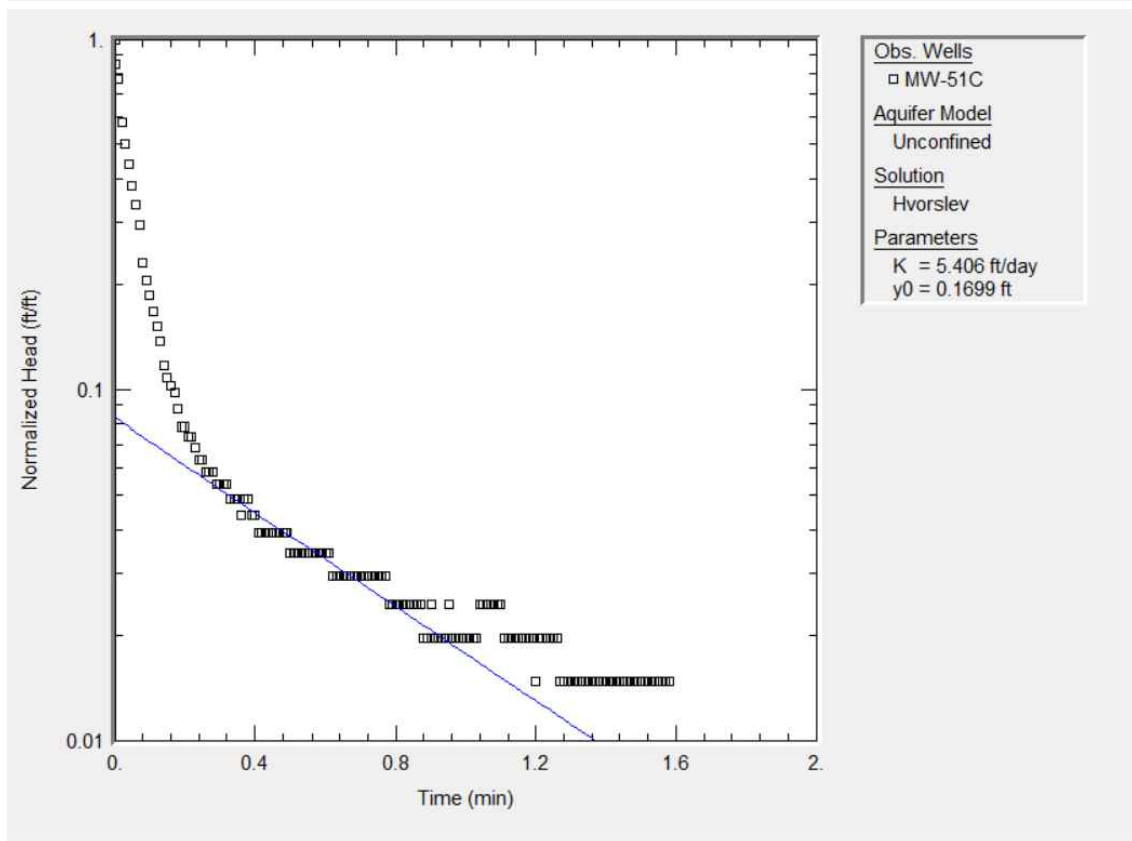
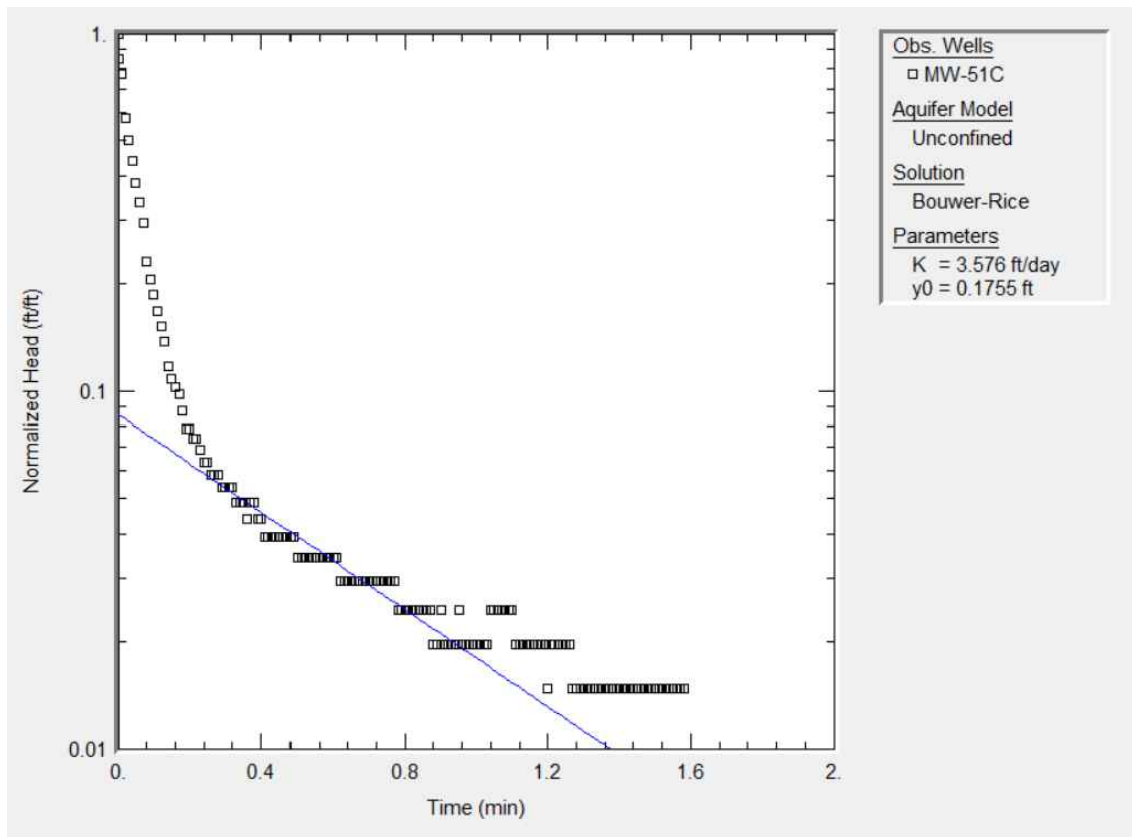
Port of Bellingham

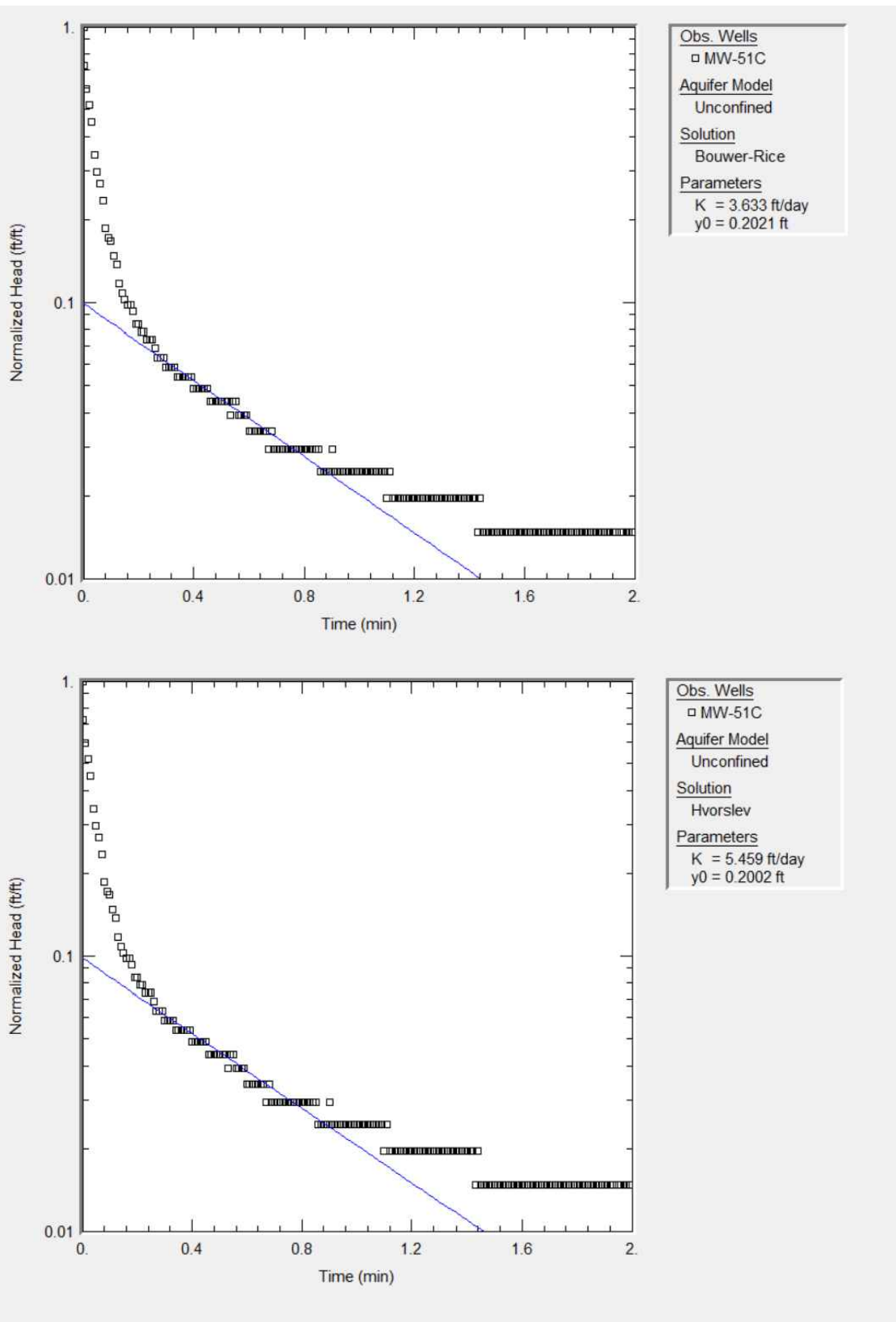
HH-MW-1
Slug Test Analysis

Figure
ST-10

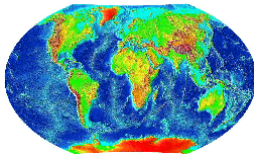








Geophysical Report



Global Geophysics
P.O. Box 2229
Redmond, WA 98053
Tel: 425-890-4321
Fax: 206-582-0838

October 17, 2023

Our ref: 113-1008.000

Landau Associates, Inc.
155 NE 100th Street, Suite 302
Seattle, WA 98125

ATTENTION: Ms. Stephanie Renando

**RE: REPORT FOR THE GEOPHYSICAL SURVEY AT PORT OF
BELLINGHAM, BELLINGHAM, WA**

This letter report presents the results of the geophysical surveys performed by Global Geophysics on October 9th and 10th, 2023 at Port of Bellingham, Bellingham, WA. The objective of the pilot geophysical survey is to define the landfill boundary.

METHODOLOGY, INSTRUMENTATION AND FIELD PROCEDURES

The following paragraphs describe the method and field procedures.

Induced Polarization Tomography (IPT)

The IPT method studies the decaying potential difference as a function of time. In this method the geophysicist looks for portions of the earth where current flow is maintained for a short time after the applied current is terminated.

When a metal electrode is immersed in a solution of ions of a certain concentration and valence, a potential difference is established between the metal and the solution sides of the interface. This difference in potential is an explicit function of the ion concentration, valence, etc. When an external voltage is applied across the interface, a current is caused to flow and the potential drop across the interface changes from its initial value. The change in interface voltage is called the "over voltage" or "polarization" potential of the electrode. Over voltages are due to an accumulation of ions on the electrolyte side of the interface. The time constant of buildup and decay is typically several tenths of a second.

The data were acquired with an AGI SuperSting R8 using up to 48 electrodes spaced at a 5 interval. Once the electrode array was installed in the ground, multiple soundings were automatically carried out by the control unit. Downloading and routine modeling of the data was done on-site to provide preliminary analysis and QA/QC of the data. These results were displayed on a color monitor as cross-section that highlight changes in IP with depths along the transects.

RESULTS

The approximate line locations are shown in Figure 1.

- **Landfill extent**

The IP profiles are presented in Figure 2. The interpreted bottom of the landfill from the IP profiles are the dashed purple lines. The interpreted bottom of the landfill may be calibrated when borehole logs are available. The interpreted lateral extent of the landfill is presented in Figure 1.

LIMITATIONS

Global Geophysics's services are conducted in a manner consistent with the level of care and skill ordinarily exercised by other members of the geophysical community currently practicing under similar conditions subject to the time limits and financial and physical constraints applicable to the services. The induced polarization tomography is a remote sensing geophysical method that may not detect all subsurface objects. Furthermore, it is possible that geophysical anomalies that are interpreted to be obstructions may upon intrusive sampling prove to be misinterpreted.

If you have any questions or require additional information, please contact us at 425-890-4321.

Sincerely,

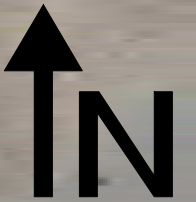
Global Geophysics



John Liu, Ph.D.
Principal Geophysicist



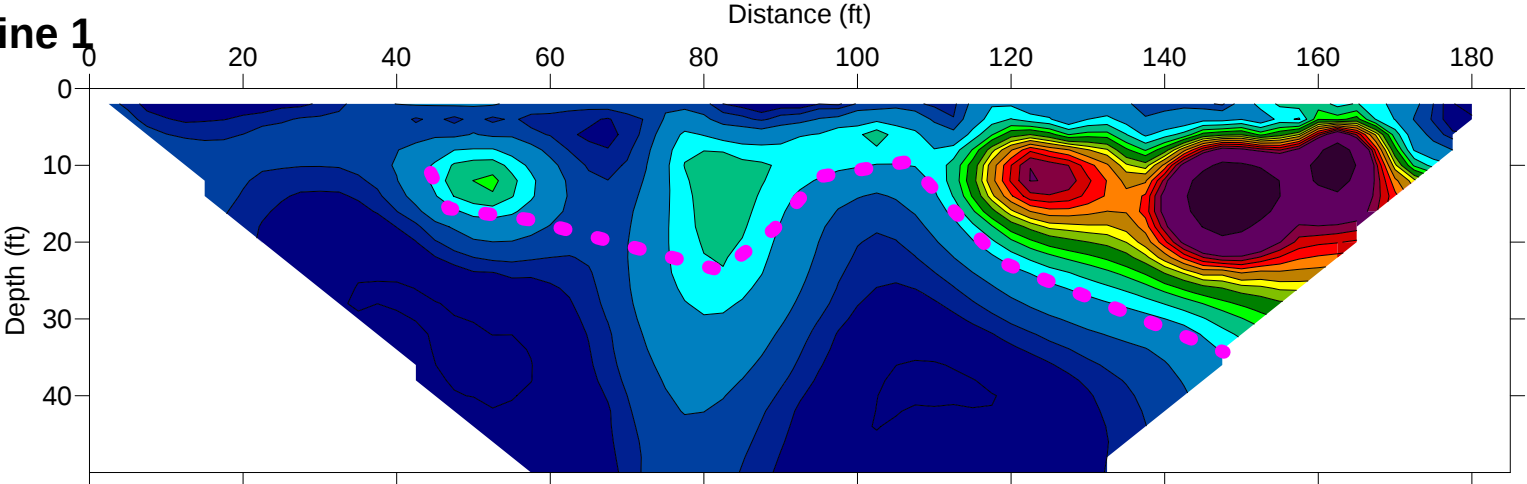
Note by Landau Associates:
Landfill extents
noted here are an
inference only and
should not be
relied upon without
confirmation by
direct exploration.



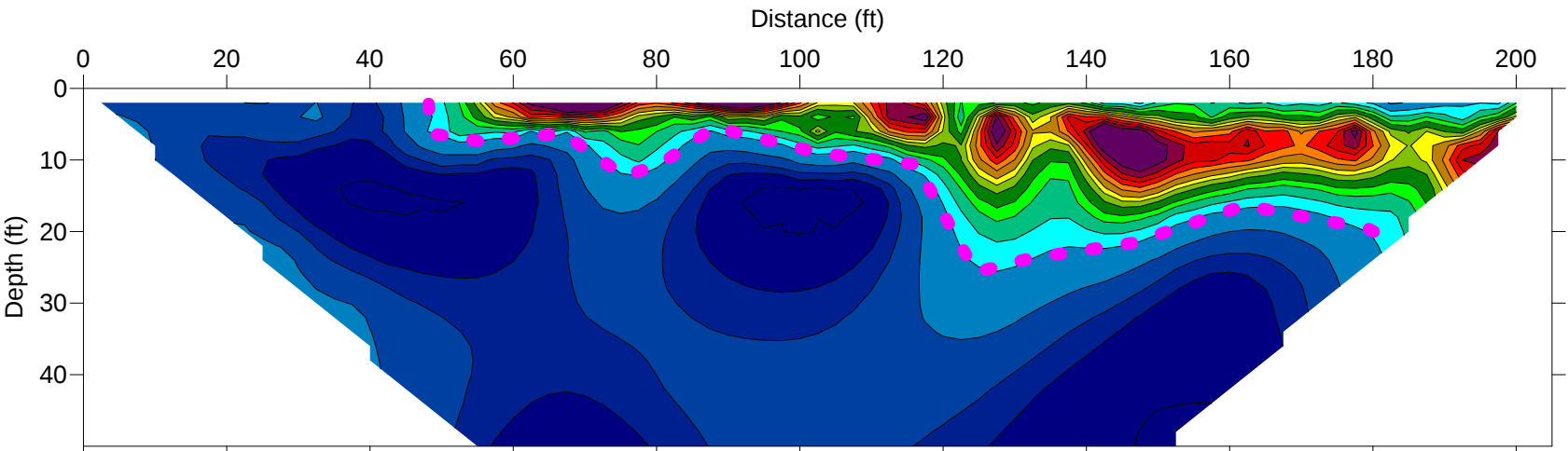
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Global Geophysics		Project #: 113-1008.000	FILE No.	
P.O. Box 2229		DESIGN --	SCALE AS SHOWN	
Redmond, WA 98073-2229		CADD EJ	FIGURE 1	
Tel: 425-890-4321		CHECK JL		
		REVIEW --		

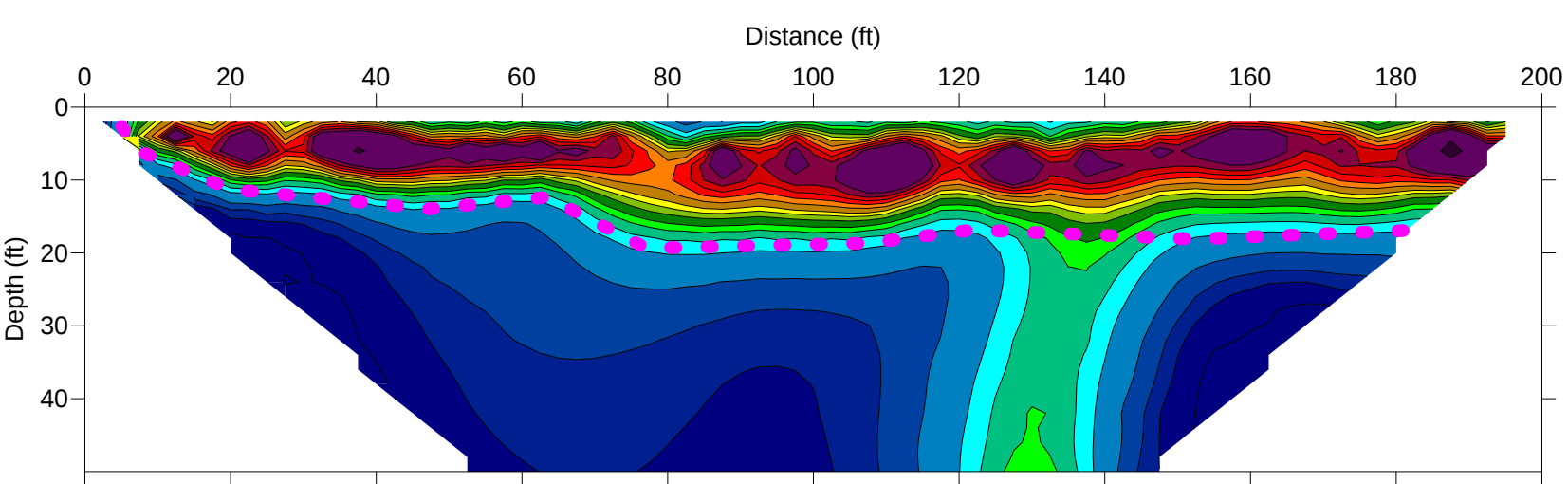
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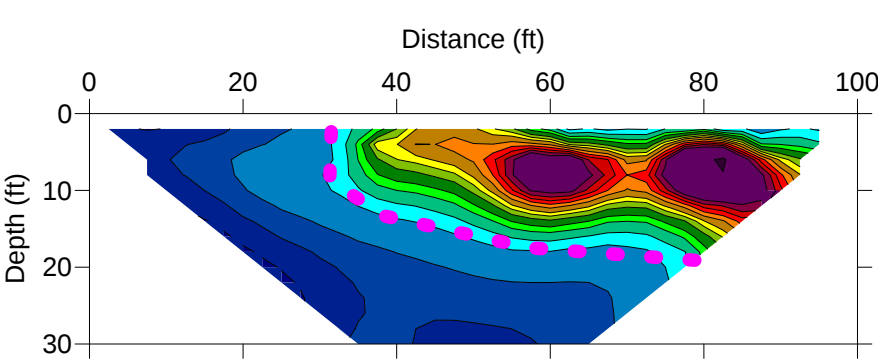
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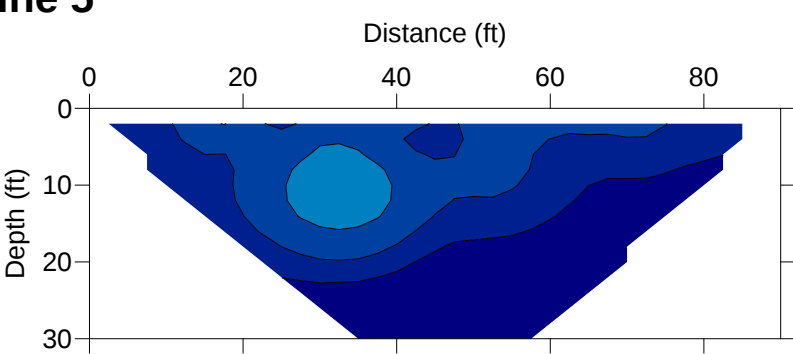
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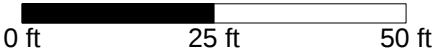
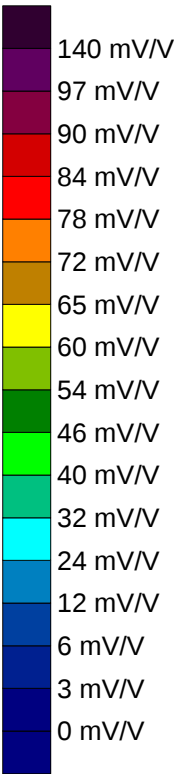


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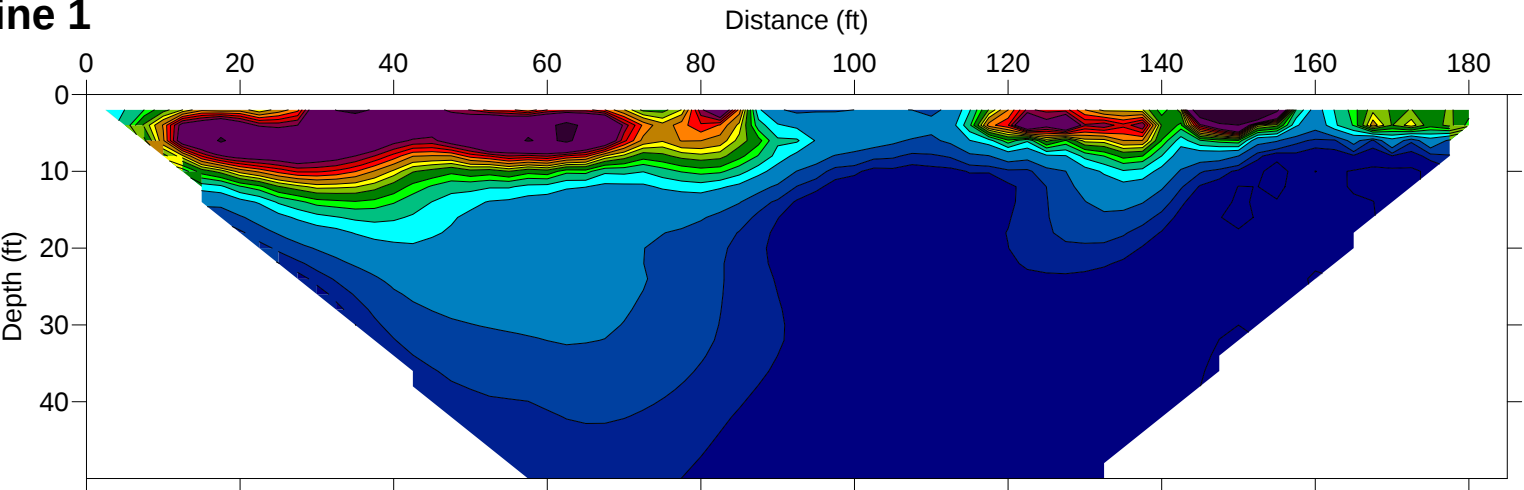
Interpreted landfill boundary



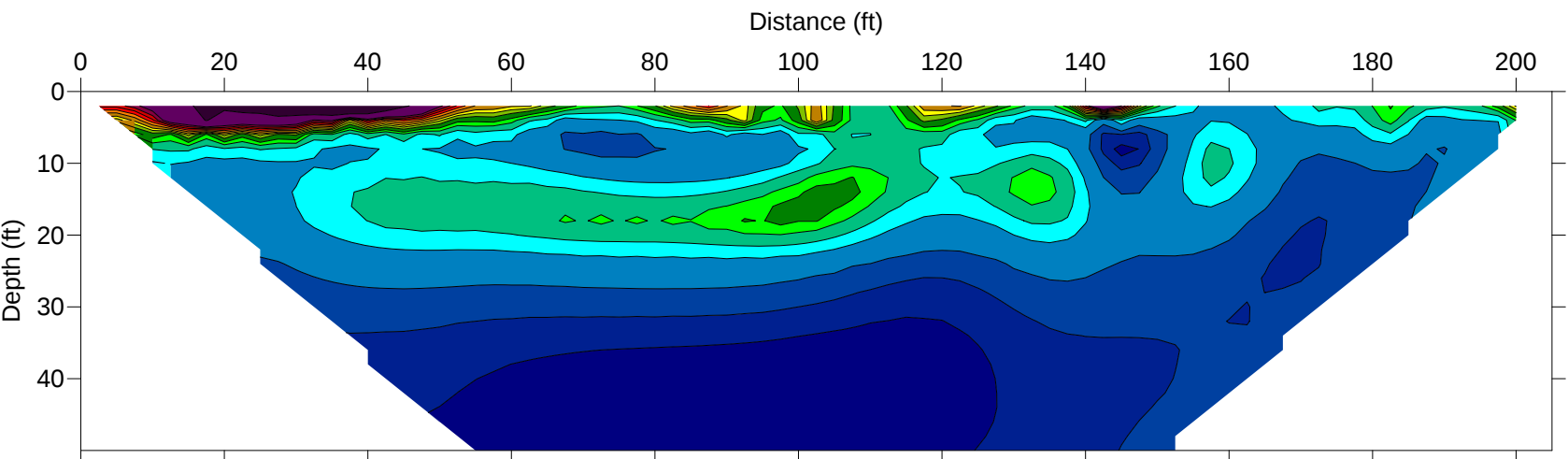
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Tel: 425-690-4321	CHECK	JL	
	REVIEW	--	

FIGURE 2

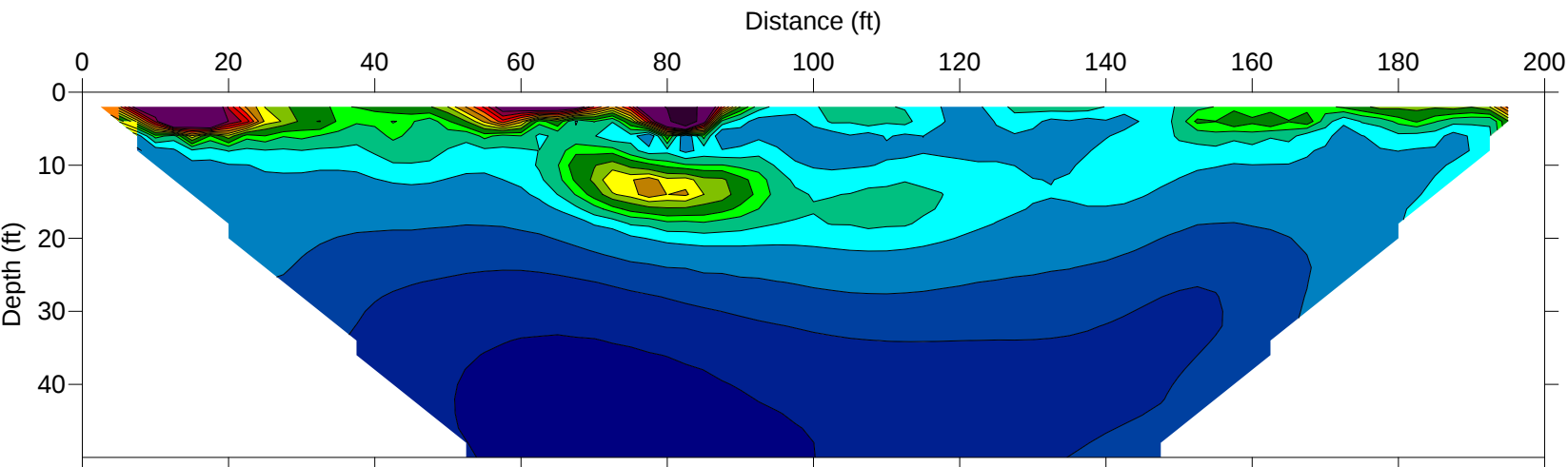
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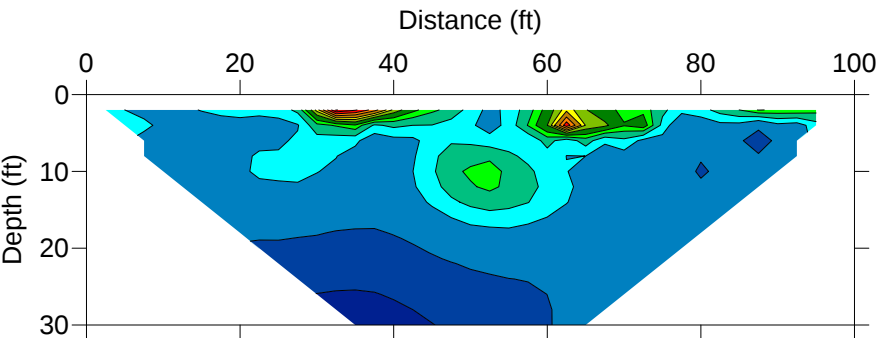
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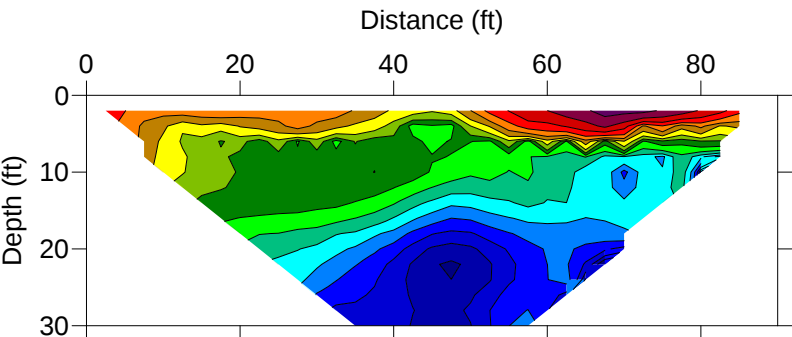
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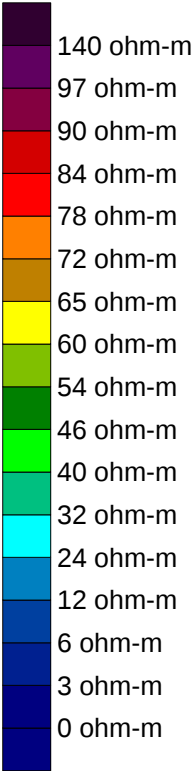
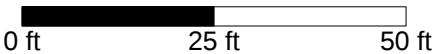


Line 5



Legend:

Interpreted landfill boundary



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Resistivity Profiles			
Global Geophysics		Project #: 113-1008,000	FILE No.
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Redmond, WA 98073-2229	CADD	EJ	REV.
Tel: 425-690-4321	CHECK	JL	
	REVIEW	--	

FIGURE 3

Boring Logs

Soil Classification System

	MAJOR DIVISIONS		USCS GRAPHIC SYMBOL	USCS LETTER SYMBOL ⁽¹⁾	TYPICAL DESCRIPTIONS ⁽²⁾⁽³⁾
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
				GM	Silty gravel; gravel/sand/silt mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		GC	Clayey gravel; gravel/sand/clay mixture(s)
		SAND WITH FINES (Appreciable amount of fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
				ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
				MH	Inorganic silt; micaceous or diatomaceous fine sand; elastic silt
	HIGHLY ORGANIC SOIL			CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
				PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	USCS GRAPHIC SYMBOL	USCS LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

- Notes:
- USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
 - Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
 - Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent: > 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
 Secondary Constituents: > 30% and < 50% - "very gravelly," "very sandy," "very silty," etc.
 > 15% and < 30% - "gravelly," "sandy," "silty," etc.
 Additional Constituents: > 5% and < 15% - "with gravel," "with sand," "with silt," etc.
 < 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

- Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key			Field and Lab Test Data	
SAMPLER TYPE & METHOD		SAMPLE NUMBER & INTERVAL	Code	Description
Graphic	Code	Description		
	a	3.25-in OD, 2.42-in ID Split Spoon	WOR	Weight of Rod
	b	2.00-in OD, 1.50-in ID Split Spoon	WOH	Weight of Hammer
	c	Thin-Wall Sampler (aka Shelby Tube)	PP = 1.0	Pocket Penetrometer, tsf
	d	Grab Sample	TV = 0.5	Torvane, tsf
	e	Single-Tube Core Barrel	PID = 100	Photoionization Detector VOC screening, ppm
	f	Double-Tube Core Barrel	W = 10	Moisture Content, %
	g	2.50-in OD, 2.00-in ID WSDOT	D = 120	Dry Density, pcf
	h	3.00-in OD, 2.37-in ID Mod. Calif.	-200 = 60	Material smaller than No. 200 sieve, %
	i	Other - See text if applicable	GS	Grain Size - See separate figure for data
	1	300-lb Hammer, 30-inch Drop	AL	Atterberg Limits - See separate figure for data
	2	140-lb Hammer, 30-inch Drop	UU	Triaxial Unconsolidated Undrained (UU) Strength
	3	Direct Push	CU	Triaxial Consolidated Undrained (CU) Strength
	4	Vibrocore	Consol	1-D Consolidation Test
	5	Other - See text if applicable	Perm	Permeability Test
	6	Piston Extraction	CA	Chemical Analysis

Central Waterfront
Cleanup Site
Bellingham, Washington

Soil Classification
System and Key

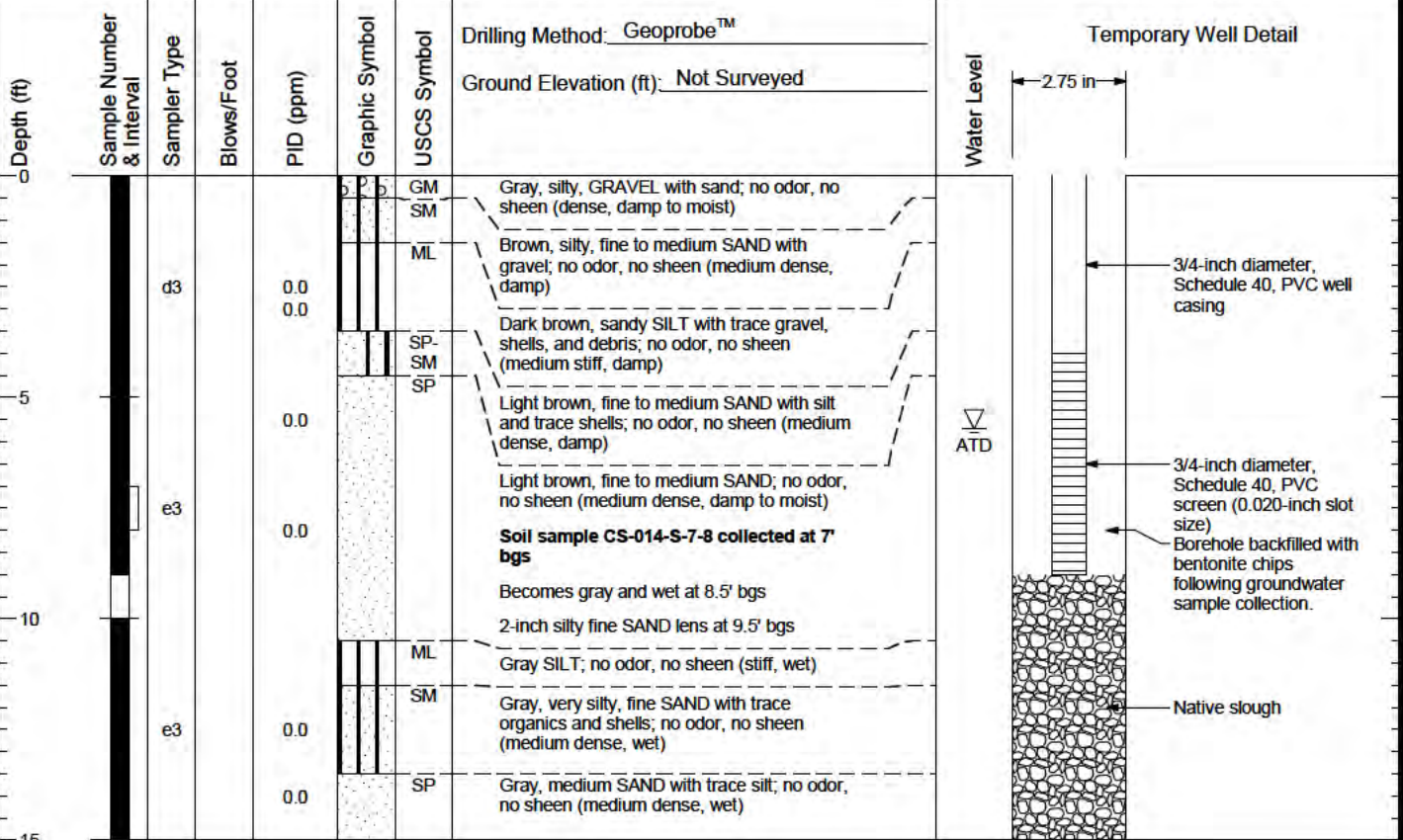
Figure
AB-1

CS-014

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/11/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

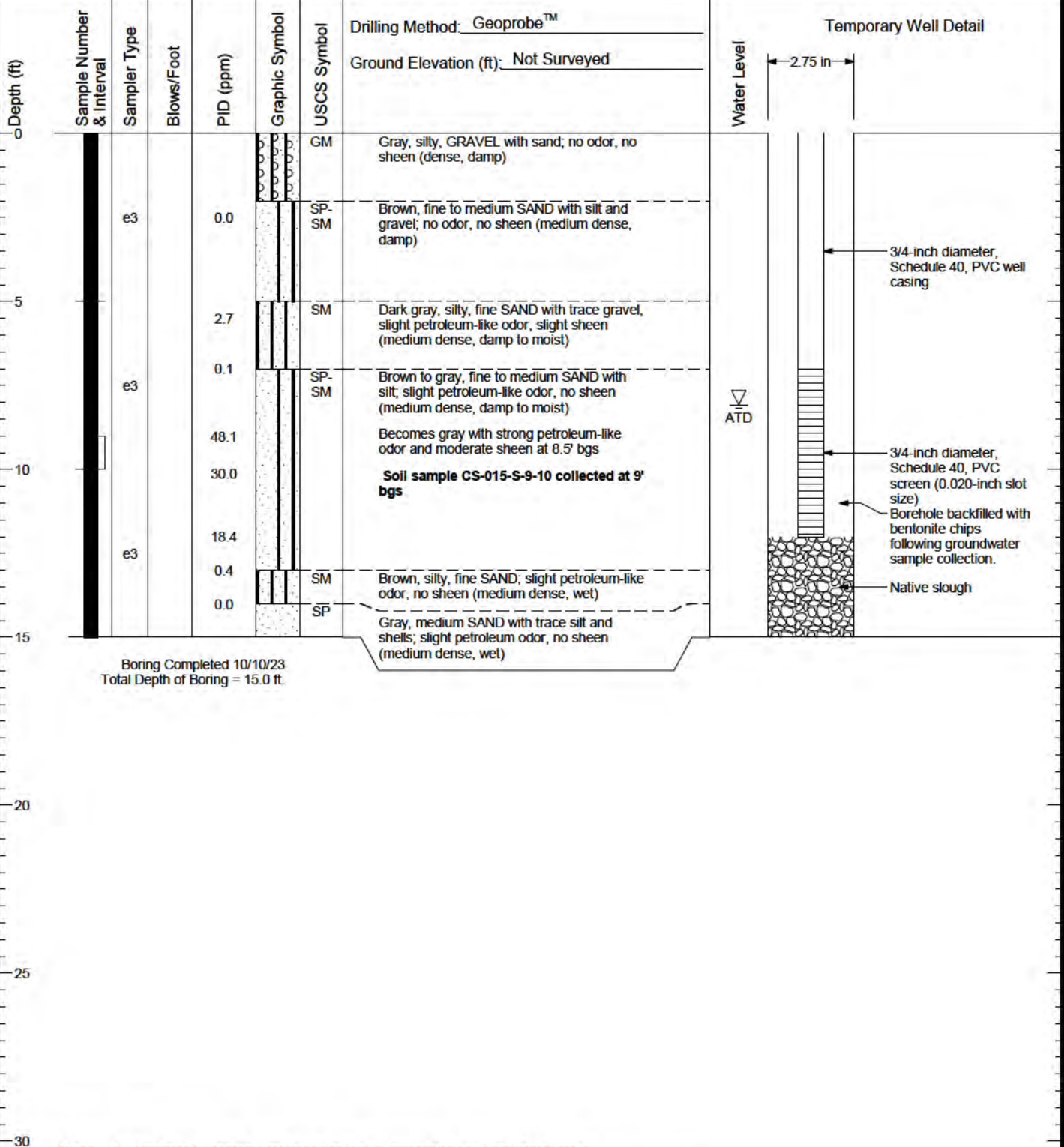
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-015

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

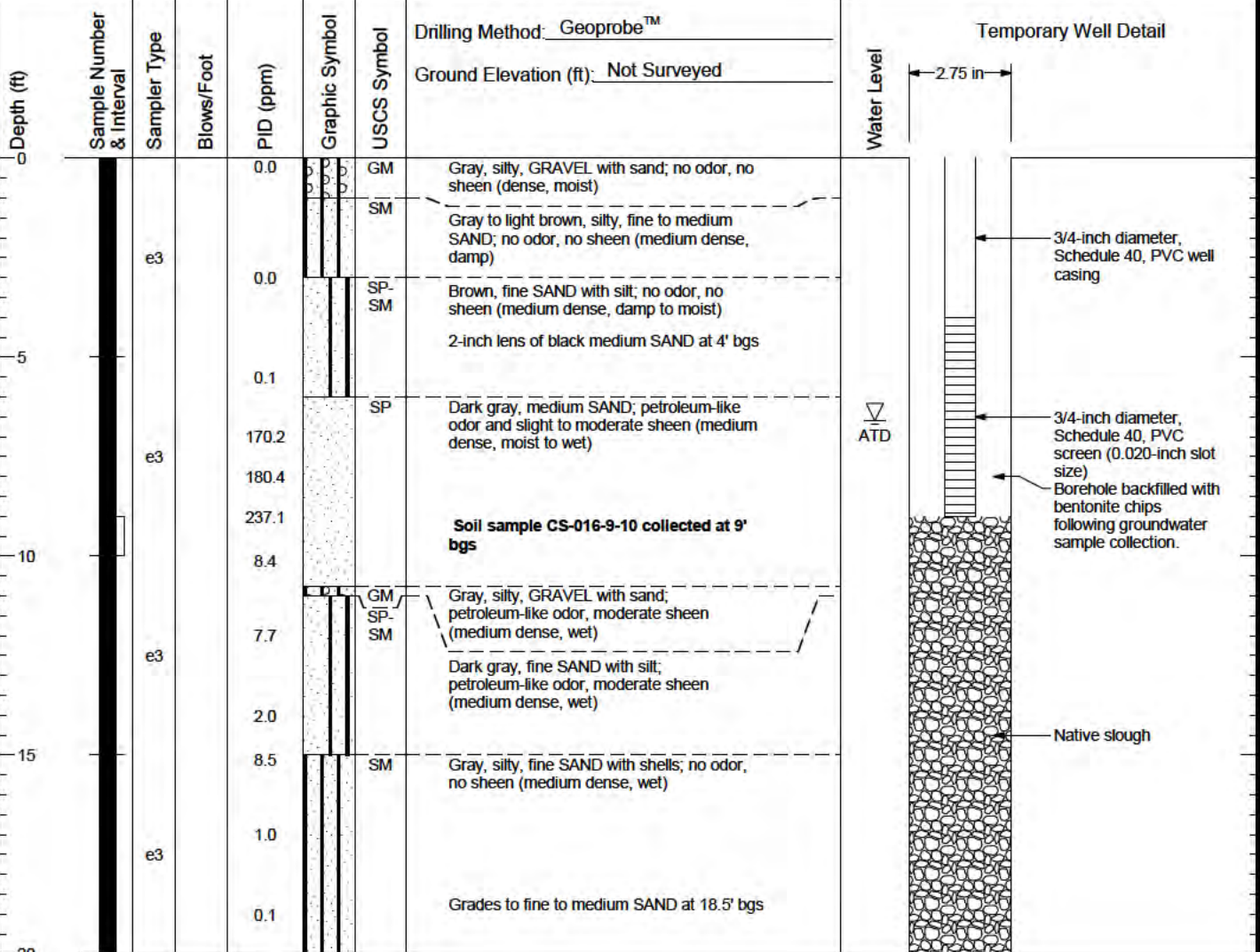
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-016

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/10/23
Total Depth of Boring = 20.0 ft.

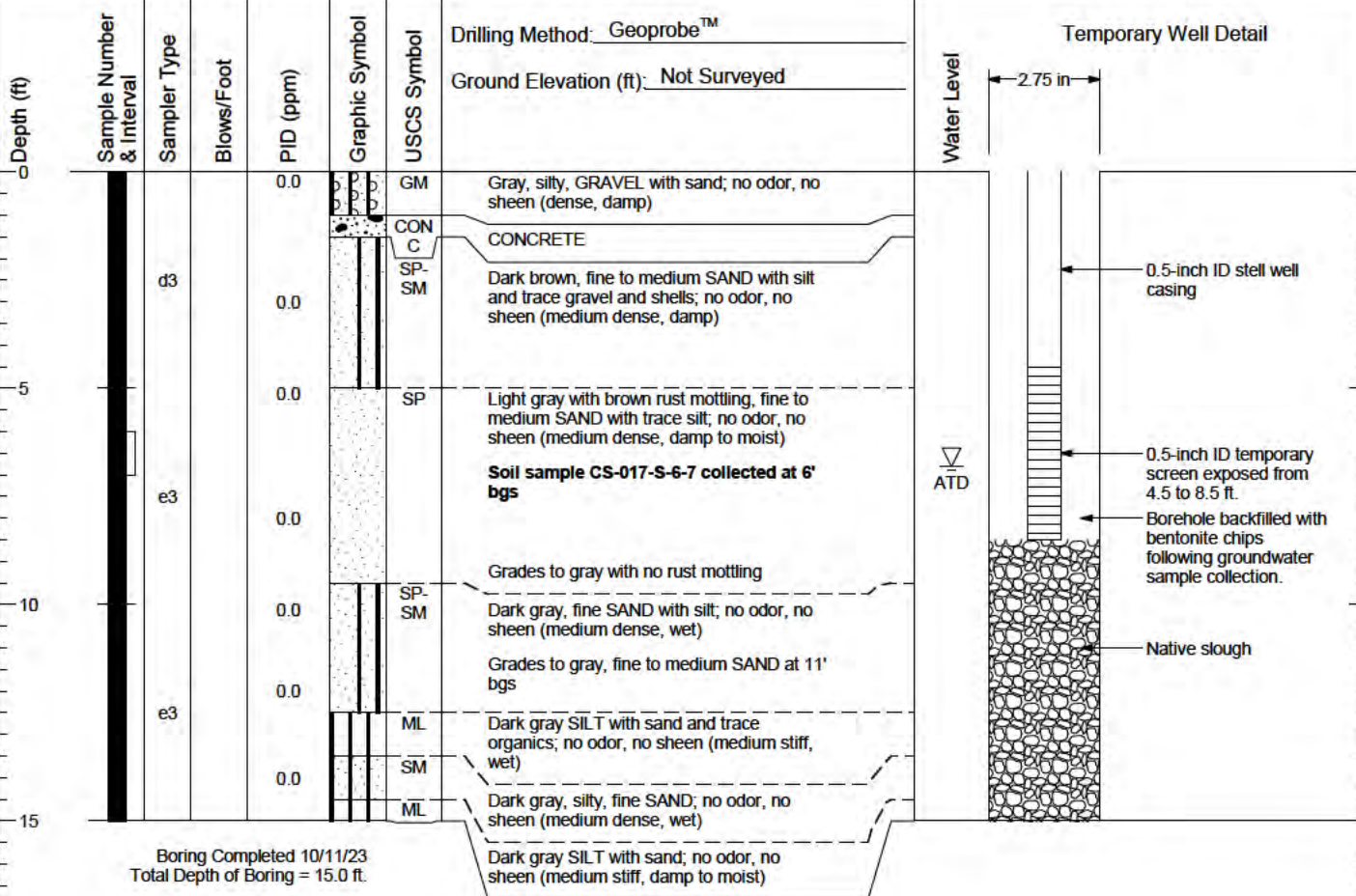
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-017

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



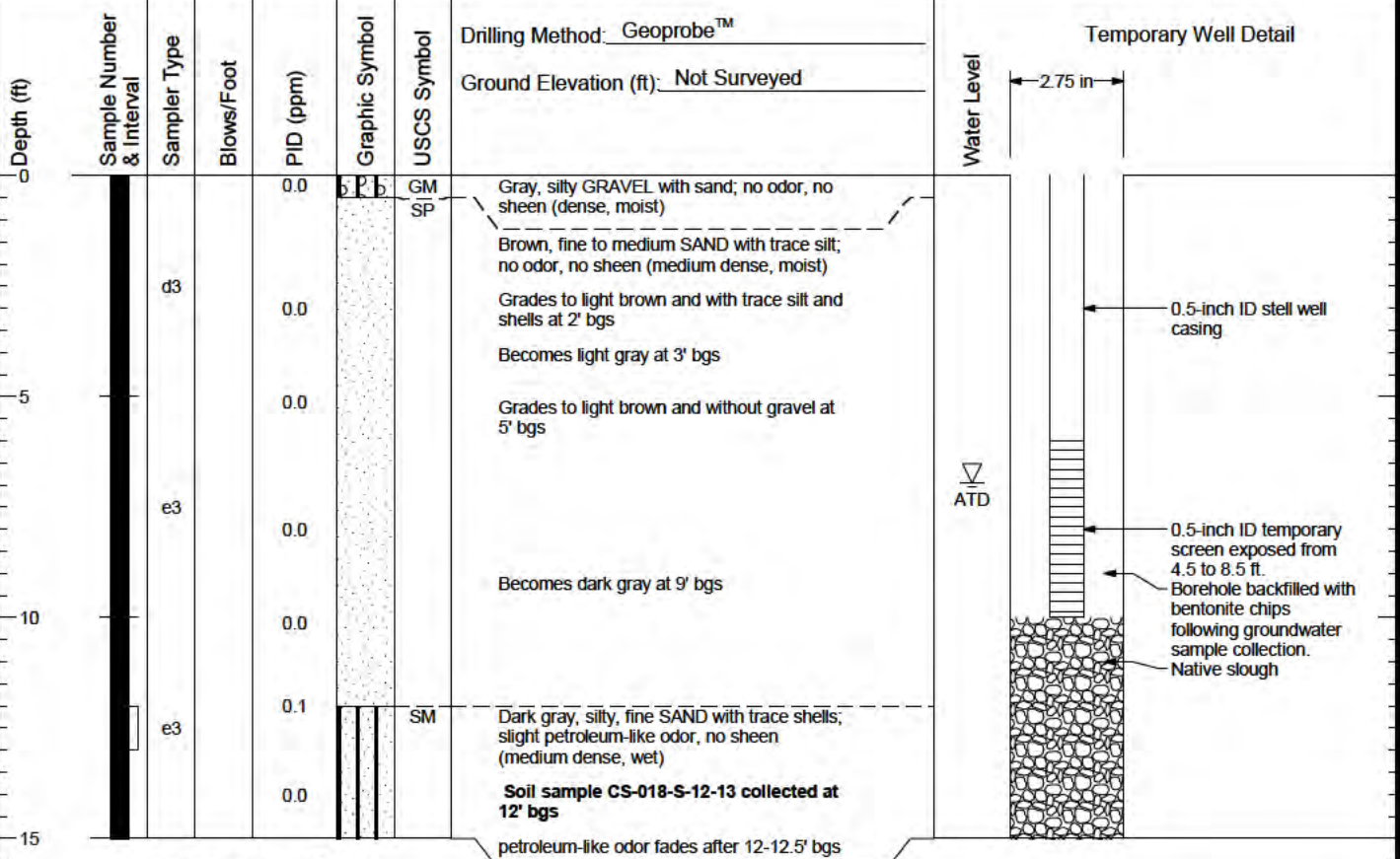
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-018

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/09/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

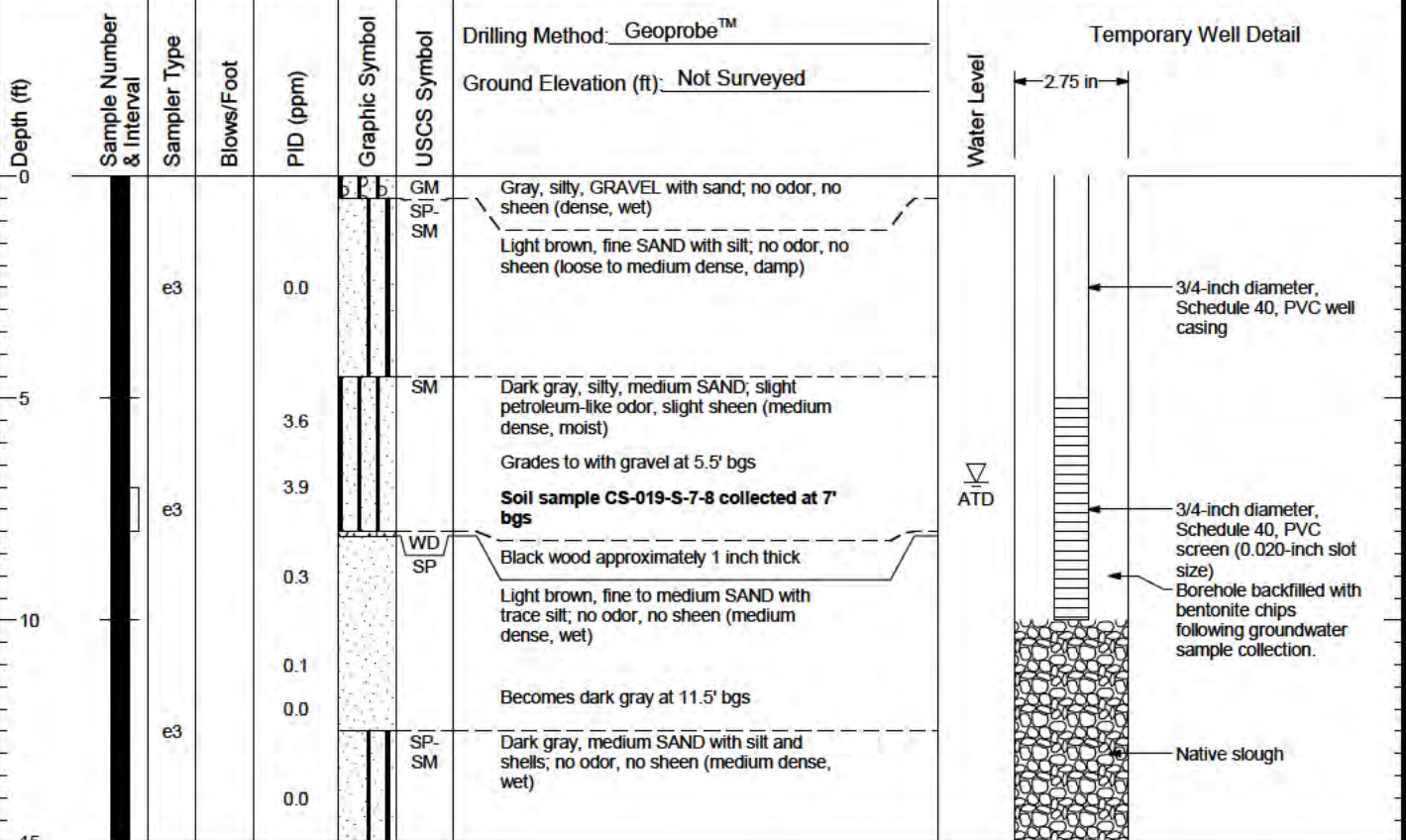
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-019

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/10/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

Central Waterfront
Cleanup Site
Bellingham, Washington

Log of Temporary Well CS-019

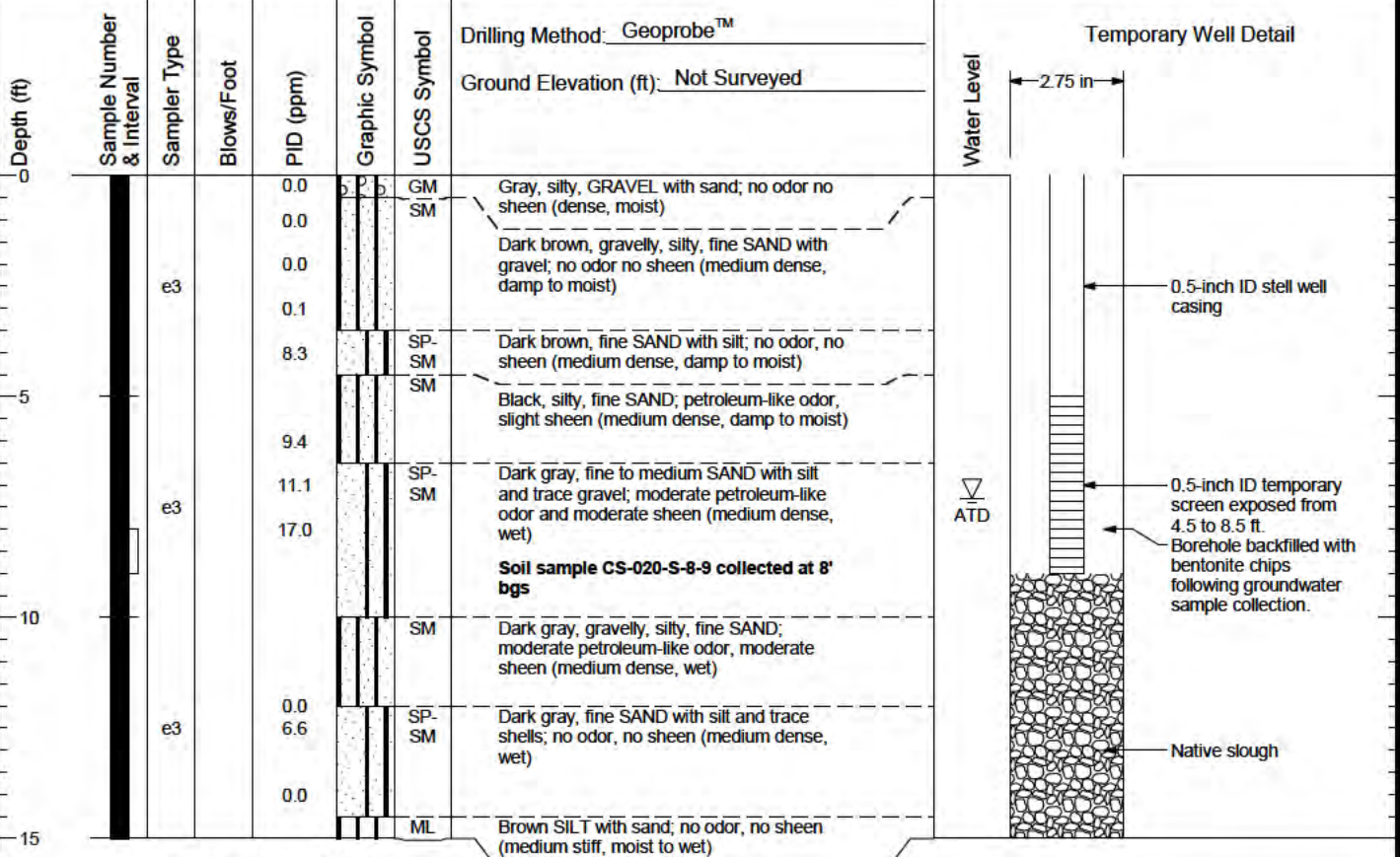
Figure
AB-7

CS-020

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/09/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

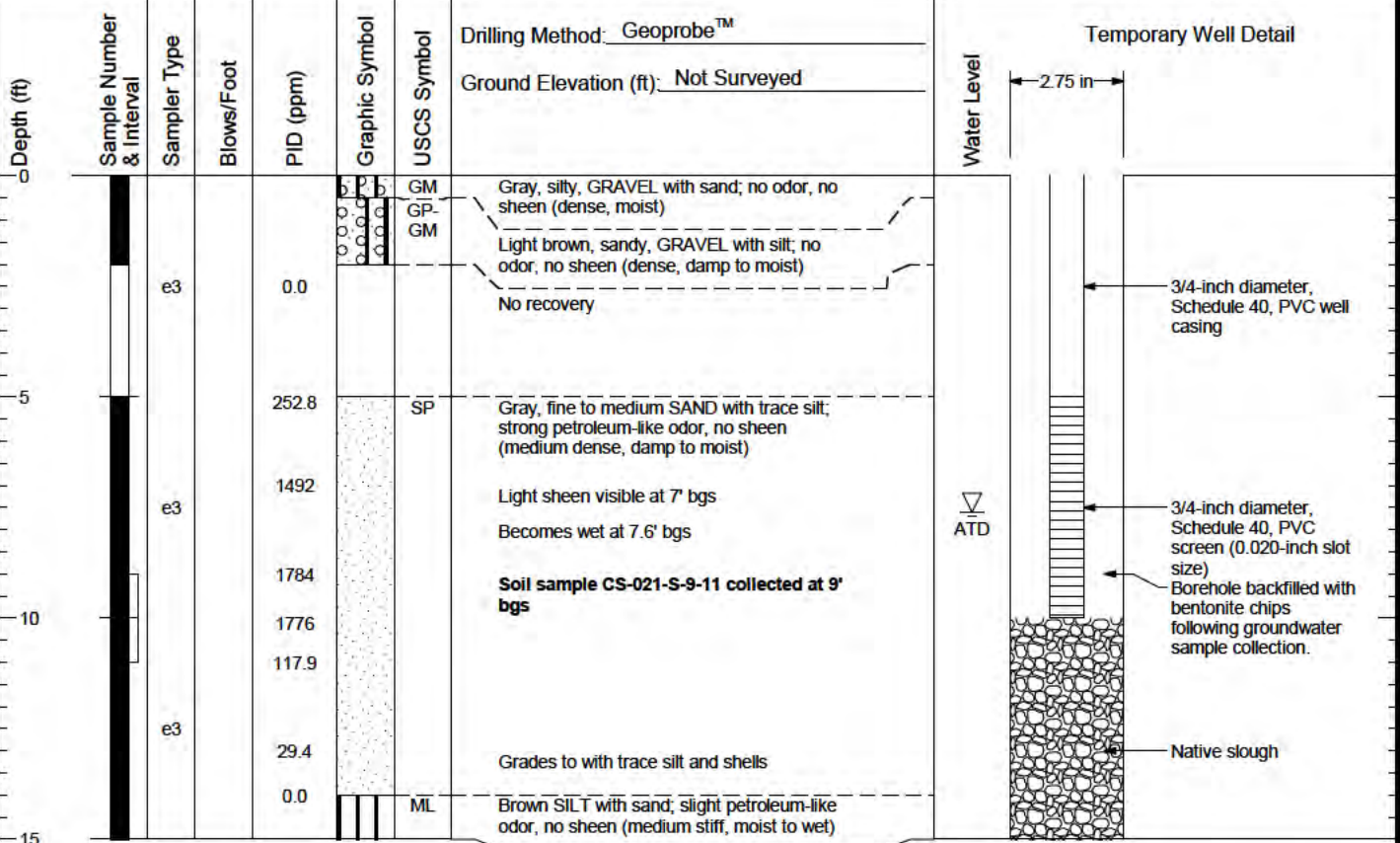
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-021

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/10/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

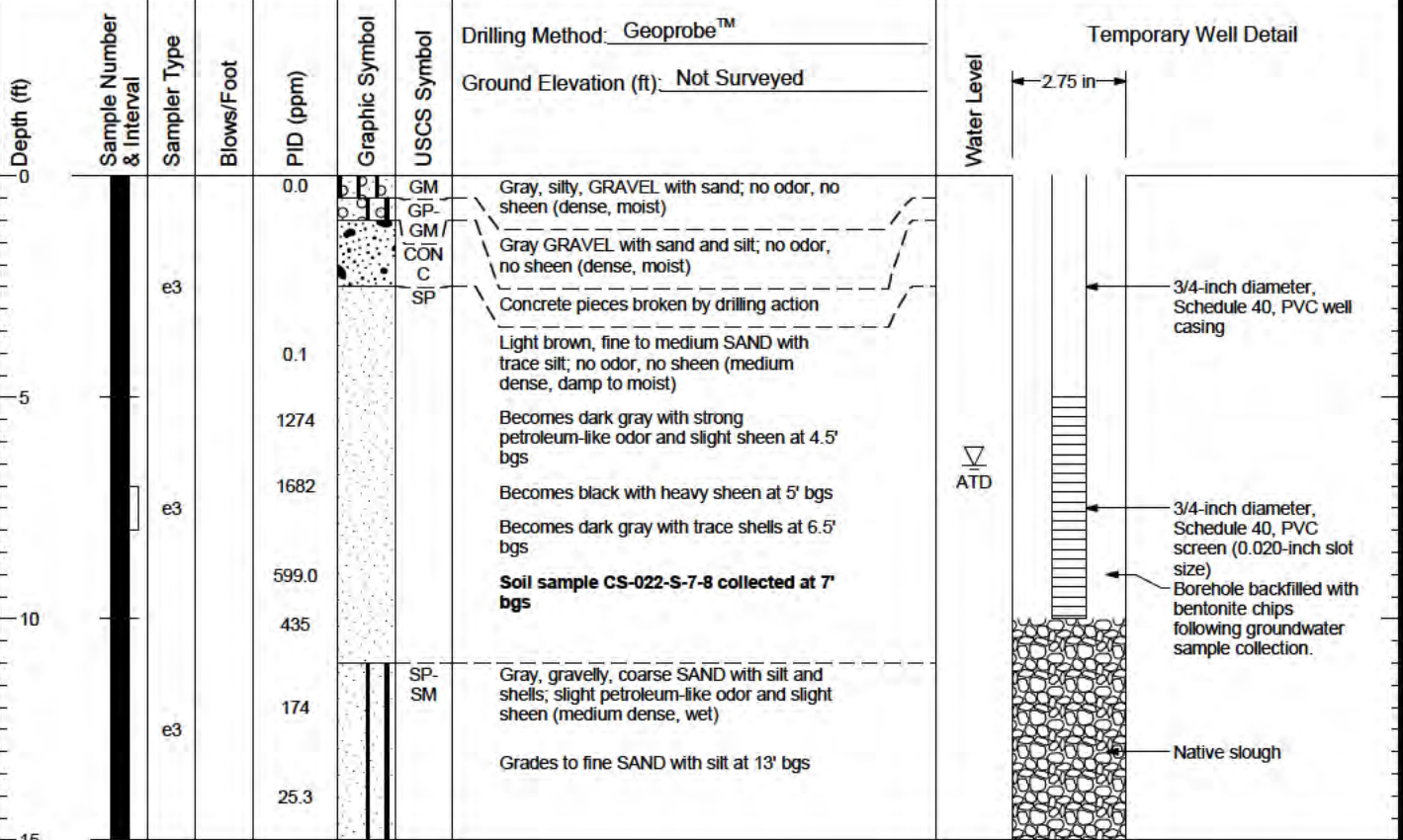
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-022

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/10/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

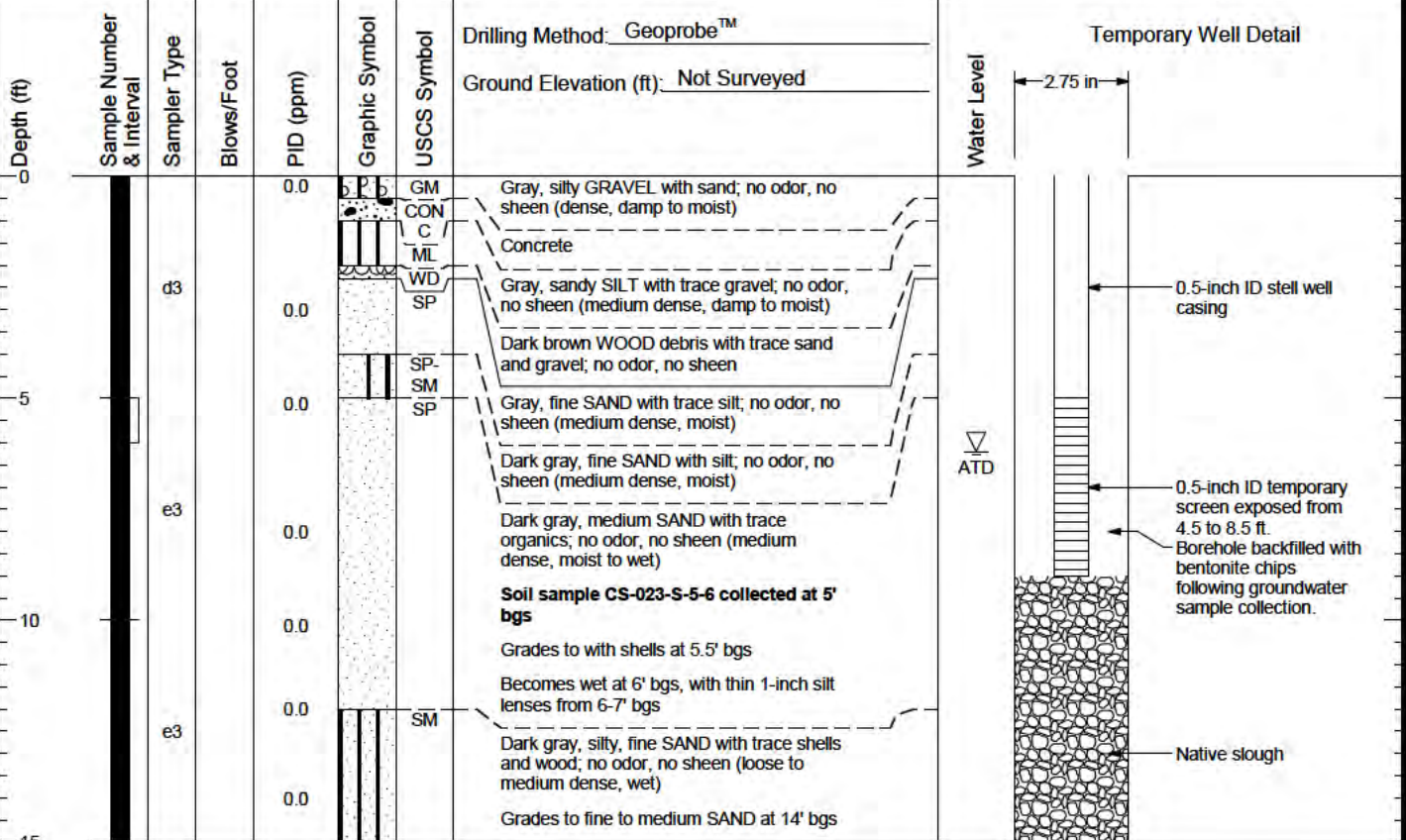
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-023

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/09/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

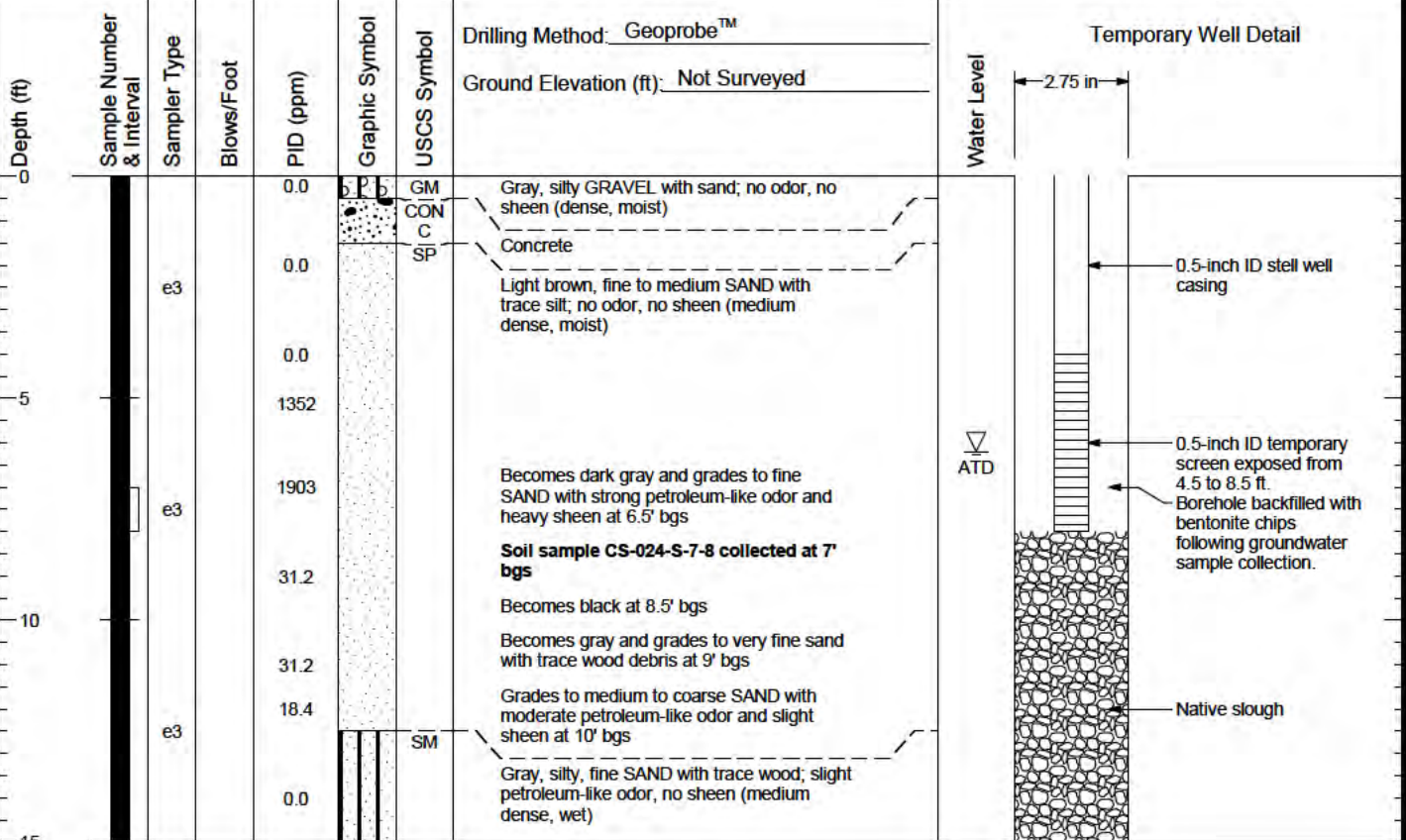
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-024

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/11/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

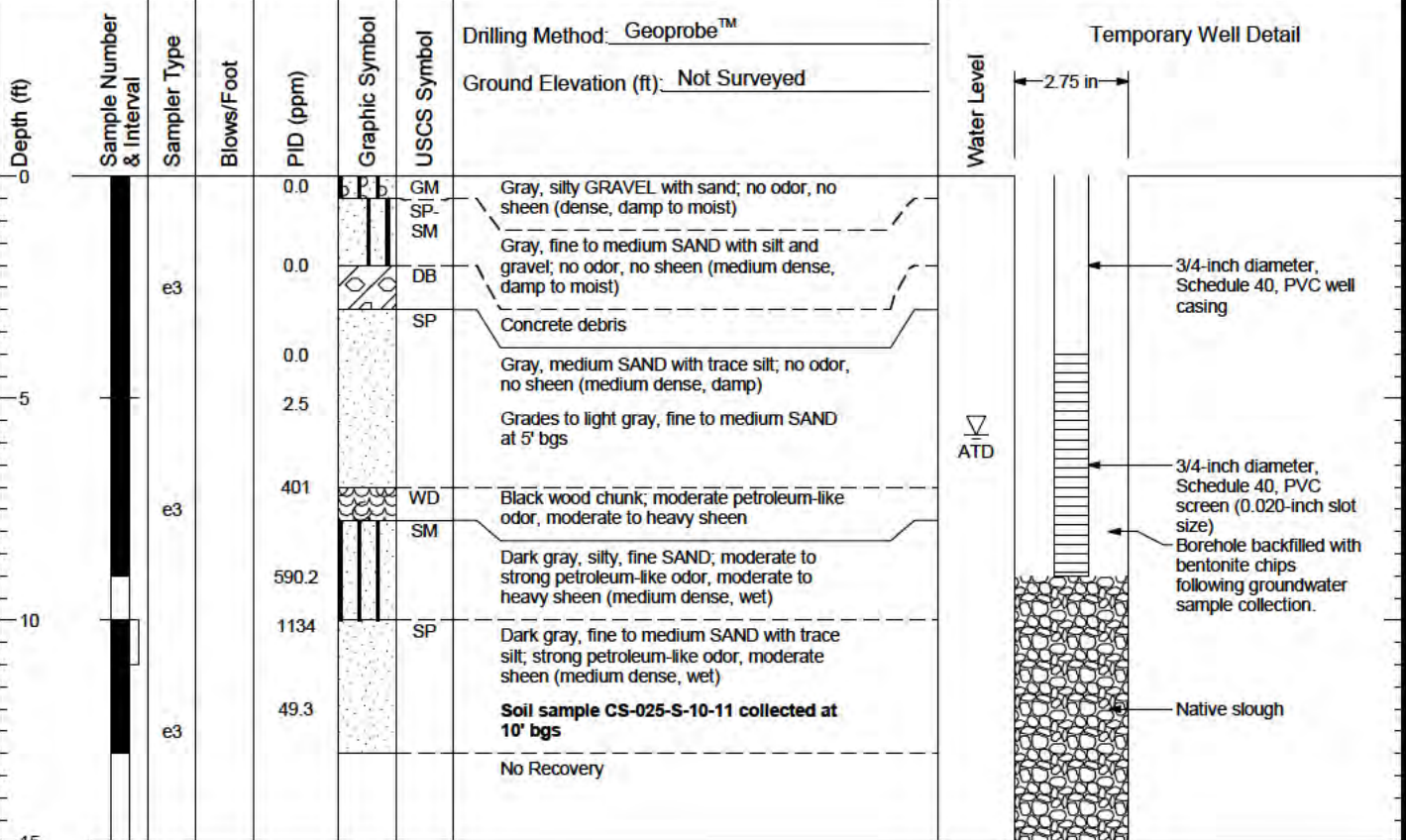
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-025

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/11/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

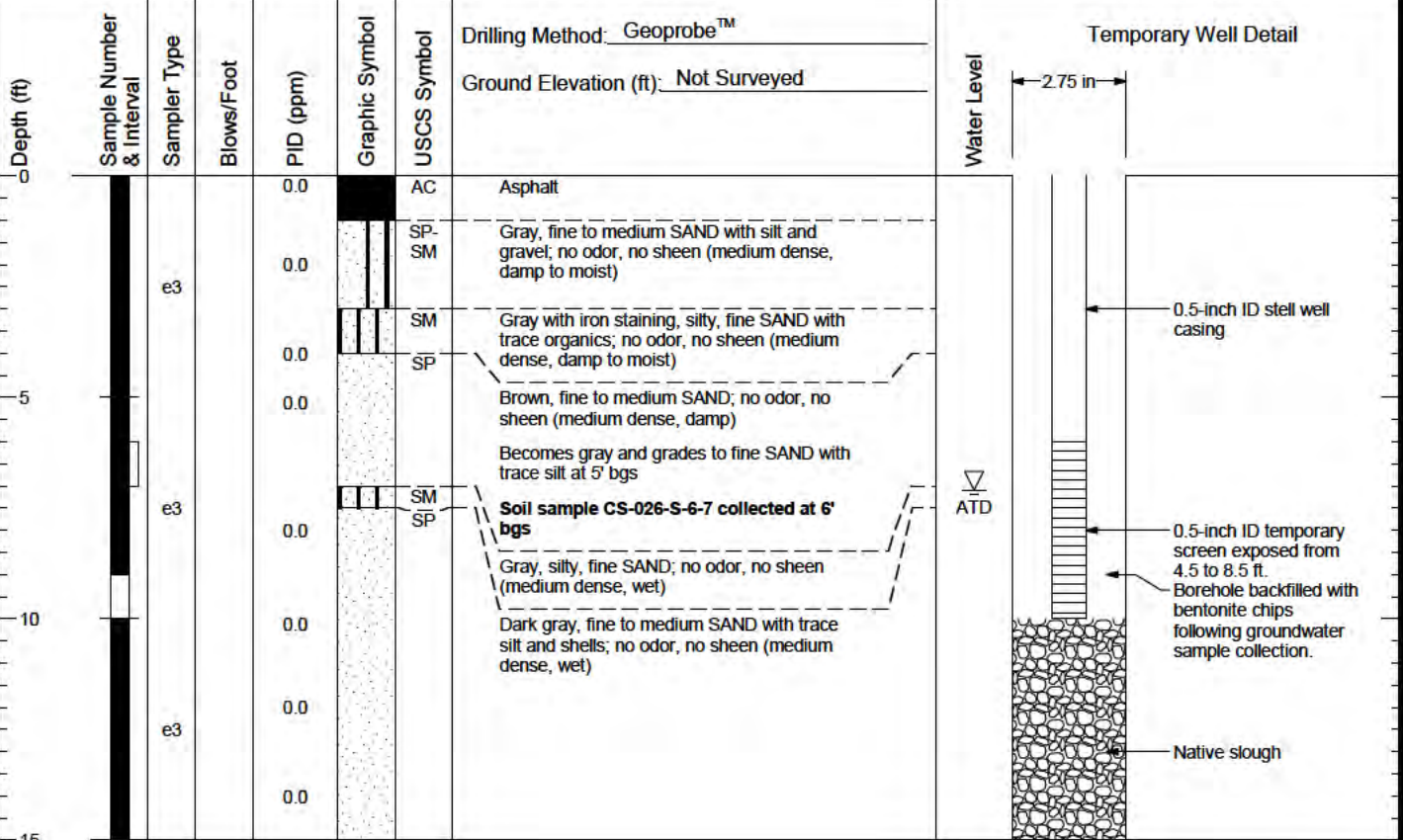
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-026

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/09/23
 Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

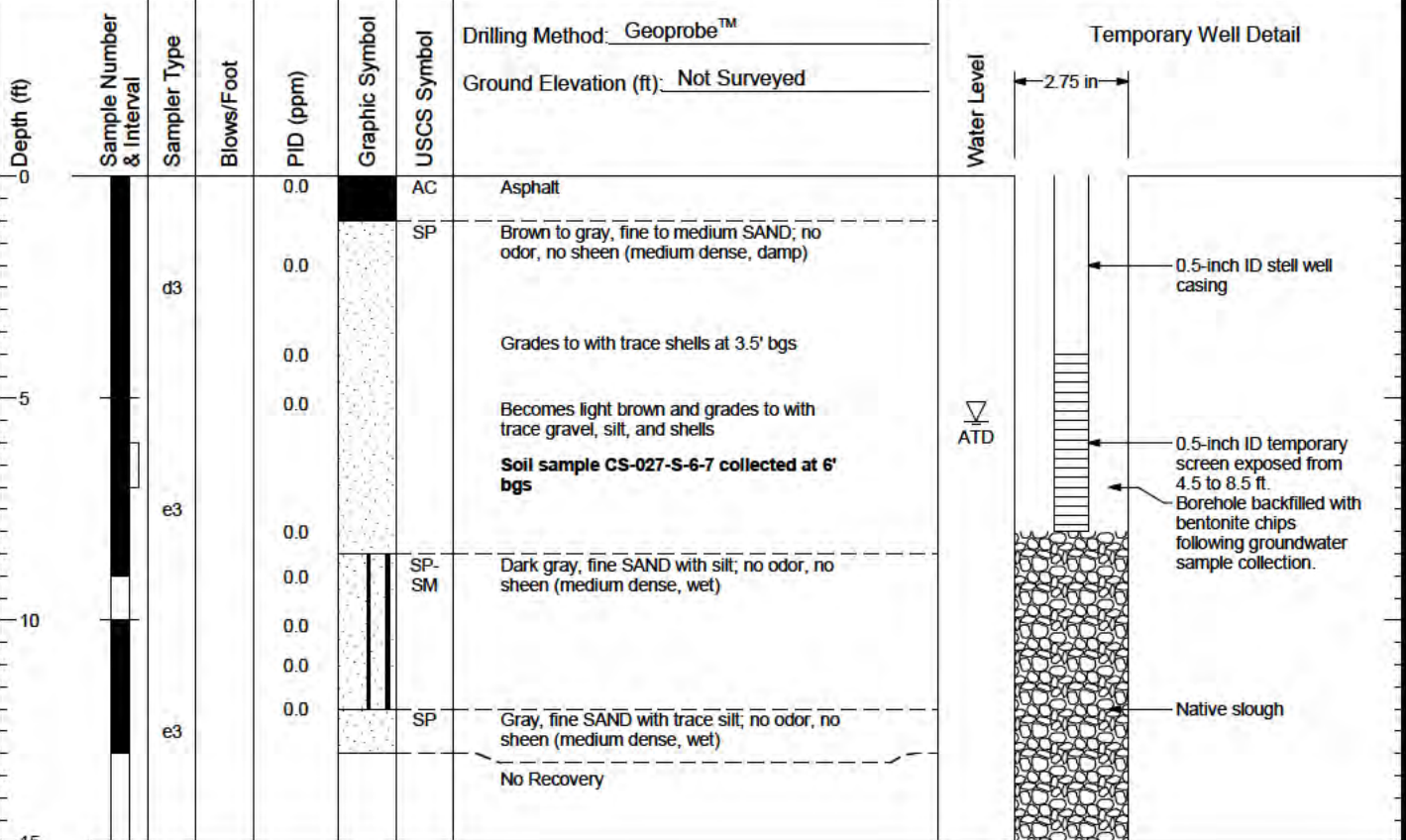
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-027

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/11/23
Total Depth of Boring = 15.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

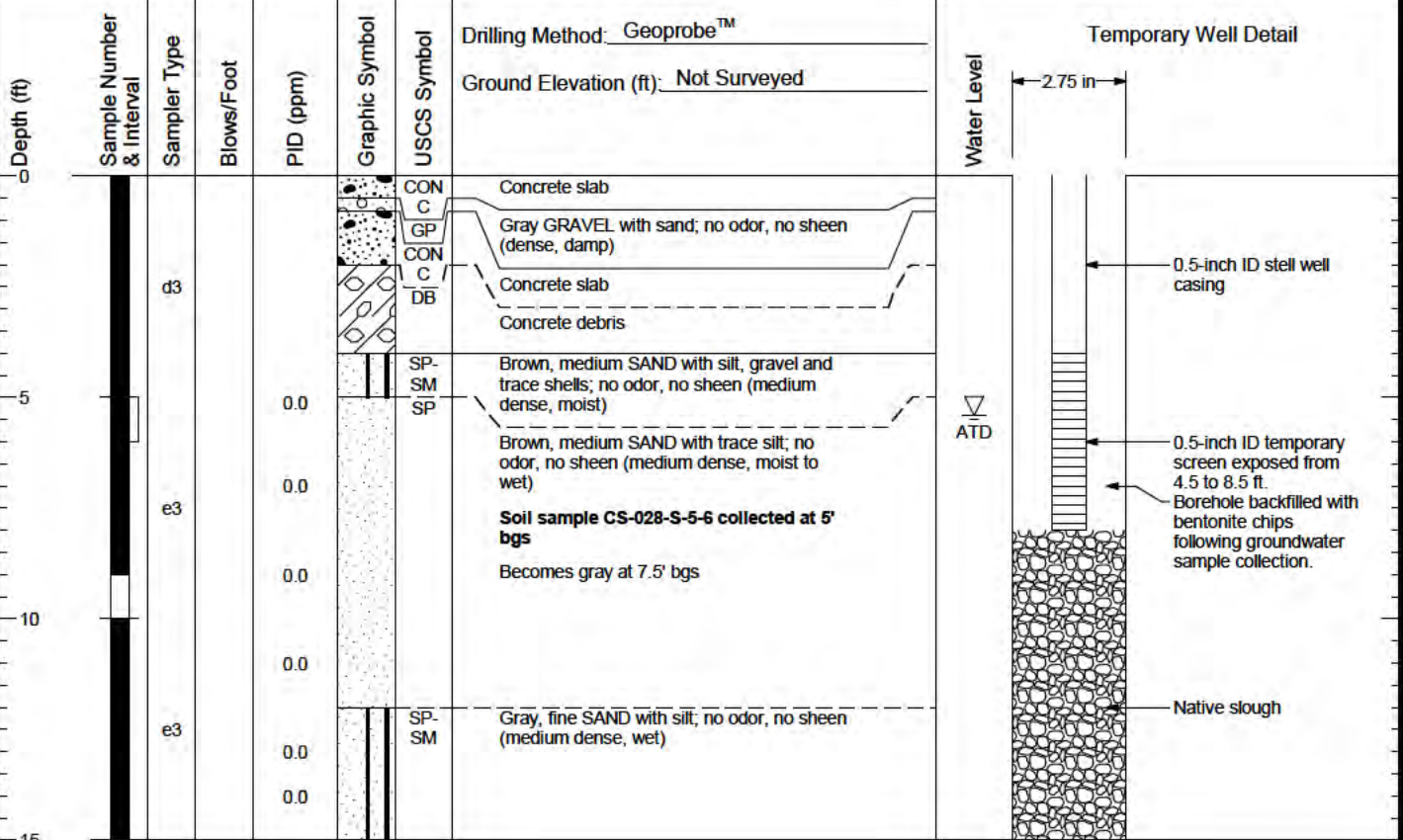
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

CS-028

SAMPLE DATA

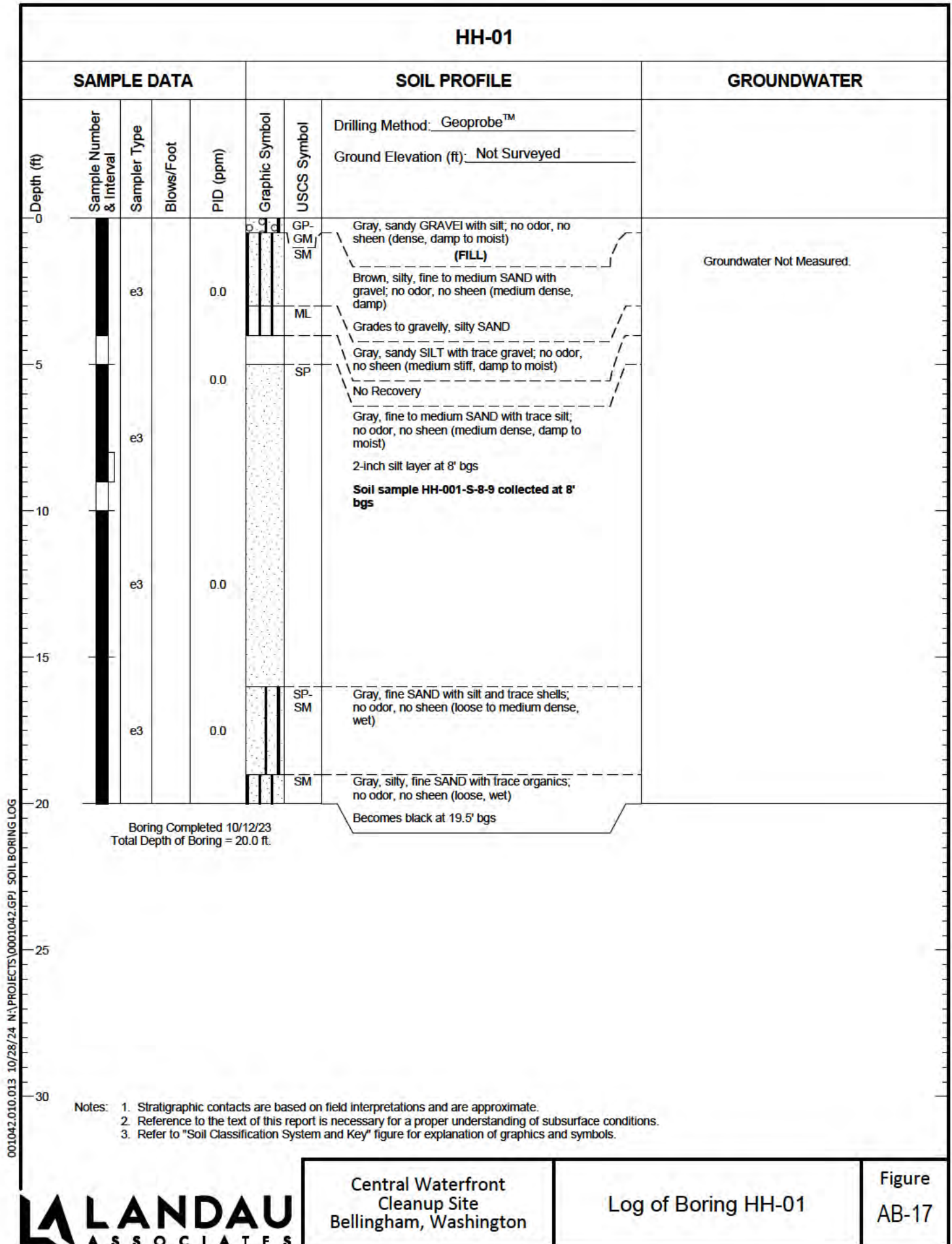
SOIL PROFILE

GROUNDWATER



- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG



HH-02

SAMPLE DATA

SOIL PROFILE

GROUNDWATER

Depth (ft)	Sample Number & Interval	Sampler Type	Blows/Foot	PID (ppm)	Graphic Symbol	USCS Symbol	Drilling Method: Geoprobe™	
							Ground Elevation (ft): Not Surveyed	
0.0				0.0	GP-GM, ML		Gray GRAVEL with silt and sand; no odor, no sheen (dense, damp)	
							(FILL)	
	e3			0.0	SM		Gray, gravelly, sandy SILT; no odor, no sheen (medium stiff, damp to moist)	
				0.0	ML		Gray, silty, gravelly, fine to coarse SAND; no odor, no sheen (medium dense, damp to moist)	
5				0.0			Gray, sandy SILT with gravel; no odor, no sheen (medium stiff, damp to moist)	
	e3			0.0				
				0.0				
10				0.0			Becomes brown, and grades to with sand and gravel at 10' bgs	
	e3						Soil sample HH-002-S-10-11 collected at 10' bgs	
							Becomes wet at 11' bgs	
							No Recovery	
15				0.0	ML		Gray, sandy SILT with trace gravel; no odor, no sheen (medium stiff, wet)	
	e3			0.0	SP-SM		Gray, fine SAND with silt; no odor, no sheen (medium dense, wet)	
				0.0				
20								

Groundwater Not Measured.

Boring Completed 10/12/23
Total Depth of Boring = 20.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

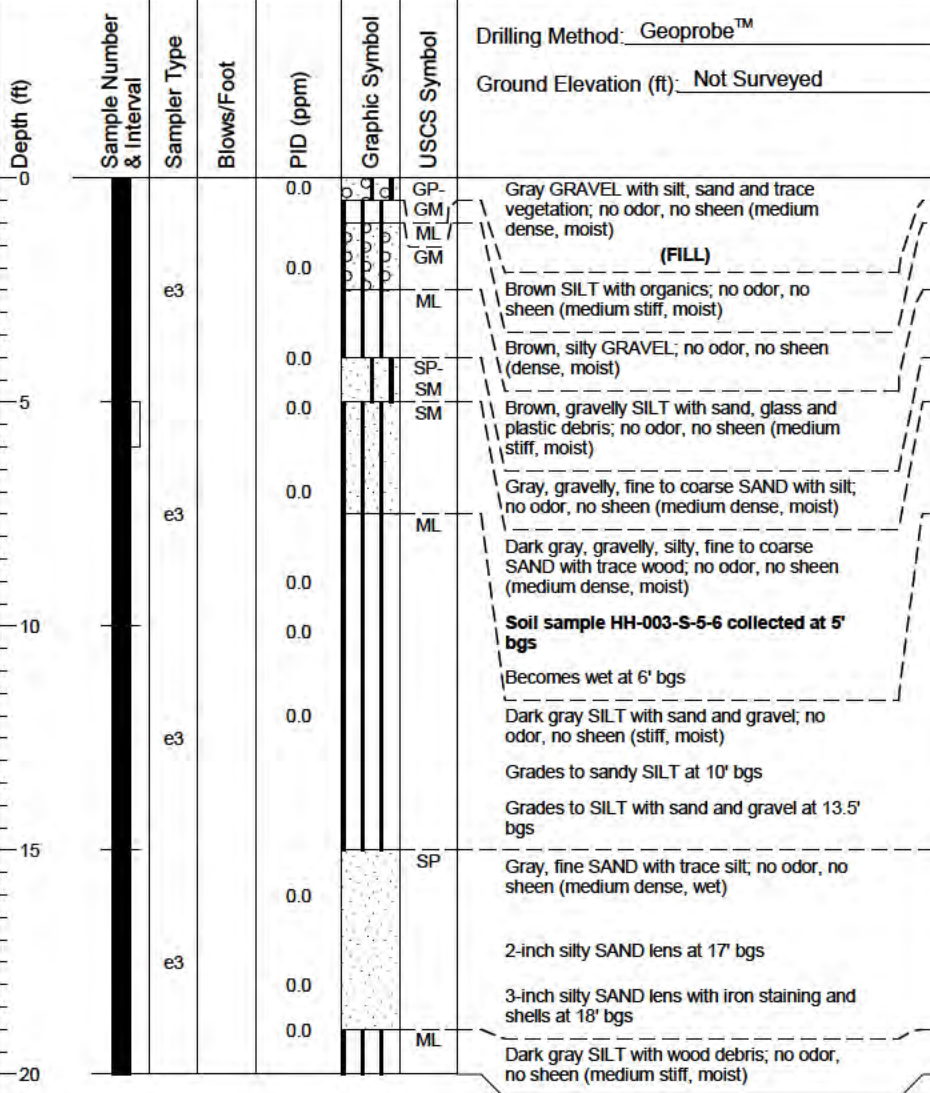
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ SOIL BORING LOG

HH-03

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Groundwater Not Measured.

Boring Completed 10/12/23
Total Depth of Boring = 20.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

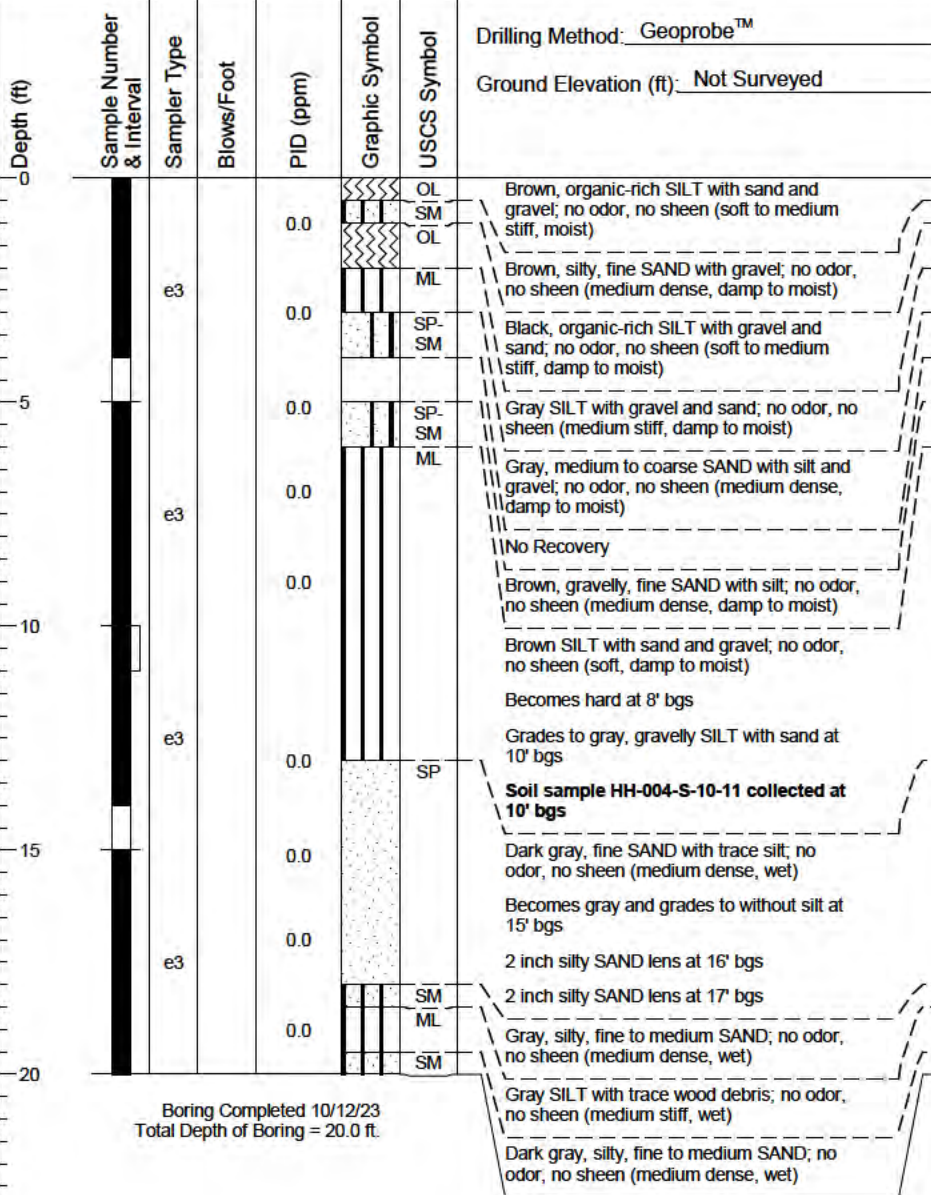
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ SOIL BORING LOG

HH-04

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Groundwater Not Measured.

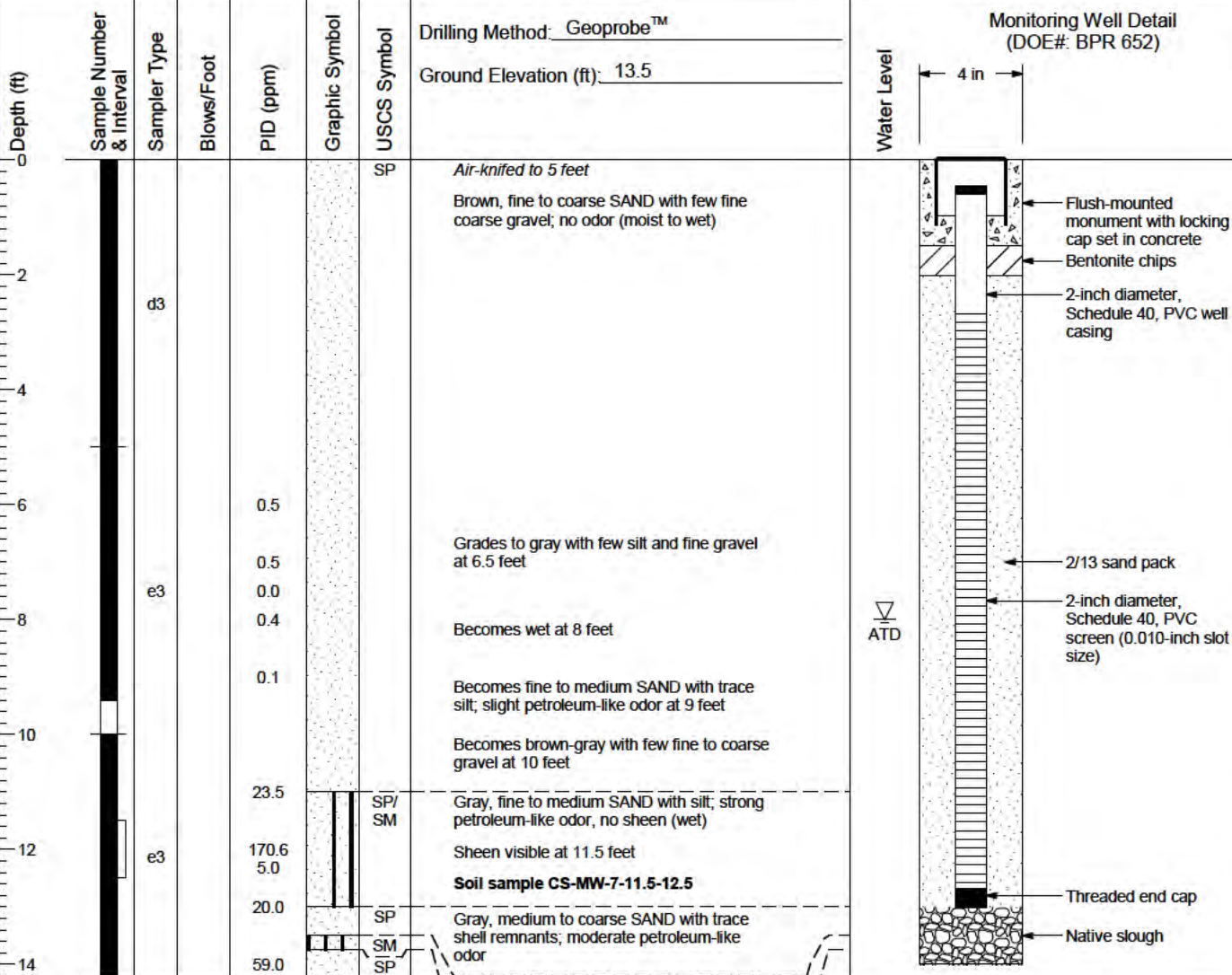
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-MW-7

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 10/08/23
Total Depth of Boring = 14.3 ft.

Monitoring Well Completed 11/08/23
Total Depth of Monitoring Well = 13.0 ft.

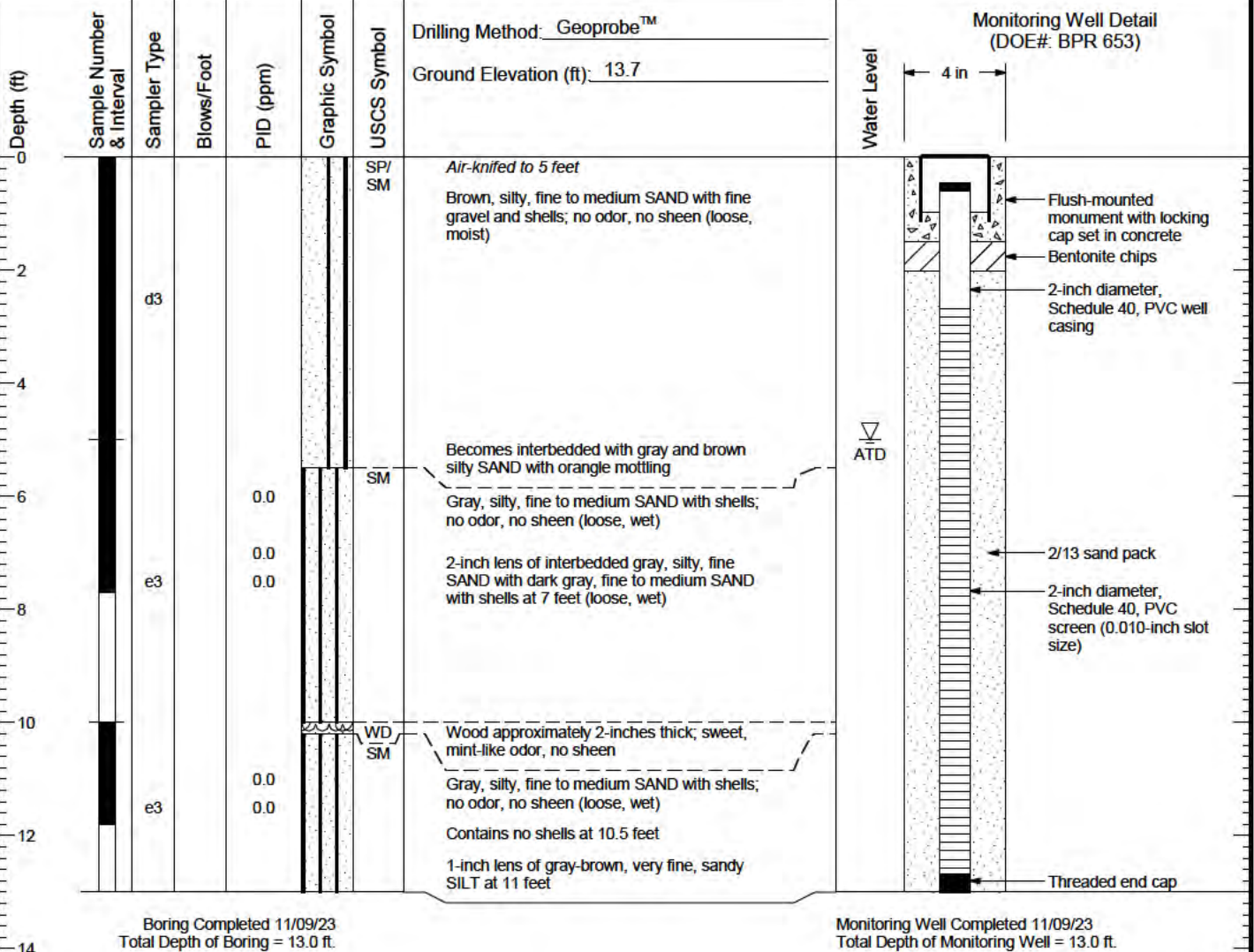
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-MW-8

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



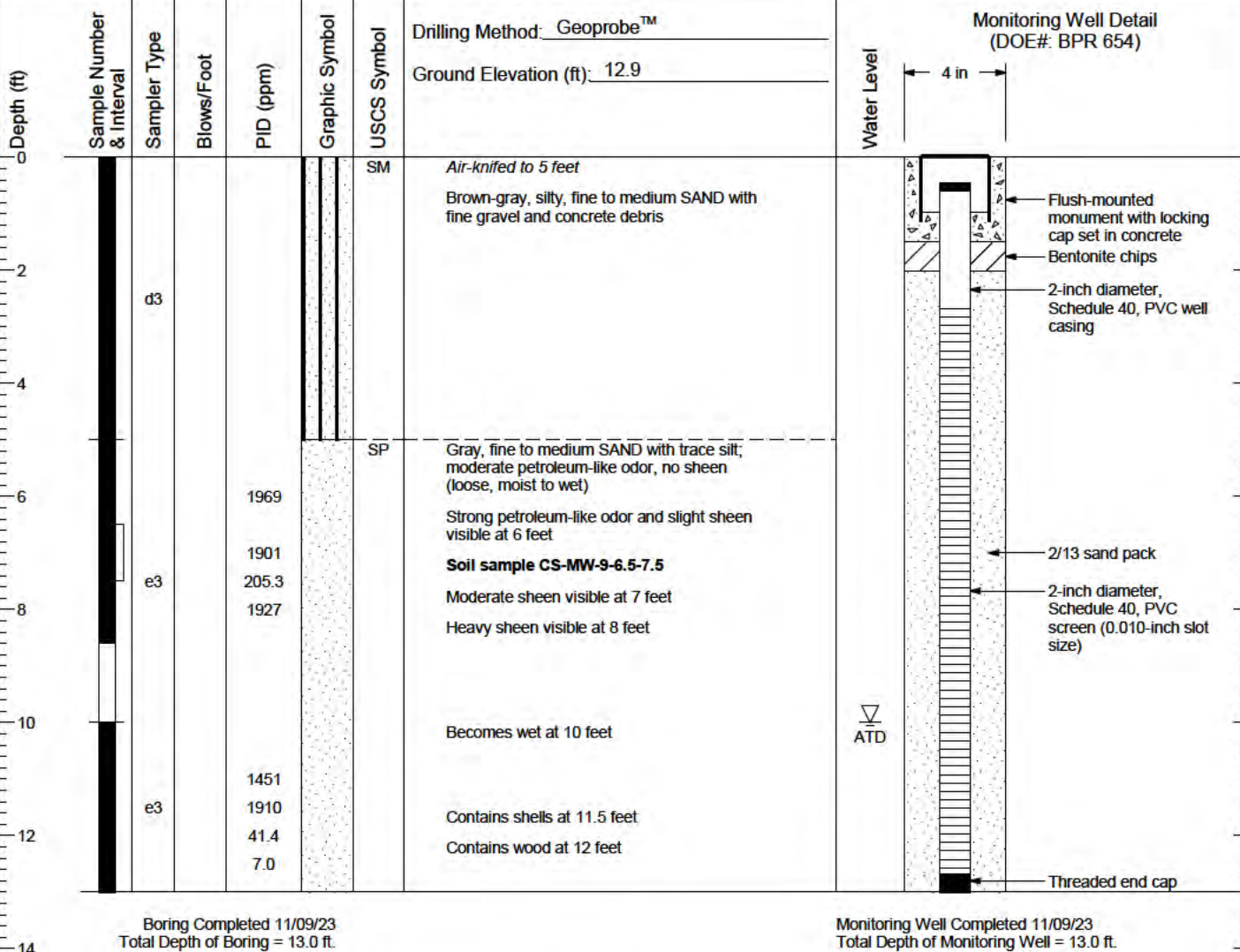
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-MW-9

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



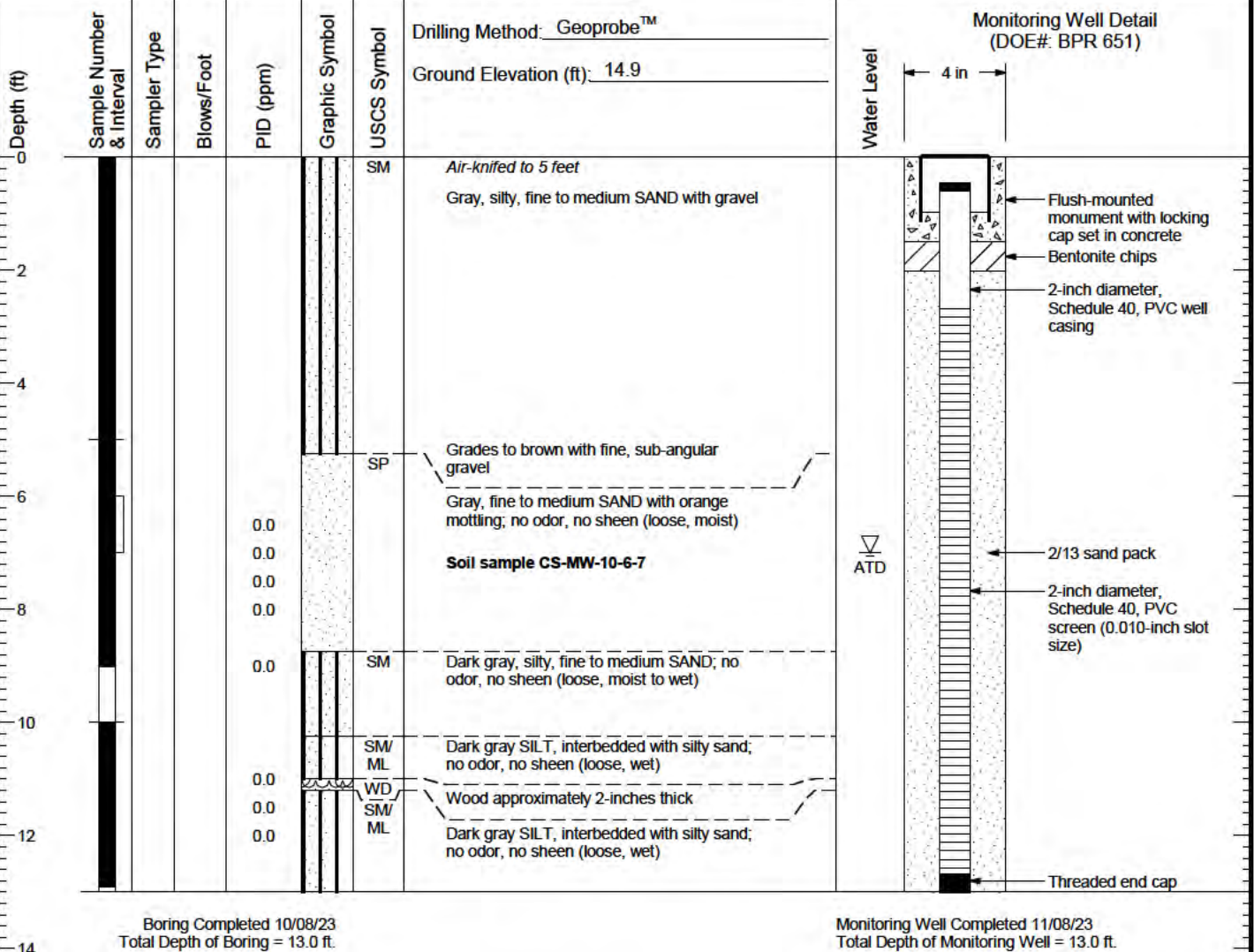
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-MW-10

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



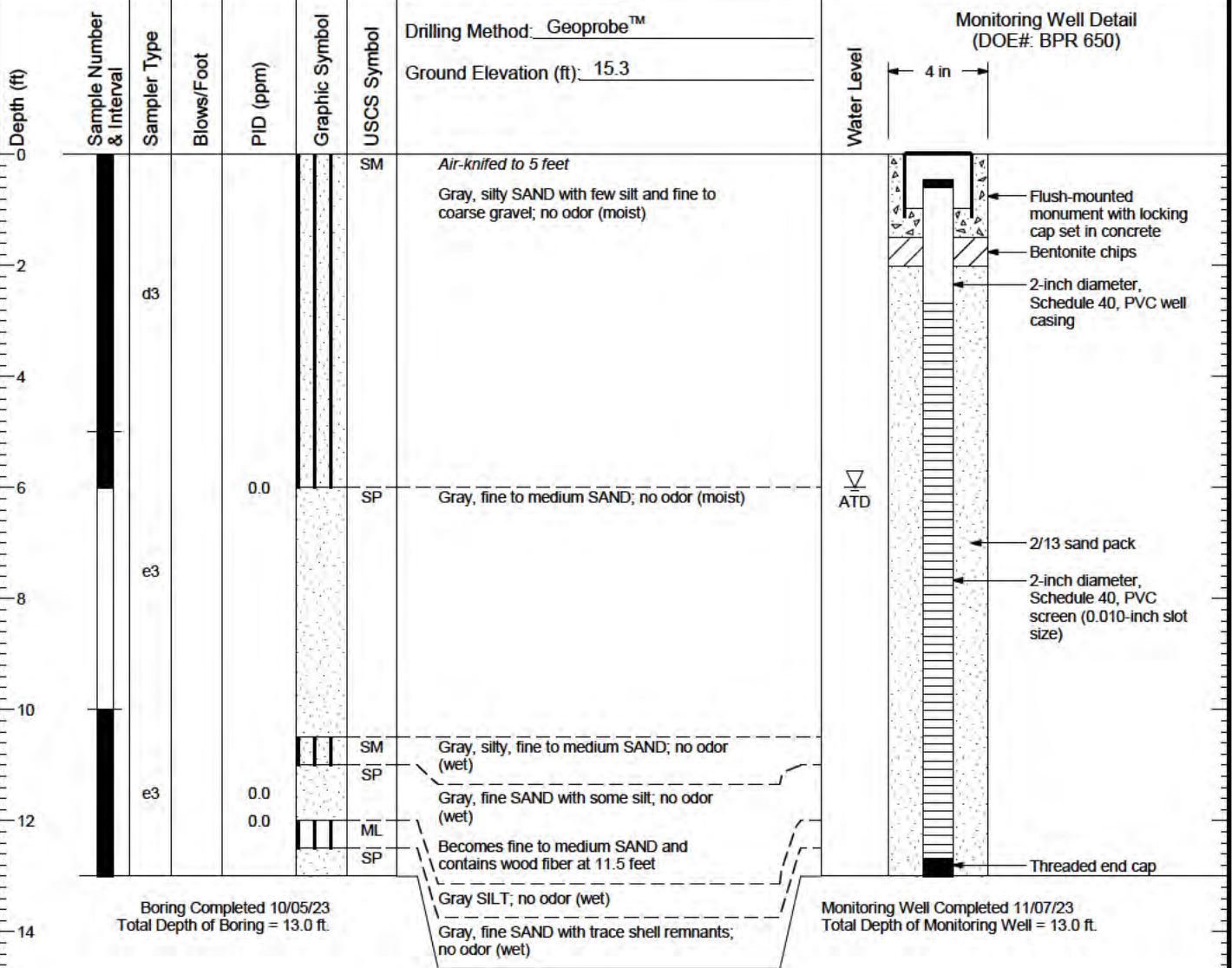
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

CS-MW-11

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



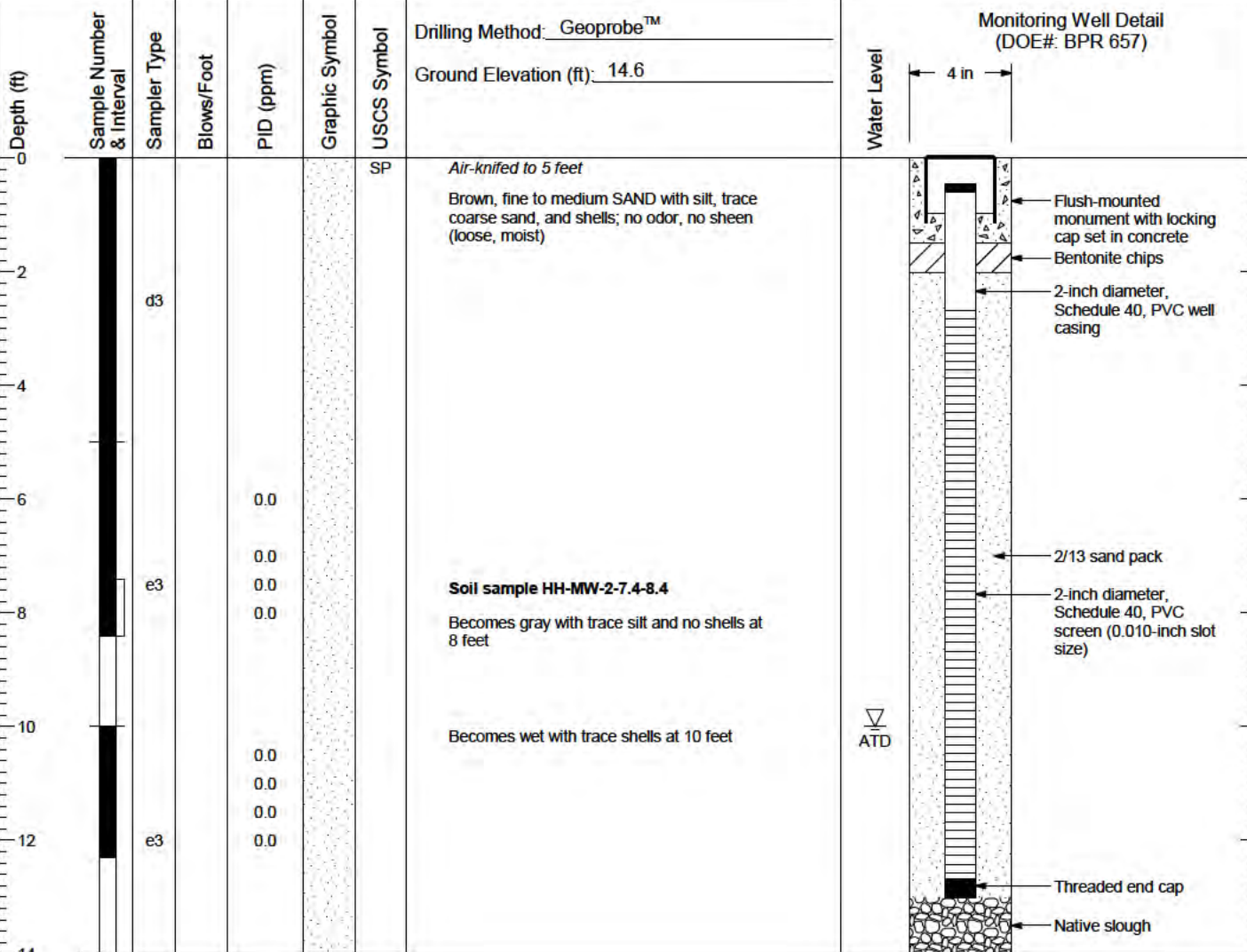
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

HH-MW-2

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 11/09/23
Total Depth of Boring = 14.0 ft.

Monitoring Well Completed 11/10/23
Total Depth of Monitoring Well = 13.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

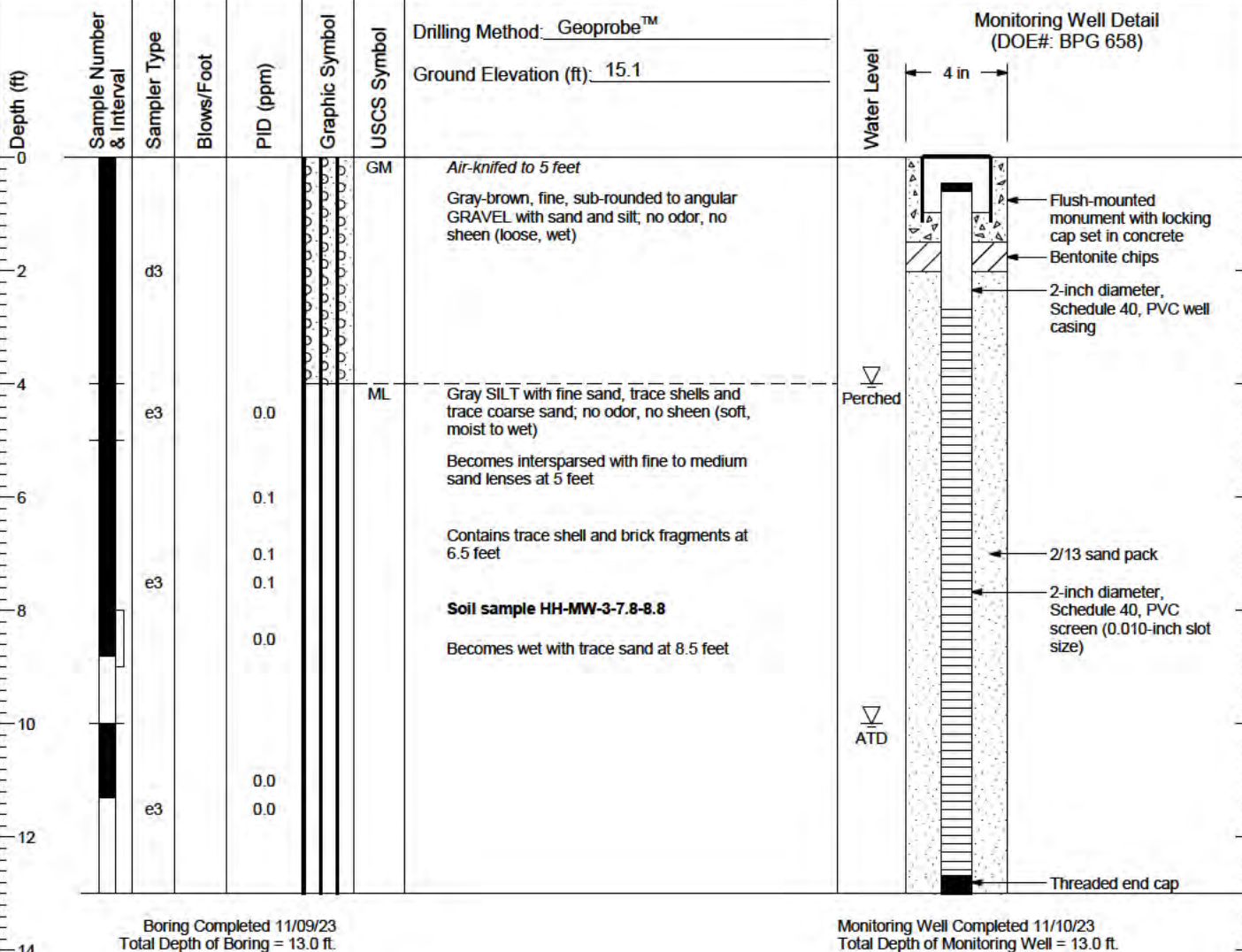
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

HH-MW-3

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



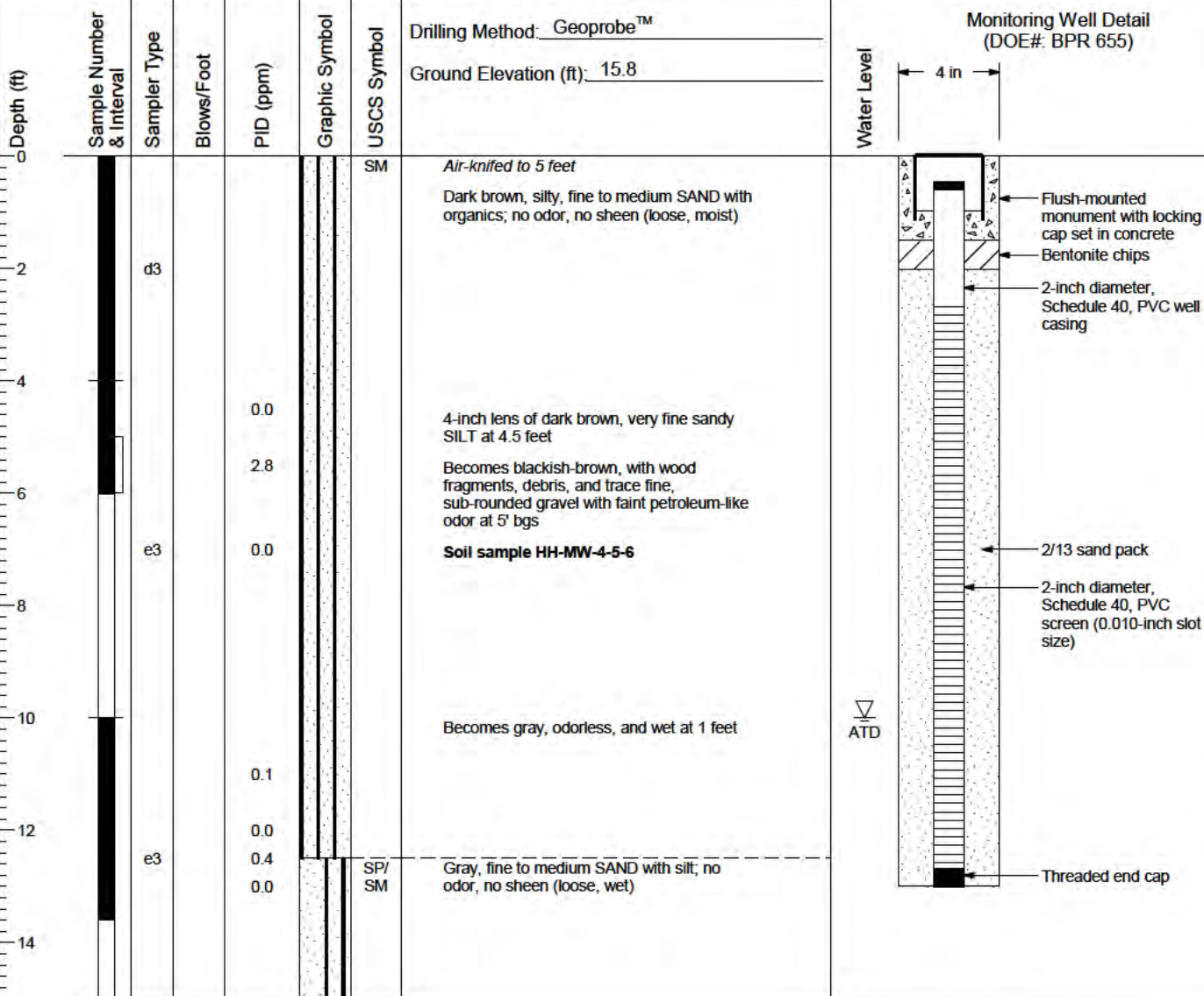
- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

HH-MW-4

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 11/09/23
Total Depth of Boring = 15.0 ft.

Monitoring Well Completed 11/09/23
Total Depth of Monitoring Well = 13.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

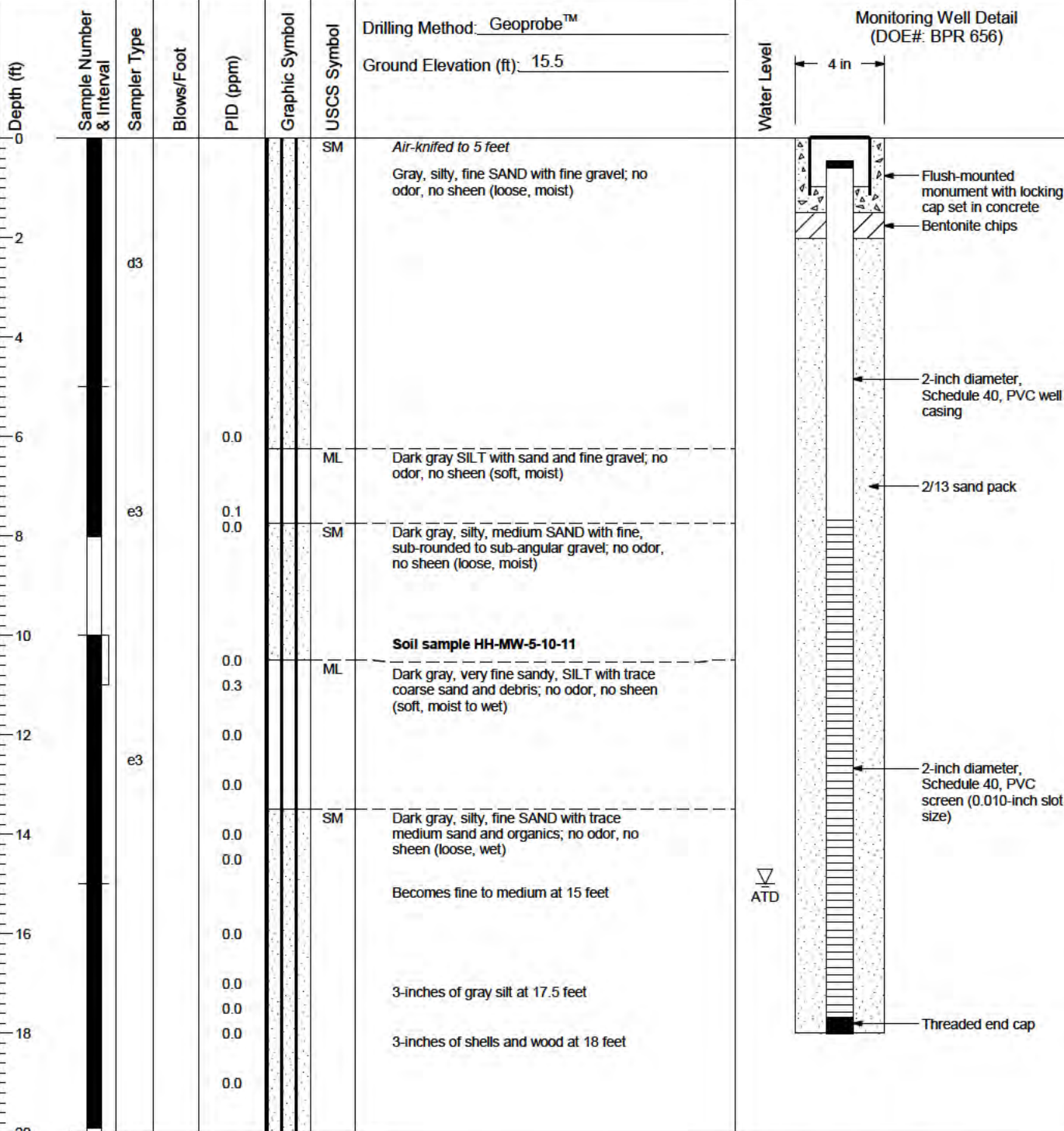
001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG

HH-MW-5

SAMPLE DATA

SOIL PROFILE

GROUNDWATER



Boring Completed 11/09/23
Total Depth of Boring = 20.0 ft.

Monitoring Well Completed 11/09/23
Total Depth of Monitoring Well = 18.0 ft.

- Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
 2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
 3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.

001042.010.013 10/28/24 N:\PROJECTS\0001042.GPJ WELL LOG