LANDAU ASSOCIATES

PRE-REMEDIAL DESIGN INVESTIGATION PROJECT PLANS

Weldcraft Steel and Marine Site
Bellingham, Washington

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Prepared for

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Bellingham, Washington

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LIST OF ABBREVIATIONS AND ACRONYMS

AO	Agreed Order
bgs	below ground surface
CAP	Cleanup Action Plan
DPE	dual-phase extraction
Ecology	Washington State Department of Ecology
EDR	Engineering Design Report
EPA	US Environmental Protection Agency
FS	feasibility study
ft	foot/feet
HASP	Health and Safety Plan
IDP	Inadvertent Discovery Plan
Landau	Landau Associates, Inc.
LNAPL	light non-aqueous phase liquid
MTCA	Model Toxics Control Act
MW	monitoring well
NAD83	North American Datum of 1983
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
PID	photoionization detector
Port	Port of Bellingham
PRDI	pre-remedial design investigation
PVC	polyvinyl chloride
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RCW	Revised Code of Washington
RI	remedial investigation
SAP	Sampling and Analysis Plan
Site	Weldcraft Steel and Marine Site
SMS	Sediment Management Standards
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
UST	underground storage tank
VOC	volatile organic compound
WAC	Washington Administrative Code

1.0 INTRODUCTION AND BACKGROUND

These Pre-Remedial Design Investigation (PRDI) Project Plans outline investigative elements for developing the final remedial design for the former Weldcraft Steel and Marine Site (Site), located in Bellingham, Washington (Figure 1). The PRDI has been prepared by Landau Associates, Inc. (Landau) on behalf of the Port of Bellingham (Port) in accordance with Agreed Order (AO) No. DE 18005 (Ecology 2025a) and the final Cleanup Action Plan (CAP; Ecology 2025b) 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 70A.305 of the Revised Code of Washington (RCW), and the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC), and under the requirements of the Washington State Sediment Management Standards (SMS).

1.1 Site Background

The Site is located in Bellingham, Washington in the northern corner of the Port's Squalicum Outer Harbor, as shown on Figure 1, and is defined by the limits of releases that occurred as a result of Weldcraft Steel and Marine's historical operations. This area is bounded approximately by the western limit of the former Dry Storage Yard to the east, Squalicum Way to the north, Squalicum Harbor to the west, and a parking lot to the south, as shown on Figure 2.

Weldcraft Steel and Marine's operations began at the Site in 1946 when it primarily operated as a boatyard. The Site currently consists of one large building (Building 1), several smaller buildings, open storage areas, parking lots, stormwater and washwater management systems, and until 2003, a marine railway. Current Site features are shown on Figure 2. Beneath the northern portion of Building 1 is the location of a former gasoline underground storage tank (UST) and a former dispenser island pad that was used to dispense gasoline. The upland portion of the Site is approximately 2.5 acres in size and the in-water portion about 0.8 acres. Current and former Site features are described in greater detail in Sections 1.1.2 and 1.1.3.

1.1.1 Site History and Operations

Historical fire insurance maps from 1904 and 1913 show the Site area was originally undeveloped tidelands of Bellingham Bay. The Port has owned the property since 1927. In the 1920s, the Site uplands were filled with material dredged during construction of the Squalicum Waterway and from other upland sources of fill. By the 1940s and 1950s, various large businesses began operating in the fill areas along the waterway.

Weldcraft Steel and Marine was established on the Site in 1946 and primarily operated as a boatyard that conducted various activities, including boat construction, repair, and maintenance; wood and metal fabrication; marine pipefitting; electrical work; sheet metal work; painting; machinery construction, installation, and repair; vessel haul-out and launching; lofting and pattern-making; canvas and plastic work; storage, brokerage, retail, and wholesale sales; and concrete work. The Port's lease with

Weldcraft Steel and Marine was terminated in February 2000 and the Port obtained full operational control of the Site in July 2000. The Port entered into an AO (AO No. DE 03TCPBE-5623) with Ecology in 2003 to address investigation of the Site. This AO was extended through the completion of the CAP; see Section 2.1 for additional details regarding Site AOs.

The Site was identified as one of several cleanup sites in the Bellingham Bay Comprehensive Strategy final environmental impact statement (Anchor and PIE 2000) developed under the Bay-Wide Demonstration Pilot. Ecology placed the Site on its Confirmed and Suspected Contaminated Sites List in 2001 and gave the Site the highest priority ranking of "1" under the Washington Ranking Method following completion of a Site Hazard Assessment in 2002.

Since April 2004, the Site has been leased to and occupied by Seaview Marine, operating as Seaview Boatyard North, a company that conducts general boat repair activities. Seaview Boatyard North operates in compliance with its National Pollutant Discharge Elimination System boatyard permit and is not associated with the historical contamination being addressed under MTCA and SMS. A number of Site improvements have been completed since Seaview's tenancy, including installation of stormwater treatment systems and upgrades to existing infrastructure. Buildings 2 and 3 have been removed to their structural frames and slabs. Seaview Boatyard North is planning to remove Building 1 to its slab and use the slab as a working surface for boat repairs, similar to the current use of the former Buildings 2 and 3 areas. Seaview Boatyard North is also planning to construct a new building to support ongoing operations in the future, although the timing and location of these activities are uncertain.

1.1.2 Summary of Current Environmental Conditions

Several environmental investigations were conducted at the Site prior to developing the CAP. The 2015 Remedial Investigation/Feasibility Study (RI/FS) report 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 2025b). In the RI/FS and CAP, the Site was subdivided into three Site Units:

- The former UST Site Unit
- The Work Yard Site Unit
- The Marine Site Unit.

The Site Units are shown on Figure 2. The CAP focused on cleanup of the UST Site Unit and the Work Yard Site Unit, as the interim action conducted for the Marine Site Unit has addressed contaminated marine sediment. Compliance monitoring of post-interim action marine sediment quality indicated that the objectives of the interim action were met and further cleanup action is not required in the Marine Site Unit.

Contaminants of concern within the UST Site Unit and Work Yard Site Unit were identified as:

- Benzene, ethylbenzene, o-xylene, metals (i.e., copper, lead, nickel, and zinc), and total petroleum hydrocarbons (TPH) as gasoline (TPH-G) and as diesel (TPH-D) in soil
- Benzene, o-xylene, metals (i.e., copper, nickel, and zinc), and TPH-G in groundwater.

The nature and extent of these contaminants at the Site were described in more detail in the RI/FS and CAP reports, and cumulative soil and groundwater data for those contaminants, along with the selected cleanup levels, are provided in Tables 1 and 2.

2.0 CLEANUP ACTION PLAN REQUIREMENTS

The cleanup action for the Site must achieve the requirements outlined under MTCA (Chapter 70A.305 RCW), as required in the AO and detailed in the final CAP (Ecology 2025b). This section briefly highlights the basis for and elements of the planned cleanup action.

2.1 Agreed Orders

AO DE 03TCPBE-5623, was entered into by Ecology and the Port in 2003, for the purpose of conducting an RI/FS, and conducting an interim action for cleanup of Site sediment (Ecology 2003). An Interim Action Work Plan was included as an exhibit to the AO. The interim action construction work was completed in 2003 and 2004 and documented in an Ecology-approved Interim Action Completion Report (Landau 2006). In February 2015, the Port completed the RI/FS for the Site in accordance with the above-referenced AO. The RI/FS report (Landau 2015) identified a preferred cleanup alternative, which is the basis for the final cleanup action described in the CAP. A draft CAP was developed and went through a 30-day comment period from June 30 to July 30, 2025. The draft CAP was finalized on September 8, 2025.

Following completion of the CAP, a new AO was entered into by Ecology and the Port on October 10, 2025 for the purpose of designing the remedial action detailed in the CAP (Ecology 2025a). Based on the Findings of Fact and Ecology Determinations, it was ordered that the Port take the remedial actions described below at the Site. These remedial actions must be conducted in accordance with Chapters 173-340 and 173-204 WAC.

2.2 Cleanup Action Plan Elements

The final CAP's selected cleanup action consists of the following elements:

- Already-completed interim actions (Marine Site Unit)
- Recovery of light non-aqueous phase liquid (LNAPL) with intermittent dual-phase extraction (DPE) methods, if LNAPL is present in recoverable quantities (UST Site Unit)
- Containment of TPH-G and soil contaminated with volatile organic compounds (VOCs) (i.e., benzene and ethylbenzene), with soil vapor control if needed to manage affected soil vapor (UST Site Unit)
- Containment of metals-contaminated soil (Work Yard Site Unit)
- Groundwater and soil vapor compliance monitoring (Site-Wide)
- Institutional controls to maintain containment layer, restrict groundwater use, and manage potentially contaminated soil and groundwater disturbed during future intrusive activities (Site-Wide).

2.3 Deliverables and Milestones

The Scope of Work defined in the AO is divided into four major tasks:

- **Task 1: PRDI Project Plans.** Describes the work necessary to further investigate the Site to inform effective design of the prescribed remedy. The AO requires that these project plans include a description of additional proposed investigation efforts to inform and refine design elements for the prescribed remedy. Specific activities chosen for the PRDI include additional groundwater and vapor sampling, a groundwater evaluation, a free-phase (i.e., LNAPL) product investigation, additional refinements of the surface condition assessment, and a soil vapor conditions assessment.

  The PRDI Project Plans consist of a Work Plan (this document), Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP; Appendix A), Health and Safety Plan (HASP; Appendix B), and Inadvertent Discovery Plan (IDP; Appendix C).

- **Task 2: Implementation of PRDI Project Plans**. Execution of the work described above.

- **Task 3: 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 4: Construction Plans and Specifications**. Preparation of Ecology review and final construction plans and specifications (at the 90 percent and 100 percent completion levels) based on the final EDR.

3.0 ELEMENTS OF THE PRE-REMEDIAL DESIGN INVESTIGATION

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 (Landau 2015) and are shown on Figure 3.

The following investigation elements are proposed to be included as part of PRDI activities:

- **Site-Wide – Assessment of Existing Groundwater Monitoring Wells and Compliance Monitoring.** The final CAP identified the need for compliance monitoring to demonstrate that groundwater cleanup standards will be achieved and maintained by the proposed remedy. PRDI activities include an inventory of existing groundwater monitoring wells, assessment of their current conditions and viability for sampling, and redevelopment as appropriate. Existing wells will be monitored and sampled to establish a pre-remedial baseline and understanding of current environmental conditions; and new wells will be installed if needed. An assessment of the results of this testing will also be used to evaluate if selected wells should be decommissioned in accordance with state regulations.
- **Site-Wide – Surface Conditions Assessment**. The final CAP identified the need to assess the use and maintenance of the existing asphalt layer and building slabs on Site, assess installation of new asphalt pavement in the North Work Yard, and installation and/or repair/replacement of additional asphalt, where needed, to prevent human contact with contaminated soil, and to reduce the potential for stormwater infiltration. This assessment will include visually assessing and documenting the condition of existing paved areas (e.g., concrete, asphalt, etc.) at the Site to help in evaluating whether the existing paved areas are adequate to satisfy containment requirements.
- **UST Site Unit - Free-Phase Product Investigation**. During the remedial design, an investigation will be conducted to determine if LNAPL is present within the UST Site Unit in practicably recoverable quantities. If the presence of recoverable LNAPL is confirmed, intermittent DPE or an alternative recovery method would be included in the final cleanup action to remove LNAPL product. The number and location of wells necessary, and the approach to LNAPL recovery, will be determined during the remedial design phase.
- **UST Site Unit – Soil Vapor Conditions Assessment**. If assessment activities conducted during the Free-Phase Product Investigation identify levels of petroleum hydrocarbons that may require soil vapor controls, an additional soil vapor conditions assessment will be conducted. The assessment would include soil vapor analysis to evaluate if vapor controls are required to prevent benzene and other VOCs from migrating to a building at the Site or across Squalicum Way at concentrations that pose an unacceptable risk to human health. The specific configuration of any vapor controls would be developed during remedial design.

4.0 PRE-REMEDIAL DESIGN INVESTIGATION 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 5 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 activities will be implemented across multiple mobilizations as new Site data are evaluated and additional focused activities are planned and undertaken. Additional future Site investigation activities, if required, will be detailed in communications with Ecology for review and approval in advance of further Site work.

The following documents have been prepared to support execution of the planned investigation activities, management of the resulting data, and support for remedy design:

- PRDI Work Plan (this document)
- SAP and QAPP (Appendix A)
- HASP (Appendix B)
- IDP (Appendix C).

4.1 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. The Site reconnaissance 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. Existing monitoring wells will be located and evaluated for accessibility and suitability for sampling. If necessary, existing wells will be redeveloped at least 48 hours prior to sampling. Records of this evaluation will be used to develop a well inventory, identify if wells need to be replaced during groundwater monitoring well installation activities, and may be evaluated following the collection of baseline samples to determine if additional wells are needed or if selected wells are not necessary for compliance monitoring and may be decommissioned.

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 may be moved based on the results of the Site reconnaissance to avoid subsurface utilities or other infrastructure.

4.2 Underground Storage Tank Site Unit

The selected cleanup action for the Underground Storage Tank Site Unit consists of assessing for the presence of LNAPL, addressing any recoverable LNAPL using intermittent DPE methods, and containing TPH-G and VOC-impacted soil in the UST Site Unit with pavement/concrete capping, soil vapor control, compliance monitoring, and institutional controls. The investigation activities detailed below will be

conducted to evaluate if LNAPL is present within the UST Site Unit in practicably recoverable quantities and soil vapor conditions, and inform remedy design and design of soil vapor controls, as needed.

4.2.1 LNAPL Assessment and Compliance Monitoring

To establish if LNAPL is present in practicably recoverable quantities, investigation activities will be conducted in the UST Site Unit as described below.

Based on historical soil and groundwater data, up to four additional monitoring wells will be installed within the area defined by the 300-milligram-per-kilogram gasoline contour at the locations shown on Figure 4 (proposed MW-13 through MW-16) to assess for the presence of LNAPL. Field screening and soil sampling will be conducted during advancement of the soil borings as detailed in Section 5.1.2, and monitoring wells will be installed and developed as detailed in Section 5.1.3.

The five existing monitoring wells (MW-1, MW-2, MW-5, MW-6, and MW-8) in the UST Site Unit and four wells to be installed in or proximate to the UST Site Unit will be used to test quarterly for the presence of recoverable quantities of LNAPL. If no LNAPL is present, then groundwater samples will be collected using peristaltic pumps. Dedicated tubing will be used to sample each well to prevent cross-contamination between wells. Well MW-2, located outside of the UST Site Unit and across the street, will be sampled only during the initial event, and is not anticipated to be sampled during other events. Low-flow sampling techniques will be used for purging and sample collection as described in Section 5.1.4 and submitted for laboratory analysis for TPH, benzene, and xylenes.

4.2.2 LNAPL Recoverability Analysis (if Present)

In the event that LNAPL is identified at thicknesses in excess of 0.2 to 0.5 feet (ft) in any of the existing and newly-installed monitoring wells described in Section 4.2.1, Landau will conduct a baildown test in each well containing LNAPL to assess for LNAPL transmissivity. During the baildown test, LNAPL will be rapidly removed from the well until only water remains, and the rate at which LNAPL recharges into the well will be measured by monitoring the depth to the top of the LNAPL compared to the depth of the LNAPL-water interface after 24 hours and calculated in accordance with ASTM International standard E2856-13 (2021). The results of this analysis will inform the design of the recovery approach.

4.2.3 Soil Vapor Assessment

Up to three soil vapor probes will be installed throughout the UST Site Unit: Two at the northern perimeter of the Unit, and one proximate to the highest level of contamination to determine the potential for vapor intrusion into existing and/or future structures. The location of each soil vapor sampling point will be determined following the groundwater monitoring well installation and following one round of the performance monitoring activities described in Section 4.2.1. Soil vapor samples will be collected using the methodology described in Section 5.2. The results of this assessment will be used to inform the design of future potential vapor controls, if required.

4.3 Work Yard Site Unit

The selected cleanup action for the Work Yard Site Unit consists of containment of metals-impacted soil. Groundwater is assumed to be potentially contaminated with metals throughout the Work Yard Site Unit, although available data indicate that metals contamination in groundwater is limited to the vicinity of the galvanized steel bulkhead at the shoreline. Containment will be achieved by installing new asphalt pavement in the North Work Yard, repairing/replacing existing asphalt pavement (as needed), and maintaining the existing pavement cover and building slabs to prevent direct human contact with, and to limit stormwater infiltration through, soil contaminated, or potentially contaminated, with metals. Institutional controls will be implemented to ensure the containment layer is properly maintained and repaired, as needed, to prevent exposure to Site construction workers.

4.3.1 Groundwater Evaluation and Compliance Monitoring

As discussed in the CAP, a point of compliance is established for the Work Yard Site Unit in the vicinity of the shoreline. To fully address this point of compliance, one additional monitoring well (MW-17) will be installed in the southwest corner of the Site, east of Bellingham Bay. Groundwater samples will be collected from the newly installed monitoring well and the seven existing monitoring wells (MW-3, MW-4, MW-7, MW-9 through MW-12) in the Work Yard Site Unit on a quarterly basis using dedicated tubing and low-flow sampling techniques. The samples will be submitted for laboratory analysis for dissolved metals in accordance with the methods discussed in Section 5.1.4.

4.4 Site Survey

The location, top-of-casing, and ground surface elevation of existing wells and wells installed as part of the proposed PRDI activities will be surveyed by a land surveyor licensed in the State of Washington. The survey will reference the NAD83[1] horizontal datum and the NAVD88[2] vertical datum. Surveyed top-of-casing elevations will be used to calculate groundwater elevations at each monitoring well to evaluate groundwater flow direction.

4.5 Surface Condition Assessment

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 and other associated institutional controls. Existing Site surface conditions as they relate to the planned containment (i.e., capping) of underlying contamination and the controlled management of landfill gas will be evaluated. This evaluation will include visually assessing and documenting the condition of existing paved areas (e.g., concrete, asphalt, etc.) at the Site.

Visually assessing and documenting the condition of existing paved areas at the Site will help in evaluating whether existing paved areas are adequate to satisfy containment requirements. Based on the CAP, a reduced-permeability cap and physical barrier are required in the both the UST Site Unit and

[1] North American Datum of 1983

[2] North American Vertical Datum of 1988

the Work Yard Site Unit. Existing surface conditions are largely expected to limit infiltration sufficiently to meet the requirements of a reduced permeability cap (Ecology 2025b). However, under the selected cleanup action, a physical barrier (e.g., soil/gravel and/or hard surface) is needed in the North Work Yard area to address the soil pathway for direct contact protection and the erosion potential of soils.

5.0 FIELD METHODS AND LABORATORY ANALYSES

This section provides further details on the means, methods, and procedures to be used during the PRDI activities discussed in Section 3. Information on specific sampling and analytical procedures, quality assurance/quality control (QA/QC) requirements, and analytical laboratory control information is provided in the SAP and QAPP documents included as Appendix A. In addition to the information included herein, these documents, along with a Site-specific HASP (Appendix B) and IDP (Appendix C) will be the guidance documents used to implement the PRDI activities.

5.1 Environmental Investigations

Methods, procedures, and related laboratory analytical information for the environmental investigations discussed in Section 3 are described in further detail in the subsections below and the SAP/QAPP (Appendix A).

5.1.1 Drilling

Borings for installation of new monitoring wells will be completed using hollow-stem auger 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 4.1), and 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. A concrete corer may be required in areas with concrete surfacing.

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 as described in the SAP/QAPP (Appendix A). 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. 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.

5.1.2 Field Screening and Soil Sampling

Soil samples from borings will be field-screened during lithologic logging. Field-screening techniques include visual inspection for staining, olfactory evaluation for the presence and strength of petroleum odors, sheen testing, and soil core/sample scanning using a photoionization detector (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 per the SAP/QAPP (Appendix A). 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 interval most likely to be contaminated based on the depth of contaminated soil identified in nearby borings. Soil sampling collection procedures are

outlined in the SAP/QAPP (Appendix A). Soil samples collected from the UST Site Unit will be analyzed for the following constituents:

- TPH-G using the Northwest TPH extended-range gasoline analytical method (NWTPH-Gx)
- TPH-D and TPH as oil (TPH-O) using the Northwest TPH extended-range diesel analytical method (NWTPH-Dx) and silica-gel cleanup
- Benzene, ethylbenzene, and o-xylenes using US Environmental Protection Agency (EPA) Method 5035/8260D.

No soil samples will be collected for laboratory analysis from boring MW-17 in the Work Yard Site Unit.

5.1.3 Monitoring Well Installation and Development

Monitoring wells will be installed in borings drilled using hollow-stem auger methods. The wells 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. As depth to groundwater at the Site has ranged from 3 ft to 10 ft bgs, screens will be set from approximately 3 ft to 13 ft.

New monitoring wells will be developed as described in the SAP/QAPP (Appendix A) by a driller licensed in the State of Washington.

5.1.4 Groundwater Monitoring Well Sampling and Analysis

Groundwater monitoring wells will be gauged prior to sampling with an oil/water interface probe to determine 1) approximate depth to water; 2) potential presence of LNAPL in the well; and 3) total well depth (which will be compared to well installation logs, if available, to confirm well construction details and determine if well redevelopment is necessary; refer to the SAP/QAPP (Appendix A) for monitoring well development requirements). Depths-to-water will be measured to the nearest 0.01 ft from the top of the well casing. If LNAPL is identified in a well, a bailer will be used to confirm presence and thickness.

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 in the SAP/QAPP provided in Appendix A. Samples 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 collected from the UST Site Unit will be analyzed for the following constituents:

- TPH-G using NWTPH-Gx
- Benzene and o-xylenes using EPA Method 8260D.

Groundwater samples collected from wells in the Work Yard Site Unit will be analyzed for:

- Copper, nickel, and zinc using EPA Method 6020B.

5.2 Soil Vapor Investigation

Soil vapor samples will be collected during two events (wet season and dry season) from up to three direct-push or hand-augered borings located in the UST Site Unit.

5.2.1 Soil Vapor Probe Installation

Soil vapor probes will be constructed to provide subsurface sampling ports in locations assessed to correspond with the highest levels of contamination observed during the initial round of groundwater monitoring and sampling described in Section 5.1.4. The locations will be selected to evaluate soil vapor conditions proximate to the highest observed petroleum contaminant levels in the UST Site Unit.

The probes will be installed by a licensed well driller after coring through the asphalt/concrete paving to document existing pavement type and thickness. A direct-push drilling rig (or hand-auger) will advance a boring of approximately 5.5 ft in depth. A ½-inch-diameter PVC casing with sample screen will be installed into the boring and sealed per the SAP/QAPP (Appendix A), and the soil vapor probe will be completed with a flush-mounted monument at the ground surface to provide some protection for continued pavement trafficking.

5.2.2 Soil Vapor Sample Collection

Soil vapor samples will be collected from approximately 5.5 ft bgs using the soil vapor probes. Up to three soil vapor samples will be collected during each of two proposed sampling events and submitted to a certified laboratory for analysis for VOCs using the EPA TO-15 Method and Massachusetts Department of Environmental Protection Air Phase Hydrocarbon (APH) method WSC-CAM-IX and analysis for helium by Modified EPA Method 3C. The VOC data will be used to evaluate the risk of vapor intrusion into current and future Site buildings. If the wet-season samples are unable to be collected due to high water table drowning the probes, the results of the low-water-level summer months will be used to evaluate if further evaluation is required.

Soil vapor samples 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. Soil vapor sample collection procedures are described in the SAP/QAPP (Appendix A).

5.3 Investigation-Derived Waste

Investigation-derived waste from the environmental investigations, 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 in 55-gallon steel drums provided by the drilling subcontractors. Drums will be stored at a pre-approved temporary 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.

6.0 INVESTIGATION AND REPORTING SCHEDULE

The table below provides a schedule for implementation of the planned field events included in the PRDI 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 may be provided in future addenda, email communication with Ecology and the Port, or separate reporting, as appropriate.

Investigation Element	Field Activities	Duration	Notes
Site Reconnaissance	• Mark locations for utility locates • Evaluate existing groundwater monitoring wells to determine suitability for sampling	1 day	Requires coordination with Port and tenant
Surface Conditions Assessment	• Site reconnaissance to evaluate condition, quality, and make-up of existing surface conditions	2 days	Requires coordination with Port and tenant
UNDERGROUND STORAGE TANK SITE UNIT			
Monitoring Well Installation	• Install up to four new groundwater monitoring wells	1-2 days for installation 1 day for development	Final locations contingent on underground utilities and tenant access requirements
Groundwater Evaluation	• Monitor, and if no LNAPL observed, sample four new wells and five existing wells during initial event • Monitor, and if no LNAPL observed, sample four new wells and five existing wells for subsequent events	1-2 days each event	Quarterly beginning in Q3 2026 (four quarters)
Soil Vapor Evaluation	• Install three soil vapor probes • Collect soil vapor samples from up to three locations	1 day to install 1 day to sample	Following first round of quarterly groundwater sampling events. One soil vapor sample collection in a “wet season” month and one in a “dry season” month.
Recoverability Analysis	• Baildown test at wells with LNAPL	2 days	As needed if LNAPL observed
WORK YARD SITE UNIT			
Monitoring Well Installation	• Install one new groundwater monitoring well	1 day for installation 1 day for development	Final location contingent on underground utilities and tenant access requirements
Groundwater Evaluation	• Monitor and sample one new well and seven existing wells	1-2 days each event	Quarterly beginning in Q3 2026 (four quarters)

ENTIRE WELDCRAFT STEEL AND MARINE SITE			
Investigation Element	**Field Activities**	**Duration**	**Notes**
Elevation Survey	• Survey top-of-casing and ground surface elevations at new and existing monitoring wells	1 day	Conducted by professional surveyor

7.0 USE OF THIS PLANNING DOCUMENT

This Pre-Remedial Design Investigation Project Plans document has been prepared for the exclusive use of the Port and applicable regulatory agencies for specific application to the former Weldcraft Steel and Marine 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.

8.0 REFERENCES

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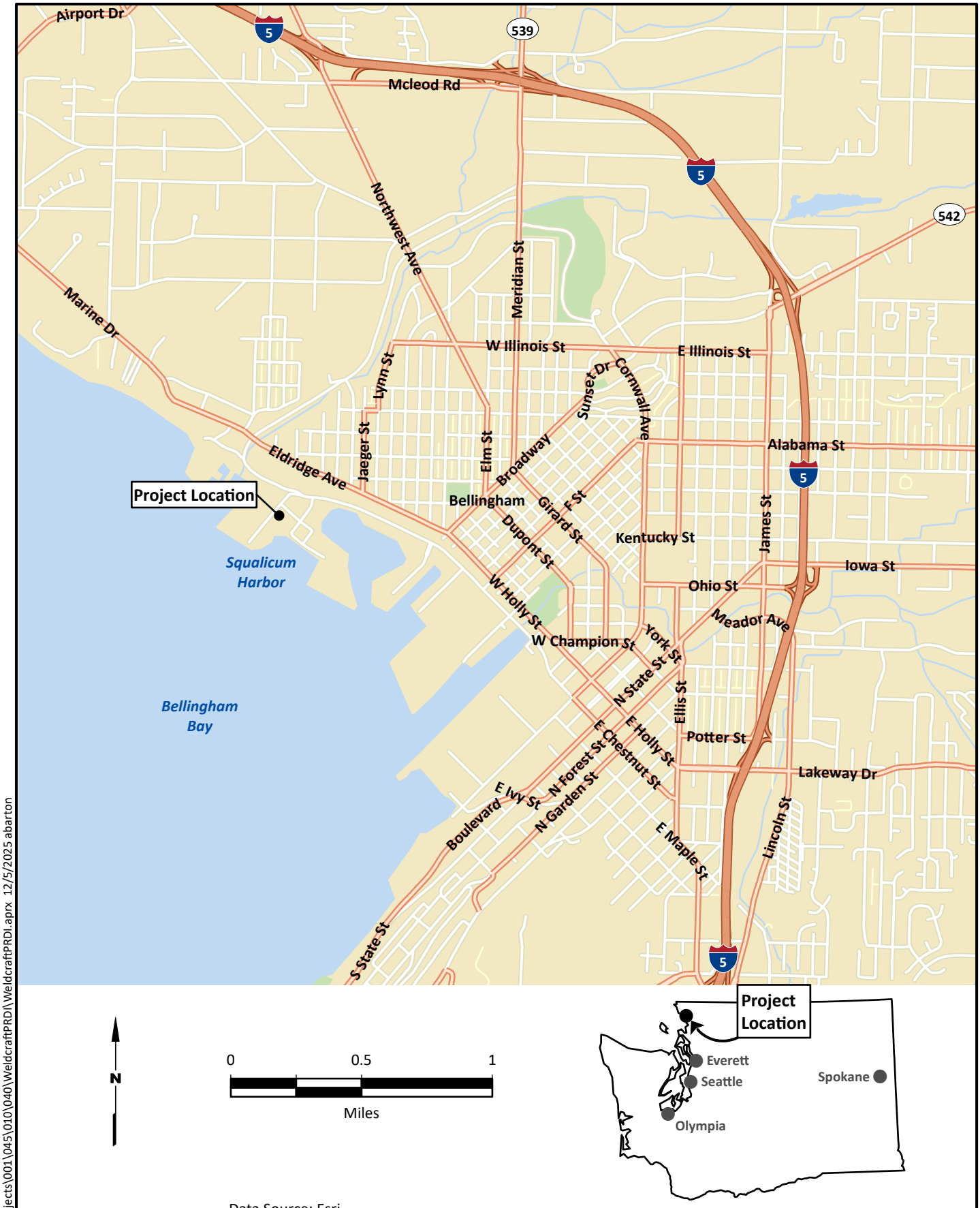
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Data Source: Esri.

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Port of Bellingham Weldcraft Steel and Marine Bellingham, Washington	**Vicinity Map**	Figure 1

N

Former Gasoline UST
Former Septic Tank
Former Dispenser Island Pad
Squalicum Way
Welding Building
Vegetative Strip
Building 1
Former Shed
Marine Way Dock Shed
UST Site Boundary
Catch Basin (No. 1)
Marine Railway
Former Donkey Shed
Former Building 2
Work Yard Site Unit Boundary
Dry Storage Yard
Former Building 3
Former Paint Shed
Catch Basin (No. 2)
Marine Site Unit Boundary
Squalicum Harbor
Bioswale

Legend

- Catch Basin
- Vault
- Work Yard Site Unit Boundary
- Marine Site Unit Boundary
- UST Site Boundary
- Former Weldcraft Boundary
- Storm Lines
- Former Site Features
- Historical Buildings

0 70 140

Scale in Feet

Data Source: Google Earth Pro.

Note

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

LANDAU ASSOCIATES

Port of Bellingham Weldcraft Steel and Marine Bellingham, Washington	**Current Site Features**	Figure 2

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Legend

- Catch Basin
- Groundwater Geoprobe
- Monitoring Well
- Soil Boring
- Surface Soil Grab Sample
- Vault
- Work Yard Site Unit Boundary
- Containment Area Boundary
- Marine Site Unit Boundary
- LNAPL Treatment
- UST Site Boundary
- Former Weldcraft Boundary
- Storm Lines
- Former Site Features
- Historical Buildings

0 70 140

Scale in Feet

Data Source: Google Earth Pro.

Note

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

LANDAU ASSOCIATES

Port of Bellingham Weldcraft Steel and Marine Bellingham, Washington	**Historical Investigation Locations**	Figure 3

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Legend

- Proposed Monitoring Well
- Catch Basin
- Groundwater Geoprobe
- Monitoring Well
- Soil Boring
- Surface Soil Grab Sample
- Vault
- Work Yard Site Unit Boundary
- Containment Area Boundary
- Marine Site Unit Boundary
- LNAPL Treatment
- UST Site Boundary
- Former Weldcraft Boundary
- Storm Lines
- Historical Buildings
- Former Site Features

0 70 140

Scale in Feet

Data Source: Google Earth Pro.

Note

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

LANDAU ASSOCIATES

Port of Bellingham Weldcraft Steel and Marine Bellingham, Washington	**PRDI Proposed Investigation Locations**	Figure 4

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Table 1
Soil Analytical Results
Weldcraft PRDI Project Plans
Bellingham, Washington

Sampling Location	Sampling Depth (feet bgs)	Sampling Date	Total Petroleum Hydrocarbons		Volatile Organic Compounds		Metals			
			TPH-G (mg/kg)	TPH-D + TPH-O (a) (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
Soil Cleanup Levels (a)			30	2,000	0.014	18	36	250	48	100
SB-1	1-1.4	1/20/1998	20 U	50 U	--	--	--	--	--	--
SB-2	1.2-1.4	1/20/1998	20 U	50 U	--	--	--	--	--	--
SB-6	0-1.4	1/20/1998	400 U	**1,100**	--	--	--	--	--	--
SB-7	0-1.7	1/20/1998	--	--	--	--	**135**	**40**	**52**	**376**
SB-8	4.7-5.6	1/20/1998	**3,200**	**1,130**	--	--	--	--	--	--
SB-17	0.2-0.6	1/21/1998	--	--	--	--	**95.7**	**50**	**86**	**113**
SB-18	0.75-1.5	1/21/1998	--	--	--	--	**91.2**	**43**	**42**	**220**
SB-19	0.5-2.1	1/21/1998	--	--	--	--	**247**	**120**	**23**	**146**
SB-20	0.4-1.7	1/21/1998	--	--	--	--	**173**	**1,160**	**31**	**441**
SB-25	7-8	1/21/1998	180 J	--	8.1 J	5 J	--	--	--	--
SB-30	7-7.5	1/21/1998	26 J	--	0.22 J	0.56 J	--	--	--	--
SB-32	5-6.8	1/21/1998	5.4 UJ	--	0.054 UJ	0.081 J	--	--	--	--
SB-33	5-7.5	1/21/1998	5.7 UJ	--	0.057 UJ	0.057 UJ	--	--	--	--
SB-WW-Comp	Composite	1/20/1998	--	--	--	--	**89.8**	**77**	**27**	**171**
SB-Bldg3-Comp	Composite	1/20/1998	--	--	--	--	**44.5**	**36**	**22**	**61.5**
SB-EW-Comp	Composite	1/20/1998	--	--	--	--	**43.2**	**15**	**23**	**53.5**
SB-DS-Comp	Composite	1/21/1998	--	--	--	--	**27.3**	**8**	**23**	**42.5**
Drum Area 1	Surface	1/23/1998	200 UJ	690 J	--	--	--	--	--	--
Drum Area 2	Surface	1/23/1998	200 UJ	630 J	--	--	--	--	--	--
DA101	0.75	7/12/2000	--	**68**	--	--	--	--	--	--
DA101	2.50	7/12/2000	--	**24.2**	--	--	--	--	--	--
DA101	8.00	7/12/2000	--	**91**	--	--	--	--	--	--
DA102	0.75	7/12/2000	--	**34.7**	--	--	--	--	--	--
DA102	3.00	7/12/2000	--	10 U	--	--	--	--	--	--
DA102	8.00	7/12/2000	--	**24**	--	--	--	--	--	--
DA103	0.50	7/12/2000	--	**53**	--	--	--	--	--	--
DA103	2.50	7/12/2000	--	**8.9**	--	--	--	--	--	--
DA103	8.00	7/12/2000	--	**172**	--	--	--	--	--	--
SB-601A	0.0-1.5	8/17/2000	20 U	**150**	--	--	--	--	--	--
SB-601B	1.5-3.0	8/17/2000	20 U	100 U	--	--	--	--	--	--
UST-A	Sidewall	1/4/2001	**20 U**	**100 U**	--	--	**41.2**	**28**	**17**	--
UST-B	Base	1/4/2001	**470**	**100 U**	--	--	**55.6**	**26**	**20**	--
UST-C	Sidewall	1/4/2001	**20 U**	**100 U**	--	--	**20.1**	**14**	**16**	--
DI-1	Surface	1/4/2001	**41**	**70**	--	--	--	--	--	--
CB-2	Surface	1/4/2001	--	**4,100**	--	--	**186**	**55**	**24**	--
MW-5	10-11.5	5/22/2002	**2,300**	--	**44**	**63**	**32**	--	--	--
MW-6	5-6.5	5/23/2002	5.4 U	--	0.0011 U	0.0011 U	**3**	--	--	--
MW-9	5-5.5	5/22/2002	--	**1,940**	--	--	--	--	--	--
SB-34	8-9	5/8/2006	**20**	--	--	--	--	--	--	--
SB-35	9.5-10	5/8/2006	**210**	--	--	--	--	--	--	--

Table 1
Soil Analytical Results
Weldcraft PRDI Project Plans
Bellingham, Washington

Sampling Location	Sampling Depth (feet bgs)	Sampling Date	Total Petroleum Hydrocarbons		Volatile Organic Compounds		Metals			
			TPH-G (mg/kg)	TPH-D + TPH-O (a) (mg/kg)	Benzene (mg/kg)	Ethylbenzene (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)
Soil Cleanup Levels (a)			30	2,000	0.014	18	36	250	48	100
SB-36	8-8.5	5/8/2006	**1,900**	--	--	--	--	--	--	--
SB-37B	8.5-9.5	5/8/2006	**550**	--	--	--	--	--	--	--
SB-37	8.5-9.5	5/8/2006	**730**	--	--	--	--	--	--	--
SB-38	8-9	5/8/2006	**720**	--	--	--	--	--	--	--
SB-39	8-8.5	5/8/2006	**1,800**	--	--	--	--	--	--	--
SB-40	8-8.5	5/8/2006	**31**	--	--	--	--	--	--	--
SB-41	7.5-8	5/8/2006	**9.8**	--	--	--	--	--	--	--
SB-42	8-8.5	5/8/2006	**2,400**	--	--	--	--	--	--	--
SB-43	8-8.5	5/8/2006	**830**	--	--	--	--	--	--	--
SB-44-0-1	0-1	5/8/2006	--	--	--	--	**545**	**1,140**	**41**	**1,160**
SB-44-1-2	1-2	5/8/2006	--	--	--	--	**37.5**	**16**	--	**51.9**
SB-45-0-1	0-1	5/8/2006	--	--	--	--	**50.8**	**6**	**19**	**206**
SB-45-1-2	1-2	5/8/2006	--	--	--	--	**17.1**	--	--	**114**
SB-45-2-3	2-3	5/8/2006	--	--	--	--	--	--	--	**33.6**
SB-46-0-1	0-1	5/8/2006	--	--	--	--	**13.9**	**9**	**22**	**39.6**
SB-47-0-1	0-1	5/8/2006	--	--	--	--	**126**	**27**	**24**	**91.2**
SB-47-1-2	1-2	5/8/2006	--	--	--	--	**49.5**	--	--	--
SB-47-2-3	2-3	5/8/2006	--	--	--	--	**101**	--	--	--
SB-48-0-1	0-1	6/29/2006	--	--	--	--	**43.3**	**17**	**27**	**50.2**
SB-48-1-2	1-2	6/29/2006	--	--	--	--	**25.7**	--	--	--
SB-49-0-1	0-1	6/29/2006	--	--	--	--	**19.2**	**4**	**24**	**61.7**
SB-50-0-1	0-1	6/29/2006	--	--	--	--	**53.2**	**36**	**30**	**145**
SB-50-1-2	1-2	6/29/2006	--	--	--	--	**11.1**	--	--	**31.6**
SB-51-0-1	0-1	6/29/2006	--	--	--	--	**102**	**871**	**32**	**246**
SB-53-9-10	9-10	6/30/2006	**180**	--	**0.39**	**0.98**	--	--	--	--
SB-54-9-10	9-10	6/30/2006	**220**	--	**1.1**	**2**	--	--	--	--
SB-55-10-11	10-11	6/30/2006	**15,000**	--	**0.9**	**31**	--	--	--	--
SB-57-10-11	10-11	6/30/2006	**59**	--	**0.29**	**0.62**	--	--	--	--
SB-59-10-11	10-11	6/30/2006	**78**	--	**0.17**	**0.54**	--	--	--	--
SB-61-10-11	10-11	6/30/2006	**86**	--	**0.073**	**0.29**	--	--	--	--
SB-62-10-11	10-11	6/30/2006	**24**	--	0.011 U	**0.031**	--	--	--	--
SB-63-9-10	9-10	6/30/2006	**120**	--	**0.81**	**1.5**	--	--	--	--
SB-64-9.5-10.5	9.5-10.5	6/30/2006	**28**	--	**0.058**	**0.2**	--	--	--	--
SB-65-9-10	9-10	6/30/2006	**57**	--	**0.45**	**0.84**	--	--	--	--
SB-66-9-10	9-10	6/30/2006	**66**	--	**0.33**	**0.78**	--	--	--	--
SB-67-10.5-11.5	10.5-11.5	6/30/2006	**64**	--	**0.23**	**0.58**	--	--	--	--
SB-68-1.5-2	1.5-2	10/22/2007	5.2 U	--	--	--	**10.4**	2 U	**19**	**26**
SB-69-0.66-1	0.66-1	10/22/2007	5.8 U	--	--	--	**9.3**	2 U	**15**	**27**

Table 1
Soil Analytical Results
Weldcraft PRDI Project Plans
Bellingham, Washington

Notes:

Bold values indicate concentration detected above laboratory reporting limits.

Gray shading indicates detected analyte exceeds applicable cleanup level.

-- = not analyzed

U = The compound was analyzed for, but was not detected at the given detection limit.

UJ = The analyte was not detected in the sample; the reported sample reporting limit is an estimate.

J = Estimated concentration.

(a) Soil screening levels based on Cleanup Action Plan values.

(b) Beginning with May 2002 data, TPH samples were silica/acid cleaned.

(c) TPH-D + TPH-O = Sum total of detected TPH-D and TPH-O; non-detects counted as zero if one constituent was detected and reported and the other was not. If both values were non-detect, the higher non-detect value was used.

Abbreviations and Acronyms:

bgs = below ground surface

mg/kg = milligrams per kilogram

ND = not detected

TPH = total petroleum hydrocarbons

TPH-D = TPH as diesel

TPH-G = TPH as gasoline

TPH-O = TPH as oil

Table 2
Groundwater Analytical Results
Weldcraft PRDI Project Plans
Bellingham, Washington

Sampling Location	Lab ID	Sampling Date	Total Petroleum Hydrocarbons	Volatile Organic Compounds		Metals		
			TPH-G (µg/L)	Benzene (µg/L)	o-Xylene (µg/L)	Dissolved Copper (µg/L)	Dissolved Nickel (µg/L)	Dissolved Zinc (µg/L)
Groundwater Screening Levels (a)			800	2.4	440	2.4	8.2	81
MW-1	BX90A	7/26/2000	250 U	0.2 U	--	--	--	--
MW-1-Dup	BX90E	7/26/2000	250 U	1.0 U	1.0 U	--	--	--
MW-1	EK56A	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-1	GV31G	7/7/2004	--	--	--	2 U	10 U	6 U
MW-2	BX90B	7/26/2000	--	1.0 U	1.0 U	--	--	--
MW-2	EK56B	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-3	BX90C	7/26/2000	250 U	1.0 U	1.0 U	--	--	--
MW-3	EK56C	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-3	GV31E	7/7/2004	250 U	1.0 U	1.0 U	**6**	10 U	**76**
MW-3	JO52G	6/29/2006	--	--	--	**16**	**9.3**	**101**
MW-3A	KJ60A	12/20/2006	--	--	--	2 U	**11**	**79**
MW-3B	KJ60G	12/20/2006	--	--	--	**5**	**12**	**97**
MW-4	BX90D	7/26/2000	250 U	1.0 U	1.0 U	--	--	--
MW-4	EK56D	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-4	GV31B	7/7/2004	250 U	1.0 U	1.0 U	**5**	10 U	**74**
MW-4	JO52H	6/29/2006	--	--	--	**3**	**9.1**	**82**
MW-4A	KJ60E	12/20/2006	--	--	--	**2**	**20**	**139**
MW-4B	KJ60I	12/20/2006	--	--	--	**2**	**17**	**126**
MW-5	EK56E	5/30/2002	**22,000**	**680**	**780**	--	--	--
MW-6	EK56F	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-6	GV31A	7/7/2004	250 U	1.0 U	1.0 U	--	--	--
MW-7	EK56G	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-7	GV31D	7/7/2004	250 U	1.0 U	1.0 U	**9**	10 U	**20**
MW-7-Dup	GV31H	7/7/2004	250 U	1.0 U	1.0 U	**8**	10 U	**21**
MW-7	JO52I	6/29/2006	--	--	--	**10**	**3.1**	**8**
MW-7A	KJ60C	12/20/2006	--	--	--	2 U	**2.5**	6 U
MW-7B	KJ60M	12/21/2006	--	--	--	**3**	**2.4**	6 U
MW-8	EK56H	5/30/2002	250 U	1.0 U	1.0 U	--	--	--
MW-8	GV31F	7/7/2004	250 U	1.0 U	1.0 U	--	--	--
MW-9	LU53F	10/22/2007	250 U	0.2 U	--	**0.7**	**2.1**	4 U
MW-10	JO52M	6/29/2006	--	--	--	**15**	**19.1**	**113**
MW-10A	KJ60B	12/20/2006	--	--	--	**2**	**37**	**172**
MW-10B	KJ60H	12/20/2006	--	--	--	**3**	**34**	**190**
MW-11	JO52L	6/29/2006	--	--	--	**35**	**16.6**	**104**
MW-11A	KJ60F	12/20/2006	--	--	--	**5**	**29**	**200**
MW-11B	KJ60J	12/20/2006	--	--	--	4 U	**27**	**190**
MW-111	KJ60K	12/20/2006	--	--	--	4 U	**28**	**180**
MW-12	JO52J	6/29/2006	--	--	--	**9**	**12.5**	**280**
MW-12-Dup	JO52K	6/29/2006	--	--	--	**9**	**13**	**280**
MW-12A	KJ60D	12/20/2006	--	--	--	**3**	**8**	**43**
MW-12B	KJ60L	12/21/2006	--	--	--	**3**	**7**	**45**

Table 2
Groundwater Analytical Results
Weldcraft PRDI Project Plans
Bellingham, Washington

Notes:

Bold values indicate concentration detected above laboratory reporting limits.

Gray shading indicates detected analyte exceeds applicable cleanup level.

-- = not analyzed

U = The compound was analyzed for, but was not detected at the given detection limit.

(a) Groundwater screening levels based on Cleanup Action Plan values.

Abbreviations and Acronyms:

µg/L = micrograms per liter

ID = identification

TPH-G = total petroleum hydrocarbons as gasoline

Table 3
Environmental Investigation Summary – Soil Borings
Weldcraft PRDI Project Plans
Bellingham, Washington

				SOIL					
Location ID	Subarea	Type	Status	Sample ID Prefix[1]	Sample Interval[2]	TPH-G (NWTPH-Gx)	TPH-D and TPH-O (NWTPH-Dx) with silica-gel cleanup	Benzene and Ethylbenzene (EPA Method 5035/8260D)	Total Metals[3]
MW-13	UST Site Unit	Split Spoon	Proposed	MW-13-S	TBD	X	X	X	
MW-14	UST Site Unit	Split Spoon	Proposed	MW-14-S	TBD	X	X	X	
MW-15	UST Site Unit	Split Spoon	Proposed	MW-15-S	TBD	X	X	X	
MW-16	UST Site Unit	Split Spoon	Proposed	MW-16-S	TBD	X	X	X	
MW-17	Work Yard Site Unit	Split Spoon	Proposed	MW-17-S	TBD				X
Field Duplicates	N/A	Split Spoon	N/A	Not proposed	N/A	X		X	
Trip Blanks	N/A	N/A	Proposed	Trip Blank	N/A	X		X	X
			TOTAL	---	---	**6**	**4**	**6**	**2**

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 MW-14 from 6 to 7 feet bgs would be "MW-14-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., visual, strongest odor, highest PID detection). If evidence of contamination is not present, samples will be collected from the the interval most likely to be contaminated based on the depth of contaminated soil identified in nearby borings .

(3) Metals to include copper, lead, nickel, and zinc.

Abbreviations and Acronyms:

bgs = below ground surface
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 = total petroleum hydrocarbons as diesel
TPH-G = total petroleum hydrocarbons as gasoline
TPH-O = total petroleum hydrocarbons as oil

Table 4
Environmental Investigation Summary – Groundwater Monitoring Locations
Weldcraft PRDI Project Plans
Bellingham, Washington

				ACTIVITIES				GROUNDWATER SAMPLING							
Location ID	Subarea	Type	Status	Collect Elevation Data	Water Sampling	Survey	Install/Develop[4]	Sample ID Prefix[1]	Sample Interval	Sampling Frequency	TPH-G (NWTPH-Gx)	Benzene and o-xylene (EPA Method 8260D)	Dissolved Metals[2] (EPA Method 6010)	YSI Meter (pH, DO, ORP, Temp)
MW-1	UST Site Unit	Monitoring Well	Existing	X	X	X		MW-1-GW	Middle of saturated screen	Quarterly	X	X		X
MW-2	UST Site Unit	Monitoring Well	Existing	X	X	X		MW-2-GW	Middle of saturated screen	Initial	X	X		X
MW-3	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-3-GW	Middle of saturated screen	Quarterly			X	X
MW-4	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-4-GW	Middle of saturated screen	Quarterly			X	X
MW-5	UST Site Unit	Monitoring Well	Existing	X	X	X		MW-5-GW	Middle of saturated screen	Quarterly	X	X		X
MW-6	UST Site Unit	Monitoring Well	Existing	X	X	X		MW-6-GW	Middle of saturated screen	Quarterly	X	X	X	X
MW-7	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-7-GW	Middle of saturated screen	Quarterly			X	X
MW-8	UST Site Unit	Monitoring Well	Existing	X	X	X		MW-8-GW	Middle of saturated screen	Quarterly	X	X		
MW-9	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-9-GW	Middle of saturated screen	Quarterly			X	X
MW-10	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-10-GW	Middle of saturated screen	Quarterly			X	X
MW-11	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-11-GW	Middle of saturated screen	Quarterly			X	X
MW-12	Work Yard Site Unit	Monitoring Well	Existing	X	X	X		MW-12-GW	Middle of saturated screen	Quarterly			X	X
MW-13	UST Site Unit	Monitoring Well	Proposed	X	X	X	X	MW-14-GW	Middle of saturated screen	Quarterly	X	X		X
MW-14	UST Site Unit	Monitoring Well	Proposed	X	X	X	X	MW-15-GW	Middle of saturated screen	Quarterly	X	X		X
MW-15	UST Site Unit	Monitoring Well	Proposed	X	X	X	X	MW-16-GW	Middle of saturated screen	Quarterly	X	X		X
MW-16	UST Site Unit	Monitoring Well	Proposed	X	X	X	X	MW-17-GW	Middle of saturated screen	Quarterly	X	X		X
MW-17	Work Yard Site Unit	Monitoring Well	Proposed	X	X	X	X	MW-18-GW	Middle of saturated screen	Quarterly			X	X
Field Duplicates	All	Monitoring Well	N/A		X			DUP01	Middle of saturated screen	Quarterly	X	X	X	X
Trip Blanks [3]	All	Laboratory Supplied	N/A					Trip Blank						
TOTAL PER EVENT (INITIAL)				**19**	**20**	**18**	**5**	---	---	---	**12**	**12**	**12**	**19**
TOTAL PER EVENT (QUARTERLY)				**19**	**16**	**18**	**5**	---	---	---	**8**	**8**	**8**	**15**

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 MW-1 on September 15, 2026 would ID of "MW-1-GW-20260915,"

(2) Metals to include copper, nickel, and zinc.

(3) Trip blanks consist of one for TPH-G/BTEX per cooler containing volatile analyses, and are not included in the "totals per event" tally.

(4) Existing wells will be evaluted, and if needed, redeveloped prior to sampling.

Abbreviations and Acronyms:

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
ORP = oxidation reduction potential
Temp = temperature
TPH-D = diesel-range total petroleum hydrocarbons
TPH-G = gasoline-range total petroleum hydrocarbo
TPH-O = oil-range total petroleum hydrocarbons
UST = underground storage tank

Table 5
Environmental Investigation Summary – Soil Vapor Samples
Weldcraft PRDI Project Plans
Bellingham, Washington

Location ID	Subarea	Type	Status	VAPOR SAMPLING ANALYSIS				
				Sample ID Prefix[1]	Sample Depth	Frequency[2]	VOCs (TO-15)	APH
SVP-1	UST Site Unit	Soil Vapor Probe	Proposed	SVP-1	5.5 ft bgs	2	X	X
SVP-2	UST Site Unit	Soil Vapor Probe	Proposed	SVP-2	5.5 ft bgs	2	X	X
SVP-3	UST Site Unit	Soil Vapor Probe	Proposed	SVP-3	5.5 ft bgs	2	X	X
			TOTAL	---	---		**6**	**6**

Notes:

(1) Sample IDs for soil vapor will contain a date following the prefix shown on the table. For example, a soil vapor sample collected at location SVP-1 on September 20, 2026 would have the sample ID "SVP-1-20260920."

(2) Sampling is planned to occur once during a "dry season" and once during a "wet season" to evaluate if conditions change with changes to the groundwater elevation at the site.

Abbreviations and Acronyms:

APH = air-phase petroleum hydrocarbons
bgs = below ground surface
ft = feet
ID = identification
UST = underground storage tank
VOCs = volatile organic compounds

APPENDIX A

Sampling and Analysis Plan/ Quality Assurance Project Plan

LANDAU ASSOCIATES

SAMPLING AND ANALYSIS PLAN AND QUALITY ASSURANCE PROJECT PLAN

Pre-Remedial Design Investigation Project Plans
Weldcraft Steel and Marine Site
Bellingham, Washington

June 11, 2026

Prepared for
Port of Bellingham
1801 Roeder Avenue
Bellingham, Washington

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Sampling and Analysis Plan and Quality Assurance Project Plan
Pre-Remedial Design Investigation Project Plans
Weldcraft Steel and Marine Site
Bellingham, Washington

This document was prepared by, or under the direct supervision of, the technical professionals noted below.

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Project No.:	0001045.040
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ATTACHMENT

Attachment	Title
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LIST OF ABBREVIATIONS AND ACRONYMS

bgs ..... below ground surface
CLP ..... Contract Laboratory Program
DO ..... dissolved oxygen
DQI ..... data quality indicators
DQO ..... data quality objective
Ecology ..... Washington State Department of Ecology
EDD ..... electronic data deliverables
EIM ..... Environmental Information Management
EPA ..... US Environmental Protection Agency
ft ..... foot/feet
GC/MS ..... gas chromatography/mass spectrometry
ID ..... identification
IDW ..... investigation-derived waste
inches Hg ..... inches of mercury
IW ..... injection well
Landau ..... Landau Associates, Inc.
LCS ..... laboratory control sample
LCSD ..... laboratory control sample duplicate
mL ..... milliliters
mL/min ..... milliliters per minute
MQO ..... measurement quality objective
MS ..... matrix spike
MSD ..... matrix spike duplicate
MW ..... monitoring well
NFG ..... National Functional Guidelines
ORP ..... oxidation reduction potential
PID ..... photoionization detector
PM ..... project manager
Port ..... Port of Bellingham, Washington
ppm ..... parts per million
PRDI ..... pre-remedial design investigation
PVC ..... polyvinyl chloride
QA ..... quality assurance
QAPP ..... Quality Assurance Project Plan
QC ..... quality control
RL ..... reporting limit

LIST OF ABBREVIATIONS AND ACRONYMS (Continued)

RPD ..... relative percent difference
SAP ..... Sampling and Analysis Plan
Site ..... Weldcraft Steel and Marine Site
SOP ..... standard operating procedure
TBD ..... to be determined
TPH-D ..... diesel-range total petroleum hydrocarbons
TPH-O ..... oil-range total petroleum hydrocarbons
UST ..... underground storage tank
VOA ..... volatile organic analysis
VOC ..... volatile organic compound
WAC ..... Washington Administrative Code

1.0 INTRODUCTION AND BACKGROUND

Landau Associates, Inc. (Landau) prepared this combined Sampling and Analysis Plan (SAP)-Quality Assurance Project Plan (QAPP) for the Port of Bellingham (Port) in support of the Weldcraft Steel and Marine remedial design and permitting project. This SAP/QAPP describes the sampling and analysis activities, data quality objectives, laboratory activities, and quality assurance procedures to be implemented during implementation of the Pre-Remedial Design Investigation (PRDI) Project Plans at the Weldcraft Steel and Marine Site (Site) in Bellingham, Washington. Details related to the scope of work are provided in the main text of the PRDI Project Plans (to which this document is Appendix A). Future SAP/QAPP revisions will be addressed with addenda to this document.

The Site is located in Bellingham, Washington in the northern corner of the Port's Squalicum Outer Harbor, as shown on Figure 1 of the PRDI Project Plans, and is defined by the limits of releases that occurred as a result of Weldcraft Steel and Marine's historical operations. This area is bounded approximately by the western limit of the former Dry Storage Yard to the east, Squalicum Way to the north, Squalicum Harbor to the west, and a parking lot to the south, as shown on Figure 2 of the PRDI Project Plans.

The Washington State Department of Ecology (Ecology) approved a Remedial Investigation/Feasibility Study of the Site, which assessed a range of cleanup options. Subsequently, Ecology approved a Cleanup Action Plan with a selected cleanup action. The Port is conducting a PRDI to support effective implementation of Ecology's approved cleanup action. The purpose of this SAP/QAPP is to provide the quality assurance (QA) and quality control (QC) procedures that will be used in the collection of environmental data to support the PRDI.

The following sections detail planned project organization and responsibilities, data quality objectives, sampling and analysis procedures (including soil sampling, sample transport and chain-of-custody procedures, and chemical and physical analyses), data validation, and reporting. This SAP/QAPP has been prepared in accordance with Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology 2016) and the US Environmental Protection Agency's (EPA's) Uniform Federal Policy for Quality Assurance Projects Plans: Evaluation, Assessing, and Documenting Environmental Data Collection and Use Programs (EPA et al. 2005). Updates to this SAP/QAPP will be prepared as addenda, if appropriate.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

The specific roles, activities, and responsibilities of project participants are described in this section. The Port has the primary responsibility for managing the work completed at the Site. Landau is the primary consultant for the management and execution of the project.

Table A-1: Project Team Roles and Responsibilities

Title/Role	Name	Organization	Responsibilities
Client Project Manager	Ben Howard	Port of Bellingham	Manages the project for the Port.
Ecology Project Manager	John Rapp	Washington State Department of Ecology	Oversees the project on behalf of Ecology.
Consultant Project Manager	John McCorkle Elyssa Dixson (Deputy Project Manager)	Landau Associates	Supervises and coordinates all work for the project. These responsibilities include conducting: Project planning and execution, scheduling, staffing, data evaluation, sample archive management, oversight of data submittal to Ecology's Environmental Information Management (EIM) database, report preparation, subcontracts, and deliverables management.
QA Manager	Danille Jorgensen	Landau Associates	Oversees and directs quality assurance reviews for the project, including laboratory procedures and actions. Coordinates and reviews data validation. Has oversight responsibility for management and integrity of the data.
Data Validator	Kristi Schultz	Landau Associates	Reviews laboratory analytical data and provides data validation.
Data Manager	Morgan DeMell	Landau Associates	Manages project database, provides support for reporting activities, uploads data to EIM database per Consultant Project Manager (PM) direction.
Field Lead	Task-Specific – To Be Determined (TBD)	Landau Associates	Leads and coordinates field activities, including documentation, sampling, and sample handling. Reports directly to the Consultant PM.
Health and Safety Manager	Christine Kimmel	Landau Associates	Responsible for review and implementation of the project health and safety plan.
Field Equipment Manager	Ken Reid	Landau Associates	Ensures equipment is properly maintained and in good condition for project use.
Environmental Laboratory Project Manager(s)	David Baumeister	OnSite Environmental (soil, groundwater)	Manages laboratory analysis and reporting, including supervising in-house chain-of-custody and scheduling sample analyses within required holding times; oversees data review and preparation of laboratory reports and electronic data deliverables (EDDs).
	Briana Barnes (soil vapor)	Alliance Technical Group	

3.0 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) reflect the overall degree of data quality or uncertainty that the decision-maker is willing to accept during decision-making. DQOs are used to specify the quality of the data, usually in terms of the following data quality indicators: Precision, bias, representativeness, comparability, and completeness. DQOs apply to the entire measurement system (e.g., sampling locations, methods of collection and handling, field analysis, laboratory analysis). DQOs are used to ensure that environmental data are scientifically valid, defensible, and of an appropriate level of quality given the intended use for the data (EPA 2000). DQOs for the project data include qualitative guidelines listed in the PRDI Project Plans, as well as the quantitative determinations of the data quality indicators as described in the following sections.

3.1 Measurement Performance Criteria

Data quality indicators (DQIs) are used to establish DQOs and are discussed in detail below. A summary of DQIs and their associated measurement quality objectives (MQOs) is provided in Table 2.

Precision

Precision is the degree to which a set of observations or measurements of the same property, obtained under similar conditions, conform to themselves (Ecology 2016). Precision is best expressed in terms of the standard deviation or relative percent difference (RPD). Quality control (QC) sample types that can be used to evaluate precision include field and laboratory duplicates, matrix spike duplicates (MSDs), and laboratory control sample duplicates (LCSDs). The precision of duplicate measurements will be expressed as an RPD, which is calculated by dividing the absolute value of the difference of the two measurements by the average of the two measurements, and expressing it as a percentage. The formula for RPD calculation is shown below.

$$\mathrm{RPD} = \left[\frac{|\mathrm{D1} - \mathrm{D2}|}{[(\mathrm{D1} + \mathrm{D2}) \div 2]}\right] \times 100\%$$

Where:

D1 = first measurement value

D2 = second measurement value (duplicate).

Accuracy/Bias

Accuracy is a combination of precision (random error) and bias (systemic error) and represents the degree to which a measured value agrees with the known value. Bias describes the systemic or persistent distortion associated with a measurement process (EPA et al. 2005). Accuracy is expressed as the percent recovery of spiked samples (matrix spike [MS], laboratory control sample [LCS], and surrogate spike). The general formula used to calculate percent recovery is shown below (for MS/MSD percent recovery the result from the unspiked sample is taken into account in the formula).

$$\%\mathrm{R} = \left[\frac{\mathrm{SSR}}{\mathrm{C_s}}\right] \times 100\%$$

Where:

%R = percent recovery

SSR = spiked sample result

C_s = concentration of the spike added.

Representativeness

Representativeness is the measure of the degree to which data accurately and precisely represent a characteristic of a population, a parameter variation at sampling point, a process condition, or an environmental condition (Ecology 2016). Representativeness qualitatively describes how well the analytical data characterize an area of concern and is largely determined by the sampling design. Key analytical factors used to evaluate it include method-specified holding times, preservation requirements, and the heterogeneity of the sample matrix. The sampling design for this project is provided in Section 5.0.

Comparability

Comparability describes the degree to which different data sets agree, can be represented as similar, and can contribute to a common analysis and interpolation (Ecology 2016). QC procedures and MQOs, as stated in this SAP/QAPP, will provide measurements that are consistent and representative of the media and conditions measured.

Completeness

Completeness is a measure of "amount of valid data obtained from a measurement system compared to the amount that could be expected to be obtained under normal conditions" (EPA 2009). Field completeness is calculated as the number of actual samples collected divided by the number of planned samples. Analytical completeness is calculated as the number of valid data points divided by the total number of data points requested. Data points are considered invalid if they are rejected during data validation. The data validation approach for this project is provided in Section 12.0 and completeness objectives are provided in Table 2.

3.1.1 Sensitivity

Sensitivity is the capability of a method or an instrument to discern the difference between very small amounts of a substance (EPA et al. 2005). For the purposes of this project, sensitivity is the lowest concentration that can be accurately detected by the analytical method. Target reporting limits (RLs) and screening levels are provided in Table 2.

4.0 FIELD INVESTIGATION

This section describes procedures for soil logging and field-screening during well installation, the methodology for collecting soil samples and for groundwater samples collected from permanent monitoring or injection wells, the methodology for collecting soil vapor samples, and the associated laboratory analyses. All field forms referenced below are provided in Attachment 1.

4.1 Monitoring Well Installation

Landau will subcontract a state-licensed well driller to install five monitoring wells at the Site. Figure 4 of the PRDI Project Plans shows the approximate locations of the wells, which may be moved based on the presence of utilities or due to warehouse operational needs. The driller will install the wells, as described in the PRDI Project Plans, with a hollow-stem auger drill rig in accordance with the Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 of the Washington Administrative Code [WAC]).

All monitoring wells are anticipated to be screened from 3 to 13 feet (ft) below ground surface (bgs).

The wells will be constructed of 2-inch diameter Schedule 40 polyvinyl chloride (PVC) well materials, with silica sand backfill, a bentonite annular seal, and a flush-mount surface monument set in concrete. The wells will feature 10-ft-long Schedule 40 PVC screens (0.010-inch slot size). The monitoring wells will be developed as described in Section 4.2.

A state-licensed surveyor will determine the horizontal and vertical coordinates of the wells. The elevations of the wells will be relative to NAVD88,[1] and the horizontal locations of the wells will be relative to NAD83/91,[2] Washington State Plane Coordinate System North Zone.

4.1.1 Soil Logging and Field Screening

Continuous soil samples will be collected during subsurface exploration using a hollow-stem auger to classify soil lithology in accordance with the Unified Soil Classification System. Lithology will be recorded on a Log of Exploration form, along with evidence of contamination based on field-screening and other pertinent information.

Soils from borings advanced in the underground storage tank (UST) Site Unit will be field-screened for evidence of volatile organic compound (VOC) impacts. Field-screening techniques may include inspecting the soil for staining, sheen, discoloration, odor, and other evidence of impacts; field meters may be used to identify known or suspected contaminants. If initial screening indicates potential VOC impacts, soil screening for VOC contamination will be conducted using headspace analysis and will be performed by first measuring VOC levels along the length of freshly exposed soil in recovered soil cores using a photoionization detector (PID). If VOC readings above background levels (i.e., PID readings taken from ambient air in the project area) are observed, a small amount of soil from that portion of the soil

[1] North American Vertical Datum of 1988.

[2] North American Datum of 1983/1991.

core yielding the VOCs will be placed in a zip-top bag (e.g., Ziploc®). The bag will then be sealed, the contents broken up, and the bag allowed to equilibrate for 2 to 5 minutes. Tubing will be attached to the PID and inserted into the zip-top bag. The bag will be resealed around the tube and the highest reading measured by the PID within the first 90 seconds will be recorded and entered in the comments section of the soil boring logs. Additionally, any PID readings of more than 5 parts per million (ppm) will be noted on the chain-of-custody form to communicate the potential need for dilution to the laboratory; 5 ppm is the threshold, because readings below 5 ppm are commonly caused by interference.

4.1.2 Soil Sampling Collection and Analysis

Soil samples will be collected from borings in accordance with the above-noted procedures.

- For soil borings, lightly scrape the outside of the soil core to expose a fresh sampling surface.
- Soil samples for volatile constituents will be collected using EPA Method 5035A procedures. The procedures involve using a small coring device or open-ended syringe to collect an undisturbed soil sample of a specified weight, which is then placed in a pre-preserved volatile organic analysis (VOA) vial. This method minimizes loss of VOCs to volatilization during the sampling process. The contracted analytical laboratory will provide specific sampling equipment and instructions on how to collect the samples (e.g., sample quantity for each VOA vial).
- Homogenize the soil from the given interval in a decontaminated stainless-steel bowl using the stainless-steel spoon used to collect the sample.
- Transfer the homogenized soil into the appropriate laboratory-supplied sample containers.
- Seal sample containers into low-density polyethylene zip-top bags (e.g., Ziploc) and immediately place all sample containers into a pre-chilled cooler.

4.1.3 Soil Laboratory Analysis

Soil samples collected for laboratory analysis will be submitted on ice and under standard chain-of-custody procedures to the laboratory to be analyzed for chemicals of concern. Sample chain-of-custody procedures are discussed in Section 8.0. Soil analytical methods, sample containers, preservation requirements, and holding times are detailed in Table 4.

4.2 Monitoring Well Development

Landau's authorized state-licensed drilling subcontractor will develop each new monitoring well and existing monitoring wells requiring redevelopment using surging, bailing, and pumping techniques to clean out silty water introduced during the well installation process, establish a hydraulic connection between the aquifer and the well filter pack, and reduce the groundwater turbidity in the well.

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.

4.3 Groundwater Monitoring

Groundwater monitoring will occur quarterly in the UST Site Unit and Work Yard Unit in accordance with the PRDI Project Plans.

4.3.1 Water Levels

Before groundwater monitoring begins, the static water level of each well will be measured with a water-level indicator. The probe and attached tape will be thoroughly rinsed with de-ionized water and wiped with a clean towel before use in each well. The water-level indicator will be constructed of chemically inert materials to prevent damage of the equipment and cross-contamination between wells.

After the well cap is removed, the depth to water will be measured by slowly inserting the water-level indicator probe into the well casing. As the probe enters the water, a buzzer and indicator light will be activated. The probe will be gently inserted into and retracted from the water surface so that the water surface can be determined accurately. The depth at which the water level buzzer and light activate represents the groundwater surface. The graduation mark on the water-level tape adjacent to the reference mark on the rim of the PVC well casing represents the depth to water. After initially determining the depth to water, the probe will be re-inserted to recheck the measurement. This measurement will be recorded on the groundwater sampling form to a precision of 0.01 ft.

4.3.2 Low-Flow Sample Collection

Groundwater samples will be collected following low-flow procedures and in accordance with the PRDI Project Plans. All field observations will be logged on a groundwater sample collection form. Low-flow sampling minimizes disturbance to the aquifer during groundwater sample collection. The low pumping rate induces laminar flow in the immediate vicinity of the sampling pump intake, drawing groundwater horizontally from the aquifer and into the sampling device.

Purging and sampling will be conducted using a peristaltic pump with dedicated polyethylene tubing. Conventional wells will have dedicated tubing that is stored in the well. The end of the sample tubing will be positioned at 2 to 3 ft above the bottom of the well within the well screen. Care will be taken to gently insert the tubing to minimize disturbance of any sediment that may have accumulated in the well. Purging will proceed as follows:

- The well will be purged at a rate of less than 0.5 liters per minute and with drawdown of less than 4 inches (0.3 ft) during purging. The flow rate will be measured by filling a 1-liter container and measuring the rate of filling using a stopwatch. Some wells may need to be pumped at slower rates to avoid drawdown of the water column within the well. Purging will continue until temperature, conductivity, pH, dissolved oxygen (DO), oxidation reduction potential (ORP), and turbidity have stabilized, as described below.
- Field parameters (pH, temperature, conductivity, DO, ORP, and turbidity) will be continuously monitored during purging using a flow cell. Purging of the well will be considered complete when all field parameters become stable for three successive readings. The three successive readings should be within +/– 3 percent for temperature, +/- 3 percent for conductivity, +/– 10 percent for DO, +/– 10 millivolts for ORP, and +/– 10 percent for turbidity.

If one or more of the readings have not stabilized within 30 minutes, samples will be collected, and the unstable readings will be noted on the sampling form.

- Purge water will be contained in 55-gallon drums or other transportable liquid containers. The drums will be labeled and stored onsite in a specified containment area. The water will be stored until laboratory analysis of groundwater samples is complete and investigation-derived waste disposal options are evaluated. Disposal will be in accordance with applicable regulations.

4.3.3 Groundwater Laboratory Analysis

All groundwater samples will be stored in coolers with ice and transported using proper chain-of-custody procedures to the laboratory, to be analyzed for chemicals of concern. Sample chain-of-custody procedures are discussed in Section 8.0. Groundwater analytical methods, sample containers, preservation requirements, and holding times are detailed in Table 4.

4.4 Soil Vapor

Soil vapor probe installation will occur only if petroleum constituents exceeding applicable cleanup levels are identified during the soil and groundwater sampling, as discussed in the PRDI Project Plans. If these constituents are positively identified, up to three soil vapor probes will be installed proximate to the highest-observed concentrations in accordance with the procedures described in the subsections below.

4.4.1 Soil Vapor Probe Installation

The soil vapor monitoring probes will be constructed using a direct-push boring rig, air knife, or hand auger to advance a 3-inch-diameter boring to the desired depth of 5.5 ft bgs. The soil vapor probes will be constructed of ½-inch-diameter Schedule 40 PVC with a 6-inch section with perforations and the remaining 5 ft with no perforations, 6 inches of silica sand backfill, a minimum 12-inch bentonite annular seal, and a flush-mount surface monument set in concrete. The top of the ½-inch PVC casing will be outfitted with a valve and ½-inch sample port below ground surface to provide for future monitoring. No PVC glue will be used in constructing the monitoring probe to prevent interference with future monitoring for VOCs. The probes will be allowed to stabilize for at least 48 hours prior to soil vapor collection.

4.4.2 Soil Vapor Quality Assurance and Sample Collection

Before sampling, the sample train will be assembled and attached to the vapor probe sample port via flexible, VOC-free tubing. The sample train will consist of a syringe or hand pump to establish a vacuum, a shroud and Tedlar® bag to conduct leak testing, a Summa canister to collect the sample, and ¼-inch Teflon® tubing/Luer fittings to connect all elements of the sample train. A shut-in test and a leak test will be conducted prior to collecting any samples.

4.4.2.1 Shut-In Test

The purpose of a shut-in test is to check the air-tightness of all laboratory-provided connections in the sample train and test the vacuum seal of the sample collection (Summa) canister prior to conducting the helium leak test. The shut-in test will be completed as follows:

- The tightness of all sample train connections will be checked visually and manually before continuing. New tubing and syringes will be used for each sampling location.
- A syringe will be used to pull a vacuum on the sample train between a Luer stop valve on the tubing coming from the Vapor Pin and the valve on the Summa canister. When both the in-line and canister vacuum gauges indicate a vacuum of at least 15 inches of mercury (inches Hg), the shut-in test starting vacuum pressure will be recorded. The system will be watched for vacuum drops for 2 minutes. The shut-in test ending vacuum will be recorded after 2 minutes. If the vacuum holds steady with no observable drop, this will indicate that there are no leaks in the laboratory-provided connections and that the Summa canister will not lose vacuum pressure prior to sampling.
- If the vacuum pressure drops during the shut-in test period, a leak is present. The tightness of fittings will be checked, tubing and other equipment will be examined for defects or other possible leaks, and the shut-in test will be repeated. If the pressure continues to drop, sample train pieces will be replaced in the following order: tubing, valves, and canister.

4.4.2.2 Helium Leak Test

The purpose of the helium leak test is to ensure that ambient air is not entering the hole in the slab from the surface and that the sample train is airtight. EPA guidance for helium leak testing will be followed as appropriate (EPA 2025). This test requires a Dielectric Helium Leak Detector MGD 2002 (or equivalent) hand-held meter and a helium shroud kit. The helium leak test will be completed as follows:

- The appropriate height shroud will be selected to fully encapsulate the location where the tubing enters the ground and the sample train. The shroud will be placed over the sampling location. Modeling clay will be used around the base of the shroud to seal the shroud to the concrete slab.
- A helium tank will be connected to the shroud and the tightness of all connections will be checked again.
- The sample train will be installed and connected to the sample tubing inside the shroud.
- The helium detector will be turned on and zeroed-out in ambient air to read a helium concentration of zero (0) ppm. The meter probe will then be inserted into the helium shroud.
- Helium will be released into the shroud until the helium detector indicates that the air inside the shroud contains at least 90 percent helium. The highest concentration of helium observed in ppm will be recorded.
- Using the syringe, the sample train will be purged into the Tedlar bag with 400 milliliters (mL) of soil gas. The Tedlar bag will then be closed and removed from the sample train.
- The helium detector will be removed from the shroud and zeroed-out in ambient air to read a helium concentration of zero (0) ppm.

- The helium detector will be inserted into the Tedlar bag to measure the helium concentration in the extracted soil gas. Concentrations of helium in the extracted soil gas sample should be less than 10 percent of the concentration measured in the shroud.
- If helium is detected in the Tedlar bag at more than 10 percent: A leak may be present in the surface seal, allowing ambient air to enter the hole in the slab, or the sample train may not be airtight. The surface seal, tightness of fittings, and other possible locations will be checked for leaks. The helium leak test will be repeated. If helium continues to be detected at concentrations greater than 10 percent in the Tedlar bag, a gas may be present in the subsurface formation causing interference with the helium detector.
- If it is suspected that a gas present in the subsurface formation is causing interference: The helium shroud will be removed, the sample train will be disconnected from the sample tubing, and the soil gas will be tested by inserting the helium meter probe directly into the sample tubing. The following actions will be taken based on the results: 1) If helium is not detected in the formation gas, there may be a problem with the surface seal that allowed helium to get into the formation during the helium leak test. The surface conditions will be assessed, and areas will be resealed with hydrated bentonite, as necessary. The helium leak test will be repeated. 2) If helium is detected, there is likely an interfering gas present. The sample train will be reconnected, the helium shroud will be reinstalled, and both the shut-in test and helium leak test will be repeated. The sample will then be collected, and analysis for helium will be added to the chain-of-custody form for that sampling location.

Following completion of the shut-in-test and helium leak test, the entire sample train has been tested for leaks. Next, the sample train will be purged, and a soil vapor sample will be collected.

4.4.2.3 Sample Train Purge

The purpose of the sample train purge is to fill the entire length of tubing with a representative soil gas sample in preparation for sample collection in the Summa canister. The length of tubing can contain a significant volume of "dead air," which can enter the canister and dilute the sample if the sample train is not purged (Eurofins Air Toxics 2014). To complete the purge, a syringe will be used to remove three tubing volumes of gas from the sample train (approximately 6 mL per foot of ¼-inch inside-diameter sample tubing). The purge volume and time will be recorded on the sample collection form. The purged volume will be pumped directly into a 1-liter Tedlar bag so that the sub-slab air does not enter the building space and result in possible detections to the indoor air samples being collected concurrently.

4.4.2.4 Soil Vapor Sample Collection

Soil vapor samples will be collected in laboratory-provided 6-liter Summa canisters with flow regulators (calibrated for a flow rate of 200 milliliters per minute [mL/min]) according to sampling guidelines(EPA 2025; Eurofins Air Toxics 2014). To collect the soil vapor sample, the Summa canister valve will be opened, allowing the vacuum in the canister to pull soil gas from the subsurface at a flow rate of <200 mL/min. The time the canister was opened (sample time) and the initial canister vacuum (inches Hg) will be recorded. Laboratory sampling guidelines specify an acceptable initial canister vacuum of greater than 25 inches Hg. Once the vacuum in the Summa canister reaches 5 inches Hg, the valve will be closed, and the canister will be removed from the sample tubing and helium shroud. The canister vacuum will be measured before and after sample collection using a laboratory-provided

certified clean pressure gauge. The sample train will be disconnected from the permanent Vapor Pin sampling port and the secure, stainless-steel cover will be reattached to protect the sampling port for additional sampling, if required.

4.5 Field Quality Control Samples

Field QC samples will be collected to identify possible issues resulting from sample collection or sample processing in the field. The collection of field QC samples includes field duplicates and MSs/MSDs, as described below. Equipment blanks may be collected, as appropriate for the media and sample collection process. Field QC samples will be documented in the field logbook and verified by the QA manager or designee. Field QC sample frequency is specified in Table 4.

4.6 Sample Containers, Preservation, and Holding Times

The analytical laboratory will provide certified, pre-cleaned, EPA-approved containers for all samples (see Table 4), with appropriate preservation in accordance with guidance provided in the EPA's SW-846 Compendium (EPA; accessed August 2025).

4.7 Sample Identification and Labels

The nomenclature to label and identify soil samples collected during well installations will be as follows:

- Code for monitoring well (MW)
- Well number (a two-digit, consecutive number)
- Soil interval depths
- Date of sample collection by year, month, day (yymmdd).

For example, a soil sample collected from injection well MW-01, spanning a depth from 12 to 13 ft bgs, on December 3, 2025 would be: MW-01(12-13)-251203.

The nomenclature to label and identify groundwater samples collected during groundwater monitoring will be as follows:

- Code for injection or monitoring well (IW or MW, respectively)
- Well number (a two-digit, consecutive number)
- Date of sample collection by year, month, day (yymmdd).

For example, a groundwater sample collected from monitoring well MW-05 on December 3, 2025 would be: MW-05-251203.

The nomenclature to label and identify soil vapor samples will be as follows:

- Code for location (SV-01, SV-02 respectively)
- Date of sample collection by year, month, day (yymmdd).

For example, a soil vapor sample collected from SV-01 on December 3, 2025 would be: SV-01-251203.

Field duplicate samples will be named with the duplicate indicator, followed by a sequential number, the matrix, and the date in year, month, day format. For example, a soil duplicate would be DUP01-SO-251203. A second soil duplicate collected on the same day would be DUP02-SO-251203.

5.0 EQUIPMENT DECONTAMINATION

The decontamination procedures described below are to be used by field personnel to clean drilling, sampling, and related field equipment. Deviation from these procedures will be documented in field records. Decontamination fluids will be managed in accordance with the procedures described in Section 7.0.

5.1 Water-Level Indicator

The tape and probe head of the water-level probe, if used, will be wiped with a clean paper towel wetted with Alconox® soap and water and rinsed with de-ionized water between each measurement.

5.2 Sampling Equipment

Dedicated sampling equipment (e.g., tubing) will be used where practicable. All non-dedicated sampling equipment (e.g., stainless-steel bowls, stainless-steel spoons, water-level indicator) will be decontaminated between sampling locations. Sampling equipment includes all devices used to collect or contain a sample prior to placement in a laboratory-provided sample container or used downhole in a well or boring (e.g., water-level indicator and depth-sounding tape). Before initial use, sampling equipment that may contribute to the contamination of a sample must be thoroughly decontaminated, unless specific documentation exists to show that the sampling equipment has already been decontaminated. Pre-cleaned equipment and sample jars in factory-sealed containers do not require decontamination.

Decontamination will be conducted according to the following procedure:

- Scrub equipment thoroughly using an Alconox and water solution, using a brush to remove any particulate matter or surface film
- Rinse with potable water
- Conduct a final rinse with de-ionized water
- Keep decontaminated equipment in a clean location to prevent recontamination.

5.3 Heavy Equipment

Heavy drilling equipment (i.e., drilling equipment that is used downhole, or that contacts material and equipment going downhole) will be cleaned by a high-pressure, hot-water wash before each use and at completion of the project.

6.0 WASTE MANAGEMENT

Investigation-derived waste (IDW) from the investigation (e.g., soil cuttings, purge water, decontamination water) will be stored in Washington State Department of Transportation-approved 55-gallon drums. Procedures for IDW storage are as follows:

- Segregate soils into separate drums according to exploration locations so the source of materials in each drum can be easily identified
- Leave about 3 to 4 inches of headspace in each drum
- When full or when not in active use, confirm the lid and ring are securely closed and attached to each drum and cover the drums with plastic sheeting that extends to the ground
- Drums will be stored on a hard, flat surface, at a pre-approved temporary storage location at the Site.

Upon initial placement of IDW into a drum, each drum will be labeled with "Investigation-Derived Waste–Pending Analysis" and the following information:

- A description of the medium (i.e., soil or water)
- Origin of the medium (i.e., boring or well number; including depth interval for soil from borings if divided between multiple drums)
- Accumulation start date (i.e., date the medium was first placed in the drum)
- Site identification
- Generator name
- Contact person
- Drum ID number corresponding to Landau drum inventory form
- Other pertinent information.

Once characterization has been completed, drums will then be labeled with Hazardous/Dangerous Waste or Non-Hazardous/Non-Dangerous Waste labels, as appropriate. Placement of these labels will occur no later than 30 days after receipt of the final analytical results used for waste characterization and classification.

After analytical results are received, Landau will arrange for the offsite disposal of the drums and their contents at an appropriately licensed and permitted disposal facility.

7.0 SAMPLE TRANSPORT AND CHAIN-OF-CUSTODY PROCEDURES

This section addresses the sampling program requirements for maintaining custody of the samples throughout the sample collection and delivery process.

7.1 Sample Custody Procedures

Samples are considered to be in one's custody if they are in the custodian's possession or view, in a secured location (under lock) with restricted access, or in a container that is secured with an official seal, such that the sample cannot be accessed without breaking the seal.

Chain-of-custody procedures will be followed for all samples throughout the collection, handling, and analysis process. The principal document used to track possession and transfer of samples is the chain-of-custody form. Each sample will be represented on a chain-of-custody form the day it is collected. All data entries will be made using an indelible ink pen. Corrections will be made by drawing a single line through the error, writing in the correct information, and then dating and initialing the change. Blank lines or spaces on the chain-of-custody form will be lined-out and dated and initialed by the individual maintaining custody.

A chain-of-custody form will accompany each cooler of samples to the analytical laboratory. Each person who has custody of the samples will sign the chain-of-custody form and ensure that the samples are not left unattended unless properly secured. Copies of all chain-of-custody forms will be retained in the project files.

7.2 Sample Delivery and Receipt Requirements

Samples submitted to the laboratory will be collected in the appropriate sample containers and preserved as specified in Table 4. The storage temperatures and method-specified holding times for chemical analyses are also provided in Table 4. The persons transferring custody of the sample container will sign the chain-of-custody form upon transfer of sample possession to the laboratory, unless the samples are shipped via commercial carriers, in which case the custody signature will be that of the individual taking possession of the samples from the carrier at its final destination. If soil samples are to be shipped, samples will be packed in coolers with new, wet ice, sample containers will be placed in laboratory-provided zip top plastic bags, and custody seals will be affixed to the outside of the cooler prior to taping. Samples will be shipped on a daily or every-other-day basis as conditions allow.

When the samples are delivered to the laboratory, the receiver will record the condition of the samples on a sample receipt form. Chain-of-custody forms will be used internally in the laboratory to track sample handling and final disposition. If containers arrive with broken custody seals, the laboratory will note this on the chain-of-custody record and will immediately notify the Landau PM or Field Lead, as appropriate. Once the laboratory work has been completed and the data report submitted by the laboratory, samples and extracts will be transferred from cold storage to a sample archiving area (as appropriate for the type of medium to be handled), where they will be stored for 30 days, unless the

Landau PM provides other written instructions. Custody will be maintained in the long-term storage area and upon ultimate disposition, samples will be logged out and the disposition recorded. Disposal will be in accordance with local, state, and federal landfill and wastewater regulations.

8.0 CHEMICAL ANALYTICAL TESTING

This section includes information on target analytes, appropriate analytical testing methods, and laboratory-testing information, as the information relates to the medium being evaluated. Alternate laboratories may be used without updates to this SAP/QAPP, as long as the laboratory achieves specified MQOs and has comparable RLs.

8.1 Sample Analysis

Soil and groundwater samples will be submitted to OnSite Environmental for analysis for select VOCs, metals, and petroleum hydrocarbons. Soil vapor samples will be submitted to Alliance for analysis for VOCs and helium. Target analyte lists, analytical methods, RLs, method detection limits, and screening levels are detailed in Table 2. Where achievable, target RLs for each analyte will be less than the screening levels.

Dissolved metals will be field-filtered. Groundwater samples scheduled for analysis by the Northwest total petroleum hydrocarbon extended-range diesel analytical method (NWTPH-Dx) may undergo silica-gel cleanup. For analysis of groundwater samples by EPA Method 6020B, samples will be run with universal cell technology to reduce potential interference.

8.2 Laboratory Quality Control

Analytical procedures will be documented in writing as laboratory standard operating procedures (SOPs), with each SOP including a QA section that addresses the minimum QC requirements for the procedure. Certain QC requirements are matrix- or method-specific, but in general, the QA program must include the following:

- Instrument calibration
- Preparation and analysis of reagent/preparation blanks
- Analysis of instrument and/or method blanks
- Preparation and analysis of MSs and MSDs
- Preparation and analysis of surrogate spikes
- Analysis of laboratory duplicates for inorganics
- Preparation and analysis of LCSs and standards
- Identification of internal standard areas and control limits
- System performance checks for both organic analyses.

An analytical batch is defined as 20 samples or less of the same type of matrix, prepared and analyzed as a group. The following analytical QC samples will be associated with each batch if the control procedure is applicable to the analysis. Laboratory QC frequency is provided in Table 3.

Method Blank

A reagent or media blank will be analyzed as a check on laboratory contamination (glassware, reagents, analytical hardware) that might affect analytical results. A sample consisting of laboratory reagent-grade water (distilled and de-ionized water) or a solid matrix will be analyzed to monitor the analytical instrument for contamination. The method blank will be processed through the entire analytical procedure, including sample preparation. The results will be used in conjunction with other control data to validate overall system performance and identify bias that may impact data quality. Method blanks must be analyzed per EPA SW-846 for applicable analyses, at least once with each analytical batch, with a 1 in 20 sample minimum.

Laboratory Control Samples

Independently prepared control samples will be processed through the entire analytical procedure. The purpose of these samples is to monitor and assure the accuracy of the procedure in the absence of matrix interference. Results of the LCSs will be charted and must meet acceptance criteria. LCSs must be analyzed per EPA SW-846 for applicable analyses, at least once with each analytical batch, with a 1 in 20 sample minimum.

Laboratory Control Sample Duplicates

Independently prepared control sample duplicates will be processed through the entire analytical procedure. The purpose of the LCSD is to assure the precision of the procedure in the absence of matrix interference. Precision results in RPD will be tabulated and charted. LCSDs must be analyzed per EPA SW-846 for applicable analyses, at least once with each analytical batch, with a 1 in 20 sample minimum.

Surrogates

Sample aliquots and laboratory QC samples scheduled for organic analysis will be spiked with surrogates. The surrogates to be added will be in compliance with the EPA SW-846 analytical method referenced and will be detailed in the laboratory method SOP. The purpose of the surrogates is to monitor and assure the accuracy of the analytical performance on individual samples and to indicate the presence of system bias, extraction inefficiencies, and/or matrix interferences. The recoveries of the surrogates will be charted and must meet acceptance criteria.

Internal Standards

Sample aliquots and laboratory QC samples scheduled for gas chromatography/mass spectrometry (GC/MS) analysis will be spiked with interval standards prior to extraction or analysis, as applicable. The internal standards to be added will be in compliance with the EPA SW-846 analytical method referenced and will be detailed in the laboratory method SOP. The purpose of the internal standards is to ensure GC/MS instrument sensitivity and stability, and to provide for accurate target analyte quantitation. The internal standard area counts and retention times will be charted and must meet acceptance criteria.

Matrix Spike

An aliquot of a sample will be spiked with a known amount of the selected analyte(s). Percent recoveries of the selected spiked analytes will be tabulated by subtracting the non-spiked concentration from the spiked sample results. Results are used to assess accuracy in specific matrices. MSs must be analyzed per EPA SW-846 for applicable analyses, at least once with each matrix-specific analytical batch, with a 1 in 20 sample minimum. Project-specific MSs are not required.

Duplicate Samples or Matrix Spike Duplicates

MSDs will be analyzed to monitor the method precision. Results in RPD will be tabulated and charted. For analytical methods in which spiking is not applicable, sample duplicates will be used to assess precision. Duplicates or MSDs must be analyzed per EPA SW-846 for applicable analyses, at least once with each matrix-specific analytical batch, and with a 1 in 20 sample minimum.

8.3 Laboratory Requirements

Environmental analytical laboratories conducting work under this SAP/QAPP shall maintain current accreditation through the National Environmental Laboratories Accreditation Program and Ecology (WAC 173-340-830). Testing will be in accordance with the methodologies established in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846; EPA; accessed July 31, 2025).

The laboratory's QA program will be reviewed by the Landau Quality Assurance Manager with specific emphasis on the acceptance criteria for QC samples, and on related corrective actions should the QC criteria not be met. Acceptance criteria and corrective actions consistent with EPA SW-846 Update III method criteria will be deemed acceptable.

Data obtained will be properly recorded. The required QC summary package and the EDD format is detailed in Section 10.0. The laboratory will reanalyze samples not handled or analyzed in conformance with the QC criteria, if sufficient sample volume is available. It is expected that sufficient volumes/weights of samples will be collected to allow for reanalysis when necessary.

Completed data reports from the laboratory will include a narrative outlining any problems, corrections, anomalies, and conclusions, as well as chain-of-custody documentation and results for all analyses and laboratory QC.

9.0 DATA MANAGEMENT

9.1 Data Recording and Reporting

Field data and observations will be recorded on waterproof paper kept in field notebooks. Qualified staff will transfer information in field notebooks to Excel spreadsheets (or alternate software) after they return from the field. Data entries will be independently verified for accuracy by another member of the project team. Relevant field and laboratory data for the project will be uploaded to Ecology's EIM database.

Laboratory results, including QC data, will be submitted electronically. The electronic formats will include a PDF file of the laboratory report and an EDD in EQuIS EFWEDD format with Landau-specified valid values. The laboratory PM shall ensure that the EDD matches the laboratory hard copy data report. This data review must be completed before deliverables are reported by the laboratory. Raw and final data will be stored electronically, with regularly scheduled backups performed and maintained at the laboratory. The laboratories will prepare a detailed laboratory data package documenting all activities associated with the sample analyses.

9.2 Laboratory Data Package Requirements

Laboratory data will be provided in a Stage 2 data report, modified to exclude raw data, with Contract Laboratory Program (CLP)-equivalent forms. Required Stage 2 data report elements include the following, as applicable:

- Case narrative
- Chain-of-custody documentation, sample receipt, and condition documentation
- Sample summary or equivalent, method summary or equivalent
- Sample results (with date, units, method reporting, and detection limits)
- Laboratory data qualifier definitions
- Method/laboratory blank results
- Sample surrogate results
- Field QC results
- LCS results, MS results, duplicate and/or MSD results, post-digestion spike sample results.

9.3 Data Reduction

This section summarizes the procedures for ensuring the accuracy of the data reduction process. Both field and laboratory data reduction procedures are summarized. Responsibilities for the data reduction process are delegated as follows:

- Technical personnel will document and review their own work and are responsible for the accuracy of the work.

- Calculations will receive a method and calculation check by a secondary reviewer prior to reporting (peer review).
- The laboratory PM will be responsible for ensuring that data reduction is conducted according to protocols discussed within this SAP/QAPP.

The laboratories will follow the data reduction and calculation procedures set forth in EPA-approved methods. Data reports and EDDs generated by the laboratory will undergo internal data approval in accordance with the laboratory's Quality Services Manual before being reported.

Automated data calculation and reduction, using instrument data system software or electronic spreadsheet software, will be used by the laboratory to the greatest extent practicable. Analyses will be programmed to allow for raw data entry and editing at the keyboard, with integrated software performing calculations and permanent database generation. Data-entry errors will be checked by comparing the raw data printouts to the chemist's original work, minimizing the common sources of error in data reduction.

The laboratory PM must ensure that the EDD matches the laboratory hard copy data report. This data review must be completed before deliverables are submitted by the laboratory. Raw and final data will be stored electronically, with regularly scheduled backups performed and maintained at the laboratory.

Logbooks will be maintained for each instrument. Computer record file identification will readily allow retrieval by the client name. Worksheets and spreadsheets will be prepared using an electronic spreadsheet or related software package.

Raw data from the chemists' notebooks or bench sheets will include all analytical variables compiled for samples, replicates, blanks, standards, and MSs. The laboratory PM will approve submittal of the final data report and EDD after internal review.

Diesel-range total petroleum hydrocarbons (TPH D) + oil-range total petroleum hydrocarbons (TPH-O) will be calculated as the sum of detected concentrations of TPH-D and TPH-O. If TPH is not detected at concentrations below the laboratory method reporting limit, then the result will be shown as the highest of either method reporting limit. If one compound is detected, and the other is not, then only the detected compound will be included in the summation and zero will be used for the other compound.

9.4 Documents and Records

This section describes the management requirements for production, distribution, and storage of documents and records associated with planned activities at the Site.

9.4.1 Document Distribution

Prior to beginning field activities, field staff will receive and have an opportunity to review PRDI Project Plan-related documents pertinent to the field activities as appropriate to support the planned activities. The PRDI Project Plans will be finalized prior to commencement of field activities, and only the finalized

versions will be distributed to field staff. Changes to procedures and plans after finalization will be documented as addenda and distributed along with the original finalized versions.

9.4.2 Field Documentation

Field equipment will have reference and related manuals stored with the equipment. In addition, equipment that requires calibration will be accompanied by a calibration logbook. Field staff will record the calibration process in the logbook every time a calibration is conducted.

A complete record of field activities will be maintained for the duration of the field phase of the work. Documentation will include the following:

- Daily recordkeeping by field personnel of field activities
- Recordkeeping of samples collected for analysis (field sample collection forms)
- Use of sample labels and tracking forms for samples collected for analysis.

The field logs will provide a description of sampling activities completed, sampling personnel, daily weather conditions, and a record of modifications to the procedures and plans identified in the PRDI Project Plans or related documentation. The field logs are intended to provide sufficient data and observations to enable project staff to reconstruct events that occurred during the sampling period.

Field logs will be supplemented by sample collection forms, boring logs, and test pit logs completed by field staff, as applicable.

Sample possession and handling will also be documented with chain-of-custody forms so that the sample is traceable from the time of sample processing in the field, to delivery to the laboratory, and to the ultimate data analysis. All personnel shall have their initials logged to correspond with their name and appropriately denoted with data entries.

9.4.3 Analytical Data Records

Laboratory analytical data reports will be provided in electronic format by the laboratory. These reports will be included as appendices in documents where data are reported, and they will be kept with all other documents in the Landau project files.

9.4.4 Storage

Documents and records associated with the project (i.e., final documents, billing and invoice records) will be stored in electronic form in files on Landau's servers for the duration of the project.

10.0 AUDITS AND CORRECTIVE ACTIONS

Field and/or laboratory audits are not planned for this project.

Corrective action will be required if there are deviations from the methods or QA requirements established in this SAP/QAPP or if there are equipment or analytical malfunctions. Corrective action procedures will be implemented based on the type of unacceptable data and will be developed on a case-by-case basis. The following corrective actions may be included:

- Altering procedures in the field
- Using a different batch of sample containers
- Performing an audit of field or laboratory procedures
- Reanalyzing samples (if holding times allow)
- Resampling
- Evaluating sampling and analytical procedures to determine possible causes of discrepancies
- Accepting the data with no action, acknowledging the level of uncertainty
- Qualification of the data
- Rejecting the data as unusable.

During field operations and sampling procedures, the field personnel will be responsible for conducting and reporting required corrective actions. A description of any corrective action taken will be entered in the daily field notebook. If field conditions do not allow for conformance with this SAP/QAPP, the Landau PM will be consulted immediately. For any corrective action or field condition resulting in a revision of this SAP/QAPP, the Landau PM will authorize changes or exceptions to this SAP/QAPP, as necessary and appropriate.

Incidents of QA failure and associated corrective action will be documented and reports will be placed in the appropriate project file. Also, corrective action will be taken promptly for deficiencies noted during spot-checks of raw data. As soon as sufficient time has elapsed for corrective action to be implemented, evidence of correction of deficiencies will be provided to the Landau Quality Assurance Manager and Project Manager and communicated to the client and agency as appropriate.

Corrective action at the analytical laboratory may be required due to equipment malfunction, failure of internal QA/QC checks, method blank contamination, non-compliance with QA requirements, or failure of performance or system audits. When measurement equipment or analytical methods fail QA/QC checks, the problem will be immediately brought to the attention of the appropriate persons in the laboratory, in accordance with the laboratory's SOPs. If failure is due to equipment malfunction, the equipment will be repaired, precision and accuracy will be reassessed, and the analysis will be rerun. Attempts will be made to reanalyze all affected parts of the analysis so that, in the end, results are not affected by the failure to achieve QA requirements.

During laboratory analysis, the laboratory PM will be responsible for taking required corrective actions in response to equipment malfunctions. If an analysis does not meet the data quality goals outlined in this SAP/QAPP, corrective action generally will follow the guidelines in the EPA analytical methods noted in this SAP/QAPP, and the EPA guidelines for data validation (EPA 2020a, b). If analytical conditions are such that non-conformance with this SAP/QAPP is indicated, the Landau PM will be notified as soon as possible so that any additional corrective actions can be taken.

The Landau PM is ultimately responsible for implementation of appropriate corrective actions and maintenance of a complete record of QC issues and corrective actions.

11.0 DATA VALIDATION AND VERIFICATION

The processes that will be used to verify and validate data are described in the subsections below.

11.1 Verification

Sample collection forms and field notes will be reviewed by the Landau PM or designee and placed in the electronic project files. Relevant field data will be entered into an Excel spreadsheet (or alternate software) and verified to determine that entered data are correct and without omissions and errors.

Laboratory data, which will be electronically provided and loaded into the database, will undergo a 100 percent check against the laboratory hard copy data. Data will be validated or reviewed manually, and qualifiers, if assigned, will be entered manually. The accuracy of all manually entered data will be verified by a second party. Data tables will be exported from an EQuIS database to Excel tables based on the requirements for reporting and data management and use.

11.2 Validation

Data validation will be conducted by a Landau data validator with guidance from applicable portions of the EPA National Functional Guidelines (NFG; EPA 2020a; EPA 2020b), and Guidance for Externally Labeled Data (EPA 2009).

Environmental analytical data associated with well installation will undergo Stage 2A data verification and validation to verify that the results are acceptable for the intended use. Validation review elements are listed below; raw data are not reviewed as part of Stage 2A.

- Verification that the laboratory data package contains all necessary documentation
- Verification that all requested analyses, special cleanups, and special handling methods were conducted
- Verification that QC samples were analyzed as specified
- Evaluation of sample holding times
- Evaluation of QC data compared to acceptance criteria, including method blanks, surrogate recoveries, laboratory duplicate and/or replicate results, and LCS results
- Evaluation of RLs compared to target RLs specified in this SAP/QAPP.

Analytical data may be qualified based on the data validation review. Qualifiers will be consistent with the applicable NFG and will be used to provide data users with an estimate of the level of uncertainty associated with the qualified result. Data validation results will be evaluated with respect to assigned qualifiers to determine any data usability issues.

The following qualifiers may be assigned during the data validation process:

J The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample.

J+ The result is an estimated quantity, but the result may be biased high.

J– The result is an estimated quantity, but the result may be biased low.

NJ The analyte has been "tentatively identified" or "presumptively identified" as present and the associated numerical value is the estimated concentration in the sample.

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

U The analyte was analyzed for but was not detected above 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.

The objectives, evaluations, and actions employed during the data validation process will be guided by NFG. Laboratories will be permitted to provide CLP-like forms in lieu of true CLP forms. The data validation criteria will not strictly adhere to the NFG but will also take into consideration method criteria for preservation and holding times; laboratory-specified criteria for surrogate, LCSs, LCSDs, and MSs; and the data validator's professional judgment. Data qualification arising from data validation activities will be documented in validation worksheets and as qualifiers in the EIM database.

The results of the data quality review, including text assigning qualifiers in accordance with the NFG and a tabular summary of qualifiers will be overseen by the Landau QA Manager, who will conduct final review and confirmation of the validity of the data.

12.0 DATA EVALUATION AND REPORTING

Following receipt of the analytical report from the laboratory, analytical data for each of the samples will be evaluated and tabulated. Analytical data will be compared to applicable screening levels.

Once data verification and validation have been completed for the project, and data have been evaluated against the MQOs and qualified accordingly, the project percent completeness will be calculated (Section 4.0). Data are considered valid and usable as long as they were not rejected during validation. The Landau PM or designee will review the data along with field documentation to ensure that project DQOs were met. The Landau PM is responsible for analyzing the data and determining whether the data are of sufficient quantity and quality to meet the project objectives.

After receipt of final laboratory analytical reports, Landau will draft a report that will be submitted to Ecology in accordance with the Agreed Order timeline.

13.0 USE OF THIS REPORT

This report has been prepared for the exclusive use of the Port of Bellingham and applicable regulatory agencies for specific application to the Weldcraft Steel and Marine 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.

14.0 REFERENCES

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Table A-2
Analyte List, Analytical Methods, and Reporting Limits
Pre-Remedial Design Investigation SAP/QAPP
Weldraft Steel and Marine Site – Bellingham, Washington

Analyte	CAS No.	Soil		Groundwater		Soil Vapor	
		Method	Target Reporting Limit (mg/kg)	Method	Target Reporting Limit (µg/L)	Method	Target Reporting Limit (µg/m^3)
Volatile Organic Compounds							
Benzene	71-43-2	EPA 8260D	0.001	EPA 8260D	0.20	TO-15	0.1276
Ethylbenzene	100-41-4	EPA 8260D	0.001	--	--	TO-15	8.68
Toluene	108-88-3	--	--	--	--	TO-15	7.52
m,p-xylenes	1330-20-7	--	--	--	--	TO-15	17.36
Naphthalene	91-20-3	--	--	--	--	TO-15	0.2936
o-xylene	1330-20-7	--	--	EPA 8260D	0.20	TO-15	8.68
Petroleum Hydrocarbons							
TPH-G	N/A	NWTPH-Gx	5.0	NWTPH-Gx	100	--	--
TPH-D	N/A	NWTPH-Dx	25	--	--	--	--
TPH-O	N/A	NWTPH-Dx	50	--	--	--	--
TPH D+O	N/A	Calculation	(a)	--	--	--	--
EC5-8 (aliphatics)	N/A	--	--	--	--	APH WSC-CAM-IX	114
EC9-12 (aliphatics)	N/A	--	--	--	--	APH WSC-CAM-IX	30.2
EC9-10 (aromatics)	N/A	--	--	--	--	APH WSC-CAM-IX	117.6
Total/Dissolved Metals							
Copper	7440-50-8	EPA 6020B	0.5	EPA 6020B UCT	1	--	--
Lead	7439-92-1	EPA 6020B	1.0	--	--	--	--
Nickel	7440-02-0	EPA 6020B	2.5	EPA 6020A UCT	0.5	--	--
Zinc	7440-66-6	EPA 6020B	2.5	EPA 6020A UCT	50	--	--
Tracer Gas							
Helium	7440-59-7	--	--	--	--	Modified EPA 3C	0.20%

Notes:

(a) TPH D+O will be calculated as the sum of detected concentrations of TPH-D and TPH-O. If TPH is not detected at levels below the laboratory method reporting limit, then the result will be shown as the highest of either method reporting limit (i.e., if TPH-D is not detected at <25 mg/kg and TPH-O is not detected at <50 mg/kg, then <50 mg/kg will be shown). If one compound is detected, and the other is not, then only the detected compound will be included in the summation and zero will be used for the other compound.

Abbreviations and Acronyms:

-- = not scheduled for analysis
APH = Air-Phase Hydrocarbon
CAS = Chemical Abstracts Service
EC = Equivalent Carbon fraction
EPA = US Environmental Protection Agency
µg/L = micrograms per liter
µg/m^3 = micrograms per cubic meter
mg/kg = miligrams per kilogram
N/A = not applicable
NWTPH-Dx = Northwest TPH extended-range diesel analytical method
NWTPH-Gx = Northwest TPH extended-range gasoline analytical method
TPH = total petroleum hydrocarbons
TPH-D = diesel-range TPH
TPH-G = gasoline-range TPH
TPH-O = oil-range TPH
UCT = universal cell technology

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Soil Samples Analyzed for Gasoline-Range Petroleum Hydrocarbons by Method NWTPH-Gx				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Bias/Contamination	Method Blank, Trip Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Soil Samples Analyzed for TPH-D and TPH-O by Method NWTPH-Dx				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	0	S&A
Bias/Contamination	Method Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Soil Samples Analyzed for Total Metals by EPA Methods 6020B				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Accuracy	LCS	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS and MS/Laboratory Duplicate	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/Laboratory Duplicate	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Bias/Contamination	Method Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Soil Samples Analyzed for VOCs by EPA Method 8260D				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Bias/Contamination	Method Blank, Trip Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Groundwater Samples Analyzed for Gasoline-Range Petroleum Hydrocarbons by Method NWTPH-Gx				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Precision	Field Duplicates	RPD <20%	1 per 20 samples or one per analytical group	S&A
Bias/Contamination	Method Blank, Trip Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Representativeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Groundwater Samples Analyzed for TPH-D and TPH-O by Method NWTPH-Dx				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Precision	Field Duplicates	RPD <20%	1 per 20 samples or one per analytical group	S&A

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Bias/Contamination	Method Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Groundwater Samples Analyzed for Dissolved Metals by EPA 6020B UCT				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Accuracy	LCS	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS and MS/Laboratory Duplicate	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/Laboratory Duplicate	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A
Precision	Field Duplicates	RPD <20%	1 per 20 samples or one per analytical group	S&A
Bias/Contamination	Method Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Groundwater Samples Analyzed for Volatile Organic Compounds by EPA Method 8260D				
Representativeness	Cooler Temperature	< 6°C	All project samples	S
Bias	Surrogates	Recoveries within laboratory-specified control limits	All project and QA samples	A
Accuracy	LCS/LCSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Precision	LCS/LCSD and MS/MSD	RPDs within laboratory-specified control limits	1 per 20 samples or one per analytical batch	A
Method performance for matrix, bias	MS/MSD	Recoveries within laboratory-specified control limits	1 per 20 samples or one per analytical batch	S&A

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Bias/Contamination	Method Blank, Trip Blank	Target analytes not detected at concentrations > 1/2 the RL	1 method blank per 20 samples, 1 every 12 hours, or 1 per analytical batch	S&A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S
Soil Vapor Samples Analyzed for Volatile Organic Compounds by EPA Method TO-15, APH by Method WSC-CAM-IX, and Helium by Modified EPA Method 3C				
Accuracy (preservation)	Temperature, atmospheric pressure, and canister pressure	Sampler shall record temperature, atmospheric pressure, and canister pressure. Laboratory shall evacuate canisters to -27 to -30 inches of Hg prior to shipment to site. Sampler must check vacuum prior to taking samples. If vacuum does not deviate significantly (<10% RPD) from laboratory-supplied pressurization measurement, the canister may be used for sample collection. The laboratory must document the canister receipt vacuum.	Every canister	S & A
Accuracy/Sensitivity	Canister certification	Canister certifications target analytes must be less than the RL.	Individual canister certification	S & A
Accuracy	Flow controller certification	Flow controller calibration checks. RPD less than 20%.	Every flow controller	S & A
Accuracy/Sensitivity	Holding time	Analyses within 30 days of collection.	Every field sample	S & A
Accuracy/Sensitivity	Method blank	Target analytes less than RL.	1 every 24 hours prior to analysis	A
Precision	LCS	Must contain all target analytes, be matrix-matched; Recoveries within laboratory-specified limits.	1 per preparatory batch of up to 20 samples	A
Accuracy	Laboratory duplicate or LCSD	RPD ≤25%	1 per preparatory batch of up to 20 samples	A

Table A-3
Measurement Quality Objectives
Pre-Remedial Design Investigation SAP/QAPP
Weldcraft Steel and Marine Site – Bellingham, Washington

DQI	QC Sample or Activity Used to Assess MQO	MQO	Frequency	Sampling or Analytical DQI
Accuracy	Surrogates	Recoveries within laboratory-specified limits.	As each standard blank and sample is being loaded	A
Analytical Completeness	Number of usable (not rejected) results out of total number of results	90%	N/A	S&A
Field Completeness	Number of samples collected out of planned samples	90%	N/A	S

Abbreviations and Acronyms:

°C = degrees Celsius
A = analytical
APH = Air-Phase Hydrocarbon
DQI = data quality indicator
EPA = US Environmental Protection Agency
Hg = mercury
LCS = laboratory control spike
LCSD = laboratory control spike duplicate
MQO = measurement quality objective
MS = matrix spike
MSD = matrix spike duplicate
N/A = not applicable
NWTPH-Dx = Northwest TPH extended-range diesel analytical method
NWTPH-Gx = Northwest TPH extended-range gasoline analytical method
QA = quality assurance
QC = quality control
RL = reporting limit
RPD = relative percent difference
S = sampling
TPH = total petroleum hydrocarbons
TPH-D = diesel-range TPH
TPH-O = oil-range TPH

Table A-4
Sample Containers, Preservatives, and Holding Times
Pre-Remedial Design Investigation SAP/QAPP
Weldraft Steel and Marine Site – Bellingham, Washington

Matrix	Analyte Group	Method	Container	Preservative	Holding Time (a)	Laboratory
Soil	TPH-G	NWTPH-Gx	2 x 40 mL vial	Cool to < 6°C, MeOH	14 days	OnSite
Soil	TPH-D, TPH-O	NWTPH-Dx	4 oz jar (b)	Cool to < 6°C	14 days	OnSite
Soil	VOCs	EPA 8260D	3 x 40 mL vial	Cool to < 6°C, 1 vial MeOH	14 days	OnSite
Soil	Metals	EPA 6010B	4 oz jar (b)	Cool to < 6°C	6 months	OnSite
Groundwater	TPH-G	NWTPH-Gx	2 x 40 mL vial	Cool to < 6°C, HCl	14 days preserved 7 days unpreserved	OnSite
Groundwater	TPH-D, TPH-O	NWTPH-Dx	2 x 500 mL Amber	Cool to < 6°C	7 days	OnSite
Groundwater	VOCs	EPA 8260D	2 x 40 mL vial	Cool to < 6°C, HCl	14 days preserved 7 days unpreserved	OnSite
Groundwater	Dissolved Metals	EPA 6020B	500 mL HDPE	Cool to < 6°C HNO3 (b)	6 months	OnSite
Soil Vapor	VOCs	TO-15 (c)	1.4-L Summa Canister	Laboratory evacuate to -27 to -30 inches of Hg prior to shipment to site; no significant canister pressurization changes at time of receipt at site.	30 days	Alliance
Soil Vapor	APH	MA APH (c)	1.4-L Summa Canister	Laboratory evacuate to -27 to -30 inches of Hg prior to shipment to site; no significant canister pressurization changes at time of receipt at site.	30 days	Alliance
Soil Vapor	Helium	Modified EPA 3C (c)	1.4-L Summa Canister	Laboratory evacuate to -27 to -30 inches of Hg prior to shipment to site; no significant canister pressurization changes at time of receipt at site.	30 days	Alliance

Notes:

(a) Time from sample collection to extraction/time from sample extraction to analysis.

(b) Field-filtered samples only.

(c) Analysis may be performed out of single canister.

Table A-4
Sample Containers, Preservatives, and Holding Times
Pre-Remedial Design Investigation SAP/QAPP
Weldraft Steel and Marine Site – Bellingham, Washington

Abbreviations and Acronyms:

°C = degrees Celsius
Alliance = Alliance Technical Group
APH = Air-Phase Hydrocarbon
EPA = US Environmental Protection Agency
HCl = hydrochloric acid
HDPE = high-density polyethylene
Hg = mercury
HNO3 = nitric acid
L = liter
MA = Massachusetts Department of Environmental Protection
MeOH = methanol
mL = milliliter
NWTPH-Dx = Northwest TPH extended-range diesel analytical method
NWTPH-Gx = Northwest TPH extended-range gasoline analytical method
OnSite = OnSite Environmental
oz = ounces
TPH-D = diesel-range total petroleum hydrocarbons
TPH-G = gasoline-range total petroleum hydrocarbons
TPH-O = oil-range total petroleum hydrocarbons
VOCs = volatile organic compounds

ATTACHMENT A-1

Field Forms

LANDAU ASSOCIATES

Chain of Custody

Project Name: ____________ Project Contact(s): Data@landauinc.com Project Location/Event: ____________
Project #: ____________ Project Contact(s): ____________ Requested TAT: ☐ Standard ☐ Rush
Sampled By: ____________
Stored on Ice: ☐ Yes ☐ No
Shipment Method: ____________
Special Handling Requirements: ____________

Sample ID	Date	Time	Matrix	# of Cont.	REQUESTED ANALYSIS																	MS/MSD	HOLD	Comments/Instructions:
		Preserved Y/N:																						☐ Dissolved metals field filtered (0.45micron) Other:

Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	Signature	Signature	Signature
Printed Name	Printed Name	Printed Name	Printed Name
Company	Company	Company	Company
Date & Time	Date & Time	Date & Time	Date & Time

LANDAU ASSOCIATES

Field Report

Project No.: _____ Report No.: _____

Client: _____ Date: _____

Project Name: _____ DPD Permit No.: _____

Location: _____

Weather Conditions: _____

Prepared By: _____

Visitors: _____

Unsatisfactory Conditions & Recommended Correction: _____

Attachments: _____

Signed: _____

Subcontractors Daily Activity Record

Project Name _____ Project No. _____

Location _____ Date _____

_____ Landau Rep. _____

Client _____ Weather _____

CONTRACTOR INFORMATION

Contractor _____ Project/Health & Safety Briefing Conducted: ☐ Yes ☐ No

☐ Drilling ☐ Grading

☐ Excavation ☐ Other _____

Contractor Rep. _____

TIME LOG (Documented by Landau Associates Representative at end of each working shift)

Activity	Total Hours	A.M.						A.M.						P.M.						P.M.					
		12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11
Mobe/Moves																									
Drilling/Excavation																									
Installation																									
Decontamination																									
Standby																									
Downtime																									

Remarks: Explain all downtime. Explain all standby time and who authorized it, unusual difficulties, etc.

EXPENDABLES: ITEMIZE QUANTITY, SIZE, ETC.

Item	Quantity	Type	I.D.	O.D.	Length	Billing

Subsurface Data	Depth	Samples

PERSONNEL / EQUIPMENT

Position	Name	Hours	Support Equipment	Status (A.D.S.F.)	Hours Oper.	Down	Standby

A – Available; D – Down; S – Standby; F – Field

Utility Locate Checklist

Project Name _____ Project No. _____

Location _____ Date _____

Client _____ Landau Rep. _____

Exploration Number (White)	TV & Telep. (Orange)	Lighting & Elect. (Red)	Fuel & Gas (Yellow)	Water (Blue)	Drains & Sewer (Green)	Access / Restriction	O.K. To Drill/Exc.	Remarks

LANDAU ASSOCIATES

Exploration No. _____
Date _____ Hour _____

Log of Exploration

Project Name _____ Project No. _____

Client/owner _____ Exploration Operator _____

Exploration Method _____

_____

Logged by _____ Exploration Completed _____

Ground Surface Conditions _____

Weather Conditions _____

Location Sketch (show dimensions to mapped features)

North Arrow

(East) (North)

Coordinates: "x" _____ "y" _____ Method _____

Elevations _____ Datum _____

Sample Depth (top) (ft.) / Sample Length (ft.)	Recovery Length (ft.)	Retained Depth (top) (ft.) / Retained Length (ft.)	Sample Number	Sampler/Hammer Codes	Blow Counts	Other Test Data) _____	USCS Symbol / Unit Contact	Depth Scale (ft)	Sample Description Color, secondary soil type, PRIMARY SOIL TYPE with modifiers and minor components (density/consistency, moisture)(geologic unit)	Comments on Heave, Water Conditions, & Drilling Action
								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								0		
								1		
								2		
								3		
								4		
								5		
								6		
								7		
								8		
								9		
								0		

Sampler and Hammer Information

a = 3.25-in. O.D. – D&M	1 = 300-lb./30-in. Drop
b = 2.0-in. O.D. – SPT	2 = 140-lb./30-in. Drop
c = Shelby Tube	3 = Pushed
d = Grab Sample	4 = Vibrocore
g = 2.5-in. O.D.– WSDOT	5 = _____
h = 3.0-in. O.D. – M.Calif.	
i = _____	

Water Level Information

Date		
Time		
Depth to Water		
Hole Depth		
Casing Depth		

Total Depth _____ Finish Date _____ Hour _____ Continued

LANDAU ASSOCIATES

PROJECT _____ PROJECT NO. _____

EVENT _____

SAMPLE NO. _____

DATE COLLECTED _____ TIME _____

Soil/Sediment Sample Collection Form

Weather _____ Collector(s) _____

SAMPLE LOCATION/COMPOSITE DATA

Sample Type: o Soil o Sediment o Other _____

Sample Location: _____

Sample Composited: o Horizontally Locations: _____
o Vertically Depth Ranges: _____
o Not Composited o Other: _____

Elevation and Reference: _____

SAMPLE COLLECTION DATA

Sample Collected From: o Hand-Dug Hole o Test Pit o Boring o Catch Basin/Manhole o Other _____

Sample Collected With: o Bowl o Spoon o Split Barrel o Shovel o Auger o Other _____

Made of: o Stainless Steel o Steel o Other _____

Decon Procedure: *(By Numerical Order)* o Alconox Wash o Tap Rinse o DI Water Rinse o Other _____ o Other _____
o Other _____

SAMPLE DESCRIPTION (color, grain size, density, moisture, etc.): _____

SIZE	QUANTITY	TYPE	LABORATORY ANALYSIS
_____	_____	o Glass o Plastic o Other _____	_____
_____	_____	o Glass o Plastic o Other _____	_____
_____	_____	o Glass o Plastic o Other _____	_____

Co-Located/Duplicate Sample No(s). _____

Photo No. _____ Roll No. _____

Comments: _____

o *Continued on Back*

Signature _____ Date _____

LANDAU ASSOCIATES

As-Built Well Completion Form

Exploration No.: _____
Well No. (If different than Expl. No.): _____
Elevation of Well Cover _____
Elevation Top of Well Pipe _____

Client/Owner: _____ Project No.: _____

Project Name: _____

Drilling Co.: _____

LAI Rep(s): _____

Installation Start Date: _____ Hour: _____

Installation Finish Date: _____ Hour: _____

Install Type(s): ☐ MW/PW ☐ Seismic/Inclino. ☐ VWP ☐ Extract/Recovery

BORING AND WELL DIMENSIONS AND INSTALLATION DETAILS

DOE Unique Well No.: _____

Number of Instillations in Boring: _____

Boring Diameter at Top of Hole: _____

Does Diameter of Hole Change? _____

Boring Diameter/Depth at First Step Down: _____

Boring Diameter/Depth at Second Step Down: _____

Depth to Water: _____ Date: _____ Time: _____

Vibrating Wire Piezometer Installation Details

Serial Number: _____ PSI Rating: _____

Transducer Depth: _____

Unsat. Digits (surface): _____

Unsat. Temp. (surface): _____

Sat. Digits (surface): _____

Sat. Temp. (surface): _____

Downhole Digits: _____

Downhole Temp. _____

Remarks: _____

_____

MATERIALS USED

_____ Sacks of _____ Sand

_____ Sacks of _____ Concrete/Cement

_____ Sacks of _____ Grout Mix Used

_____ Sacks of Bentonite Chips

_____ Feet of _____-inch PVC Blank Casing

_____ Feet of _____-inch PVC Slotted Screen

_____ Threaded End Cap

_____ Waterproof Well Seal/Slip Cap

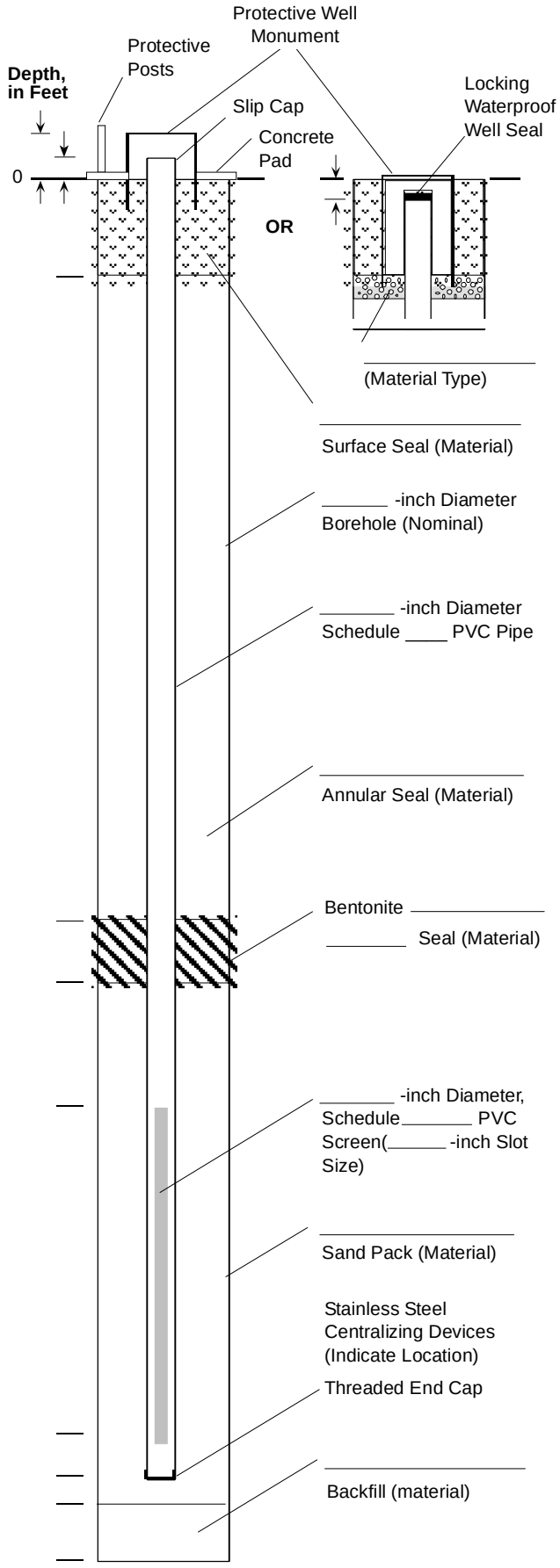
_____ Flush Mount/Aboveground Protective Monument

_____ Protective Posts

_____

_____

_____



Drum/Tank Inventory

Project Name _____ Project Number _____

Location _____ Date _____

Client _____ Landau Representative _____

Drum/Tank Number	Date Generated	Contents	Estimated Quantity	Suspected Contaminants	Generation Source	Disposal Method / Date Disposed	Sketch of Site and Drum/Tank Location

LANDAU ASSOCIATES

// GROUNDWATER ELEVATION RECORD

Project Name: _____ Project Number: _____

Event: _____ Date: _____

Client: _____ Weather: _____

Landau Representative: _____

Water Level Indicator No.: _____ **Sensitivity Setting:** _____

Well ID	Screen Interval	Under Pressure?	1st Measurement		2nd Measurement		3rd Measurement		TOC El. (ft)**	GW El. (ft)	Comments/Observations
			Time	DTW*	Time	DTW*	Time	DTW*			

* If well screen is not saturated and well cap not under pressure, only one depth to water measurement required.

** Record relative positions of ground surface, well casing, and protective casing (monument cover) if elevation of well casing is unknown. Record Datum if known.

Free Product Level Measurements

Project Name _____ Project No. _____

Location _____ Date _____

_____ Landau Rep. _____

Client _____ Weather _____

Well I.D.	Time	Depth to Product (ft)	Depth to Water * (ft)	Well Casing Elevation** (ft)	Product Elevation (ft)	Water Elevation (ft)	Equivalent Water Elevation (ft)	Comments

* From top of well casing.

** Record relative positions of ground surface, well casing, and protective casing (monument cover) if elevation of well casing is unknown. Record Datum, if known.

// GROUNDWATER LOW-FLOW SAMPLE COLLECTION FORM

Project Name: _____ Project Number: _____

Event: _____ Well ID: _____

Weather: _____ Sample ID: _____

Landau Rep.: _____ Date: _____ Time: _____

WELL INFORMATION

Screened Interval: Top (ft): _____ Bottom (ft): _____ Well Secure? ☐ No ☐ Yes Damaged? ☐ No ☐ Yes

DTW After Cap Opened (ft): _____ Time: _____ Describe: _____

Static DTW (ft): _____ Time: _____ Flow-Thru Cell Vol.: _____ WQM No.: _____

Begin Purge (Date/Time): _____ End Purge (Date/Time): _____ Gallons Purged: _____

Water Disposal: ☐ 55-gal drum ☐ Storage tank ☐ Ground ☐ Other: _____

PURGE DATA

Cell shading indicating purge stabilization is for informational purposes only.

Time	Temp (°C)	DO (mg/L)	Cond (µS/cm)	pH (S.U)	ORP (mV)	Turbidity (NTU)	DTW (ft)	Purge Vol ≥1 flow-thru cell vol.	Comments/ Observations
Stabilization →	**± 3%**	**± 10%**	**± 3%**	**± 0.1 units**	**± 10 mV**	**± 10%**	**± 0.00 ft**	**(Yes/No)**	

Sample Description (turbidity, color, odor, sheen): _____ **Fe 2^+ (mg/L):** _____

PUMP AND MATERIAL INFORMATION

Collection Method: ☐ Bailer ☐ Pump Type: _____

Material: ☐ Stainless Steel ☐ PVC ☐ Teflon ☐ Polyethylene ☐ Other ☐ Dedicated

Decon Procedure: ☐ Alconox Wash ☐ Tap Rinse ☐ DI Water ☐ Dedicated

☐ Other (describe sequence): _____

CONFIRMATION PARAMETERS (if applicable per Landau Field Manual)

☐ Applicable

Time	Temp (°C)	DO (mg/L)	Cond (µS/cm)	pH (S.U)	ORP (mV)	Turbidity (NTU)	DTW (ft)	Comments/Observations

Scheduled Analysis (Circle/Bold Applicable)							Bottle Information	
							Number	Type
Volatiles:	8260	8260 SIM	8021	524	624			
Semivolatiles:	8270	8270 SIM	8011	625				
Petroleum Hydrocarbons:	NWTPH-HCID	NWTPH-Gx	NWTPH-Dx	NWTPH-Dx SGC				
Total/Dissolved Metals:	6010	6020	200.7	200.8	7471	☐ Field Filtered		
PCBs & Nitroaromatics:	8082	1668	608	8330				
Dioxin-Furans:	1613	8290						
PFAS:	1633	537.1	533	SOP				
Conventionals:	300.0	SM2450C	SM2450D	SM5310C	RSK175			
Other:								

Duplicate or Parent Sample ID: _____ ☐ MS/MSD

Comments: _____

Signature: _____ Date: _____

LANDAU ASSOCIATES

Sub Slab Vapor / Soil Gas Sample Collection Form

Project Name: _____ Project Number: _____

Client: _____ Sample Number: _____

Landau Rep: _____ Date/Time Collected: _____

Location Information: _____

SAMPLE TYPE

☐ Sub Slab Vapor ☐ Soil Gas ☐ Other: _____

WEATHER DATA

Rainfall < 1" in 24 hrs.? (YES or **NO**) Irrigation not w/in 5 hrs.? (YES or **NO**) Standing water near sampling location? (YES or **NO**)

Air Temperature _____ °F or °C Wind Direction _____ Wind Speed _____ mph Humidity _____ %

Barometric Pressure _____ in HG or mBar Is sampling occurring after frontal system during stable pressure? (**YES** or NO)

SOIL GAS AND SUB SLAB INFORMATION AND AND PURGE DATA

Nature of Location: PERMENANT or TEMPORARY (circle one) ☐ Post-Run Tubing (PRT) ☐ Soil Gas Monitoring Well ☐ Other: _____

Installation Method : ☐ Direct Push Drill Rig ☐ Hollow Stem Auger ☐ Rotosonic ☐ Other: _____

☐ Hand Driven ☐ Rotohammer ☐ Vapor Pin Manufacturer:_____

If Permanent, Is Well Secure? (YES or NO or NA) Damaged (YES or NO) YES-Describe: _____

Materials: ☐ PVC Pipe ☐ Stainless Steel ☐ Teflon ☐ Nylon or Polyethylene Tubing ☐ Other: _____

Well/Hole Diameter: _____ inches Total Depth of Well: _____ ft Depth to Groundwater: _____ ft

Vacuum/Pressure of source (in. H_2O): _____ Time: _____

Purge Volume Calculation: _____

Purge: Begin Time _____ End Time _____ Casing Volume (ft^3): _____

Flow Rate (liter or ml/min): _____ Volume Purged (ft^3): _____

VOLUME EXAMPLES

Diameter (in)	OD (in)	ID (in)	Vol (ft^3/ln ft)
0.25 (tubing)	0.250	0.170	0.00016
1 (sch. 40)	1.315	1.029	0.006
1.25 (sch. 40)	1.660	1.380	0.010
2 (sch. 40)	2.375	2.067	0.020

Vol. Purged (ft^3)	Temp. (°F/°C)	PID (ppm)	Other	Comments/Observations

LEAK TEST OPTIONS

☐ Shut-in Test Starting Vacuum: _____ in H2O *(target 100 inches H2O)* Test Duration: _____ minutes *(target > 1 min)*

Ending Vacuum: _____ in H2O *(target no noticable vacuum decrease)* Result: PASS FAIL (circle one)

☐ Helium Shroud Design: _____ Helium Source Concentration:_____

Shroud Tracer Concentration Fluctuation: _____ % *(target ± 10%)* Tracer Equilibration Time: _____*(target min. 5 min)*

Sample Air Tracer Concentration: _____ % of Shroud Conc. *(target <5%)*

☐ Water Bath (vapor pins only)

SAMPLE COLLECTION DATA

Sample Container: ☐ Summa Canister, Size (liters) _____ Canister #:_____ ☐ Tedlar Bag, Size (liters): _____

☐ Passive / Diffusive Manufacturer:_____ ☐ Other: _____

Sample Type: ☐ Grab ☐ Integrated (composite sample over time)

Sample Collection/Purge Pump (if used): _____

Summa Canister, Pre-Sampling and Post-Sampling: Initial Vacuum: _____ in Hg Vacuum After Sample Collection: _____ in Hg

LABORATORY ANALYSES: _____

Duplicate Sample Number(s) and Comments: _____

Signature: _____ Date: _____

APPENDIX B

Health and Safety Plan

SITE-SPECIFIC HEALTH AND SAFETY PLAN

Project Number:	001045.010.040	**Reviewed by:**	Christine Kimmel
Prepared by:	Jamie Brewster	**Date:**	June 11, 2026
Date:	November 25, 2025		

Work Location Description

Project Name:	Weldcraft Pre-Remedial Design Investigation (PRDI)
Location:	2652 North Harbor Loop Drive Bellingham, Washington
Anticipated Activities	Hollow-stem auger drilling to an anticipated depth of 15 feet (ft) below ground surface (bgs), monitoring well installation, and soil and groundwater sampling from 5 borings, all of which will be converted to permanent monitoring wells, as well as groundwater sampling from up to 12 existing monitoring wells. Soil vapor sampling from 3 direct-push or hand-augered borings to an anticipated depth of 5.5 ft bgs, following soil and groundwater sampling.
Size:	2.5 Acres
Surrounding Population:	Commercial/ports/warehouses
Buildings/Homes/Industry:	Site is currently occupied by Seaview Boatyard North, which conducts general boat repair activities.
Site Topography:	Flat
Anticipated Weather:	Overcast/rainy, 40s-50s
Unusual Features:	Concrete slabs associated with two former buildings are located south of the existing building.
Site History:	The Site area was originally undeveloped tidelands of Bellingham Bay. The Port of Bellingham has owned the property since 1927. In the 1920s, the Site uplands were filled with material dredged during construction of the Squalicum Waterway and from other upland sources of fill. By the 1940s and 1950s, various large businesses began operating in the fill areas along the waterway. Weldcraft Steel and Marine was established on the Site in 1946 and primarily operated as a boatyard that conducted various activities, including boat construction, repair, and maintenance; wood and metal fabrication; marine pipefitting; electrical work; sheet metal work; painting; machinery construction, installation, and repair; vessel haul-out and launching; lofting and pattern-making; canvas and plastic work; storage, brokerage, retail, and wholesale sales; and concrete work.

Several environmental investigations were conducted at the Site prior to developing the cleanup action plan. Contaminants of concern were identified as benzene, ethylbenzene, o-xylene, metals (copper, lead, nickel, and zinc), and total petroleum hydrocarbons such as gasoline (TPH-G) and diesel (TPH-D) in soil and benzene, o-xylene, metals (copper, nickel, and zinc) and TPH-G in groundwater.

Hazard Description

Background Review: ☒ Complete ☐ Partial

If partial, why?

Hazard Level: ☐ B ☐ C ☒ D ☐ Unknown

Justification: Typical compounds associated with historical Site uses and planned soil and groundwater investigation activities.

Types of Hazards: **(Attach additional sheets as necessary)**

A. ☒ Chemical ☐ Biological ☒ Ingestion ☐ O_2 Def. ☒ Skin Contact ☒ Inhalation ☒ Explosive

Describe: Possible contact, inhalation of vapors; or ingestion of particulates from contaminated soil and groundwater.

B. ☒ Physical ☒ Cold Stress ☒ Noise ☐ Heat Stress ☐ Other

Describe: Physical hazards associated with sampling activities including strains, slips, trips, and falls, working around drill rig, noise hazards associated with heavy equipment and vehicle traffic. Groundwater sampling involving heavy lifting. Possible cold stress should field activities be completed during winter months.

C. ☐ Radiation

Describe:

Nature of Hazards:

☒ Air	Describe:	Potential volatile organic compounds (VOCs) vapors released from soil; generation of dust
☒ Soil	Describe:	Possible dermal exposure if soil contacts skin
☐ Surface Water	Describe:	
☒ Groundwater	Describe:	Possible exposure via splashing or inhalation
☐ Other	Describe:	

Chemical Contaminants of Concern ☐ N/A

Contaminant	PEL (ppm or mg/m³)	IDLH (ppm or mg/m³)	Source/Quantity Characteristics in Soil	Route of Exposure	Symptoms of Acute Exposure	Instruments Used to Monitor Contaminant
Petroleum Hydrocarbons	100	400	Petroleum concentrations in soil may be up to 3,900 mg/kg. Petroleum concentrations in groundwater may be up to 37,000 µg/L.	Inhalation, Skin/eye adsorption, Ingestion	Irritated eyes, skin, mucous membrane; dermatitis; headache, lassitude, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonia; possible liver and kidney damage	PID meter
Benzene, toluene, ethylbenzene, xylenes (BTEX) (protective to Benzene)	0.5	5	Known Maximum Concentrations in Soil: Benzene = 0.19 mg/kg, Toluene = not detected, Ethylbenzene = 0.57 mg/kg, Xylenes = 0.21 mg/kg.	Inhalation, Skin/eye adsorption, Ingestion	Irritated eyes, skin, nose, and respiratory system; giddiness; headache; nausea; staggered gait; dermatitis; fatigue; anorexia (benzene is a known carcinogen)	PID meter
Metals (protective to arsenic):	0.01	5	Suspected but not discovered at Site to date.	Inhalation, Skin/eye adsorption, Ingestion	Long-term accumulation in the body	Dust Control.

Abbreviations and Acronyms:

µg/L = micrograms per liter
BTEX = benzene, toluene, ethylbenzene, and xylenes
IDLH = immediately dangerous to life and health
mg/kg = milligrams per kilogram
mg/m^3 = milligrams per cubic meter
N/A = not applicable PPE = personal protective equipment
PID = photoionization detector
PEL = permissible exposure limit
PID = photoionization detector
ppm = parts per million
REL = recommended exposure limit

Physical Hazards of Concern ☐ N/A

Hazard	Description	Location	Procedures Used to Monitor Hazard
Travel to and from Site	Operating motor vehicle in traffic on highways and rural roads	Route to and from Site from Landau Associates office	Operate motor vehicle while well rested and physically able to drive safely. Conduct pre-trip vehicle inspection, all vehicles to be maintained and in good working order. Obey all traffic laws including no cell phone use while driving. Secure all cargo properly to avoid shifting. Allow sufficient time for travel to Site at safe speeds. Engage emergency brake when parking vehicles. Establish a planned route prior to departure.
Vehicles and drill rig used at Site	Incoming and outgoing transport vehicles	All areas of Site	Wear task assigned PPE. Establish work area using cones and/or delineation tape. Remain alert of surroundings. Provide clear drive lane for vehicles using cones and "worker ahead" signage. Only Hazwoper-trained personnel inside the established work zone.
Underground and aboveground utilities	Damage to utilities through advancement of borings	Site-Wide	Public and private utility locating services will be performed prior to drilling. Drilling locations will adhere to minimum clearance distances from overhead transmission lines in accordance with WAC 296-24-960 and WAC 296-155-428. A minimum 10-ft separation will be maintained from overhead power lines less than 50 kilovolts (kV).
Slips/trips/falls	General	Site-Wide	Wear task assigned PPE. Maintain awareness of Site conditions. Keep work area clear of debris. Keep hands free and no use of cell phones while walking around Site.
Moving parts of drill rig and heavy equipment	Drilling soil borings	Site-Wide	Wear task assigned PPE. Remain alert of surroundings; minimize time spent near drill rig and get driller's attention before approaching drill rig; no loose clothing; tie back long hair. Verify working backup alarms and emergency shutoff equipment on drill rig.
Weather stress	Exposure to hot or cold temperatures	Site-Wide	Wear task assigned PPE. Have drinking water accessible, wear appropriate clothing (light for heat, warm for cold), wear sunscreen protection, avoid caffeine, and take short breaks, as needed. Use buddy system to monitor team member for weather-related illness.
Hazard	**Description**	**Location**	**Procedures Used to Monitor Hazard**
Explosive vapors in subsurface explorations	Elevated organic vapors and possible spark from drill rig and excavator	Explorations Locations	Wear task assigned PPE. Properly ground drill rig to prevent sparks, monitor borehole vapor and oxygen concentrations.

Potential exposure to contaminated media	Petroleum hydrocarbons, BTEX, metals	Explorations Locations, Monitoring Wells	Wear task assigned PPE, exchange disposable PPE between soil sampling intervals. Minimize contact with soil and groundwater. Contain investigation-derived waste, soil, and groundwater in work isolation area and do not transfer to work vehicles or other areas of the Site.

Work Location Instrument Readings ☒ N/A

Location: _____

Percent O_2:		Percent LEL:	
Radioactivity:		PID:	
FID:		Other:	
Other:		Other:	
Other:		Other:	

Location: _____

Percent O_2:		Percent LEL:	
Radioactivity:		PID:	
FID:		Other:	
Other:		Other:	
Other:		Other:	

Location: _____

Percent O_2:		Percent LEL:	
Radioactivity:		PID:	
FID:		Other:	
Other:		Other:	
Other:		Other:	

Location: _____

Percent O_2:		Percent LEL:	
Radioactivity:		PID:	
FID:		Other:	
Other:		Other:	
Other:		Other:	

Location: _____

Percent O_2:		Percent LEL:	
Radioactivity:		PID:	
FID:		Other:	
Other:		Other:	
Other:		Other:	

Hazards Expected in Preparation for Work Assignment ☒ N/A

Describe:

Personal Protective Equipment

Level of Protection:

☐ A ☐ B ☐ C ☒ D

Location/Activity: All Site activities: Soil vapor sampling, drilling, and groundwater sampling.

☐ A ☐ B ☒ C ☐ D

Location/Activity: Upgrade to Level C based on air monitoring results for all locations. See Attachment A for action levels.

Protective Equipment:

Respirator: ☐ N/A

- ☐ SCBA, Airline
- ☐ Full-Face Respirator
- ☒ Half-Face Respirator (Cart. Organic vapor/HEPA) (Only if upgrade to Level C)
- ☐ Escape mask
- ☐ Other:
- ☐ Other:

Clothing: ☐ N/A

- ☒ High Visible Safety Vest (all tasks)
- ☐ Chemically-Resistant Splash Suit
- ☐ Apron; Type:
- ☐ Tyvek Coverall (Upgrade to Level C)
- ☐ Saranex Coverall
- ☐ Coverall; Type:
- ☒ Other: Work clothes, long pants and shirt (all tasks)

Head & Eye: ☐ N/A

- ☒ Hard Hat (exploration and if overhead hazards are present)
- ☐ Goggles
- ☐ Face Shield
- ☒ Safety Eyeglasses (all tasks)
- ☒ Other: Hearing protection (exploration tasks)

Hand Protection: ☐ N/A

- ☒ Undergloves; Type: Nitrile (sampling tasks)
- ☒ Gloves; Type: work gloves (task specific)
- ☐ Overgloves; Type:
- ☐ Other:

Foot Protection: ☐ N/A

- ☒ Leather Boots with Steel Toe (all tasks)
- ☐ Neoprene Boots with Steel Toe/Shank
- ☐ Disposable Overboots
- ☐ Other:

Monitoring Equipment: ☐ **N/A**

- ☐ CGI
- ☐ O_2 Meter
- ☐ Rad Survey
- ☐ Detector Tubes; Type:
- ☒ PID (for ground disturbing activities only)
- ☐ FID
- ☐ Other:

Decontamination

Personal Decon: ☒ Required ☐ Not Required

If required, describe: Wash hands and face prior to eating or drinking and at the end of each shift, prior to leaving the Site. Replace disposable nitrile gloves between sampling intervals. Replace disposable PPE frequently. Work from clean areas of the Site toward more contaminated areas.

Equipment Decon: ☒ Required ☐ Not Required

If required, describe: Non-dedicated or non-disposal sampling equipment will be decontaminated between sampling locations using a tap water and Alconox® soap mixture, followed by a tap water rinse, followed with a distilled water rinse.

Heavy equipment will be decontaminated using dry decontamination methods.

Down-the-hole drilling equipment will be decontaminated using hot-water high-pressure stream cleaner on all down-the-hole drilling equipment between boring locations.

All decontamination fluids to be contained and stored in 55-gallon WSDOT-approved drums for offsite disposal.

Activities Covered Under This Plan

Task No.	Description	Preliminary Schedule
1	HSA drilling and monitoring well installation	To be updated prior to implementation
2	Groundwater sampling	To be updated prior to implementation
3	Soil vapor sampling	To be updated prior to implementation

Subcontractor's Health and Safety Program Evaluation ☐ N/A

Subcontractor: To be updated prior to implementation

Address: Click here to enter text.
Click here to enter text.

Evaluation Criteria:

Item	Adequate	Inadequate	Comments
Medical Surveillance Program	☐	☐	
Personal Protective Equipment Availability	☐	☐	
Onsite Monitoring Equipment Availability	☐	☐	
Safe Working Procedures Specification	☐	☐	
Training Protocols	☐	☐	
Ancillary Support Procedures (if any)	☐	☐	
Emergency Procedures	☐	☐	
Evacuation Procedures Contingency Plan	☐	☐	
Decontamination Procedures Equipment	☐	☐	
Decontamination Procedures Personnel	☐	☐	

Results of Evaluation: ☐ **Adequate** ☐ **Inadequate**

Additional Comments: Click here to enter text.

Evaluation Conducted By: Date:

Personnel and Roles

Name	Work Location Title/Task	Medical Current	Respirator Fit Test Current	Hazwoper Training Current
To be updated prior to implementation		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐
		☐	☐	☐

Emergency Facilities and Numbers

Hospital: PeaceHealth St. Joseph Medical Center

Telephone: (360) 734-5400

Address: 2901 Squalicum Parkway, Bellingham, Washington 98225

Directions: See Attachment B

Urgent Care: Optum Bellingham Walk-In Clinic
Telephone: (425) 339-5422
Address: 3130 Ellis St, Bellingham, Washington 98225
Directions: See Attachment B

Emergency Transportation Systems (Fire, Police, Ambulance): 911
Emergency Routes: See Attachment B

Emergency Contacts:

Name	Main Phone Number	Alternate Phone Number
John McCorkle	206-510-2736	425-329-0316
Chris Kimmel	206-786-3801	425-329-0254

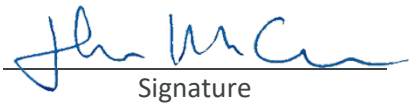
In the event of an emergency, do the following:

1. Call for help as soon as possible. Call 911. Give the following information:
    - WHERE the emergency is – use cross streets or landmarks
    - PHONE NUMBER you are calling from
    - WHAT HAPPENED – type of injury
    - WHAT is being done for the victim(s)
    - YOU HANG UP LAST – let the person you called hang up first.
2. If the victim can be moved, paramedics will transport to the hospital. If the injury or exposure is not life-threatening, decontaminate the individual first. If decontamination is not feasible, wrap the individual in a blanket or sheet of plastic prior to transport.

Health and Safety Plan
Approval/Sign Off Form

This Health and Safety Plan has been prepared for use by Landau Associates for the defined scope of work. Subcontractors (contracted by Landau Associates or the client) will prepare individual plans documenting their safety program for the defined scope of work.

I have read, understood, and agreed with the information set forth in this Health and Safety Plan (and attachments) and discussed in the Personnel Health and Safety briefing.

	Signature	
	Signature	
	Signature	
	Signature	
	Signature	
	Signature	
Christine Kimmel Landau H&S Manager	Christine Kimmel Signature	6/11/2026 Date
John McCorkle Landau Project Manager	 Signature	6/11/2026 Date

Personnel Health and Safety Briefing Conducted by:

Name	Signature	Date

Attachment A
Action Levels for Respiratory Protection

Monitoring Parameter	Reading	Level of Protection
Organic Vapors	PID reading >5 ppm at point of operations for more than 1 minute	Establish 25-foot-diameter exclusion zone around work area; monitor workers' breathing zone. Follow up Draeger tube analysis to evaluate benzene concentrations. If benzene concentrations are greater than 0.05 ppm, stop work, leave area, and contact Safety Manager.
	PID reading >20 ppm in worker's breathing zone for more than 1 minute	Evacuate area and move upwind to allow vapors to dissipate; may resume work after vapors dissipate or upgrade to half-face respirator with organic vapor/HEPA cartridge. Resume work when ambient conditions return to background.
	PID reading >80 ppm in worker's breathing zone at any time	Stop work, evacuate area, and move upwind; do not resume work until contacting Safety Manager.
Explosive Vapors	>10% LEL	Discontinue work immediately and allow vapors to reduce to background prior to resuming work.
Dust Control	Visible Dust Generation	Apply Water

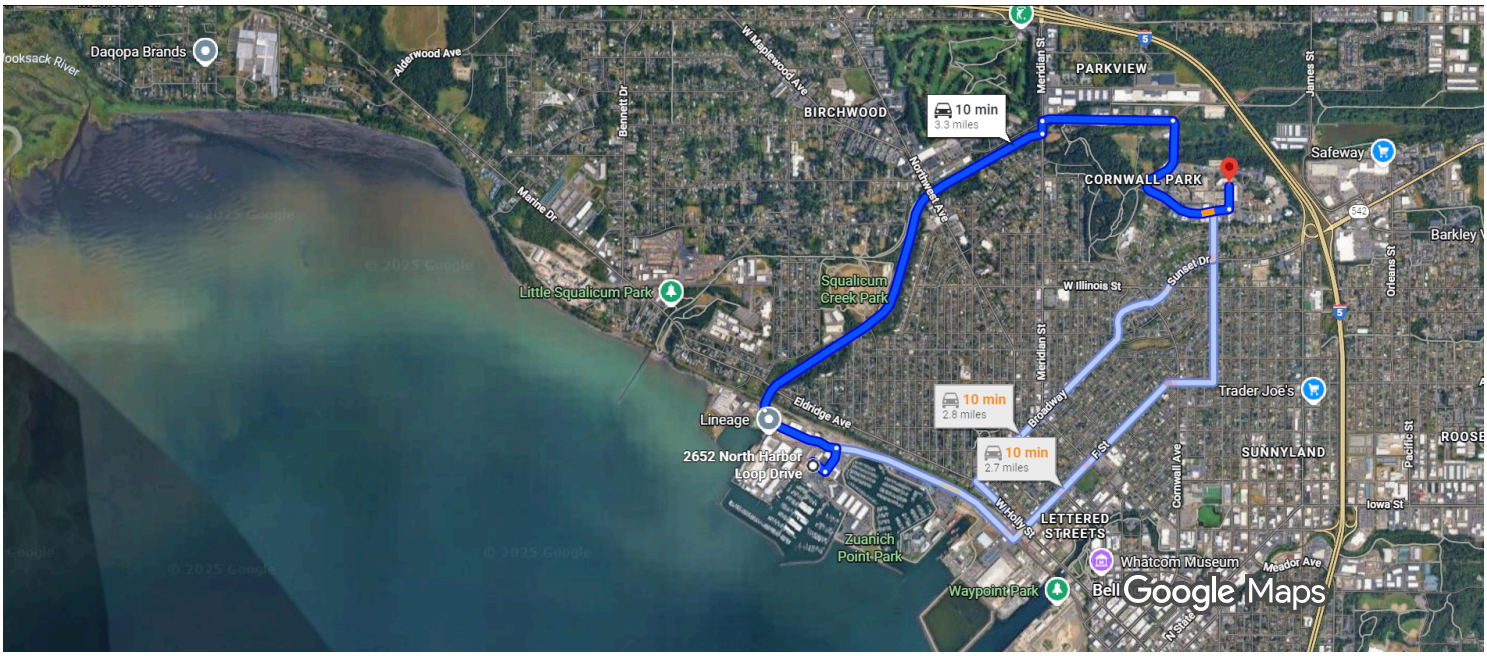
Attachment B
Emergency Route – Map to the Hospital and Urgent Care

Directions to Hospital

Google Maps

2652 N Harbor Loop Dr, Bellingham, WA 98225 to PeaceHealth St. Joseph Medical Center, 2901 Squalicum Pkwy, Bellingham, WA 98225

Drive 3.3 miles, 10 min



Imagery ©2025 Airbus, CNES / Airbus, Landsat / Copernicus, Maxar Technologies, USDA/FPAC/GEO, Map data ©2025 Google 2000 ft

2652 N Harbor Loop Dr
Bellingham, WA 98225

Take Squalicum Way/Squalicum Pkwy to Meridian St

5 min (2.0 mi)

1. Head southeast on N Harbor Loop Dr toward Coho Way

315 ft

2. Turn left onto Coho Way

0.1 mi

3. Turn left onto Roeder Ave

0.3 mi

4. Slight right onto Squalicum Way/Squalicum Pkwy

1.5 mi

5. Turn left onto Meridian St

20 sec (256 ft)

Follow Birchwood Ave and Squalicum Pkwy to your destination

4 min (1.2 mi)

6. Turn right at the 1st cross street onto Birchwood Ave

0.5 mi

7. Turn right onto Squalicum Pkwy

0.6 mi

8. Turn left

440 ft

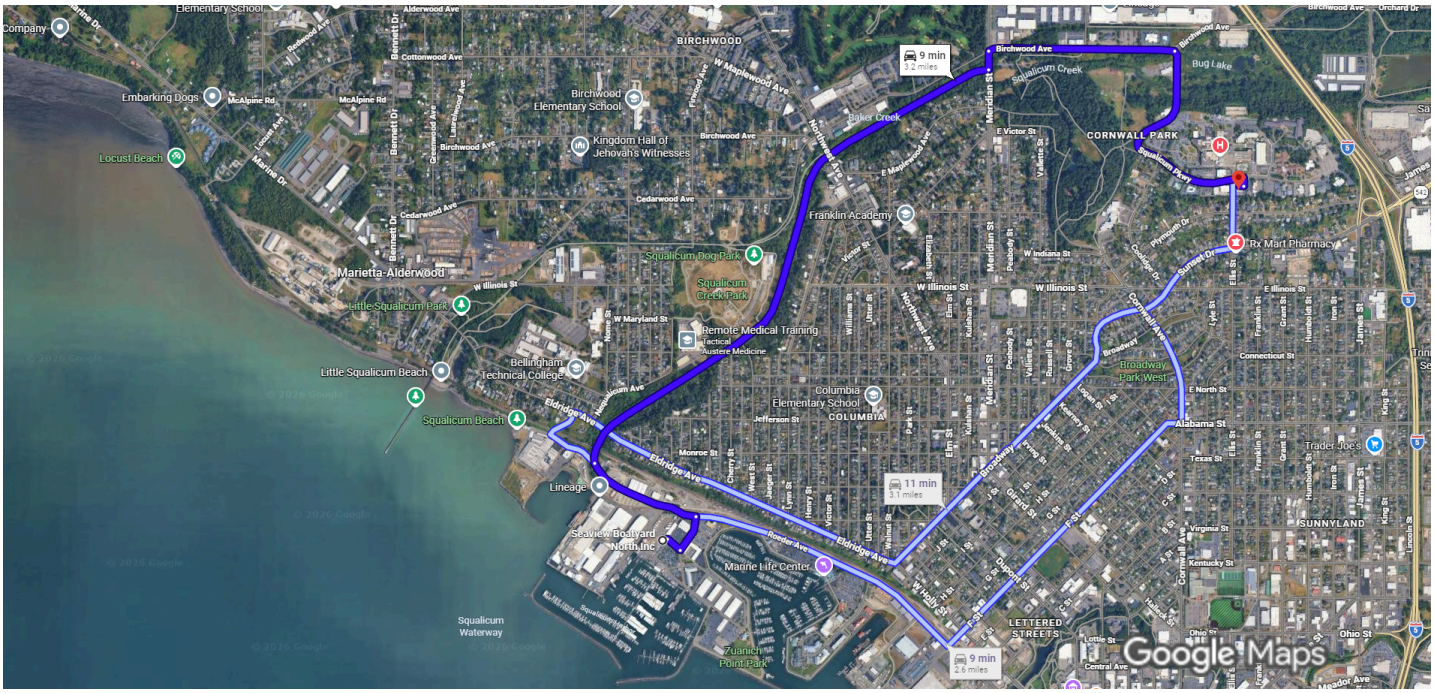
PeaceHealth St. Joseph Medical Center
2901 Squalicum Pkwy, Bellingham, WA 98225

Directions to Urgent Care

Google Maps

Seaview Boatyard North Inc, 2652 N Harbor Loop Dr, Bellingham, WA 98225 to Optum - Bellingham Walk-In Clinic, 3130 Ellis St, Bellingham, WA 98225

Drive 3.2 miles, 9 min



Imagery ©2026 Airbus, CNES / Airbus, Maxar Technologies, USDA/FPAC/GEO, Map data ©2026 Google 1000 ft

Seaview Boatyard North Inc
2652 N Harbor Loop Dr, Bellingham, WA 98225

Take Squalicum Way/Squalicum Pkwy to Meridian St

5 min (2.0 mi)

1. Head toward Coho Way

236 ft

2. Turn left onto Coho Way

0.1 mi

3. Turn left onto Roeder Ave

0.3 mi

4. Slight right onto Squalicum Way/Squalicum Pkwy

1.5 mi

5. Turn left onto Meridian St

20 sec (256 ft)

Follow Birchwood Ave and Squalicum Pkwy to your destination

3 min (1.1 mi)

6. Turn right at the 1st cross street onto Birchwood Ave

0.5 mi

7. Turn right onto Squalicum Pkwy

0.6 mi

8. Turn right

118 ft

9. Turn right

Destination will be on the left

62 ft

Optum - Bellingham Walk-In Clinic
3130 Ellis St, Bellingham, WA 98225

APPENDIX C

Inadvertent Discovery Plan

LANDAU ASSOCIATES

INADVERTENT DISCOVERY PLAN

Pre-Remedial Design Investigation Project Plans
Weldcraft Steel and Marine Site
Bellingham, Washington

June 10, 2026

Prepared for

Port of Bellingham
Bellingham, Washington

SEATTLE
155 NE 100th St, Ste 302, Seattle, WA 98125 T 206.631.8680

landauinc.com

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ATTACHMENT

Attachment	Title
C-1	Support for Inadvertent Discovery Plan Implementation

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1.0 INTRODUCTION

This Inadvertent Discovery Plan (IDP) for the Weldcraft Steel and Marine Pre-Remedial Design Investigation Work Plan outlines procedures to perform in the event of the discovery of archaeological materials or human remains during work activities, in accordance with state and federal laws. Previous Site work has not identified any culturally sensitive resources.

2.0 RECOGNIZING CULTURAL RESOURCES

A cultural resource discovery could be prehistoric or historic. Some examples include:

- An accumulation of shell, burned rocks, or other food-related materials
- Bones or small pieces of bone
- An area of charcoal or very dark-stained soil with artifacts
- Stone tools or waste flakes (e.g., an arrowhead or stone chips)
- Clusters of tin cans or bottles; logging or agricultural equipment that appears to be older than 50 years
- Buried railroad tracks, decking, or industrial materials.

If the item(s) inadvertently discovered are unknown in age and origin, assume the material is a cultural resource. See Attachment 1 for photographs of the examples of the items listed above.

3.0 ONSITE RESPONSIBILITIES

If an employee, contractor, or subcontractor believes that they have uncovered a cultural resource at any point in the project, the following steps must be taken:

Step 1: *Stop Work.* In the event of a cultural resource inadvertent discovery, project work must stop immediately. Notify the appropriate party(s). Leave the surrounding area untouched and provide a demarcation adequate to provide for the security, protection, and integrity of the discovery. The discovery location must be secured at all times by a temporary fence or other form of onsite security.

Step 2: *Notify Licensed Archaeologist/Cultural Resource Specialist.* This project does not have an established Archaeological Monitor. In the event of an inadvertent discovery, Landau Associates, Inc. (Landau) will contact the following licensed Archaeologist/Cultural Resource Specialist in the Bellingham, Washington area.

- Caldera Archaeology, LLC
  1155 North State, Suite 428
  Bellingham, Washington 98227
  (360) 332-2600

Step 3: *Notify the Project Manager.* Notify the overall Site Project Manager, the Landau Project Manager, the subcontractor Project Managers, and the Washington State Department of Ecology (Ecology) Project Manager, or other applicable contacts:

Title	Name	Phone	Email
Port of Bellingham Project Manager	Ben Howard	(360) 715-7365	benh@portofbellingham.com
Landau Project Manager	John McCorkle	(206) 510-2736	jmccorkle@landauinc.com
Ecology Project Manager	John Rapp	(206) 247-3242	john.rapp@ecy.wa.gov

The Landau Project Manager or applicable representative will make the necessary calls and notifications. If human remains are encountered, treat them with dignity and respect at all times. Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed. **Do not call 911 or speak with the media. Do not take pictures unless directed to do so by representatives of the Washington State Department of Archaeology and Historic Preservation (DAHP).**

4.0 FURTHER CONTACTS AND CONSULTATION

Project Manager Responsibilities (Landau):

- **Project Find:** The Project Manager (Landau) is responsible for taking appropriate steps to protect the discovery site if a cultural resource is discovered. Work will stop immediately in a surrounding area adequate to provide for the complete security of the location, the protection, and the integrity of the resource. Vehicles, equipment, and unauthorized personnel will not be permitted to traverse the discovery site. Work in the immediate area will not resume until treatment of the discovery has been completed following provisions for treating archaeological/ cultural material as set forth in this document.
- **Direct Construction Elsewhere:** The Project Manager may direct construction away from the discovered cultural resources to work in other areas prior to contacting the concerned parties.
- **Contact Senior Support Staff:** If the Senior Support Staff Member has not yet been contacted, the Project Manager must do so.

Senior Support Staff/Delegated Cultural Resource Specialist Responsibilities:

- **Identify the Find:** The Senior Support Staff Member (or delegated Cultural Resource Specialist) will ensure that a qualified professional archaeologist examines the area to determine if an archaeological find has been identified.
  - If it is determined not to be an archaeological or historic find, or human remains, work may proceed with no further delay.
  - If it is determined to be an archaeological find, the Senior Support Staff Member or Cultural Resource Specialist will continue with necessary notifications.
  - If the find may be human remains or funerary objects, the Senior Support Staff Member or Cultural Resource Specialist will ensure that a qualified physical anthropologist examines the find. If it is determined to be human remains, refer to the procedure described below.
- **Notification of DAHP:** The Senior Support Staff Member (or delegated Cultural Resource Specialist) will contact the involved agencies (if any) and the DAHP.
- **Notification of Tribes:** If the discovery may be of interest to Native American Tribes, the DAHP and Ecology Coordinator will coordinate with the interested and/or affected tribes.

Washington State Department of Archaeology and Historic Preservation contacts:

Name	Title	Phone
Dr. Allyson Brooks	State Historic Preservation Officer	(360) 480-6922 allyson.brooks@dahp.wa.gov
Rob Whitlam, Ph.D.	Staff Archaeologist	(360) 890-2615 rob.whitlam@dahp.wa.gov

Tribal contacts:

Tribe	Contact	Contact's Email	Contact's Phone
Confederated Tribes of the Colville Reservation	Guy Moura, Cultural Resources	guy.moura@colvilletribes.com	(509) 634-2695
	Melissa Anne Ayvaz, Cultural Resources	melissa.ayvaz.hsy@colvilletribes.com	(509) 634-2697
Lummi Nation	Lena Tso, Cultural Resources	lenat@lummi-nsn.gov	(360) 312-2257
Nooksack Indian Tribe	Trevor Delgado, Cultural Resources	tdelgado@nooksack-nsn.gov	(360) 592-5176
Samish Indian Nation	Jacquelyn Ferry, Cultural Resources	jferry@samishtribe.nsn.us	(360 293-6404 ext. 126
Sauk-Suiattle Indian Tribe	Kevin Joseph, Cultural Resources	kjoseph@sauk-suiattle.com	(360) 436-2833
Swinomish Indian Tribal Community	Josephine Jefferson, Cultural Resources	jjefferson@swinomish.nsn.us	(360) 466-7352
Snoqualmie Indian Tribe	Steven Moses, Cultural Resources	dahp@snoqualmietribe.us	(425) 888-6551
Upper Skagit Tribe	Scott Schuyler, Cultural, Natural Resources & Emergency Management	scotts@upperskagit.com	(360) 854-7009

5.0 SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Photographs will not be taken at any time, unless pre-approved to do so.

The Landau Project Manager and project team will comply with applicable state and federal laws for non-federal lands, and the following procedure:

1) In all cases you must notify a law enforcement agency or Medical Examiner/Coroner's Office.
    a. The Landau Project Manager or designated member of the project team will comply with actions described above and immediately notify the local law enforcement agency or Medical Examiner/Coroner's Office.

b. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human, whether the discovery site constitutes a crime scene, and will then notify DAHP.

i. Bellingham Police Department
505 Grand Avenue
Bellingham, Washington 98225

1. Emergency phone number: 911
2. Non-Emergency phone number: (360) 778-8804
3. Main Office: (360) 778-8800

2) Participate in Consultation:

a. Per the Revised Code of Washington (RCW; RCW 27.44.055, RCW 68.50, and RCW 68.60), DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation.

3) Further Activities:

a. Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.

b. When consultation and documentation activities are complete, construction in the discovery area may resume as described above.

6.0 DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

In the event of cultural resource discovery, archaeological deposits discovered during work activities will be assumed eligible for inclusion in the National Register of Historic Places (under Criterion D) until a formal Determination of Eligibility is made.

Project staff will ensure the proper documentation and field assessment will be made of discovered cultural resources in cooperation with the involved parties: federal agencies (if appropriate), DAHP, Ecology, affected tribes, and a contracted consultant (if required).

Prehistoric and historic cultural material discovered during project activities will be recorded by a professional archaeologist/cultural resource specialist on a cultural resource site or isolate form using standard and approved techniques. Site overviews, features, and artifacts will be photographed; stratigraphic profiles and soil/sediment descriptions will be prepared for minimal subsurface exposures. Discovery locations will be documented on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require further evaluation using hand-dug test units. Units may be dug in controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. A test excavation unit or small trench might also be used to determine if an intact occupation surface is present. Test units will be used only when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. Excavations will be conducted using state-of-the-art

techniques for controlling provenance, and the chronology of ownership, custody, and location recorded with precision.

Spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock will be recorded for each probe on a standard form. Test excavation units will be recorded on unit-level forms, which will include plan maps for each excavated level, and material type, number, and vertical provenance (depth below surface and stratum association where applicable) for the artifacts recovered from the level. A stratigraphic profile will be drawn for at least one wall of each test excavation unit, as appropriate.

If relevant, sediments excavated for purposes of cultural resources investigation will be screened through ⅛-inch mesh, unless soil conditions warrant ¼-inch mesh.

Prehistoric and historic artifacts collected from the surface and from probes and excavation units will be analyzed, catalogued, and temporarily curated. Ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if appropriate, DAHP, Ecology, and the affected tribes).

Within 90 days of concluding field activities, or such other time as agreed to with Ecology, a technical report describing the monitored and resultant archaeological excavations will be provided to the Project Manager (Landau), who will forward the report for review and delivery to Ecology, the federal agencies (if appropriate), DAHP, and the affected tribe(s).

If assessment activities expose human remains (e.g., burials, isolated teeth, or bones), the procedures described above will be followed.

7.0 PROCEEDING WITH WORK

Work outside the discovery location may continue while documentation and assessment of the archaeological/cultural resources proceeds. A professional archaeologist/cultural resource specialist must determine the boundaries of the discovery location. In consultation with Ecology, DAHP, and affected tribes, the Project Manager (Landau) will determine the appropriate level of documentation and treatment of the resource. If there is a federal nexus, National Historic Preservation Act Section 106 consultation and associated federal laws may need to be considered to support the final determinations about treatment and documentation.

Project work may continue at the discovery location only after the procedures outlined in this IDP are followed and the Project Manager (Landau), DAHP, any affected tribes, Ecology (and the federal agencies, if appropriate) determine that compliance with state and federal law is complete.

8.0 RECIPIENT/PROJECT PARTNER RESPONSIBILITY

This IDP must be immediately available on site, be implemented to address any discovery, and be available by request by any party.

ATTACHMENT C-1

Support for Inadvertent Discovery Plan Implementation

Implement the IDP if …

You see chipped stone artifacts.



- Glass-like material
- Angular
- “Unusual” material for area
- “Unusual” shape
- Regularity of flaking
- Variability of size



Implement the IDP if …

You see ground or pecked stone artifacts.









- Striations or scratching
- Unusual or unnatural shapes
- Unusual stone
- Etching
- Perforations
- Pecking
- Regularity in modifications
- Variability of size, function, and complexity

Implement the IDP if …

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Carved
- Often pointed if used as a tool
- Often wedge shaped like a "shoehorn"



Bone Awls from Oregon and Bone Wedge from California

Implement the IDP if …

You see bone or shell artifacts.



- Often smooth
- Unusual shape
- Perforated
- Variability of size



Implement the IDP if …

You see fiber or wood artifacts.



- Wet environments needed for preservation
- Variability of size, function, and complexity
- Rare



Artifacts from Mud Bay, Olympia, Washington

Implement the IDP if …

You see historic period artifacts.







Artifacts from Downtown Seattle, Alaskan Way Viaduct (Upper Left and Lower) and Unknown Site (Upper Right)

Implement the IDP if …

You see strange, different or interesting looking dirt, rocks, or



- Human activities leave traces in the ground that may or may not have artifacts associated with them
- “Unusual” accumulations of rock (especially fire-cracked rock)
- “Unusual” shaped accumulations of rock (e.g., similar to a fire ring)
- Charcoal or charcoal-stained soils
- Oxidized or burnt-looking soils
- Accumulations of shell
- Accumulations of bones or artifacts
- Look for the “unusual” or out of place (e.g., rock piles or accumulations in areas with few rock)

Implement the IDP if …

You see strange, different or interesting looking dirt, rocks, or



- "Unusual" accumulations of rock (especially fire-cracked rock)
- "Unusual" shaped accumulations of rock (e.g., similar to a fire ring)
- Look for the "unusual" or out of place (e.g., rock piles or accumulations in areas with few rock)

Site on Muckleshoot Indian Reservation, near WSDOT ROW along SR 164

Implement the IDP if …

You see strange, different or interesting looking dirt, rocks, or



- Often have a layered or “layer cake” appearance
- Often associated with black or blackish soil
- Often have very crushed and compacted shells



Implement the IDP if …

You see historic foundations or buried structures.

