Coastline Law Group PLLC

4015 Ruston Way, Suite 200
Tacoma, WA 98402
Phone: 253-203-6820

Kimberly Seely
Attorney at Law

August 31, 2021

Mr. Nick Acklam
Washington State Department of Ecology
VCP Unit Manager, Southwest Region
300 Desmond Drive SE
Lacey, WA 98503

RE: VCP Application and Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site (AO DE4108, Cleanup Site ID 3704)
1210 West Bay Drive NW, Olympia, Washington

Dear Nick:

On behalf of West Bay Development Group LLC, this letter submits an application to the VCP, accompanied by a Remedial Investigation (RI) Data Gap Report, with respect to the Hardel Mutual Plywood Site. West Bay Development Group recently purchased the Site for the purpose of transforming the former industrial property into a mixed-use development known as West Bay Yards. As you are already aware, Hardel investigated and remediated the former industrial Site, between 2007 and 2012, to Ecology's satisfaction pursuant to an Agreed Order. Nonetheless, West Bay Development Group conducted supplementary RI data gap activities in 2020 and 2021 to confirm 1) the completeness of the previous investigation and remediation, and 2) that MTCA cleanup standards were attained throughout the Site.[1] RI data gap investigation results confirm that most of the Site was appropriately remediated, however, minor residual impacts above MTCA cleanup levels were encountered at sporadic locations within the Site.[2] This VCP application seeks your assistance to ensure that these remnant impacts are investigated and remediated to Ecology's satisfaction and that MTCA cleanup standards are attained for this project.

It is important to note that the West Bay Yard redevelopment effort is extensive and involves numerous agencies and stakeholders, including, but not limited to, Ecology, the City of Olympia, the Squaxin Tribe, the Army Corps of Engineers, as well as neighborhood and public interest

[1] Portions of the RI data gap activities were funded by the City of Olympia's United States Environmental Protection Agency brownfield assessment grant.
[2] Based on the minor impacts discovered during RI data gap activities, Ecology rescinded its 2012 no further action determination for the Site on August 17, 2021.

groups. On March 31, 2021, the Olympia City Council approved a Development Agreement for the West Bay Yards project, which was the first step in the development process. The Development Agreement provides the project with vesting and phasing in exchange for West Bay Development Group's commitment to complete in-water shoreline restoration and contribute $250,000 to the City's Home Fund. On June 8, 2021, West Bay Development Group completed its land use permit submittal with the City of Olympia. The City's initial review comments are pending.

Throughout this process, West Bay Development Group has endeavored to bring all interested stakeholders together to thoroughly address all issues and concerns raised. Similarly, this VCP effort is intended to engage Ecology, as well as other stakeholders. For instance, West Bay Development Group is sharing this VCP application and the RI Data Gap Report with the Squaxin Tribe to seek their input and address any concerns raised. Our intent is to further this project in a holistic and comprehensive manner to the satisfaction of all stakeholders to the extent feasible.

With submittal of this VCP application and RI Data Gap Report, we request an informal technical consultation with you to discuss whether investigation activities conducted thus far, as well as those planned for the near future, adequately address Ecology's expectations at this Site. The comprehensive data and analysis presented in the enclosed RI Data Gap Report provide the relevant technical information to support your assessment. The primary opinion sought through the VCP at this time is confirmation that the completed and planned work will satisfy MTCA requirements applicable to the Site.

Informal Consult: If possible, Troy Bussey and I would like to meet with you (remotely) during the week of September 25th to informally discuss your technical assessment and any questions or concerns you may have concerning future plans for this Site.

If you have any questions or comments, please do not hesitate to contact me or Troy Bussey. Feel free to call my direct line at (253) 203-6820 or Troy Bussey at (360) 570-1700.

Sincerely,

Kimberly Seely

cc: B. Smith (West Bay Development Group)
T. Bussey (PIONEER Technologies Corporation)
M. Reid (City of Olympia)
J. Hecker (PIONEER Technologies Corporation)
N. Floyd (City of Olympia)
J. Dickison (Squaxin Island Tribe)
H. Burgess (Phillips Burgess)

Remedial Investigation Data Gap Report

Hardel Mutual Plywood Corporation Site
1210 West Bay Drive NW
Olympia, Washington

Prepared for:

West Bay Development Group, LLC
8512 Canyon Road East, Suite 105
Puyallup, Washington 98371

Prepared by:

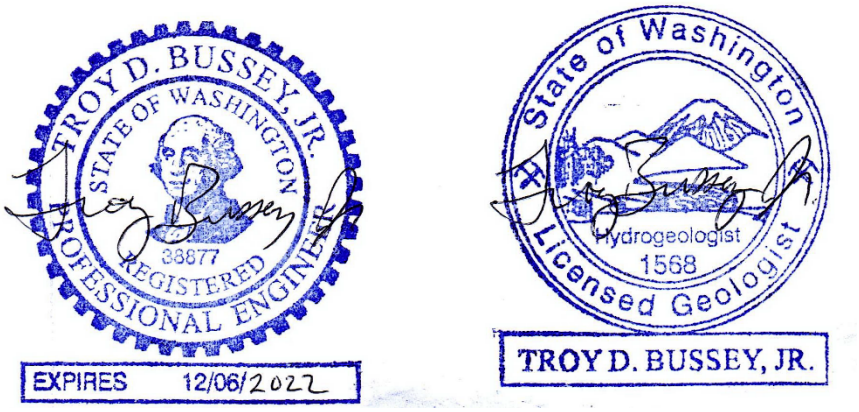
PIONEER TECHNOLOGIES CORPORATION

5205 Corporate Center Ct. SE, Suite A
Olympia, Washington 98503
Phone: 360.570.1700
Fax: 360.570.1777
www.uspioneer.com

August 2021

Professional Certification

This document was prepared under my direction. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I hereby certify that I was in responsible charge of the work performed for this document.



August 31, 2021

Troy D. Bussey Jr.
Principal Engineer
PIONEER Technologies Corporation
Washington P.E. Registration No. 38877
Washington L.G. and L.HG. Registration No. 1568

Date

Executive Summary

This Remedial Investigation (RI) Data Gap Report (Report) summarizes the investigation and evaluation results of the supplementary RI activities recently completed at the Hardel Mutual Plywood Corporation (Hardel) Site in support of the planned West Bay Yards redevelopment project. This brownfield redevelopment project will transform a derelict industrial legacy property that has been unused for 25 years into a vibrant mixed-use development that provides urban housing, jobs, shoreline habitat restoration, and waterfront access. Even though the Site was successfully investigated and remediated to the Washington State Department of Ecology's (Ecology's) satisfaction under an Agreed Order (AO) between Ecology and Hardel (see Appendix A), supplementary RI data gap activities were conducted between June 2020 and May 2021 to further evaluate the Site's suitability for the planned mixed-use development.[1] RI data gap activities to date have included soil sampling, direct-push groundwater sampling, installation of monitoring wells (MWs), four groundwater monitoring (GWM) events, and field methane soil gas measurements.

As expected based on Ecology's 2012 no further action determination following Hardel's remediation activities (Ecology 2012b), RI data gap activities have confirmed that this Model Toxics Control Act (MTCA) Site is relatively clean. However, RI data gap activities also demonstrated that some minor MTCA screening level (SL) exceedances – mostly petroleum constituents – are present sporadically in soil and groundwater within the upland area, which is not surprising given the size and duration of historical operations and the presence of fill material (e.g., wood debris). A focused soil excavation and the planned redevelopment cap/cover will remediate the few minor soil direct contact SL exceedances to attain MTCA cleanup standards. The cap/cover is an ideal solution to address known and potential unknown soil SL exceedances associated with historical operations, treated wood debris, and urban background, and to prevent potentially contaminated subsurface soil from being inadvertently disturbed during future construction activities. The few minor groundwater-related SL exceedances at the Site have been delineated in five potential conditional point of compliance MWs located upgradient of West Bay surface water (with a few additional GWM events planned so that all five MWs are sampled at least four times). Based on vapor intrusion (VI) screening conducted in accordance with MTCA regulations and Ecology guidance, the Site does not pose an unacceptable VI risk to future occupants and no further VI work is needed for the Site. Likewise, no further action is needed with respect to a potential methane hazard for future buildings based on existing methane results, although additional methane measurements are planned for further confirmation. In addition, RI data gap soil and groundwater results for chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans (dioxins/furans) and polychlorinated biphenyls (PCBs) further confirmed Ecology's previous conclusion that these constituents are not a concern at this Site. In summary, the Site is suitable for the planned mixed-use

[1] Ecology-approved work completed under the AO between 2007 and 2012 included the MTCA RI, Feasibility Study (FS), Interim Action (IA), and Cleanup Action Plan (CAP) phases. The RI data gap investigation and evaluation results presented in this Report are intended to supplement the AO RI and AO IA confirmational monitoring activities and results.

redevelopment following some straightforward remediation activities (e.g., focused soil excavation, cap/cover, monitoring, engineering controls, institutional controls) that will supplement the remediation activities previously completed by Hardel.

Before proceeding with the few remaining RI data gap activities and preparation of a Focused FS Report and CAP, an informal technical consultation with Ecology is requested via the enclosed voluntary cleanup program (VCP) application. The primary technical opinion sought at this time is confirmation that the completed and planned work (i.e., AO work, RI data gap activities presented in this Report, and future tasks outlined in this Report) will satisfy MTCA requirements applicable to the Site. Specifically, Ecology's input and opinion is requested regarding:

- The adequacy of existing AO and RI data gap results;
- The adequacy of the remaining proposed RI data gap activities (i.e., additional GWM events and additional field methane measurements);
- The conceptual schedule outlined in Section 5.1;
- MTCA documentation expectations for this Site given the extensive reporting under the AO, the no further action determination under the AO, and submittal of this Report; and
- The probable recommended cleanup action alternative outlined in Section 5.2.

Table of Contents

Figures

Tables

Appendices

List of Acronyms

Acronym	Explanation
AO	Agreed Order
ASTM	American Society of Testing and Materials
bgs	Below Ground Surface
CAP	Cleanup Action Plan
CFR	Code of Federal Regulations
CLARC	Cleanup Levels and Risk Calculation
COC	Constituent of Concern
COI	Constituent of Interest
COPC	Constituent of Potential Concern
cPAHs	Carcinogenic PAHs
CSM	Conceptual Site Model
Dioxins/Furans	Chlorinated Dibenzo-p-dioxins and Chlorinated Dibenzofurans
Ecology	Washington State Department of Ecology
EDB	Ethylene Dibromide
EPH	Extractable Petroleum Hydrocarbon
ESA	Environmental Site Assessment
FS	Feasibility Study
Greylock	Greylock Consulting LLC
GWM	Groundwater Monitoring
Hardel	Hardel Mutual Plywood Corporation
HVAC	Heating, Ventilation, and Air Conditioning
IA	Interim Action
LNAPL	Light Non-Aqueous Phase Liquid
mg/kg	Milligrams per Kilogram
MTCA	Model Toxics Control Act
MW	Monitoring Well
NAVD88	North American Vertical Datum of 1988
NTU	Nephelometric Turbidity Units
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethylene
PID	Photoionization Detector
PIONEER	PIONEER Technologies Corporation
POC	Point of Compliance
PVC	Polyvinyl Chloride

Acronym	Explanation
QAPP	Quality Assurance Project Plan
QC	Quality Control
REC	Recognized Environmental Condition
Report	RI Data Gap Report
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
Site	Hardel Mutual Plywood Corporation Site
SL	Screening Level
SVOC	Semi-Volatile Organic Compound
SVP	Soil Vapor Probe
TEF	Toxicity Equivalence Factor
TPH	Total Petroleum Hydrocarbon
TPH-D	TPH in the Diesel Range
TPH-G	TPH in the Gasoline Range
TPH-HO	TPH in the Heavy Oil Range
ug/L	Micrograms per Liter
USEPA	United States Environmental Protection Agency
VCP	Voluntary Cleanup Program
VI	Vapor Intrusion
VOC	Volatile Organic Compound
WAC	Washington Administrative Code

SECTION 1: INTRODUCTION

1.1 Purpose

This Remedial Investigation (RI) Data Gap Report (Report) summarizes the investigation and evaluation results of the supplementary RI activities completed at the Hardel Mutual Plywood Corporation (Hardel) Site (Site) in support of the planned West Bay Yards redevelopment project. Even though the Site was successfully investigated and remediated to the Washington State Department of Ecology's (Ecology's) satisfaction under an Agreed Order (AO) between Ecology and Hardel (see Appendix A), supplementary RI data gap activities were conducted between June 2020 and May 2021 to further evaluate the Site's suitability for the planned mixed-use development. This Report (and the associated voluntary cleanup program [VCP] application) are submitted to provide the basis for having a technical consultation with Ecology and obtaining informal VCP opinions from Ecology.[2] The primary technical opinion sought from Ecology at this time is confirmation that the completed and planned work (i.e., the 2007 through 2012 AO work, the RI data gap activities presented in this Report, and the successful completion of future tasks outlined in this Report) will satisfy Model Toxics Control Act (MTCA) requirements applicable to the Site.

1.2 Location

The Hardel property is located at 1210 West Bay Drive NW, in Olympia, Washington, along the West Bay of Budd Inlet in the southern Puget Sound (see Figure 1). The 19.28-acre property includes approximately 7.5 acres of vacant upland area, which is the area of interest for this Report. The remainder of the property consists of Budd Inlet intertidal and subtidal areas. The property is located in a mixed-use commercial and residential area west of downtown Olympia.

1.3 Report Organization

The remainder of this Report is organized as follows:

- Section 2: Background Information
- Section 3: RI Data Gap Activities
- Section 4: RI Data Gap Results and Discussion
- Section 5: MTCA Next Steps
- Section 6: References

[2] It is anticipated that a formal VCP opinion will be requested by the West Bay Development Group, LLC for this Site when a Focused Feasibility Study (FS) and Cleanup Action Plan (CAP) are submitted to Ecology.

SECTION 2: BACKGROUND INFORMATION

A summary of key background information is presented in this section to provide context for the RI data gap investigation and evaluation activities that have been conducted.

2.1 Environmental Setting

2.1.1 Current and Future Land Use

Land use in the upland portion of the property was historically industrial and is currently vacant land awaiting redevelopment. The upland area is currently covered with crushed rock, asphalt, remnants of former building foundations, and vegetation. The current zoning for the upland area is Urban Waterfront (City of Olympia 2021).

West Bay Development Group, LLC purchased the property from Hardel in March 2021 and plans to construct a mixed-use development known as the West Bay Yards. This brownfield redevelopment project will transform a derelict industrial legacy property that has been unused for 25 years into a vibrant mixed-use development that provides urban housing, jobs, shoreline habitat restoration, and waterfront access. The redevelopment plans include (1) shoreline restoration, (2) outdoor public spaces (e.g., waterfront trail and kayak launches), (3) subsurface parking garages, (4) commercial retail, restaurants, and residential housing on the first floor of occupied spaces (i.e., "plaza level") and (5) residential housing on the floors above the plaza level. The schematic design for the planned redevelopment is included in Appendix B, and the "site plan" from the schematic design is shown in Figure 2. Construction is currently scheduled to begin by 2023.

Key components of the planned redevelopment for the purpose of this Report are:

- The current ground surface elevation for the overwhelming majority of the upland area is between 13 feet and 16 feet North American Vertical Datum of 1988 (NAVD88; see Appendix C).
- The top of bank elevation for the proposed development will be 17 feet NAVD88 (see Figure 2 and Appendix B). As a result, up to four feet of clean fill soil will be added on top of the current ground surface prior to constructing any buildings. This also means that potentially contaminated subsurface soil will not be inadvertently brought to the surface during future construction activities.
- The lowest floor of occupied commercial/residential spaces will be on the plaza level, which will have a base elevation of 26 feet NAVD88 (see Appendix B). In other words, there will be a significant distance between the top of the current ground surface and the floor of the lowest occupied spaces.
- The only structures between the top of bank at 17 feet NAVD88 and the plaza level at 26 feet NAVD88 will be subsurface parking garages (see Appendix B).
- In accordance with building, mechanical, and fire code requirements, the subsurface parking garages will have mechanical ventilation systems that (1) are separate from the heating, ventilation, and air conditioning (HVAC) systems used in the residential/commercial occupied spaces, (2) satisfy code-required air exchange requirements for an enclosed structure, and (3)

satisfy code-required vertical and horizontal separation distances between exhaust and fresh air intakes.[3]

2.1.2 Climate

The Site is located within the marine-influenced and relatively mild climate of the Puget Sound region. The current average annual precipitation for Olympia is approximately 51 inches, with most of the precipitation falling between October and April. The current average daily low and high temperatures are 41 and 60 degrees Fahrenheit, respectively (National Oceanic and Atmospheric Administration 2021).

2.1.3 Topography and Drainage

The current topography varies depending on the location within the property. The overwhelming majority of the upland area is relatively flat with elevations ranging from approximately 13 feet and 16 feet NAVD88. The upland shoreline consists of rip-rap and slopes downward to the north and east towards Budd Inlet. The westernmost portion of the upland area and the land west of the property slopes up towards the hillside above West Bay. For instance, the elevation of West Bay Drive to the west of the property ranges from approximately 25 feet to 28 feet NAVD88 (see Appendix C).

During former Hardel operations (and likely up until the 2010 interim action [IA] was completed), on-property stormwater was discharged to Budd Inlet "through approximately five outfalls" (Greylock Consulting LLC [Greylock] 2007, 2010). However, only limited portions of the former stormwater infrastructure remain, and the remaining infrastructure components have questionable functionality. Although several storm drains remain in the upland area, it is unlikely that the outflow systems for these storm drains are still fully intact. More importantly, the functionality of these storm drains are severely limited by the permeable surfaces located throughout most of the upland area (including a clean crushed concrete cover that was placed across the majority of the upland area during the 2010 IA [Greylock 2010; Ecology 2012a]). Therefore, it is expected that almost all of the on-property stormwater currently infiltrates to upland soil.

2.1.4 Geology

Although the regional geology is dominated by Quaternary ice age glacial deposits (e.g., sand and gravel aquifers associated with glacial outwash and low permeability glacial till deposits containing clay and silt), the geologic unit of interest for this Site is the fill unit. It is suspected that most of the upland portion of the property was originally created from the historical placement of fill from unknown sources in formerly intertidal and subtidal areas. A prominent source of the historical fill was apparently the soil generated from regrading the former bluffs along West Bay (Coast and Harbor Engineering 2016). Although a substantial portion of the fill material consists of sand and silty sand, the fill material is highly variable and also includes gravel, clay, silt, wood, brick, metal, and concrete (see Appendix D).

[3] Personal correspondence between Josh Gobel of Thomas Architecture Studios and Troy Bussey of PIONEER Technologies Corporation (PIONEER).

Notably, wood is a prevalent component of the fill material. Wood debris was encountered in 25 of the 33 RI data gap soil borings and significant subsurface wood layers were encountered in 13 of the 33 RI data gap soil borings (see Appendix D).[4] Many of the subsurface wood layers are likely indictive of remnant subsurface features installed to hold upland soil and structures in place (e.g., pilings). In some borings, a native silty sand layer and/or native silt layer were interpreted to be present beneath the fill material, although the transition between fill material and native material is difficult to discern since both contain similar soils (see Appendix D; Greylock 2007; Landau Associates, Inc. 2020).

2.1.5 Hydrogeology

The hydrogeologic unit of interest at the Site is the fill unit mentioned in the previous subsection. Shallow groundwater is present within the fill material in the upland area at approximately one to ten feet below ground surface (bgs), depending on location and time of year (see Table 1).[5] The direction of groundwater flow is generally towards the east into Budd Inlet, with a northeastern flow direction in the northern portion of the upland area (see Figure 3). These groundwater flow directions are consistent with AO investigation results (Greylock 2011). Groundwater in the fill unit is tidal influenced.[6] As a result, marine water mixing and hydraulic tidal dispersion are occurring in the hyporheic transition zone between fresh groundwater and marine surface water.

2.2 Overview of Operational History

The upland area has an industrial history of logging and lumber related businesses beginning sometime prior to 1924 (PIONEER 2020a). Between 1924 and 1951, the property was occupied by the Henry McCleary Timber Company, Olympia Harbor Lumber Company, Olympia Towing, and West Side Log Dump. From 1951 through 1996, Hardel operated a plywood manufacturing facility on the property. The footprints of historical operations associated with these businesses are shown on Figures 4 and 5. Hardel ended operations after a fire in 1996 severely damaged buildings on the property. All buildings were subsequently demolished. Concrete building foundations, floor slabs, and other former operational features were removed during the 2010 IA (Greylock 2010).

2.3 Overview of AO Investigation and Remediation Activities

Pursuant to 2007 AO #DE 4108 between Hardel and Ecology, investigation and remediation activities were completed by 2012 to assess and address releases from historical operations. Ecology-approved work completed under the AO included the MTCA RI, FS, IA, and CAP phases. Based on the nature of historical operations, and the results of sampling and analyses activities conducted between 2004 and

[4] The borings with significant subsurface wood layers were B2, B3, B8, B101/MW101, B102/MW102, B104/MW104, B2-C, B2-N, B2-E, B2-S, B202, PZ102, and PZ103.

[5] The RI data gap monitoring wells (MWs) are flush mounted, which means the top of casing is roughly half a foot deeper than the ground surface.

[6] Based on September 2007 Greylock groundwater elevation measurements (Greylock 2007), August 2021 PIONEER low-tide and high-tide groundwater elevation measurements (to be documented in a future report), and the high chloride concentrations in the August 2020 groundwater sample collected from MW104.

2007, total petroleum hydrocarbons (TPH) in the diesel range (TPH-D), TPH in the heavy oil range (TPH-HO), and the associated polycyclic aromatic hydrocarbons (PAHs) were identified as the constituents of concern (COCs) for the Site (Greylock 2009a). In addition, to address questions about chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans (dioxins/furans) from concerned citizens during multiple AO-related public comment periods, Ecology explicitly concluded that "dioxins/furans were determined to not be COCs at this Site" (Ecology 2012a). Remediation activities during the 2010 IA included excavation of approximately 23,331 tons of petroleum-impacted soil and debris that were disposed of at the Weyerhaeuser landfill in Cowlitz County, Washington (Greylock 2010).[7] Light non-aqueous phase liquid (LNAPL) was also removed during the IA excavation activities. Since "all soil contaminated with petroleum hydrocarbons and polyaromatic hydrocarbons (PAHs) above MTCA cleanup levels were removed from the Site as part of the interim action" and "confirmation groundwater monitoring results were below the MTCA cleanup levels for petroleum hydrocarbons and PAHs," Ecology determined in the CAP that "Hardel completed all required cleanup of soil, groundwater and sediment at the Hardel Mutual Plywood Site" (Ecology 2012a). In addition, Ecology stated in a 2012 letter (included as Appendix A) that Hardel had satisfied all AO requirements and "no additional remedial action is necessary at this Site unless new or different information becomes known" (Ecology 2012b).

Most of the AO RI and IA confirmational monitoring results remain relevant for current conditions, and were used to guide RI data gap sampling activities. A summary of all AO sampling locations that had at least one laboratory analysis is presented in Table 2. Locations of AO soil and groundwater samples are shown on Figure 4 and Figure 5, respectively. The relevant AO samples for current conditions are (1) the in-place 2004 through 2009 soil samples, (2) the in-place IA confirmational monitoring samples for soil (i.e., final excavation sidewall and bottom samples), and (3) the IA confirmational monitoring samples for groundwater (i.e., MW-2, MW-3, MW-6, and MW-10 through MW-15). The locations of in-place AO soil samples and AO MWs were used to inform RI data gap sampling locations. For example, since most of the AO soil and groundwater sampling locations were concentrated within the main historical operations footprint, many of the RI data gap soil and groundwater sampling locations were positioned between the main historical operations footprint and the shoreline in order to capture soil releases and/or groundwater transport from historical operations that might have been missed by the AO sampling design. In addition, the AO confirmational monitoring results for groundwater were explicitly incorporated into the RI data gap evaluation activities presented in this Report in order to provide a more holistic evaluation of groundwater quality in the upland area. Although the in-place AO soil sample results are not discussed further in this Report for simplicity reasons (since soil cleanup levels were achieved in all in-place AO soil samples), the in-place AO soil sample results will be presented and discussed as necessary in future reports (e.g., if the soil samples are being used to evaluate statistical compliance with soil cleanup levels).

[7] This total of removed soil and debris included approximately 28 tons of stained concrete.

2.4 Regulatory Context

As discussed in the previous section, the Site was cleaned up by 2012 under 2007 AO #DE 4108. All AO requirements were satisfied and no further action was necessary "unless new or different information becomes known" (Ecology 2012b). The Facility/Site ID for the Site is 75128579 and the Cleanup Site ID for the Site is 3704.

PIONEER completed a Phase I Environmental Site Assessment (ESA) and identified Recognized Environmental Conditions (RECs) in 2020 on behalf of West Bay Development Group, LLC prior to their March 2021 purchase of the property. PIONEER then conducted RI data gap activities between June 2020 and May 2021 as summarized in this Report. Based on RI data gap results and information submitted by Greylock to Ecology in November 2020 (when Hardel still owned the property), Ecology rescinded its 2012 no further action determination for the Site on August 17, 2021 (Ecology 2021c). It is expected that a no further action opinion will be requested from Ecology's VCP in conjunction with the future submittal of a Focused FS Report and CAP to Ecology.

2.5 Key Transport and Exposure Pathways

The following transport and exposure pathways were considered the key pathways for conservative screening purposes:

- The soil direct contact exposure pathways;
- The soil-to-groundwater transport pathway;
- The groundwater as drinking water exposure pathways;
- The groundwater-to-surface water transport pathway;
- The vapor intrusion (VI) transport and exposure pathways; and
- The methane gas transport and exposure pathways.

The presentation and evaluation of results in this Report is organized in the context of the aforementioned pathways. A preliminary evaluation of the exposure pathways based on data obtained to date is presented in the current conceptual site model (CSM; see Section 4.8).

Sediment exposure pathways are not a concern for this Site. Although bis-(2-ethylhexyl)phthalate and dioxins/furans were detected in one or more shoreline sediment samples during the 2007 RI at concentrations exceeding sediment screening levels (SLs), Ecology concluded in the CAP that (1) "sediment containing phthalates and dioxins/furans are not associated with historic operations at this Site" and (2) "there have been no documented uses of this Site that would have produced phthalates or dioxins/furans" (Ecology 2012a). In the case of bis-(2-ethylhexyl)phthalate, Ecology determined that "sediments in urban areas of Puget Sound frequently contain phthalates above the Washington Department of Ecology cleanup levels, which are set to protect aquatic organisms. Research shows that phthalates wind up in marine sediments and are pervasive in the environment because they are contained in hundreds of common products found in everyday life" (Ecology 2012a). In the case of dioxins/furans, Ecology determined in the CAP that "dioxins/furans are believed to originate from an offsite source and are not known to have originated from historic operations on the uplands of this Site.

There does not appear to be a direct linkage of dioxins/furans found in the intertidal sediment to the upland source area investigated in the remedial investigation of this Site. Dioxins/furans in sediments of Budd Inlet are believed to come from several upland sources including the former Cascade Pole facility" (Ecology 2012a). The RI data gap soil and groundwater results for dioxins/furans (see Section 4) further support Ecology's determination that the upland area is not a source for dioxins/furans in sediment. Furthermore, the minor bis-(2-ethylhexyl)phthalate and dioxins/furans concentrations in sediment will be capped by clean material as part of planned shoreline restoration activities (see Appendix B).

SECTION 3: RI DATA GAP ACTIVITIES

This section summarizes the RI data gap activities completed at the Site between June 2020 and May 2021 to supplement the results from AO RI and IA confirmational monitoring activities.

3.1 RI Data Gap Investigation Chronology

To date, the following RI data gap sampling events have been completed (see Table 2):

- June 2020 soil sampling and direct-push groundwater sampling (Phase II ESA);
- August 2020 soil sampling;
- January 2021 soil sampling and direct-push groundwater sampling; and
- August 2020, November 2020, January 2021, and May 2021 groundwater monitoring (GWM) events.

To date, PIONEER has completed the following RI data gap activities as part of the aforementioned sampling events:

- A total of 33 soil borings were advanced, logged, and field screened (i.e., B1 through B12, B101 through B107, B2-C, B2-N, B2-E, B2-S, and B2-W, B201 through B205, MW107, and PZ101 through PZ103);
- Soil samples were collected from 22 borings (i.e., B1 through B9, B101 through B107, B2-C, B2-N, B2-E, B2-S, B2-W, and B202);
- Direct-push groundwater samples were collected from nine borings (i.e., B1 through B6, B201, B202, and B204);
- Seven MWs were installed and developed (i.e., MW101 through MW107);[8]
- Three piezometers were installed (PZ101 through PZ103);
- Static water level measurements and LNAPL thickness measurements were obtained from installed MWs and piezometers during four GWM events;
- Synoptic static water level measurements were obtained from all MWs and piezometers during the May 2021 GWM event;
- Groundwater samples were collected from MWs during four GWM events; and
- Field methane soil gas concentrations were measured from soil vapor probes (SVPs) installed in two borings (i.e., B10 and B11).[9]

A summary of all RI data gap sampling locations that had at least one laboratory analysis is presented in Table 2. Boring logs for the 33 soil borings and construction details for the seven MWs and three piezometers are included in Appendix D. Locations of RI data gap soil and groundwater samples are shown on Figure 6 and Figure 7, respectively. In summary, the rationale for the sampling locations were as follows:

[8] MW101 through MW104 were installed in Borings B101 through B104, respectively. MW105 and MW106 were installed in Borings B203 and B205, respectively.

[9] An SVP was not installed in B12 as planned due to shallow groundwater.

- Borings B1 through B4, B7 through B12, and B101 through B107 were positioned to evaluate the Phase I ESA REC for historical fill material throughout the upland area. In addition, B1 through B4 and B101/MW101 through B104/MW104 were positioned between the main historical operations footprint and the shoreline in order to capture soil releases and/or groundwater transport from historical operations that might have been missed by the AO sampling design.
- Borings B5 and B6 were positioned to evaluate the Phase I ESA REC for the south-adjoining Reliable Steel site.
- Borings B2-C was co-located with B2 to confirm the TPH-D soil concentration at B2, and B2-N, B2-E, B2-S, and B2-W were positioned in cardinal directions around the B2 sampling location to delineate an elevated TPH-D soil concentration in B2.
- Borings B201 through B205 were positioned to evaluate elevated TPH-D, TPH-HO, and PAH concentrations in MW104 groundwater samples. In addition, MW105/B203 was positioned downgradient of B202 and MW104, and MW106 was positioned downgradient of B202.
- MW107 was positioned downgradient of MW101.
- PZ101 through PZ103 were positioned in the western portion of the upland area to improve the understanding of groundwater flow directions throughout the upland area.

3.2 Summary of Key Field Procedures

Key field activities to date have included (1) soil sampling, (2) MW and piezometer installation, development, and surveying, (3) groundwater monitoring and sampling, and (4) soil gas sampling for methane. These field activities were completed in general accordance with United States Environmental Protection Agency (USEPA)-approved Sampling and Analysis Plans (SAPs) and the Quality Assurance Project Plan (QAPP) prepared for the City of Olympia's USEPA brownfield assessment grant (PIONEER 2020b, 2020c, 2021) since the grant funded the Phase II ESA and the May 2021 investigation activities (e.g., installation of MW107 and PZ101 through PZ103 and the May 2021 GWM event). RI data gap activities that were not grant funded also followed the same SAP and QAPP methodologies. Components of the field procedures that are particularly relevant to the purpose of this Report are summarized in the following subsections.

3.2.1 Soil Sampling

Soil samples were collected continuously at direct-push locations using a 4-foot long, (2.25-inch outer diameter) GeoProbe® Macro Sampler fitted with disposable acetate liners. PIONEER field personnel visually classified the soil samples in accordance with the American Society of Testing and Materials (ASTM) Practice D2488, noted any visual or olfactory indicators of environmental contamination, and screened soil for the presence of ionizable volatile organic compounds (VOCs) using a photoionization detector (PID) equipped with a 10.6 eV lamp. Sub-samples for PID screening were typically collected at intervals of no more than two feet apart. PID screening was conducted by placing the sub-sample into a sealable Ziploc® bag, inserting the tip of the PID into the headspace of the bag, and recording the screening result. The PID detection limit was 0.1 part per million. The logged lithology, PID field screening results, and visual and olfactory observations are included on the soil boring logs in Appendix D.

PIONEER field personnel selected soil samples for laboratory analyses based on the interpreted worst-case location(s) within a given soil boring. Factors considered in the selection of soil sample intervals included PID field measurements, visual and olfactory observations, the nature and depth of fill material, and professional judgement. Soil samples for VOC and TPH in the gasoline range (TPH-G) analyses were collected first and in accordance with USEPA Method SW846-5035 by placing the soil sample into new, unpreserved 40-milliliter vials, which were immediately preserved by the lab upon arrival. Soil samples for non-VOC analyses were placed in unpreserved, 4-ounce, glass jars. Pre-cleaned sample containers supplied by the laboratory were used for collecting all samples.

3.2.2 MW and Piezometer Installation, Development, and Surveying

All MWs and piezometers were installed by a licensed Washington driller in accordance with Washington Administrative Code (WAC) 173-160 Part II. Construction details for the seven MWs and three piezometers are included in Appendix D.

All MWs were developed (the piezometers were not developed). MW development was conducted by over-pumping the MW with a surge block and check valve (i.e., foot pump) until the turbidity in the development water was less than 5 nephelometric turbidity units (NTU). If it was clearly not practical to continue development to reach the 5 NTU goal, then a development goal of 50 NTU was used instead. A calibrated field turbidity meter was used to measure the turbidity.

A licensed Washington surveyor established the vertical and horizontal location of the top of casing for all MWs and piezometers. The vertical elevation was surveyed to an accuracy of 0.01-foot NAVD88.

3.2.3 Groundwater Monitoring and Sampling

During each GWM event, PIONEER field personnel used an electronic interface probe to measure the static water level and any measurable LNAPL thickness in the on-site MWs and piezometers that had been previously installed. The depth-to-water and any LNAPL thickness were recorded to the nearest 0.01 foot from the top of the MW/piezometer casing.

PIONEER field personnel used the following low-flow purging procedures to purge water from each MW prior to sampling. A peristaltic pump, equipped with dedicated polyethylene tubing, was used to purge water from the MW. The tubing intake was typically positioned approximately two feet below the top of the MW screen or two feet below the water level, whichever was lower. A variable-frequency drive controller on the pump was used to limit the purging flow rate to less than one liter per minute. During purging, relative water levels were monitored with an interface probe or electronic water level indicator, and water quality parameters (i.e., pH, specific conductivity, turbidity, dissolved oxygen, temperature, and oxidation/reduction potential) were measured with a calibrated water quality meter to verify stabilization. In the event that water quality parameters did not stabilize, purging was considered complete after 60 minutes of continuous purging. Groundwater samples were collected immediately following purging without turning off the pumping system. If a MW was pumped dry before the sample could be collected, the groundwater sample was collected as soon as groundwater in the MW recharged.

The nine direct-push groundwater samples (B1 through B6, B201, B202, and B204) were collected from temporary MWs installed in soil borings. Temporary groundwater MWs were constructed with a 5-foot long, 1-inch diameter, 0.10-inch slotted polyvinyl chloride (PVC) screen and associated sand prepack and PVC risers. The temporary MWs were installed such that the screen intersected the depth where groundwater was encountered in a given boring. After gauging the depth to water and total well depth, the temporary MWs were purged using a peristaltic pump at low flow rates. Purging was conducted for 15 minutes or until the groundwater appeared relatively free of suspended sediment, whichever occurred first.

Pre-cleaned sample containers supplied by the laboratory were used for collecting all samples. Groundwater samples for VOC and TPH-G analyses were collected first and filled to a positive meniscus so that the containers did not contain any headspace. Samples for metals analyses were filtered in the field using a 0.45-micron filter.

3.2.4 Soil Gas Sampling for Methane

Field methane soil gas measurements were obtained from SVPs installed in B10 and B11. The SVPs were installed approximately one foot above groundwater, which was encountered at 4.5 feet and 3.5 feet in B10 and B11, respectively. The SVPs were constructed by (1) placing a six-inch long, 1-inch diameter, 0.10-inch slotted PVC screen in the open borehole, (2) attaching the screen to ¼-inch high density polyethylene tubing that was fed to the ground surface, (3) placing sand from the base of the screen to approximately six inches above the top of the screen, and (4) installing hydrated bentonite to the ground surface. Following installation, at least three SVP volumes of air were purged from each SVP using a GEM2000 landfill gas monitor and then the SVPs were sealed with rubber caps. On the next day, PIONEER field personnel used the GEM2000 to purge soil gas in each SVP, while documenting the concentrations of methane, oxygen, carbon dioxide, and differential pressure at each location. Peak methane concentrations were recorded at the beginning of SVP purging and sustained methane concentrations were recorded after 15 minutes of SVP purging.

3.3 Constituents of Interest

The initial constituents of interest (COIs) for RI data gap activities were (1) the COCs identified during the AO (i.e., TPH-D, TPH-HO, and PAHs; Greylock 2009a), and (2) other constituents that might reasonably be associated with the historical fill material and/or the south-adjoining Reliable Steel site RECs. Thus, the initial COIs included TPH-D, TPH-HO, TPH-G, semi-volatile organic compounds (SVOCs), PAHs, VOCs, dioxins/furans, polychlorinated biphenyls (PCBs), and Resource Conservation and Recovery Act metals. For ongoing GWM activities, the initial COI list was refined based on June 2020 and August 2020 soil and groundwater results. The current GWM COIs are TPH-D, TPH-HO, TPH-G, PAHs, select VOCs, arsenic, and silver (see Table 2).

3.4 Laboratory Analyses

Laboratory analyses were performed in general accordance with the USEPA-approved QAPP for the City of Olympia's USEPA brownfield assessment grant (PIONEER 2021b). The following analytical methods were used to analyze RI data gap samples:

- TPH by Ecology Method NWTPH-HCID
- TPH-D and TPH-HO by Ecology Method NWTPH-Dx
- Extractable Petroleum Hydrocarbons (EPH) by Ecology Method NWEPH
- PAHs and SVOCs by USEPA Method SW846-8270C
- TPH-G by Ecology Method NWTPH-Gx
- VOCs by USEPA Method SW846-8260D
- Dioxins/Furans by USEPA Method SW846-8290
- PCBs by USEPA Method SW846-8082
- Metals by USEPA Methods 200.8, 245.1, SW846-6020, SW846-7010, and SW846-7471
- Total Organic Carbon by USEPA Method 9060

Due to City of Olympia's USEPA brownfield assessment grant requirements and Hardel requirements (prior to Hardel selling the property), different laboratories were used for laboratory analyses of RI data gap soil and groundwater samples. Libby Environmental in Olympia, Washington (and any subcontracted laboratories) analyzed samples collected in June 2020 and May 2021, Anatek Labs in Moscow, Idaho (and any subcontracted laboratories) analyzed samples collected in August 2020, and Friedman and Bruya in Seattle, Washington (and any subcontracted laboratories) analyzed samples collected in November 2020 and January 2021. Laboratory analytical reports for each phase of the RI data gap activities are included in Appendix E.

Quality control (QC) was conducted and evaluated in general accordance with the USEPA-approved QAPP for the City of Olympia's USEPA brownfield assessment grant (PIONEER 2021b). The results for the field QC samples and the laboratory QC samples are presented in Appendix E. A cursory data quality review determined that the quality of the data obtained to date appears to be acceptable and usable for the purpose of the investigation activities.

SECTION 4: RI DATA GAP RESULTS AND DISCUSSION

This section presents and discusses the RI data gap results and AO confirmational monitoring results for groundwater (which are still relevant for assessing groundwater quality) relative to pathway-specific SLs. Laboratory analytical reports for all laboratory analyses of all RI data gap samples are included in Appendix E. The RI data gap soil results for constituents detected in at least one RI data gap soil or groundwater sample are presented in Table 3 relative to soil direct contact SLs and soil-to-groundwater SLs. The AO confirmational monitoring results for groundwater and the RI data gap groundwater results for constituents detected in at least one RI data gap soil or groundwater sample are presented in Table 4 relative to groundwater SLs. Even though PCBs were not detected in either soil or groundwater, RI data gap PCB results are also included in Tables 3 and 4 to make the PCB results more accessible to the public.

4.1 Screening Levels

Pathway-specific SLs were calculated for constituents detected in at least one RI data gap soil or groundwater sample. The SL calculations are presented in Appendix F, with the exception of preliminary soil VI SLs, which were established as defined in MTCA regulations. The following subsections summarize the methodology used to calculate the pathway-specific SLs.

4.1.1 Soil Direct Contact SLs

Soil direct contact SLs were calculated for an unrestricted land use scenario and a commercial/industrial land use scenario. With the exception of TPH, the soil direct contact SLs for an unrestricted land use scenario were Standard Method B soil cleanup levels calculated in accordance with WAC 173-340-740(3)(b)(iii)(B), subject to any necessary adjustments per WAC 173-340-740. With the exception of TPH, the soil direct contact SLs for a commercial/industrial land use scenario were Standard Method C soil cleanup levels calculated in accordance with WAC 173-340-745(5)(b)(iii)(B), subject to any necessary adjustments per WAC 173-340-745. The TPH soil direct contact SLs were values Ecology calculated for default TPH compositions when developing Method A soil cleanup levels (Ecology 2001a, 2001b).

4.1.2 Soil-to-Groundwater SLs

With the exception of TPH, the soil-to-groundwater SLs were calculated using the MTCA fixed parameter three-phase partitioning model in accordance with WAC 173-340-747(4), subject to (1) any necessary residual saturation adjustments required by WAC 173-340-747(10), and/or (2) any necessary adjustments per WAC 173-340-740. MTCA defaults in WAC 173-340-747(4) were used as the input parameters in the three-phase partitioning model calculations. Notably, the default fraction organic carbon value of 0.1% was used for conservative screening purposes, even though site-specific total organic carbon results (see Table 3) indicate that the site-specific fraction organic carbon concentration

is likely significantly higher than 0.1% in most Site soil (as expected based on lithologic data).[10] The groundwater SLs described in the next subsection were used as the target groundwater concentrations for the three-phase partitioning model calculations. The TPH soil-to-groundwater SLs were based on MTCA Method A soil cleanup levels, which in turn were based on the more stringent of the results from the four-phase partitioning model per WAC 173-340-747(6) and the residual soil saturation concentrations in Table 747-5 of MTCA regulations for default TPH compositions.

4.1.3 Groundwater SLs

The groundwater SLs were calculated as the more stringent of groundwater as drinking water SLs (for protection of the groundwater as drinking water exposure pathways) and surface water SLs (for protection of the groundwater-to-surface water transport pathway). With the exception of TPH, the groundwater as drinking water SLs were Standard Method B groundwater cleanup levels calculated in accordance with WAC 173-340-720(4)(b)(i) and WAC 173-340-720(4)(b)(iii), subject to any necessary adjustments per WAC 173-340-720. The TPH groundwater as drinking water SLs were MTCA Method A groundwater cleanup levels, which were based on values calculated for default TPH compositions in accordance with WAC 173-340-720(4)(b)(iii). The surface water SLs were Standard Method B surface water cleanup levels calculated in accordance with WAC 173-340-730(3)(b)(i) and 173-340-730(3)(b)(iii), subject to any necessary adjustments per WAC 173-340-730.

Although groundwater as drinking water SLs and surface water SLs were both included in the calculation of groundwater SLs for conservative screening purposes, groundwater SL exceedances need to be evaluated in the context of realistic exposure scenarios at the Site. The groundwater as drinking water SLs are extremely conservative for assessing protection of drinking water since (1) groundwater at the Site is not currently being used for drinking water and will not be used for drinking water in the planned redevelopment, (2) non-potable marine surface water is located immediately downgradient of Site groundwater, and (3) a drinking water well that complies with Chapter 173-160 WAC, Chapter 246-190 WAC, and standard water well construction practices could not be installed in Site groundwater because of the extremely shallow depth to water and the proximity to salt water. In other words, it is essentially impossible for future receptors to use shallow Site groundwater as a drinking water source. Similarly, surface water SLs are extremely conservative for assessing protection of surface water receptors because comparing groundwater results to surface water SLs unrealistically assumes that (1) marine aquatic organisms live in upland groundwater, and (2) recreators/fishers consume marine aquatic organisms obtained from upland groundwater.

[10] Total organic carbon analyses were performed on soil samples collected from Borings B4, B5, and B7. Even though the B4 and B7 samples contained slight amounts of TPH-HO, the B4 and B7 total organic carbon concentrations would still be significantly higher than 0.1% after subtracting out the TPH-HO concentrations (i.e., the B4 result would only be reduced from 1.4% to 1.3% and the B7 result would only be reduced from 3.4% to 3.3%).

4.1.4 Preliminary Vapor Intrusion SLs

Preliminary soil VI SLs and preliminary groundwater VI SLs for volatile constituents detected in at least one RI data gap soil or groundwater sample were established to conservatively screen existing soil and groundwater results. The preliminary soil VI SLs were established as defined in MTCA regulations. Specifically, the preliminary soil VI SLs for VOCs and TPH-G equal the soil-to-groundwater SLs (see Section 4.1.2) in accordance with WAC 173-340-740(3)(b)(iii)(C) and WAC 173-340-745(5)(b)(iii)(C). The preliminary soil VI SL for TPH-D is 10,000 milligrams per kilogram (mg/kg) as defined in WAC 173-340-740(3)(b)(iii)(C)(II) and WAC 173-340-745(5)(b)(iii)(C)(II). As shown in Appendix F, the preliminary groundwater VI SLs were calculated as the more stringent of the groundwater VI carcinogenic and non-carcinogenic values from the Ecology Cleanup Levels and Risk Calculation (CLARC) database (Ecology 2021a).

4.1.5 ASTM Methane Gas Decision Matrix

Field methane soil gas concentrations were evaluated in accordance with ASTM Designation E2993-16, Standard Guide for Evaluating Potential Methane Hazards as a Result of Methane in the Vadose Zone. The suggested default decision matrix for methane in soil gas and indoor air from this ASTM designation is presented in the following table.

Suggested Default Decision Matrix for Methane in Soil Gas and Indoor Air				
	Indoor Air Concentration			
Shallow Soil Gas Concentration	No Measurements Available	Methane Concentration < 0.01%	Methane Concentration 0.01% to < 1.25%	Methane Concentration > 1.25%
Methane Concentration <1.25% to 5%	No further action	No further action	No further action	Immediately notify authorities, recommend that owner/operator evaluate building
Methane Concentration > 5% to 30%	No further action unless pressure differential > 500 Pascals	No further action unless pressure differential > 500 Pascals	No further action unless pressure differential > 500 Pascals	
Methane Concentration > 30%	Collect indoor air data	Evaluate on a case-by-case basis	Evaluate on a case-by-case basis	

4.2 Soil Direct Contact Results and Discussion

A comparison of soil concentrations in RI data gap soil samples with soil direct contact SLs is presented in Table 3 and summarized in Figure 8. There were very few soil direct contact SL exceedances, with the only exceedances being:

- A TPH-D soil concentration of 41,000 mg/kg in the B2 soil sample slightly exceeded the soil direct contact SL for commercial/industrial land use.
- TPH-HO soil concentrations in the B3 and B2-C soil samples slightly exceeded the soil direct contact SL for unrestricted land use.

- Total carcinogenic PAHs (cPAHs) soil concentrations in the B1, B7, B2-W, and B202 soil samples exceeded the soil direct contact SL for unrestricted land use.

These soil direct contact SL exceedances in the RI data gap soil samples will be remediated to attain MTCA soil direct contact cleanup standards. Specifically, soil associated with the TPH-D exceedance at B2 (which is the only sample with an exceedance of a soil direct contact SL for commercial/industrial land use) will be excavated prior to redevelopment construction activities and disposed of at an off-site facility permitted to accept the waste. The placement of clean fill soil and the construction of buildings, paved roads, pavement, and other physical barriers across the upland area during the planned redevelopment will serve as a cap/cover over the current ground surface and address the soil direct contact pathway pursuant to WAC 173-340-740(6)(f).

Installing a cap/cover across the entire upland area is the best solution to address the known and possible exceedances of soil direct contact SLs for unrestricted land use. The cap/cover will obviously address the known minor TPH-HO and total cPAHs exceedances that are scattered across the upland area (in Borings B3, B2-C, B1, B7, B2-W, and B202). The cap/cover solution also eliminates the possibility for potentially contaminated subsurface soil to be inadvertently brought to the surface during future construction activities. However, the most important benefit of a cap/cover solution may be the presumptive remediation of upland soil that has not been sampled. Given the nature and extent of historical operations and the spatial distribution of the existing TPH-HO and total cPAHs soil direct contact SL exceedances, other minor soil direct contact SL exceedances for unrestricted land use are possible at other upland locations. It is also likely that urban background conditions contributed total cPAHs to the upland area at concentrations slightly exceeding the soil direct contact SL for unrestricted land use (PIONEER 2010). For instance, the assumption for the south-adjoining Reliable Steel site is that essentially all of the upland area has total cPAHs soil concentrations exceeding the proposed soil cleanup level (GeoEngineers 2013). While some of the total cPAHs exceedances on the Reliable Steel property are presumably related to historical Reliable Steel operations, urban background conditions likely contributed to the elevated total cPAHs concentrations in the surface soil on the Reliable Steel and Hardel properties.

4.3 Soil-to-Groundwater Results and Discussion

A comparison of soil concentrations in RI data gap soil samples with soil-to-groundwater SLs is presented in Table 3 and summarized in Figure 9. There were very few soil-to-groundwater SL exceedances, with the only exceedances being:

- Concentrations of TPH-D, TPH-G, benzene, ethylbenzene, acenaphthene, anthracene, fluorene, total naphthalenes, and silver in the B2 soil sample exceeded the soil-to-groundwater SLs.
- Concentrations of TPH-D, TPH-G, acenaphthene, anthracene, fluoranthene, fluorene, pyrene, total cPAHs, and total naphthalenes in the B202 soil sample exceeded the soil-to-groundwater SLs.
- TPH-HO soil concentrations in the B1, B3, and B2-C soil samples slightly exceeded the soil-to-groundwater SL.

- The total cPAHs soil concentration in the B7 soil sample slightly exceeded the soil-to-groundwater SL.

The B2 soil-to-groundwater SL exceedances are not a concern because there were no groundwater SL exceedances in the co-located B2 groundwater sample and the downgradient MW102 groundwater samples (see Table 4 and Figure 10). Furthermore, the soil associated with the B2 soil-to-groundwater SL exceedances will be removed as described in Section 4.2 (due to a TPH-D exceedance of the soil direct contact SL for commercial/industrial land use).

The soil-to-groundwater SL exceedances in the B202 saturated zone soil sample are likely associated with treated wood debris and do not pose a significant concern. A three-feet-thick wood layer that extended into the saturated zone and contained a strong hydrocarbon order was located immediately above the B202 soil sample. In addition, the composition and prevalence of certain PAHs in the B202 soil sample are indictive of treated wood as discussed in Section 4.4. Regardless of the source, the B202 soil exceedances have caused minimal impacts in groundwater. Although there were groundwater SL exceedances in the co-located B202 groundwater sample for all constituents with a soil-to-groundwater SL exceedance, with the exception of anthracene, there were no groundwater SL in downgradient groundwater locations B204 (with the exception of total cPAHs), B4, MW105, and MW106 (see Table 4 and Figure 10).

The minor TPH-HO soil-to-groundwater SL exceedances in B1, B3, and B2-C soil samples have not caused TPH-HO groundwater SL exceedances in the co-located B1, B3, and B2 groundwater samples or in the immediately downgradient MW101, MW103, and MW102 groundwater samples. Likewise, the minor total cPAHs soil-to-groundwater SL exceedances in the B7 soil sample have not caused total cPAHs groundwater SL exceedances in the nearby MW-2 and downgradient groundwater locations B2, MW102, B3, and MW103. Furthermore, no measurable LNAPL has been detected during any GWM events to date. If future GWM events continue to empirically demonstrate the lack of LNAPL on Site groundwater, then the TPH-HO residual saturation requirement could be satisfied empirically per WAC 173-340-747(10)(c), and the TPH-HO soil concentrations in B1, B3, and B2-C would no longer be considered soil-to-groundwater SL exceedances.

4.4 Groundwater Results and Discussion

A comparison of concentrations in the AO confirmational monitoring and RI data gap groundwater samples with groundwater SLs is presented in Table 4 and summarized in Figure 10. In addition, field water quality parameters obtained during RI data gap GWM events are shown in Table 5. There were very few groundwater SL exceedances, with the only exceedances being:

- Concentrations of TPH-D, TPH-HO, acenaphthene, fluoranthene, fluorene, pyrene, total cPAHs, and total naphthalenes in the B202 direct-push groundwater sample and most or all of the MW104 groundwater samples exceeded the groundwater SLs. In addition, the TPH-G concentration in the B202 groundwater sample and the total cPAHs concentration in the B204 groundwater sample located between B202 and MW104 exceeded the groundwater SLs.
- Arsenic concentrations in the August 2020, November 2020, and January 2021 MW101 groundwater samples and the August 2020 MW104 groundwater sample slightly exceeded the

groundwater SL. However, if the arsenic natural background groundwater concentration for the Puget Sound Basin is increased to 8 micrograms per liter (ug/L) as suggested in a recent draft Ecology document (Ecology 2021b), then the only arsenic SL exceedance in a MW would be the 13 ug/L arsenic concentration in the August 2020 MW101 sample.

- The ethylene dibromide (EDB) concentration in the B3 direct-push groundwater sample slightly exceeded the groundwater SL.
- The tetrachloroethylene (PCE) concentration in the B5 direct-push groundwater sample and the EDB and arsenic concentrations in the B6 direct-push groundwater sample slightly exceeded the groundwater SLs.
- The pyrene groundwater concentration in the December 2010 MW-15 sample slightly exceeded the groundwater SL.

The minor groundwater SL exceedances in the MW104 and B202 groundwater samples do not pose a significant concern because the exceedances are localized and are likely associated with treated wood debris. Localized treated wood debris appears to responsible for the groundwater SL exceedances in MW104 due to (1) the presence of wood within the MW104 screened interval, (2) the lack of any groundwater SL exceedances in adjacent sampling locations B4 and MW105, and (3) the clearly declining PAH concentrations in MW104 from the August 2020 GWM event to the January 2021 GWM event (as the MW becomes better developed). In the case of B202, a three-feet-thick wood layer that contained a strong hydrocarbon order was present in the B202 saturated zone. In addition, the composition and prevalence of certain PAHs (i.e., phenanthrene, fluoranthene, pyrene, fluorene, naphthalenes, acenaphthene, anthracene, and cPAHs) in the MW104 and B202 groundwater samples (and the B202 soil sample) are indictive of treated wood (West et al. 2019).[11] More importantly, the groundwater SL exceedances in the MW104 and B202 groundwater samples are limited in extent. There were no groundwater SL exceedances immediately adjacent to or downgradient of MW104 in B4 or MW105. Likewise, there were no groundwater SL exceedances downgradient of B202 in B204 (with the exception of total cPAHs), B4, MW105, or MW106.

The other groundwater SL exceedances are insignificant and/or attributable to the Reliable Steel site for the following reasons:

- The slight arsenic groundwater SL exceedances in MW101 groundwater samples and the August 2020 MW104 groundwater sample were likely due to wood debris, which can alter the localized geochemical conditions and cause additional arsenic leaching from soil that has natural background arsenic concentrations. Wood was present in the MW101 and MW104 soil borings at depths that are within the MW101 and MW104 screened intervals. More importantly, there were no arsenic groundwater SL exceedances in MW107 and MW105, which are located closely downgradient of MW101 and MW104, respectively. In addition, there were no arsenic groundwater SL exceedances in the MW104 samples from the November 2020 and January 2021 GWM events.

[11] The soil sample collected from B104/MW104 was not analyzed for PAHs.

- The slight EDB groundwater SL exceedance in the B3 sample appears to be an unrepresentative artifact from direct-push groundwater sampling since EDB was not detected in the three subsequent groundwater samples collected to date from the adjacent MW103.
- The slight PCE, EDB, and arsenic groundwater SL exceedances in the B5 and B6 locations along the boundary of the south-adjoining Reliable Steel site are attributable to the Reliable Steel site for the following reasons:
    - The Reliable Steel building located immediately south of sampling locations B5 and B6 is a likely source of the B5 and B6 groundwater SL exceedances since it was historically used as a paint shop (GeoEngineers 2013). In addition, there has been obvious trespasser use inside the remaining paint shop building shell for many years.
    - The groundwater flow direction near the former paint shop and the B5 and B6 sampling locations is to the northeast/east towards the Hardel Site (GeoEngineers 2013).
    - Potential Reliable Steel releases in the vicinity of the former paint shop have not been adequately characterized (e.g., no groundwater samples were collected within or downgradient of the former paint shop, soil samples collected within the former paint shop were not analyzed for VOCs [GeoEngineers 2013]).
    - The B5 and B6 groundwater samples were positioned on the Reliable Steel property line in order to assess potential groundwater impacts migrating from Reliable Steel (e.g., former paint shop).
    - There were no historical Hardel operations proximate to sampling locations B5 and B6 (TetraTech 1999; PIONEER 2020a). In addition, there were no PCE, EDB, or arsenic detections in the co-located B5 and B6 soil samples, with the exception of an arsenic detection below the Puget Sound natural background soil concentration (Ecology 1994) in the B5 soil sample.
- The slight pyrene groundwater SL exceedance in the December 2010 MW-15 sample was not replicated in MW-15 groundwater samples collected during the three subsequent 2011 GWM events. In addition, there were no pyrene exceedances downgradient or cross-gradient of MW-15 at MW-13, MW-14, B1 through B3, MW101 through MW103, or MW107. Thus, the December 2010 pyrene concentrations appears to be an unrepresentative artifact of the initial MW-15 sampling (prior to additional MW development during subsequent GWM events).

There have been no groundwater SL exceedances in any of the five downgradient-most MWs to date (i.e., MW102, MW103, MW105, MW106, and MW107). Thus, the few minor and localized groundwater impacts in the interior of the upland area are not causing unacceptable impacts in downgradient surface water. These five MWs could potentially serve as the conditional point of compliance (POC) for groundwater in accordance with WAC 173-340-720(8)(c). Additional GWM events are planned to confirm the lack of groundwater SLs in these potential conditional POC MWs (see Section 5).

4.5 Vapor Intrusion Results and Discussion

The evaluation of the VI pathway was conducted in two steps. The first step consisted of comparing existing soil and groundwater results with preliminary soil VI SLs and preliminary groundwater VI SLs, respectively, to identify potential VI locations of concern. A comparison of soil concentrations in the RI data gap soil samples with preliminary soil VI SLs is presented in Table 6A, and a comparison of groundwater concentrations in the AO confirmational monitoring and RI data gap groundwater samples

with preliminary groundwater VI SLs is presented in Table 6B. The results of these comparisons are summarized in Figure 11. There were very few exceedances of preliminary soil VI SLs or preliminary groundwater VI SLs, with the only exceedances being:

- TPH-D, TPH-G, benzene, and ethylbenzene soil concentrations in the B2 soil sample exceeded the preliminary soil VI SLs.
- TPH-G and naphthalene concentrations in the B202 soil and groundwater samples exceeded the preliminary soil and groundwater VI SLs. In addition, the TPH-D concentration in the B202 groundwater sample exceeded the preliminary groundwater VI SL.
- TPH-D and naphthalene concentrations in all MW104 groundwater samples exceeded the preliminary groundwater VI SLs.
- Naphthalene concentrations in one or two groundwater samples collected from AO MWs MW-2, MW-11, and MW-13 exceeded the preliminary groundwater VI SL.

Since all of the preliminary soil and groundwater VI SL exceedances are for petroleum constituents, the second step of the VI pathway evaluation consisted of comparing the minimum vertical separation distance for each preliminary soil or groundwater VI SL exceedance with the separation distance screening criteria in Ecology's "Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion" implementation memo (Ecology 2016). Ecology's 2016 memo was based in large part on USEPA's 2015 VI guidance, which states "the potential for PVI [petroleum VI] from dissolved PHC [petroleum hydrocarbon] contaminant plumes is typically limited to sites where there are high concentrations of dissolved contaminants or the plume is in direct contact with a building foundation, basement, or slab" (USEPA 2015). USEPA's 2015 guidance and Ecology's 2016 memo both utilize the vertical separation distance between the lowest point of an occupied building and the highest vertical extent of contamination for initially assessing the petroleum VI pathway. As discussed in Section 2.1.1, there will be a significant distance between the top of the current ground surface (generally between 13 feet and 16 feet NAVD88) and the floor of the lowest occupied spaces on the plaza level (26 feet NAVD88). For each sample location identified during first step of the VI pathway evaluation, a conservative minimum vertical separation distance between the bottom of the plaza level at 26 feet NAVD and the top of the soil/groundwater sample was calculated (see Table 7 and Figure 11). The planned subsurface parking garages were included in the calculated vertical separation distance since (1) no receptors will be living or working in the parking garages, (2) the attenuation in parking garage air is expected to be greater than the attenuation in soil gas, and (3) the concentrations of petroleum vapors in the parking garage air from vehicle use and storage will be substantially greater than the concentrations of petroleum vapors from VI.

As shown in Table 7, all of the vertical separation distances for samples with a preliminary soil or groundwater VI SL exceedances are larger than the applicable criterion in Ecology's 2016 memo, with the exception of the B2 soil sample, which has a slightly shorter vertical separation distance than the applicable criterion. However, the soil associated with the B2 preliminary soil VI SL exceedances will be removed as described in Section 4.2 (due to a TPH-D exceedance of the soil direct contact SL for commercial/industrial land use). Thus, no additional VI investigation, evaluation, or remediation

activities are needed for the Site and VI will not present an unacceptable risk to future residents or commercial workers in the planned redevelopment.

4.6 Methane Gas Results and Discussion

The June 2020 field methane soil gas measurements obtained from the B10 and B11 SVPs are presented in the following table below. Atmospheric pressure at the time of sampling was 30.04 inches mercury.

Measurement	Methane (%)	Carbon Dioxide (%)	Oxygen (%)	Differential Pressure (inches mercury)	Differential Pressure (Pascals)
Sustained B10 Reading	0.9%	3.2%	17.2%	+0.03	+102
Peak B10 Reading	8.0%	3.3%	6.1%	+0.03	+102
Sustained B11 Reading	21.6%	5.7%	0.0%	+0.03	+102
Peak B11 Readings	23.0%	5.7%	0.0%	+0.03	+102

Based on the measured results in B10 and B11 SVPs (i.e., methane soil gas concentrations were less than 30% and differential pressures were less than 500 Pascals), no further action is recommended in ASTM Designation E2993-16 with respect to a potential methane hazard for future buildings (see decision matrix in Section 4.1.5). However, given the amount of wood debris in the subsurface, the relatively high methane concentration in B11, and the limited nature of the methane investigation activities to date, additional field methane investigations are planned now that the redevelopment schematic design has been prepared. Proposed SVPs locations for field methane soil gas measurements are shown on Figure 12. As part of the evaluation of these additional field methane measurements, it should be considered that potential methane gas transport to the air within subsurface parking garages in the planned redevelopment will likely be decreased by (1) the additional fill material that will raise the top of bank elevation to 17 feet NAVD88, and (2) the code-required air exchange requirements for an enclosed structure that will apply to the parking garages.

4.7 Dioxins/Furans and PCBs

Although Ecology previously concluded that dioxins/furans and PCBs were not a concern at this Site, additional RI data gap sampling of dioxins/furans and PCBs was conducted in response to public concerns about the potential presence of elevated dioxins/furans and PCBs in historical fill material at the Site. Specifically, seven soil samples (i.e., B101 through B107) and four groundwater samples (MW101 through MW104 during the August 2020 GWM event) were collected. Dioxins/furans were detected at concentrations typical of background concentrations, and PCBs were not detected in any RI data gap soil or groundwater sample. As presented in Section 4.2, 4.3, and 4.4, there were no dioxins/furans or total PCBs exceedances of soil direct contact SLs, soil-to-groundwater SLs, or groundwater SLs. Thus, the RI data gap results for dioxins/furans and PCBs further confirm the previous Ecology conclusion that dioxins/furans and PCBs are not a concern at this Site.

4.8 Current Conceptual Site Model

The current CSM for the Site was developed based on a review of previous Site documents and the RI data gap results presented and discussed in this Report. The CSM includes a high level summary of the nature and extent of Site contamination, current constituents of potential concern (COPCs), conceptual fate and transport elements, and exposure pathway elements. The CSM will be updated as necessary when new information is obtained.

4.8.1 Nature and Extent of Site Contamination Summary

Based on existing information and RI data gap results, the nature and extent of Site contamination is summarized as follows:

- The 2010 IA (which included removal of contaminated soil and debris, stained concrete, and LNAPL) completely addressed all soil and groundwater contamination within and immediately downgradient of the IA excavation boundaries (see Figures 4 and 5).
- The Site is relatively clean, which is expected given the size and scope of the 2010 IA, the results from IA confirmational monitoring for soil and groundwater, and Ecology's 2012 AO satisfaction letter and no further action determination (Ecology 2012b).
- However, some minor SL exceedances are present sporadically in soil and groundwater in the interior of the upland area (outside of the 2010 IA excavation boundaries), which is not surprising given the size and duration of historical operations and the presence of fill material (e.g., wood debris).
- The B2 soil sample is only Site location with a constituent concentration that exceeds the soil direct contact SL for commercial/industrial land use. The soil associated with the B2 soil sample will be removed as described in Section 4.2.
- All SL exceedances are from petroleum-related constituents, with the exception of (1) the slight arsenic groundwater SL exceedances in MW101 and MW104, (2) a slight silver soil-to-groundwater exceedance in the B2 soil sample, and (3) the slight PCE and arsenic groundwater SL exceedances in B5 and B6, respectively, that are attributable to the Reliable Steel site.
- Although Site soil and groundwater have been extensively characterized during AO and RI data gap activities, it is possible that other minor petroleum-related exceedances may be present in the interior of the upland area as a result of historical operations or treated wood debris. In addition, slight total cPAHs soil SL direct contact exceedances from urban background (PIONEER 2010) and/or slight arsenic groundwater SL exceedances from wood debris may be present in other locations within the interior of the upland area.
- Although there are scattered and minor groundwater SL exceedances within or downgradient of the main historical operations footprint, there have been no groundwater SL exceedances in any of the five potential conditional POC MWs located between the main historical operations footprint and the shoreline (i.e., MW102, MW103, MW105, MW106, and MW107).
- The Site is suitable for the planned mixed-use redevelopment following the removal of soil associated with the B2 soil samples and the planned placement of clean fill soil across the upland area (see Section 4.2).

4.8.2 Current COPCs

A constituent detected during RI data gap activities was identified as a current COPC if any of the following criteria were met for that constituent:

- The concentration in any RI data gap soil sample exceeded a soil direct contact SL or the soil-to-groundwater SL;
- The concentration in any RI data gap groundwater sample exceeded the groundwater SL; or
- The concentration in any RI data gap soil sample exceeded the preliminary soil VI SL and the vertical separation distance associated with that sample was less than the applicable Ecology criterion.[12]

Based on the above criteria, almost all of the current COPCs are petroleum-related constituents (i.e., TPH-D, TPH-G, TPH-HO, benzene, ethylbenzene, EDB, acenaphthene, anthracene, fluoranthene, fluorene, pyrene, total cPAHs, and total naphthalenes). The other current COPCs are PCE, arsenic, and silver. However, as discussed in Section 4.4, the only PCE SL exceedance (a slight groundwater SL exceedance in the B5 direct-push groundwater sample) is attributable to the Reliable Steel site. Similarly, as discussed in Section 4.4, the only arsenic SL exceedances (a few slight arsenic groundwater SL exceedances) are localized and insignificant and/or attributable to the Reliable Steel site. The soil associated with the only silver SL exceedance (a slight soil-to-groundwater SL exceedance in the B2 soil sample) will be removed as described in Section 4.2.

4.8.3 Conceptual Fate and Transport Elements

Key conceptual fate and transport elements for the Site include:

- In general terms, petroleum constituents are typically amenable to natural biodegradation and attenuation. Thus, it is expected that the petroleum concentrations of petroleum-related constituents will decrease over time, although the time frame will generally be longer for higher molecular weight compounds.
- The petroleum constituents are weathered since all petroleum releases at the Site are at least 25 years old (historical operations ceased in 1996), and it is possible that some of the constituents detected in the TPH analyses are actually less toxic polar metabolites from biodegradation (Zemo et al. 2017).
- Wood is a prevalent component of the fill material, and subsurface wood debris will likely continue to serve as a potential source of arsenic groundwater concentrations slightly exceeding the groundwater SL and methane gas.
- The lack of any groundwater SL exceedances to date in the five potential conditional POC MWs (i.e., MW102, MW103, MW105, MW106, and MW107) have demonstrated that the localized upland groundwater impacts are not impacting downgradient surface water in West Bay.
- Hydraulic tidal dispersion and favorable geochemical conditions for attenuation (e.g., increased dissolved oxygen) from marine water mixing in the hyporheic transition zone provide additional attenuation of constituents before groundwater discharges to West Bay surface water.

[12] The B2 soil sample was the only sample that met this third criterion.

4.8.4 Complete and Potentially Complete Exposure Pathways

The USEPA defines an exposure pathway as "the course a chemical or pollutant takes from the source to the organism exposed" and an exposure route as "the way a chemical or pollutant enters an organism after contact" (USEPA 1989). For an exposure pathway to be complete, all four of the following elements must be present: (1) an on-site constituent source, (2) a migration/transport route, (3) a potentially exposed human or ecological receptor, and (4) a route of exposure (e.g., ingestion, dermal contact, inhalation). If any one of the four elements is absent, then the pathway is considered incomplete, and there is no exposure or risk associated with the pathway.

Based on existing data and information, the exposure pathways that are currently considered complete or potentially complete at the Site are:

- Incidental ingestion, dermal contact, and inhalation of particulates from surface soil by current trespassers, current and future remediation workers, future redevelopment workers, and future utility workers;
- Incidental ingestion, dermal contact, and inhalation of particulates from subsurface soil by current and future remediation workers, future redevelopment workers, and future utility workers;
- Dermal contact with groundwater by current and future remediation workers, future redevelopment workers, and future utility workers;
- Absorption and bioaccumulation of any constituents in Site groundwater discharged to West Bay by current and future marine aquatic organisms;
- Incidental ingestion and dermal contact with Site groundwater discharged to West Bay and consumption of marine aquatic organisms by current and future recreators/fishers;
- Inhalation of indoor air vapors by future residents and future commercial workers on the first floor of occupied spaces (i.e., plaza level) in the planned redevelopment; and
- A hazard associated with potential methane gas generation and transport to the air within subsurface parking garages in the planned redevelopment.

A pathway that is complete or potentially complete does not necessarily pose an unacceptable risk to human health or the environment. For instance, since groundwater SL exceedances have been delineated in MWs located upgradient of West Bay surface water, Site groundwater does not pose an unacceptable risk to surface water receptors. Likewise, based on the evaluation results presented in Section 4.5, the potentially complete VI pathways do not pose an unacceptable risk to human health.

4.8.5 Incomplete Exposure Pathways

Based on existing data and information, the following exposure pathways are currently considered incomplete for the following reasons:

- Incidental ingestion, dermal contact, and inhalation of particulates from surface soil are incomplete pathways for future residents, future commercial workers, and future upland recreators because the clean fill soil, buildings, paved roads, pavement, and other physical barriers installed during the planned redevelopment will serve as a cap/cover over the current ground surface.

- Incidental ingestion, dermal contact, and inhalation of particulates from subsurface soil are incomplete pathways for current trespassers, future residents, future commercial workers, and future upland recreators because these receptors do not have access to subsurface soil at the Site.
- Ingestion of groundwater is an incomplete pathway for all receptors because Site groundwater is not currently used for drinking water and it is essentially impossible for Site groundwater to be used as drinking water in the future (see Section 4.1.3).
- Dermal contact with groundwater is an incomplete pathway for current trespassers, future residents, future commercial workers, and future upland recreators because these receptors do not have access to Site groundwater.
- Inhalation of indoor air vapors is an incomplete pathway for current trespassers, current and future remediation workers, future redevelopment workers, future utility workers, and future upland recreators because these receptors are outside.

4.8.6 Terrestrial Ecological Evaluation

The Site is excluded from a terrestrial ecological evaluation in accordance with WAC 173-340-7491(1)(b) because the upland area was previously developed for industrial use and the planned redevelopment will cover the upland area with buildings, paved roads, pavement, and other physical barriers that will prevent plants or wildlife from being exposed to soil contamination.

SECTION 5: MTCA NEXT STEPS

This section presents an overview of the current schedule, a probable recommend cleanup action alternative for the Site, and information about the requested Ecology VCP consultation.

5.1 Current Schedule

The current conceptual schedule for the additional RI data gap activities mentioned in Section 4 (i.e., additional GWM events, additional field methane soil gas measurements), MTCA FS/CAP documentation, and the start of remediation/redevelopment is as follows:

- 3rd quarter of 2021:
  - Conduct quarterly GWM event
  - Submit this Report and a VCP application to Ecology
  - Meet with Ecology to discuss informal VCP technical consultation
  - Install proposed SVPs (see Figure 12) and measure field methane soil gas concentrations
- 4th quarter of 2021: Conduct quarterly GWM event
- 1st quarter of 2022: Conduct quarterly GWM event
- 3rd quarter of 2022: Submit draft Focused FS Report (that includes documentation of the remaining RI data gap activities outlined above), draft CAP, and request for formal VCP opinion to Ecology
- 1st quarter of 2023: Begin implementing remediation activities and begin constructing planned redevelopment

Note that the current GWM goal is to obtain four quarters of groundwater results from the five potential conditional POC MWs (i.e., MW102, MW103, MW105, MW106, and MW107). Since four quarters of groundwater results have already been obtained from MW102, MW102 is not scheduled to be sampled again as part of RI data gap activities. Likewise, if there are no groundwater SL exceedances in MW103 and MW105 through MW107 during future GWM events, MW103 will only be sampled one more time, MW105 and MW106 will only be sampled two more times, and MW107 will only be sampled three more times.

5.2 Probable Recommended Cleanup Action Alternative

Although it is premature to select a cleanup action alternative, it is not premature to start thinking about likely cleanup action alternatives to be considered in a Focused FS Report. As discussed in this Report, the soil and groundwater SL exceedances identified during RI data gap activities are minor in terms of magnitude and limited in terms of extent. However, the scattered nature of the existing SL exceedances as well as the potential for additional undiscovered minor SL exceedances associated with historical operations, treated wood debris, urban background (i.e., total cPAHs in soil), and untreated wood debris (i.e., arsenic in groundwater and methane in soil gas) within the upland area make it very challenging to achieve soil and groundwater SL exceedances for unrestricted land uses within the standard points of compliance. In reality, a substantial amount of soil and wood would likely need to be

excavated in order to ensure achievement of soil and groundwater SL exceedances for unrestricted land uses within the standard points of compliance. A cleanup action alternative that includes such a substantial excavation would most likely not use permanent solutions to the maximum extent practicable, which is a key MTCA remedy selection criterion. However, a cleanup action alternative that includes the 2010 IA, the B2 soil removal discussed in Section 4.2, and the cap/cover discussed in Section 4.2 could satisfy all MTCA remedy selection criteria. Thus, a probable recommended cleanup action alternative for the Site would consist of the following remedial components:

- The 2010 IA;
- The B2 soil removal described in Section 4.2;
- The cap/cover described in Section 4.2 (i.e., the placement of clean fill soil and the construction of buildings, paved roads, pavement, and other physical barriers across the upland area);
- Monitoring and maintenance of the cap/cover;
- Engineering controls to protect future receptors during and after remediation/redevelopment;[13]
- An environmental covenant to prohibit the use of Site groundwater as drinking water;
- Monitored natural attenuation of petroleum constituents in groundwater at conditional POC MWs MW102, MW103, MW105, MW106, and MW107, if determined to be necessary based on the results from the additional planned GWM events; and
- Methane monitoring and/or mitigation if determined to be necessary based on the results obtained from the additional planned field methane soil gas measurements.

5.3 Requested Ecology VCP Consultation

Via the enclosed VCP application, a technical consultation is requested to obtain informal opinions from Ecology. The primary technical opinion sought from Ecology at this time is confirmation that the completed and planned work (i.e., the 2007 through 2012 AO work, the RI data gap activities presented in this Report, and the successful completion of future tasks outlined in this Report) will satisfy MTCA requirements applicable to the Site. Specifically, Ecology's input and opinion is requested regarding:

- The adequacy of existing AO and RI data gap results;
- The adequacy of the remaining proposed RI data gap activities (i.e., additional GWM events and additional field methane measurements);
- The conceptual schedule outlined in Section 5.1;
- MTCA documentation expectations for this Site given the extensive reporting under the AO, the no further action determination under the AO, and submittal of this Report; and
- The probable recommended cleanup action alternative outlined in Section 5.2.

[13] Engineering controls would include items such as health and safety requirements, site controls, dust controls, preparation and use of a soil materials and management plan for any post-remediation excavations, and preparation and use of a groundwater management plan for any post-remediation dewatering.

SECTION 6: REFERENCES

City of Olympia. 2021. 2021 Zoning Map. June.

Coast and Harbor Engineering. 2016. City of Olympia West Bay Environmental Restoration Assessment, Final Report. February 26.

Ecology. 1994. Natural Background Soil Metals Concentrations in Washington State, Publication No. 94-115. October.

Ecology. 2001a. Memorandum from Pete Kmet to Interested Persons with the subject of "Calculations for Table 740-1; Method A Soil Cleanup Levels for Unrestricted Land Uses." February 9.

Ecology. 2001b. Memorandum from Pete Kmet to Interested Persons with the subject of "Calculations for Table 745-1; Method A Soil Cleanup Levels for Commercial/Industrial Land Uses." February 9.

Ecology. 2001c. Concise Explanatory Statement for the Amendments to the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC. February 12.

Ecology. 2012a. Final Cleanup Action Plan. Hardel Mutual Plywood. Thurston County, Washington. April.

Ecology. 2012b. Satisfaction of Agreed Order No. DE 4108: Hardel Mutual Plywood, FS #75128579. August 22.

Ecology. 2016. Updated Process for Initially Assessing the Potential for Petroleum Vapor Intrusion. Implementation Memorandum No. 14. March 31.

Ecology. 2021a. Toxics Cleanup Program's Cleanup Levels and Risk Calculations database, https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx, accessed February.

Ecology. 2021b. Natural Background Groundwater Arsenic Concentrations in Washington State: Results of a Study. Draft for Public Comment. July.

Ecology. 2021c. Letter from Rebecca Lawson to Brandon Smith with the subject of "Rescission of No Further Action (NFA) Status for the following Site: Site Name: Hardel Mutual Plywood, Site Address: 1210 W Bay Dr. NW, Olympia, Thurston County, WA 98502." August 17.

GeoEngineers. 2013. Ecology Draft Final Remedial Investigation/Feasibility Study Report. Former Reliable Steel Site. 1218 West Bay Drive NW, Olympia, Washington. July 18.

Greylock. 2007. Remedial Investigation Report. Former Hardel Plywood Site. December 17.

Greylock. 2009a. Feasibility Study. Former Hardel Plywood Site. May 8.

Greylock. 2009b. Supplemental Subsurface Investigation. Former Hardel Plywood Site. November 4.

Greylock. 2010. Interim Action Closure Report. Former Hardel Mutual Plywood Site. December.

Greylock. 2011. Post-Construction Groundwater Monitoring Summary of Four Quarters. Former Hardel Mutual Plywood Site. November 28.

Landau Associates, Inc. 2020. Preliminary Geotechnical Engineering Recommendations Technical Memorandum. West Bay Yards. Olympia, Washington. August 27.

National Oceanic and Atmospheric Administration. 2021. National Centers for Environmental Information. LCD Annual Publication for 2020 for Olympia, Washington. May.

PIONEER. 2010. Site Boundary Technical Memorandum for the East Bay Redevelopment Site. November.

PIONEER. 2020a. Phase I Environmental Site Assessment. Hardel Mutual Plywood Corporation. 1210 West Bay Drive NW. Olympia, Washington. February.

PIONEER. 2020b. Quality Assurance Project Plan for the City of Olympia's Brownfield Assessment Grant. March.

PIONEER. 2020c. Sampling and Analysis Plan. Hardel Mutual Plywood Corporation. 1210 West Bay Drive NW. Olympia, Washington. April.

PIONEER. 2020d. Phase II Environmental Site Assessment. Hardel Mutual Plywood Corporation. 1210 West Bay Drive NW. Olympia, Washington. October.

PIONEER. 2020e. Due Diligence Investigation Status Update. Hardel Mutual Plywood Corporation. 1210 West Bay Drive NW. Olympia, Washington. October 13.

PIONEER. 2021. RI Data Gaps Investigation Work Plan. Hardel Mutual Plywood Corporation. 1210 West Bay Drive NW. Olympia, Washington. March.

Stemen Environmental, Inc. 2004. Phase II ESA Report, Former Hardel Mutual Plywood Waterfront Property. July.

TetraTech. 1999. Phase I Environmental Site Assessment. Hardel Mutual Plywood Waterfront Property, 1210 N.W. West Bay Drive, Olympia, Washington. 1999.

USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS): Volume I. Human Health Evaluation Manual (Part A). Publication No. EPA/540/1-89/002. December.

USEPA. 2015. Technical Guide for Addressing Petroleum Vapor Intrusion at Leaking Underground Storage Tank Sites. Publication No. EPA 510-R-15-001. June.

West et al. 2019. A Comparison of the Relative Abundance of Polycyclic Aromatic Hydrocarbon (PAH) Chemicals in Creosote-Treated Wood Pilings (CTWP), Low-Density Polyethylene Passive Samplers, and Herring Embryos Exposed to CTWPs, page 49 in 2018 Salish Sea Toxics Monitoring Synthesis: A Selection of Research.

Zemo et al. 2017. Life Cycle of Petroleum Biodegradation Metabolite Plumes, and Implications for Risk Management at Fuel Release Sites, Integrated Environmental Assessment and Management, Volume 13, Number 4, pp. 714-727.

Figures

PIONEER TECHNOLOGIES CORPORATION

Location Map
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 1

Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 1_Site Location Map.mxd; Author: MK; Date Saved: 8/17/2021

PIONEER TECHNOLOGIES CORPORATION

Redevelopment Overview
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 2

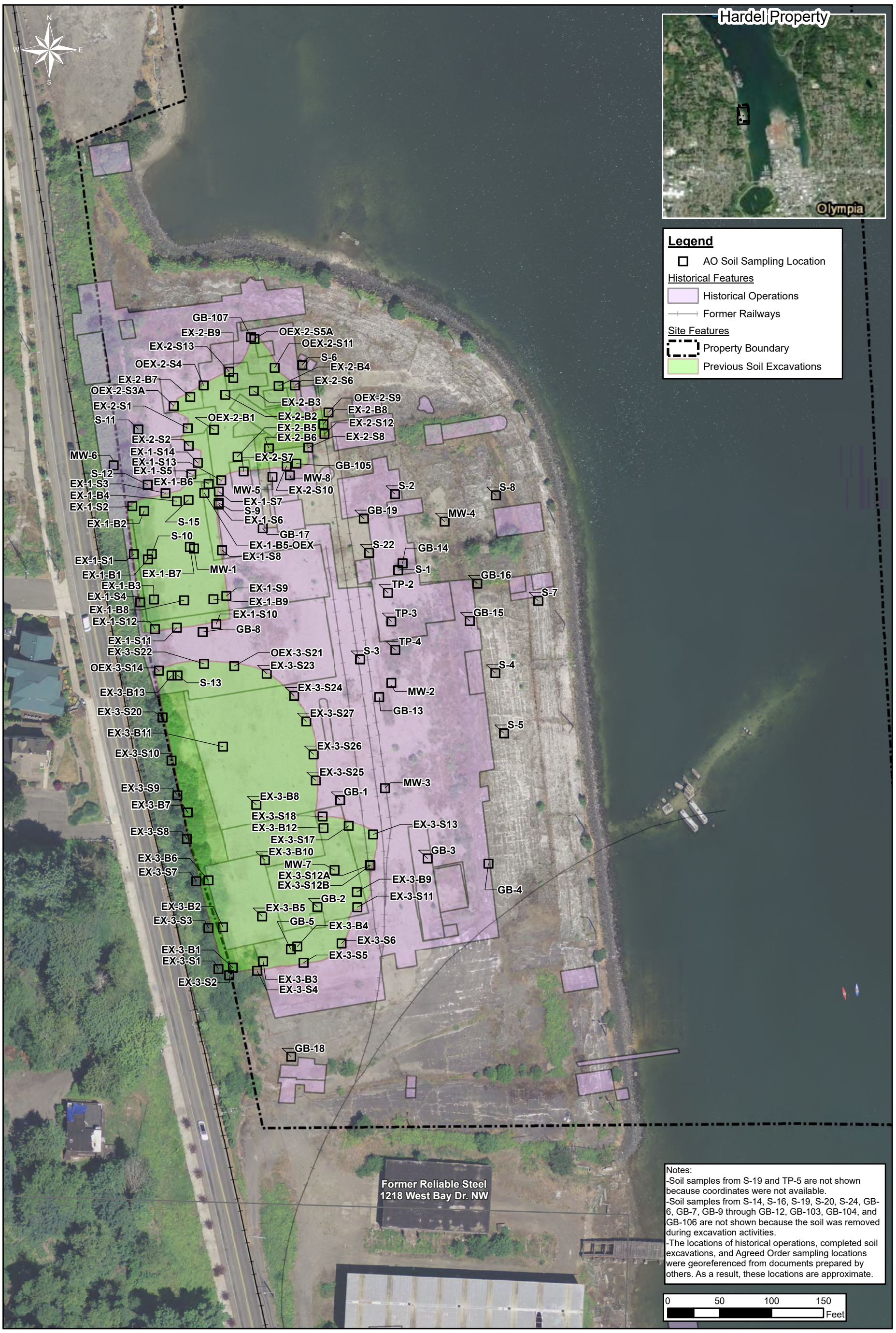
Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 2_Redevelopment.mxd; Author: MK; Date Saved: 8/17/2021

PIONEER TECHNOLOGIES CORPORATION

May 2021 Groundwater Flow Map
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 3

Document Path: G:\Projects\HardelMaps\2021\RI Interim Status\Fig 3_GW Flow Map.mxd; Author: MK; Date Saved: 8/17/2021



PIONEER TECHNOLOGIES CORPORATION

Historical Operational Features,
Completed Soil Excavations,
and AO Soil Sampling Locations
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 4

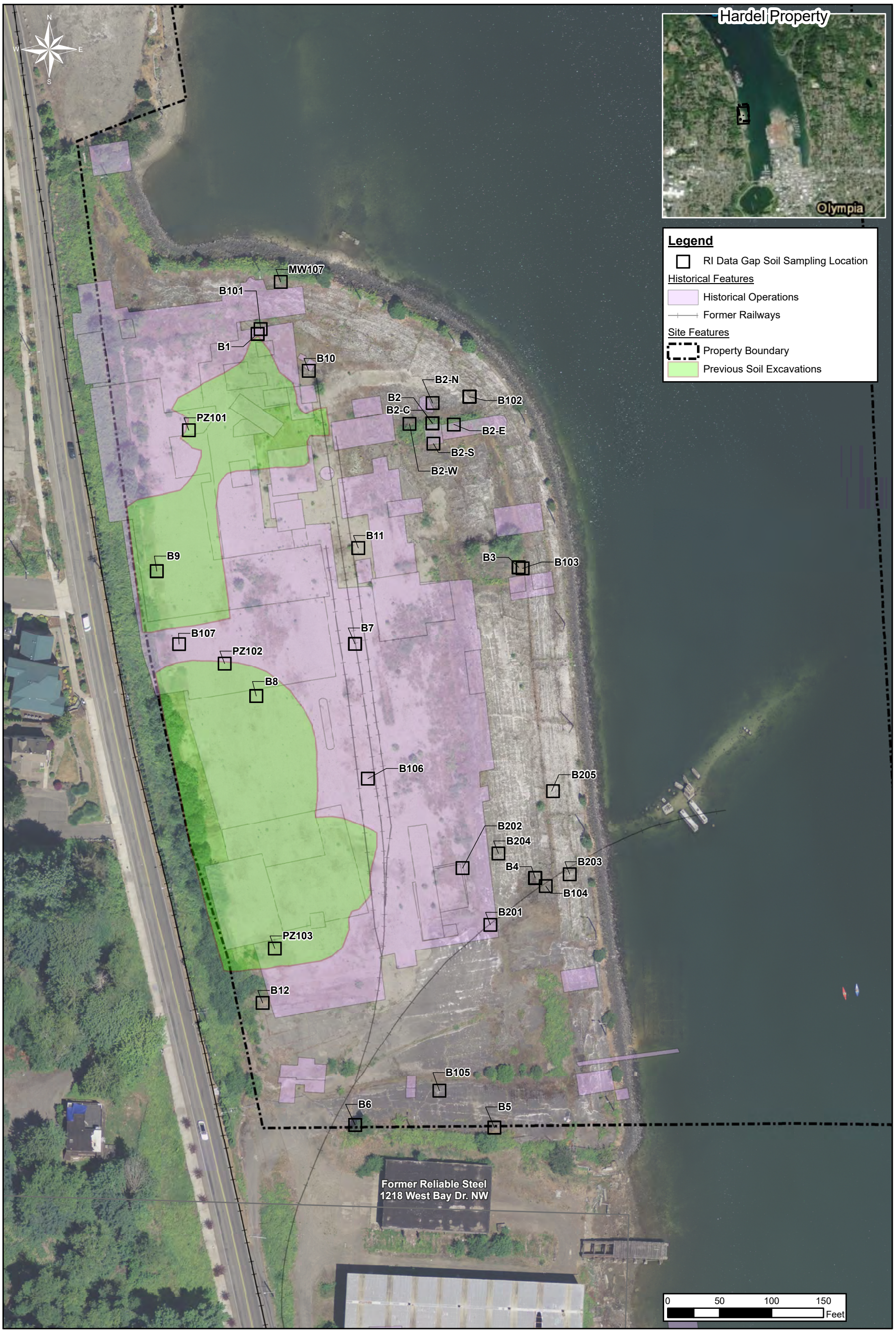
Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 4_Historical Features and Soil.mxd; Author: MK; Date Saved: 8/20/2021

PIONEER TECHNOLOGIES CORPORATION

Historical Operational Features,
Completed Soil Excavations,
and AO Groundwater Sampling Locations
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 5

Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 5_Historical Features and GW.mxd; Author: MK; Date Saved: 8/20/2021

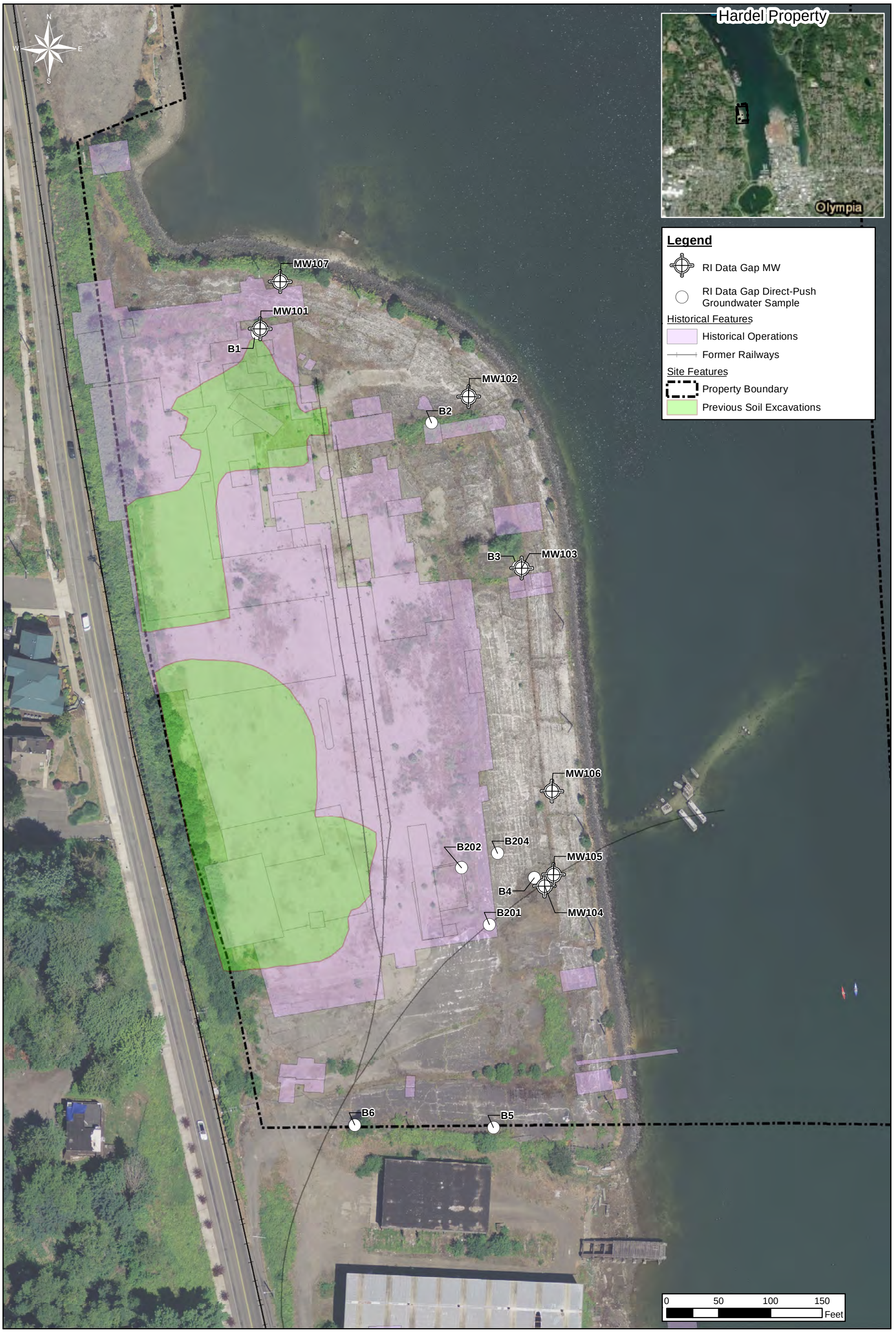


PIONEER TECHNOLOGIES CORPORATION

RI Data Gap Soil Sampling Locations
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 6

Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 6_RI Soil.mxd; Author: MK; Date Saved: 8/20/2021

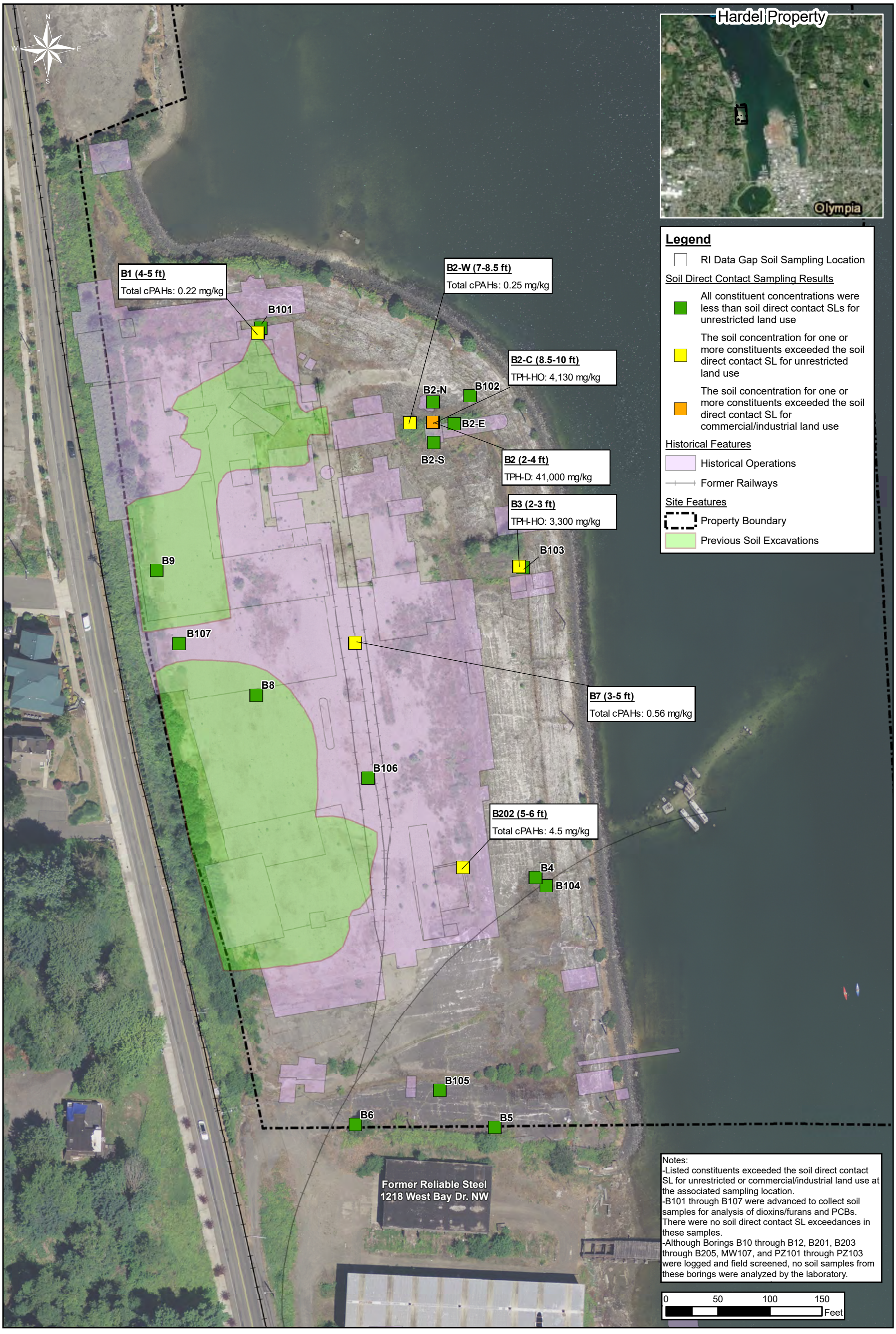


PIONEER TECHNOLOGIES CORPORATION

RI Data Gap Groundwater Sampling Locations
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 7

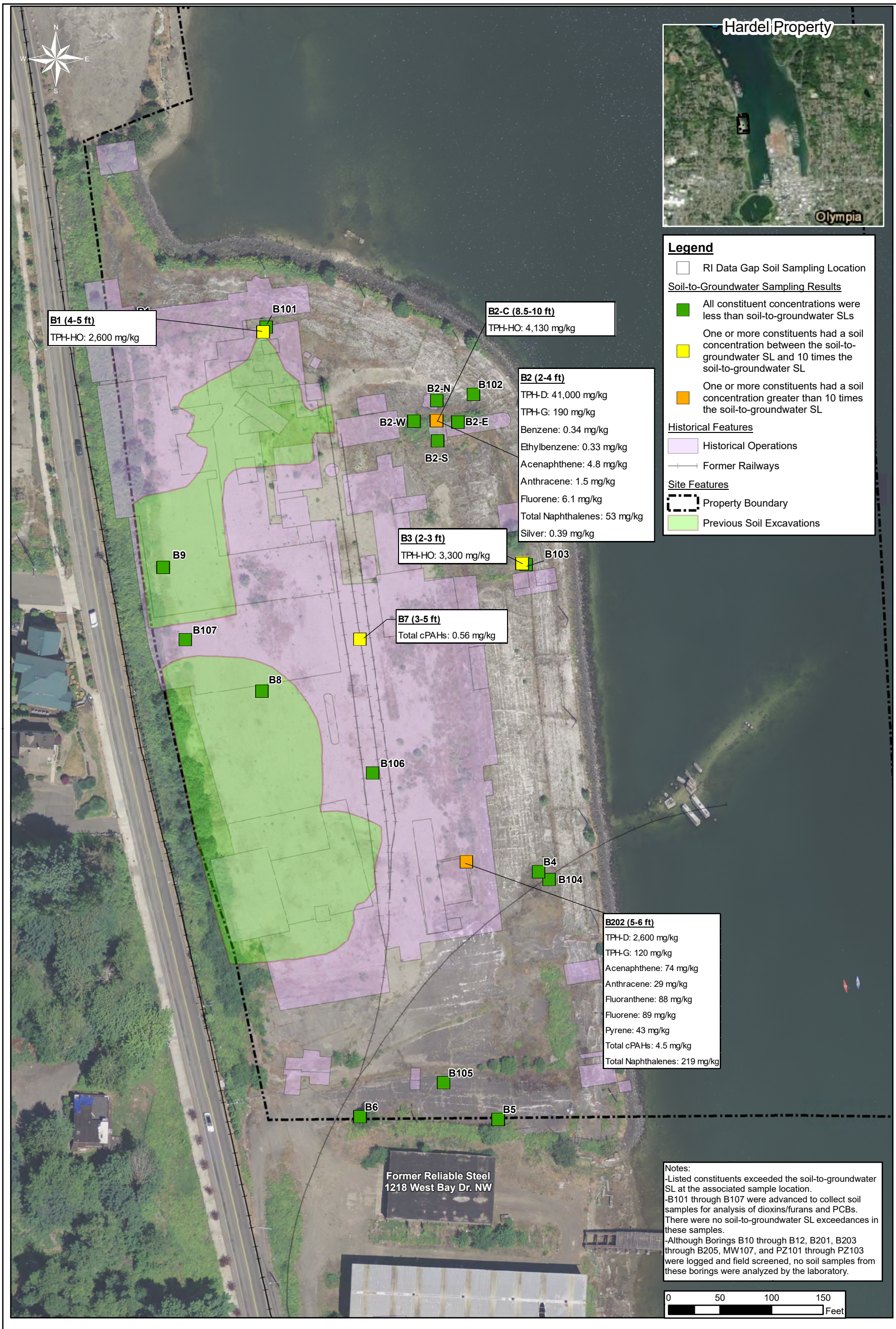
Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 7_RI Groundwater.mxd; Author: MK; Date Saved: 8/20/2021



PIONEER TECHNOLOGIES CORPORATION

Summary of Soil Direct Contact Sampling Results
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 8

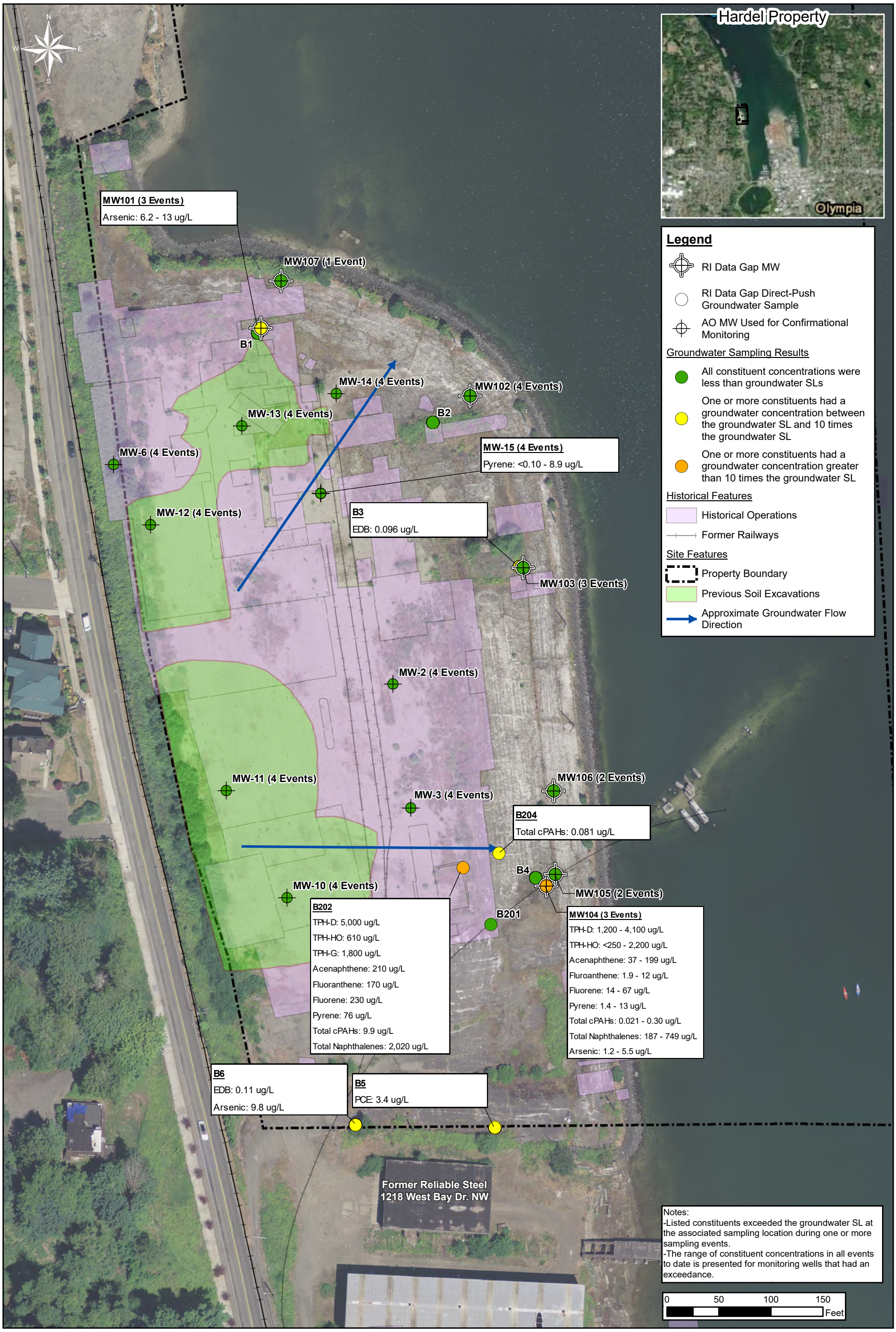


Document Path: G:\Projects\HardelMaps\2021\RI Interim Status\Fig 9_Soil to GW Results.mxd; Author: VN; Date Saved: 8/25/2021

PIONEER TECHNOLOGIES CORPORATION

Summary of Soil-to-Groundwater Sampling Results
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 9

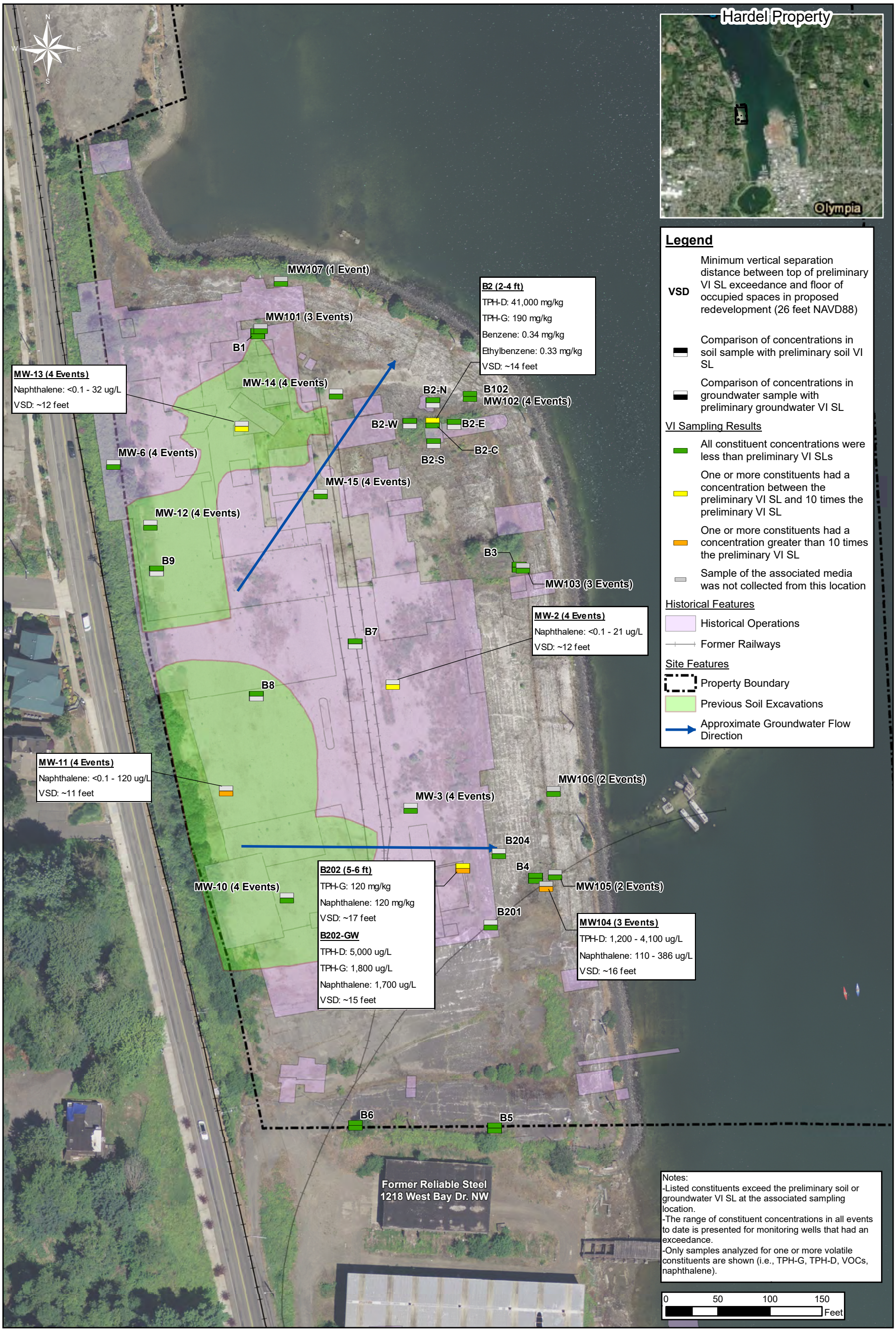


Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 10_GW Results.mxd; Author: MK; Date Saved: 8/20/2021

PIONEER TECHNOLOGIES CORPORATION

Summary of Groundwater Sampling Results
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 10



PIONEER TECHNOLOGIES CORPORATION

Summary of VI Soil and Groundwater Sampling Results
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 11

Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 11_ VI Soil and GW Results.mxd; Author: MK; Date Saved: 8/25/2021

Notes:
-%: percent by volume
-Peak methane readings are those recorded at the beginning of SVP purging on June 4, 2020 and represent built up gasses within the capped SVP.
-Sustained methane readings are those recorded after 15 minutes of SVP purging on June 4, 2020.

PIONEER TECHNOLOGIES CORPORATION

Summary of Methane Soil Gas Results and Proposed Sampling Locations
Remedial Investigation Data Gap Report
Hardel Mutual Plywood Corporation Site

Figure 12

Document Path: G:\Projects\Hardel\Maps\2021\RI Interim Status\Fig 12_Methane Results_plans.mxd; Author: MK; Date Saved: 8/19/2021

Tables

Table 1: Groundwater Elevations in RI Data Gap MWs and Piezometers

Location ID	Northing	Easting	TOC Elevation (feet NAVD88)	August 31, 2020 Event				November 24, 2020 Event				January 14, 2021 Event				May 5, 2021 Event			
				Time [1] (AM)	Measured Depth to Water (feet from TOC)	Measured LNAPL Thickness (feet)	Groundwater Elevation (feet NAVD88)	Time [1] (AM)	Measured Depth to Water (feet from TOC)	Measured LNAPL Thickness (feet)	Groundwater Elevation (feet NAVD88)	Time [1] (AM)	Measured Depth to Water (feet from TOC)	Measured LNAPL Thickness (feet)	Groundwater Elevation (feet NAVD88)	Time [2] (AM)	Measured Depth to Water (feet from TOC)	Measured LNAPL Thickness (feet)	Groundwater Elevation (feet NAVD88)
MW101	638447.57	1038803.42	15.72	11:15	5.80	--	9.92	8:50	4.31	--	11.41	11:50	4.17	--	11.55	9:40	4.73	--	10.99
MW102	638382.34	1039004.53	13.64	8:50	4.04	--	9.60	9:50	1.94	--	11.70	11:00	1.13	--	12.51	9:37	2.94	--	10.70
MW103	638216.88	1039055.58	12.80	10:15	2.65	--	10.15	11:00	0.71	--	12.09	NM	NM	NM	NM	9:34	1.49	--	11.31
MW104	637910.53	1039077.88	13.98	7:40	5.01	--	8.97	11:50	4.36	--	9.62	9:15	2.40	--	11.58	9:29	4.47	--	9.51
MW105	637921.74	1039086.43	14.66	NM	NM	NM	NM	NM	NM	NM	NM	8:10	3.27	--	11.39	9:28	9.00	--	5.66
MW106	638002.06	1039084.92	13.98	NM	NM	NM	NM	NM	NM	NM	NM	10:15	2.61	--	11.37	9:31	4.95	--	9.03
MW107	638493.10	1038822.85	17.02	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	9:39	9.39	--	7.63
PZ101	638350.02	1038734.38	16.28	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	9:41	4.15	--	12.13
PZ102	638125.01	1038768.84	15.40	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	9:43	1.77	--	13.63
PZ103	637850.42	1038817.08	15.30	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	9:45	2.37	--	12.93

Notes:

--: No LNAPL thickness was detected; NM: not measured; TOC: top of casing

Northings and Eastings in Washington State Plane, South Zone, North American Datum of 1983 (2011).

[1] MWs were gauged prior to sampling. The gauging events were not completed during a synoptic event near low tide.

[2] MWs and piezometers were gauged during a synoptic event near low tide, which was at 09:45 AM on 5/5/2021.

Table 2: Summary of All Sampling Locations with Laboratory Analyses to Date

Phase	Document / Activity	Media	Total # of Sampling Locations [1]	Sampling Location IDs [1]	Laboratory Analyses	Total # of Sampling Locations Analyzed for Dioxins/ Furans	Total # of Sampling Locations Analyzed for PCBs
AO [1]	2004 Phase II ESA (Stemen Environmental, Inc. 2004)	Soil [2]	25	S-1 through S-16, S-18, S-19, S-20, S-22, S-24, TP-2 through TP-5	NWTPH-Dx (e.g., TPH-D, TPH-HO), SVOCs*, VOCs*, PCBs*, Metals*	0	2
		Groundwater	11	S-1, S-3, S-6, S-8, S-10, S-12, S-15, S-24, S-26, TP-3, TP-4	NWTPH-Dx (e.g., TPH-D, TPH-HO), SVOCs*, VOCs*, PCBs*	0	3
		Sediment	1	SED-1	VOCs, Metals	0	0
	2007 Remedial Investigation Report (Greylock 2007)	Soil [2]	26	GB-1 through GB-19, MW-1 through MW-7	NWTPH-Dx (e.g., TPH-D, TPH-HO), PAHs*, Phenols*	0	0
		Groundwater	7	MW-1 through MW-7	NWTPH-Dx (e.g., TPH-D, TPH-HO), SVOCs, pH, Salinity	0	0
		Sediment	3	GS-1, GS-2, and GS-4	SVOCs, Dioxins/Furans, PCBs, Pesticides, Metals, Sulfide, TOC, and Total Solids	3	3
	2009 Supplemental Subsurface Investigation (Greylock 2009b)	Soil [2]	6	GB-103 through GB-107, MW-8	NWTPH-Dx (e.g., TPH-D, TPH-HO)	0	0
	Confirmational monitoring for soil in 2010 Interim Action Closure Report (Greylock 2010)	Soil	83	See Footnote 2 for sampling location IDs [3]	NWTPH-Dx (e.g., TPH-D, TPH-HO)	0	0
	Confirmational monitoring for groundwater in Post-Construction GWM Summary of Four Quarters (Greylock 2011)	Groundwater [4]	9	MW-2, MW-3, MW-6, MW-10 through MW-15	NWTPH-Dx (e.g., TPH-D, TPH-HO), PAHs	0	0

Table 2: Summary of All Sampling Locations with Laboratory Analyses to Date

Phase	Document / Activity	Media	Total # of Sampling Locations [1]	Sampling Location IDs [1]	Laboratory Analyses	Total # of Sampling Locations Analyzed for Dioxins/ Furans	Total # of Sampling Locations Analyzed for PCBs
RI Data Gap [1]	June 2020 Phase II ESA (PIONEER 2020d)	Soil	9	B1 through B9	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), SVOCs*/PAHs, VOCs, Metals*, EPH*, TOC*	0	0
		Groundwater	6	B1 through B6	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), SVOCs, VOCs, Metals	0	0
	August 2020 investigation activities (PIONEER 2020e)	Soil	7	B101 through B107	Dioxins/Furans, PCBs, NWTPH-Dx (e.g., TPH-D, TPH-HO)*, NWTPH-Gx (e.g., TPH-G)*	7	7
		Soil	5	B2-C, B2-N, B2-E, B2-S, B2-W	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5]	0	0
	August 2020 GWM event (PIONEER 2020e)	Groundwater	4	MW101 through MW104	NWTPH-HCID, NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5], Dioxins/Furans, PCBs, Arsenic, Chloride, EPH*	4	4
	November 2020 GWM event	Groundwater	4	MW101 through MW104	NWTPH-HCID*, NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5], Arsenic, Silver, Chloride, EPH*	0	0
	January 2021 investigation activities	Soil	1	B202	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5]	0	0
		Groundwater	3	B201, B202, B204	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5]	0	0
	January 2021 GWM event	Groundwater	5	MW101, MW102, MW104, MW105, MW106	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5], Arsenic, Silver, Chloride	0	0
	May 2021 GWM event	Groundwater	5	MW102, MW103, MW105, MW106, MW107	NWTPH-Dx (e.g., TPH-D, TPH-HO), NWTPH-Gx (e.g., TPH-G), PAHs, Select VOCs[5], Arsenic, Silver	0	0
		Totals	**220**			**14**	**19**

Notes:

EPH: extractable petroleum hydrocarbons; NWTPH-Dx: Northwest TPH - Diesel Extended; NWTPH-Gx: Northwest TPH - Gasoline Extended; NWTPH-HCID: Northwest TPH - Hydrocarbon Identification; TOC: total organic carbon

* This analysis was performed on a subset of the samples.

[1] There were additional sampling locations that did not include laboratory analyses (and were therefore not included in this table). Although MW-8 and MW-9 were installed during AO activities to measure LNAPL thicknesses, no groundwater samples from these MWs were analyzed by the laboratory. Although Borings B10 through B12, B201, B203 through B205, MW107, and PZ101 through PZ103 were logged and field screened during RI data gap activities, no soil samples from these borings were analyzed by the laboratory.

[2] Multiple soil samples were often collected from different depths at a given location. This table counts unique sample locations (not the total number of samples).

[3] EX-1-S1 through EX-1-S14, EX-1-B1 through EX-1-B4, EX-1-B5-OEX, EX-1-B6 through EX-1-B9, EX-2-S1, EX-2-S2, OEX-2-S3A, OEX-2-S4, OEX-2-S5A, EX-2-S6, EX-2-S7, EX-2-S8, OEX-2-S9, EX-2-S10, OEX-2-S11, EX-2-S12, EX-2-S13, OEX-2-B1, EX-2-B2 through EX-2-B9, EX-3-S1 through EX-3-S11, EX-3-S12A, EX-3-S12B, EX-3-S13, OEX-3-S14, EX-3-S17, EX-3-S18, EX-3-S20, OEX-3-S21, EX-3-S-22 through EX-3-S27, and EX-3-B1 through EX-3-B13.

[4] Four quarters of samples were collected from each of the nine sampled monitoring wells.

[5] Select VOCs were benzene, toluene, ethylbenzene, xylenes, EDB, 1,2-dichloroethane, methyl-tert-butyl-ether, naphthalene, PCE, trichloroethylene, cis-1,2-dichloroethylene, and vinyl chloride, with the following exception. Samples collected in August 2020 were not analyzed for PCE, trichloroethylene, cis-1,2-dichloroethylene, and vinyl chloride. Samples collected in November 2020 and January 2021 were also analyzed for n-hexane.

Table 3: Summary of RI Data Gap Soil Analytical Results

Constituent Category	Detected Constituent [1,2]	Soil Screening Levels [3]			Sample Location, Depth Interval (feet bgs), and Sample Date											
		Soil Direct Contact SL for Unrestricted Land Use	Soil Direct Contact SL for Commercial/ Industrial Land Use	Soil-to-Groundwater SL	B1 4'-5' 6/3/2020	B2 2'-4' 6/3/2020	B3 2'-3' 6/3/2020	B4 1'-3' 6/3/2020	B4 11'-12' 6/3/2020	B5 3'-4' 6/3/2020	B6 3'-4' 6/3/2020	B7 3'-5' 6/3/2020	B8 4'-5' 6/3/2020	B9 6'-7' 6/3/2020	B2-C 8.5'-10' 8/20/2020	B2-N 3'-5' 8/20/2020
TPH (mg/kg)	TPH-D	3,000	39,000	2,000	50 U	**41,000**	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	355 U	129 U
	TPH-G	4,700	150,000	30	10 U	**190**	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	0.348 U	0.18 U
	TPH-HO	3,000	39,000	2,000	**2,600**	**1,500**	**3,300**	**550**	**420**	250 U	250 U	**430**	250 U	250 U	**4,130**	**792**
VOCs (mg/kg)	1,2,4-Trimethylbenzene	800	35,000	No Value	0.02 U	**10**	0.02 U	0.02 U	0.02 U	0.02 U	**0.040**	**0.17**	0.02 U	0.02 U	NA	NA
	1,3,5-Trimethylbenzene	800	35,000	No Value	0.02 U	**3.6**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.050**	0.02 U	0.02 U	NA	NA
	Benzene	18	2,400	0.0088	0.02 U	**0.34**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.0087 U	0.0045 U
	Chloroethane	No Value	No Value	No Value	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	NA	NA
	Cumene	8,000	350,000	No Value	0.08 U	**0.56**	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	NA	NA
	Ethylbenzene	8,000	350,000	0.26	0.03 U	**0.33**	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.0087 U	0.0045 U
	Ethylene Dibromide (EDB)	0.50	66	0.00079	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.0087 U	0.0045 U
	n-Butylbenzene	4,000	180,000	No Value	0.02 U	**1.4**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
	n-Propylbenzene	8,000	350,000	No Value	0.02 U	**0.95**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
	p-Isopropyltoluene	No Value	No Value	No Value	0.02 U	**1.4**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
	sec-Butylbenzene	8,000	350,000	No Value	0.02 U	**1.3**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
	Tetrachloroethylene (PCE)	480	21,000	0.029	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	NA	NA
	Toluene	6,400	280,000	0.92	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.0087 U	0.0045 U
	Trichloroethylene	12	1,800	0.020	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	NA	NA
	Xylenes, Total [4]	16,000	700,000	14	0.03 U	**2.5**	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U	0.017 U	0.0091 U
SVOCs/PAHs (mg/kg)	3&4-Methylphenol coelution	No Value	No Value	No Value	NA	NA	NA	NA	NA	0.11 U	0.12 U	0.12 U	NA	NA	NA	NA
	Acenaphthene	4,800	210,000	3.1	0.046 U	**4.8**	0.041 U	0.038 U	**0.059**	0.054 U	0.058 U	0.058 U	0.044 U	0.038 U	0.089 U	0.014 U
	Acenaphthylene	No Value	No Value	No Value	0.046 U	0.053 U	0.041 U	0.038 U	0.044 U	0.054 U	0.058 U	**0.16**	0.044 U	0.038 U	0.089 U	0.014 U
	Anthracene	24,000	1,100,000	1.0	**0.089**	**1.5**	0.041 U	0.038 U	0.044 U	0.054 U	0.058 U	**0.28**	0.044 U	0.038 U	0.089 U	0.014 U
	Benzo(g,h,i)perylene	No Value	No Value	No Value	**0.049**	0.053 U	0.041 U	0.038 U	0.044 U	0.054 U	**0.083**	**0.55**	0.044 U	0.038 U	0.089 U	**0.019**
	Carbazole	No Value	No Value	No Value	NA	NA	NA	NA	NA	0.081 U	0.087 U	**0.099**	NA	NA	NA	NA
	Fluoranthene	3,200	140,000	5.9	**0.67**	**0.92**	**0.35**	**0.11**	**0.15**	0.054 U	**0.080**	**0.24**	0.044 U	0.038 U	0.089 U	**0.026**
	Fluorene	3,200	140,000	1.6	0.046 U	**6.1**	0.041 U	0.038 U	0.044 U	0.054 U	0.058 U	0.058 U	0.044 U	0.038 U	0.089 U	0.014 U
	Naphthalene [5]	No Value	No Value	No Value	0.0455 U	**3.6**	0.0407 U	0.0382 U	0.044 U	0.0542 U	**0.32**	**0.27**	0.0438 U	0.0382 U	0.00871 U	**0.029**
	Naphthalenes, Total [4,5]	1,600	70,000	4.5	0.14 U	**53**	0.12 U	0.12 U	0.13 U	0.16 U	**0.52**	**0.33**	0.13 U	0.12 U	0.19 U	**0.062**
	Phenanthrene	No Value	No Value	No Value	**0.069**	**17**	**0.083**	0.038 U	**0.062**	0.054 U	**0.077**	**0.13**	0.044 U	0.038 U	0.089 U	**0.044**
	Phenol	24,000	1,100,000	43	NA	NA	NA	NA	NA	0.11 U	0.12 U	0.12 U	NA	NA	NA	NA
	Pyrene	2,400	110,000	9.2	**0.93**	**1.7**	**0.35**	**0.11**	**0.12**	0.054 U	**0.076**	**0.28**	**0.11**	0.038 U	0.089 U	**0.024**
	Total cPAHs TEF [6]	0.19	130	0.29	**0.22**	**0.051**	**0.15**	**0.098**	0.066 U	0.081 U	**0.055**	**0.56**	0.066 U	0.057 U	0.13 U	0.022 U
Other Organics (units vary)	Total PCBs (mg/kg) [4]	0.50	66	8.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total dioxins/furans TEF (ng/kg) [6]	13	1,700	36	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total organic carbon (%)	Not Applicable			NA	NA	NA	**1.4**	NA	**0.077**	NA	**3.4**	NA	NA	NA	NA
Metals (mg/kg)	Arsenic	20	88	20	**6.5**	**10.0**	**7.3**	**8.0**	5 U	**7.0**	5 U	**8.2**	**9.2**	5 U	NA	NA
	Barium	16,000	700,000	1,600	**87**	**294**	**57**	**72**	**42**	**88**	**120**	**103**	NA	NA	NA	NA
	Chromium	120,000	5,300,000	2,000	**14**	**37**	**12**	**14**	**24**	**23**	**13**	**20**	**10**	**6.7**	NA	NA
	Lead	250	1,000	1,600	**38**	**16**	5 U	**9.9**	**9.2**	5 U	**7.2**	**11**	5 U	5 U	NA	NA
	Selenium	400	18,000	5.2	**1.1**	**1.0**	**0.80**	**1.1**	**0.85**	**1.2**	**0.75**	**1.1**	NA	NA	NA	NA
	Silver	400	18,000	0.32	**0.13**	**0.39**	0.084 U	0.078 U	0.086 U	0.090 U	0.091 U	0.098 U	NA	NA	NA	NA

Notes:

NA: constituent not analyzed; ng/kg: nanograms per kilogram; No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); U: constituent not detected at shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded the soil direct contact SL for unrestricted land use.

Orange highlighted concentrations exceeded the soil direct contact SL for commercial/industrial land use.

Concentrations with this shading exceeded the soil-to-groundwater SL, and were less than ten times the SL.

Concentrations with this shading and border were greater than ten times the soil-to-groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 3: Summary of RI Data Gap Soil Analytical Results

Constituent Category	Detected Constituent [1,2]	Soil Screening Levels [3]			Sample Location, Depth Interval (feet bgs), and Sample Date											
		Soil Direct Contact SL for Unrestricted Land Use	Soil Direct Contact SL for Commercial/ Industrial Land Use	Soil-to-Groundwater SL	B2-E 3'-5.5' 8/20/2020	B2-S 8.5'-10' 8/20/2020	B2-W 7'-8.5' 8/20/2020	B101 0.5'-3' 8/20/2020	B102 2'-4' 8/20/2020	B102 5'-7' 8/20/2020	B103 1'-3' 8/20/2020	B104 1'-3' 8/20/2020	B105 2'-4' 8/20/2020	B106 6'-8' 8/20/2020	B107 2'-4' 8/20/2020	B202 5'-6' 1/7/2021
TPH (mg/kg)	TPH-D	3,000	39,000	2,000	31.3 U	63.4 U	388 U	NA	129 U	104 U	NA	NA	NA	NA	NA	**2,600**
	TPH-G	4,700	150,000	30	0.16 U	0.19 U	**5.6**	NA	**5.1**	**9.6**	NA	NA	NA	NA	NA	**120**
	TPH-HO	3,000	39,000	2,000	125 U	254 U	1550 U	NA	516 U	**553**	NA	NA	NA	NA	NA	**600**
VOCs (mg/kg)	1,2,4-Trimethylbenzene	800	35,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,3,5-Trimethylbenzene	800	35,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzene	18	2,400	0.0088	0.00079 U	0.00099 U	0.0010 U	NA	NA	NA	NA	NA	NA	NA	NA	0.03 U
	Chloroethane	No Value	No Value	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumene	8,000	350,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylbenzene	8,000	350,000	0.26	0.00079 U	0.00099 U	0.0010 U	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
	Ethylene Dibromide (EDB)	0.50	66	0.00079	0.00079 U	0.00099 U	0.0010 U	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
	n-Butylbenzene	4,000	180,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Propylbenzene	8,000	350,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	p-Isopropyltoluene	No Value	No Value	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	sec-Butylbenzene	8,000	350,000	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tetrachloroethylene (PCE)	480	21,000	0.029	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.025 U
	Toluene	6,400	280,000	0.92	0.00079 U	0.00099 U	0.0010 U	NA	NA	NA	NA	NA	NA	NA	NA	0.05 U
	Trichloroethylene	12	1,800	0.020	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.02 U
	Xylenes, Total [4]	16,000	700,000	14	0.0016 U	0.0020 U	0.0020 U	NA	NA	NA	NA	NA	NA	NA	NA	0.15 U
SVOCs/PAHs (mg/kg)	3&4-Methylphenol coelution	No Value	No Value	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	4,800	210,000	3.1	0.012 U	**0.16**	**0.086**	NA	NA	NA	NA	NA	NA	NA	NA	**74**
	Acenaphthylene	No Value	No Value	No Value	0.012 U	0.015 U	0.016 U	NA	NA	NA	NA	NA	NA	NA	NA	1 U
	Anthracene	24,000	1,100,000	1.0	0.012 U	0.015 U	**0.016**	NA	NA	NA	NA	NA	NA	NA	NA	**29**
	Benzo(g,h,i)perylene	No Value	No Value	No Value	0.012 U	**0.060**	**0.19**	NA	NA	NA	NA	NA	NA	NA	NA	1 U
	Carbazole	No Value	No Value	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	3,200	140,000	5.9	0.012 U	**0.042**	**0.19**	NA	NA	NA	NA	NA	NA	NA	NA	**88**
	Fluorene	3,200	140,000	1.6	0.012 U	**0.028**	**0.032**	NA	NA	NA	NA	NA	NA	NA	NA	**89**
	Naphthalene [5]	No Value	No Value	No Value	0.000788 U	**0.022**	**0.034**	NA	NA	NA	NA	NA	NA	NA	NA	**120**
	Naphthalenes, Total [4,5]	1,600	70,000	4.5	0.025 U	**0.037**	**0.10**	NA	NA	NA	NA	NA	NA	NA	NA	**219**
	Phenanthrene	No Value	No Value	No Value	0.012 U	**0.041**	**0.12**	NA	NA	NA	NA	NA	NA	NA	NA	**210**
	Phenol	24,000	1,100,000	43	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	2,400	110,000	9.2	0.012 U	**0.025**	**0.19**	NA	NA	NA	NA	NA	NA	NA	NA	**43**
	Total cPAHs TEF [6]	0.19	130	0.29	0.018 U	**0.038**	**0.25**	NA	NA	NA	NA	NA	NA	NA	NA	**4.5**
Other Organics (units vary)	Total PCBs (mg/kg) [4]	0.50	66	8.7	NA	NA	NA	0.038 U	NA	0.042 U	0.021 U	0.038 U	0.031 U	0.35 U	0.030 U	NA
	Total dioxins/furans TEF (ng/kg) [6]	13	1,700	36	NA	NA	NA	**1.2**	NA	**0.91**	**0.21**	**0.17**	**3.7**	**0.11**	**0.12**	NA
	Total organic carbon (%)	Not Applicable			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Arsenic	20	88	20	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	16,000	700,000	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	120,000	5,300,000	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	250	1,000	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	400	18,000	5.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	400	18,000	0.32	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

NA: constituent not analyzed; ng/kg: nanograms per kilogram; No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); U: constituent not detected at shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded the soil direct contact SL for unrestricted land use.

Orange highlighted concentrations exceeded the soil direct contact SL for commercial/industrial land use.

Concentrations with this shading exceeded the soil-to-groundwater SL, and were less than ten times the SL.

Concentrations with this shading and border were greater than ten times the soil-to-groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 4: Summary of AO Confirmational Monitoring and RI Data Gap Groundwater Analytical Results

Constituent Category	Detected Constituent [1,2]	Groundwater SL [3]	Sample Location and Sample Date															
			MW-2				MW-3				MW-6				MW-10			
			12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011
TPH (ug/L)	TPH-D	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
	TPH-G	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	TPH-HO	500	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
VOCs (ug/L)	1,2,4-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,3,5-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzene	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chloroethane	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylbenzene	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylene Dibromide (EDB)	0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Butylbenzene	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Propylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	p-Isopropyltoluene	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	sec-Butylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tetrachloroethylene (PCE)	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Trichloroethylene	0.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Xylenes, Total [4]	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs/PAHs (ug/L)	3&4-Methylphenol coelution	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	30	**1.7**	0.1 U	0.1 U	0.1 U	**5.5**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**23**	**11**	0.1 U	0.1 U
	Acenaphthylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**2.2**	0.1 U
	Anthracene	100	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Benzo(ghi)perylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Carbazole	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	6.0	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.40**
	Fluorene	10	0.1 U	0.1 U	0.1 U	**0.60**	0.1 U	0.1 U	0.1 U	**0.40**	0.1 U	0.1 U	0.1 U	0.1 U	**3.1**	0.1 U	0.1 U	0.1 U
	Naphthalene [5]	No Value	**11**	0.1 U	**21**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**8.8**	0.1 U	**6.1**	0.1 U
	Naphthalenes, Total [4,5]	160	**11**	0.3 U	**21**	**0.85**	0.3 U	0.3 U	0.3 U	**1.7**	0.3 U	0.3 U	0.3 U	0.3 U	**16**	0.3 U	**7.5**	**2.5**
	Phenanthrene	No Value	0.1 U	0.1 U	0.1 U	**0.20**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**5.7**	0.1 U
	Phenol	2,400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	8.0	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**0.20**
	Total cPAHs TEF [6]	0.015	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Other (units vary)	Total PCBs (ug/L) [4]	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total dioxins/furans TEF (pg/L) [6]	7.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chloride (mg/L)	Not Applicable	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (ug/L)	Arsenic	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

J: estimated concentration; mg/L: milligrams per liter; NA: constituent not analyzed, No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); pg/L: picograms per liter; U: constituent not detected at the shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded than the groundwater SL, and were less than ten times the SL.

Orange highlighted concentrations were greater than ten times the groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 4: Summary of AO Confirmational Monitoring and RI Data Gap Groundwater Analytical Results

Constituent Category	Detected Constituent [1,2]	Groundwater SL [3]	Sample Location and Sample Date															
			MW-11				MW-12				MW-13				MW-14			
			12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011	12/1/2010	2/22/2011	5/16/2011	8/25/2011
TPH (ug/L)	TPH-D	500	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
	TPH-G	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	TPH-HO	500	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
VOCs (ug/L)	1,2,4-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,3,5-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzene	1.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chloroethane	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylbenzene	31	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylene Dibromide (EDB)	0.050	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Butylbenzene	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Propylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	p-Isopropyltoluene	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	sec-Butylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tetrachloroethylene (PCE)	2.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Toluene	130	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Trichloroethylene	0.70	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Xylenes, Total [4]	1,600	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SVOCs/PAHs (ug/L)	3&4-Methylphenol coelution	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	30	**5.0**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**2.5**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Acenaphthylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Anthracene	100	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Benzo(ghi)perylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Carbazole	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	6.0	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Fluorene	10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Naphthalene [5]	No Value	**58**	0.1 U	**120**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	**32**	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Naphthalenes, Total [4,5]	160	**61**	0.3 U	**120**	**0.75**	0.3 U	0.3 U	0.3 U	0.3 U	**35**	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U
	Phenanthrene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Phenol	2,400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	8.0	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
	Total cPAHs TEF [6]	0.015	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U	0.15 U
Other (units vary)	Total PCBs (ug/L) [4]	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total dioxins/furans TEF (pg/L) [6]	7.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chloride (mg/L)	Not Applicable	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (ug/L)	Arsenic	5.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	1.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

J: estimated concentration; mg/L: milligrams per liter; NA: constituent not analyzed, No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); pg/L: picograms per liter; U: constituent not detected at the shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded than the groundwater SL, and were less than ten times the SL.

Orange highlighted concentrations were greater than ten times the groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 4: Summary of AO Confirmational Monitoring and RI Data Gap Groundwater Analytical Results

Constituent Category	Detected Constituent [1,2]	Groundwater SL [3]	Sample Location and Sample Date															
			MW-15				B1	B2	B3	B4	B5	B6	B201	B202	B204	MW101		
			12/1/2010	2/22/2011	5/16/2011	8/25/2011	6/3/2020	6/3/2020	6/3/2020	6/3/2020	6/3/2020	6/3/2020	1/7/2021	1/7/2021	1/7/2021	8/31/2020	11/24/2020	1/14/2021
TPH (ug/L)	TPH-D	500	250 U	250 U	250 U	250 U	200 U	200 U	200 U	200 U	200 U	200 U	**140**	**5,000**	**98**	**322**	**410**	**460**
	TPH-G	800	NA	NA	NA	NA	100 U	100 U	100 U	100 U	100 U	100 U	**110**	**1,800**	100 U	157 U	100 U	100 U
	TPH-HO	500	500 U	500 U	500 U	500 U	400 U	400 U	400 U	400 U	400 U	400 U	250 U	**610**	250 U	471 U	**290**	250 U
VOCs (ug/L)	1,2,4-Trimethylbenzene	80	NA	NA	NA	NA	1.0 U	**3.2**	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	1,3,5-Trimethylbenzene	80	NA	NA	NA	NA	1.0 U	**1.1**	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	Benzene	1.6	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**0.51**	0.35 U	0.35 U	0.50 U	0.35 U	0.35 U
	Chloroethane	No Value	NA	NA	NA	NA	2.0 U	**6.0**	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	NA	NA	NA	NA
	Cumene	800	NA	NA	NA	NA	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	4.0 U	NA	NA	NA	NA	NA	NA
	Ethylbenzene	31	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**1.2**	**4.3**	1.0 U	0.50 U	1.0 U	1.0 U
	Ethylene Dibromide (EDB)	0.050	NA	NA	NA	NA	0.010 U	0.010 U	**0.096**	0.010 U	0.010 U	**0.11**	0.050 U	0.050 U	0.050 U	0.50 U	0.050 U	0.050 U
	n-Butylbenzene	400	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	n-Propylbenzene	800	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	p-Isopropyltoluene	No Value	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	sec-Butylbenzene	800	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	NA	NA	NA	NA	NA	NA
	Tetrachloroethylene (PCE)	2.9	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	**3.4**	1.0 U	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U
	Toluene	130	NA	NA	NA	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**5.0**	**3.0**	**1.6**	0.50 U	1.0 U	1.0 U
	Trichloroethylene	0.70	NA	NA	NA	NA	0.40 U	0.40 U	0.40 U	0.40 U	**0.55**	**0.51**	0.70 U	0.70 U	0.70 U	NA	0.70 U	0.70 U
	Xylenes, Total [4]	1,600	NA	NA	NA	NA	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	**8.1**	**15**	**2.6**	1.0 U	3.0 U	3.0 U
SVOCs/PAHs (ug/L)	3&4-Methylphenol coelution	No Value	NA	NA	NA	NA	**1.5**	1.0 U	1.0 U	1.0 U	0.99 U	0.99 U	NA	NA	NA	NA	NA	NA
	Acenaphthene	30	**4.0**	0.1 U	0.1 U	0.1 U	0.50 U	**0.70**	0.50 U	**1.2**	0.50 U	0.50 U	**5.1**	**210**	**1.8**	0.01 U	0.04 U	0.02 U
	Acenaphthylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.02 U	**2.2**	0.02 U	0.01 U	0.04 U	0.02 U
	Anthracene	100	**1.1**	0.1 U	0.1 U	0.1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.034**	**55**	**0.097**	0.01 U	0.04 U	0.02 U
	Benzo(ghi)perylene	No Value	0.1 U	0.1 U	0.1 U	0.1 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.04 U	**1.0**	**0.085**	0.01 U	0.08 U	0.04 U
	Carbazole	No Value	NA	NA	NA	NA	5.0 U	5.0 U	4.9 U	5.0 U	5.0 U	5.0 U	NA	NA	NA	NA	NA	NA
	Fluoranthene	6.0	**2.3**	0.1 U	0.1 U	**0.20**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.049**	**170**	**0.53**	0.01 U	0.04 U	0.02 U
	Fluorene	10	0.1 U	0.1 U	0.1 U	0.1 U	0.50 U	**0.73**	0.50 U	0.50 U	0.50 U	0.50 U	**1.3**	**230**	**0.81**	**0.020**	0.04 U	**0.020**
	Naphthalene [5]	No Value	0.1 U	0.1 U	**1.1**	0.1 U	0.495 U	**1.3**	0.494 U	0.499 U	0.495 U	0.495 U	**0.22**	**1,700**	0.2 U	**0.011**	0.4 U	0.2 U
	Naphthalenes, Total [4,5]	160	0.3 U	0.3 U	**1.2**	0.3 U	1.5 U	**12**	1.5 U	1.5 U	1.5 U	1.5 U	**0.42**	**2,020**	0.6 U	**0.17**	1.2 U	0.6 U
	Phenanthrene	No Value	**3.4**	0.1 U	0.1 U	0.1 U	0.50 U	**0.88**	0.50 U	0.50 U	0.50 U	0.50 U	**0.13**	**430**	**0.26**	**0.018**	0.04 U	**0.033**
	Phenol	2,400	NA	NA	NA	NA	**2.1**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	NA	NA	NA	NA	NA	NA
	Pyrene	8.0	**8.9**	0.1 U	0.1 U	**0.10**	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	0.50 U	**0.031**	**76**	**0.31**	0.01 U	0.04 U	0.02 U
	Total cPAHs TEF [6]	0.015	0.15 U	0.15 U	0.15 U	0.15 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.030 U	**9.9 J**	**0.081 J**	0.015 U	0.060 U	0.030 U
Other (units vary)	Total PCBs (ug/L) [4]	1.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.4 U	NA	NA
	Total dioxins/furans TEF (pg/L) [6]	7.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**0.74**	NA	NA
	Chloride (mg/L)	Not Applicable	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**111**	**175**	**182**
Metals (ug/L)	Arsenic	5.0	NA	NA	NA	NA	3.0 U	3.0 U	3.0 U	3.0 U	3.0 U	**9.8**	NA	NA	NA	**13**	**6.2**	**6.8**
	Barium	2,000	NA	NA	NA	NA	**125**	**56**	**178**	**65**	**8.9**	**9.4**	NA	NA	NA	NA	NA	NA
	Chromium	100	NA	NA	NA	NA	5.0 U	5.0 U	**11**	5.0 U	5.0 U	5.0 U	NA	NA	NA	NA	NA	NA
	Lead	8.1	NA	NA	NA	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	NA	NA	NA	NA
	Selenium	50	NA	NA	NA	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	NA	NA	NA	NA	NA	NA
	Silver	1.9	NA	NA	NA	NA	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	NA	NA	NA	NA	1.0 U	1.0 U

Notes:

J: estimated concentration; mg/L: milligrams per liter; NA: constituent not analyzed, No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); pg/L: picograms per liter; U: constituent not detected at the shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded than the groundwater SL, and were less than ten times the SL.

Orange highlighted concentrations were greater than ten times the groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 4: Summary of AO Confirmational Monitoring and RI Data Gap Groundwater Analytical Results

Constituent Category	Detected Constituent [1,2]	Groundwater SL [3]	Sample Location and Sample Date														
			MW102				MW103			MW104			MW105		MW106		MW107
			8/31/2020	11/24/2020	1/14/2021	5/5/2021	8/31/2020	11/24/2020	5/5/2021	8/31/2020	11/24/2020	1/14/2021	1/14/2021	5/5/2021	1/14/2021	5/5/2021	5/5/2021
TPH (ug/L)	TPH-D	500	**105 J**	50 U	50 U	200 U	**196**	**170**	200 U	**1,690**	**4,100**	**1,200**	50 U	200 U	**220**	200 U	200 U
	TPH-G	800	133 U	100 U	100 U	100 U	139 U	100 U	100 U	472 U	**150**	100 U	100 U	100 U	100 U	100 U	100 U
	TPH-HO	500	**282 J**	250 U	250 U	400 U	**289 J**	250 U	400 U	**2,200**	**480**	250 U	250 U	400 U	250 U	400 U	400 U
VOCs (ug/L)	1,2,4-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	1,3,5-Trimethylbenzene	80	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Benzene	1.6	0.50 U	0.35 U	0.35 U	1.0 U	0.50 U	0.35 U	1.0 U	2.5 U	0.35 U	0.35 U	0.35 U	1.0 U	0.35 U	1.0 U	1.0 U
	Chloroethane	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Cumene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ethylbenzene	31	0.50 U	1.0 U	1.0 U	1.0 U	0.50 U	1.0 U	1.0 U	2.5 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Ethylene Dibromide (EDB)	0.050	0.50 U	0.050 U	0.050 U	0.010 U	0.50 U	0.050 U	0.010 U	5.0 U	0.050 U	0.050 U	0.050 U	0.010 U	0.050 U	0.010 U	0.010 U
	n-Butylbenzene	400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	n-Propylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	p-Isopropyltoluene	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	sec-Butylbenzene	800	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Tetrachloroethylene (PCE)	2.9	NA	1.0 U	1.0 U	1.0 U	NA	1.0 U	1.0 U	NA	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
	Toluene	130	0.50 U	1.0 U	1.0 U	2.0 U	0.50 U	1.0 U	2.0 U	2.5 U	1.0 U	1.0 U	1.0 U	2.0 U	1.0 U	2.0 U	2.0 U
	Trichloroethylene	0.70	NA	0.70 U	0.70 U	0.40 U	NA	0.70 U	0.40 U	NA	0.70 U	0.70 U	0.70 U	0.40 U	0.70 U	0.40 U	0.40 U
	Xylenes, Total [4]	1,600	1.0 U	3.0 U	3.0 U	2.0 U	1.0 U	3.0 U	2.0 U	5.0 U	3.0 U	3.0 U	3.0 U	2.0 U	3.0 U	2.0 U	2.0 U
SVOCs/PAHs (ug/L)	3&4-Methylphenol coelution	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Acenaphthene	30	**0.76**	**1.3**	**1.1**	**0.97**	**0.36**	**1.7**	**1.5**	**199**	**150**	**37**	0.02 U	**8.1**	**0.031**	0.10 U	**0.32**
	Acenaphthylene	No Value	**0.022**	0.04 U	0.02 U	0.099 U	0.01 U	0.04 U	0.099 U	**2.5**	0.04 U	0.02 U	0.02 U	0.10 U	0.02 U	0.10 U	0.099 U
	Anthracene	100	**0.032**	0.04 U	0.02 U	0.099 U	**0.013**	0.04 U	0.099 U	**16**	**11**	**2.2**	0.02 U	0.10 U	0.02 U	0.10 U	0.099 U
	Benzo(ghi)perylene	No Value	0.01 U	0.08 U	0.04 U	0.099 U	0.01 U	0.08 U	0.099 U	0.1 U	0.08 U	0.04 U	0.04 U	0.10 U	0.04 U	0.10 U	0.099 U
	Carbazole	No Value	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Fluoranthene	6.0	**0.034**	0.04 U	**0.020**	0.099 U	**0.027**	0.04 U	0.099 U	**12**	**8.3**	**1.9**	0.02 U	0.10 U	0.02 U	0.10 U	0.099 U
	Fluorene	10	**0.30**	**0.40**	**0.37**	**0.30**	**0.039**	**0.21**	**0.20**	**67**	**56**	**14**	0.02 U	**3.0**	0.02 U	0.10 U	0.099 U
	Naphthalene [5]	No Value	**0.81**	**1.3**	**1.4**	**0.93**	**0.041**	0.4 U	0.0991 U	**386**	**240**	**110**	0.2 U	**0.12**	0.2 U	0.0999 U	0.0989 U
	Naphthalenes, Total [4,5]	160	**1.7**	**1.7**	**1.7**	**1.4**	**0.092**	1.2 U	0.30 U	**749**	**530**	**187**	0.60 U	**0.22**	0.60 U	0.30 U	0.30 U
	Phenanthrene	No Value	**0.26**	**0.13**	**0.11**	0.099 U	**0.056**	0.04 U	0.099 U	**117**	**96**	**19**	0.02 U	**0.56**	0.02 U	0.10 U	0.099 U
	Phenol	2,400	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pyrene	8.0	**0.075**	0.04 U	**0.020**	0.099 U	**0.021**	0.04 U	0.099 U	**13**	**8.4**	**1.4**	0.02 U	0.10 U	0.02 U	0.10 U	0.099 U
	Total cPAHs TEF [6]	0.015	**0.0081 J**	0.060 U	0.030 U	0.15 U	0.015 U	0.060 U	0.15 U	**0.30 J**	**0.15 J**	**0.021**	0.030 U	0.15 U	0.030 U	0.15 U	0.15 U
Other (units vary)	Total PCBs (ug/L) [4]	1.4	1.4 U	NA	NA	NA	1.4 U	NA	NA	1.4 U	NA	NA	NA	NA	NA	NA	NA
	Total dioxins/furans TEF (pg/L) [6]	7.2	**0.60**	NA	NA	NA	**0.50**	NA	NA	**2.3**	NA	NA	NA	NA	NA	NA	NA
	Chloride (mg/L)	Not Applicable	**12**	**2.4**	**1.1**	NA	**5.0**	**5.8**	NA	**2,340**	**329**	**60**	**32**	NA	**7.9**	NA	NA
Metals (ug/L)	Arsenic	5.0	1.0 U	**2.3**	**2.0**	**2.9**	1.0 U	1.0 U	1.0 U	**5.5**	**2.3**	**1.2**	1.0 U	1.0 U	**1.8**	1.0 U	1.0 U
	Barium	2,000	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Chromium	100	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lead	8.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Selenium	50	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Silver	1.9	NA	1.0 U	1.0 U	0.35 U	NA	1.0 U	0.35 U	NA	1.0 U	1.0 U	1.0 U	0.35 U	1.0 U	0.35 U	0.35 U

Notes:

J: estimated concentration; mg/L: milligrams per liter; NA: constituent not analyzed, No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a); pg/L: picograms per liter; U: constituent not detected at the shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations exceeded than the groundwater SL, and were less than ten times the SL.

Orange highlighted concentrations were greater than ten times the groundwater SL.

(1) Results are shown for constituents that were detected in one or more media during RI data gap activities. In addition, total PCBs results are shown even though PCBs were not detected in any media.

(2) Constituent results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number. The following data reduction rules were used for duplicate samples: (a) if both samples had a detected result, then the average concentration was used, (b) if neither sample had a detected result, then the lower reporting limit was used, and (c) if only one of the two samples had a detected result, then the detected concentration was used. The following data reduction rules were used when the laboratory provided two results for the same non-duplicate sample: (a) if one or both results were a detect, then the highest detection was used, and (b) if both results were non-detects, then the lower reporting limit was used.

(3) See Appendix F for calculation of SLs. As mentioned in the Appendix F table footnotes, a non-detect result with a reporting limit greater than a SL was not considered an exceedance since the SL would technically need to be adjusted up to the reporting limit.

(4) The following data reduction rules were used for compound totaling of these constituents: (a) if one or more individual constituent was detected in a sample, the non-detect constituents were assumed to equal one-half of the reporting limit, and (b) if no individual constituents were detected in a sample, the sum of the reporting limits for the individual constituents was used.

(5) Naphthalene results are included in addition to total naphthalenes results in order to support the VI screening. The following data reduction rules were used for naphthalene results from USEPA Method SW846-8260 and SW846-8270: (a) if naphthalene was detected by one or both methods, then the highest detection was used, and (b) if naphthalene was not detected by either method, then the lower reporting limit was used.

(6) Total cPAHs and total dioxins/furans concentrations were calculated using MTCA toxicity equivalence factors (TEFs) per WAC 173-340-708(8) and data reduction rules per the 2001 MTCA Concise Explanatory Statement (Ecology 2001c). If a constituent/congener was detected in any sample in any media, non-detect results for that constituent/congener in other samples were assumed to equal half of the laboratory reporting limit in the TEF calculation. If a constituent/congener was non-detect in all samples from all sampled media, non-detect results for that constituent/congener were assumed to equal zero in the TEF calculation.

Table 5: RI Data Gap Field Water Quality Parameter Results

Location	Sample Date	Dissolved Oxygen (mg/L)	pH (standard units)	ORP (mV)	Specific Conductance (µS/cm)	Temperature (°C)	Turbidity (NTU)	Odor	Color
MW101	8/31/2020	0.45	6.51	-42.3	2,426	19.8	243 (1)	No odor	Clear
	11/24/2020	0.69	6.38	131.3	2,639	14.0	9.8	Sulfur odor	Clear
	1/14/2021	0.85	6.42	-68.3	2,717	11.9	49.1	Sulfur odor	Clear
MW102	8/31/2020	0.33	6.31	-34.3	575	22.1	4.05	Hydrocarbon odor (slight)	Clear, slight sheen
	11/24/2020	0.78	6.28	-74.1	200	10.9	18.2	No odor	Clear
	1/14/2021	1.23	6.57	-55.0	166	8.9	8.4	No odor	Clear
	5/5/2021	1.19	6.34	24.0	230	13.9	4.9	No odor	Clear
MW103	8/31/2020	0.42	6.24	-14.6	632	18.7	185 (1)	No odor	Clear
	11/24/2020	0.90	6.20	-30.7	701	11.6	8.3	No odor	Clear
	1/14/2021	NM (2)	NM (2)	NM (2)	NM (2)	NM (2)	NM (2)	NM (2)	NM (2)
	5/5/2021	0.71	6.26	18.3	428	12.9	28.4	No odor	Clear
MW104	8/31/2020	0.49	6.37	-46.7	7,645	20.7	12.33	No odor	Clear
	11/24/2020	0.79	6.44	-74.4	2,257	12.9	14.4	No odor	Clear
	1/14/2021	1.07	6.28	-60.1	1,366	9.7	25.7	No odor	Clear
MW105	1/14/2021	11.16	7.24	267.6	148	7.1	16.1	No odor	Clear
	5/5/2021	1.17	6.44	49.4	1,650	14.4	25.1	No odor	Clear
MW106	1/14/2021	0.91	6.47	-51.3	517	11.1	7.8	No odor	Clear
	5/5/2021	1.20	6.24	-18.0	562	13.0	4.3	No odor	Clear
MW107	5/5/2021	1.32	6.51	-33.7	1,202	13.8	3.4	Sulfur odor	Clear

Notes:

°C: Degrees Celsius; mg/L: milligram per liter; mV: millivolts; NM: not measured; NTU: nephelometric turbidity units; ORP: oxidation reduction potential; µS/cm: microsiemens per centimeter

All results were obtained from unfiltered field samples.

(1) The turbidity meter malfunctioned during the 08/31/2020 GWM event. These values were not representative of in-situ groundwater conditions. Purged groundwater was clear of suspended particles.

(2) MW103 was not sampled because groundwater appeared to be interacting with surface water (e.g., groundwater was upwelling out of the MW and nearby ground surfaces contained ponded water due to heavy rains).

Table 6A: Preliminary VI Screening of RI Data Gap Soil Results

Volatile Constituent Detected in Soil	Total Number of Samples Analyzed	Total Number of Samples Detected	Detection Frequency (%)	Minimum Detected Concentration (mg/kg)	Maximum Detected Concentration (ug/L)	Preliminary Soil VI Screening Level [1] (mg/kg)	Maximum Detected Concentration Exceeds Preliminary Soil VI Screening Level?	Soil Concentration and Associated Sample Depth for Sample Locations with Preliminary Soil VI Screening Level Exceedance
TPH-D	18	2	11%	2,600	41,000	10,000	**Yes**	41,000 mg/kg at 2-4 feet bgs in B2
TPH-G	18	5	28%	5.1	190	30	**Yes**	190 mg/kg at 2-4 feet bgs in B2, 120 mg/kg at 5-6 feet bgs in B202
Benzene	16	1	6%	0.34	0.34	0.0088	**Yes**	0.34 mg/kg at 2-4 feet bgs in B2
Ethylbenzene	16	1	6%	0.33	0.33	0.26	**Yes**	0.33 mg/kg at 2-4 feet bgs in B2
Xylenes, Total	16	1	6%	2.5	2.5	14	No	--
1,2,4-Trimethylbenzene	10	3	30%	0.040	10	No Value	No	--
1,3,5-Trimethylbenzene	10	2	20%	0.050	3.6	No Value	No	--
Cumene	10	1	10%	0.56	0.56	No Value	No	--
n-Butylbenzene	10	1	10%	1.4	1.4	No Value	No	--
n-Propylbenzene	10	1	10%	0.95	0.95	No Value	No	--
p-Isopropyltoluene	10	1	10%	1.4	1.4	No Value	No	--
sec-Butylbenzene	10	1	10%	1.3	1.3	No Value	No	--
Naphthalene	16	7	44%	0.022	120	4.5	**Yes**	120 mg/kg at 5-6 feet bgs in B202

Table 6B: Preliminary VI Screening of AO Confirmational Monitoring and RI Data Gap Groundwater Results

Volatile Constituent Detected in Groundwater	Total Number of Samples Analyzed	Total Number of Samples Detected	Detection Frequency (%)	Minimum Detected Concentration (ug/L)	Maximum Detected Concentration (ug/L)	Preliminary Groundwater VI Screening Level [2] (ug/L)	Maximum Detected Concentration Exceeds Preliminary Groundwater VI Screening Level?	Maximum Groundwater Concentration and Associated Sample Depth for Sample Locations with Preliminary Groundwater VI Screening Level Exceedance
TPH-D	63	13	21%	98	5,000	500	**Yes**	4,100 ug/L at $\geq$ 4.4 feet bgs in MW104, 5,000 ug/L at $\geq$ 3.5 feet bgs at B202
TPH-G	27	3	11%	110	1,800	800	**Yes**	1,800 ug/L at $\geq$ 3.5 feet bgs in B202
Benzene	27	1	4%	0.51	0.51	2.4	No	--
Toluene	27	3	11%	1.6	5.0	15,000	No	--
Ethylbenzene	27	2	7%	1.2	4.3	2,800	No	--
Xylenes, Total	27	3	11%	2.6	15	320	No	--
EDB	27	2	7%	0.096	0.11	0.30	No	--
PCE	23	1	4%	3.4	3.4	24	No	--
Trichloroethylene	23	2	9%	0.51	0.55	1.4	No	--
1,2,4-Trimethylbenzene	11	1	9%	3.2	3.2	240	No	--
1,3,5-Trimethylbenzene	11	1	9%	1.1	1.1	170	No	--
Chloroethane	11	1	9%	6.0	6.0	15,000	No	--
Naphthalene	63	21	33%	0.011	1,700	8.9	**Yes**	21 ug/L at $\geq$ 1.2 feet bgs in MW-2, 120 ug/L at $\geq$ 0.40 feet bgs in MW-11, 32 ug/L at $\geq$ 1.4 feet bgs in MW-13, 386 ug/L at $\geq$ 5.0 feet bgs in MW104, 1,700 ug/L at $\geq$ 3.5 feet bgs in B202

Notes:

--: no sample locations exceed the preliminary VI SL; No Value: a screening level cannot be calculated because no values exist in CLARC (Ecology 2021a)

Results are shown as two significant figures in standard notation, except numbers greater than 100 are rounded to a whole number.

[1] The soil-to-groundwater SLs were used to evaluate the soil-to-vapor pathway for VOCs and TPH-G per WAC 173-340-740(3)(b)(iii)(C) and WAC 173-340-745(5)(b)(iii)(C). A value of 10,000 mg/kg was used to evaluate the soil-to-vapor pathway for TPH-D per WAC 173-340-740(3)(b)(iii)(C)(II) and WAC 173-340-745(5)(b)(iii)(C)(II). These preliminary SLs were used for conservative screening purposes to identify potential VI locations of concern. Additional screening and evaluation of the locations with preliminary SL exceedances is presented in the main text and Table 7.

[2] The preliminary groundwater VI screening levels are the groundwater VI screening levels for an unrestricted land use scenario (see Appendix F). These preliminary SLs were used for conservative screening purposes to identify potential VI locations of concern. Additional screening and evaluation of the locations with preliminary SL exceedances is presented in the main text and Table 7.

Table 7: Further Screening of Preliminary VI SL Exceedances

Media	Sample Location with Preliminary VI SL Exceedance [1]	Constituents and Concentrations at Sample Location with Preliminary VI SL Exceedance [1]	Depth to Top of Sample with Preliminary VI SL Exceedance [1] (feet bgs)	Approximate Ground Surface Elevation at Sample Location [2] (feet NAVD88)	Approximate Elevation for Top of Preliminary VI SL Exceedance (feet NAVD88)	Minimum Floor Elevation for Future Occupied Spaces [3] (feet NAVD88)	Vertical Separation Distance Between Top of Preliminary VI SL Exceedance and Floor of Future Occupied Spaces [4] (feet)	Applicable Ecology Screening Criterion [5] (feet)	Does Vertical Separation Distance Satisfy Ecology Screening Criterion?
Soil	B2	TPH-D (41,000 mg/kg), TPH-G (190 mg/kg), Benzene (0.34 mg/kg), Ethylbenzene (0.33 mg/kg)	2.0	14.0	12.0	26	14	15 [6]	**No**
	B202	TPH-G (120 mg/kg), Naphthalene (120 mg/kg)	5.0	14.5	9.5	26	17	15 [7]	Yes
Groundwater	MW104	TPH-D (4,100 ug/L), Naphthalene (386 ug/L)	4.4	14.5	10.1	26	16	6 [8]	Yes
	B202	TPH-D (5,000 ug/L), TPH-G (1,800 ug/L), Naphthalene (1,700 ug/L)	3.5	14.5	11.0	26	15	6 [8]	Yes
	MW-2	Naphthalene (21 ug/L)	1.2	15.0	13.8	26	12	6 [8]	Yes
	MW-11	Naphthalene (120 ug/L)	0.4	15.0	14.6	26	11	6 [8]	Yes
	MW-13	Naphthalene (32 ug/L)	1.4	15.5	14.1	26	12	6 [8]	Yes

Notes:

[1] See Tables 6A and 6B.

[2] Estimated to the nearest 0.5 feet based on the topographic survey information in Appendix C and monitoring well survey information.

[3] The minimum elevation for the floor of occupied spaces in the proposed development is 26 feet NAVD88 (see Appendix B). Subsurface parking garages will be located between elevation 17 feet NAVD88 and 26 feet NAVD88.

[4] Values rounded to the nearest whole number.

[5] Per Ecology's 2016 memo, "the vertical separation distance represents the thickness of clean, biologically active soil between the source of PHC vapors (LNAPL, residual LNAPL, or dissolved PHCs) and the lowest (deepest) point of a receptor" (Ecology 2016). The planned subsurface parking garages were included in the vertical separation distance since (1) no receptors will be living or working in the parking garages, (2) the attenuation in parking garage air is expected to be greater than the attenuation in soil gas, and (3) the concentrations of petroleum vapors in the parking garage air from vehicle use and storage will be substantially greater than the concentrations of petroleum vapors from VI.

[6] Per Ecology's 2016 memo, the applicable vertical separation distance criterion for the B2 soil sample is 15 feet because the weathered TPH-D concentration in that sample was greater than 250 mg/kg (Ecology 2016). The weathered TPH-G and benzene concentrations in the B2 soil sample meet the concentration criteria for using a 6 feet vertical separation distance.

[7] Although there is no concentration criterion for naphthalene in Ecology's 2016 memo, the applicable vertical separation distance criterion for the B202 soil sample was conservatively assumed to be 15 feet because the naphthalene concentration of 120 mg/kg in that sample was greater than the benzene concentration criterion of 10 mg/kg (Ecology 2016). The weathered TPH-G concentration in the B202 soil sample meets the concentration criterion for using a 6 feet vertical separation distance.

[8] The applicable vertical separation distance criterion for all of the groundwater samples with a VI SL exceedance is 6 feet because all of the TPH-G and TPH-D concentrations in these samples were less than 30,000 ug/L (Ecology 2016). In addition, the 6 feet criterion is most likely appropriate for the naphthalene SL exceedances since all of the naphthalene concentrations were less than the benzene concentration criterion of 5,000 ug/L and benzene has a lower groundwater VI SL than naphthalene.