5205 Corporate Ctr. Ct. SE, Ste. A
Olympia, WA 98503-5901
Phone: 360.570.1700
Fax: 360.570.1777
www.uspioneer.com

October 21, 2022

James Weaver
Port of Bremerton
8850 SW State Highway 3
Bremerton, Washington 98312

Subject: Pre-Design Investigation (PDI) and Initial Remedial Investigation (RI) Data Gaps Work Plan
521 and 525 Bay Street, Port Orchard, Washington

Dear Mr. Weaver:

PIONEER Technologies Corporation is submitting the aforementioned Work Plan for your use and distribution. If you have any questions or comment about the Work Plan, please do not hesitate to contact us at (360) 570-1700.

Respectfully,

Troy Bussey, Jr., PE, LG, LHG
Principal Engineer

Joel Hecker, LG, LHG
Senior Scientist/Hydrogeologist

Enclosures:
PDI and Initial RI Data Gaps Work Plan

cc: Ali Furmall, Washington Department of Ecology (electronic copy only)
Kari Sample, Washington Department of Commerce (electronic copy only)

PDI and Initial RI Data Gaps Work Plan

521 and 525 Bay Street
Port Orchard, Washington

Prepared for:

Port of Bremerton
8850 SW State Highway 3
Bremerton, Washington 98312

Prepared by:

PIONEER TECHNOLOGIES CORPORATION

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

October 2022

Professional Certification

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

October 21, 2022

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

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List of Acronyms

Acronym	Explanation
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
Building 1	The Building Located on the 521 Bay Street Parcel
Building 2	The Building Located on the 525 Bay Street Parcel
CFR	Code of Federal Regulations
CLARC	Cleanup Level and Risk Calculation
cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons
ECI	Earth Consulting Incorporated
Ecology	Washington State Department of Ecology
EPH	Extractable Petroleum Hydrocarbons
ESA	Environmental Site Assessment
Geoscience	GeoScience Management, Inc.
GW	Groundwater
IA	Interim Action
Krazen	Krazen & Associates, Inc.
LNAPL	Light Non-Aqueous Phase Liquid
mg/kg	Milligrams per Kilogram
MTCA	Model Toxics Control Act
MW	Monitoring Well
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PDI	Pre-Design Investigation
PID	Photoionization Detector
PIONEER	PIONEER Technologies Corporation
Property	521 and 525 Bay Street parcels
PVC	Polyvinyl Chloride
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
REC	Recognized Environmental Condition
RGI	The Riley Group, Inc.
RI	Remedial Investigation
SAP	Sampling and Analysis Plan
SL	Screening Level
SW	Surface Water

Acronym	Explanation
TPH	Total Petroleum Hydrocarbons
TPH-D	TPH in the Diesel Range
TPH-G	TPH in the Gasoline Range
TPH-HO	TPH in the Heating Oil Range
TOC	Total Organic Carbon
ug/L	Micrograms per Liter
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VCP	Voluntary Cleanup Program
VI	Vapor Intrusion
VOC	Volatile Organic Compound
VPH	Volatile Petroleum Hydrocarbons
WAC	Washington Administrative Code
Work Plan	PDI and Initial RI Data Gaps Work Plan

SECTION 1: INTRODUCTION

1.1 Purpose

The purpose of this Pre-Design Investigation (PDI) and Initial Remedial Investigation (RI) Data Gaps Work Plan (Work Plan) is to present the plan for implementing investigation activities at the 521 and 525 Bay Street parcels (the Property) that will:

- Collect environmental data to inform a remedial design for an interim action (IA).[1]
- Address initial RI data gaps.

Initial RI data gaps are associated with potential migration of contaminants from off-Property on to the Property, the on-Property topographic depression, and vapor intrusion (VI). This Work Plan outlines specific investigation activities, while recognizing other data gaps will need to be addressed during future stages of the RI. Subsequent phases of investigation activities will likely be conducted pursuant to the procedures described in this Work Plan. Following completion of the activities described in this Work Plan, an Interim Action Work Plan will likely be prepared for the Property. Once all necessary phases of the RI are completed, an RI/Feasibility Study Report will be prepared for the Property.

1.2 Property Background

A brief overview of Property background information is presented in this section to provide context for the proposed investigation. The information presented in this section is based on the Phase I Environmental Site Assessment (ESA) Report completed in 2021 (Krazen & Associates, Inc. [Krazen] 2021a), documentation of subsurface investigation and cleanup activities conducted in 2000 and 2002 (GeoScience Management, Inc. [Geoscience] 2000a, 2000b, and 2002), and the Phase II ESA completed in 2021 (Krazen 2021b), unless otherwise noted.

All references to direction (i.e., north, south, east, and west) in this Report are in relation to "site north," which is perpendicular to the Sinclair Inlet shoreline (see Figure 1). "Site north" is approximately 45 degrees west (counterclockwise) from true north. Both "site north" and true north are shown on the figures for this Report.

1.2.1 Property Location

The Property is located immediately northwest of the junction of Kitsap Street and Bay Street in Port Orchard, Washington (see Figures 1 and 2). The Property consists of two parcels of land totaling 1.21 acres, including 0.55 acres of upland area and two buildings (see Figure 2):

- One community theater/meeting hall constructed on the 521 Bay Street parcel in 1910 (Building 1); and

[1] Depending on the PDI results, additional geotechnical data may be necessary to design a potential future excavation-based interim action near the buildings.

- One building currently used for sheet metal fabrication that operated as a gasoline sales and automotive service station until the mid-1980s. The building was constructed on the 525 Bay Street parcel in the 1940s (Building 2).[2]

The Property is currently bound by Sinclair Inlet to the north; a public boat launch and asphalt parking lot to the east; the intersection of Bay Street, Kitsap Street, and Cline Avenue with a landscaped traffic barrier to the southeast; an asphalt parking lot operated by Vlist Motors to the south, and a vacant multi-tenant warehouse/commercial building to the west.

1.2.2 Environmental Setting

The Property is located in Western Washington, which is typified by relatively mild temperatures and a marine-influenced climate. The average annual precipitation for Port Orchard is approximately 45 inches, with most precipitation falling between October and April (Western Regional Climate Center 2022).

The southern upland portion of the Property is relatively flat at an elevation of approximately 10 feet above mean sea level. The northern portion of the Property consists of tidelands and open water within Sinclair Inlet. There is also a six- to eight-foot-deep depression on the center of the Property beneath both Building 1 and Building 2 (the central portion of both buildings are constructed on pilings; see Figure 2). The entire upland portion of the Property is covered with impervious surfaces (i.e., buildings and asphalt-covered areas) with the exception of 1) the depression beneath the buildings and 2) a strip of gravel and exposed soil immediately around Building 2. Surface drainage appears to be adequate and there is no evidence of standing water in the vicinity of the Property. Reportedly, at king tides the past several years, seawater upwells into the depression beneath the buildings. No stormwater catch basins are present on the Property; therefore, it is presumed that stormwater flows into the central depression beneath the buildings or off-Property areas. It is unknown if the floor drains located in Building 2 are connected to the sanitary or stormwater utility or discharge to the depression in the center of the Property (this will be verified during the initial RI).

The regional geology is dominated by Quaternary ice age glacial deposits. The Property is located on artificial fill, with upland areas to the south composed of quaternary alluvium (Washington Division of Geology and Earth Resources 2022). Based on the previous investigations completed at the Property, the shallow subsurface generally consists of silty sand and sandy silt with gravel and wood debris transitioning to silty sand with shell fragments at depths of 6 to 12 feet below ground surface (bgs). Sandy silt or silty clay are present until the termination depths of 15.0 feet bgs.

Groundwater (GW) is generally encountered at depths between five and 10 feet bgs and is presumed to be tidally influenced due to the Property's proximity to Sinclair Inlet. Although the direction of shallow GW flow was previously inferred to be towards the north-northeast (Geoscience 2000a; Krazen 2021b), the actual GW flow direction on the Property has not been determined. GW flow on the adjacent sites to the south across Bay Street in 2007 was reported to be to the northeast (Earth Consulting

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[2] The Kitsap County parcel card for the 525 Bay Street parcel lists the construction date of Building 2 as 1910.

Incorporated [ECI] 2007). The GW flow direction(s) in the shallowest GW-bearing unit will be assessed in later phases of the RI.

1.2.3 Land Use

The current land uses for the Property are commercial (521 Bay Street parcel) and light industrial (525 Bay Street parcel). Future land uses for the Property are likely to be mixed-use residential and/or commercial for both parcels comprising the Property. Building 1 is currently and has historically been used as a theater and gathering place. Building 2 is currently used as a sheet metal fabrication shop and was formerly used for gasoline sales and automotive service from the early-1940s through the mid-1980s.

1.2.4 Key Operational Features

A number of key operational features with the potential to cause a release or that have been documented as causing releases to the subsurface have been identified on the Property during past investigations. Key operational features on the Property include (see Figure 2):

- A former 800-gallon heating oil underground storage tank (UST) immediately south of Building 1 that was removed and disposed of off-Property in 2002.
- Three approximately 2,000-gallon gasoline USTs immediately south of Building 2 that were reportedly closed in-place with concrete in the mid-1980s.
- A former dispenser island immediately east of the reportedly closed-in-place 2,000-gallon gasoline USTs.
- An approximately 1,000-gallon UST immediately east of Building 2 that was reportedly closed in-place with concrete in the mid-1980s.[3]
- An in-place hydraulic lift and associated floor staining within Building 2.
- A floor drain in the shop area of Building 2 with an unknown discharge point.

Based on verbal information discussed in past reports, each of the five USTs on the Property were reportedly decommissioned (i.e., contents evacuated and filled with concrete). However, there is no decommissioning documentation available. During removal of the heating oil UST south of Building 1 in 2002, it was determined that the UST was not decommissioned, contrary to what was previously reported. Based on the lack of records and existing soil and GW data near the remaining USTs, there is uncertainty about whether or not those USTs were actually decommissioned and closed-in-place.

[3] The contents of the UST are reportedly gasoline; however, based on the location and distance from the other USTs on the 525 Bay Street parcel, PIONEER suspects this UST may be a heating and/or waste oil UST.

1.2.5 Overview of Property Investigation Chronology

Several investigation activities were completed between 2000 and 2021. The Property investigation chronology to date is summarized in the following table. The approximate locations of all previous soil, GW, and soil gas sampling locations are shown on Figure 2.

Date	Investigation	Summary of Activities
1/2000	Site Assessment (Geoscience 2000a)	10 soil borings (**SP-1, SP-2, SP-3, SP-4A through SP-4C, SP-5 through SP-8**) were advanced on the 525 Bay Street parcel and soil and GW samples were collected from the borings. Soil samples were collected at SP-1, SP-2, SP-4A, SP-4C, and SP-8. GW samples were collected from temporary monitoring wells (MWs) placed in the open boreholes at each boring with the exception of SP-4A and SP-4B. Soil and GW samples were analyzed for total petroleum hydrocarbons (TPH) in the gasoline range (TPH-G) and benzene, toluene, ethylbenzene, and total xylenes (BTEX). Samples collected from SP-8 were also analyzed for total lead.
3/2002	Heating Oil UST Removal and Cleanup (Geoscience 2002)	One 800-gallon heating oil UST and associated contaminated soil were removed as part of this investigation on the 521 Bay Street parcel. As discussed in Section 1.2.4, the UST was previously identified as being decommissioned but this proved to be false. The UST removal included removal of approximately 25 tons of petroleum-contaminated soil and 600 gallons of oily water (evacuated from the UST basin) that were disposed of off-Property. The final limits of the excavation measured approximately 8 feet wide east-west, 10 feet wide north-south, and approximately 5.5 feet deep. The excavation was backfilled with compacted crushed rock to stabilize the excavation sidewalls. Four soil samples were collected from the sidewalls (**UST-North, UST-East, UST-South, UST-West**) and one from the bottom (**UST-Bottom**) of the excavation. Each soil sample was analyzed for TPH in the diesel range (TPH-D; specifically, kerosene, diesel, and heavy oil). One soil boring with a temporary GW well (**GP-1**) was advanced to collect a GW sample from the backfilled excavation. The GW sample was analyzed for TPH-D and BTEX.
3/2021	Phase I ESA (Krazen 2021a)	Krazen concluded that the only on-Property Recognized Environmental Condition (REC) was the presence of soil and GW contamination documented in 2000 on the 525 Bay Street parcel, likely resulting from the prior sale of gasoline on the Property. Krazen identified the presence of an in-place hydraulic lift on the 525 Bay Street parcel as a Potential Area of Concern. Krazen also identified two adjacent sites located hydraulically upgradient of the Property (Vlist Motors and Marina Mart) as an additional REC.[4] The two sites have documented releases of multiple constituents in soil and GW that are the same as those present on the Property (e.g., TPH-G, TPH-D, and BTEX). See Section 1.2.7 for additional information about off-Property releases.
4/2021	Phase II ESA (Krazen 2021b)	Seven soil borings (**B-1 through B-5**) were advanced on the Property (both the 521 and 525 Bay Street parcels) and soil and GW samples were collected from the borings. GW samples were collected from temporary MWs placed in the open boreholes at each boring. Soil and GW samples were analyzed for TPH-G, TPH-D, TPH in the heavy oil range (TPH-HO), and BTEX. The soil and GW sample collected from B-1 were also analyzed for polychlorinated biphenyls (PCBs). Two soil vapor probes **(VP-1 and VP-2)** were installed, one immediately to the south of each building. The soil vapor probes were analyzed for TPH, BTEX, and naphthalene. A soil sample was also collected from VP-1 and analyzed for TPH-G, TPH-D, TPH-HO, and BTEX.

[4] The Dick Vlist Motors site is also known as the City of Port Orchard Public Works site. For simplicity, the Dick Vlist Motors site is referred to as the Vlist Motors site throughout this Work Plan.

1.2.6 Summary of Existing On-Property Exceedances

The investigation activities summarized in the previous section have identified the presence of Model Toxics Control Act (MTCA) screening level (SL) exceedances in soil, GW, and soil gas. TPH-G, TPH-D, benzene, toluene, ethylbenzene, and xylenes exceeded MTCA SLs in one or more soil samples (see Table 1). TPH-G, TPH-D, benzene, and ethylbenzene exceeded MTCA SLs in one or more GW samples (see Table 2). TPH, benzene, and xylenes exceeded MTCA SLs in one or more soil gas sample (Krazen 2021b). Previous TPH-G soil, GW, and soil gas sampling results are shown on Figure 3 relative to the most stringent MTCA SL for the medium.

1.2.7 Surrounding Sites of Interest

The Vlist Motors site and the Marina Mart site are upgradient of the Property and have known releases to soil and GW that may have impacted the Property (see Figure 3). The Vlist Motors site is located south of Building 1, immediately across Bay Street. The site operated as a City of Port Orchard maintenance yard with three USTs containing diesel fuel and gasoline; the site was sold to Vlist Motors and used as a used car sales lot beginning in the 1990s. The three USTS were initially abandoned in 1990 and reportedly filled with concrete; the USTs were subsequently removed in 1999. The Marina Mart site is located south of Building 2, immediately across Bay Street. The Marina Mart site operated as a gasoline service station between the 1950s and 1990s. Three USTs containing leaded gasoline were removed from the Marina Mart site in 1992 (Associated Earth Sciences, Inc. 2002; EMS Consultants 2003).

Both upgradient sites had documented releases from the historical USTs. Over 1,400 tons of petroleum-contaminated soil were removed during a series of remedial excavations across both sites between the late 1990s and 2002 (see Figures 2 and 3). Significant petroleum contamination exceeding MTCA SLs remained along the northern excavation sidewall adjacent to Bay Street (Associated Earth Sciences, Inc. 2002; EMS Consultants 2003). The maximum remaining concentrations in soil along Bay Street were as follows:

- TPH-G - 5,700 milligrams per kilogram (mg/kg)
- TPH-D - 2,800 mg/kg
- benzene - 22 mg/kg
- toluene - 66 mg/kg
- ethylbenzene - 56 mg/kg
- total xylenes - 160 mg/kg

Concurrent with the remedial excavations, in 2000, a right-of-way investigation collected soil and GW samples from the center of Bay Street, between the south-adjacent contaminated sites and the Property. Significant petroleum contamination was encountered in both soil and GW in the center of Bay Street, approximately 40 feet from the southern Property boundary (see Figure 3). Geoscience concluded that that “gasoline range soil and groundwater contamination detected in boring SP-11 has migrated from the Marina Mart site beneath Bay Street” (Geoscience 2000b). Soil and GW results from SP-11 are shown in Tables 1 and 2, respectively.

Nine MWs were installed across both upgradient sites following completion of the remedial excavations, including one MW in the center of Bay Street (MW105). The MWs were sampled periodically until 2010.[5] Several constituents in MWs in and along Bay Street exceeded MTCA SLs during the most recent GWM event (ECI 2007; The Riley Group, Inc. [RGI] 2010). The maximum GW concentrations for constituents detected in MWs in and along Bay Street (closest to the Property) during the last time each MW was sampled are shown below:

- TPH-G - 13,000 micrograms per liter (ug/L)
- benzene - 890 ug/L
- toluene - 700 ug/L
- ethylbenzene - 160 ug/L
- total xylenes - 200 ug/L
- total lead - 10.5 ug/L

The most recent GWM results for MWs adjacent to the Property (i.e., MW102, MW104, MW105, and MW106) are detailed in Table 2 and SL exceedances are summarized on Figure 3. In the 2010 GWM Report, RGI stated that "subsurface sediments located on the western and northwestern portion of the Vlist site appear to contain gasoline range petroleum hydrocarbons that are continuing to impact groundwater quality" (RGI 2010). In addition, RGI concluded that "there may be an undetected abandoned gasoline tank in the vicinity of these wells [MW102 and MW106] or that contaminated soil with environmentally significant levels of gasoline and BTEX are impacting groundwater quality" (RGI 2010).

No additional investigation or remedial activities have occurred on either upgradient site since 2010. Both sites were initially enrolled in the Washington State Department of Ecology's (Ecology's) Voluntary Cleanup Program (VCP) but have been dropped due to inactivity.

Even with the significant investigation and cleanup activities on these upgradient sites, the extent of off-site contamination was never fully characterized or delineated. Soil and GW contamination exceeding MTCA SLs extend into the center of Bay Street and likely onto the Property.

1.3 Regulatory Context

This Property is being addressed under MTCA. The PDI and initial RI activities are being conducted as part of an independent remedial action pursuant to Washington Administrative Code (WAC) 173-340-515. It is expected that the Property will eventually be enrolled in the VCP pursuant to WAC 173-340-515 or the Pollution Liability Insurance Agency's Technical Assistance Program.

[5] MW105 in the center of Bay Street was not sampled during the 2010 GW monitoring (GWM) event. The most recent results from MW105 were collected in 2006.

1.4 Work Plan Organization

This Work Plan is organized as follows:

- Section 2: PDI and Initial RI Data Gaps Objectives
- Section 3: Sampling and Analysis Plan
- Section 4: Quality Assurance Project Plan
- Section 5: References

SECTION 2: PDI AND INITIAL RI DATA GAPS OBJECTIVES

The objectives of the PDI are to determine:

- The extent of soil SL exceedances around the previously removed UST south of Building 1.
- The extent of soil SL exceedances associated with the existing USTs and former dispenser island south and east of Building 2.
- The extent of soil SL exceedances associated with the former hoist, stained area, and floor drain inside Building 2.

The objectives of the initial RI data gaps are to assess:

- The potential for contamination emanating from the two upgradient sites (Vlist Motors site and Marina Mart site) to impact the Property.
- The condition of shallow soil/sediment in the topographic depression located beneath Buildings 1 and 2.
- The potential for VI exposures in occupied building spaces near exterior elevated soil vapor probe results.

Additional RI data gaps will be identified and addressed in the future.

SECTION 3: SAMPLING AND ANALYSIS PLAN

The purpose of this sampling and analysis plan (SAP) is to present the methodology for collecting and analyzing samples pursuant to this Work Plan in accordance with WAC 173-340-820 and applicable components of Ecology guidance (Ecology 1995). Typical background contents of a stand-alone SAP are not repeated if included elsewhere in this Work Plan.

3.1 Sampling Design for PDI and Initial RI Data Gaps

A sampling design for the PDI and initial RI data gaps was developed in order to address the objectives defined in Section 2. A total of 10 investigation activities are proposed. The objective, sampling details, anticipated number of samples, and the constituents to be analyzed for each of the investigation activities are presented in Table 3. The proposed sampling locations are shown on Figure 3.[6,7] The fieldwork for the 10 investigation activities included in Table 3 is anticipated to occur between November 2022 and January 2023 due to the need to conduct VI sampling during the winter heating season.

3.2 Sampling Design for Potential Additional Phases of the RI

It is expected that additional RI activities will be conducted following completion of the specific investigation activities associated with the PDI and initial RI data gaps. For instance, permanent MWs with multiple rounds of GWM events will likely be necessary. In addition, it may be necessary to advance additional soil borings and/or conduct additional VI sampling events. It is expected that all additional RI activities will be conducted using the procedures described in this Work Plan. If necessary, the planning of additional RI activities will be documented with a brief addendum to this Work Plan (e.g., a sampling design table, a sampling design figure, and any modifications or addendums to procedures in the Work Plan).

3.3 MTCA Screening Levels

Conservative MTCA SLs were developed for the constituents associated with the PDI and initial RI data gaps sampling design in order to support the development of the Work Plan and to evaluate results obtained pursuant to the Work Plan. SLs were developed to be protective of the following pathways of potential concern:

- The GW-to-surface water (SW) transport pathway;
- The GW-to-VI transport pathway;
- The GW as drinking water exposure pathway;
- The soil-to-GW transport pathway;
- The soil direct contact exposure pathway; and

[6] Actual locations will be adjusted as necessary in the field based on utilities, obstructions, access, or other field considerations.

[7] Since the location of the ambient air sample associated with Sampling Activity #10 is dependent on the conditions during the sampling event, the location is not shown on Figure 3.

- The VI exposure pathway.

Most stringent SLs in each medium (i.e., GW, soil, indoor air, soil gas) were calculated assuming all of the aforementioned potential exposure and transport pathways may be complete and future Property land use could potentially be unrestricted (e.g., residential). Updated SLs, cleanup levels, and/or remediation levels may be developed in the future because the most stringent SLs used in this Work Plan are protective of (1) transport and exposure pathways that may not be complete, and (2) a land use (i.e., unrestricted land use) that is not representative of current Property land use and may not be representative of future Property land uses.

3.3.1 SLs for the GW-to-SW Pathway

SW SLs were calculated as presented in Appendix A using the default assumption that GW may flow to the Sinclair Inlet north of the Property. With the exception of TPH, the GW-to-SW SLs were the cleanup levels calculated in accordance with WAC 173-340-730(3)(b)(i) through (iii) and current Cleanup Level and Risk Calculation (CLARC) values (Ecology 2022c), subject to any necessary adjustments in WAC 173-340-730(5)(b) and (c). The TPH GW-to-SW SLs were protective values calculated by Ecology for marine water (Ecology 2021).

3.3.2 SLs for the GW-to-VI Pathway

GW-to-VI SLs were calculated for an unrestricted land use scenario and a commercial/industrial land use scenario as presented in Appendix A. The GW-to-VI SLs for an unrestricted land use scenario were the most stringent of the Method B GW VI carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c). Likewise, the GW-to-VI SLs for a commercial/industrial land use scenario were the most stringent of the Method C GW VI carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c).

3.3.3 SLs for the GW as Drinking Water Pathway

GW SLs were calculated for an unrestricted land use scenario as presented in Appendix A using the default assumption that shallow GW at the Property could potentially be use as a drinking water source even though that is highly unlikely given (1) the proximity of the Property to marine SW, and (2) the inability to install a permitted drinking water well in shallow GW. With the exception of TPH, the GW SLs were Standard Method B GW cleanup levels calculated in accordance with WAC 173-340-720(4)(b)(i) and (iii) and current CLARC values (Ecology 2022c), subject to any necessary adjustments in WAC 173-340-720(7)(b) and (c). The TPH GW SLs were MTCA Method A GW cleanup levels.

3.3.4 Soil-to-GW Pathway

Soil-to-GW SLs were calculated as presented in Appendix A. With the exception of TPH, the soil-to-GW SLs were calculated using the MTCA fixed parameter three-phase partitioning model in accordance with WAC 173-340-747(4) and current CLARC values (Ecology 2022c), subject to (1) any necessary residual saturation adjustments required by WAC 173-340-747(10), and/or (2) any necessary adjustments in WAC 173-340-740(5)(b) and (c). MTCA defaults in WAC 173-340-747(4) were used as the input parameters and the most stringent GW SLs calculated pursuant to Sections 3.3.1 through 3.3.3 were used as the target GW concentrations for the three-phase partitioning model calculations. The TPH soil-to-GW SLs were based on MTCA Method A soil cleanup levels, which in turn were based on the more stringent of the values that Ecology calculated for default TPH compositions when developing Method A soil cleanup levels (Ecology 2001a, 2001b) and the residual soil saturation concentrations in Table 747-5 of MTCA regulations for default TPH compositions.

3.3.5 Soil Direct Contact Pathway

Soil direct contact SLs were calculated for an unrestricted land use scenario and a commercial/industrial land use scenario as presented in Appendix A. With the exception of TPH, lead, and mercury, the soil direct contact SLs for an unrestricted land use scenario were Standard Method B soil cleanup levels calculated in accordance with WAC 173-340-740(3)(b)(iii)(B) and current CLARC values (Ecology 2022c), subject to any necessary adjustments in WAC 173-340-740(5)(b) and (c). With the exception of TPH, lead, and mercury, the soil direct contact SLs for a commercial/industrial land use scenario were Standard Method C soil cleanup levels calculated in accordance with WAC 173-340-745(5)(b)(iii)(B) and current CLARC values (Ecology 2022c). The TPH, lead, and mercury soil direct contact SLs were values that Ecology calculated for default TPH compositions when developing Method A soil cleanup levels (Ecology 2001a, 2001b).

3.3.6 SLs for the VI Pathway

Indoor air and sub-slab soil gas SLs were calculated for an unrestricted land use scenario and a commercial/industrial land use scenario as presented in Appendix A. The indoor air SLs for unrestricted land use were the most stringent of the Method B indoor air carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c). Likewise, the sub-slab soil gas SLs for unrestricted land use were the most stringent of the Method B sub-slab soil gas carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c). The indoor air SLs for commercial/industrial land use were the most stringent of the Method C indoor air carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c). Likewise, the sub-slab soil gas SLs for commercial/industrial land use were the most stringent of the Method C sub-slab soil gas carcinogenic and non-carcinogenic values from the CLARC database (Ecology 2022c).

3.4 Investigation Roles and Responsibilities

The project team for implementing this SAP includes representatives from PIONEER Technologies Corporation (PIONEER), Holocene drilling, GPRS for utility locates, Libby Environmental for soil and GW analyses, and Friedman & Bruya for soil vapor analyses. The specific roles and responsibilities that are anticipated for key personnel involved in this investigation project are summarized in Table 4.

3.5 Pre-Mobilization Tasks

Before the commencement of field work, PIONEER will:

- Subcontract and coordinate work with GPRS, Holocene, and the labs.
- Coordinate with the Port about the proposed fieldwork schedule.

- Coordinate with the Port regarding proposed sampling locations and access.
- Perform utility locates for proposed drilling locations by (1) calling the Washington Call Before You Dig phone number, and (2) assessing potential utilities near proposed drilling locations during a private utility locate completed by GPRS.
- Complete health and safety preparation tasks.
- Coordinate with the laboratories regarding key elements of the SAP / Quality Assurance Project Plan (QAPP).
- Obtain all necessary equipment and supplies.
- Coordinate with the Port and their tenants regarding temporary removal of chemicals from the on-Property buildings at least 12 hours prior to the VI sampling event (to the extent practicable).
- Verify initial Summa® Canister vacuums measured by Friedman & Bruya. A canister with an initial vacuum of less than 25 inches of mercury will be returned to Friedman & Bruya in exchange for a replacement canister.
- Core through asphalt and concrete as necessary to facility drilling activities.

Before advancing soil borings, Holocene will ensure that applicable notices of intent and associated fees are submitted to Ecology's Water Resources Program.

3.6 Field Investigation Procedures

3.6.1 Geophysical Survey

GPRS will conduct a geophysical survey prior to any drilling and sampling activities to (1) assess potential utilities near proposed drilling locations, (2) map subsurface utilities at the Property (e.g., discharge point for floor drain in Building 2, utilities within the Property), and (3) confirm the locations of the former and reportedly closed-in-place USTs. GPRS will utilize ground penetrating radar and electromagnetic conductivity tools to conduct the survey.

3.6.2 Drilling and Soil Sampling Using a Geoprobe

A driller licensed in Washington State per Chapter 173-162 WAC will complete all drilling activities. Soil borings will be advanced using a direct-push, hollow stem auger, or similar rig. Continuous sample cores will be collected from each boring using a split-spoon sampler, dual tube sampler, or similar. A total of 17 soil borings (i.e., SB101 through SB117) will be advanced to 15 feet bgs. Those soil borings that will be converted to temporary MWs will be advanced approximately six to eight feet beyond the first encountered GW, with a maximum expected depth on the order of 15 feet bgs. Once all applicable samples have been collected from a given soil boring, the driller will decommission the soil boring in accordance with Chapter 173-160 WAC.

PIONEER will examine and classify sample cores according to the Unified Soil Classification System, and will note any visual or olfactory observations associated with potential contamination. PIONEER will use a calibrated photoionization detector (PID) equipped with a 10.6 eV lamp to assess potential volatile organic compounds (VOC) impacts in the sample cores. Soil sample interval expectations and constituents to be analyzed are presented in Table 3. Key details about the laboratory analyses and sample containers are included in Section 3.7. PIONEER field personnel will log borehole lithology, and record drilling and soil sampling activities using the forms included in Appendix B.

3.6.3 Surface Soil Sampling

A total of two surface soil samples (i.e., SS101 and SS102) will be collected using a stainless-steel trowel. PIONEER will examine and classify surface soil samples according to the Unified Soil Classification System, and will note any visual or olfactory observations associated with potential contamination. PIONEER will use a calibrated PID equipped with a 10.6 eV lamp to assess potential VOC impacts in the samples. Soil sample interval expectations and constituents to be analyzed are presented in Table 3.

3.6.4 GW Sampling from Temporary MWs

A temporary, one-inch diameter, polyvinyl chloride (PVC) MW assembly fitted with a five-foot long MW screen will be installed in four soil borings (i.e., SB114 through SB117) after soil samples are collected. GW will be purged from the temporary MWs using a peristaltic pump at low-flow sampling rates, or a bailer. Purging will be conducted for 15 minutes or until the GW appears relatively free of suspended sediment, whichever occurs first. If GW in the temporary MW is pumped dry, a GW sample will be collected as soon as the GW in the temporary MW recharges. Before purging and again after collecting GW samples, an electronic interface probe will be used to record any light non-aqueous phase liquid (LNAPL) thicknesses to the nearest 0.01 foot in each temporary MW. GW sample interval expectations and constituents to be analyzed are presented in Table 3. Key details about the laboratory analyses and sample containers are included in Section 3.7. PIONEER field personnel will record temporary MW installation and GW sampling activities using the forms included in Appendix B.

3.6.5 VI Sampling

3.6.5.1 Sampling Event

PIONEER will collect indoor air, sub-slab soil gas, and ambient air samples during one VI sampling event conducted during the winter, when the heating of buildings typically induces greater depressurization of a building relative to the subsurface, resulting in increased VI and higher indoor air concentrations of volatile constituents. During the VI sampling event, paired sub-slab soil gas and indoor air samples will be collected from three locations (SG1/IA1 through SG3/IA3) in the occupied portions of the Property (see Figure 3). Constituents to be analyzed during the VI sampling event are presented in Table 3. Key details about the laboratory analyses and sample containers associated with the VI sampling event are included in Section 3.7. The results from the VI sampling event (as wells as soil and GW sampling results) will be used to design subsequent VI sampling events, if necessary.

3.6.5.2 Preparation Activities Prior to VI Sampling

PIONEER will complete the following activities prior to the VI sampling event in order to ensure representative data are collected and to help assess potential indoor air sources associated with ongoing on-Property operations:

- Conduct a reconnaissance of potential preferential pathways (e.g., utilities that penetrate the surface, significant cracks in the concrete slab). Depending on the results of this reconnaissance, the proposed locations of SG1/IA1 through SG3/IA3 may be adjusted to be closer to potentially preferential pathways or to avoid obstructions/access issues.
- Compile a comprehensive inventory of chemical products used in the buildings being sampled. The following information will be recorded for each chemical:
  - Product name/description;
  - Volatile ingredients included in the products;
  - PID measurements adjacent to the product; and
  - A photograph of the product.
- Verify that the Port and their tenants have temporarily removed chemicals from the on-Property buildings at least 12 hours prior to the VI sampling event (to the extent practicable).
- Verify that the Port and their tenants are operating all doors and windows in a manner similar to normal work day conditions. If in doubt, all windows and doors should be closed prior to sampling and remain closed for the duration of the sampling.
- Verify that the Port and their tenants are operating the applicable heating, ventilation, and air conditioning systems in a manner similar to normal work day conditions (e.g., the heat will be on during the VI sampling event).

3.6.5.3 Sub-Slab Soil Gas Sampling

PIONEER will collect sub-slab soil gas samples using a Vapor Pin™ in accordance with the procedures outlined in Appendix C. Each sub-slab soil gas sample will be collected as synoptically as practicable with the associated paired indoor air sample (e.g., on the same day). Each sub-slab soil gas sample will be collected using the containers indicated in Table 5 over an approximately eight-hour period, with the flow rate controlled by the intake regulator provided by the laboratory. Sampling will stop when the remaining canister vacuum is approximately three to five inches of mercury or after ten hours of sampling, whichever occurs first. The final canister vacuum will be recorded on the chain-of-custody.

3.6.5.4 Indoor Air Sampling

Each indoor air sample will be collected as synoptically as practicable with the associated paired sub-slab soil gas sample (e.g., on the same day). Indoor air samples will be collected using the containers indicated in Table 5 at a breathing height (approximately five feet above ground surface), over an approximately eight-hour period with the flow rate controlled by the intake regulator provided by the laboratory. Sampling will stop when the remaining canister vacuum contains approximately three to five inches of mercury or after ten hours of sampling, whichever occurs first. The final canister vacuum will be recorded on the chain-of-custody.

3.6.5.5 Ambient Air Sampling

In order to estimate ambient air background concentrations during the sampling period, an upwind ambient air sample will be collected each day that sub-slab soil gas or indoor air samples are being collected. The wind direction will be determined by observations immediately prior to sample collection (or by using a wind rose generated with at least one year of wind data from a nearby meteorological station if there is no obvious wind direction during the day of sampling). Ambient air samples will be collected using the containers indicated in Table 5 at a breathing height (approximately five feet above ground surface), over an approximately eight-hour period with the flow rate controlled by the intake regulator provided by the laboratory. Sampling will stop when the remaining canister vacuum contains approximately three to five inches of mercury or after ten hours of sampling, whichever occurs first. The final canister vacuum will be recorded on the chain-of-custody.

3.6.6 Equipment Decontamination Procedures

Non-dedicated sampling equipment (e.g., drill rods) will be decontaminated in accordance with the following procedures:

- All non-dedicated equipment will be cleaned before use.
- Following use at each sampling location, the affected portions of non-dedicated equipment will be scrubbed with potable water containing diluted detergent (e.g., Liquinox) before being sufficiently rinsed with potable water.
- All water generated during decontamination will be managed as investigation-derived waste.

3.6.7 Field Measurements

PIONEER will determine the locations of sampling locations and relevant features (e.g., floor drains, subsurface utility laterals, and former hydraulic lift) inside the on-Property buildings by using a measuring tape from a reference point. PIONEER will determine the horizontal locations of outside subsurface utility laterals using a Trimble GeoXH global positioning system unit or similar unit, with an accuracy expectation of +/- one meter.

3.6.8 Field Recordkeeping

PIONEER will complete the following forms to document each sampling event (see Appendix B):

- Field Checklist, which is used to assist with planning and coordination prior to a field event, and to document completion of field activities.
- Daily Field Report, which is used to document miscellaneous field activities on a daily basis (e.g., miscellaneous field notes, miscellaneous sampling notes).
- Subsurface Sampling Field Log, which is used to record drilling, lithologic (e.g., color, grain size, moisture, detail), and associated sampling details.
- GWM Form, which is used to record current MW conditions, static water level and LNAPL thickness measurements, purging data, sampling information, and investigation-derived waste details.
- Indoor Air Sampling - Building Survey Checklist, which is used to document the reconnaissance of potential preferential pathways (e.g., utilities that penetrate the surface, significant cracks in the concrete slab), and to compile a comprehensive inventory of chemical products used in the building being sampled.

In addition, representative photographs should be taken as necessary to support documentation of the field investigation procedures.

3.7 Laboratory Analyses and Sample Containers

The constituents to be analyzed for each of the sampling activities are presented in Table 3. The constituents to be analyzed include:

- TPH-G
- TPH-D and TPH-HO
- Constituents related to evaluating the VI pathway for TPH (i.e., C5-C8 aliphatics, C9-C12 aliphatics, C9-C10 aromatics, oxygen, carbon dioxide, and methane)
- VOCs
- BTEX
- Volatile petroleum hydrocarbons (VPH)
- Extractable petroleum hydrocarbons (EPH)
- Polynuclear aromatic hydrocarbons (PAHs), including carcinogenic PAHs (cPAHs)
- PCBs
- Resource Conservation and Recovery Act (RCRA) Metals, which include arsenic, barium, cadmium, total chromium, lead, mercury, selenium, and silver
- Hexavalent chromium
- Total organic carbon (TOC)

Laboratory analyses will be performed for soil, GW, sub-slab soil gas, indoor air, and ambient air samples collected pursuant to this Work Plan. The analytical methods, sample container expectations, preservation requirements, and holding times relevant to each medium being sampled and the constituents being analyzed are presented in Table 5.

Requirements associated with filling soil and GW sample containers include:

- Sample containers will be provided by the laboratories.
- Unless otherwise noted below, sample containers will be filled until almost full in order to provide the laboratory with sufficient sample volume.
- Particles larger than approximately 1/4-inch should not be included in soil sample containers.
- At each sampling location, sample containers for TPH-G, VOC, and VPH analyses will be filled before all other containers.
- Soil samples for TPH-G, VOC, and VPH analyses will be collected and prepared in accordance with United States Environmental Protection Agency (USEPA) Method SW846-5035.
- GW sample containers for TPH-G, VOC, and VPH analyses will be filled to a positive meniscus so that the containers do not contain any headspace.
- If any GW samples will be analyzed for metals, the GW sample will be filtered in the field using a 0.45-micron filter.

3.8 Sample Labeling and Shipment

3.8.1 Sample Labeling

Sample labels will clearly indicate the Property location, sample number identification, date, time, sampler's initials, parameters to be analyzed, and added preservative (if any). Each sample will be individually labeled. Each sample number identification will be unique and will adhere to the PIONEER sample number schema included in Appendix D.

3.8.2 Chain-of-Custody Documentation

Chain-of-custody procedures will be followed to maintain and document sample possession. A sample is considered under a person's custody if it is in that person's physical possession, within visual sight of that person after taking physical possession, secured by that person so that the sample cannot be tampered with, or secured by that person in an area that is restricted to unauthorized personnel.

The originator (the sampler) will complete requested information on the custody record, including signature and date. Original signed custody records listing the samples in the cooler will accompany sample shipments.[8] The originator of the custody record will retain a copy of the custody record.

3.8.3 Sample Shipment

Sample packaging and shipping procedures are based on USEPA specifications and United States Department of Transportation regulations as specified in 49 Code of Federal Regulations (CFR) 173.6 and 49 CFR 173.24. Soil and GW samples will be packed in coolers with bubble wrap, bags, and ice in a manner to achieve preservation requirements while also preventing breakage of sample containers and leakage of melting ice. Canisters for sub-slab soil gas, indoor air, and ambient air samples will be packed in cardboard boxes (e.g., the containers the laboratory used to ship the canisters) without preservation (i.e., no ice). Samples will be shipped as environmental samples and not hazardous material. Samples will be hand delivered or shipped express delivery to the laboratories.

3.9 Investigation-Derived Waste

The following types of investigation-derived waste will be generated during sampling activities and will be handled as follows:

- Cuttings from soil borings will be placed in sealed and labeled drums, and temporarily stored in a secure area of the Property.
- Development water, purge water, and decontamination water will be placed in sealed and labeled drums, and temporarily stored in a secure area of the Property.
- Personal protective equipment (e.g., nitrile gloves) and other disposable sampling equipment will be disposed of as solid waste in the standard municipal solid waste stream.

All drummed investigation-derived waste will be characterized and then removed by a licensed waste transporter for off-Property treatment and/or disposal at a facility permitted to accept the waste.

[8] More than one custody form may be needed per cooler to list all the samples contained in the cooler.

SECTION 4: QUALITY ASSURANCE PROJECT PLAN

The purpose of this QAPP is to summarize the methodology for ensuring usable sampling and analysis data of acceptable quality are generated. This QAPP was prepared in general accordance with WAC 173-340-820 and Ecology guidance (Ecology 2016).

Typical contents of a stand-alone QAPP are not repeated if included elsewhere in this Work Plan. For instance, requirements for laboratory analytical methods, sample containers, preservation, and holding times are already described in the SAP. Likewise, field procedures associated with quality assurance (e.g., equipment decontamination, field recordkeeping, sample identification schema, sample handling and shipment) are already described in the SAP.

4.1 Calibration of Field Equipment

The PID (used for field screening during drilling and when conducting inventories of chemical products) will be calibrated daily using procedures in accordance with the manufacturer's recommendations. The calibration will be documented in the field notes.

4.2 Field Quality Control Samples

Field quality control (QC) samples will include matrix spike/matrix spike duplicates[9], VOC trip blanks, and cooler temperature blanks. Unless otherwise noted, field QC samples will be handled, preserved, and documented in the same manner as primary samples. The frequency expectation for each type of field QC sample is listed below:

- Matrix spike/matrix spike duplicate: One soil sample and one GW sample
- VOC trip blank: One per cooler of soil and/or GW samples being analyzed for VOCs
- Cooler temperature blanks: One per cooler of soil and/or GW samples

The matrix spike/matrix spike duplicates will be collected at random locations selected by the field sampling team. The matrix spike/matrix spike duplicate samples will be collected simultaneously with the primary sample using the same sample collection and preparation techniques. The matrix spike/matrix spike duplicate will be analyzed for the same constituents as the primary sample.

VOC trip blanks and cooler temperature blanks will be prepared and provided by the laboratory. VOC trip blanks will consist of organic-free water.

4.3 Laboratory Quality Control Samples

The project laboratories will be responsible for conducting laboratory QC procedures and reporting laboratory QC results in accordance with the analytical methods and their standard operating procedures. Laboratory QC samples provide important qualitative results used to evaluate the

[9] Matrix spikes and matrix spike duplicates are lab QC samples, but are also included with the field QC samples since the field sampling team is responsible for ensuring that appropriate sample volumes are collected for analysis of matrix spikes and matrix spike duplicates.

laboratory QC procedures. Laboratory QC samples for applicable analyses will include method blanks, laboratory control samples (also known as blank spikes), matrix spikes, and matrix spike duplicates once per batch of analyses. Expectations for laboratory control limits for laboratory control samples, matrix spikes, and matrix spike duplicates are presented in Table 6. In addition, it is also expected that the project laboratories will perform and report results of surrogate recovery for every sample (excluding analyses for metals, TOC, oxygen, carbon dioxide, and methane). Expectations for laboratory control limits for surrogate recoveries are shown in Table 6.

4.4 Laboratory Target Reporting Limits

Analytical methods and laboratories have been selected to achieve low target reporting limits. The target reporting limits for each medium are presented in Table 7. Almost all of the laboratories' target reporting limits are less than the corresponding SLs for unrestricted land use. Those GW and soil SLs that exceeded target reporting limits were adjusted to the target reporting limit in accordance with WAC 173-340-720(7)(c) and WAC 173-340-740(5)(c), respectively, as presented in Appendix A. The target reporting limits are reasonably sensitive for these few constituents with a target reporting limit exceeding the most stringent GW or soil SL. Therefore, the target reporting limits are considered appropriate for the purposes of this investigation.

4.5 Data Quality Review

An evaluation of data quality will be performed for all field and lab data. Specifically, field records will be reviewed by PIONEER for completeness, accuracy, and legibility. The laboratories will review their results relative to method criteria and laboratory QC procedures as the data are generated. The laboratories will report their QC results and qualify data as necessary in a report suitable for a Level II data validation. PIONEER will evaluate precision, accuracy, representativeness, comparability, completeness, and sensitivity by reviewing the following items relative to analytical method criteria, laboratory control limits, and national functional guidelines (USEPA 2016a, 2016b) as necessary:

- Comparison of actual analyses versus requested analyses
- Comparison of consistency between laboratory reports and associated electronic data deliverables
- Holding times
- Field QC sample results
- Lab QC sample results
- Actual reporting limits

As a result of the data quality review process, PIONEER may reject data or add other qualifications in addition to the laboratory qualifications. The data quality review documentation will be included with the applicable laboratory reports for reporting purposes.

4.6 Corrective Action

The need for corrective action will be evaluated as appropriate for deviations from the SAP/QAPP and other potential data quality issues that arise in the field or the laboratory. Relatively minor field issues will be discussed, resolved, and documented by the PIONEER Project Manager, PIONEER Field Team Lead, and/or laboratories. Corrective action decisions will be situation-dependent. Potential corrective action decisions may include one or more of the following:

- Revising the sampling and analysis methodology
- Collecting a new sample
- Reanalyzing an existing sample
- Accepting the data with a recognized level of uncertainty
- Revising the sampling design

SECTION 5: REFERENCES

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Figures

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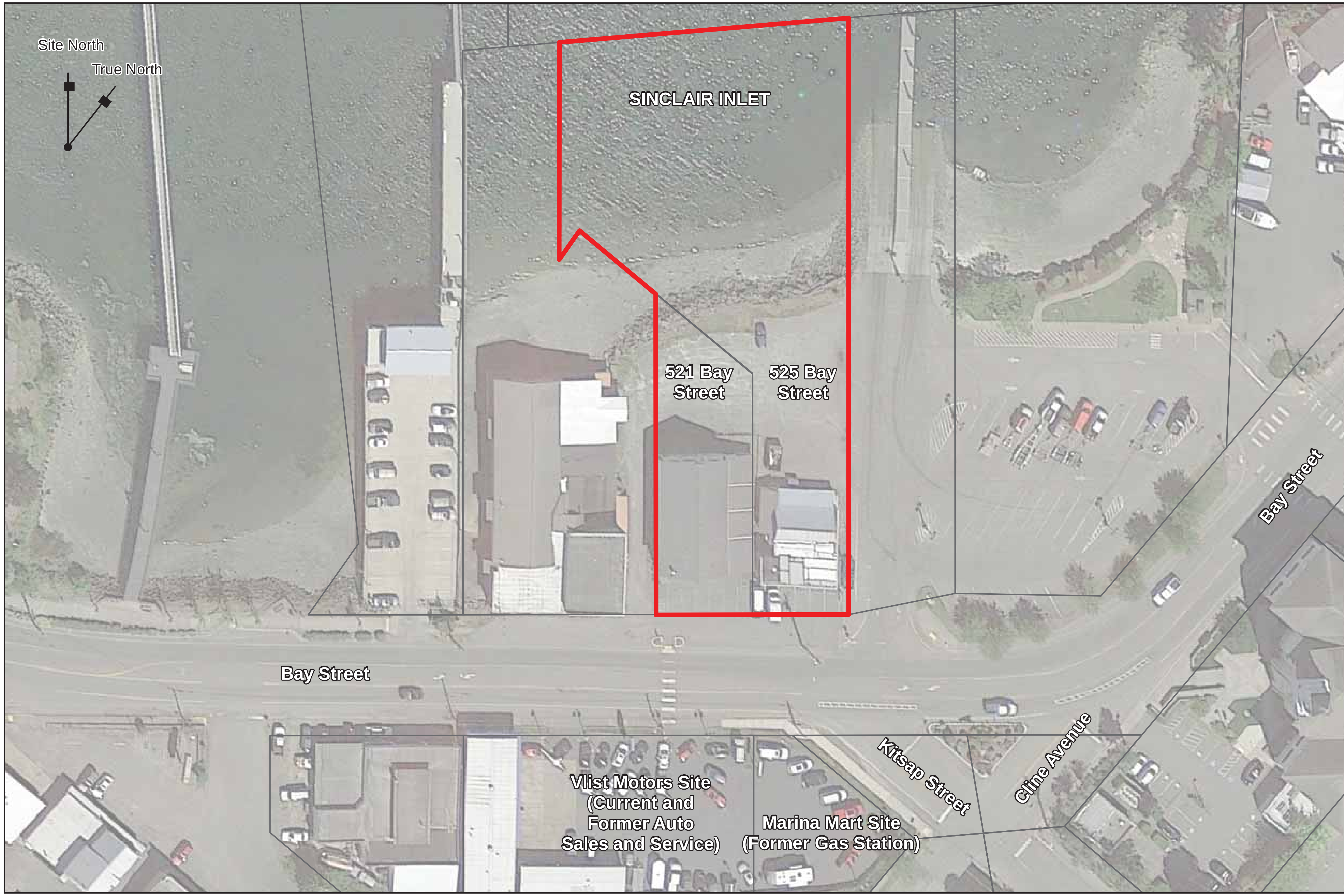


Legend

- Property Bounary
- Parcel Boundaries

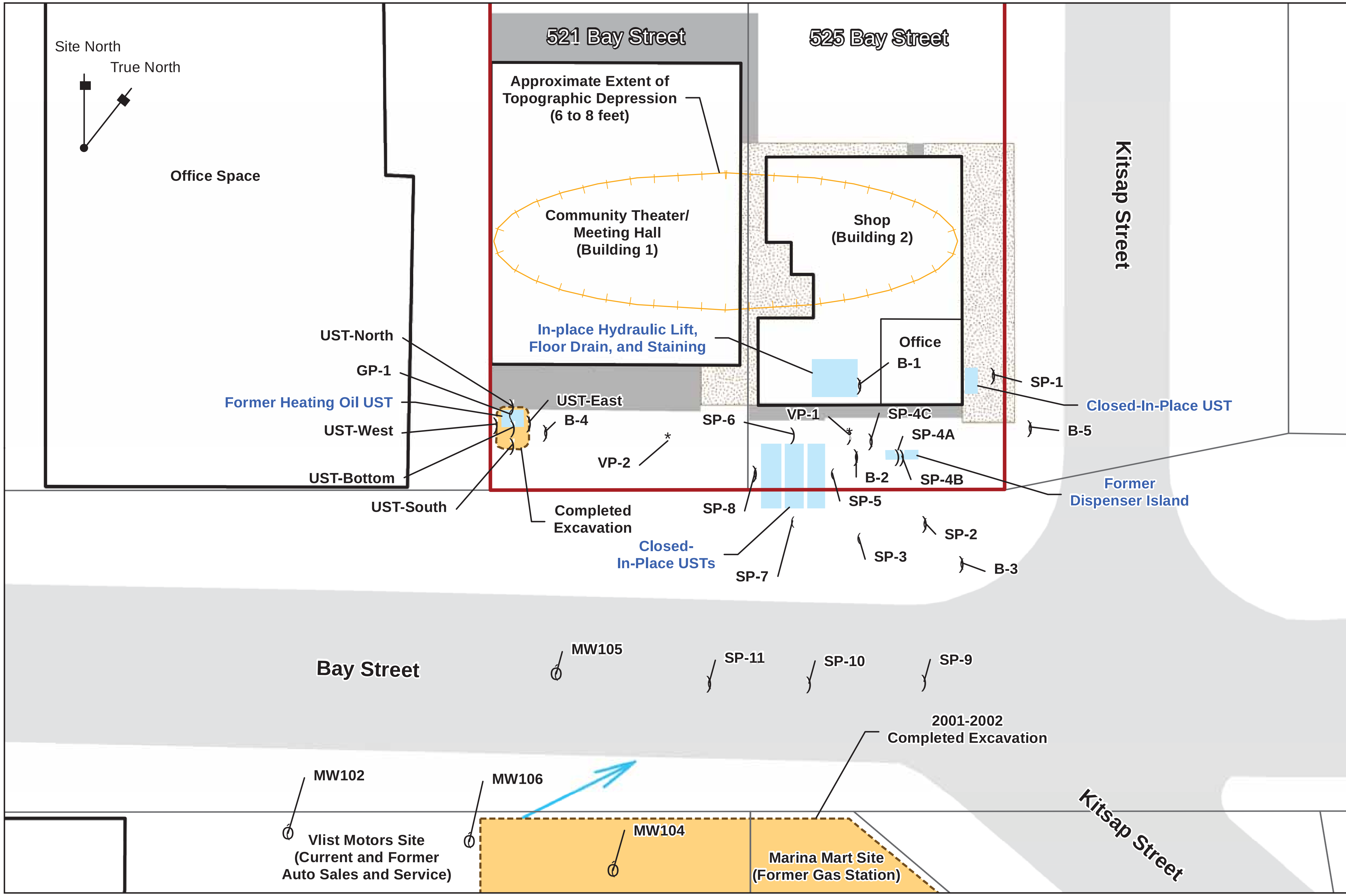
Notes:
Features Shown are Approximate.

0 150 Feet

PIONEER TECHNOLOGIES CORPORATION

Vicinity Map
PDI and Initial RI Data Gaps Work Plan
521 & 525 Bay Street, Port Orchard

Figure 1



Legend

Previous Sampling Locations
- Soil Sampling Location
- Groundwater Sample Collected From Soil Boring
- Existing Monitoring Well
- Soil Vapor Probe Sampling Location

Other Features
- Property Boundary
- Existing Building Footprint
- Roadway
- Concrete Area
- Gravel and Soil Covered Area
- Parcel Boundaries
- Approximate Extent of Topographic Depression (6 to 8 feet)
- Historical Operations
- Completed Excavation
- Approximate Groundwater Flow Direction (ECI 2007)

Notes:
- No samples were analyzed at SP-4B, SP-6, SP-9, or SP-10.
- All previous sampling locations, historical operations, and completed excavations were georeferenced from reports by others. All locations and features should be considered approximate.
UST: Underground Storage Tank
SL: Screening Level

0 50 Feet

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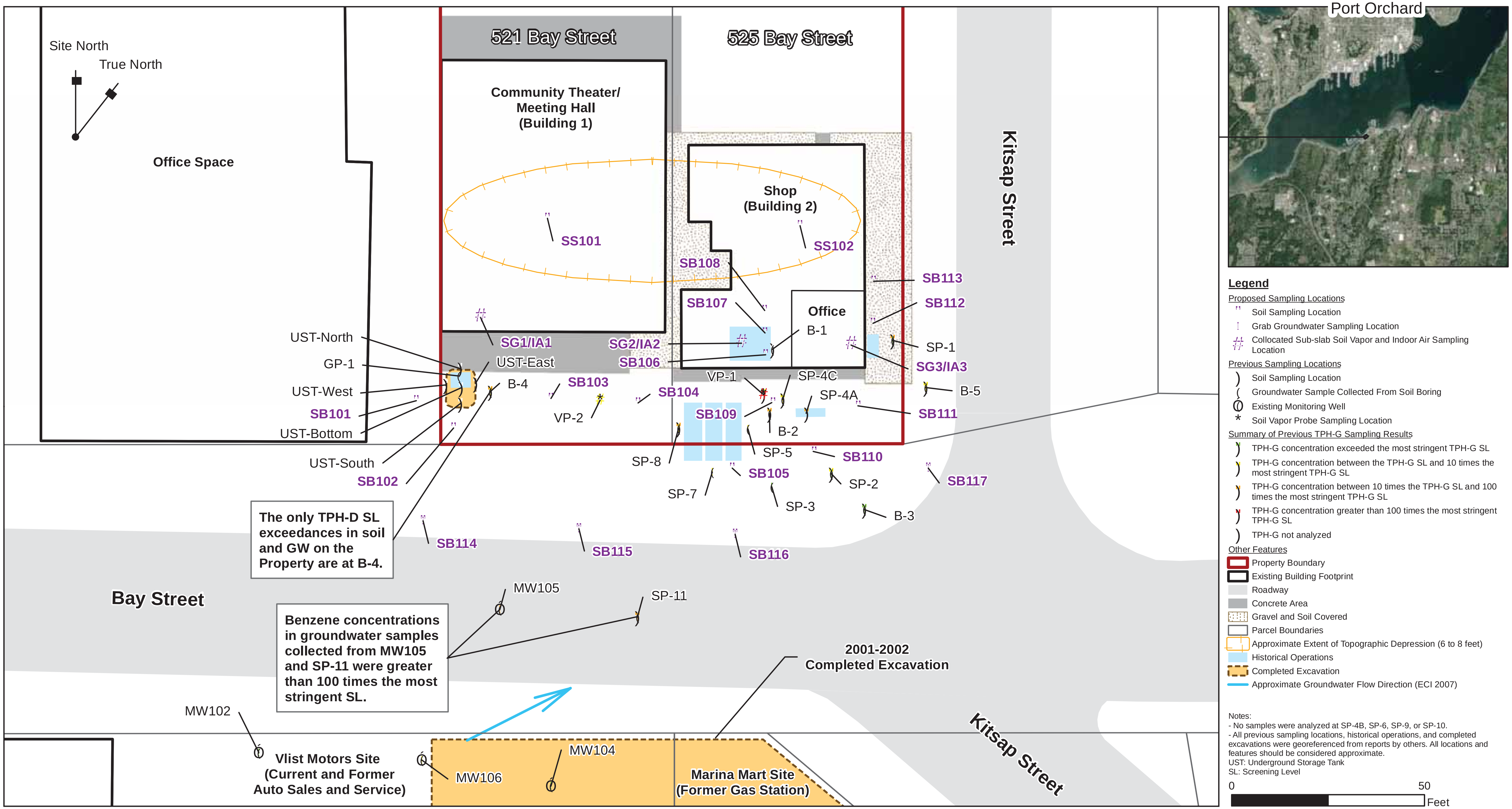
Key Operational Features and Previous Sampling Locations
PDI and Initial RI Data Gaps Work Plan
521 & 525 Bay Street, Port Orchard

Figure 2



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Summary of Previous Results and Proposed Sampling Locations
PDI and Initial RI Data Gaps Work Plan
521 & 525 Bay Street, Port Orchard

Figure 3

Tables

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Table 1: Summary of Previously Collected Soil Analytical Results

Constituent Category	Constituent [1,2]	Soil Screening Levels [3]	Sample Location, Area, Depth Interval (feet bgs), and Sample Date																	
			SP-1	SP-2	SP-4A	SP-4C	SP-8	UST-East	UST-West	UST-North	UST-South	UST-Bottom	VP-1	B-1	B-2	B-2	B-3	B-3	B-4	B-5	SP-11
			On-Property																		Off-Property
			5.5-6	2.5-3	2-2.5	5.5-6	5.5-6	4	4	4	4	5.5	5	8	5	9	8	14	5	10	4-4.5
			10/4/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	3/13/2002	3/13/2002	3/13/2002	3/13/2002	3/13/2002	4/9/2021	4/9/2021	4/9/2021	4/9/2021	4/9/2021	4/9/2021	4/9/2021	4/9/2021	10/4/1999
TPH (mg/kg)	TPH-D	2,000	NA	NA	NA	NA	NA	20 U	20 U	**520**	**790**	20 U	50 U	NA	50 U	50 U	50 U	50 U	**4,100**	50 U	NA
	TPH-G	30	**310**	**260**	**410**	**170**	**450**	NA	NA	NA	NA	NA	**120**	NA	**1,800**	**1,400**	**12**	10 U	**600**	**59**	**500**
	TPH-HO	2,000	NA	NA	NA	NA	NA	20 U	20 U	20 U	20 U	20 U	100 U	NA	**490**	**200**	**690**	**480**	100 U	100 U	NA
	Kerosene/Jet Fuel	2,000	NA	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs (mg/kg)	Benzene	0.020	**0.56**	**0.11**	**0.16**	**0.30**	**0.84**	NA	NA	NA	NA	NA	**0.020**	NA	**0.040**	**0.14**	0.020 U	0.020 U	0.020 U	0.020 U	**0.060**
	Ethylbenzene	0.18	0.050 U	**1.6**	0.050 U	**1.1**	**2.8**	NA	NA	NA	NA	NA	**0.10**	NA	**0.13**	**1.1**	0.050 U	0.050 U	0.050 U	0.050 U	0.050 U
	Toluene	0.72	0.050 U	**0.060**	0.050 U	**0.070**	**0.98**	NA	NA	NA	NA	NA	0.050 U	NA	0.050 U	**0.15**	0.050 U	0.050 U	0.050 U	0.050 U	**5.2**
	Xylenes, Total	0.94	**3.7**	**5.0**	0.050 U	**0.35**	**1.5**	NA	NA	NA	NA	NA	0.15 U	NA	0.15 U	**0.53**	0.15 U	0.15 U	0.15 U	0.15 U	**8.4**
PCBs (mg/kg)	Total PCBs [4]	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0.045 U	NA	NA	NA	NA	NA	NA	NA
Metals (mg/kg)	Lead	250	NA	NA	NA	NA	**18**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**18**

Notes:

mg/kg: milligrams per kilogram; NA: constituent not analyzed; U: constituent not detected at shown reporting limit

Bold font concentrations were detections.

Yellow highlighted concentrations are between the SL and 10x the SL.

Orange highlighted concentrations are between 10x SL and 100x the SL.

[1] Results are shown for all constituents analyzed during previous investigations.

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

[3] See Appendix A for calculation of SLs.

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

Table 2: Summary of Previously Collected Groundwater Analytical Results

Constituent Category	Constituent [1,2]	Groundwater SL [3]	Sample Location, Area, Depth Interval (feet bgs), and Sample Date																	
			SP-1	SP-2	SP-3	SP-4C	SP-5	SP-7	SP-8	GP-1	B-1	B-2	B-3	B-4	B-5	SP-11	MW102 [4]	MW104 [4]	MW105 [4]	MW106 [4]
			On-Property													Off-Property				
			5.5-11	6-9	6.5-9	6-9	6-9	5.5-9	5.5-9	5-8	10-15	10-15	10-15	10-15	10	4.5-9	2.5-9.5	2.5-10.5	2.5-10.5	2.5-10.5
			10/4/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	10/4/1999	3/15/2002	4/9/2021	4/9/2021	4/9/2021	4/9/2021	4/9/2021	10/4/1999	4/16/2010	4/16/2010	10/11/2006	4/16/2010
TPH (ug/L)	TPH-D	500	NA	NA	NA	NA	NA	NA	NA	200 U	NA	50 U	50 U	**13,000**	50 U	NA	NA	**170**	NA	NA
	TPH-G	800	**360**	**610**	**370**	**2,100**	**1,200**	**1,100**	**1,100**	NA	NA	**4,000**	**630**	**1,200**	**1,300**	**22,000**	**690**	**360**	**13,000**	**3,000**
	TPH-HO	500	NA	NA	NA	NA	NA	NA	NA	500 U	NA	100 U	100 U	100 U	100 U	NA	NA	250 U	NA	NA
	Kerosene/Jet Fuel	500	NA	NA	NA	NA	NA	NA	NA	200 U	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VOCs (ug/L)	Benzene	1.6	**17**	**7.6**	**10**	**71**	**25**	**11**	**16**	1.0 U	NA	**50**	1.0 U	1.0 U	1.0 U	**1,600**	1.0 U	**110**	**890**	5.0 U
	Ethylbenzene	21	1.0 U	1.0 U	1.0 U	**54**	**7.8**	1.0 U	1.0 U	**2.9**	NA	**44**	1.0 U	1.0 U	1.0 U	**670**	**2.0**	**14**	**700**	**76**
	Toluene	102	1.0 U	4.3	1.0 U	**29**	**23**	**11**	1.0 U	1.0 U	NA	**33**	**2.5**	1.0 U	1.0 U	**170**	**1.0**	**2.0**	**160**	5.0 U
	Xylenes, Total	106	**1.8**	**4.2**	**9.1**	**30**	**24**	**22**	**33**	**17**	NA	**22**	**5.6**	3.0 U	3.0 U	**320**	**4.0**	3.0 U	**200**	**18**
PCBs (ug/L)	Total PCBs [5]	0.14	NA	NA	NA	NA	NA	NA	NA	NA	0.45 U	NA	NA	NA	NA	NA	NA	NA	NA	NA
Metals (ug/L)	Lead, Total	8.1	NA	NA	NA	NA	NA	NA	1.0 U	NA	NA	NA	NA	NA	NA	1.0 U	NA	**10.5**	NA	NA

Notes:

NA: constituent not analyzed, U: constituent not detected at the shown reporting limit; ug/L: micorgrams per liter

Bold font concentrations were detections.

Yellow highlighted concentrations are between the SL and 10x the SL.

Orange highlighted concentrations are between 10x SL and 100x the SL.

Red highlighted concentrations are greater than 100x the SL.

(1) Results are shown for all constituents analyzed during previous investigations.

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

(3) See Appendix A for calculation of SLs.

(4) For each MW, sample results from the most recent groundwater monitoring event area shown.

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

Table 3: Sampling Design for PDI and Initial RI Data Gaps

Sampling Activity #	Objective and General Description of Sampling Activity	Media	Depth (feet bgs)	# of Primary Samples	Description of Sample Interval/Location	Constituents: TPH-G	TPH-D and TPH-HO [(1)]	TPH-Related for VI [(2)]	VOCs	BTEX	VPH [(3)]	EPH [(4)]	PAHs	PCBs	RCRA 8 Metals [(5)]	Cr (VI) [(6)]	TOC [(7)]
1	Conduct public and private utility locate.	NA	NA	NA	Conduct public and private utility locate to identify on-Property underground utilities and confirm locations of reportedly closed-in-place USTs. As part of this effort, the discharge point of the floor drain in Building 2 will be evaluated.												
2	Further assess the extent of soil SL exceedances around the previously removed UST south of Building 1 (SB101 through SB103).	Soil [(8)]	15	9		9	9			9		1					
3	Further assess the extent of soil SL exceedances near three existing USTs south of Building 2 (SB104 and SB105).	Soil [(8)]	15	6		6				6							
4	Further assess the extent of soil SL exceedances near former hoist, stained area, and floor drain inside Building 2 (SB106 through SB108).	Soil [(8)]	15	9	Up to three soil samples will be collected from each boring. Samples in a given boring will be from 1) interval directly above the first indication of impacted soil, 2) the worst case interval based on field screening results, and/or 3) directly beneath any indications of impacted soil.	9				9	1						1
5	Further assess the extent of soil SL exceedances near the former dispenser island area south of Building 2 (SB109 through SB111).	Soil [(8)]	15	9		9				9						1	
6	Further assess the extent of soil SL exceedances near the UST east of Building 2 (SB112 and SB113). [(9)]	Soil [(8)]	15	6		6			2	4			2	2	2		
7	Assess potential contamination emanating from the two upgradient sites (Vlist Motors site and Marina Mart site) to impact the Property (SB114 through SB117).	Soil [(8)]	15	12	Up to three soil samples will be collected from each boring. Samples in a given boring will be from 1) interval directly above the first indication of impacted soil, 2) the worst case interval based on field screening results, and/or 3) directly beneath any indications of impacted soil.	12	6			12		1					1
		GW	5-15	4	One GW sample from each of the four borings with the pump intake near the top of the GW interface.	4	2			4	1						
8	Assess the condition of shallow soil/sediment in the topographic depression located beneath Building 1 (SS101).	Soil [(8)]	1	1	One shallow soil sample from the uppermost one foot of soil/sediment.		1						1	1			
9	Assess the condition of shallow soil/sediment in the topographic depression located beneath Building 2 (SS102).	Soil [(8)]	1	1		1	1		1				1	1	1		
10	Assess the potential for VI exposures in occupied building spaces near exterior elevated soil vapor probe results. One VI sampling event will be conducted. During this VI sampling event, paired sub-slab soil gas and indoor air samples will be collected at three locations (SG1/IA1 through SG3/IA3), and one upwind ambient air sample (AA1) will be collected.	IA	NA	3	Three samples at typical breathing height (e.g., approximately five feet) within typically occupied spaces of the buildings, biased towards the UST locations.			3	3								
		SG	0.5	3	Three sub-slab SG samples co-located with IA samples.			3	3								
		AA	NA	1	One upwind sample at typical breathing height (e.g., approximately five feet).			1	1								
Waste characterization and field QC samples [(10)]		Soil		NA	Waste characterization composite	1	1		1				1	1	1		
		GW		NA	Waste characterization composite	1	1										
		GW		NA	VOC trip blank					1							
					Total soil samples	53	18	0	4	49	1	2	5	5	4	1	2
					Total GW samples	5	3	0	0	5	1	0	0	0	0	0	0
					Total IA and AA samples	0	0	4	4	0	0	0	0	0	0	0	0
					Total SG samples	0	0	3	3	0	0	0	0	0	0	0	0

Notes:

AA: ambient air, Cr (VI): hexavalent chromium, EPH: extractable petroleum hydrocarbons, IA: indoor air, NA: not applicable, PAHs: polycyclic aromatic hydrocarbons, PCBs: polychlorinated biphenyls, QC: quality control, RCRA: Resource Conservation and Recovery Act, SG: soil gas, TOC: total organic carbon, VPH: volatile petroleum hydrocarbons

(1) For Sampling Activity #6, the soil samples collected from SB114 and SB115 will also be analyzed for TPH-D and TPH-HO.

(2) TPH-related VI analyses include: C5-C8 aliphatics, C9-C12 aliphatics, C9-C10 aromatics, oxygen, carbon dioxide, and methane.

(3) All non-VI samples will be held for possible VPH analyses. It is anticipated that one sample total from Sampling Activities #2 through #5 and one from Sampling Activity #7 (i.e., the samples with the highest TPH-G concentrations) will be analyzed for VPH.

(4) All non-VI samples will be held for possible EPH analyses. It is anticipated that one sample from Sampling Activities #2 and one from Sampling Activity #7 (i.e., the samples with the highest TPH-D plus TPH-HO concentrations) will be analyzed for EPH.

(5) RCRA 8 metals include arsenic, barium, cadmium, total chromium, lead, mercury, selenium, and silver.

(6) If soil sample results exceed 48 mg/kg total chromium, the soil sample with the highest concentration of total chromium will be analyzed for hexavalent chromium.

(7) Two lithologically representative samples that do not have detections of organic compounds will be analyzed for TOC. The samples will be collected from uncontaminated soil below three feet bgs.

(8) Boring locations will be adjusted as necessary in the field based on access, existing operations, overhead power lines, underground utilities, etc. The maximum depth for each soil boring is expected to be 15 feet bgs. Field screening of each boring will include visual and olfactory observations, and near continuous readings using a photoionization detector equipped with a 10.6 eV lamp.

(9) For Sampling Activity #5, one soil sample collected from both SB112 and SB113 will be analyzed for the full suite of VOCs, TPH-Dx, PAHs, PCBs, and RCRA8 metals.

(10) Waste characterization samples may be omitted if the sample-specific soil and groundwater analytical data is deemed sufficient for waste disposal. One VOC trip blank sample will be collected. Dedicated equipment will be used for soil and GW sampling. Therefore, soil and aqueous equipment rinsate blanks will not be collected.

Table 4: Anticipated Investigation Roles and Responsibilities

Project Role	Name and Contact Information	Key Responsibilities
PIONEER Principal and Project Manager	Troy Bussey, P.E., L.G., L.HG. busseyt@uspioneer.com (360) 570-1700	• Manage overall completion of the investigation • Communicate and coordinate with client (and Ecology if needed) • Oversee preparation of planning and reporting documents • Oversee completion of fieldwork • Support implementation of site-specific health and safety plan • Perform data quality review for all laboratory data
PIONEER Health and Safety Manager	Kevin Gallagher, ASP gallagherk@uspioneer.com (360) 570-1700	• Develop site-specific health and safety plan • Oversee implementation of site-specific health and safety plan
PIONEER Field Team Lead and Site Safety Officer	Joel Hecker, L.G., L.HG. heckerj@uspioneer.com (360) 570-1700	• Support project manager with preparation of planning and reporting documents • Implement site-specific health and safety plan • Coordinate and oversee completion of all field work • Collect all samples
PIONEER Field Staff	To be determined	• Support Field Team Lead with collection of samples
Geophysical Survey	GPRS (253) 796-5637	• Conduct a geophysical survey to (1) clear utilities at soil boring locations, (2) confirm locations of USTs, and (3) map the subsurface utility lines on the Site.
Licensed Driller	Holocene Drilling (253) 848-6500	• Advance soil borings and install temporary MWs
Analytical Laboratories	Libby Environmental (360) 352-2110	• Analyze soil and groundwater samples • Perform laboratory quality control activities
	Friedman & Bruya (206) 285-8282	• Analyze soil gas, indoor air, and ambient air samples • Perform laboratory quality control activities

Table 5: Analytical Methods, Sample Containers, Preservation, and Holding Times

Constituent(s)	Media	Analytical Method	Sample Containers [1]	Preservation	Extraction Holding Times (days)	Analysis Holding Time (days)
TPH-G	Soil	Ecology Method NWTPH-Gx	Two pre-tared 40 mL VOA vials with Teflon septa lids	Lab-supplied methanol preservative in each VOA [2]; Place on ice to cool to 4°C +/- 2°C	--	14
	GW		Two 40 mL glass VOA vials with Teflon septa lids	Lab-supplied HCl preservative in each VOA; No headspace in VOA; Place on ice to cool to 4°C +/- 2°C	--	14
TPH-D and TPH-HO	Soil	Ecology Method NWTPH-Dx	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	14	40
	GW		One 1 Liter amber glass jar		14	40
EPH	Soil	Ecology Method NWEPH	One 4 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	--	14
	GW		One 1 Liter amber glass jar		--	7
VPH	Soil	Ecology Method NWVPH	One pre-tared 40 mL VOA vial with Teflon septa lid (and one 4 oz amber glass jar for moisture analysis)	Lab-supplied methanol preservative in each VOA [2]; Place on ice to cool to 4°C +/- 2°C	--	14
	GW		Two 40 mL glass VOA vials with Teflon septa lids	Lab-supplied HCl preservative in each VOA; No headspace in VOA; Place on ice to cool to 4°C +/- 2°C	--	14
VOCs	Soil	USEPA Method SW846-8260D	Two pre-tared 40 mL VOA vials with Teflon septa lids	Lab-supplied methanol preservative in each VOA [2]; Place on ice to cool to 4°C +/- 2°C	--	14
	GW		Two 40 mL glass VOA vials with Teflon septa lids	Lab-supplied HCl preservative in each VOA; No headspace in VOA; Place on ice to cool to 4°C +/- 2°C	--	14
PAHs	Soil	USEPA Method SW846-8270C	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	14	40
	GW		One 1 Liter amber glass jar		7	40
PCBs	Soil	USEPA Method SW846-8082	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	--	180
Metals	Soil	USEPA Method SW846-6000/7000 Series	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	--	180
	GW		One 125 mL HDPE bottle		--	180

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Table 5: Analytical Methods, Sample Containers, Preservation, and Holding Times

Constituent(s)	Media	Analytical Method	Sample Containers [1]	Preservation	Extraction Holding Times (days)	Analysis Holding Time (days)
Hexavalent Chromium	Soil	USEPA Method SW-846-7196	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	--	28
	GW	USEPA Method SM-3500B	One 125 mL HDPE bottle	Place on ice to cool to 4°C +/- 2°C	--	1
Total Organic Carbon	Soil	USEPA Method 9060M	One 8 oz amber glass jar	Place on ice to cool to 4°C +/- 2°C	--	28
C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics	Indoor Air, Sub-slab Soil Gas, and Ambient Air	Massachusetts DEP APH Test Methods WSC-CAM-IX	6-liter evacuated SUMMA® Canister, batch certified clean by the laboratory, equipped with a Swagelok 1/4-inch stainless steel bellows valve, brass cap, particulate filter, and vacuum gauge. Regulator shall be adjusted for a flow rate for an 8-hour sample collection.	None	N/A	30
VOCs		USEPA Method TO-15 Select Ion Monitoring (SIM)		None	N/A	30
Oxygen, Carbon Dioxide, and Methane		USEPA Method 3C		None	N/A	30

Notes:

--: not applicable; °C: degree Celsius; HCL: hydrochloric acid; HDPE: high density polyethylene; mL: milliliter; oz: ounce; VOA: volatile organic analysis

[1] Depending on analysis volume needs, the laboratory may decide to use one container to perform multiple analyses (e.g., one 8 ounce amber glass jar may provide sufficient volume to perform the lead, TPH-D, TPH-HO, PAH, and/or PCB soil analyses).

[2] Soil samples for analyses of TPH-G, VOCs, and VPH will be collected and prepared in accordance with USEPA Method SW846-5035.

Table 6: Laboratory Control Limits

Constituent(s)	Media	Analytical Method	LCS	MS/MSD		Surrogates
			% Recovery	% Recovery	RPD	% Recovery
TPH-G	Soil and Groundwater	Ecology Method NWTPH-Gx	65 - 135	65 - 135	≤ 25	65 - 135
TPH-D and TPH-HO	Soil and Groundwater	Ecology Method NWTPH-Dx	65 - 135	65 - 135	≤ 50	65 - 135
EPH	Soil	Ecology Method NWEPH	70 - 130	70 - 130	< 30	60 - 140
	Groundwater		70 - 130	70 - 130	< 30	45 - 123
VPH	Soil	Ecology Method NWVPH	70 - 130	70 - 130	< 30	60 - 140
	Groundwater		70 - 130	70 - 130	< 30	60 - 140
VOCs	Soil and Groundwater	USEPA Method SW846-8260D	80 - 120	65 - 135	≤ 35	65 - 135
PAHs	Soil	USEPA Method SW846-8270C	30 - 140	30 - 140	< 50	18 - 137
	Groundwater		30 - 140	30 - 140	< 50	33 - 141
PCBs	Soil	USEPA Method SW846-8082	75 - 125	75 - 125	< 20	65 - 135
RCRA Metals	Soil	USEPA Method SW846-6000/7000 Series	80 - 120	75 - 125	< 20	N/A
Total Organic Carbon	Soil	USEPA Method 9060M	80 - 120	70 - 130	< 25	N/A
C5-C8 Aliphatics, C9-C12 Aliphatics, and C9-C10 Aromatics	Indoor Air, Sub-slab Soil Gas, and Ambient Air	Massachusetts DEP APH Test Methods WSC-CAM-IX	70 - 130	N/A	N/A	70 - 130
VOCs		USEPA Method TO-15 Select Ion Monitoring (SIM)	70 - 130	N/A	N/A	70 - 130
Oxygen, Carbon Dioxide, and Methane		USEPA Method 3C	70 - 130	N/A	N/A	N/A

Notes:

LCS: Laboratory control sample; MS/MSD: Matrix spike/matrix spike duplicate; N/A: Not applicable; RPD: Relative percent difference

Table 7: Target Reporting Limits

Constituent	Soil Analytical Method	Soil Target Reporting Limit [1] (mg/kg)	Groundwater Analytical Method	Groundwater Target Reporting Limit [1] (ug/L)	Indoor Air, Sub-slab Soil Gas, and Ambient Air Analytical Method	Indoor and Ambient Air Target Reporting Limit [1,2] (ug/m^3)
TPH						
TPH-D	NWTPH-Dx	50	NWTPH-Dx	100	N/A	N/A
TPH-G	NWTPH-Gx	10.0	NWTPH-Gx	100	N/A	N/A
TPH-HO	NWTPH-Dx	250	NWTPH-Dx	500	N/A	N/A
EPH	NWEPH	5.0	NWEPH	50	N/A	N/A
VPH	NWVPH	5.0	NWVPH	50	N/A	N/A
C5-C8 Aliphatics	N/A	N/A	N/A	N/A	MassDEP APH WSC-CAM-IX	30
C9-C12 Aliphatics	N/A	N/A	N/A	N/A	MassDEP APH WSC-CAM-IX	35
C9-C10 Aromatics	N/A	N/A	N/A	N/A	MassDEP APH WSC-CAM-IX	25
VOCs						
1,1,1,2-Tetrachloroethane	SW846-8260D	0.050	SW846-8260D	1.0	N/A	
1,1,1-Trichloroethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.55
1,1,2,2-Tetrachloroethane	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	0.14
1,1,2-Trichloroethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.11
1,1-Dichloroethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.40
1,1-Dichloroethylene	SW846-8260D	0.050	SW846-8260D	0.50	USEPA TO-15 SIM	0.40
1,1-Dichloropropene	SW846-8260D	0.030	SW846-8260D	1.0	N/A	
1,2,3-Trichlorobenzene	SW846-8260D	0.15	SW846-8260D	5.0	N/A	
1,2,3-Trichloropropane	SW846-8260D	0.15	SW846-8260D	1.0	N/A	
1,2,4-Trichlorobenzene	SW846-8260D	0.15	SW846-8260D	2.0	USEPA TO-15 SIM	0.74
1,2,4-Trimethylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	2.5
1,2-Dibromo-3-chloropropane	SW846-8260D	0.15	SW846-8260D	1.0	N/A	
Ethylene Dibromide (EDB)	SW846-8260D	0.0050	SW846-8260D	0.010	USEPA TO-15 SIM	0.077
1,2-Dichlorobenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	0.60
1,2-Dichloroethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.040
1,2-Dichloropropane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.23
1,3,5-Trimethylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	2.5
1,3-Dichlorobenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	0.60
1,3-Dichloropropane	SW846-8260D	0.050	SW846-8260D	1.0	N/A	
1,4-Dichlorobenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	0.24
2,2-Dichloropropane	SW846-8260D	0.050	SW846-8260D	2.0	N/A	
2-Chlorotoluene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	5.2
4-Chlorotoluene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Benzene	SW846-8260D	0.020	SW846-8260D	1.0	USEPA TO-15 SIM	0.32
Bromobenzene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Bromodichloromethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.067
Bromoform	SW846-8260D	0.15	SW846-8260D	1.0	USEPA TO-15 SIM	2.1
Bromomethane	SW846-8260D	0.090	SW846-8260D	2.0	USEPA TO-15 SIM	1.6
Carbon Tetrachloride	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.63
Chlorobenzene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.46
Chloroethane	SW846-8260D	0.060	SW846-8260D	2.0	USEPA TO-15 SIM	2.6
Chloroform	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.049
Chloromethane	SW846-8260D	0.060	SW846-8260D	2.0	USEPA TO-15 SIM	3.7
1,2-cis-Dichloroethylene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.40
1,3-cis-Dichloropropene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.45
Dibromochloromethane	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.085
Methylene Bromide	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Dichlorodifluoromethane	SW846-8260D	0.060	SW846-8260D	2.0	USEPA TO-15 SIM	0.49
Ethylbenzene	SW846-8260D	0.050	SW846-8260D	1.0	USEPA TO-15 SIM	0.43

Table 7: Target Reporting Limits

Constituent	Soil		Groundwater		Indoor Air, Sub-slab Soil Gas, and Ambient Air	
	Analytical Method	Target Reporting Limit [(1)] (mg/kg)	Analytical Method	Target Reporting Limit [(1)] (ug/L)	Analytical Method	Indoor and Ambient Air Target Reporting Limit [(1,2)] (ug/m^3)
Hexachlorobutadiene	SW846-8260D	0.15	SW846-8260D	5.0	USEPA TO-15 SIM	0.21
Cumene	SW846-8260D	0.050	SW846-8260D	4.0	USEPA TO-15 SIM	2.5
p-isopropyltoluene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Methyl-t-butyl Ether	SW846-8260D	0.050	SW846-8260D	5.0	USEPA TO-15 SIM	1.8
Methylene Chloride	SW846-8260D	0.020	SW846-8260D	1.0	USEPA TO-15 SIM	87
Naphthalene	SW846-8260D	0.15	SW846-8260D	5.0	USEPA TO-15 SIM	0.01 [(3)]
n-Butylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
n-Propylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	USEPA TO-15 SIM	2.5
sec-Butylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Styrene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.85
tert-Butylbenzene	SW846-8260D	0.040	SW846-8260D	1.0	N/A	
Tetrachloroethylene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	6.8
Toluene	SW846-8260D	0.10	SW846-8260D	1.0	USEPA TO-15 SIM	19
Total Xylenes	SW846-8260D	0.15	SW846-8260D	2.0	USEPA TO-15 SIM	0.43
1,2-trans-Dichloroethylene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.40
1,3-trans-Dichloropropene	SW846-8260D	0.030	SW846-8260D	1.0	USEPA TO-15 SIM	0.45
Trichloroethylene	SW846-8260D	0.020	SW846-8260D	0.40	USEPA TO-15 SIM	0.27
Trichlorofluoromethane	SW846-8260D	0.050	SW846-8260D	2.0	USEPA TO-15 SIM	2.2
Vinyl Chloride	SW846-8260D	0.020	SW846-8260D	0.20	USEPA TO-15 SIM	0.26
1,1,2-Trichloro-1,2,2-trifluoroethane	N/A				USEPA TO-15 SIM	0.77
1,3-Butadiene	N/A				USEPA TO-15 SIM	0.022
1,4-Dioxane	N/A				USEPA TO-15 SIM	0.36
2,2,4-Trimethylpentane	N/A				USEPA TO-15 SIM	4.7
2-Hexanone	N/A				USEPA TO-15 SIM	4.1
2-Propanol	N/A				USEPA TO-15 SIM	8.6
3-Chloropropene	N/A				USEPA TO-15 SIM	1.6
4-Ethyltoluene	N/A				USEPA TO-15 SIM	2.5
Acetone	N/A				USEPA TO-15 SIM	4.8
Acrolein	N/A				USEPA TO-15 SIM	2.1
Benzyl Chloride	N/A				USEPA TO-15 SIM	0.052
Butane	N/A				USEPA TO-15 SIM	2.4
Carbon Disulfide	N/A				USEPA TO-15 SIM	6.2
Cyclohexane	N/A				USEPA TO-15 SIM	6.9
Ethanol	N/A				USEPA TO-15 SIM	7.5
Ethyl Acetate	N/A				USEPA TO-15 SIM	7.2
F-114	N/A				USEPA TO-15 SIM	0.70
Heptane	N/A				USEPA TO-15 SIM	4.1
Methyl Ethyl Ketone	N/A				USEPA TO-15 SIM	2.9
Methyl Isobutyl Ketone	N/A				USEPA TO-15 SIM	4.1
Methyl Methacrylate	N/A				USEPA TO-15 SIM	4.1
n-Hexane	N/A				USEPA TO-15 SIM	3.5
Nonane	N/A				USEPA TO-15 SIM	5.2
Pentane	N/A				USEPA TO-15 SIM	3.0
Propene	N/A				USEPA TO-15 SIM	1.2
t-Butyl Alcohol	N/A				USEPA TO-15 SIM	12
Tetrahydrofuran	N/A				USEPA TO-15 SIM	0.29
Vinyl Acetate	N/A				USEPA TO-15 SIM	7.0
Vinyl Bromide	N/A				USEPA TO-15 SIM	0.44

Table 7: Target Reporting Limits

Constituent	Soil Analytical Method	Soil Target Reporting Limit [1] (mg/kg)	Groundwater Analytical Method	Groundwater Target Reporting Limit [1] (ug/L)	Indoor Air, Sub-slab Soil Gas, and Ambient Air Analytical Method	Indoor and Ambient Air Target Reporting Limit [1,2] (ug/m^3)
PAHs						
Acenaphthene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Acenaphthylene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Anthracene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Benzo(ghi)perylene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Fluoranthene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Fluorene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Naphthalenes, Total [4]	SW846-8270C	0.15	SW846-8270C	0.50	N/A	N/A
Phenanthrene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Pyrene	SW846-8270C	0.050	SW846-8270C	0.50	N/A	N/A
Total cPAHs [4]	SW846-8270C	0.076	SW846-8270C	0.76	N/A	N/A
PCBs						
Total PCBs [4]	SW846-8082	0.70	SW846-8082	0.14	N/A	N/A
Metals						
Arsenic	SW846-7010	5.0	SW846-7010	3.0	N/A	N/A
Barium	SW846-6020B	0.50	SW846-6020B	1.0	N/A	N/A
Cadmium	SW846-7010	1.0	SW846-7010	5.0	N/A	N/A
Chromium (III)	SW846-6020B	0.10	SW846-6020B	1.0	N/A	N/A
Chromium (VI)	SW846-7196	0.50	SM-3500 Cr B	45	N/A	N/A
Total Chromium	SW846-7010	5.0	SW846-7010	5.0	N/A	N/A
Lead	SW846-7010	5.0	SW846-7010	5.0	N/A	N/A
Mercury	SW846-7471	0.50	SW846-7470	0.50	N/A	N/A
Selenium	SW846-6000/7000	0.50	SW846-6020B	2.5	N/A	N/A
Silver	SW846-6000/7000	0.10	SW846-6020B	0.20	N/A	N/A
Other Analyses						
Total Organic Carbon	USEPA Method 9060M	0.075%	N/A	N/A	N/A	N/A
Oxygen	N/A	N/A	N/A	N/A	USEPA Method 3C	0.00050
Carbon Dioxide	N/A	N/A	N/A	N/A	USEPA Method 3C	0.00050
Methane	N/A	N/A	N/A	N/A	USEPA Method 3C	0.00050

Notes:

N/A : not applicable; No Value: A SL was not calculated for this constituent (see Appendix A).

(1) It may not be possible to achieve these reporting limits in all samples (e.g., samples requiring extra dilution to achieve laboratory control limits, interferences).

(2) These are the target reporting limits for indoor air and ambient air samples. Sub-slab soil vapor samples are analyzed with an approximate three fold dilution, which results in target reporting limits that are three times higher than the target reporting limits for indoor and ambient air samples.

(3) The target reporting limit for naphthalene will be the method detection limit (0.01 ug/m3 for indoor and ambient air samples) so that the target reporting limit for indoor air samples is less than the indoor air SL for unrestricted land use.

(4) The shown target reporting limits are for total naphthalenes, total cPAHs, and total PCBs.

Appendices

Appendix A