



Targeted Brownfields Assessment Report OMSI District Road Parcels, Portland, OR

Prepared for:

U.S. Environmental Protection Agency, Region 10
1200 6th Avenue
Seattle, WA 98101

Prepared by:

Eastern Research Group, Inc.
14555 Avion Parkway
Suite 200
Chantilly, VA 20151-1102

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Targeted Brownfield Assessment Report OMSI District Road Parcels, Portland, OR

Brook McKeown - ERG Project Manager

Date

Jon Munkers - Alta Project Manager

Date

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Acronyms and Abbreviations

ABCA	Analysis of Brownfields Cleanup Alternatives
ACBM	asbestos-containing building materials
Alta	Alta Science & Engineering, Inc.
AOC	Area of Concern
AST	aboveground storage tank
ASTM	ASTM International
AUUL	Advanced Underground Utility Locating Inc.
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
BTEXN	benzene, toluene, ethylbenzene, total xylenes, and naphthalene
COC	constituent of concern
CRL	Confirmed Release List
DCE	dichloroethene
DQO	data quality objective
ECSI	Environmental Cleanup Site Information
EDB	ethylene dibromide
EDC	1,2-dichloroethane
EDR	Environmental Data Resources, Inc.
EPA	U.S. Environmental Protection Agency
ESA	Environmental Site Assessment
Holt	Holt Services, Inc.
HSIS	Hazardous Substance Information Survey
IDW	investigation-derived waste
ISM	Incremental Sampling Methodology
LCS	laboratory control sample
LUST	leaking underground storage tank
MCL	Maximum Contaminant Level
MDL	method detection limit
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
MTBE	methyl tert-butyl ether
OMSI	Oregon Museum of Science & Industry
ODEQ	Oregon Department of Environmental Quality
Pace	Pace Analytical
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCS	petroleum contaminated soil

PERC	perchloroethylene
PFAS	per- and polyfluoroalkyl substances
PGE	Portland General Electric
PID	photo-ionization detector
ppb	parts per billion
PPM	priority pollutant metals
PVC	polyvinyl chloride
QAPP	Quality Assurance Project Plan
QAO	Quality Assurance Officer
QA/QC	quality assurance/quality control
RCRA	Resource Conservation and Recovery Act
REC	recognized environmental condition
RBC	Risk Based Concentration
RL	reporting limit
RSL	Regional Screening Level
SIM	select ion monitoring
TBA	Targeted Brownfields Assessment
TCE	trichloroethylene
TPH	total petroleum hydrocarbon
TPH-GRO	total petroleum hydrocarbons as gasoline range organics
TPH-DRO	total petroleum hydrocarbon as diesel range organics
TPH-MRO	total petroleum hydrocarbon as motor oil/lube range organics
TriMet	Tri-County Metropolitan Transportation District of Oregon
UIC	underground injection control
USCS	Unified Soil Classification System
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
VCP	Voluntary Cleanup Program
VOC	volatile organic compound
XRF	X-ray fluorescence

Executive Summary

The U.S. Environmental Protection Agency (EPA) Region 10 Targeted Brownfields Assessment Program engaged Eastern Research Group, Inc. to conduct a Targeted Brownfields Assessment (TBA) of the Oregon Museum of Science & Industry (OMSI, or the Applicant) District Road Parcels Site (the Site) located in Portland, OR (Figure 1). The TBA included a preliminary Phase I Environmental Site Assessment (ESA) to identify the presence of recognized environmental conditions (RECs), followed by a Phase II ESA, to acquire information regarding the nature of contamination (if present) and risks posed by that contamination to support future cleanup of the Site.

The entire OMSI District is 26.09 acres comprised of 10 different parcels, bordered on the west by the Willamette River, on the east by the Union Pacific railroad, on the north by SE Market St and SE Clay St and on the south by SE Caruthers St and SE Tilikum Way. The Site assessed through this TBA includes approximately 5 acres on portions of four parcels within the OMSI District. The parcels are owned by the City of Portland Bureau of Transportation (existing right-of-way), City of Portland Water Bureau (Tax Lot 4300), Portland General Electric Co. (PGE) (Tax Lot 4400), and Tri-County Metropolitan Transportation District of Oregon (TriMet) (Tax Lot 4500).

ERG performed a Phase I Environmental Site Assessment (ESA) of the OMSI District Road Parcels Site in Portland, OR, in conformance with the scope and limitations of the ASTM Standard. The assessment identified the following known or suspected RECs:

- **Historical Use of the Site:** The following are descriptions of the historical Site uses of each parcel within the TBA Site.

The City of Portland Bureau of Transportation right-of-way was historically part of the Campbell Stone Yard and the Portland Railway Light and Power tracks and yard. Based on aerial imagery, railroad tracks were present on the site until the late 1990s. The current structure on the Site is visible beginning in the 1969 Sanborn map.

Tax Lot 4300, owned by the City of Portland Water Bureau has been used for water pipeline conveyance since the early 1900s. The eastern portion of the parcel has been in railroad use since the early 1900s. Historical aerial imagery indicates that this parcel was used for storage (shipping containers, sheds, vehicles, etc.) from the early 2000s until approximately 2020.

Tax Lot 4400 contains the former PGEs Stephens Substation, which was part of a complex of six buildings that made up PGE's Station L Group. Stephen's Substation was used as an electrical substation from 1929 until 2020 and housed oil-filled and non-oil-filled electrical equipment such as transformers, regulators, capacitors, circuit breakers, switchgear, cable, and other associated equipment. Remedial actions were conducted on the property, which concluded in 2021, and Oregon Department of Environmental Quality (ODEQ) determined that the remedial action to address environmental contamination was complete and No Further Action was required. Based on a review of historical sources, it does not appear that major operations or storage activities were concentrated on the eastern portion of Tax Lot 4400 that is part of the TBA Site, however, it is assumed that any of these historical activities may have occurred on the TBA Site area.

Tax Lot 4500 contained a structure in the early 1900s that, according to historical Sanborn fire insurance maps, was used for blacksmith, oil house, pipe shop, machine shop, and sand. A railroad spur on Tax Lot 4500 has been present since the 1920s.

The entire Site has a history of railroad use. Railroad tracks and spurs represent environmental concerns due to the potential of historical application or transport of hazardous substances or petroleum products. Contamination resulting from activities in the railroad right-of-way would likely be confined to the near subsurface sediments.

- **Known Soil Contamination at the Site:** The 2009 Phase II ESA of Tax Lot 4500 identified lead in shallow soils (up to depths of 3 feet below ground surface [bgs]) at a concentration that exceeds ODEQ Residential Risk Based Concentration (RBC) for Leaching to Groundwater and identified petroleum constituents and polychlorinated biphenyls (PCBs) in shallow soils at concentrations below ODEQ's most stringent RBCs (PBS 2009). Sampling results were limited to shallow surface soils and soils at 15 feet bgs.
- **Known and Suspected Groundwater Contamination at the Site:** The 2021 Remedial Action Closeout Report for the PGE Stephens Substation (Tax Lot 4400) identified detections of arsenic above the RBCs for residential and occupational tapwater and ethylbenzene above the RBC for residential tapwater (Bridgewater 2021).

The Oregon Environmental Cleanup Site Information (ECSI) database identified the "Groundwater – SE 1ST Ave & Stevens St" site, which is suspected to be on Lot 4400 or 4500. The exact location of the site is unknown and limited information is provided. The database notes that in 1987, two wells had maximum detections of perchloroethylene (PERC) at 73 parts per billion (ppb) and trichloroethylene (TCE) at 23 ppb. According to the ECSI database listing, by 1990, these wells had disappeared and new upgradient well was installed on the PGE/OMSI property. In 1993, this well was sampled with maximum concentrations of PERC at 41 ppb and TCE at 5.4 ppb detected. The source of the groundwater contamination is unknown.

- **Unknown Impacts to Site Soils from Suspected Lead-based Paint.** During the Phase I ESA site visit, paint chips were observed surrounding several stationary railcars at the Site (located on Tax Lot 4500). The age of the rail cars and whether they were coated with lead-based paints are unknown, however, the presence of lead-based paint cannot be ruled out as a possibility.

The Phase I ESA also identified the following Areas of Concern (AOCs), which may not meet the definition of a REC but may be a relevant finding and may represent data gaps in the context of the TBA process.

- **Historical Use of Adjoining Properties:** The general area surrounding the Site has an extensive history of commercial and industrial uses. Pioneer Waterproofing (to the west of Tax Lot 4400) was formerly located on the adjacent property (Tax Lot 1702). Railroad tracks border the Site to the east. The former PGE Station L facility, with documented contamination of PCBs, Total Petroleum Hydrocarbon (TPH), polycyclic aromatic hydrocarbons (PAHs), and metals in soil, as well as volatile organic compounds (VOCs), PAHs and metals in groundwater is located west of the Site. Remedial excavations occurred at the PGE Station L facility in the late 1980s and early 1990s in conjunction with the decommissioning of storage tanks and general site remediation. The PGE Station L site was issued a No Further Action Record of Decision in 1994, while acknowledging that groundwater cleanup for benzene on the northern portion of the site was ongoing. PGE donated 18 acres of the Station L site to OMSI in 1986. The EDR review of City Directories identified multiple historical facilities including a waterproofing facility, chemical manufacturing, metals plating, a fuel company, commercial iron works, and a machine shop/foundry.

- **Federal and State Database Listings of Surrounding Sites:** The April 2023 EDR report identified multiple nearby properties on state or federal environmental databases. Over 300 sites were identified within 1 one mile of the TBA Site. Several sites adjacent to the TBA Site or upgradient and within a quarter mile were listed on databases of concern including the Oregon Environmental Cleanup Site Information (ECSI), Leaking Underground Storage Tank (LUST), Oregon Voluntary Cleanup Program (VCP), Brownfields, SPILLS, HAZMAT, Engineering Controls, Institutional Controls, Oregon Confirmed Release List (CRL), Environmental Data Resources (EDR) Historic Auto List, EDR Historic Cleaner List, Oregon Solid Waste Facilities/Landfill Sites. Notable sites are discussed below due to the nature of the listing and/or proximity to the TBA Site.
 - The “East Side Plating, Inc. Plant 4”, “1988 SE 3rd Avenue”, and “Byrum Morehouse Building” sites are located within close proximity of each other, approximately 200 to 500 feet east and upgradient of the TBA Site. The ECSI database indicates likelihood that the East Side Plating facility released metals and solvents to soil/groundwater and a 2018 Phase II ESA of 1988 SE 3rd Ave (the East Side Plating site) identified that arsenic and hexavalent chromium were detected in soils above the Urban Residential RBC and that chloroform was detected in groundwater in excess of the Urban Residential RBC (Farallon 2018).
 - The Crescent Park Site is located approximately 100 feet northwest of the subject property. TPH as diesel range organics (TPH-DRO) was detected in one sample collected from the bottom of a cesspool drywell at a concentration above the Urban Residential RBC for Leaching to Groundwater. TPH as residual range organics (TPH-RRO) was detected in soil, but there was no RBC for comparison. Benzo(a)pyrene was detected in soils above RBCs in various locations around the site. PCB aroclors were detected in soils and one sample exceeded the Urban Residential RBC. Arsenic and lead were detected in soils at concentrations that exceeded Urban Residential and/or Occupational RBCs (Integral 2011). ODEQ determined that no remediation was required based on current and future likely uses, and the site was granted No Further Action status in May 2013.
 - The “Bent 3 – Portland Streetcar Extension” site is adjacent to the TBA Site to the southeast. Exceedances for diesel, lube oil, lead and PAHs in soils were detected in four locations, referred to as “bents” or vertical structural supports, associated with the expansion of the Portland Streetcar during environmental assessments conducted in 2009 and 2010. Remedial activities were restricted to these four discrete locations as part of a construction project; however, based on the database listing, it is not known if petroleum contamination exists beyond the bent locations.
 - The Portland Harbor Superfund Site is located approximately one mile downgradient of the TBA Site. Water and sediment at the Portland Harbor Site are contaminated with many hazardous substances, including PCBs, PAHs, dioxins/furans, pesticides and heavy metals (EPA 2024).

Considering the widespread nature of current and historic industrial operations as well as known contamination in the vicinity of the TBA Site, it is possible that the TBA Site could have been impacted by off-site sources of contamination. Environmental sampling would provide more definitive information.

- **Staining:** De minimis staining under the railcars on the Tri-Met property (Tax Lot 4500) was observed at the time of the Site reconnaissance.
- **Fill:** A 2015 geotechnical evaluation conducted by Shannon and Wilson for OMSI, focused on parcels adjacent to the Site, noted that the area generally south and west of the Site appears to be covered with undocumented fill at depths ranging from 2 to 23.5 feet bgs. It is likely that other portions of the Site may also be underlain with fill, although specific information on the presence of fill or buried materials at the Site is not known.

During the Phase II ESA, ERG collected subsurface soil samples, dripline soil samples adjacent to the four stationary railcars, and groundwater samples. The findings from the Phase II ESA are presented by individual property below:

- **Tax Lot 4500 (Tri-County Metropolitan Transportation District of Oregon):** One temporary groundwater monitoring well (TMW-1) was installed, four soil borings (BH-1, BH-2, BH-6, and BH-7) were advanced, and four soil composite samples representing the west side from each of the four stationary railcars (RC1 through RC4) along the dripline on Tax Lot 4500 were collected (Figure 2).

No constituents of concern (COCs) were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, EPA Regional Screening Levels (RSLs) for Resident Tap Water, or EPA Maximum Contaminant Levels (MCLs) for drinking water. No COCs were detected in subsurface soil samples or from dripline soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or RSLs for Construction Workers.

- **Tax Lot 4400 (Portland General Electric Co.):** One temporary groundwater monitoring well (TMW-2) was installed and three soil borings (BH-3, BH-4, and BH-5) were advanced on Tax Lot 4400.

1,4-dioxane was detected at concentrations above the RSL for Resident Tapwater (0.00046 milligrams per liter [mg/L]) (EPA 2023a) at TMW-2. However, 1,4-dioxane concentrations in this sample were below the ODEQ RBCs for Construction/Excavations Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a).

No other COCs were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, EPA RSLs for Resident Tapwater, or MCLs. No COCs were detected in subsurface soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or EPA RSLs for Construction Workers.

- **Tax Lot 4300 (City of Portland Water Bureau):** Due to major city utilities in this area, no subsurface soil or groundwater samples were collected from this area. BH-8 and TMW-3, located on the right-of-way (City of Portland Bureau of Transportation), are adjacent to the fence that separates Tax Lot 4300 and the City of Portland Bureau of Transportation property.
- **Right-of-Way (City of Portland Bureau of Transportation):** Three temporary groundwater monitoring wells (TMW-3, TMW-4, and TMW-5) were installed and six soil borings (BH-8 through BH-13) were advanced on the City of Portland Bureau of Transportation property.

1,4-dioxane was detected at concentrations above EPA RSL for Resident Tapwater (0.00046 milligrams per liter [mg/L]) (EPA 2023a) at TMW-3 and TMW-4. However, 1,4-dioxane concentrations in these samples were below the ODEQ RBC for Construction/Excavations Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a).

No other COCs were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, RSLs for Resident Tapwater, or MCLs. No COCs were detected in subsurface soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or EPA RSLs for Construction Workers.

Based on field observations, available information, and Site-specific data collected, ERG concludes the following:

- Photoionization detector (PID) readings, visual and olfactory observations, and analytical data suggest that Site soils and groundwater are not impacted by petroleum contamination.
- During drilling, ERG's Field Team encountered groundwater from approximately 12-20 feet bgs. Depending on the depth of excavation for the proposed road construction, potential intrusion of shallow groundwater during excavation activities may occur.
- 1,4-dioxane in groundwater was detected at concentrations above EPA RSL for Resident Tapwater criteria of 0.00046 milligrams per Liter (mg/L) (EPA 2023a) throughout the Site. However, Site-wide 1,4-dioxane groundwater concentrations are below the ODEQ RBC for Construction/Excavation Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a) and therefore is unlikely to pose a risk to workers during Site construction activities.
- The presence of 1,4-dioxane in groundwater at concentrations above RSL for Resident Tapwater indicates that there may be risks to future residents who drink groundwater extracted from the Site; however, this is unlikely based on the proposed Site use as a roadway.
- During the Phase II ESA, wood debris and buried metal were observed during soil boring activities. In the vicinity of the City of Portland Bureau of Transportation property, a potentially buried rail spur was observed while clearing the boring locations prior to drilling. Fill and unidentified buried debris and materials (such as drums and tanks that could have once contained chemicals) could be encountered during excavation and redevelopment activities and could impact the road construction activities.

Based on the available information and site-specific data collected during the Phase II investigation, ERG does not recommend the development of an Analysis of Brownfields Cleanup Alternatives (ABCA). However, the applicant should consider the following:

- Due to the possibility of shallow groundwater intrusion, a contingency plan for dewatering and disposal should be developed prior to construction.
- A contingency plan for soil disposal should be developed prior to construction in the event that drums, tanks, or other unidentified potential contaminant sources are uncovered during excavation and site development activities.
- A geotechnical evaluation of the Site to determine the extent of fill including buried metal and wood waste is recommended.

1.0 Introduction

1.1 Purpose and Involved Parties

ERG was contracted by EPA on behalf of the Oregon Museum of Science & Industry (OMSI, or the Applicant) to conduct a Targeted Brownfields Assessment (TBA) of the OMSI District Road Parcels Site (the “Site” or the “property”) located in Portland, Oregon. EPA’s TBA program helps states, tribes, and municipalities minimize the uncertainties of contamination often associated with brownfield sites. This program supplements other efforts under the Brownfields Program to promote the cleanup and redevelopment of brownfield sites. The TBA consists of a Phase I and Phase II Environmental Site Assessment (ESA) that was completed in conformance with ASTM International’s Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E1527-21 (ASTM 2021) and Phase II Environmental Site Assessment Process E1903-19 (ASTM 2019), respectively.

ERG was contracted to complete this work under EPA Contract No. 68HERH19D0017, Task Order 16. ERG subcontracted with Alta Science and Engineering, Inc. (Alta) to provide additional technical and field support in conducting the Phase I and Phase II ESAs and preparing the TBA Report.

The purpose of the Phase I assessment was to identify any recognized environmental conditions (RECs) or other areas of concern that may pose a risk to human health or the environment based on potential future re-use of the property. A REC, as defined by the ASTM International’s Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process E1527-21, is: “1) the presence of hazardous substances or petroleum products in, on, or at the subject property due to a release to the environment; 2) the likely presence of hazardous substances or petroleum products in, on, or at the subject property due to a release or likely release to the environment; or 3) the presence of hazardous substances or petroleum products in, on, or at the subject property under conditions that post a material threat of a future release to the environment.” An Area of Concern (AOC) does not meet the definition of a REC but may still be a relevant finding in the context of the TBA process.

The purpose of the Phase II assessment was to confirm the presence or absence of RECs and AOCs identified in the Phase I assessment, and to acquire information regarding the nature of contamination (if present) and risks posed by that contamination to support future cleanup and reuse of the Site.

1.2 Scope of the Assessment

ERG completed the following tasks during its Phase I and Phase II ESAs of the Site:

- A visit to the Site by Jon Munkers of Alta on August 2, 2023 to complete the Phase I ESA site reconnaissance activities. During the Site visit, the Mr. Munkers observed the exterior features of the Site and current uses and conditions of Site and the adjoining properties. No interiors of the onsite buildings were accessible and/or observed. Mr. Munkers conducted informal interviews with OMSI staff and property owners who may have knowledge of previous Site assessment activities and uses. Photographs were taken during the site visit and are presented in Appendix A.
- A review of information contained in federal and state environmental databases, historical sources, and physical setting sources including the following:
 - A radius report prepared by Environmental Database Sources, Inc. (EDR, see Appendix B), which presents the results of the searches of federal and state databases for the Site

- as well as properties near the Site. The EDR report also includes geologic, hydrogeologic, and hydrologic sources, including the current United States Geological Survey (USGS) 7.5-minute topographic map for the site and historical sources (where available) such as aerial photographs, historical topographic maps, city directories, and Sanborn maps.
- The EPA’s Envirofacts database and Oregon Department of Environmental Quality’s (ODEQ’s) Environmental Cleanup Site Information database (ODEQ 2023b).
 - A review of documents provided to ERG by the Applicant. The Applicant provided over 70 historic documents and reports. Reports that pertain to the Site are listed below; these and other select reports that pertain to nearby sites are further discussed in Section 3.4:
 - “Phase II Environmental Site Assessment, Lot 4500, SE Stephens Street and Water Avenue”, prepared by PBS Engineering and Environmental, dated August 2009 (PBS 2009);
 - “Limited Groundwater Investigation Results, Stephens Substation, 1900 SE Water Avenue, Portland, Oregon” prepared by Bridgewater Group, dated August 2020 (Bridgewater 2020); and,
 - “Remedial Action Closeout Report, Stephens Substation, 1900 SE Water Avenue, Portland, Oregon”, prepared by Bridgewater Group, dated January 2021 (Bridgewater 2021).
 - A Phase II ESA was conducted at the Site on January 22 through January 25, 2024 by Brett McLees and Brady Brandley of Alta and Jackson Bates of ERG. ERG notified Oregon Utility Notification center and subcontracted with Advanced Underground Utility Locating Inc (AUUL) to locate underground utilities prior to excavation activities. Holt Services, Inc (Holt) provided support developing soil borings and temporary groundwater wells. Holt cleared the boring locations with a combination of hand tools and soft digging methods (air and a vacuum truck) to depths ranging from 4 to 8 feet bgs to avoid damage to subsurface utilities. A track-mounted Geoprobe 7822DT Combo Rig equipped with an automatic drop hammer was utilized to drive a dual tube Geoprobe® 2.5-inch diameter 5-foot length macro-core barrel in 5-foot intervals (0-5 feet, 5-10 feet, 10-15 feet, etc.) to the target depth of approximately 30 feet bgs.
 - The field work consisted of the following samples:
 - Thirteen subsurface soil grab samples and 32 subsurface soil composite samples from 13 soil boring locations to evaluate concentrations of target analytes in subsurface soils;
 - Four dripline soil samples from the west perimeter along the dripline/foundation area of the four stationary railroad cars to evaluate concentrations of target analytes in surface soils; and,
 - Five temporary groundwater monitoring wells were constructed and sampled for target analytes.
 - Phase II sampling was conducted in accordance with the Quality Assurance Project Plan (QAPP) approved by EPA on January 19, 2024. Any deviations from the approved QAPP are described in Section 7.1.

1.3 Reliance and Limitations

The TBA Report has been prepared solely for the use and benefit of EPA and the Applicant. Any use of this document or information provided herein by persons or entities other than EPA and the Applicant without express written consent of ERG will be at the sole risk and liability of said person or entity.

The conclusions presented in this report represent ERG's best professional judgment based upon the information available and conditions existing as of the date of this report. In performing this work, ERG relied upon publicly available information, information provided by EPA and the Applicant, and information provided by third parties. Accordingly, the conclusions in this report are valid only to the extent that the information provided to ERG was accurate and complete. This review is not intended as legal advice, nor is it an exhaustive review of site conditions. ERG makes no representations or warranties, expressed or implied, about the conditions of the Site.

2.0 Site Description

2.1 Site Setting

The Site is located in the city of Portland, OR, at 45.50944 degrees North Latitude and 112.66445 degrees West Longitude, within the southeast $\frac{1}{4}$ of Section 3, Township 1 South, Range 1 East, Willamette Principal Meridian. The entire OMSI District is 26.09 acres comprised of 10 different parcels, bordered on the west by the Willamette River, on the east by the Union Pacific railroad, on the north by SE Market St and SE Clay St and on the south by SE Caruthers St and SE Tilikum Way. The Site assessed through this TBA includes approximately 5 acres on portions of four parcels within the OMSI District. The parcels are owned by the City of Portland Bureau of Transportation (existing right-of-way), City of Portland Water Bureau (Tax Lot 4300), Portland General Electric Co. (PGE) (Tax Lot 4400), and Tri-County Metropolitan Transportation District of Oregon (TriMet) (Tax Lot 4500). Figure 1 provides an aerial photograph with the portions of these parcels that are included in the TBA Site.

Based on the TBA Application submitted by OMSI, the proposed future use of the TBA Site is a paved roadway, more specifically the realignment of SE Water Avenue from its current location to the parcels assessed through this TBA. The TBA application notes that the road parcels are within the larger OMSI District redevelopment project, which proposes a stepped hierarchy of streets to support a thriving, mixed use district while facilitating existing freight and commuter traffic.

Additional physical setting information is provided below:

- **Elevation:** Ranges from approximately 20 feet near the northwest property boundary to 26 feet near the southwest portion of the Site (USGS topographic map, Google Earth).
- **Topography:** The topography of the Site and the area surrounding the site is generally flat, with elevations generally sloping west toward the Willamette River.
- **Nearest Surface Water Body:** The Willamette River, located approximately 450 feet to the west of the Site, is the nearest surface water body.
- **Flood Plain:** The Site is not mapped within the Federal Emergency Management Agency Flood Map Service Center (FEMA 2024).
- **Wetlands:** No federally designated wetlands were identified on site, although there are federally designated wetlands within one mile of the Site. The primary habitat feature noted on the

National Wetland Inventory is the Willamette River, which is classified as Riverine habitat (USFWS 2024).

- **Depth to Groundwater:** Historic reports indicate that depth to groundwater at the Site is approximately 16 to 25 feet bgs and groundwater was encountered at approximately 12 to 20 feet bgs during Phase II sampling activities conducted in January 2024.
- **Presumed Direction of Groundwater Flow:** Based on site topography, approximate depth to groundwater, and the location relative to the Willamette River, groundwater is presumed to flow to the west.
- **Geology:** During the Phase II activities conducted in January 2024, sand with coarse gravel were encountered at the Site up to a depth of 25 feet bgs, with poorly graded sands with silts increasing with depths below 30 feet bgs. Additional information on site geology is provided in Section 7.2 and Appendix C.
- **On-site Wells and Nearest Groundwater Supply Wells:** Three wells were identified and confirmed to be near the Site. The stated use of two of the wells is “dewatering”. These wells are located approximately 150 feet southwest of the Site. The stated use of the third is “industrial”. This well is located approximately 500 feet northeast of the Site. No groundwater supply or federally registered wells were identified downgradient from the Site within one mile.

2.2 Current Property Use

The current Site use is commercial and industrial with some vacant properties. Current Site use is described below for each individual parcel within the TBA Site. Additional Site conditions and observations are included in Section 5.0.

- **City of Portland Bureau of Transportation (right-of-way):** This portion of the Site currently contains paved and unpaved parking areas, one warehouse structure, and a rail spur terminus.
- **Tax Lot 4300, owned by the City of Portland Water Bureau:** This portion of the Site is currently vacant and lightly vegetated with volunteer shrubs and weeds, with an underground drinking water transmission pipeline.
- **The eastern portion of Tax Lot 4400, owned by PGE:** This area of the TBA Site is the eastern portion of the former PGE Stephens Substation, an electrical substation. The electrical substation equipment is no longer present and this portion of the Site currently contains a vacant gravel area surrounded by a 10-foot-tall concrete wall.
- **Tax Lot 4500, owned by TriMet:** This portion of the Site currently contains rail spurs, including a rail spur with multiple permanent rail cars converted for commercial uses. Other areas on this property are gravel-covered.

2.3 Current Use of the Adjoining Properties

The general area surrounding the Site has an extensive history of commercial and industrial uses. Select properties are noted below due to suspected or known contamination, proximity to the Site, or availability of information regarding the property history and assessment.

The Site is bordered on the west by the remainder of Tax Lot 4400 and by Tax Lot 1702. The western portion of Tax Lot 4400 is outside the boundary of the TBA and contains the former Stephens Substation control building and vacant land. Additionally, transformers (not in use) are staged and stored on wooden pallets on this property. Tax Lot 1702 currently contains three commercial buildings and vacant land.

The Site is bordered on the north by Portland Community College - CLIMB Center, a classroom and office facility, and paved parking lot.

The Site is bordered on the east by railroad tracks owned by Union Pacific Railroad Company. Properties to the east of the railroad tracks contain commercial and industrial buildings, including a warehouse, a laundry service, a flooring store, and vacant land.

The Site is bordered on the south by SE Water Ave. Properties to the south and west of SE Water Ave contain the OMSI campus, Oregon Rail Heritage Center, commercial buildings, parking lots, rail lines and vacant land.

3.0 Phase I Review of Public Records and Other Information Sources

3.1 Regulatory Database Research

ERG reviewed records from standard EDR in accordance with ASTM E1527-21. State and Federal database listings are documented in an EDR Radius Map Report dated April 7, 2023, which includes listings for properties located within approximately one mile of the Site. A copy of the EDR Radius Report is provided in Appendix B.

Additional searches were conducted on federal and state databases to supplement the EDR Radius Report. If relevant information was identified across these searches, it is discussed in the sections below.

3.1.1 Database Review for the Subject Site

The following parcels that comprise the TBA Site were identified in the databases searched by EDR.

- **“PGE Stephens Substation”**, which includes the portion of the TBA Site on Lot 4400, is listed on the Oregon Environmental Cleanup Site Information (ECSI) database, the Oregon Voluntary Cleanup Program (VCP) database and the Hazardous Substance Information Survey (HSIS) database. The ECSI database listing states that this site received an agreement letter from the state VCP in February 2020 related to soil contaminated with polychlorinated biphenyls (PCBs), metals, and polycyclic aromatic hydrocarbons (PAHs). A site investigation was conducted in April 2020 and the site obtained No Further Action status in February 2021 with a consent order in place. More detailed information on the site investigation and No Further Action order is discussed in Section 3.4. The VCP database listing is consistent with the ECSI database and does not include any additional information. The HSIS database includes Tier II inventory reporting data, which requires facilities to report on hazardous substances stored at the site. The listing indicates that lead acid batteries were stored at this location in 2018.
- **“Groundwater – SE 1ST Ave & Stevens St”**. The exact location of this site is not known, however, the coordinates associated with the listing are located on Lot 4400 and is described as “adjacent

to the Southern Pacific Transportation Co. Line”. This site is listed on the Oregon Confirmed Release List (CRL) and ECSI database. The site is listed on the CRL database with a status of “remedial action recommended”. No additional information on the substances released or the quantities are provided. The ECSI database listing states that as part of the PCB cleanup at PGE Station L (adjacent to the west of the TBA Site) two off-site and upgradient groundwater monitoring wells were installed. In 1987, the wells had maximum detections of PERC at 73 ppb and TCE at 23 ppb. According to the ECSI database listing, by 1990, these wells had disappeared and new upgradient well was installed on the PGE/OMSI property. In 1993, this well was sampled with maximum concentrations of PERC at 41 ppb and TCE at 5.4 ppb detected. The source of the groundwater contamination is unknown. Information indicates that these wells may have been located on the former Portland Traction Company, but the locations have not been confirmed. Based on a review of the ECSI database, the site was added to the CRL in September 1995 based on the groundwater sampling data. There are no subsequent actions listed for the site. The ECSI listing indicates that there may have been detections of PERC and TCE in groundwater on Lot 4400 or 4500 in the late 1980s and early 1990s. Potential impacts to the subject property are discussed further in Section 6.0.

- **“Union Pacific RR Portland Traction Co”.** This site is identified on the ODEQ Underground Storage Tank (UST) and Leaking Underground Storage Tank (LUST) lists with an address of 1640 SE Water Avenue. 1640 SE Water Avenue does not correspond to a currently known address. It is possible that this site is located on the City of Portland Bureau of Transportation right-of-way. ODEQ’s LUST database identified that petroleum contaminated soil (PCS) was encountered at this site in 1990 during a diesel UST removal and approximately 54 cubic yards of PCS was removed and disposed of off-site. Based on the results of confirmatory soil samples collected from the excavation area and analyzed for total petroleum hydrocarbons (TPH), ODEQ issued a No Further Action letter to Portland Traction Company in 1992. The ODEQ UST database indicates that there was one diesel UST that was removed and the site was closed in 1992; it is assumed that this is the same tank identified in the LUST database.

3.1.2 Database Review for Surrounding Sites

Multiple properties within one mile of the subject site were identified in the databases searched by EDR. The information below includes all listings for adjacent sites in databases that could indicate potential contamination concerns, and any upgradient facilities from the subject property on databases that could indicate potential contamination concerns that have not received closure. Based on the large number of listings identified within one mile of the subject site (over 300), the discussion below only includes listings within a quarter mile of the site. Complete database search results can be viewed in Appendix B.

Adjacent Properties

- **“Pioneer Waterproofing”, 1800 SE Water Ave, Adjacent to the West.** This site is listed on the Oregon Underground Injection Control (UIC) database as formerly having a 5D2 UIC well for stormwater drainage, which now has a status of “formal closure”, which means that the well was approved for closure by ODEQ. Per ODEQ’s website on well classification¹, “5D2” wells are

¹ <https://www.oregon.gov/deq/wq/wqpermits/Pages/UIC-Federal-Classifications.aspx>

utilized for “stormwater injection systems such as sumps, drywells and commonly receiving stormwater runoff from roof drains, parking areas, and roads”.

- **“Bent 3 – Portland Streetcar Extension”, SE 3rd Ave & Lincoln, Adjacent to the Southeast.** This site is listed on the Oregon ECSI database with “Closeout Activities” having been completed in March 2012 for hydrocarbon contamination in soils. Based on a review of a site map within ECSI’s database, the site appears to be comprised of four locations where support pillars or “bents” were planned to be constructed as part of a viaduct for public transportation (Portland Street Car). Exceedances for diesel, lube oil, lead and PAHs in soils were detected in different bent locations during environmental assessments conducted in 2009 and 2010. In 2010, a total of 937.01 tons of petroleum contaminated soils were removed from the four bent locations; however, based on the database listing, it is not known if petroleum contamination exists beyond the bent locations. Remedial activities were restricted to these four discrete locations as part of a construction project. Potential impacts to the subject property from adjacent properties are discussed further in Section 6.0.
- **“OMSI”, 1701 SE Water Ave, Adjacent to the West.** This site is listed on the ECSI, VCP, Oregon Brownfields, Oregon UIC, LUST, and UST databases. The ECSI, VCP, Brownfields and Oregon UIC database listings are related to the Crescent Park Site, which is a part of the larger OMSI District. Information from these listings and from other environmental reports related to this site are discussed further in Section 3.4.3. The LUST listing is associated with the former PGE Station L, which is also a part of the larger OMSI District. The LUST listing does not include information on the materials released; however, the cleanup is noted as having been complete as of March 1990. The UST listing indicates that 14 UST were removed.
- **“OMSI Redevelopment”, 1945 SE Water Ave, Adjacent to the Southwest.** This site is listed on the ECSI, VCP, SPILLS, OR HAZMAT, and National Pollutant Discharge Elimination System (NPDES) databases. The ECSI database identifies that it is a suspect site requiring further investigation but does not provide specific information regarding the type or extent of contamination. The listing in the SPILLS database relate to spills that occurred in the Willamette River and are not expected to impact the TBA Site. The OR HAZMAT listing is related to a small quantity of picric acid which was found near the OMSI museum and was disposed of off-site by Portland police. The NPDES listing relates to the wastewater discharge permit for the OMSI museum.
- **“Portland General Electric ST L”, 1841 SE Water Ave, Adjacent to the West.** This site is listed on the ECSI, CRL, Engineering Controls and Brownfields databases. The ECSI listing states that several areas of this site were used to store electrical equipment, including during time periods when PCBs were known to be used in oils within electrical equipment. Contaminants of concern for the site are listed as PCBs, heavy metals, benzene, toluene, ethylbenzene and xylene (BTEX) and PAHs. River sediment remediation, including dredging and capping, was conducted in 1990 and 1991. A certificate of completion for the river sediment remedial actions was issued from ODEQ in 1991. Operation, maintenance, and monitoring of the sediment cap is ongoing as engineering controls for this site. An additional investigation and simultaneous cleanup on the remainder of the 28-acre Station L property was conducted from 1986 to 1994 (Phase III Investigation). The PGE Station L site was issued a No Further Action Record of Decision in 1994, while acknowledging that groundwater cleanup for benzene on the northern portion of the site was ongoing. Additional information on the PGE Station L site investigation and remediation is included in Section 3.4.3.

- **“Oregon Rail Heritage Foundation”, Between SE Grand Ave and Water Ave at Grant St, Adjacent to the Southeast.** This site is listed on the ECSI, CRL, Engineering Controls, Institutional Controls, VCP and Brownfields databases. The ECSI listing indicates that the site sits on top of Stephens Slough, a 1,500-foot long waterway that extended from the east bank of the River to SE Division Street. From approximately 1890 to 1954, the Inman-Poulsen Lumber Mill was operated at the site. In the late 1800s, the lumber mill disposed of wood waste in Stephens Slough and the saw dust fill reportedly extends from about 4 to 45 feet bgs at the site. The site was also reportedly used as a telephone pole storage yard and a PGE right-of-way. Contaminants of concern at the site were petroleum hydrocarbons, PAHs, VOCs, as well as methane generated from the buried wood waste. During site construction activities, almost 3,000 tons of contaminated soil were removed from the site for disposal and an additional 3,000 cubic yards of soil were removed from the site to be used as cover for a regional landfill. The site installed a Methane Barrier and Venting system and has a methane monitoring plan in place. Based on these corrective actions and engineering controls, the site was granted No Further Action status in March 2013. Information in other database listings for this site is consistent with the information provided in the ECSI database. This site was also registered on the Solid Waste Facility/Landfill database related to activities conducted as part of the site redevelopment.

Upgradient Sites

- The EDR Historic Auto List, which identifies potential gas station/filling station/service station sites from historic business directories, identified one site within one eighth of a mile at an equal/higher elevation than the TBA Site. The listing identifies the site as the “Third Street Garage” from 1935, but no additional information regarding spills or releases is provided.
- The EDR Historic Cleaner List, which identifies potential dry cleaner sites from historic business directories, identified one site within one eighth of a mile at an equal/higher elevation than the subject property. No additional information related to the site is provided.
- Oregon Environmental Cleanup Site Information: The EDR report identified 11 records on the ECSI database within one quarter mile and at an equal/higher elevation than the subject property. Eight of the sites have a status of “No Further Action (Conditional)”, “No Further State Action Required”, “Certificate of Completion”, or “Closeout activities on completed project.” . The remaining three sites, “East Side Plating, Inc. Plant 4”, “1988 SE 3rd Avenue”, and “Byrum Morehouse Building”, are located within close proximity of each other, approximately 200 to 500 feet east and upgradient of the TBA Site. These facilities are discussed further in Section 3.4.3.
- Oregon Confirmed Release List: The EDR report identified four sites within one quarter mile and at an equal/higher elevation than the subject property on the Oregon Confirmed Release List. The EDR report identifies all four sites as having a facility status of “No Further Action (Conditional)”.
- Oregon Leaking Underground Storage Tank: The EDR report identified nineteen LUST sites within approximately one quarter mile and at an equal/higher elevation of the property. The EDR Report indicates that cleanup is complete on seventeen of the nineteen sites. The remaining two sites are both related to heating oil tanks. LUST site 26-08-0459 is located at SE Harrison Street and SE Grand Avenue, approximately 500 feet from the TBA Site, and the LUST database notes that a heating oil release to soil was reported in 2008. No further information is provided. LUST site 26-93-6063 is located at 444 SE Caruthers, approximately 900 feet from the

TBA Site, and the LUST database notes that a diesel release to soil was reported in 1993. No other information is provided.

- Oregon Voluntary Cleanup Sites: The EDR report identified seven sites on the Oregon Voluntary Cleanup Program (VCP) within approximately one quarter mile and at an equal/higher elevation of the target property. All seven sites are also listed in the ECSI database as discussed above. Review of the VCS information provided in the EDR Report did not indicate additional environmental concerns associated with these seven sites that are not discussed above.
- Brownfield Sites: The EDR report identified four sites on the Oregon Brownfields list within approximately one quarter mile and at an equal/higher elevation than the target property. All sites have a status of “No Further Action (Conditional)”, “Certification of Completion”, or “No Further State Action Required”.
- PFAS ECHO list: Four sites were identified on the PFAS ECHO list within one quarter mile and at an equal/higher elevation than the subject property. The PFAS ECHO list contains a dataset from various sources that show industries may be handling per- and polyfluoroalkyl substances (PFAS). No addresses were provided in the EDR report, but the facilities were identified as “East Side Plating Pl”, “Tektronix, Inc”, “Gamblin Artists Colo”, and “Extra Space Storage”. A review of ODEQ’s website “Addressing PFAS in Oregon,” indicates that to date, no major source of PFAS has been found in Oregon that would create regular exposure for Oregonians and ODEQ and Oregon Health Authority are evaluating policy responses to prevent and address potential PFAS pollution in the state (ODEQ 2024a).

Other Notable Sites

The Portland Harbor Superfund Site is located approximately one mile downgradient of the TBA site. The Portland Harbor Superfund Site was added to EPA’s National Priorities List in 2000 and includes an in-river and an upland portion of a heavily industrialized stretch of the Willamette River, extending from Portland’s Broadway Bridge to Sauvie Island (ODEQ 2024b, EPA 2024). Water and sediment at the Portland Harbor Site are contaminated with many hazardous substances, including PCBs, PAHs, dioxins/furans, pesticides and heavy metals (EPA 2024). Due to the downgradient location of this site, it is not anticipated to impact contamination at the TBA Site; however, it should be noted that the Portland Harbor Joint Source Control Strategy aims to control sources of upland contamination that may reach the Willamette River and as such, the TBA Site may be subject to requirements of that strategy.

3.2 Historical Uses of the Site

The TBA Site formerly consisted of riparian wetlands, specifically Stephens Slough and floodplain. In the late 1980s and early 1990s, the Stephens Slough was filled with a mixture of sand, gravel, silt, and wood waste (CH2M Hill 1989). The Site is near the upland portion of the former river edge and therefore is likely underlain by less fill than properties further to the west. The following are descriptions of the historical Site uses of each parcel within the TBA Site.

- City of Portland Bureau of Transportation (right-of-way): Review of historical Sanborn fire insurance maps and aerial photographs from an April 2023 EDR report indicate that in the early 1900s this portion of the Site was part of the Campbell Stone Yard, which included structures identified for stone cutting, a forge blacksmith, tool storage, a dwelling, and a tramway used for conveying stones by movable steam crane. By 1909, the Sanborn map indicates this portion of the Site was within the Portland Railway Light and Power tracks and yard. Sanborn maps from 1950 and 1969 also label this general area of the TBA Site as “tracks and yard”, and railcars are

visible on aerial photographs. The 1950 Sanborn map identifies coach service and office structures on this portion of the TBA Site; by the 1969 Sanborn map, these structures are no longer shown and instead a storage structure is identified with an address of 1800 SE Water. This structure is still present. Historic aerial photographs indicate that the railroad tracks were removed from this property sometime in the late 1990s. By 2000, based on aerial photography, the site appears to be paved, with multiple vehicles parked on site and possible storage sheds. Aerial photographs indicate little change in the use of the site from the early 2000s to the present.

- Tax Lot 4300, owned by the City of Portland Water Bureau: Review of an April 2023 EDR report indicates that this area has been used for water pipeline conveyance since the early 1900s. The eastern portion of the parcel has been in railroad use since the early 1900s. Historical aerial imagery indicates that this parcel was used for storage (shipping containers, sheds, vehicles, etc.) from the early 2000s until approximately 2020.
- The eastern portion of Tax Lot 4400, owned by PGE: This area of the TBA Site is the eastern portion of PGE's Stephens Substation, which was part of a complex of six buildings that made up PGE's Station L Group. Station L was donated to OMSI in 1986, but PGE retained Stephens Substation (lot 4400). The Stephens Substation was used as an electrical substation from 1929 through early 2020. The original substation control building was constructed in 1929 and housed oil-filled and non-oil-filled electrical equipment such as transformers, regulators, capacitors, circuit breakers, switchgear, cable, and other associated equipment. The oil-filled substation equipment was removed from the building, although the specific removal dates are not known (Bridgewater 2021). The Stephens Substation property had known soil contamination from its historic uses. Remedial actions were conducted on the property, which concluded in 2021, and ODEQ determined that the remedial action to address environmental contamination was complete and no further action was required. Based on a review of historical sources, it does not appear that major operations or storage activities were concentrated on the eastern portion of Tax Lot 4400 that is part of the TBA Site, however, it is assumed that any of these historical activities may have occurred on the TBA Site area.
- Tax Lot 4500, owned by TriMet: This area of the Site was formerly part of an extensive railroad system in the area, a portion of which was part of the East Portland Traction Company. The rail spur on the site has been present since the 1920s. This parcel contained a structure in the early 1900s that, according to historical Sanborn fire insurance maps, was used for blacksmith, oil house, pipe shop, machine shop, and sand. The Multnomah County Assessor records indicate that in the early 2000s, ownership of this portion of the TBA Site was conveyed from Portland Traction Company to Union Pacific Railroad Company which then conveyed ownership to Oregon Rail Heritage, which conveyed ownership to TriMet in 2012.

3.2.1 Aerial Photographs

Aerial photographs of the Site from 1936, 1948, 1951, 1955, 1960, 1963, 1970, 1975, 1981, 1990, 1994, 2000, 2005, 2009, 2012, 2016, and 2020 were obtained from EDR and reviewed; they are presented in Appendix B. The summary below describes the subject property and nearby area as shown in the aerial photographs. This information is based on interpretations of the aerials using best professional judgment.

In the 1936 aerial photo, railroad tracks traverse the length of the Site from the northwest to the southeast. The PGE Station L property is visible to the southwest of the Site, including a large pile of sawdust, estimated at over 500' wide.

By 1951, a large building has been constructed in the northern portion of the Site. By 1955, the Stephens Substation is visible directly west of the Site. Beginning in the 1960 photo, the large sawdust pile is no longer visible.

In 1963, bridge pilings can be seen in the Willamette River as construction began for the Marquam Bridge and the bridge is complete in the 1970 photo.

By 1990, most of the Station L facility is gone other than a few buildings but the Stephens Substation is still visible to the west of the Site. In the 1994 photo, the OMSI campus and SE Water Avenue are visible in the former location of the Station L facility, southwest of the Site.

By 2000, the railroad tracks are visible in the southern portion of the Site, but the northern portion of the site contains primarily vacant land. The large building first identified in 1951 is still visible as well as an additional structure adjacent to it. The property adjacent to the Site to the north has been developed into a parking lot.

Between 2005 and 2020, the northern half of the property was paved and used for parking while the southern half remained as a railroad track with railcars. Beginning in 2012, the Tillikum Crossing Bridge south of the Site appears to be under construction and appears to be complete by 2016. By 2020, the Stephens Substation property directly adjacent to the west primarily consists of vacant land surrounded by a fence. One structure remains within the former substation property.

3.2.2 Historical Topographic Maps

Topographic maps from 1897, 1905, 1914, 1939/1940, 1941, 1954, 1961, 1970, 1975, 1977, 1984, 1995, 2014, 2017, and 2020 (Appendix B) were obtained from EDR and reviewed. Observations from the topographic maps for the Site are summarized as follows:

The topography of the subject property is not visible in topographic maps from 1914, 1941, 1975, or 1984. From 1897 to 1977, the property appears to have a rail line running through its whole length. The maps following 1995 only show this rail line in the southern half of the property. This rail is labeled as "Portland Traction" in the 1954, 1961, 1970, and 1977 topographic maps. None of the topographic maps display buildings on the subject property. The property is on a topographically flat portion of land, with a slight gradient west towards the Willamette River.

3.2.3 Sanborn Maps

Sanborn maps from 1889, 1901, 1909, 1924, 1950, 1954, and 1969 (Appendix B) were obtained from EDR and reviewed. Observations from the Sanborn maps for the Site are summarized as follows:

The site is not included in the detail of the 1889 Sanborn map, and site use cannot be determined. Development is noted in the 1901 map, including several small structures labeled as tool shed, dwelling, and stable in the northern portion of the site. A large stone yard, stone cutting shed, and elevated tramways powered by movable steam crane for conveying stones overlay a portion of the site as well as the area adjacent of the site to the east. A forge blacksmith is noted near the center of the Site. An area in the southern portion of the Site as well as west of the site is denoted as "low land, inundated during

high water.” A water pipeline traverses the portion of the site currently known as Tax Lot 4300, which is owned by the City of Portland Water Bureau. A water pipeline is noted in all subsequent Sanborn maps and this portion of the Site is still used for water conveyance.

In the 1909 map, the Portland Railway Light & Power Co tracks and yard and right-of-way are denoted in the general area of the site. Structures are noted on the site, including a car barn, car repair shed, blacksmith, oil house, pipe shop, and machine shop. Those structures are also present on the 1924 map except for the car barn; however, that structure is again shown on the 1950 map. Additional water pipelines traverse the Site in the 1924 map. The land uses of the Site in the 1950 map are very similar to the 1924 map, with the addition of two structures, labeled “office” and “coach service”. In the last 1969 map, the Site land uses include multiple water pipelines, a storage structure, and an area within and adjacent to the Site labeled as tracks and yard.

3.2.4 City Directory

A review of city directories was provided in the EDR report for 1924-2020. The Site was not identified in the city directory listings.

3.2.5 State Database Resources

The April 2023 EDR database report included a review of the ECSI database, which identified properties in the vicinity of the Site. ERG reviewed the ECSI database for select sites as noted in Section 3.1.2. Select properties are further discussed in section 3.4.3.

3.3 Historical Uses of Adjacent Properties

The general area surrounding the Site has an extensive history of commercial and industrial uses. Select properties are noted below due to suspected or known contamination, proximity to the Site, or availability of information regarding the property history and assessment.

- The former PGE Station L site consisted of 28 acres and was located downgradient approximately 300 feet southwest of the Site. Portions of the Station L site were originally used as a lumber mill as early as the 1880s. Stephens Slough originally ran through the site and was filled in with sawdust, sand, gravel and silt in the 1890s and early 1900s. The Station L power generation plant operated from 1910-1975 and initially burned wood waste from the adjacent lumber mill and fuel oil, later switching to oil and natural gas. Significant quantities of wood fuel were stored in a large pile at the site for several decades until at least the late 1950s. As reported in the ODEQ Record of Decision (ODEQ 1994), the release of dielectric fluid from electrical equipment at the Station L plant resulted in the contamination of upland soil and Willamette River sediment with PCBs, hydrocarbons, and metals in soil, groundwater and sediment due to other ancillary activities. Between 1986 and 1994, approximately 8,200 tons of PCB-contaminated soils were excavated from various parcels and transported off-site for disposal from the Station L site. In addition to PCB-contaminated soil, several remedial excavations occurred in the late 1980s in conjunction with the decommissioning of storage tanks and more general site remediation. In 1994, ODEQ issued a Record of Decision stating that no further remedial actions were required for the site, outside of remediation of benzene in groundwater on northern portions of the site (ODEQ 1994). PGE donated 18 acres of the Station L site to OMSI in 1986, while retaining the Stephens Substation (Bridgewater 2021). The property has been the location of the OMSI museum and parking lots since 1992.

- The Site is bordered on the east by railroad tracks owned by Union Pacific Railroad Company. The railroad on the east side of the Willamette River was originally constructed in the 1860s and has expanded with additional lines and spurs over time. To the east of the rail line, residential properties were present since at least the late 1880s and more commercial and industrial developments appear in the late 1940s. Notable operations to the east of the rail line includes a dry cleaner, metal plating, foundry, agricultural machinery sales, and chemical manufacturing.
- The Site is bordered on the west by the remainder of Tax Lot 4400 and by Tax Lot 1702. The western portion of Tax Lot 4400 is outside the boundary of the TBA and contains the former Stephens Substation control building. Tax Lot 1702 was formerly Pioneer Waterproofing. Drum storage was observed at Pioneer Waterproofing during a 2009 Phase I ESA conducted by PBS Engineering and Environmental (PBS).
- The area south of the Site was historically a slough. From approximately 1890 to 1954, the Inman-Poulsen Lumber Mill was operated at the site. In the late 1800s, the lumber mill disposed of wood waste in Stephens Slough and the saw dust fill reportedly extends from about 4 to 45 feet bgs at the site. The site was also reportedly used as a telephone pole storage yard and a PGE right-of-way.
- The Site is bordered on the north by the Portland Community College-CLIMB Center, a classroom and office facility, and paved parking lot. Multnomah County Assessor records indicate that the structure was built in 1998. Prior to the current use, the area north of the TBA Site was associated with the Portland Lime & Cement Company in the late 1800s. By the early 1900s, historical Sanborn maps identify multiple vacant structures as well as a boat carpentry structure. From approximately 1909 to 1963, historical Sanborn maps and aerial photographs indicate this facility was also part of a railway yard, along with the TBA Site. Around 1970, a large structure occupied the site and railroad tracks still traversed the western edge, although the tracks are not clearly present in the 1994 photo. By 2000, the site changed dramatically, with the current structure and parking lot visible from aerial photography. The general use of the site appears to be relatively unchanged from the early 2000s to 2020.

3.3.1 Historical Topographic Maps

The topography of the surrounding areas is not visible in topographic maps from 1914, 1941, 1975, and 1984. From 1897 to 2020, a railroad bordered the property to the west. This rail is labeled as “Southern Pacific” in the 1954, 1961, 1970, and 1977 topographic maps. Buildings of unspecified use are in areas adjacent to the subject property in the 1939/1940 and 1995 maps. The 1897 and 1905 topographic maps show a river channel south of the property that branches from the Willamette River. The 1970, 1977, and 1995 maps show a road that extends north to south along the northwestern tip of the property. In the 2014 through 2020 maps, this road (now labeled as ‘SE Water Ave’) extends further into an ‘L’ shape and touches the southern tip of the property. Another block of roads is visible extending from SE Water Ave in the 2017 map. The Marquam bridge is first visible in the 1970 map and the Tilikum Crossing Bridge is visible in the 2020 map. The general topography of the surrounding area is flat with a slight gradient west towards the Willamette River.

3.3.2 Sanborn Maps

In the 1889 map, the Portland Lime & Cement Co and a sparsely developed residential area are in the general vicinity east of the Site.

In the 1901 map, the T.K. Campbell Stone Yard stone yard overlays a portion of the Site as well as areas adjacent to the Site to the east and includes structures for stone cutting, stone sawing, and a tramway. Multiple structures are near or adjacent to the site to the east, including a boat carpenter, offices, a stable, and multiple vacant structures. The Southern Pacific Co. Oregon & California railroad area are denoted east of the Site. In the 1901 map, the area east of the railroad tracks is primarily developed as residential uses, although at a higher density than the 1889 map. South of the site, an area is noted as a slough. A large development is visible south and west of the slough, labeled as a power station. West of the site is an area identified as low land as well as multiple structures including a dwelling and ship carpentry shed. A boat building yard is also denoted west of the site, on the bank of the Willamette River.

By 1909, the large stone yard is no longer present. The general area where the stone yard was located is marked as the Portland Railway Light & Power Co. tracks and yard, which partially overlays site as well as directly adjacent to the east. A trestle with gravel bins underneath is also noted east of the site. East of the railroad tracks, the land use is still primarily residential, with a slight increase in density of dwellings. South of the site, the slough is no longer denoted and certain areas surrounding Portland Railway Light & Power Co.'s Station F facility are marked as "filled land". West of the site, a large area is noted as "low land partly filled with sawdust". Outside of the low land are multiple structures identified as a car painting shop, two car repair sheds, wood working and lumber sheds, a store room, and a vacant old car barn.

In the 1924 Sanborn map, the area between the Site and the railroad tracks is still labeled as "tracks and yard". East of the railroad tracks, some areas are still developed as residential uses, but other areas that were residential uses in previous maps no longer show structures at all. South and west of the site, the Station F power generating facility is no longer indicated, but a separate power generating facility and transformer station are present to the north of the former Station F plant. Between the Site and the power generating facility is a 40-foot-high shavings pile. Most other structures to the west of the Site remain unchanged from the 1909 map.

In the 1950 Sanborn map, the area between the Site and the railroad tracks is still labeled as "tracks and yard". East of the railroad tracks are very few residential dwellings; instead, the land use has transitioned to larger commercial or industrial structures, including a large grocery warehouse, agricultural implements, building supplies, and a foundry. South of the Site appears to be wood working or carpentry facilities. West of the Site, the 40-foot high shavings pile is noted and the footprint of the Station L facility has expanded, including a new area with a transformer house and transformer stands. An industrial track is noted running generally north-south adjacent to the northernmost portion of the Site.

In the 1969 map, the area between the Site and the railroad tracks is still labeled as "tracks and yard". East of the railroad tracks still contains commercial/industrial structures, many of which are the same as the 1950 map, including warehouses, a plating facility, offices, scattered lumber piles, and machinery storage. The Station L electric generating facility is still present to the west of the site, generally occupying the same area as in the 1950 map, although the shavings pile is no longer noted. Some structures, including the car shop and car repair building are still visible from the 1950 map. Additionally, a structure identified as the Portland Track Company office is present. A note west of the Portland Traction Company building says, "gas & oil (not in operation)".

3.3.3 City Directory

A review of city directories was provided in the EDR report for 1924-2020. Select records are noted below as they appear in the city directory search for properties in the area. The full city directory review is available in Appendix B.

- Pioneer Waterproofing Co Inc, located at 1800 SE Water Ave.
- Portland General Electric Station L, and other associated names, located at 1841 Water Ave.
- Chemical Mfrs, located at 1932 Water Ave.
- East Side Plating, located at 310 Stephens Street.
- Ace Fuel Co, located at 318 Stephens Street.
- Commercial Iron Works, located 382 Stephens and 412 Stephens.
- Mach Shp & Fndry Dept, located at 412 Stephens St.
- Greater Mountain Chemical Co Mfrs, located at 1919 3rd Ave.

3.4 Previous Environmental Reports

Two environmental assessments were conducted at the Site and are summarized below. Additional reports for properties within the vicinity of the Site are also discussed.

3.4.1 2009 Phase I/Phase II Environmental Site Assessment – Tax Lot 4500

PBS performed Phase I and Phase II ESAs on Tax Lot 4500, owned by TriMet, in August 2009. The Phase II ESA report was reviewed. Soil samples were analyzed for PCBs, TPH, and Resource Conservation and Recovery Act (RCRA) 8 metals. Lead was detected in shallow soils (up to depths of 3 feet bgs) at concentrations that exceed ODEQ Residential Risk Based Concentrations (RBCs) for Leaching to Groundwater. Based on the depth to groundwater (deeper than 20 feet bgs at the time of the study), PBS concluded that lead levels do not pose a high risk for groundwater contamination. Petroleum constituents and PCBs were detected in shallow soils at concentrations below ODEQ's most stringent RBCs (PBS 2009).

3.4.2 2021 Remedial Action Closeout Report – Tax Lot 4400

The 2021 Remedial Action Closeout Report prepared by Bridgewater Group presents results of soil and groundwater sampling at Tax Lot 4400, owned by PGE, in 2019 and 2020 in accordance with PGE's participation in the Voluntary Cleanup Program. Soil samples were analyzed for PCBs, total petroleum hydrocarbons as gasoline range organics (TPH- GRO), TPH as diesel range organics (TPH-DRO), TPH as motor oil/lube range organics (TPH-MRO), RCRA 8 metals, BTEX, and PAHs. The report identified detections of arsenic in Incremental Sampling Methodology (ISM) surface soil samples collected in 2019 at concentrations above the ODEQ Residential and Occupational RBCs for direct contact; however, the detected concentrations do not exceed the background concentration for soil in the Portland, OR area. Arsenic was detected in a 2019 groundwater sample at a concentration above the residential and occupational RBC. PGE conducted soil removal of the upper one foot of select decision units in 2020. Groundwater samples were analyzed for RCRA 8 metals, VOCs, PAHs, TPH, and PCBs. Arsenic was detected in a 2020 groundwater sample above the RBCs for residential and occupational ingestion and inhalation from tap water and ethylbenzene was detected above the RBC for residential ingestion or

inhalation of tapwater; however, no other analytes were detected at concentrations that exceed the respective RBCs (Bridgewater 2021).

Subsequent to the 2021 Bridgewater Remedial Action Closeout Report, ODEQ issued a No Further Action Determination for the PGE Stephens Substation, stating that the remedial action to address environmental contamination is complete. The NFA determination noted that although certain analytes were detected in groundwater, it is not for certain these contaminants are from this site and furthermore, there are no known current and reasonably likely future groundwater uses at or around the site.

3.4.3 Previous Environmental Reports for Surrounding Properties

The Station L plant operated from 1910-1975 and initially burned wood waste from an adjacent lumber mill, later switching to oil and natural gas. As reported in the ODEQ Record of Decision (ODEQ 1994), the release of dielectric fluid from electrical equipment at the Station L plant resulted in the contamination of upland soil and Willamette River sediment with PCBs. Other plant activities resulted in somewhat more isolated areas of soil contamination by petroleum hydrocarbons and metals. Between 1986 and 1994, approximately 8,200 tons of PCB-contaminated soils were excavated from various parcels and transported off-site for disposal from the Station L site. In addition to PCB-contaminated soil, several remedial excavations occurred in the late 1980s in conjunction with the decommissioning of storage tanks and more general site remediation. The property has been the location of the OMSI museum facility and parking lots since 1992. In 1994, ODEQ issued a Record of Decision stating that no further remedial actions were required for the site (ODEQ 1994).

Parametrix conducted a 2010 Phase I and II ESA on the southern portion of the former Station L site that identified diesel and oil in surface soils above ODEQ RBCs. PAHs were detected in soils above the Residential RBCs but below Occupational and/or Construction Worker RBCs. Arsenic was detected in soil above background levels and above Residential, Occupational, and Construction Worker RBCs. PAHs were also detected in groundwater above Residential RBCs for groundwater. Metals were detected above the EPA RSLs for tapwater (Parametrix 2010).

The Crescent Park Site is located approximately 100 feet northwest and downgradient of the subject property. This property was assessed as part of ODEQ's Voluntary Cleanup Program. A 2011 Phase II ESA and Source Control Evaluation conducted by Integral Consulting sampled soils for VOCs, TPHs, PAHs, PCBs, and metals. TPH-DRO was detected in one sample collected from the bottom of a cesspool drywell above the Urban Residential RBC for Leaching to Groundwater. TPH-RRO was detected in soil, but there was no RBC to compare against. Benzo(a)pyrene was detected in soils above RBCs in various locations around the site. PCB aroclors were detected in soils and one sample exceeded the Urban Residential RBC. Arsenic and lead were detected in soils at concentrations that exceeded Urban Residential and/or Occupational RBCs (Integral 2011). Based on the listing for the site in the ECSI database, ODEQ determined that no remediation was required based on current and future likely uses, and the site was granted No Further Action status in May 2013.

The East Side Plating, 1988 SE 3rd Avenue, and Byrum Morehouse Building sites are located in close proximity to each other, approximately 200 to 500 feet to the east and upgradient of the Site. Historical documents indicate East Side Plating, located at 310 SE Stephens Street, is a metal plating facility (PBS 2009). The ECSI database identifies the hazardous substance types associated with East Side Plating as cadmium, chromium, cyanide, hydrochloric acid, zinc, nickel, copper, caustic, and used oil and notes that the site has a history of compliance violations. Furthermore, the ECSI database notes that "there is a

good chance that the East Side Plating facility has released metals and solvents to soil/groundwater. If this is the case, subsurface contamination could affect downgradient industrial supply wells, water in the on-site well, and surface water in the Willamette River.” The current investigative status is “Contamination Suspected.” The property located at 1988 SE 3rd Ave, adjacent to the East Side Plating Site, was also formerly occupied by a metals plating operation. A 2018 Phase II ESA of 1988 SE 3rd Ave identified PAHs in soil below the Residential RBCs for direct contact. Arsenic and hexavalent chromium were detected in soils above the Urban Residential RBC. Chloroform was detected in groundwater in excess of the Urban Residential RBC. Several VOCs were detected in soil gas samples, but all were below Residential RBCs except trichloroethane (Farallon 2018). The ECSI database identifies the current status of 1988 SE 3rd Avenue as “Site Investigation.” The Byrum Morehouse Building, located at 1805 SE Martin Luther King Jr. Blvd, is currently listed in the ECSI database with a status of “Removal.” The ECSI database noted in 2022 that this site is currently undergoing remedial action for TCE in soil vapor greater than the occupational RBC for inhalation.

A 2015 Conceptual Geotechnical Report by Shannon and Wilson provided geologic background, subsurface conditions, and geotechnical opinion of the area generally south and west of the subject property. The report noted that fill was encountered in soil borings from the ground surface to depths ranging from 2 to 23.5 feet. In certain locations, fill was underlain by additional wood debris fill ranging in depth from 12.5 to 24.5 feet (Shannon and Wilson 2015).

3.5 User-Provided Information

OMSI provided relevant files and other information with their TBA Application submitted to EPA:

- The applicant’s future plans for the Site, specifically as a paved roadway as part of the larger OMSI District redevelopment project.
- The February 2023 OMSI Central City Master Plan Land Use Review, which presents the goals for the larger redevelopment project.
- Over 70 documents regarding historic assessments conducted for the Site or nearby properties.

4.0 Phase I Site Reconnaissance

4.1 Methodology and Limiting Conditions

Weather conditions on-site during Phase I ESA activities were sunny and warm. Representatives from Alta, Jon Munkers and Jeff Wallace, were on-site to perform Site reconnaissance. Representatives from OMSI, Carol Gossett and Preston Greene, assisted with the initial Site reconnaissance. Margaret Olson (EPA), Sarah VanGlubt (ODEQ), Blair Paulik (ODEQ), and Peter Craig (KPF Engineering) were also present during Site reconnaissance.

Site reconnaissance consisted of traversal of the property. Utility corridors were identified and access to the various parcels was noted. Most of the surface was covered in gravel and/or asphalt. Some staining was noted under the railroad cars on the southern parcels.

Due to access restrictions, the interior of the buildings/railroad cars were not observed. Appendix A provides photographic documentation of the site visit. Ms. Gossett provided a historical background presentation.

4.2 Property Observations

The Site was assessed in August 2023 and again in January 2024 and the following observations were made on both the interior and exterior portions.

4.2.1 Hazardous Substances

No apparent hazardous substances were observed while on the property.

4.2.2 Unidentified Containers

Two unmarked 55-gallon drums were observed at the time of the Site Reconnaissance, one on Tax Lot 4500 near the railcars and one within Tax Lot 4400. The drums were rusting and based on their appearance, they have been presumed to have been at the Site for several years. The drum observed on Tax Lot 4500 near the railcars may contain soil cuttings.

4.2.3 Staining

De minimus staining was observed under the railcars at the time of the Site Reconnaissance.

4.2.4 Stressed Vegetation

While most areas of the Site are capped, some isolated areas around the fence lines were overgrown with vegetation. No areas displayed signs of stressed vegetation.

4.2.5 Aboveground Storage Tanks (ASTs)

No ASTs were observed on the property at the time of the investigation.

4.2.6 Lack of Secondary Containment

No ASTs or containers were observed at the Site that would require secondary containment.

4.2.7 Underground Storage Tanks (USTs)

No obvious USTs were observed on the property at the time of the investigation.

4.2.8 PCB Containing Equipment

PG&E's property located on Tax Lot 4400, at the time of the Site visit and Phase II work, was being utilized as an electrical transformer laydown yard. However, the identified transformers were non-PCB-containing transformers. No additional PCB-containing equipment were identified at the time of the Site Reconnaissance visit and Phase II work.

4.2.9 Asbestos-Containing Building Materials (ACBM)

No ACBMs were observed throughout exteriors of the subject property at the time of the investigation. Crews did not observe the buildings' interiors or roofs.

4.2.10 Solid Waste Disposal

No abandoned materials were present throughout the interior and exterior of the subject property such as scrap metal, scrap wood, and/or other potentially hazardous material.

4.2.11 Wetlands

There are no documented wetlands within the boundaries of the property.

4.2.12 Drywells

There were no drywell(s) observed at the time of the Site Reconnaissance.

4.2.13 Groundwater Wells

There were no obvious groundwater supply wells observed on the property at the time of the investigation.

4.2.14 Lead-Based Paint

Paint chips were observed surrounding the stationary rail cars at the time of the Site Reconnaissance. The Phase I ESA did not include testing of the rail car paint chips to identify the presence of lead-based paint. It is assumed that with the proposed redevelopment of a road, the rail cars will be relocated. Sampling in the footprint/dripline of the rail cars could identify the presence of environmental impacts to the TBA Site due to potential lead-based paint.

4.2.15 Exterior Observations

The property was explored for vent pipes and other indications of RECs. The surrounding property uses appeared to be commercial and industrial with a history of railroad activity. Large powerlines and the walled portion of the PG&E facility are currently being used for utilities. Utility corridors are extensive across the site.

4.2.16 Interior Observations

No interior observations were made as part of the Site Reconnaissance.

5.0 Phase I Interviews

Interviews were conducted with individuals who may have been knowledgeable about the current or past site conditions. The following individuals were interviewed and provided pertinent information.

5.1 Carol Gossett & Preston Greene (Oregon Museum of Science & Industry)

Ms. Gossett, Senior Property Analyst, and Mr. Greene, Vice President of Real Estate, provided an overview of the Site and current conditions at the Site Reconnaissance meeting with ODEQ, EPA, and Alta on August 2, 2023. Ms. Gossett gave a brief presentation on site history that aligned with information obtained from other historical sources and environmental reports, as summarized in Section 3.0.

During the January 2024 Phase II, Ms. Gossett provided additional information that historical operations and maintenance for rail cars occurred on the Portland Bureau of Transportation parcel. These activities occurred in the existing warehouse.

5.2 Blair Paulik & Kara Master (Oregon Department of Environmental Quality)

Ms. Paulik, Project Manager and Toxicologist, and Ms. Master, Northwest Oregon Brownfields Coordinator, met virtually with Allison Marshall of Alta on June 21, 2023. Ms. Paulik and Ms. Master provided information regarding ODEQ environmental databases and state-specific RBCs.

6.0 Phase I Findings

The Phase I ESA uncovered the following known or suspected RECs:

- **Historical Use of the Site:** The following are descriptions of the historical Site uses of each parcel within the TBA Site.

The City of Portland Bureau of Transportation right-of-way was historically part of the Campbell Stone Yard and the Portland Railway Light and Power tracks and yard. Based on aerial imagery, railroad tracks were present on the site until the late 1990s. The current structure on the Site is visible beginning in the 1969 Sanborn map.

Tax Lot 4300, owned by the City of Portland Water Bureau has been used for water pipeline conveyance since the early 1900s. The eastern portion of the parcel has been in railroad use since the early 1900s. Historical aerial imagery indicates that this parcel was used for storage (shipping containers, sheds, vehicles, etc.) from the early 2000s until approximately 2020.

Tax Lot 4400 contains the former PGEs Stephens Substation, which was part of a complex of six buildings that made up PGE's Station L Group. Stephen's Substation was used as an electrical substation from 1929 until 2020 and housed oil-filled and non-oil-filled electrical equipment such as transformers, regulators, capacitors, circuit breakers, switchgear, cable, and other associated equipment. Remedial actions were conducted on the property, which concluded in 2021, and ODEQ determined that the remedial action to address environmental contamination was complete and No Further Action was required. Based on a review of historical sources, it does not appear that major operations or storage activities were concentrated on the eastern portion of Tax Lot 4400 that is part of the TBA Site, however, it is assumed that any of these historical activities may have occurred on the TBA Site area.

Tax Lot 4500 contained a structure in the early 1900s that, according to historical Sanborn fire insurance maps, was used for blacksmith, oil house, pipe shop, machine shop, and sand. A railroad spur on Tax Lot 4500 has been present since the 1920s.

The entire Site has a history of railroad use. Railroad tracks and spurs represent environmental concerns due to the potential of historical application or transport of hazardous substances or petroleum products. Contamination resulting from activities in the railroad right-of-way would likely be confined to the near subsurface sediments.

- **Known Soil Contamination at the Site:** The 2009 Phase II ESA of Tax Lot 4500 identified lead in shallow soils (up to depths of 3 feet bgs) at concentrations that exceed ODEQ Residential RBCs for Leaching to Groundwater and identified petroleum constituents and PCBs in shallow soils at concentrations below ODEQ's most stringent RBCs (PBS 2009). Sampling results were limited to shallow surface soils and soils at 15 feet bgs.
- **Known and Suspected Groundwater Contamination at the Site:** The 2021 Remedial Action Closeout Report for the PGE Stephens Substation (Tax Lot 4400) identified detections of arsenic

above the RBCs for residential and occupational tapwater and ethylbenzene above the RBC for residential tapwater (Bridgewater 2021).

The ECSI database identified the “Groundwater – SE 1ST Ave & Stevens St” site, which is suspected to be on Lot 4400 or 4500. The exact location of the site is unknown and limited information is provided. The database notes that in 1987, two wells had maximum detections of PERC at 73 ppb and TCE at 23 ppb. According to the ECSI database listing, by 1990, these wells had disappeared and new upgradient well was installed on the PGE/OMSI property. In 1993, this well was sampled with maximum concentrations of PERC at 41 ppb and TCE at 5.4 ppb detected. The source of the groundwater contamination is unknown.

- **Unknown Impacts to Site Soils from Suspected Lead-based Paint.** During the Phase I ESA site visit, paint chips were observed surrounding several stationary railcars at the Site (located on Tax Lot 4500). The age of the rail cars and whether they were coated with lead-based paints are unknown, however, the presence of lead-based paint cannot be ruled out as a possibility.

The Phase I ESA also identified the following Areas of Concern, which may not meet the definition of a REC but may be a relevant finding and may represent data gaps in the context of the TBA process.

- **Historical Use of Adjoining Properties:** The general area surrounding the Site has an extensive history of commercial and industrial uses. Pioneer Waterproofing (to the west of Tax Lot 4400) was formerly located on the adjacent property (Tax Lot 1702). Railroad tracks border the Site to the east. The former PGE Station L facility, with documented contamination of PCBs, TPH, PAHs, and metals in soil, as well as VOCs, PAHs and metals in groundwater is located west of the Site. Remedial excavations occurred at the PGE Station L facility in the late 1980s and early 1990s in conjunction with the decommissioning of storage tanks and general site remediation. The PGE Station L site was issued a No Further Action Record of Decision in 1994, while acknowledging that groundwater cleanup for benzene on the northern portion of the site was ongoing. PGE donated 18 acres of the Station L site to OMSI in 1986. The EDR review of City Directories identified multiple historical facilities including a waterproofing facility, chemical manufacturing, metals plating, a fuel company, commercial iron works, and a machine shop/foundry.
- **Federal and State Database Listings of Surrounding Sites:** The April 2023 EDR report identified multiple nearby properties on state or federal environmental databases. Over 300 sites were identified within 1 one mile of the TBA Site. Several sites adjacent to the TBA Site or upgradient and within a quarter mile were listed on databases of concern including the Oregon ECSI, LUST, VCP, Brownfields, SPILLS, HAZMAT, Engineering Controls, Institutional Controls, Oregon CRL, EDR Historic Auto List, EDR Historic Cleaner List, Oregon Solid Waste Facilities/Landfill Sites. Notable sites are discussed below due to the nature of the listing and/or proximity to the TBA Site.
 - The “East Side Plating, Inc. Plant 4”, “1988 SE 3rd Avenue”, and “Byrum Morehouse Building” sites are located within close proximity of each other, approximately 200 to 500 feet east and upgradient of the TBA Site. The ECSI database indicates that likelihood that the East Side Plating facility released metals and solvents to soil/groundwater and a 2018 Phase II ESA of 1988 SE 3rd Ave (the East Side Plating site) identified that arsenic and hexavalent chromium were detected in soils above the Urban Residential RBC and that chloroform was detected in groundwater in excess of the Urban Residential RBC (Farallon 2018).

- The Crescent Park Site is located approximately 100 feet northwest of the subject property. TPH-DRO was detected in one sample collected from the bottom of a cesspool drywell at a concentration above the Urban Residential RBC for Leaching to Groundwater. TPH-RRO was detected in soil, but there was no RBC for comparison. Benzo(a)pyrene was detected in soils above RBCs in various locations around the site. PCB aroclors were detected in soils and one sample exceeded the Urban Residential RBC. Arsenic and lead were detected in soils at concentrations that exceeded Urban Residential and/or Occupational RBCs (Integral 2011). ODEQ determined that no remediation was required based on current and future likely uses, and the site was granted No Further Action status in May 2013.
- The “Bent 3 – Portland Streetcar Extension” site is adjacent to the TBA Site to the southeast. Exceedances for diesel, lube oil, lead and PAHs in soils were detected in different bent locations during environmental assessments conducted in 2009 and 2010. Remedial activities were restricted to these four discrete locations as part of a construction project; however, based on the database listing, it is not known if petroleum contamination exists beyond the bent locations.
- The Portland Harbor Superfund Site is located approximately one mile downgradient of the TBA Site. Water and sediment at the Portland Harbor Site are contaminated with many hazardous substances, including PCBs, PAHs, dioxins/furans, pesticides and heavy metals (EPA 2024).

Considering the widespread nature of current and historic industrial operations as well as known contamination in the vicinity of the TBA Site, it is possible that the TBA Site could have been impacted by off-site sources of contamination. Environmental sampling would provide more definitive information.

- **Staining:** De minimis staining under the railcars on the Tri-Met property (Tax Lot 4500) was observed at the time of the Site reconnaissance.
- **Fill:** A 2015 geotechnical evaluation conducted by Shannon and Wilson Shannon and Wilson for OMSI, focused on parcels adjacent to the Site, noted that the area generally south and west of the Site appears to be covered with undocumented fill at depths ranging from 2 to 23.5 feet bgs. It is likely that other portions of the Site may also be underlain with fill, although specific information on the presence of fill or buried materials at the Site is not known.

7.0 Phase II Field Activities

Following the Phase I ESA, a Phase II ESA was completed including the collection of soil, groundwater, and stationary railcar dripline samples, as well as delivery of samples to the selected laboratories for analysis. The goal of the Phase II ESA was to perform investigative sampling at the Site to determine the extent, if any, of environmental impacts to soil and groundwater. Sampling data at the site will help inform OMSI of potential environmental challenges that may need to be addressed prior to road realignment activities.

7.1 QAPP Deviations

Sampling procedures followed the *Quality Assurance Project Plan [QAPP] for Phase II Site Assessment – OMSI District Road Parcels, Portland, OR (ERG 2024)* except for the following deviation:

- The Field Team successfully advanced 13 soil borings, rather than the proposed 15 soil borings, as outlined in the QAPP. Site limitations, such as buried utilities, physical obstructions, and limitations due to the size of the drill rig prevented 2 soil borings from being advanced. In addition, select soil borings were not advanced to the target depth of 30 feet bgs due to shallow groundwater at approximately 12 to 20 feet bgs.
- The Field team successfully sampled the west side of the four stationary rail cars, rather than all four sides, as outlined in the QAPP. Site limitations such as physical obstructions prevented the Field team from sampling the south, east, and north sides of the railcars.

7.2 Geology and Hydrology

Sand with coarse gravel dominates the Site lithology. In general, sand and coarse gravel are present within soils from the surface to about 25 feet bgs, with poorly graded sands with silts increasing with depths below 30 feet. Wood, metal, and other various debris was also encountered at varying depths throughout the Site leading to borehole advancement refusal. Appendix C includes boring and well logs, which provide a detailed description of lithology for each borehole.

During drilling, ERG's Field Team encountered groundwater from approximately 12-20 feet bgs. Based on site topography, approximate depth to groundwater, and the location relative to the Willamette River, groundwater is presumed to flow to the west.

7.3 Soil Sampling

ERG notified Oregon Utility Notification Center to identify potential underground utilities within the area and subcontracted with a private utility locator (AUUL) the day of the soil boring advancement to locate underground utilities using ground penetrating radar.

The Field Team collected soil samples wearing clean nitrile gloves into the sampling containers described in the QAPP (ERG 2024) and placed all soil samples in a refrigerated cooler containing double-bagged ice immediately after collection. Samples were held under chain-of-custody following ASTM *Standard Guide for Sample Chain-of-Custody Procedures* (ASTM 2018) until shipment to Pace Analytical (Pace) for analyses.

Subsurface soil grab samples from all soil boring locations were analyzed for:

- VOCs including benzene, toluene, ethylbenzene, total xylenes, and naphthalene (BTEXN); isopropylbenzene; n-propylbenzene; 1,2,4-trimethylbenzene; 1,3,5-trimethylbenzene; methyl tert-butyl ether (MTBE); 1,2-dichloroethane (EDC); and ethylene dibromide (EDB) by EPA Method 8260D (EPA 2018a),
- Chlorinated solvents including perchloroethylene (PERC; or tetrachloroethene), and daughter products, such as but not limited to: trichloroethylene (TCE), cis 1,2-dichloroethene (DCE), trans 1,2-DCE, 1,1-DCE, 1,1-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, and 1,4 dioxane by EPA Method 8260D (EPA 2018a),
- PAHs including acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, and pyrene by EPA Method 8270C-select ion monitoring (SIM) (EPA 2018b),
- TPH-GRO by NWTPH-Gx (Ecology 1997), and

- TPH-DRO by NWTPH-Dx (Ecology 1997).

Subsurface soil composite samples from all soil boring locations were analyzed for:

- Priority pollutant metals (PPMs) including: antimony, arsenic, beryllium, cadmium, total chromium, copper, lead, nickel, selenium, silver, thallium, and zinc by EPA Method 6010D (EPA 2018c) and mercury by EPA Method 7471B (EPA 2007a), and
- PCBs by EPA Method 8082A (EPA 2007b).

Railcar drip line soil samples were analyzed for:

- PAHs including acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, and pyrene by EPA Method 8270C-select ion monitoring (SIM) (EPA 2018b), and
- Mercury by EPA Method 7471B (EPA 2007a).

Appendix A includes photographs taken during the sampling activities. Appendix D includes complete laboratory data sheets and chain-of-custody documentation.

7.3.1 Subsurface Soil Grab/Composite Sampling

Between January 22 and January 25, 2024, Alta subcontracted with licensed driller Holt to complete 13 soil borings and co-locate 5 temporary monitoring wells.

Holt completed 13 soil borings per ASTM D6282/D6282M-14, *Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations* (ASTM 2014) using a track mounted Geoprobe 7822DT Combo Rig equipped with an automatic drop hammer, to drive a dual tube Geoprobe® 2.5-inch diameter 5-foot length macro-core barrel in 5-foot intervals. The borings were co-located with temporary groundwater monitoring wells TMW-1, TMW-2, TMW-3, TMW-4, and TMW-5. Holt's field crew used a new poly-vinyl chloride (PVC) liner to collect each sample interval to the target depth of the borehole (~25-30 feet bgs). Groundwater was encountered at approximately 12-20 feet bgs.

The field crew logged borehole soils according to the Unified Soil Classification System (USCS), the boring logs are included in Appendix E. Field crews screened all soil samples in the field using a portable MiniRae® PID to check for the presence of VOCs and recorded the measurements on the boring logs.

The field crew collected a total of 13 soil grab samples (plus one duplicate samples) and a total of 32 soil composite samples (plus two duplicate samples) from 13 soil boring and 5 co-located temporary monitoring well locations at the Site (borings BH-1 through BH-13 and TMW-1 through TMW-5; Figure 2) to evaluate concentrations of COCs in soils. ERG collected the samples for VOC analysis in accordance with EPA Sampling Method 5035 for VOCs (EPA 1996).

The field crew recorded all PID measurements on the boring logs (Appendix E) and used the readings to determine sample depth. There were no significant PID readings in any boring/well location.

7.3.2 Dripline Soil Sampling

On January 22, 2024, ERG collected four surface soil composite samples (plus one duplicate sample) along the dripline areas of the stationary railroad cars. Samples were shipped to Pace Analytical for

analysis for total lead by EPA Method 6010D (EPA 2018c). Figure 2 notes the sides of the railcars associated with each composite sample.

The Field Team wore clean nitrile gloves when working with soil along the dripline and replaced the gloves between composite samples to prevent cross-contamination. Samples were collected from the top ½-inch of surface soil to a maximum depth of 6-inches bgs. Samples were collected using a stainless steel step probe for each subsample location. The Field Team placed the soil from the subsample locations into a dedicated, new, clean, and disposable plastic bucket for homogenization of the parent composite sample. The Field Team mixed the soil thoroughly by hand while wearing single-use nitrile gloves and placed the collected composite samples into one-2oz clear glass jar and one-4oz clear glass jar.

7.4 Temporary Monitoring Well Installation and Development

ERG oversaw Holt use a track mounted Geoprobe 7822DT Combo Rig equipped with an automatic drop hammer to install five temporary wells (TMW-1 through TMW-5) between January 22 and January 25, 2024, (see Figure 2 and boring/well logs included as Appendix E) using ASTM D6282/D6282M-14, Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations (ASTM 2014).

Three wells were constructed to an approximate depth of 25 feet bgs with 1-inch schedule 40 PVC prepacks with 10 feet of 0.010-inch screened casing. ERG placed 10/20 Colorado silica sand in the annulus and retracted the tooling. The field crew placed the screened interval to ensure that the maximum water table fluctuations were fully captured by the screen (generally 15-25 feet; see well logs included in Appendix E). No seal was set and Alta developed the wells using over-purge and bailing methods in accordance with ASTM D5521/D5521M, *Standard Guide for Development of Groundwater Monitoring Wells in Granular Aquifers* (ASTM 2013).

7.5 Groundwater Sampling

On January 24 and January 25, 2024, ERG sampled the onsite temporary monitoring wells TMW-1 through TMW-5 (Figure 2).

The field crew purged the wells using a low-flow peristaltic pump for approximately 20 minutes and recorded water quality parameters (Appendix F). All wells maintained good water flow with no noticeable drawdown during the purging and sampling procedures.

The field crew inserted new disposable single-use ¼-inch Teflon lined tubing into each well and placed the intake near the midpoint of the wetted screen.

Sampling personnel collected groundwater samples wearing clean nitrile gloves into the sampling containers described in the QAPP (ERG 2024) and placed all samples in a refrigerated cooler containing double-bagged ice immediately after collection. Samples were held under chain-of-custody until shipment to Pace for the following analyses:

- TPH-GRO by NWTPH-Gx (Ecology 1997)
- TPH-DRO by NWTPH-Dx (Ecology 1997).
- VOCs including:

- BTEXN, iso-propylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, MTBE, and EDC, and EDB by EPA Method 8260D (EPA 2018a).
- Chlorinated solvents including: PERC and daughter products, such as but not limited to, TCE, cis 1,2-DCE, trans 1,2-DCE, 1,1-DCE, 1,1-dichloroethane, 1,1,1-trichloroethane, vinyl chloride, and 1,4-dioxane by EPA Method 8260D (EPA 2018a).
- PAHs including: acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, and pyrene by EPA Method 8270C-SIM (EPA 2018b).
- PPMs by EPA Method 6010D (EPA 2018c) and mercury by EPA Method 7470A (EPA 1994).
- PCBs by EPA Method 8082A (EPA 2007b).

Appendix F provides complete laboratory data sheets and chain-of-custody documentation.

7.6 Investigation Derived Waste (IDW)

Investigation derived waste (IDW) consisted of two 55-gallon drums of soil cuttings and two 55-gallon drums of purge water. The drums were determined to be non-hazardous wastes, and are scheduled for transport off-site with a certified waste hauler, Heritage, and disposed of at a permitted facility.

8.0 Phase II Data Quality Assurance Evaluation

Section 2.5 of the QAPP outlines the data quality objectives (DQOs) and criteria (ERG 2024). Alta's project Quality Assurance Officer (QAO) reviewed field documentation, results of field and laboratory quality assurance/quality control (QA/QC) samples, and data reported by the laboratory to ensure that the data had been recorded, transmitted, and processed correctly, and to determine that DQOs were met. Appendix G includes the site-specific QA/QC Memorandum which summarizes the data validation and data quality assessment performed by ERG.

8.1 General Data Review

Alta's QAO qualified certain data based on sample handling, tracking, and reporting. Data meet the data quality objectives for representativeness and comparability, with the exceptions discussed below.

- 1,4-dioxane was analyzed past the 14-day technical holding time for certain soil samples. According to the laboratory, the quality control failed with the initial run and by the time the lab could re-analyze the samples, 1,4-dioxane was outside of holding time. 1,4-dioxane results were all below their method detection limits (MDLs); however, the MDLs for 1,4-dioxane are at least one order of magnitude below the ODEQ RBCs for Excavation and Construction Workers and the RSL for Construction Workers. Therefore, based on the NFG Organic and based on professional judgment of the Alta data validator, these non-detect results will be qualified as estimated with a low bias (UJ-).
- TPH-GX was analyzed past the 14-day technical holding time for certain soil samples; per the NFG-Organic, these results will be qualified as estimated (J).
- All mercury and PAH sample results in shallow soil composite samples were qualified due to sample preservation. Results where mercury was <MDL were rejected and results where mercury was detected will be qualified as estimated with a low bias (J-). For PAHs, results that

were <MDL will be qualified as estimated non-detect (UJ) and results that were detected will be qualified as estimated (J).

- Analysis of PAHs was conducted outside of hold time for one rinsate blank sample. PAHs were not detected >MDL in that sample; therefore, based on professional judgement, these results for PAHs will be qualified as estimated non-detect (UJ).

8.2 Data Accuracy and Precision

Accuracy and precision are also considered acceptable, with the exceptions discussed below.

8.2.1 Accuracy

Alta's QAO qualified the following data based on accuracy results (surrogate recoveries, Laboratory control samples [LCS] recoveries, or Matrix Spike [MS] recoveries):

- Based on surrogate %R o-Terphenyl below the laboratory acceptance limit in soil sample OD-BH-12-SG-15', TPH-DRO will be qualified as estimated non-detect (UJ) in that sample.
- For analysis of n-propylbenzene in soil, the %R in the LCS in one analytical batch was below the laboratory limits. Results from associated field samples (samples analyzed in the same analytical batch) where these analytes were <MDL will be qualified as estimated non-detect (UJ). Results from associated field samples where these analytes were >MDL will be qualified estimated with a low bias (J-).
- For analysis of VOCs in soil, the laboratory qualified certain naphthalene, 1,3,5-trimethylbenzene, MTBE, n-propylbenzene, and 1-4, dioxane sample results as "C3," indicating that the continuing calibration standard associated with this data responded low and the reported concentration is an estimate. In all associated field samples, these analytes were not detected above the MDL and therefore will be qualified as estimated non-detect (UJ).
- Most MS/matrix spike duplicate (MSD) %Rs were within acceptable laboratory limits except for the following instances:
 - For analysis of PPMs in soil, the antimony, arsenic, and silver %Rs were below the lower acceptance limit in certain samples in the MS and/or MSD. Results in these samples where these analytes were <MDL will be qualified as estimated non-detect (UJ). Results from associated field samples where these analytes were >MDL will be qualified estimated with a low bias (J-).
 - For analysis of mercury in soil, the %R was above the upper acceptance limit in one MSD. The associated mercury sample result is >MDL and therefore, will be qualified estimated with a high bias (J+).
 - For analysis of TPH-DRO in soil, the %R was below the lower acceptance limit in one MS. The associated field sample had detected concentrations of DRO and therefore will be qualified as estimated (J).
 - For analysis of mercury in groundwater, the %R was below the lower acceptance limit in one MS. Mercury was not detected in the associated field sample and will therefore be qualified as estimated non-detect (UJ).

8.2.2 Precision

Alta's QAO qualified the following data based on precision results (MSD, laboratory control sample duplicates [LCSD], and field duplicates).

- Certain results for PPMs arsenic, copper, lead, and nickel and PAHs benzo(a)anthracene, benzo(k)fluoranthene, chrysene, fluoranthene, or pyrene in soil samples will be qualified in the parent and duplicate field samples. Sample results in the field duplicate pairs for these analytes that were <MDL will be qualified as estimated non-detect (UJ) and sample results where these analytes were detected will be qualified as estimated (J) due to field duplicate results.

8.3 Data Sensitivity

Alta's QAO noted the following which may affect the sensitivity of the results:

- TPH-GRO and PPM cadmium were detected in method blanks >MDL and < reporting limit (RL) in certain analytical batches for soil sample analysis. Results from associated field samples (those samples that were analyzed in the same batch as the method blank) where these analytes were <MDL will not be qualified. Results from associated field samples where these analytes were >MDL and <RL will be reported at the RL and qualified non-detect (U). Results from associated field samples where these analytes were >RL but were <10 times the blank result will be qualified as estimated, biased high (J+), based on professional judgement. Results from associated field samples where these analytes were >RL and were >10 times the blank result will not be qualified, based on professional judgement.
- For analysis of TPH-GRO using Method NWTPH-Gx, the field samples were analyzed in two batches with one method blank analyzed for each batch; the target analyte was detected in both method blanks >MDL and <RL. Results from associated field samples where these analytes were <MDL will not be qualified. Results from associated field samples where these analytes were >MDL and <RL will be reported at the RL and qualified non-detect (U).
- For analysis of PPMs and TPH in the rinsate blanks, cadmium, nickel, and TPH-DRO were detected in certain method blanks >MDL and <RL. Associated samples (i.e. the rinsate blanks analyzed in the same batch) where these analytes were <MDL will not be qualified. Results from associated field samples where these analytes were >MDL and <RL will be reported at the RL and qualified non-detect (U).
- PPM copper was detected in one rinsate blank. Results from the associated groundwater field sample were raised to the RL and qualified as non-detect (U).
- For PPMs antimony, selenium, and thallium; and VOCs 1,1-DCE, 1,2-dibromoethane (EDB), EDC, 1,4-dioxane, benzene, MTBE, naphthalene, PERC, TCE, and vinyl chloride in soil, both the RL and the MDL exceed the lowest screening levels (which are either ODEQ RBCs for Leaching to Groundwater or RSLs for the Protection of Groundwater). In field samples where these analytes were <MDL, it is possible for these analytes to be present in site soils at a concentration <MDL and > the ODEQ for Leaching to Groundwater and/or the RSL for Protection of Groundwater. However, groundwater samples were also collected from the site and analyzed for COCs.

- For analysis of EDB in groundwater: the MDL and RL exceed the RSL for Resident Tapwater and the MCL for all samples. Therefore, for samples with EDB results <MDL, it is possible for the analyte to be present at the site in groundwater at a concentration <MDL and > the RSL and/or MCL. However, it should be noted that EDB was not detected in any groundwater samples and there is no indication that EDB is present at the site.
- For analysis of 1,4-dioxane in groundwater: both the MDL and RL exceed the RSL for Resident Tapwater for all samples (no MCL is available for 1,4-dioxane). For samples where 1,4-dioxane was <MDL, it is possible for the analyte to be present at the site in groundwater at a concentration <MDL and > RSL.
- For analysis of thallium in groundwater: the MDL and RL exceed the RSL for Resident Tapwater and the EPA MCL for all samples. Therefore, for samples with thallium results <MDL, it is possible for the analyte to be present at the site in groundwater at a concentration <MDL and > the EPA RSL and/or MCL. However, it should be noted that thallium was not detected in any groundwater samples and there is no indication that thallium is present at the site.

8.4 Data Usability

Because the Alta QAO rejected data, completeness for this sampling event is calculated at 99% as defined in the QAPP.

9.0 Phase II Sampling Results

This section summarizes the soil and groundwater analytical results for the Site assessment activities completed from January 22 through 25, 2024.

9.1 Soil Sampling Results

ERG compared target analyte concentrations in soil samples to ODEQ RBCs for Construction and Excavation Workers (ODEQ 2003 and ODEQ 2023a) and EPA RSLs for Construction Workers (EPA 2023a, 2023b). Soil results for metals were also compared to background metals concentrations (ODEQ 2018). Soil results were not compared to ODEQ RBCs for Leaching to Groundwater and EPA RSLs for Protection of Groundwater, as listed in Appendix A of the QAPP, because groundwater was encountered and sampled during the Phase II ESA.

9.1.1 Subsurface Soil Grab/Composite Sampling Results

The field crew collected a total of 13 soil grab samples (plus one duplicate samples) and a total of 32 soil composite samples (plus two duplicate samples) from 13 soil boring and 5 co-located temporary monitoring well locations at the Site (borings BH-1 through BH-13 and TMW-1 through TMW-5; Figure 2) to evaluate concentrations of COCs in soils.

No COCs were detected in subsurface composite and subsurface grab soil samples at concentrations above the ODEQ RBCs for Construction and Excavation Workers or EPA RSLs for Construction Workers.

Tables 1 through 4 in Appendix C summarize the subsurface soil analytical results (expressed in milligrams per kilogram [mg/kg]). Tables 1 through 4 include all results for the COCs that were detected in one or more samples. Laboratory results for all COCs are provided in Appendix D. Figure 2 shows sample locations.

9.1.2 Dripline Composite Soil Sampling Results

ERG collected four composite soil samples (plus one duplicate sample) from the driplines along the west sides of each of the four stationary railcars to evaluate the absence or presence of PAHs and metals.

No COCs were detected in dripline composite soil samples at concentrations above ODEQ RBCs for Construction and Excavation Workers or EPA RSLs for Construction Workers.

Tables 5 and 6 in Appendix C summarize the shallow soil analytical results (expressed in mg/kg) for the COCs that were detected above the method detection limits in one or more samples. Laboratory results for all COCs are provided in Appendix D. Figure 2 shows the sample locations.

9.2 Groundwater Sampling Results

ERG collected water quality field parameters data during the groundwater purging process immediately prior to sample collection. Field parameters include temperature, pH, specific conductance, dissolved oxygen, oxidation/reduction potential, and turbidity. These parameters provide information on the water chemistry and stabilization criteria to indicate that the well sufficiently purged and that the extracted groundwater is representative of the groundwater from the aquifer (see Appendix F).

ERG collected five groundwater samples (plus one duplicate sample) from the temporary well locations (TMW-1, TMW-2, TMW-3, TMW-4, and TMW-5) on January 24 and January 25, 2024 and compared target analyte concentrations in groundwater samples to ODEQ RBCs for Construction/Excavations Workers (Groundwater in Excavations) (ODEQ 2003 and ODEQ 2023a), EPA MCLs, and EPA RSLs for Tapwater (EPA 2023a, 2023b).

1,4-dioxane in groundwater samples from TMW-2, TMW-3, and TMW-4 was detected at concentrations above the EPA RSL for Resident Tapwater criteria of 0.00046 mg/L (EPA 2023a). However, 1,4-dioxane concentrations in these samples were below the ODEQ RBC for Construction/Excavations Workers of 3.4 mg/L (ODEQ 2023a) and there is no MCL for 1,4-dioxane.

No other target COCs were detected in groundwater at concentrations above ODEQ RBCs for Construction/Excavations Workers, RSLs for Resident Tapwater, or MCLs.

Tables 7-9 provide a summary of the groundwater analytical results (expressed in milligrams per liter [mg/L]) for the COCs that were detected above the method detection limit in one or more samples. Laboratory results for all COCs are provided in Appendix D. Figure 2 shows groundwater sampling locations.

9.3 Results by Property

The findings from the Phase II ESA are presented by individual property below:

- **Tax Lot 4500 (Tri-County Metropolitan Transportation District of Oregon):** One temporary groundwater monitoring well (TMW-1) was installed, four soil borings (BH-1, BH-2, BH-6, and BH-7) were advanced, and four soil composite samples representing the west side from each of the four stationary railcars (RC1 through RC4) along the dripline on Tax Lot 4500 were collected (Figure 2).

No COCs were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, RSLs for Resident Tapwater, or MCLs. No COCs were detected in subsurface soil samples or from dripline soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or RSLs for Construction Workers.

- **Tax Lot 4400 (Portland General Electric Co.):** One temporary groundwater monitoring well (TMW-2) was installed and three soil borings (BH-3, BH-4, and BH-5) were advanced on Tax Lot 4400.

1,4-dioxane was detected at concentrations above the RSL for Resident Tapwater (0.00046 milligrams per liter [mg/L]) (EPA 2023a) at TMW-2. However, 1,4-dioxane concentrations in this sample were below the ODEQ RBCs for Construction/Excavations Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a).

No other COCs were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, RSLs for Resident Tapwater, or MCLs. No COCs were detected in subsurface soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or RSLs for Construction Workers.

- **Tax Lot 4300 (City of Portland Water Bureau):** Due to major city utilities in this area, no subsurface soil or groundwater samples were collected from this area. BH-8 and TMW-3, located on the right-of-way (City of Portland Bureau of Transportation), are adjacent to the fence that separates Tax Lot 4300 and the City of Portland Bureau of Transportation property.
- **Right-of-Way (City of Portland Bureau of Transportation):** Three temporary groundwater monitoring wells (TMW-3, TMW-4, and TMW-5) were installed and six soil borings (BH-8 through BH-13) were advanced on the City of Portland Bureau of Transportation property.

1,4-dioxane was detected at concentrations above EPA RSL for Resident Tapwater (0.00046 mg/L (EPA 2023a) at TMW-3 and TMW-4. However, 1,4-dioxane concentrations in these samples were below the ODEQ RBC for Construction/Excavations Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a).

No other COCs were detected in groundwater samples collected from this portion of the Site at concentrations above ODEQ RBCs, RSLs for Resident Tapwater, or MCLs. No COCs were detected in subsurface soil samples collected from this portion of the Site at concentrations above ODEQ RBCs for Construction and Excavation Workers or EPA RSLs for Construction Workers.

9.4 Discussion

The presence of 1,4-dioxane in groundwater at concentrations above RSL for Resident Tapwater suggests there may be risks to future residents who drink groundwater extracted from the Site; however, this is unlikely based on the proposed Site use as a roadway. All detected concentrations of 1,4-dioxane were below the ODEQ RBC for Construction/Excavation Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a) and therefore is unlikely to pose a risk to workers during Site construction activities. No soil samples from the Site had detected concentrations of 1,4-dioxane.

During drilling, ERG's Field Team encountered groundwater from approximately 12-20 feet bgs. Depending on the depth of excavation for the proposed road construction, potential intrusion of shallow groundwater during excavation activities may occur. Due to the possibility of shallow groundwater intrusion, a contingency plan for dewatering and disposal should be developed prior to construction.

Wood debris and buried metal were observed during Phase II ESA soil boring activities. In the vicinity of the City of Portland Bureau of Transportation property, a possible buried rail spur was observed while clearing boring locations prior to drilling. In addition, a 2015 geotechnical evaluation identified undocumented fill at depths ranging from 2 to 23.5 feet bgs in the area generally south and west of the Site. It is possible that other areas of the Site may also be underlain with fill. Fill and unidentified buried debris and materials (such as drums and tanks that could have once contained chemicals) could be encountered during excavation and redevelopment activities and could impact the road construction activities. A geotechnical evaluation of the Site, to determine the extent of fill including buried metal and wood waste is recommended, and a contingency plan for soil disposal should be developed prior to construction.

10.0 Phase II Conclusions and Recommendations

The analytical results for soil and groundwater samples indicate there are no COCs that are present at the Site at concentrations above ODEQ RBCs for Construction/Excavation Workers (soil and groundwater) or EPA RSLs for Construction Workers (soil only). Analytical results for groundwater results for 1,4-Dioxane exceed EPA RSL for Resident Tapwater (EPA 2023a) throughout the Site. The following sections summarize ERG's conclusions and recommendations.

10.1 Conclusions

Based on field observations, available information, and Site-specific data collected, ERG concludes the following:

- PID readings, visual and olfactory observations, and analytical data suggest that Site soils and groundwater are not impacted by petroleum contamination.
- During drilling, ERG's Field Team encountered groundwater from approximately 12-20 feet bgs. Depending on the depth of excavation for the proposed road construction, potential intrusion of shallow groundwater during excavation activities may occur.
- 1,4-dioxane in groundwater was detected at concentrations above EPA RSL for Resident Tapwater criteria of 0.00046 mg/L (EPA 2023a) throughout the Site. However, Site-wide 1,4-dioxane groundwater concentrations are below the ODEQ RBC for Construction/Excavation Workers (Groundwater in Excavations) (3.4 mg/L) (ODEQ 2023a) and therefore is unlikely to pose a risk to workers during Site construction activities.
- The presence of 1,4-dioxane in groundwater at concentrations above RSL for Resident Tapwater indicates there may be risks to future residents who drink groundwater extracted from the Site; however, this is unlikely based on the proposed Site use as a roadway.
- During the Phase II ESA, wood debris and buried metal were observed during soil boring activities. In the vicinity of the City of Portland Bureau of Transportation property, a potentially buried rail spur was observed while clearing the boring locations prior to drilling. Fill and unidentified buried debris and materials (such as drums and tanks that could have once

contained chemicals) could be encountered during excavation and redevelopment activities and could impact the road construction activities.

10.2 Recommendations

The available information and site-specific data collected during the Phase II investigation did not identify COCs above the applicable RBCs or RSLs based on the proposed redevelopment of the Site as a paved roadway, therefore, ERG does not recommend the development of an ABCA. However, the applicant should consider the following:

- Due to the possibility of shallow groundwater intrusion, a contingency plan for dewatering and disposal should be developed prior to construction.
- A contingency plan for soil disposal should be developed prior to construction in the event that drums, tanks, or other unidentified potential contaminant sources are uncovered during excavation and site development activities.
- A geotechnical evaluation of the Site to determine the extent of fill including buried metal and wood waste is recommended.

11.0 Limitations

There is a possibility that even with the proper application of these methodologies, there may exist on the subject property conditions that could not be identified within the scope of the assessment, or which were not reasonably identifiable and/or ascertainable from the available information. ERG believes that the information obtained from the regulatory file review and the interviews concerning the site are reliable. However, ERG cannot and does not warrant or guarantee that the information provided by these other sources is accurate or complete. The methodologies of this assessment are not intended to produce all-inclusive or comprehensive results, but rather to provide the client with information relating to the subject property.

Along with all of the limitations set forth in various sections of the ASTM E1527-21 protocol (ASTM 2021), the accuracy and completeness of this report may be limited. As discussed in Section 4.1, ERG did not observe the interior of the buildings/railroad cars due to access limitations. It should also be noted that this assessment did not include a review or audit of operational environmental compliance issues or of any environmental management systems that may exist on the property. Some of the information presented in this report was provided through existing documents and interviews. Although attempts were made, whenever possible, to obtain a minimum of two confirmatory sources of information, in certain instances ERG has been required to assume that the information provided is accurate.

The information and conclusions contained in this report are based upon work undertaken by trained professional and technical staff in accordance with generally accepted engineering and scientific practices current at the time the work was performed. The conclusions and recommendations presented represent the best judgment of ERG based on the data obtained from the work. Due to the limited nature of the investigation, and the data available, ERG cannot warrant against undiscovered environmental liabilities that are beyond the scope of this assessment. A Phase II ESA is not an all-encompassing investigation. It is a professional investigation with a limited scope based on reasonably obtainable information that an experienced professional practicing due care could be expected to obtain

or observe and evaluate. Conclusions and recommendations presented in this report should not be construed as legal advice.

Should additional information become available that differs significantly from our understanding of conditions presented in this report, we request that this information be brought to our attention so that we may reassess the conclusions provided herein.

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EXPLANATION

- Approximate Site Boundary
- Borehole Sample Location
- Borehole and Temporary Well Sample Location
- Dripline Composite Sample Location
*Each composite sample is composed of 10 sub-sample locations located along each Rail Car (RC)
- Existing Water Well
- Existing Groundwater Monitoring Well
- Historical Building Footprint
- Concrete Wall
- Historical Building
- Existing Building
- Right of way (City of Portland Bureau of Transportation)
- Tax lot 4300 (City of Portland Water Bureau)
- Tax lot 4400 (Portland General Electric Co.)
- Tax lot 4500 (Tri-County Metropolitan Transportation District of Oregon)



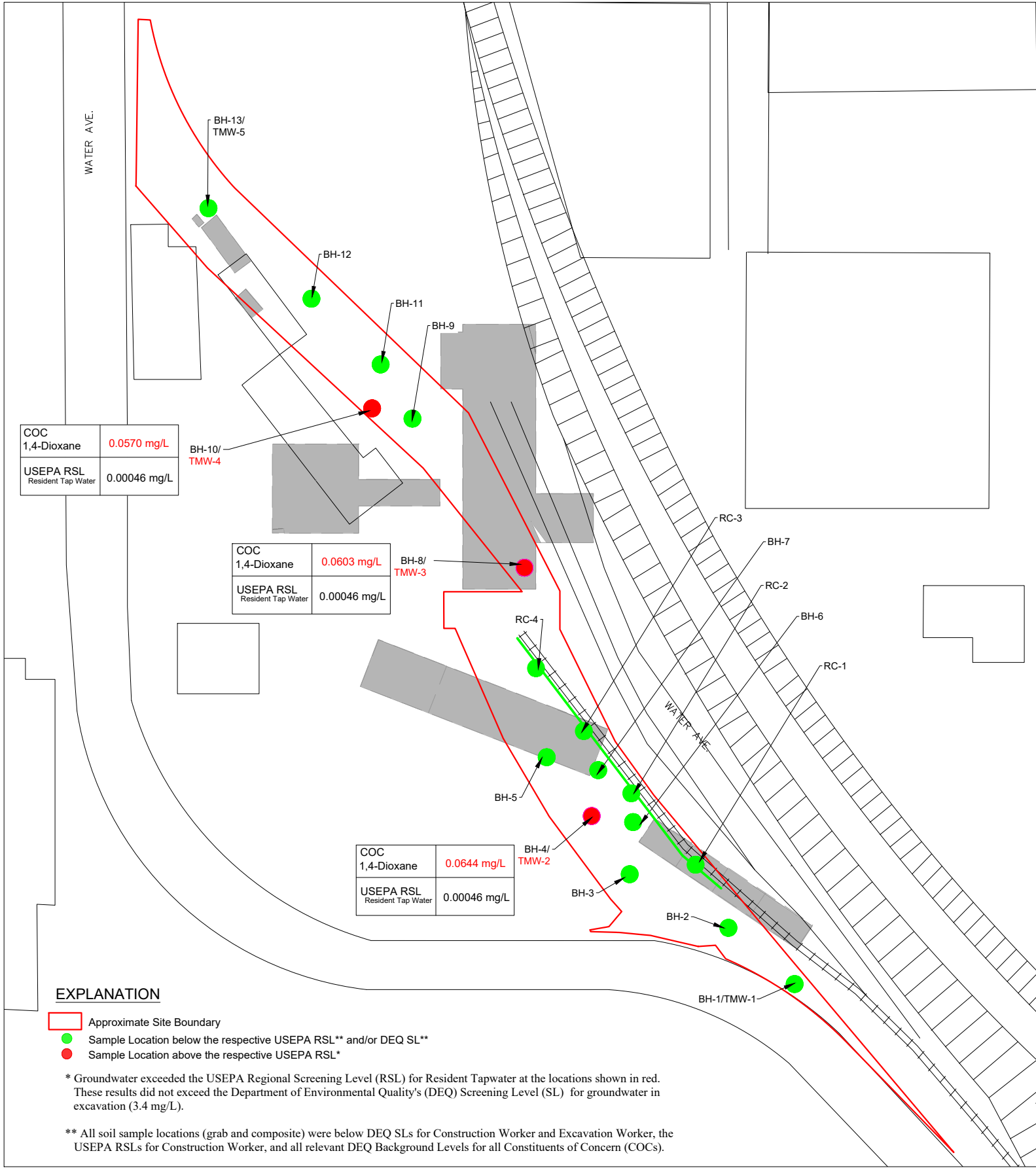
PRINT DATE:
March 25, 2024
PROJECT NUMBER:
22136-40

PROJECTION:
UTM NAD 83, Zone 11N
PROJECT MANAGER:
Sarah Weppner
CARTOGRAPHER:
Melody Studer

PROJECT NAME:
**OMSI District Road
Parcels TBA
Portland, OR 97214**

FIGURE 1:
**Generalized Site Plan
and Sampling Locations
Map**

This map was produced using information obtained from several different sources that have not been independently verified. These sources have also not provided information on the precision and accuracy of the data. Information on this map is not a substitute for survey data.

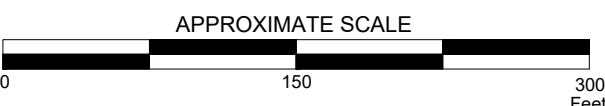



EXPLANATION

- Approximate Site Boundary
- Sample Location below the respective USEPA RSL** and/or DEQ SL**
- Sample Location above the respective USEPA RSL*

* Groundwater exceeded the USEPA Regional Screening Level (RSL) for Resident Tapwater at the locations shown in red. These results did not exceed the Department of Environmental Quality's (DEQ) Screening Level (SL) for groundwater in excavation (3.4 mg/L).

** All soil sample locations (grab and composite) were below DEQ SLs for Construction Worker and Excavation Worker, the USEPA RSLs for Construction Worker, and all relevant DEQ Background Levels for all Constituents of Concern (COCs).



	PRINT DATE: March 25, 2024	PROJECTION: UTM NAD 83, Zone 11N	PROJECT NAME: OMSI District Road Parcels TBA Portland, OR 97214	FIGURE 2: Sampling Locations Map with Highlighted Results	This map was produced using information obtained from several different sources that have not been independently verified. These sources have also not provided information on the precision and accuracy of the data. Information on this map is not a substitute for survey data.
	PROJECT NUMBER: 22136-40	PROJECT MANAGER: Sarah Weppner			
	CARTOGRAPHER: Melody Studer				

Appendix A – Photo Log

Photo 1



Grey water tank under stationary railcar with unknown insulation.

Photo 2



De minimis surface staining.

Photo 3



Electrical panel for the stationary railcars.

Photo 4



55-gallon drum containing potential soil cuttings.

Photo 5



Water infrastructure in front of OMSI.

Photo 6



Electrical utilities located on PG&E property.

Photo 7



Old rail spurs and various metal components.

Photo 8



Northern gate to the Water Bureau property.



PRINT DATE:
October 5, 2023

PROJECT NUMBER:
22136-40

PROJECT MANAGER:
J. Munkers

CREATED BY:
A. Ward

PROJECT NAME:
OMSI District
Road Parcels

APPENDIX A, PHOTO LOG

Phase I ESA

Photo 9



Pallets of old brick.

Photo 10



Gate motor for PG&E's gate.

Photo 11



Unidentified 55-gallon drum located on tax lot 4400.

Photo 12



Overhead power.

Photo 1



Holt clearing boring location via an air knife. Utility marks shown in the background.

Photo 2



Property line being marked on PG&E property.

Photo 3



Drilling BH-3.

Photo 4



10-15' foot soil core from BH-3.



PRINT DATE:
February 24, 2024

PROJECT NUMBER:
22136-40

PROJECT MANAGER:
J. Munkers

CREATED BY:
B. McLees

PROJECT NAME:
OMSI

APPENDIX A, PHOTO LOG

Phase II ESA

Photo 5



Railcar soil composite sampling with a step probe.

Photo 6



Sewage collection at the rail cars.

Photo 7



Unidentified insulation.

Photo 8



Greased idler wheel.

Photo 9



Screening soils with a PID.

Photo 10



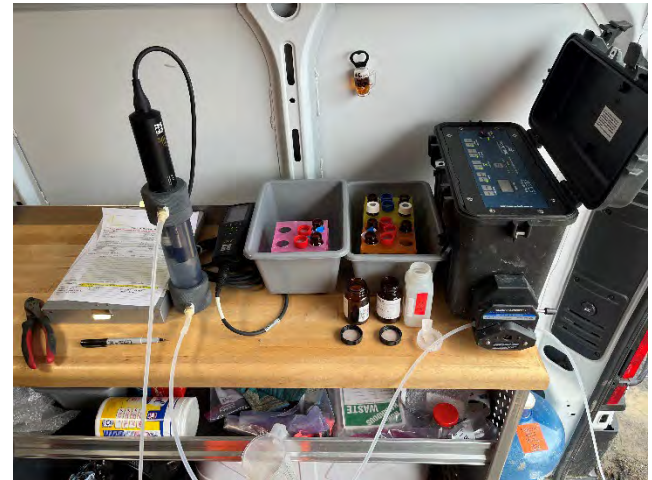
Developing one of the temporary wells.

Photo 11



Groundwater sampling.

Photo 12



Groundwater sampling setup.



PRINT DATE:
February 24, 2024

PROJECT NUMBER:
22136-40

PROJECT MANAGER:
J. Munkers

CREATED BY:
B. McLees

PROJECT NAME:
OMSI

APPENDIX A, PHOTO LOG

Phase II ESA

Appendix B – EDR Report

Appendix C – Sampling Results

Table 1. Subsurface Soil Grab Sample Results for TPH

Sample ID	Sample Date	Units	TPH-DRO			TPH-GRO		
DEQ RBC - Construction Worker - DC			4,600			9,700		
DEQ RBC - Excavation Worker - DC			>Max			>Max		
USEPA RSL - Construction Worker			NA			NA		
			RDL	MDL	Result	RDL	MDL	Result
OD-BH1-SG-15'	01/23/2024	mg/kg	4	1.33	ND	2.5	0.848	2.74 J+
OD-BH2-SG-15'	01/23/2024	mg/kg	4	1.33	ND	2.5	0.848	2.97 J+
OD-BH3-SG-15'	01/23/2024	mg/kg	4	1.33	ND	2.5	0.848	2.8 J+
OD-BH6-SG-15'	01/23/2024	mg/kg	4	1.33	2.31 J	2.9	0.983	2.9 U
OD-BH13-SG-15'	01/24/2024	mg/kg	4	1.33	ND	2.5	0.848	1.03 J

Notes:

mg/kg = milligram per kilogram

TPHs = total petroleum hydrocarbons. GRO = gasoline range organics. DRO = diesel range organics.

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios

>Max = The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg. Constituent is deemed not to pose risks in this scenario.

EPA RSL = USEPA Regional Screening Level for Construction Worker

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

J = result is an estimate

J+ = result is an estimate, biased high

Table 2. Subsurface Soil Grab Sample Results for PAHs

Sample ID	Sample Date	Units	BENZO(A)ANTHRACENE			BENZO(A)PYRENE			BENZO(B)FLUORANTHENE			CHRYSENE			FLUORANTHENE			PYRENE								
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result						
DEQ RBC - Construction Worker - DC					170			17			170			17,000			10,000			7,500						
DEQ RBC - Excavation Worker - DC					4,800			490			4,900			490,000			280,000			210,000						
USEPA RSL - Construction Worker					169			17.5			175			17,500			24,000			71,900						
OD-BH11-SG-15'	01/24/2024	mg/kg	0.006	0.00173	0.00265	J	0.006	0.00179	0.00242	J	0.006	0.00153	0.00319	J	0.006	0.00232	0.00367	J	0.006	0.00227	0.00407	J	0.006	0.002	0.00435	J

Notes:
 mg/kg = milligram per kilogram
 PAHs = polycyclic aromatic hydrocarbons
 Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios.
 EPA RSL = USEPA Regional Screening Level for Construction Worker
 Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.
 Bold values exceed the DEQ SL.
 Underlined results exceed the EPA RSL.
 J = result is an estimate

Table 3. Subsurface Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	ANTIMONY			ARSENIC			BERYLLIUM		
DEQ RBC - Construction Worker - DC			NA			15			700		
DEQ RBC - Excavation Worker - DC			NA			420			19000		
USEPA RSL - Construction Worker			136			23.7			1700		
DEQ Background Levels for Portland Basin			0.56			8.8			2		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-BH1-SC-0'-5'	01/22/2024	mg/kg	2	0.544	2.19	2	0.518	3.66	0.2	0.0315	ND
OD-BH1-SC-5'-15'	01/23/2024	mg/kg	2	0.544	1.89 J	2	0.518	2.5	0.2	0.0315	ND
OD-BH1-SC-15'-25'	01/23/2024	mg/kg	2	0.544	3.5	2	0.518	2.51	0.2	0.0315	ND
OD-BH2-SC-0'-5'	01/22/2024	mg/kg	2	0.544	1.37 J	2	0.518	1.99 J	0.2	0.0315	0.246
OD-BH2-SC-5'-15'	01/23/2024	mg/kg	2	0.544	1.83 J	2	0.518	3.81	0.2	0.0315	0.451
OD-BH2-SC-15'-25'	01/23/2024	mg/kg	2	0.544	1.84 J	2	0.518	2.26	0.2	0.0315	0.361
OD-BH3-SC-0'-5'	01/22/2024	mg/kg	2	0.544	1.55 J	2	0.518	2.74	0.2	0.0315	0.269
OD-BH3-SC-5'-15'	01/23/2024	mg/kg	2	0.544	1.63 J	2	0.518	2.54	0.2	0.0315	0.255
OD-BH3-SC-15'-25'	01/23/2024	mg/kg	2	0.544	1.81 J	2	0.518	4.99	0.2	0.0315	ND
OD-BH4-SC-0'-5'	01/22/2024	mg/kg	2	0.544	2.49	2	0.518	4.99	0.2	0.0315	ND
OD-BH4-SC-5'-15'	01/23/2024	mg/kg	2	0.544	1.16 J	2	0.518	1.62 J	0.2	0.0315	0.0446 J
OD-BH4-SC-15'-25'	01/23/2024	mg/kg	2	0.544	2.15	2	0.518	3.82	0.2	0.0315	ND
OD-BH5-SC-0'-5'	01/22/2024	mg/kg	2	0.544	2.38	2	0.518	5.08	0.2	0.0315	ND
OD-BH5-SC-5'-15'	01/23/2024	mg/kg	2	0.544	2.09	2	0.518	4.1	0.2	0.0315	0.051 J
OD-BH5-SC-15'-25'	01/23/2024	mg/kg	2	0.544	1.64 J	2	0.518	6.46	0.2	0.0315	0.156 J
OD-BH6-SC-0'-5'	01/22/2024	mg/kg	2	0.544	1.61 J	2	0.518	3.6	0.2	0.0315	ND
OD-BH6-SC-10'-15'	01/23/2024	mg/kg	2	0.544	1.7 J-	2	0.518	4.9 J-	0.2	0.0315	0.121 J
OD-BH6-SC-15'-25'	01/23/2024	mg/kg	2	0.544	1.83 J	2	0.518	4.98	0.2	0.0315	0.214
OD-BH7-SC-0'-5'	01/22/2024	mg/kg	2	0.544	2.49	2	0.518	3.13	0.2	0.0315	<0.0315 UJ
OD-BH7-SC-5'-15'	01/23/2024	mg/kg	2	0.544	1.77 J	2	0.518	4.48	0.2	0.0315	0.119 J
OD-BH7-SC-15'-25' *	01/23/2024	mg/kg	2	0.544	2.54	2	0.518	6.68 J	0.2	0.0315	0.175 J
OD-BH8-SC-0'-5'	01/23/2024	mg/kg	2	0.544	1.14 J	2	0.518	0.68 J	0.2	0.0315	ND
OD-BH8-SC-5'-15'	01/24/2024	mg/kg	2	0.544	1.19 J	2	0.518	1.38 J	0.2	0.0315	0.13 J
OD-BH8-SC-15'-25'	01/24/2024	mg/kg	2	0.544	1.05 J	2	0.518	2.42	0.2	0.0315	0.0618 J
OD-BH9-SC-0'-5'	01/23/2024	mg/kg	2	0.544	1.68 J	2	0.518	1.74 J	0.2	0.0315	0.0635 J
OD-BH9-SC-5'-15'	01/24/2024	mg/kg	2	0.544	ND	2	0.518	1.12 J	0.2	0.0315	ND
OD-BH9-SC-15'-25'	01/23/2024	mg/kg	2	0.544	1.79 J	2	0.518	1.18 J	0.2	0.0315	ND
OD-BH10-SC-0'-5'	01/23/2024	mg/kg	2	0.544	ND	2	0.518	2.13	0.2	0.0315	0.0992 J
OD-BH10-SC-5'-15'	01/25/2024	mg/kg	2	0.544	ND	2	0.518	3.01	0.2	0.0315	0.152 J
OD-BH10-SC-15'-25'	01/25/2024	mg/kg	2	0.544	ND	2	0.518	1.6 J	0.2	0.0315	ND
OD-BH11-SC-0'-5'	01/23/2024	mg/kg	2	0.544	1.46 J	2	0.518	1.83 J	0.2	0.0315	ND
OD-BH11-SC-5'-15'	01/24/2024	mg/kg	2	0.544	1.91 J	2	0.518	2.74	0.2	0.0315	ND
OD-BH12-SC-0'-5'	01/23/2024	mg/kg	2	0.544	1.81 J	2	0.518	3.25	0.2	0.0315	0.0723 J
OD-BH12-SC-5'-15' *	01/24/2024	mg/kg	2	0.544	2.06	2	0.518	5.32	0.2	0.0315	0.196 J
OD-BH12-SC-15'-25'	01/24/2024	mg/kg	2	0.544	0.611 J-	2	0.518	4.08	0.2	0.0315	0.17 J
OD-BH13-SC-0'-5'	01/24/2024	mg/kg	2	0.544	2.82	2	0.518	5.59	0.2	0.0315	ND
OD-BH13-SC-5'-15'	01/24/2024	mg/kg	2	0.544	2.62	2	0.518	10	0.2	0.0315	0.0976 J
OD-BH13-SC-15'-25'	01/24/2024	mg/kg	2	0.544	2.23	2	0.518	4.92	0.2	0.0315	0.0564 J

Notes:

mg/kg = milligram per kilogram

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

Table 3, cont. Subsurface Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	CADMIUM			CHROMIUM			COPPER		
DEQ RBC - Construction Worker - DC			350			530,000			14,000		
DEQ RBC - Excavation Worker - DC			9700			NA			390,000		
USEPA RSL - Construction Worker			150			NA			13,600		
DEQ Background Levels for Portland Basin			0.63			76			34		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-BH1-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.246 J	1	0.133	17.2	2	0.4	23.5
OD-BH1-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.155 J	1	0.133	12.5	2	0.4	15.1
OD-BH1-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.264 J	1	0.133	11.7	2	0.4	15.8
OD-BH2-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.0976 J	1	0.133	6.14	2	0.4	16.7
OD-BH2-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.128 J	1	0.133	12.5	2	0.4	17.7
OD-BH2-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.0983 J	1	0.133	11.4	2	0.4	14.7
OD-BH3-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.155 J	1	0.133	6.12	2	0.4	26.8
OD-BH3-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.0855 J	1	0.133	9.06	2	0.4	14.8
OD-BH3-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.0852 J	1	0.133	10.7	2	0.4	17.4
OD-BH4-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.178 J	1	0.133	9.12	2	0.4	27.8
OD-BH4-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.5 U	1	0.133	5.01	2	0.4	12.7
OD-BH4-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.0476 J	1	0.133	9.62	2	0.4	15.7
OD-BH5-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.0762 J	1	0.133	9.58	2	0.4	20
OD-BH5-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.0955 J	1	0.133	13.5	2	0.4	16.7
OD-BH5-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.0773 J	1	0.133	15.6	2	0.4	18.5
OD-BH6-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.215 J	1	0.133	12	2	0.4	36
OD-BH6-SC-10'-15'	01/23/2024	mg/kg	0.5	0.047	0.137 J	1	0.133	17.4	2	0.4	20.7
OD-BH6-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.114 J	1	0.133	16.7	2	0.4	15.9
OD-BH7-SC-0'-5'	01/22/2024	mg/kg	0.5	0.047	0.157 J	1	0.133	15.5	2	0.4	33.9
OD-BH7-SC-5'-15'	01/23/2024	mg/kg	0.5	0.047	0.142 J	1	0.133	19.8	2	0.4	22.5
OD-BH7-SC-15'-25' *	01/23/2024	mg/kg	0.5	0.047	0.149 J	1	0.133	18.4	2	0.4	18.7
OD-BH8-SC-0'-5'	01/23/2024	mg/kg	0.5	0.047	0.068 J	1	0.133	4.36	2	0.4	10.8
OD-BH8-SC-5'-15'	01/24/2024	mg/kg	0.5	0.047	0.0929 J	1	0.133	6.83	2	0.4	13.6
OD-BH8-SC-15'-25'	01/24/2024	mg/kg	0.5	0.047	0.0842 J	1	0.133	24.8	2	0.4	25.4
OD-BH9-SC-0'-5'	01/23/2024	mg/kg	0.5	0.047	0.0964 J	1	0.133	8.59	2	0.4	26.3
OD-BH9-SC-5'-15'	01/24/2024	mg/kg	0.5	0.047	0.111 J	1	0.133	7.05	2	0.4	14.2
OD-BH9-SC-15'-25'	01/23/2024	mg/kg	0.5	0.047	0.0667 J	1	0.133	10.7	2	0.4	20.9
OD-BH10-SC-0'-5'	01/23/2024	mg/kg	0.5	0.047	0.0815 J	1	0.133	8.89	2	0.4	18.1
OD-BH10-SC-5'-15'	01/25/2024	mg/kg	0.5	0.047	0.775	1	0.133	14.2	2	0.4	29.6
OD-BH10-SC-15'-25'	01/25/2024	mg/kg	0.5	0.047	0.0634 J	1	0.133	7.2	2	0.4	14.8
OD-BH11-SC-0'-5'	01/23/2024	mg/kg	0.5	0.047	0.101 J	1	0.133	7.11	2	0.4	20
OD-BH11-SC-5'-15'	01/24/2024	mg/kg	0.5	0.047	0.197 J	1	0.133	12.8	2	0.4	20.5
OD-BH12-SC-0'-5'	01/23/2024	mg/kg	0.5	0.047	0.127 J	1	0.133	15.2	2	0.4	17.8
OD-BH12-SC-5'-15' *	01/24/2024	mg/kg	0.5	0.047	0.129 J	1	0.133	14.9	2	0.4	24.1
OD-BH12-SC-15'-25'	01/24/2024	mg/kg	0.5	0.047	0.0647 J	1	0.133	11.7	2	0.4	19.3
OD-BH13-SC-0'-5'	01/24/2024	mg/kg	0.5	0.047	0.248 J	1	0.133	13	2	0.4	42.6
OD-BH13-SC-5'-15'	01/24/2024	mg/kg	0.5	0.047	0.0958 J	1	0.133	17.4	2	0.4	18.3
OD-BH13-SC-15'-25'	01/24/2024	mg/kg	0.5	0.047	0.0635 J	1	0.133	16.9	2	0.4	16.9

Notes:

mg/kg = milligram per kilogram

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

Table 3, cont. Subsurface Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	LEAD			NICKEL			SELENIUM		
DEQ RBC - Construction Worker - DC			800			7,000			NA		
DEQ RBC - Excavation Worker - DC			800			190,000			NA		
USEPA RSL - Construction Worker			NA			6,790			1,700		
DEQ Background Levels for Portland Basin			79			47			0.71		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-BH1-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	19.7	2	0.132	19.8	2	0.764	ND
OD-BH1-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	14.4	2	0.132	13.9	2	0.764	ND
OD-BH1-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	23	2	0.132	15.4	2	0.764	ND
OD-BH2-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	11.2	2	0.132	8.95	2	0.764	ND
OD-BH2-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	8.9	2	0.132	11.1	2	0.764	1.05 J
OD-BH2-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	6.59	2	0.132	11.8	2	0.764	1.2 J
OD-BH3-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	38.3	2	0.132	10.4	2	0.764	ND
OD-BH3-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	10.9	2	0.132	10.6	2	0.764	ND
OD-BH3-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	15.3	2	0.132	12.3	2	0.764	1.36 J
OD-BH4-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	42.1	2	0.132	13	2	0.764	0.992 J
OD-BH4-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	17.4	2	0.132	5.51	2	0.764	0.9 J
OD-BH4-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	11.8	2	0.132	10.7	2	0.764	0.812 J
OD-BH5-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	22.5	2	0.132	12	2	0.764	1.27 J
OD-BH5-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	16.7	2	0.132	13	2	0.764	0.833 J
OD-BH5-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	19	2	0.132	13.8	2	0.764	ND
OD-BH6-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	23.9	2	0.132	15.6	2	0.764	ND
OD-BH6-SC-10'-15'	01/23/2024	mg/kg	0.5	0.208	20.2	2	0.132	14	2	0.764	1.35 J
OD-BH6-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	15.5	2	0.132	12.9	2	0.764	ND
OD-BH7-SC-0'-5'	01/22/2024	mg/kg	0.5	0.208	32.3	2	0.132	18.3	2	0.764	ND
OD-BH7-SC-5'-15'	01/23/2024	mg/kg	0.5	0.208	26.6	2	0.132	14.8	2	0.764	ND
OD-BH7-SC-15'-25' *	01/23/2024	mg/kg	0.5	0.208	20	2	0.132	15.7	2	0.764	ND
OD-BH8-SC-0'-5'	01/23/2024	mg/kg	0.5	0.208	12.2	2	0.132	5.19	2	0.764	1.92 J
OD-BH8-SC-5'-15'	01/24/2024	mg/kg	0.5	0.208	6.37	2	0.132	9.31	2	0.764	1.36 J
OD-BH8-SC-15'-25'	01/24/2024	mg/kg	0.5	0.208	24.7	2	0.132	12.3	2	0.764	0.963 J
OD-BH9-SC-0'-5'	01/23/2024	mg/kg	0.5	0.208	24.2	2	0.132	8.72	2	0.764	1.86 J
OD-BH9-SC-5'-15'	01/24/2024	mg/kg	0.5	0.208	9.31	2	0.132	8.3	2	0.764	1.58 J
OD-BH9-SC-15'-25'	01/23/2024	mg/kg	0.5	0.208	14.6	2	0.132	11.1	2	0.764	2.8
OD-BH10-SC-0'-5'	01/23/2024	mg/kg	0.5	0.208	21.2	2	0.132	10.5	2	0.764	1.85 J
OD-BH10-SC-5'-15'	01/25/2024	mg/kg	0.5	0.208	11.1	2	0.132	20.2	2	0.764	4.41
OD-BH10-SC-15'-25'	01/25/2024	mg/kg	0.5	0.208	7.91	2	0.132	12	2	0.764	1.5 J
OD-BH11-SC-0'-5'	01/23/2024	mg/kg	0.5	0.208	12.2	2	0.132	8.67	2	0.764	ND
OD-BH11-SC-5'-15'	01/24/2024	mg/kg	0.5	0.208	12.7	2	0.132	13.7	2	0.764	ND
OD-BH12-SC-0'-5'	01/23/2024	mg/kg	0.5	0.208	20.8	2	0.132	12.8	2	0.764	1.09 J
OD-BH12-SC-5'-15' *	01/24/2024	mg/kg	0.5	0.208	25.3	2	0.132	13.4	2	0.764	ND
OD-BH12-SC-15'-25'	01/24/2024	mg/kg	0.5	0.208	15.7	2	0.132	10.3	2	0.764	2.44
OD-BH13-SC-0'-5'	01/24/2024	mg/kg	0.5	0.208	50.5	2	0.132	11.1	2	0.764	ND
OD-BH13-SC-5'-15'	01/24/2024	mg/kg	0.5	0.208	15.8	2	0.132	14.7	2	0.764	ND
OD-BH13-SC-15'-25'	01/24/2024	mg/kg	0.5	0.208	7.25	2	0.132	19.1	2	0.764	0.998 J

Notes:

mg/kg = milligram per kilogram

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UU = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

Table 3, cont. Subsurface Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	THALLIUM			ZINC			MERCURY		
DEQ RBC - Construction Worker - DC			NA			NA			110		
DEQ RBC - Excavation Worker - DC			NA			NA			2,900		
USEPA RSL - Construction Worker			13.6			100,000			3.13		
DEQ Background Levels for Portland Basin			5.2			180			0.23		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-BH1-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	49.8	0.04	0.018	0.0253 J
OD-BH1-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	39.6	0.04	0.018	0.022 J
OD-BH1-SC-15'-25'	01/23/2024	mg/kg	10	1.97	ND	5	0.832	59.9	0.04	0.018	ND
OD-BH2-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	29.5	0.04	0.018	ND
OD-BH2-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	35	0.04	0.018	0.0181 J
OD-BH2-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	34.7	0.04	0.018	ND
OD-BH3-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	50.5	0.04	0.018	0.0508
OD-BH3-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	30.9	0.04	0.018	ND
OD-BH3-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	41.4	0.04	0.018	0.0446
OD-BH4-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	73.5	0.04	0.018	0.0563
OD-BH4-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	24.1	0.04	0.018	0.0621
OD-BH4-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	34.1	0.04	0.018	0.0465
OD-BH5-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	46.5	0.04	0.018	0.0551
OD-BH5-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	47.5	0.04	0.018	0.0213 J
OD-BH5-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	52.7	0.04	0.018	0.0214 J
OD-BH6-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	93.3	0.04	0.018	0.0767
OD-BH6-SC-10'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	55.9	0.04	0.018	0.0269 J+
OD-BH6-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	50.9	0.04	0.018	0.0272 J
OD-BH7-SC-0'-5'	01/22/2024	mg/kg	2	0.394	ND	5	0.832	55.7	0.04	0.018	0.0374 J
OD-BH7-SC-5'-15'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	58.1	0.04	0.018	0.0306 J
OD-BH7-SC-15'-25' *	01/23/2024	mg/kg	2	0.394	ND	5	0.832	54.7	0.04	0.018	0.0454
OD-BH8-SC-0'-5'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	23	0.04	0.018	0.024 J
OD-BH8-SC-5'-15'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	28.1	0.04	0.018	ND
OD-BH8-SC-15'-25'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	42.8	0.04	0.018	ND
OD-BH9-SC-0'-5'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	66.2	0.04	0.018	0.0245 J
OD-BH9-SC-5'-15'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	33.8	0.04	0.018	ND
OD-BH9-SC-15'-25'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	36.9	0.04	0.018	ND
OD-BH10-SC-0'-5'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	42.5	0.04	0.018	0.0289 J
OD-BH10-SC-5'-15'	01/25/2024	mg/kg	2	0.394	1.13 J	5	0.832	40.8	0.04	0.018	ND
OD-BH10-SC-15'-25'	01/25/2024	mg/kg	2	0.394	ND	5	0.832	33.4	0.04	0.018	ND
OD-BH11-SC-0'-5'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	38.8	0.04	0.018	ND
OD-BH11-SC-5'-15'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	51.9	0.04	0.018	ND
OD-BH12-SC-0'-5'	01/23/2024	mg/kg	2	0.394	ND	5	0.832	58.8	0.04	0.018	0.0558
OD-BH12-SC-5'-15' *	01/24/2024	mg/kg	2	0.394	ND	5	0.832	58	0.04	0.018	0.0256 J
OD-BH12-SC-15'-25'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	42.8	0.04	0.018	0.0258 J
OD-BH13-SC-0'-5'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	74.1	0.04	0.018	0.0925
OD-BH13-SC-5'-15'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	56.5	0.04	0.018	0.0394 J
OD-BH13-SC-15'-25'	01/24/2024	mg/kg	2	0.394	ND	5	0.832	39.6	0.04	0.018	0.0334 J

Notes:

mg/kg = milligram per kilogram

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

Table 4. Subsurface Soil Composite Sample Results for PCBs

Sample ID	Sample Date	Units	Total PCBs		
DEQ RBC - Construction Worker - DC			4.9		
DEQ RBC - Excavation Worker - DC			140		
USEPA RSL - Construction Worker			NA		
			RDL	MDL	Result
OD-BH13-SC-0'-5'	01/24/2024	mg/kg	0.017	0.00738	0.0144 J

Notes:

mg/kg = milligram per kilogram

PCBs = polychlorinated biphenyls

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation for Construction Worker and Excavation Worker receptor scenarios.

EPA RSL = USEPA Regional Screening Level for Construction Worker

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

J = result is an estimate

Table 5. Shallow Soil Composite Sample Results for PAHs

Sample ID	Sample Date	Units	ACENAPHTHENE				ANTHRACENE				BENZO(A)ANTHRACENE			
DEQ RBC - Construction Worker - DC			21,000				110,000				170			
DEQ RBC - Excavation Worker - DC			590,000				>Max				4,800			
USEPA RSL - Construction Worker			47,900				100,000				169			
			RDL	MDL	Result		RDL	MDL	Result		RDL	MDL	Result	
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00209	ND	UJ	0.006	0.0023	0.0137	J	0.006	0.00173	0.0639	J
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	0.006	0.00209	ND	UJ	0.006	0.0023	0.009	J	0.006	0.00173	0.0442	J
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00209	ND	UJ	0.006	0.0023	0.0118	J	0.006	0.00173	0.0224	J
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00209	0.00322	J	0.006	0.0023	0.196	J	0.006	0.00173	0.192	J

Notes:

mg/kg = milligram per kilogram

PAH = polycyclic aromatic hydrocarbon

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

>Max = The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg. Constituent is deemed not to pose risks in this scenario.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

UJ = estimated non detect concentration

J = result is an estimate

Table 5, cont. Shallow Soil Composite Sample Results for PAHs

Sample ID	Sample Date	Units	BENZO(A)PYRENE				BENZO(B)FLUORANTHENE				BENZO(K)FLUORANTHENE			
DEQ RBC - Construction Worker - DC			17				170				1,700			
DEQ RBC - Excavation Worker - DC			490				4,900				49,000			
USEPA RSL - Construction Worker			17.5				175				1,750			
			RDL	MDL	Result		RDL	MDL	Result		RDL	MDL	Result	
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00179	0.122	J	0.006	0.00153	0.0968	J	0.006	0.00215	0.0318	J
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	0.006	0.00179	0.0615	J	0.006	0.00153	0.0536	J	0.006	0.00215	0.0178	J
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00179	0.0379	J	0.006	0.00153	0.0371	J	0.006	0.00215	0.00812	J
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00179	0.247	J	0.006	0.00153	0.417	J	0.006	0.00215	0.131	J

Notes:

mg/kg = milligram per kilogram

PAH = polycyclic aromatic hydrocarbon

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

>Max = The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg. Constituent is deemed not to pose risks in this scenario.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

UJ = estimated non detect concentration

J = result is an estimate

Table 5, cont. Shallow Soil Composite Sample Results for PAHs

Sample ID	Sample Date	Units	CHRYSENE				FLUORANTHENE				FLUORENE			PYRENE				
DEQ RBC - Construction Worker - DC			17,000				10,000				14,000			7,500				
DEQ RBC - Excavation Worker - DC			490,000				280,000				390,000			210,000				
USEPA RSL - Construction Worker			17,500				24,000				192			71,900				
			RDL	MDL	Result		RDL	MDL	Result		RDL	MDL	Result	RDL	MDL	Result		
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00232	0.0557	J	0.006	0.00227	0.11	J	0.006	0.00205	ND	UJ	0.006	0.002	0.134	J
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	0.006	0.00232	0.0403	J	0.006	0.00227	0.0315	J	0.006	0.00205	ND	UJ	0.006	0.002	0.0363	J
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00232	0.0238	J	0.006	0.00227	0.0419	J	0.006	0.00205	ND	UJ	0.006	0.002	0.0396	J
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	0.006	0.00232	0.27	J	0.006	0.00227	0.343	J	0.006	0.00205	0.00683	J	0.006	0.002	0.284	J

Notes:

mg/kg = milligram per kilogram

PAH = polycyclic aromatic hydrocarbon

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

>Max = The constituent RBC for this pathway is calculated as greater than 1,000,000 mg/kg. Constituent is deemed not to pose risks in this scenario.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

UJ = estimated non detect concentration

J = result is an estimate

Table 6. Shallow Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	ANTIMONY				ARSENIC			BERYLLIUM			CADMIUM			
DEQ RBC - Construction Worker - DC			NA				15			700			350			
DEQ RBC - Excavation Worker - DC			NA				420			19,000			9,700			
USEPA RSL - Construction Worker			136				23.7			1,700			150			
DEQ Background Levels for Portland Basin			0.56				8.8			2			0.63			
			RDL	MDL	Result		RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	2	0.544	1.57	J	2	0.518	4.56	0.2	0.0315	ND	0.5	0.0471	0.201	J
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	2	0.544	1.57	J	2	0.518	4.73	0.2	0.0315	0.288	0.5	0.0471	0.327	J
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	2	0.544	1.47	J	2	0.518	2.81	0.2	0.0315	ND	0.5	0.0471	0.162	J
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	2	0.544	1.87	J	2	0.518	4.01	0.2	0.0315	ND	0.5	0.0471	0.141	J

Notes:

mg/kg = milligram per kilogram

PPM = priority pollutant metal

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

R = data was rejected as a result of data validation review.

Table 6, cont. Shallow Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	CHROMIUM			COPPER			LEAD			NICKEL		
DEQ RBC - Construction Worker - DC			530,000			14,000			800			7,000		
DEQ RBC - Excavation Worker - DC			NA			390,000			800			190,000		
USEPA RSL - Construction Worker			NA			13,600			NA			6,790		
DEQ Background Levels for Portland Basin			76			34			79			47		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	1	0.133	10.9	2	0.4	42.7	0.5	0.208	21.7	2	0.132	12.3
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	1	0.133	8.7	2	0.4	96.3 J	0.5	0.208	27.2 J	2	0.132	17.4 J
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	1	0.133	9.15	2	0.4	22.6	0.5	0.208	11.3	2	0.132	9.87
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	1	0.133	8.44	2	0.4	22.5	0.5	0.208	16.1	2	0.132	10.3

Notes:

mg/kg = milligram per kilogram

PPM = priority pollutant metal

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

R = data was rejected as a result of data validation review.

Table 6, cont. Shallow Soil Composite Sample Results for Priority Pollutant Metals

Sample ID	Sample Date	Units	SELENIUM				SILVER			ZINC			MERCURY				
DEQ RBC - Construction Worker - DC			NA				1,800			NA			110				
DEQ RBC - Excavation Worker - DC			NA				49,000			NA			2,900				
USEPA RSL - Construction Worker			1,700				1,700			100,000			3.13				
DEQ Background Levels for Portland Basin			0.71				0.82			180			0.23				
			RDL	MDL	Result		RDL	MDL	Result		RDL	MDL	Result	RDL	MDL	Result	
OD-RC1-WS-SC-6"	01/22/2024	mg/kg	2	0.764	0.935	J	1	0.127	ND		5	0.832	47.9	0.04	0.018	0.0369	J-
OD-RC2-WS-SC-6" *	01/22/2024	mg/kg	2	0.764	0.972	J	1	0.127	0.777	J	5	0.832	34.2	0.04	0.018	0.0254	J-
OD-RC3-WS-SC-6"	01/22/2024	mg/kg	2	0.764	ND		1	0.127	0.155	J	5	0.832	43.1	0.04	0.018		R
OD-RC4-WS-SC-6"	01/22/2024	mg/kg	2	0.764	ND		1	0.127	ND		5	0.832	44.8	0.04	0.018	0.0299	J-

Notes:

mg/kg = milligram per kilogram

PPM = priority pollutant metal

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Soil Ingestion, Dermal Contact, and Inhalation exposure pathway for Construction Worker and Excavation Worker receptor scenarios.

EPA RSL = USEPA Regional Screening Level for Construction Worker

Oregon DEQ background values for Portland Basin (DEQ 2018)

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceed the screening level.

Bold values exceed the DEQ SL.

Underlined results exceed the EPA RSL.

* Location of duplicate sample; higher concentration shown

ND = not detected above the method detection limit

U = not detected above the reporting limit shown

UJ = estimated non detect concentration

J = result is an estimate

J+ = result is an estimate, biased high

J- = result is an estimate, biased low

R = data was rejected as a result of data validation review.

Table 7. Groundwater Sampling Results for VOCs

Sample ID	Sample Date	Units	Tetrachloroethene			1,4-Dioxane		
DEQ RBC - GW in Excavation (mg/l)			5.6			3.4		
USEPA MCL (mg/l)			0.011			NA		
USEPA RSL (mg/l)			0.005			0.00046		
			RDL	MDL	Result	RDL	MDL	Result
OD-TMW-1	01/24/2024	mg/l	0.001	0.0003	ND	0.1	0.036	ND
OD-TMW-2 *	01/24/2024	mg/l	0.001	0.0003	ND	0.1	0.036	<u>0.0644</u> J
OD-TMW-3	01/24/2024	mg/l	0.001	0.0003	0.00258	0.1	0.036	<u>0.0603</u> J
OD-TMW-4	01/24/2024	mg/l	0.001	0.0003	ND	0.1	0.036	<u>0.0570</u> J
OD-TMW-5	01/24/2024	mg/l	0.001	0.0003	ND	0.1	0.036	ND

Notes:

VOC = volatile organic compound

mg/l = milligram per liter

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Groundwater in Excavation exposure pathway, Construction & Excavation Worker receptor scenario.

USEPA MCL = Maximum Contaminant Level

USEPA RSL = Regional Screening Level for resident tap water

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceeds the shaded screening level.

Bold results exceed the DEQ SL.

Underlined results exceed the EPA MCL or RSL.

* Location of duplicate sample; higher concentration shown

MDL = method detection limit

RDL = reported detection limit

ND = not detected above the method detection limit

J = result is an estimate

Table 8. Groundwater Sampling Results for PAHs

Sample ID	Sample Date	Units	Anthracene			Acenaphthene			Fluoranthene		
DEQ RBC - GW in Excavation (mg/l)			>S			>S			>S		
USEPA MCL (mg/l)			NA			NA			NA		
USEPA RSL (mg/l)			1.8			0.53			0.8		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-TMW-1	01/24/2024	mg/l	0.00005	0.000019	0.0000709	0.00005	0.000019	ND	0.0001	0.000027	ND
OD-TMW-2 *	01/24/2024	mg/l	0.00005	0.000019	ND	0.00005	0.000019	0.000123	0.0001	0.000027	0.000335
OD-TMW-3	01/24/2024	mg/l	0.00005	0.000019	0.0000297 J	0.00005	0.000019	ND	0.0001	0.000027	ND
OD-TMW-4	01/24/2024	mg/l	0.00005	0.000019	ND	0.00005	0.000019	ND	0.0001	0.000027	ND
OD-TMW-5	01/24/2024	mg/l	0.00005	0.000019	ND	0.00005	0.000019	ND	0.0001	0.000027	ND

Notes:

PAH = polycyclic aromatic hydrocarbon

mg/l = milligram per liter

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Groundwater in Excavation exposure pathway, Construction & Excavation Worker receptor scenario

>S = This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.

USEPA MCL = Maximum Contaminant Level

USEPA RSL = Regional Screening Level for resident tap water

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceeds the shaded screening level.

Bold results exceed the DEQ SL.

Underlined results exceed the EPA MCL or RSL.

* Location of duplicate sample; higher concentration shown

MDL = method detection limit

RDL = reported detection limit

ND = not detected above the method detection limit

J = result is an estimate

Table 8, cont. Groundwater Sampling Results for PAHs

Sample ID	Sample Date	Units	Fluorene			Pyrene		
DEQ RBC - GW in Excavation (mg/l)			>S			>S		
USEPA MCL (mg/l)			NA			NA		
USEPA RSL (mg/l)			0.29			0.12		
			RDL	MDL	Result	RDL	MDL	Result
OD-TMW-1	01/24/2024	mg/l	0.00005	0.0000169	ND	0.00005	0.0000169	ND
OD-TMW-2 *	01/24/2024	mg/l	0.00005	0.0000169	0.0000247 J	0.00005	0.0000169	0.000206
OD-TMW-3	01/24/2024	mg/l	0.00005	0.0000169	ND	0.00005	0.0000169	ND
OD-TMW-4	01/24/2024	mg/l	0.00005	0.0000169	ND	0.00005	0.0000169	ND
OD-TMW-5	01/24/2024	mg/l	0.00005	0.0000169	ND	0.00005	0.0000169	ND

Notes:

PAH = polycyclic aromatic hydrocarbon

mg/l = milligram per liter

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Groundwater in Excavation exposure pathway, Construction & Excavation Worker receptor scenario

>S = This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.

USEPA MCL = Maximum Contaminant Level

USEPA RSL = Regional Screening Level for resident tap water

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceeds the shaded screening level.

Bold results exceed the DEQ SL.

Underlined results exceed the EPA MCL or RSL.

* Location of duplicate sample; higher concentration shown

MDL = method detection limit

RDL = reported detection limit

ND = not detected above the method detection limit

J = result is an estimate

Table 9. Groundwater Sampling Results for PPMs

Sample ID	Sample Date	Units	Cadmium			Chromium			Copper			Lead		
DEQ RBC - GW in Excavation (mg/l)			130			>S			5,400			>S		
USEPA MCL (mg/l)			0.005			0.1			1.3			0.015		
USEPA RSL (mg/l)			0.0018			NA			0.8			0.015		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-TMW-1	01/24/2024	mg/l	0.002	0.000479	ND	0.01	0.0014	ND	0.01	0.00368	ND	0.006	0.00299	ND
OD-TMW-2 *	01/24/2024	mg/l	0.002	0.000479	0.000733 J	0.01	0.0014	ND	0.01	0.00368	ND	0.006	0.00299	0.00518 J
OD-TMW-3	01/24/2024	mg/l	0.002	0.000479	ND	0.01	0.0014	0.00254 J	0.01	0.00368	ND	0.006	0.00299	ND
OD-TMW-4	01/24/2024	mg/l	0.002	0.000479	ND	0.01	0.0014	0.00181 J	0.01	0.00368	0.01 U	0.006	0.00299	ND
OD-TMW-5	01/24/2024	mg/l	0.002	0.000479	ND	0.01	0.0014	0.00215 J	0.01	0.00368	0.00554 J	0.006	0.00299	ND

Notes:

PPM = priority pollutant metal

mg/l = milligram per liter

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Groundwater in Excavation exposure pathway, Construction & Excavation Worker receptor scenario

>S = This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.

USEPA MCL = Maximum Contaminant Level

USEPA RSL = Regional Screening Level for resident tap water

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceeds the shaded screening level.

Bold results exceed the DEQ SL.

Underlined results exceed the EPA MCL or RSL.

* Location of duplicate sample; higher concentration shown

MDL = method detection limit

RDL = reported detection limit

ND = not detected above the method detection limit

U = not detected above the reported detection limit

J = result is an estimate

Table 9, cont. Groundwater Sampling Results for PPMs

Sample ID	Sample Date	Units	Nickel			Selenium			Zinc		
DEQ RBC - GW in Excavation (mg/l)			>S			NA			NA		
USEPA MCL (mg/l)			NA			0.05			NA		
USEPA RSL (mg/l)			0.39			0.1			6		
			RDL	MDL	Result	RDL	MDL	Result	RDL	MDL	Result
OD-TMW-1	01/24/2024	mg/l	0.01	0.00161	ND	0.01	0.00735	ND	0.05	0.00652	ND
OD-TMW-2 *	01/24/2024	mg/l	0.01	0.00161	0.00171 J	0.01	0.00735	0.00845 J	0.05	0.00652	ND
OD-TMW-3	01/24/2024	mg/l	0.01	0.00161	ND	0.01	0.00735	ND	0.05	0.00652	ND
OD-TMW-4	01/24/2024	mg/l	0.01	0.00161	0.00328 J	0.01	0.00735	ND	0.05	0.00652	0.00784 J
OD-TMW-5	01/24/2024	mg/l	0.01	0.00161	0.00282 J	0.01	0.00735	ND	0.05	0.00652	ND

Notes:

PPM = priority pollutant metal

mg/l = milligram per liter

Oregon DEQ risk-based concentrations (RBCs) obtained from table of Risk-Based Concentrations for Individual Chemicals (DEQ 2023) for the Groundwater in Excavation exposure pathway, Construction & Excavation Worker receptor scenario

>S = This groundwater RBC exceeds the solubility limit. Groundwater concentrations in excess of S indicate that free product may be present.

USEPA MCL = Maximum Contaminant Level

USEPA RSL = Regional Screening Level for resident tap water

NA = Screening Level is not available for this analyte.

Shaded areas identify constituents where the reporting limit and/or method detection limit exceeds the shaded screening level.

Bold results exceed the DEQ SL.

Underlined results exceed the EPA MCL or RSL.

* Location of duplicate sample; higher concentration shown

MDL = method detection limit

RDL = reported detection limit

ND = not detected above the method detection limit

U = not detected above the reported detection limit

J = result is an estimate

Appendix D – Lab Reports

Appendix E – Boring and Well Logs

Appendix F – Groundwater Sampling Forms

**Appendix G –
QA/QC**
