Urban Environmental Partners llc

REMEDIAL INVESTIGATION / FEASIBILITY STUDY

Rainier Mall Property

4208 Rainier Avenue South, Seattle, WA 98118

King County Parcel #7950301480

September 7, 2021

Prepared for:

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1.0 Introduction

On behalf of Rainier & Genesee, LLC and Lake Union Partners (LUP) Affiliates, Urban Environmental Partners llc (UEP) has prepared this **DRAFT** Remedial Investigation (RI), and Feasibility Study (FS), for the Rainier Mall "Site" (Voluntary Cleanup Program [VCP] ID NW3261), addressed at 4208 Rainier Avenue South in Seattle, Washington (the Property) as shown on Figures 1 and 2.

As established in the Washington Administrative Code (WAC), Chapter 173-340-200, a "Site" is defined by the full vertical and lateral extent of contamination that has resulted from the release of hazardous substances into the environment. The Rainier Mall Site is defined by the historical release of chlorinated volatile organic compounds (CVOCs) associated with former dry-cleaning operations on the Property and by the use of creosote treated wood pilings to support the construction of an historic grocery store. The primary CVOCs at the Site include tetrachloroethylene, also known as perchloroethylene (PCE) and its degradation compounds trichloroethylene (TCE), cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE), and vinyl chloride (VC). In addition, the chemical compounds of concern (COCs) at the Site that are associated with creosote treated wood piles are the polycyclic aromatic hydrocarbons (PAHs).

This report was prepared for submittal to the Washington State Department of Ecology (Ecology) under the VCP, and was developed to meet the general requirements of an RI and FS as defined by the Washington State Model Toxics Control Act (MTCA) Regulation in Chapters 173-340-350 through 173-340-370 of the WAC.

1.1 Document Purpose

1.1.1 Remedial Investigation

The purpose of the RI was to collect data necessary to adequately characterize the COCs at Site for the purposes of developing and evaluating remedial alternatives consistent with WAC 173-340-350(7). The RI components of this report present historical information regarding the former use of the Property, summarize the scope and findings of each environmental investigation that has been conducted at the Site, provide the Site data for soil, groundwater, and vapor studies from the remedial investigations, and present a Conceptual Site Model (CSM) for the contaminant release, transport, and potential exposure pathways at the Site.

1.1.2 Feasibility Study

The purpose of the FS is to utilize the data collected during the RI to develop and evaluate remedial alternatives for the Site and to select the most appropriate alternative based on the procedures in WAC

173-340-350(1) through (8), and the evaluation criteria listed below. According to MTCA, a cleanup alternative must satisfy all of the following threshold criteria as specified in WAC 173-340-360(2):

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and,
- Provide for compliance monitoring.

WAC 173-340-360(2)(b) also recommends that the selected cleanup action:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and,
- Consider public concerns related to potential impacts from the proposed cleanup action alternative.

The FS analysis proposes the cleanup levels to be applied to the impacted media at the Site, and shows how the Site will be brought into compliance with the proposed cleanup standards by the selected alternative.

2.0 Background

The following section provides a description of the Property, a presentation of the physical settings of the Property, and a summary of environmental investigations and interim actions conducted at the Site to date.

2.1 Location, Address, and Legal Description

The Property consists of a single, irregularly-shaped King County Tax Parcel (#7950301480), comprising 2.33 acres, addressed at 4208 Rainier Avenue South in Seattle, Washington (Figures 1 and 2). The Property is accessed from the north side of South Genesee Street on the south side of the Property.

The following is an abbreviated legal description of the Property as provided by the King County Department of Assessments:

SQUIRES LAKESIDE ADD & POR VAC ALLEY ADJ LESS ST
Plat Block: 9
Plat Lot: 7 THRU 38

2.2 Current Improvements, Land Use, and Occupant Information

The Property is currently improved with a 36,071 square foot (sf) vacant retail structure on the north half of the parcel, and has an associated asphalt parking lot on the south side of the Property that covers the remainder of the parcel.

2.3 Historical Land Use Summary

According to historical land use research conducted by Hahn and Associates, Inc. (Hahn) in 2000 as part of Phase I and Phase II Environmental Site Assessments (ESAs), the Property was formerly developed with up to three separate dry-cleaning facilities on the southwestern portion of the Property as shown on Figure 2. These historic dry cleaners reportedly operated in three distinct locations between approximately 1930 and 1968. The buildings were removed from the Property between 1967 and 1978.

According to Hahn's Phase I ESA, the current single-story retail building was constructed on the north end of the Property around 1967 and was initially occupied by a Safeway (Store No. 441) and then a mixed-use retail mall. Historical building plans associated with the construction of the Safeway indicate the building was constructed on approximately 174 treated wooden piles. Wooden piles of this era were commonly treated with creosote, which contains chemical compounds such as PAHs.

Safeway No. 441 ceased operations in approximately 1998, and the structure was then expanded and converted into a mixed-use mall (Rainier Mall) supporting multiple retail tenants. Rainier Mall closed in August of 2016 and has remained vacant since that time.

2.4 Physical Settings

2.4.1 Topographic Characteristics

The primary topographic gradient at the Site is gently sloped from west to east, with a localized depression throughout the central portion of the parking area. Elevations range from approximately 47 feet above mean sea level (AMSL) (NAVD 88 datum) near the western property boundary, to approximately 42 feet AMSL within the localized depression.

2.4.2 Groundwater Use Assessment

According to a database search of registered water wells with Ecology (Ecology 2020), there are no active water supply wells within a 0.5-mile radius of the Property.

Seattle Public Utilities (SPU) provides the potable water supply to the City of Seattle. SPU's main source of water is derived from surface water reservoirs located within the Cedar and South Fork Tolt River watersheds. According to King County's Interactive Map for the County's Groundwater Program, there

are no designated aquifer recharge or wellhead protection areas within several miles of the Site (King County iMAP 2020).

The King County Board of Health (BOH) requires connection to an existing water system where available (BOH-Code-Title-12, Section 12.32.010). The City of Seattle supplies potable water to the entire City; therefore, groundwater cannot be used as a potable water supply within the City limits.

The King County Groundwater Well Viewer indicates the nearest groundwater well is over 4,000 feet west of the site, and is 775 feet deep. There is no other information for the well, including whether it still exists.

Based on these findings, local groundwater in the vicinity of the Property does not serve as a source of drinking water.

2.5 Summary of Environmental Investigations

This report section summarizes the release discovery and subsequent environmental investigations conducted by various consulting companies at the Site. The types and locations of the historic explorations from the investigations are depicted on Figure 3, while the cumulative soil, groundwater and soil gas data results from the studies are tabulated on Tables 1 through 9. The primary contaminants of concern for the Site, and those that have been the focus of the majority of these environmental investigations, are the CVOCs - PCE and its degradation products (TCE, DCE, and VC). The concentrations of these CVOCs will be compared to the most conservative MTCA Method A or B Cleanup Levels (CULs), as appropriate.

The CVOC data results for soil and groundwater samples from the studies are depicted by location on plan view Figures 4 and 5, respectively, as well as on cross sectional Figures 14 and 17 through 20. Laboratory analytical reports are presented in Appendix A and boring logs for the explorations, if available, are presented in Appendix B.

2.5.1 Hahn and Associates, Inc. Phase I and II Environmental Site Assessments, 2000

In 2000, Hahn performed a Phase I ESA for the Property which identified the historical presence of up to three dry cleaning operations, operating in three distinct locations on the southwestern portion of the Property (Figure 2). This land use practice was identified as a Recognized Environmental Condition (REC) due to the common use, storage, and improper disposal hazardous cleaning solvents, and further environmental assessment was recommended in the Hahn report.

Hahn subsequently oversaw the advancement of eight borings (B-1 through B-8) on the Property to evaluate the environmental quality of soil and groundwater in the vicinity of these former dry cleaners.

Soil samples were collected from 4 locations at depths between 4.5 and 19.5 feet below ground surface (bgs).

Groundwater was encountered in borings B-1, B-3, B-4, B-5, and B-7 at depths between 26 and 32 feet bgs. Reconnaissance groundwater samples were collected at these 5 locations by inserting a temporary screened well point in the boring, purging the wells dry with a peristaltic pump, waiting for recharge, then extracting groundwater using a disposable polyethylene bailer.

Soil and groundwater samples collected during the investigation were analyzed for volatile organic compounds (VOCs) by EPA Method 8260B.

Investigation Findings – Soil

- One soil sample, collected from boring B-1 at a depth of 19.5 bgs, contained concentrations of PCE and TCE in excess of their respective MTCA CULs.

Investigation Findings – Groundwater

- Groundwater samples collected from borings B-1 and B-4 contained concentrations of PCE, TCE, 1,1-DCE and/or VC in excess of their respective MTCA CULs.
- The groundwater sample collected from boring B-7 contained a detectable concentration of PCE, however the value was well below its MTCA CUL.

The results of the investigation indicated that a significant release of CVOCs had occurred to both soil and groundwater in the vicinity of the southern dry-cleaning facilities. The PCE release was reported to Ecology by the owner following Hahn's Phase II sampling.

2.5.2 SoundEarth Strategies, Inc. –Subsurface Investigation, 2017

During due diligence work between January and March of 2017, SoundEarth conducted a subsurface investigation to evaluate the nature and extent of the CVOC release identified by Hahn. The investigation consisted of the advancement of 13 borings (SB01 through SB08, and B01 through B05) across the southern portion of the Property in locations shown on Figure 3. Soil samples were collected from depths between 5 and 40 feet bgs.

One boring (B01), located in the suspected PCE source area, was completed as a 2-inch diameter groundwater monitoring well (B01/MW01) and was sampled in accordance with American Society of Testing and Materials (ASTM) Guideline D6771-02 "Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations" (ASTM low flow methodology). Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples from the SoundEarth borings/wells were analyzed for CVOCs by EPA Method 8260C.

Investigation Findings - Soil

Soil samples collected from borings SB01, SB02, SB08, B01, B02, B03, and B04, at depths between 12.5 and 32.5 feet bgs, contained concentrations of PCE, TCE, and/or VC in excess of their respective MTCA CULs, as shown by soil data presented on Figure 4.

Investigation Findings – Groundwater

- The groundwater sample collected from monitoring well MW01 contained an elevated concentration of PCE (8,700 ug/L) in excess of its MTCA CUL. TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and VC were not detected above their laboratory reporting limits in this early sample, however the reporting limits themselves were in excess of their respective MTCA CULs due to laboratory dilution. Groundwater data are presented on Figure 5.

2.5.3 SoundEarth Strategies, Inc. – Passive Soil Vapor Assessment, 2017

In December of 2017, SoundEarth performed a soil vapor assessment to further assess the CVOC source area and the extent of shallow soil impacts. Fifty-six passive soil vapor samplers (Gore Sorbers) were installed on the southern portion of the Property and into the adjacent sidewalk right-of-way (ROW) as shown on Figure 6.

Investigation Findings – Soil Vapor

- Only 5 of the 56 soil vapor samples contained even detectable concentrations of CVOCs. These low-level soil gas results provided inconclusive data with respect to the investigation purpose as an obvious PCE source area was not found. Also, there was/is no direct correlation of the soil gas data from this study with existing soil contamination data, or with CVOC concentrations in groundwater. However, the soil gas results from the survey indicated that shallow soil (fill) on the Property is not likely impacted with PCE.

2.5.4 SoundEarth Strategies, Inc. – Subsurface Investigation, 2018

In 2018, SoundEarth conducted a multi-phase supplemental subsurface investigation to further define the extent of the CVOC release, characterize the fill material across the Property, and assess the potential for vapor intrusion into the existing retail building. The investigation consisted of the advancement of 21 borings (B06 through B18 and TB01 through TB08) across the Property and three soil gas vapor sampling points (SG01 – SG03) in locations as shown on Figure 3. Soil samples were collected from depths between 5 and 46 feet bgs and the soil gas samples were collected at approximately 8 feet bgs to represent a sub-slab location for a future building.

Borings B12, B15, and B16 were drilled near the western Property boundary with Rainier Avenue South, at angles of approximately 46-48 degrees toward the adjacent ROW, to collect soil samples beneath known utilities in the sidewalk as shown on Figure 3.

Soil Borings B07, B09, B15 through B18, TB07 and TB08 were completed as 2-inch diameter groundwater monitoring wells. Monitoring wells B07/MW03, B09/MW02, B15/MW07, B16/MW06, B17/MW09, B18/MW08, TB07/MW04, and TB08/MW05 were sampled in accordance with ASTM low flow methodology. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples were analyzed for: CVOCs by EPA Method 8260C; gasoline-range petroleum hydrocarbons (GRPH) by Northwest Method NWTPH-Gx; diesel-range petroleum hydrocarbons (DRPH) and oil-range petroleum hydrocarbons (ORPH) by Northwest Method NWTPH-Dx; MTCA 5 metals (arsenic, cadmium, chromium, lead, and mercury) by EPA Method 6020A; and/or polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270D SIM.

The soil gas samples were analyzed for CVOCs by EPA Method TO-15.

Investigation Findings – Soil

- The soil sample collected from a fill area containing debris at TB05 at a depth of 5 feet bgs contained a concentration of ORPH in excess of its MTCA Method A Cleanup Level.
- Soil samples collected from borings B06, B12, B14, B18, and TB08, at depths between 10.5 and 20 feet bgs, contained concentrations of PCE and/or TCE in excess of their respective MTCA CULs.
- Select soil samples collected from borings TB01, TB03, TB04, B06, and B09 contained concentrations of metals consistent with natural background levels, which were below their respective MTCA CULs.
- Select soil samples collected from TB01, TB03, and B09 did not contain concentrations of PAHs above the laboratory detection limit and/or MTCA CULs.

Investigation Findings – Groundwater

- The groundwater samples collected from monitoring wells MW05, MW08, and MW09 contained concentrations of PCE, TCE, cis-1,2-DCE, and VC in excess of their respective MTCA CULs.
- The initial groundwater sample collected from monitoring well MW02 contained a concentration of VC slightly above its MTCA CUL.

- The groundwater samples collected from MW03, MW04, MW06, and MW07 showed no concentrations of CVOCs above their laboratory detection limits and/or MTCA CULs.

Investigation Findings – Soil Gas

- Concentrations of PCE were detected in all three soil gas samples at concentrations between 25 to 48 micrograms per cubic meter (µg/m3), which is below the MTCA Method B screening level of 321 µg/m3.
- Remaining CVOC concentrations were below the laboratory detection limit for all three soil gas samples.

The results of this 2018 soil and groundwater sampling provided additional detail regarding the nature of the CVOC release but did not adequately define the extent of impacts, specifically in the direction to the south.

The ORPH detected in soil from TB05 has been attributed to uncontrolled fill material, or isolated debris, and does not appear to be associated with a point source release on the Property.

The results of the soil gas sampling indicate that vapor intrusion is not a concern for the existing on-Property structure to the north.

Soil gas analytical results are tabulated on Table 8.

2.5.5 Urban Environmental Partners – Subsurface Investigation, 2019

In April of 2019, subsequent to the Site's enrollment into the Voluntary Cleanup Program, UEP conducted a subsurface investigation to evaluate potential CVOC impacts beneath the southern adjacent ROW (South Genesee Street). The investigation consisted of the advancement of 2 borings (UB10 and UB11) within the westbound traffic lane in South Genesee Street using hollow stem auger (HSA) drilling methods. Soil samples were collected from depths between 10 and 28 feet bgs.

Both borings were completed as 2-inch diameter groundwater monitoring wells. Monitoring wells UB10/MW10 and UB11/MW11 were sampled in accordance with ASTM low flow methodology. Monitoring well construction details are summarized in Table 7.

Select soil and groundwater samples were analyzed for CVOCs by EPA Method 8260C.

Investigation Findings – Soil

- Two soil samples collected from the eastern location in South Genesee at UB10 in the saturated soil zone at depths of 25 and 28 feet bgs, respectively, contained concentrations of PCE and/or TCE in excess of their respective MTCA CULs.

- The soil samples collected from the western location at UB11 between 13 and 28 feet bgs did not contain detectable concentrations of CVOCs.

Investigation Findings – Groundwater

- The initial groundwater sample collected from monitoring well MW10 contained concentrations of PCE, TCE, cis-1,2-DCE, and VC in excess of their respective MTCA CULs, however subsequent GW data for MW10 have been ND as discussed later..
- The groundwater sample collected from MW11 did not contain detectable concentrations of CVOCs.

2.5.6 Aestus – GeoTrax CSM+™ Ultra-High Resolution Site Characterization, 2019-2020

In December of 2019, Aestus, LLC (Aestus) began its GeoTrax Survey™ work and applied an electrical resistivity imaging (ERI) technology to survey the Site. The goal was to use the Aestus imaging technology in further assessing the nature and extent of the CVOC release. The imaging survey evaluates potential geologic formations, soil types, preferential flow pathways, and levels of naturally occurring and enhanced bioactivity by bacteria using its electrical hydrogeology scanning technology. The ERI imaging results are used to update the Conceptual Site Model (CSM) with higher data density to more fully understand and develop the CSM.

ERI works by imparting an electrical current into the ground, and then simultaneously measuring voltage and soil resistance and conductivity at hundreds of locations along each of several straight survey line/transects. Based on these voltage conductance data, the apparent resistivity of subsurface materials is calculated using Ohm's Law. From thousands of ERI measurements collected from the survey area, the collected data are processed and converted to provide measurements of model resistivity or true resistivity at regular points in the survey area. Aestus uses specialty ERI methods developed specifically for the environmental industry with enough sensitivity and resolution to image non-aqueous phase liquids (NAPLs) and associated aqueous phase impacts, as well as to interpret hydrogeology and enhanced bioactivity at a Site.

Subsurface areas impacted with fresh or unweathered light or dense non-aqueous liquids (LNAPLs or DNAPLs, respectively) and related dissolved phase contamination, typically present in the ERI images as more resistive anomalous zones relative to areas that contain only non-impacted soils and pore fluids.

The presence of chloride and/or other ions from contaminants in soil create lower resistivity (i.e., higher electrical conductivity) in the subsurface. The Aestus technology routinely detects bioactive zones in the subsurface which create a very electrically conductive signature (less resistive) due to shifting

groundwater chemistry and the presence of nanowires between the bacteria and other organisms which may be present. Bioactivity signatures are typically the strongest electrical signal in Aestus' imagery.

Aestus performed 10 transect lines (labeled RAI-01 through RAI-10) across the property in the locations shown on Figure 8. Each transect line consisted of 56 stainless steel electrodes, installed in a straight line at specific intervals to a depth of approximately 12 inches. The electrodes were connected via geophysical cables and the cables were connected to Aestus' data acquisition field instruments. Once each survey line was laid out in the field, Aestus' specialized data acquisition methods gathered a significant amount of data related to the electrical properties of the subsurface in that transect area. Following field data collection, Aestus used their proprietary data processing techniques to develop a final electrical resistivity 2D image of the subsurface for each transect location. The depth of the 2D image is one-fifth of the transect line length on the ground surface, which was long enough to allow the Aestus survey to interpret soil conditions to depths of about 40 feet bgs.

Because Aestus' subsurface imaging technology is not a quantitative analytical tool, it does not immediately identify or quantify the chemical, geological, and biological (bioactivity) composition of anomalies detected in the imagery. Data integration of historical investigation work, and follow-up confirmation drilling is necessary to effectively "convert" or calibrate the Aestus electrical signatures back to the subsurface features of interest, such as physical (geology signatures), chemical (contamination presence/absence and relative concentration), and biological signatures (indicating potential presence/absence of bioactivity). The cumulative and multiple sources of data are integrated for calibration and interpretation purposes, which typically includes but is not limited to boring logs, site stratigraphy, analytical sample data, and fluid level measurements.

Investigation Findings

The Aestus GeoTrax ERI Survey™ identified three areas of potential concern at the Site apart from the known zones of impacts proximate to the former dry cleaners at the southwest corner of the Property which are illustrated on Figure 8. Specifically, these 3 areas exhibited anomalous electrically resistive or conductive properties which could be consistent with the presence of subsurface isolated contamination zones or preferential flow paths containing contaminant impacts and/or ongoing naturally occurring bioactivity.

Primary areas of interest from the Aestus survey included the following:

Area 1 – Potential Deeper Flow Path Proximate to Former Dry Cleaner at SW Corner of Site

The GeoTrax Survey™ imagery indicated an electrically anomalous, and possibly layered zone proximate to the know impacted monitoring wells in the Site's primary source area which may be consistent with a preferential flow path affecting the horizontal and vertical migration of the impacts.

Area 2 – Former Dry Cleaner Building at Northwest Corner of Site

The GeoTrax Survey™ imagery identified a high value resistor/conductor pair in the area of the former northern former dry cleaner at 4234 Rainier Avenue South (Figure 8). Previous investigations in this area have not identified CVOCs at elevated concentrations; however, the survey results indicated a potential secondary contaminant source in the indicated location that needed investigation.

The general area slightly north of the former cleaner showed the highest electrical resistivity values detected by Aestus' GeoTrax Survey™ imaging, however, high electrical resistivity values can also be caused by dry or coarse grain soils and/or fill materials.

Area 3 – Potential Subsurface Channel Feature Oriented North-South

The GeoTrax Survey™ imagery identified what appears to be a channel-like subsurface feature of anomalously low resistivity (high electrical conductivity) oriented north to south within the central portion of the Property as shown on Figure 8. This anomalous zone extended vertically to approximately 25 feet bgs, and could be indicative of a geologic feature as a preferential flow path containing the presence of impacts with ongoing bio-degradation activity.

2.5.7 Urban Environmental Partners – GeoTrax Survey™ Confirmation Drilling, 2020

In March of 2020, UEP conducted a subsurface investigation to evaluate the 3 areas of potential concern identified during Aestus' GeoTrax Survey™. The investigation consisted of the advancement of 8 borings (UB12 through UB19) in locations shown on Figure 3 using HSA or direct push drilling methods. Soil samples were collected from depths between 4 and 46 feet bgs. The sampling depths at each location which were specifically targeted based on the Geotrax Survey™ results.

Seven of the borings were completed as 2-inch diameter groundwater monitoring wells. Wells UB12/MW12 through UB18/MW18 were sampled in accordance with ASTM low flow methodology. Reconnaissance groundwater was also sampled from boring UB19 in accordance EPA 2005 publication Groundwater Sampling and Monitoring with Direct Push Technologies. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples from this Aestus confirmation work were analyzed in an on-site mobile laboratory using approved lab protocols for: VOCs by EPA Method 8260D; GRPH by Northwest Method NWTPH-Gx; and/or DRPH and ORPH by Northwest Method NWTPH-Dx. The mobile lab was used to provide immediate information during drilling to allow additional bounding investigation work, if it was indicated by the lab results.

Investigation Findings – Soil

- The soil samples collected from UB13 at depths between 9 and 43 feet bgs contained concentrations of PCE, TCE, and/or VC in excess of their respective MTCA CULs. The sample collected from 23 feet bgs also reported a concentration of GRPH, however this result was flagged by the laboratory, indicating that the value consists of a chlorinated compound with elevated concentrations.
- A soil sample collected from UB15 at a depth of 6 feet contained a concentration of PCE in excess of its MTCA CUL.
- The soil samples collected from the remaining borings contained CVOC concentrations below their laboratory detection limits and/or MTCA CULs.

Investigation Findings – Groundwater

- The groundwater samples collected from monitoring wells MW12, MW13, MW16, MW17, and MW18 contained concentrations of one or more CVOC in excess of their respective MTCA CULs.
- The groundwater samples collected from the remaining borings/monitoring wells contained CVOC concentrations below their laboratory detection limits and/or MTCA CULs.
- The groundwater samples collected from monitoring wells MW12, MW13, MW16, and MW18 contained detectable concentrations of GRPH, however these results were flagged by the laboratory, indicating that the values consist of chlorinated compound(s) with elevated concentrations.

The lab data findings of the confirmation drilling from the GeoTrax Survey™ targets indicate the following results with respect to the 3 areas of potential concern:

Area 1

The CVOC concentrations detected in groundwater from monitoring wells MW12, MW13, MW16 and MW18 indicate a preferential pathway as a saturated sand unit not previously identified on the Property, which explains the southeasterly distribution of the dissolved phase contaminants. This Site feature is discussed further in Section 3.4.

Area 2

The PCE concentration detected in shallow soil at boring UB15 may explain the GeoTrax Survey™ results in this area, however follow up explorations (UB27 through UB29) presented later, show that the shallow PCE impact is not extensive based on deeper soil test results and lack of groundwater impacts.

Area 3

The CVOC concentrations detected in groundwater from monitoring wells MW16, MW17, and MW18 indicated a groundwater flow channel not previously identified on the Property, supporting the north/south distribution of contaminants. This Site feature is discussed further in Section 3.4.

2.5.8 Urban Environmental Partners – Plume Boundary Investigation, 2020

In March and April of 2020, UEP conducted a subsurface investigation to evaluate and bound the southern and eastern extents of groundwater impacts, and the southern extent of soil impacts. The investigation consisted of the advancement of 5 borings (UB20 through UB24) using HSA or direct push drilling methods to the south and east of the known plume extents. Soil samples were collected from depths between 25 and 35 feet bgs.

All five borings were completed as 1- or 2-inch diameter groundwater monitoring wells. Monitoring wells UB20/MW20 through UB24/MW24 were sampled in accordance with ASTM low flow methodology. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples were analyzed for CVOCs by EPA Method 8260C.

Investigation Findings – Soil

- The saturated soil samples collected from UB20 at depths between 30 and 35 feet bgs contained concentrations of PCE, and/or TCE slightly exceeding their respective MTCA CULs.
- The soil samples collected from the remaining borings (UB21, UB22, and UB23) did not contain detectable concentrations of CVOCs.

Investigation Findings – Groundwater

- The initial groundwater sample collected from MW20, on the day after installation, contained concentrations of TCE and cis-1,2-DCE, slightly in excess of their respective MCTA CULs. This well was resampled after proper well development and equilibration period on April 10th, 2020, and that more representative sample contained no detectable concentrations of CVOCs.
- The groundwater samples collected from monitoring wells MW21 through MW24 contained no detectable concentrations of CVOCs.

The results from this investigation defined the contaminant plume boundary to the south and east of the Property as represented on Figure 5. Results from these bounding wells identified and targeted a saturated sand layer that begins at around 20-27 feet bgs on the Property, which is believed to be the primary preferential flow path for contaminants on the south end of the Property. This geologic feature is discussed further in Section 3.4.

2.5.9 Urban Environmental Partners – Groundwater Sampling Event, March and April 2020

In March and April of 2020, UEP resampled existing monitoring wells (MW01 through MW11) to assess current groundwater conditions across the Site. Many of these wells had not been sampled for several years since their initial installation. Samples were collected in accordance with ASTM low flow methodology and were analyzed for CVOCs by EPA Method 8260C

Investigation Findings

- The groundwater samples collected from MW01, MW05, MW08 in the source area, and from downgradient MW09 contained high concentrations of CVOCs in excess of their respective MTCA CULs. These results were consistent with previous sampling event(s), and indicate the primary source area of the release.
- The March groundwater sample collected from MW02 contained concentrations of CVOCs below their respective laboratory reporting limits and/or MTCA CULs. The sample previously collected from MW02 contained a concentration of VC slightly above the MTCA Method A Cleanup Level.
- The groundwater samples collected from MW03, MW04, MW07, and MW11 did not contain detectable concentrations of CVOCs. These results were consistent with previous sampling event(s), and appear to bound the edges of the dissolved phase plume.
- The UEP 2020 groundwater sample collected from MW06 contained concentrations of PCE, TCE, and VC in excess of their respective MCTA Method A CUL. This well previously (2010) did not contain detectable concentrations of CVOCs.
- The groundwater sample collected from MW10 did not contain detectable concentrations of CVOCs. These latest results represented a significant reduction in contaminant concentration from the initial 2019 sampling event after the MW10 well installation. To verify these results as accurate, an additional sampling event was conducted. One sample was collected from the well with the tubing placed at the center of the well screen, and the second sample with the tubing placed at the bottom of the well screen. Neither sample interval contained detectable concentrations of CVOCs, verifying the sample results that show groundwater within MW10 does not contain contaminants above laboratory detection limits.

2.5.10 Urban Environmental Partners – Additional Subsurface Investigation, April 2020

In April of 2020, UEP conducted an additional subsurface investigation to further evaluate the contaminant distribution and confirm the geology and primary preferential flow path on the Property. The investigation work consisted of the advancement of 2 borings (UB25 and UB26) using sonic drilling

technology to produce a continuous soil core which allowed for a detailed and continuous review of soil lithology to the maximum depth explored of 50 feet bgs. UB25 was positioned near the primary source area, while UB26 was positioned to the south and east of the source area, just inside the Property boundary. Continuous soil cores were observed from each boring, and select soil samples were collected from depths between 27 and 45 feet bgs.

Both borings were completed as 2-inch diameter groundwater monitoring wells. Monitoring wells UB25/MW25 and UB26/MW26 were sampled in accordance with ASTM low flow methodology. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples were analyzed for CVOCs by EPA Method 8260C.

Investigation Findings – Soil

- Fill material was encountered in UB25 to a depth of approximately 14 feet bgs. The soil identified below the fill consisted primarily of a dense Recessional Lacustrine clay to approximately 27 feet bgs, underlain by discontinuous silty sand and sand layers to a depth of approximately 35 feet bgs. Dense glacially consolidated silt and clay was encountered between approximately 35 feet and the maximum depth explored of 50 feet bgs.
- Fill material was also encountered in UB26 to a depth of approximately 16 feet bgs. The soil identified below the fill consisted primarily of a dense Recessional Lacustrine clay to approximately 25 feet bgs, underlain by a continuous Recessional Outwash sand layer to a depth of approximately 40 feet bgs. Dense glacially consolidated silt and clay was encountered between approximately 40 feet and the maximum depth explored of 50 feet bgs.
- Soil samples collected from both borings within the saturated sand layer at depths of 30 and 35 feet bgs contained concentrations of PCE and TCE above their respective MTCA CULs.
- Soil samples collected from both borings within the dense glacially consolidated clay at or below 40 feet bgs did not contain detectable concentrations of CVOCs.

These soil observations from continuous cores, and data results in consolidation with observations from other borings indicate the presence of discontinuous lenses of sand in the vicinity of the primary source area, transitioning to a more continuous sand layer to the south and east of the source area. The geologic representation of the Site stratigraphy is shown as a north to south cross-section on Figure 14.

Based on the cumulative soil sample data set, the Site contaminants are shown not to have penetrated the dense glacially consolidated silty clay present ubiquitously at the Property at and below approximately 40 feet bgs.

Investigation Findings – Groundwater

- The groundwater samples collected from MW25 and MW26 contained concentrations of PCE, TCE, cis-1,2-DCE, and VC at expected values above their respective MTCA CULs.

2.5.11 Urban Environmental Partners – Northern Dry Cleaner Investigation, 2020

In April of 2020, UEP conducted a targeted subsurface investigation to evaluate the extent of soil impacts in the vicinity of UB15, where a concentration of PCE was previously detected in soil at 6 feet bgs. The investigation consisted of the advancement of 3 borings (UB27 through UB29) using direct push drilling methods. The borings were advanced approximately 12-15 feet to the northeast, southeast, and northwest from UB15. Soil samples were collected between 6 and 17 feet bgs.

Select soil samples were analyzed for CVOCs by EPA Method 8260C.

Groundwater was not sampled during this investigation, as the samples previously collected from both monitoring wells MW14 and MW15 contained no detectable concentrations of CVOCs.

Investigation Findings

- None of the soil samples from UB27 through UB29 contained detectable concentrations of CVOCs.

These findings confirm that the shallow soil impacts detected in UB15 at 6 feet bgs are isolated and bounded, and do not represent a significant source of contaminants at the Site.

2.5.12 Urban Environmental Partners – Soil Gas and Sewer Gas Sampling, April 2020

In April of 2020, UEP conducted a soil gas and sewer gas investigation to evaluate the potential for vapor intrusion into future on-Property structures and adjacent structures through contaminant migration within sewer conduits. The investigation consisted of the advancement of 2 soil gas probes (SG04 and SG05) using direct push drilling methods adjacent or near sewer laterals within the northwest portion of the parking area, and the collection of two sewer gas samples (sewer north and sewer south) collected from manhole access ports up-stream and down-stream of the CVOC source area (Figure 7).

The soil gas probes were advanced to approximately 18-inches bgs. Rigid inert tubing was cut to length and inserted to the bottom of the borings. Sand was then poured into the holes around the tubing and hydrated granular bentonite chips were used to seal the top of the holes from the atmosphere. The existing air within the tubing was then purged prior to sample collection to avoid any external cross contamination.

The sewer gas samples were prepped for collection by lowering a section of rigid inert tubing to the approximate depth of the sewer main (~10 feet bgs).

The samples were collected utilizing 1-liter Summa canisters fitted with flow regulators calibrated to a rate of between 150 to 200-milliliters per minute (ml/min).

The gas samples were analyzed for target list VOCs by EPA Method TO-15.

Investigation Findings – Soil Gas

- Neither soil gas sample contained detectable concentrations of CVOCs.

Investigation Findings – Sewer Gas

- The sewer gas sample collected from up-stream of the source area, contained concentrations of TCE and VC above their respective MTCA Method B Screening Levels for Sub-slab Soil Gas.
- The sewer gas sample collected down-stream of the source area did not contain detectable concentrations of CVOCs.

These findings indicate that vapor intrusion is not an issue for current or future on-Property structures on the northern portion of the Property, or up-stream structures due to no evidence of contaminant migration within the sewer conduit adjacent to the Site.

These sewer gas results also suggest that dry cleaner originated contaminants have been introduced into the sewer from source(s) up-stream (south) of the Property.

Soil gas and sewer gas results are tabulated on Table 8.

2.5.13 Urban Environmental Partners – Creosote Treated Pile Assessment, 2020

On April 27, 2020, UEP oversaw the excavation of a test pit/trench on the north side of the Property in a location next to the vacant retail building in order to expose and evaluate existing, treated wooden piles installed as the foundation of the building. The trench was advanced using a track mounted mini-excavator and was approximately 3 feet wide by 15 feet long, and about 4 feet deep (Figure 9). The positioning of the trench was determined using historical building plans which identified the likely placement of the treated wooden piles used for the foundation (Figures 10 and 11).

The trenching successfully exposed the 2 piles in this northern location. Upon exposure of the piles, it was visually evident that they had been treated with creosote due to the odor and dark staining of the surrounding soil which appeared to be a sand fill with discoloration next to the piles.

UEP collected soil samples at sequential intervals away from one of the piles at a depth of approximately 4 feet bgs to evaluate the migration distance of potential soil impacts proximate to the pile (3-inches, 6-inches, 12-inches) with PAHs, and also collected a sample at the middle distance between two pile systems (approximately 6 feet) as shown on Figure 9.

To assess potential groundwater impacts from the building's treated wood pile foundation, UEP oversaw the advancement of two soil borings (UB32 and UB33) on June 3, 2020 in locations south and downgradient from the former retail building (Figure 3 and Figure 22) using direct push drilling technology. In consultation with Ecology, the soil borings were positioned approximately 15 feet downgradient from the existing building, which would be approximately 40 feet from the nearest suspected pile locations as shown on Figure 22. Soil samples were collected from depths between 2 and 18 feet bgs.

Both borings were completed as 1-inch diameter monitoring wells (UB32/MW32 and UB33/MW33) which were sampled on June 8, 2020 in accordance with ASTM low flow methodology. The wells were installed to evaluate the potential for PAH leachability and mobility in soil and groundwater at the Site. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples from both locations were analyzed for PAHs by EPA Method 8270E SIM, and the laboratory results were evaluated using Toxicity Equivalency Methodology detailed in WAC 173-340-708(e).

To evaluate the structural integrity of the treated wood piles, the project geotechnical engineer from PanGeo, and the project structural engineer from Coughlin Porter Lundeen (CPL) accompanied UEP on December 31, 2020, to expose and inspect the existing wood piles within the vacant Safeway building interior. In two new test pit areas (Figure 12), existing timber piles under the building were accessed by saw cutting the concrete floor, removing concrete pile caps above two locations, and excavating test pits next to the piles. The efforts and observations are reported by PanGeo in their Letter Report entitled *Existing Timber Pile Evaluation*, January 13, 2021 (provided as Appendix G). The PanGeo report presents observations and an analysis of the existing pile conditions in three representative areas of the building, which include examples of existing single pile, double pile, and triple pile systems under the building. Figure 10 is the original piling installation plan from 1967, which shows a total of 174 piles in 148 locations under the building. According to the plan, there are 125 single piles, 20 sets of double piles, and 3 sets of triple piles in the indicated locations.

Investigation Findings – Existing Pile Conditions and Re-Use of Piles

The PanGeo report concludes that the piles in the 3 observed locations are in satisfactory structural condition and are representative of the complete pile system. PanGeo reports that pile conditions are appropriate to allow repurposing of the existing piles to support the floor slab of the new proposed building that will be developed for the north part of the Property. The PanGeo report presents methods and means for the re-use of the existing piles to serve as the primary structural support for the new building. The structural design for re-use of existing piles is presented as the piling plan, prepared by CPL as Figure S2.01 - Piling Plan, provided as UEP Figure 13. The CPL figure shows the existing pile system

plan with an overlay of the proposed new building. Detailed call outs on the CPL plan present a photo of one of the exposed piles at PanGeo location Pile 109 (Test Pit 3), and schematic sections of the existing pile attachments, and cross-sections 1 and 2 on Figure 13, to show the construction methods planned for pile re-use. The CPL figure notes some new areas of the planned development that are outside of the present footprint of the Safeway building, and indicates these areas will receive suitable ground improvement methods to support the slab-on-grade floor structure.

Investigation Findings – Soil

- The soil sample collected in the UEP test pit at a distance of 3-inches away from a pile contained concentrations of PAHs in excess of the MTCA Method A Cleanup Level as shown on Figure 9.
- The soil samples collected 6- and 12-inches away from a pile contained detectable concentrations of PAHs, however the calculated toxicity equivalency concentrations were below the MTCA Method A Cleanup Level.
- The soil sample collected at the approximate central location between two pile systems (6 feet) did not contain detectable concentrations of PAHs.
- The soil samples collected from borings UB32 and UB33 between 2 and 18 feet bgs did not contain detectable concentrations of PAHs.

Investigation Findings – Groundwater

- The groundwater samples collected from MW32 and MW33 did not contain detectable concentrations of any PAHs (Table 9).

The results of this series of investigations have confirmed that the wood pilings were treated with creosote, and that PAHs from the creosote exceed the MTCA Method A soil cleanup level in a “halo” of soil impact in soil immediately adjacent to each treated pile. However, the migration of PAHs from the creosote treated piles is limited to soil within 3- to 6-inches from each of the piles. Moreover, data results from the groundwater sampling in MW32 and MW33 show that the presence of the treated piles is not a threat to groundwater quality. As discussed in subsequent sections, these wells were sampled on a quarterly basis for 1 year, and have shown no detectable concentrations of PAHs over that time.

It was concluded from the PanGeo timber pile evaluation that the piles can be repurposed to support the new building floor slab by having the top of each existing pile system cast directly into the new concrete slab. A pile re-use plan prepared by CPL (Figure 13), presents the construction methods for repurposing the existing pile system to serve as the foundation and structural support of the planned concrete slab floor for the future development building.

2.5.14 Urban Environmental Partners – Subsurface Investigation, 2020

In May of 2020, UEP conducted a focused subsurface investigation to validate data previously collected at the Site. Specifically, UEP suspected that the lab results for previous soil samples collected from borings UB12 and UB13 at depths of 37 and 43 feet bgs, respectively, were anomalous data. These 2 samples were collected from points within the upper edge of the consolidated glacial till layer beneath the Site, which has been shown in other Site areas to retard the transmission of contaminants. These 2 deeper soil samples (UB12-37' and UB13-43') were analyzed by a mobile laboratory, and the reported concentrations were suspected to result from gas chromatograph "column bleed" from previous high PCE concentrations from "hot" samples analyzed in a lab sequence ahead of these 2 borings/samples. Also, it was considered possible that the anomalous results may have been a result of potential contaminant drag down from the hollow stem auger drilling methodology that was used.

The focused investigation consisted of the advancement of 2 borings (UB30 and UB31) using sonic drilling technology, which allowed for a detailed and continuous soil core to allow observation of the complete lithology to the maximum depth explored. UB30 was positioned in a downgradient position close to the source area, while UB31 was positioned directly between UB12 and UB13, where the suspected samples with anomalous data were collected. Numerous discrete soil samples from UB30 (10 samples) and UB31 (8 samples) were collected in these sonic borings from depths between 12 and 43 feet bgs, targeting each specific geologic feature that was encountered.

Both borings were completed as 2-inch diameter groundwater monitoring wells, and the wells UB30/MW30 through UB31/MW31 were sampled in accordance with ASTM low flow methodology. Monitoring well construction details are summarized on Table 7.

Select soil and groundwater samples were analyzed for CVOCs by EPA Method 8260C.

<u>Investigation Findings – Soil</u>

- Fill was encountered in UB30 to a depth of approximately 17 feet bgs. The soil identified below the fill consisted primarily of a dense Recessional Lacustrine clay with intermixed fine sand to approximately 30 feet bgs, underlain by a medium to coarse Recessional Outwash sand to a depth of approximately 36 feet bgs. Dense glacially consolidated silt and clay was encountered between approximately 36 feet and the maximum depth explored of 40 feet bgs, with results as follows:
    - Soil samples from UB30 collected from within the Recessional Lacustrine clay did not contain detectable concentrations of CVOCs.

- Soil samples collected from within the medium coarse Recessional Outwash sand between 30 and 35 feet contained concentrations of PCE and/or TCE above their respective MTCA CULs.
- Two successive soil samples collected from within the glacially consolidated silt and clay below 35 feet contained concentrations of CVOCs below their laboratory reporting limit and/or MTCA CUL.

- Fill was encountered in UB31 to a depth of approximately 12 feet bgs. The soil identified below the fill consisted primarily of a dense Recessional Lacustrine clay to approximately 24 feet bgs, underlain by discontinuous layers of sand and sandy silt to a depth of approximately 30 feet bgs. Dense glacially consolidated silt and clay was encountered between approximately 30 feet and the maximum depth explored of 45 feet bgs with results as follows:
  - Soil samples collected from UB31 within the discontinuous layers of sand and sandy silt between 24 and 28 feet bgs contained concentrations of PCE and TCE above their respective MTCA CULs.
  - Numerous (5) soil samples collected from within the glacially consolidated silt and clay below 30 feet bgs did not contain detectable concentrations of CVOCs.

These results for the soil analysis in the targeted lithologies support the conclusion that the mobile laboratory data for samples collected from UB12 and UB13, within the glacially consolidated silt and clay, were anomalous and likely the result of laboratory error.

The data results from sonic borings UB30 and UB31 for the soil in various depths at these locations are also consistent with the previous understanding of Site geology and contaminant migration pathways, discussed in Section 3.4.

Investigation Findings – Groundwater

- As expected in the source area, the groundwater samples collected from MW30 and MW31 contained elevated concentrations of PCE, TCE, cis-1,2-DCE, and VC in excess of their respective MTCA CULs.

2.5.15 Urban Environmental Partners – ORPH Investigation, 2020

On June 3, 2020, UEP oversaw the advancement of two borings (UB34 and UB35) using direct push drilling technology at locations shown on Figure 3 near and downgradient from boring TB05, where ORPH was previously detected at concentrations exceeding the MTCA Method A Cleanup Level. The purpose of these borings was to confirm that the ORPH detection was due to variable fill material

(possible asphalt) and was not the result of a point source release. Soil samples were collected between approximately 3 feet and 14 feet bgs.

Groundwater was encountered in both borings at approximately 5 feet bgs was sampled in accordance with the EPA 2005 publication Groundwater Sampling and Monitoring with Direct Push Technologies.

Soil and groundwater samples were analyzed for DRPH and ORPH by Northwest Method NWTPH-Dx.

Investigation Findings - Soil

- As shown by data results on Table 2, none of the soil samples from around boring TB05 contained concentrations of DRPH or ORPH.

Investigation Findings – Groundwater

- The groundwater sample collected from boring UB34 contained a concentration of DRPH well below the MTCA Method A Cleanup Level, however this result was flagged by the laboratory for not resembling the fuel standard used for quantitation. It is possible this result is due to organic interference.
- The groundwater sample collected from UB35 did not contain detectable concentrations of DRPH or ORPH (Table 6).

The results of this investigation confirm that the ORPH detection in TB05 was the result of variable fill material, likely inclusive of asphalt debris. Based on these findings, this area does not appear to warrant further investigation or remedial action.

2.5.16 Urban Environmental Partners – Groundwater Sampling Event, August 2020

In August of 2020, UEP resampled all existing monitoring wells on Site (MW01 through MW18, MW20 through MW26, and MW30 through MW31) to assess current groundwater conditions. Samples were collected in accordance with ASTM low flow methodology and were analyzed for CVOCs by EPA Method 8260C.

Duplicate samples were also collected in several wells utilizing Passive Diffusion Bags (PDBs). PDBs are polyethylene tubes filled with analyte-free water, hung inside the monitoring wells for a period of at least 14-days to equilibrate with the surrounding groundwater conditions. These samples were collected to evaluate sample concentrations variation using this methodology and may be considered for future compliance sampling events. These samples were labeled with “PDB” or “DB” as shown on Table 5.

Investigation Findings - Groundwater

- The groundwater samples collected from MW01, MW05, MW08, MW12, MW13, MW25 and MW31 contained concentrations of CVOCs well in excess of their respective MTCA CULs. The concentrations in these wells have generally been the highest detected on Site and represent conditions within the primary source area of the release.
- The groundwater samples collected from MW02, MW06, MW09, MW17, MW18, and MW26 contained CVOC concentrations above their MTCA CULs, although the concentrations were much lower than those seen within the primary source area. This data is generally consistent with previous sampling events and represents conditions on the leading edges of the contaminant plume.
- The groundwater samples collected from MW03, MW04, MW07, MW10, MW11, MW14, MW15, and MW20 through MW24 did not contain detectable concentrations of CVOCs, or contained concentrations below their respective MTCA CULs. This data is generally consistent with previous sampling events and defines the extent of the Site.

2.6 Subsurface Conditions

Subsurface conditions have been evaluated at the Site through interpretation of soil characteristics, and observation of groundwater levels in monitoring wells that have been installed. This data and associated interpretation provide the basis for understanding the distribution and movement of the contamination at the Site. Additionally, the Seattle Geologic Map (Troost, K.G., Booth, D.B., Wisher, A.P., and Shimel, S.A., 2005) was referenced and provides a basis for understanding the off-Site movement of groundwater.

It should be noted that, historically, a glacial stream previously ran through the Site, as indicated on the 1908 topographic map of Seattle (U.S. Geological Survery, 1955). The stream pathway meandered from north to south/southeast, eventually turning to the east near the existing Rainier Playfield and discharging to Wetmore Slough. The Wetmore Slough at the time extended southward in what is now Genesee Park and Playfields, before being filled.

2.6.1 Soil Conditions

The Seattle Geologic Map indicates the Site is underlain by fill over Recessional Lacustrine soil. Based on the Site explorations, the fill consists of a highly variable mixture of gravel, sand, clay, and silt; and wood and concrete debris have been observed in places. The thickness of the fill ranges from approximately 8 to 17 feet bgs.

Underlying the fill in some explorations, an organic-rich silty sand to sandy silt was observed, generally less than 1-foot thick. This soil is likely a recent wetland deposit associated with the former stream.

The fill and wetland deposit are underlain by Recessional Lacustrine soil. The Recessional Lacustrine soil consists of mostly a silty clay although in some areas silt is the predominate soil type. In several explorations the clay was relatively plastic. Reddish brown mottling was observed in the upper portions of the deposit, likely as a result of iron oxide staining, which indicates the movement of water through the soil. The Recessional Lacustrine deposit ranges in thickness from approximately 10 to 20 feet.

In the central portion of the PCE impacted area, a sand layer with varying amounts of silt and occasional gravel is present below the Recessional Lacustrine deposit, and likely represents Recessional Outwash. The Recessional Outwash forms a channel-like structure running from northwest to southeast as shown on Figure 14. Also shown on Figure 14, the sand channel thickens from just a couple of feet in the northwest to approximately 15 feet to the southeast, with a decrease in the silt content to the southwest area of the Site.

Underlying the Recessional deposits are glacially consolidated soils. Based on the Seattle Geologic Map and our experience in the Seattle area, these soils are likely Pre-Vashon in age. In general, these soils consist of clay and silt, with some of the silt deposits exhibiting a till-like texture. These deposits are hard to very hard.

Although it was not observed on the Site, the Seattle Geologic Map shows a bedrock outcropping approximately 2 blocks south of the Site roughly parallel to South Alaska Street.

2.6.2 Groundwater Conditions

The depth to groundwater was measured in each of the Site monitoring wells and, the depth to groundwater ranges from approximately 6 to 15 feet bgs. The depth to water measurements were converted to elevations based on the recent survey of the wells. Groundwater elevations range from approximately 32 to 37 feet AMSL across the Site.

The groundwater elevations were contoured to identify groundwater flow patterns using data collected on April 14, 2020, as shown on Figure 15. The groundwater contours indicate that groundwater flows toward the primary area of soil contamination at the Site, then flows to the southeast toward monitoring well MW20. This flow pattern is a function of the sand channel observed at the Site, which provides a lower resistance to flow than the clay and silt, and serves as a preferential pathway for groundwater flow.

The hydraulic gradient across the Site ranges from approximately 0.1 feet per foot between monitoring wells MW05 and MW12 to 0.005 feet per foot between monitoring wells MW10 and MW20. These

gradients are consistent with the soil conditions at the Site, with higher resistance to flow within the silt and clay resulting in higher gradients, and lower hydraulic gradients within the sand channel.

2.6.3 Hydraulic Conductivity

Slug tests were performed in monitoring wells MW09, MW16, MW18, MW25, and MW26 on April 30 and May 1, 2020. The results of the slug testing can be used to provide a basis for estimating the hydraulic conductivity of the soil to support remedial evaluation. Additionally, the slug testing provided a method for understanding the presence of the sand layer in several wells where the sampling interval during drilling may have missed the sand.

A slug test involves displacement of water within the well and is accomplished by dropping a sealed, sand-filled PVC pipe in to the well. Introduction of the pipe causes water to rise in the well via displacement, and then fall back down to the static (original) water level; this is called the “falling head” portion of the test. Once the water level has recovered to the static level, the PVC pipe is removed, causing the water level to drop in the well and again rise to the static level; this is called the “rising head” portion of the test. Prior to each test, the static water level was checked using a water level tape. Recovery of water level back to static was measured using a pressure transducer/datalogger system set to collect water level on a 1-second interval. Following testing, the data was downloaded to a spreadsheet for evaluation. Graphs 2 through 6 presented after the report tables show the test data for each of the wells. Depending on the rate of recovery, one to three series of tests were performed in each well.

The slug test data was analyzed using the Bouwer and Rice method (Bouwer, H., and Rice, R.C., 1976) and Bouwer (Bouwer 1989). Although the Bouwer and Rice method was developed for use when testing unconfined aquifers, the method can be used for confined aquifers as indicated in Bouwer (Bouwer 1989) and has been used successfully for numerous slug tests performed in the Seattle area.

Monitoring wells that were known to be screened within the Recessional Outwash unit (MW09, MW25, and MW26) produced mean hydraulic conductivity values ranging from 0.0008 to 0.0018. While those that appear to be screened within the Recessional Lacustrine unit (MW16 and MW18) produced slow recovery and low mean hydraulic conductivity values between 0.00019 and 0.000024, which indicate that the sand layer is likely not present in this area, or is relatively thin at these locations. This data is consistent with the relatively low levels of contamination in groundwater in MW16 and MW18 when compared to other wells on Site.

3.0 Conceptual Site Model

This report section presents a conceptual understanding of the Site and identifies potential or suspected sources of hazardous substances, types and concentrations of hazardous substances, potentially contaminated media, potential exposure pathways and receptors, and contaminant fate and transport. The conceptual site model (CSM) is presented graphically on Figure 16 to show these issues for the Property.

3.1 Confirmed and Suspected Source Areas

The results of the RI indicate that the CVOC impacts confirmed in soil and groundwater beneath the Site are the result of dry-cleaning operations between approximately 1930 and 1968 from facilities that existed on the southwest corner of the Property. A minor surficial release may have also occurred near the northern dry-cleaning operation, but this area has been shown to have minimal impacts in shallow soil, and does not appear to represent a significant source at the Site.

No ongoing chlorinated solvent releases from the former dry cleaner(s) are now occurring at the Site. The highest soil and groundwater concentrations show the source area to be proximate to the vicinity of the locations of MW01, MW05, MW13, MW25, MW30, and MW31. The contaminated soil in this area continues to act as a secondary source to soil vapor and groundwater.

A second impacted area of the Site has been identified in association with treated wood piles that presently support the former Safeway building on the north half of the Property. As shown on Figure 9, the presence of PAH compounds above cleanup levels was confirmed in soil very close to each treated pile. The groundwater tests from monitoring wells (MW32 and MW33) downgradient from the pile system under the building provide empirical evidence that groundwater is not impacted by the presence of the treated piles.

3.2 Contaminants of Concern

Based on the results of the RI, the COCs for the southern portion of the Site include PCE, TCE, cis-1,2-DCE, trans-1,2-DCE, 1,1-DCE, and VC from the historic dry cleaner operations. PAHs in soil directly adjacent to the creosote treated piles were also identified as a COC in the northern portion of the Site.

3.3 Media of Concern

Based on the results of the RI, soil and groundwater are the confirmed media of concern for the Site.

Soil vapor will be retained as a media of concern for future on-Site structures based on CVOC concentrations detected in shallow groundwater that exceed the MTCA Method B Groundwater

Screening Level for indoor air risks associated with potential vapor intrusion; however, as discussed in Section 2.5.12, soil gas/vapor sampling results have not indicated an elevated risk for vapor intrusion for current on-Property structures.

3.4 Distribution of Contamination in Soil

CVOC concentrations in soil were identified in two areas: a) the primary source area, which contains concentrations ranging from 0.049 mg/kg to 510 mg/kg and may support some, but limited areas of residual PCE in soil, which could be contributing to groundwater impacts; and b) the leading plume edge that contains detectable PCE concentrations in saturated soil ranging from 0.027 mg/kg to 2.2 mg/kg which is likely more representative of impacted groundwater coming into contact with the soil. This soil area is not considered a continued source of groundwater impacts.

The lateral extent of CVOC soil contamination within the source area is limited to the southwestern corner of the Property, within the parcel boundaries (Figure 4). The northern limit is defined by the absence of impacts in borings B-6, B-8, B07, B08, and UB17; the eastern limit is defined by the absence of impacts in borings B09, UB18, and UB19; the southern limit is defined by the absence of impacts in borings SB05, TB07, B-2, and B13; and the western limit is defined by the absence of impacts in the angle borings B12 and B16 at locations beneath the western adjacent ROW. It should be noted that shallow soil samples, between approximately 0 and 16 feet bgs beneath the western adjacent ROW could not be collected due to the presence of multiple utilities.

The lateral extent of CVOC soil contamination within the leading plume edge is limited to the southcentral portion of the Property, the southern adjacent ROW, and the northern portion of the south adjacent property. These impacts are bounded laterally by the lack of soil contamination within the saturated Recessional Outwash sand in borings UB21 through UB23 (Figure 4).

The vertical extent of CVOC soil contamination within the source area ranges from approximately 10 feet bgs to approximately 35 feet bgs, while the vertical extent of soil contamination within the leading plume edge ranges from approximately 25 to 35 feet bgs within the saturated Recessional Outwash sand. The vertical extents in both zones are limited by the presence of glacially consolidated silt and clay consistently encountered around 35 to 40 feet bgs (Figures 17 through 20).

The lateral extent of PAH soil contamination associated with the creosote treated pile assemblage is limited to approximately 3 inches from the surface of each pile, with the vertical extent limited to the depth of the piles.

3.5 Distribution of Contamination in Groundwater

The lateral extent of groundwater contamination at the Site is limited to the southwestern portion of the Property, extending south beneath the adjacent ROW to the northern portion of the south adjacent property.

The northern plume boundary is defined by the absence of impacts in monitoring well MW03; the eastern leading plume edge is represented by the slight concentrations detected in MW02; the southeastern plume boundary is defined by the absence of impacts in monitoring well MW24, and the southern plume boundary is defined by the absence of impacts in monitoring wells MW21 through MW23 (Figure 5). The most recent groundwater sampling events have not detected CVOC concentrations in monitoring wells MW10 or MW20, indicating the groundwater plume may not extend far beyond the southern Property boundary, however this Site area will be considered impacted until four consecutive quarters of compliant groundwater data can be obtained.

The western plume boundary had previously been defined by the absence of CVOC contamination in the groundwater collected from MW06 and MW07. However, CVOC concentrations were recently detected in MW06 during the March 12, 2020 sampling event; the groundwater collected from MW07 contained non-detectable concentrations of CVOCs, consistent with previous sampling results. Access limitations due to utilities within the ROW of Rainier Avenue South prohibit the collection of more meaningful data (Figure 5) further to the west of MW06. Based on our understanding of the CSM, the contaminant transport mechanisms at the Site (fill depth, groundwater gradient and flow direction) do not support a westerly migration and distribution of contaminants, therefore MW06 will be proposed as the western point of compliance in combination with monitoring of vapors in the adjacent sewer main. The minor PCE concentrations recently shown in groundwater in this area will be treated by the selected remedial approach for the Site.

3.6 Contaminant Fate and Transport

3.6.1 Chlorinated Solvents

The understanding of the CVOC transport at the Site is based on soil and groundwater conditions observed as part of the exploration program and the distribution of contamination in the subsurface. Contamination appears to have moved through the fill material to the top of the native soil, which generally consists of silt and clay, then contamination has generally migrated from west to east on top of this confining layer.

Over time, the chlorinated solvents have migrated downward through the upper native silt and clay into variable lenses of sand. These sand layers have been shown to be less continuous within the source area, and then are more continuous to the south and east. In a number of explorations, the sand lens is

observed at a depth ranging from approximately 20 to 35 bgs as shown on Figure 14. This sand channel provides a pathway for contaminants in groundwater to migrate vertically downward, and downgradient to the southeast from the major area of soil contamination.

The sand channel is underlain by dense, hard glacially-consolidated till and fine-grained soil. These soils have a low hydraulic conductivity and serve to reduce the downward migration of contamination. In our opinion, the glacially consolidated soils served as the downward limit of Site contamination.

The downgradient extent of groundwater contamination is generally the south edge of the Property at the South Genesee Street boundary based on the most recent groundwater sampling data (monitoring wells MW10, MW11, and MW20).

The general absence of off- groundwater contamination (with the exception of very low levels within and across South Genesee Street) is attributed to anaerobic degradation that is occurring at the dissolved phase plume edge. Once PCE enters the subsurface, chemical processes such as hydrolysis, direct mineralization, and/or reductive dehalogenation by endemic bacteria facilitates a natural reduction or breakdown of the PCE into non-hazardous components. Biological attenuation processes such as reductive dechlorination and cometabolic degradation may also affect the reduction of PCE under conducive subsurface conditions. As reductive biodegradation of PCE occurs, we find the PCE degradation compounds in the plume to include TCE, cis-1,2-DCE, trans-1,2-DCE, and VC. In most of the monitoring wells where PCE has been detected in groundwater at the Site, these degradation products are present, including TCE, cis-1,2-DCE, and VC, demonstrating the biological degradation and possibly chemical attenuation processes are occurring at the Site. This process is most evident in the samples collected from monitoring wells MW01, MW05, MW09, MW12, MW13, MW16, MW18, MW25, MW26, MW30, and MW31, which all show the presence of these degradation compounds.

In addition, during the August 2020 groundwater sampling event, the average dissolved oxygen (DO) and oxidation-reduction potential (ORP) values within the primary area of groundwater contamination were approximately 0.57 mg/l and -8.2 millivolts (mV), respectively, as shown by data presented in Table 10). These values for these groundwater parameters indicate that there is anaerobic biological activity occurring. According to United States Geological Survey (USGS) Scientific Investigations Report 2006-5030, dissolved-oxygen concentrations greater than 1 mg/L generally indicate aerobic conditions and concentrations less than 1 mg/L indicate one of the anaerobic conditions. Regarding the ORP values, a positive value is representative of an oxidized state and a negative value indicates a reduced state.

3.6.2 Evaluation of Empirical Data for PAHs Associated with Treated Wood Piles

Under Washington Administrative Code (WAC) 173-340-747(9), Ecology allows for empirical demonstrations to show that minor cleanup level exceedances in soil have not, and will not, cause an exceedance of applicable groundwater cleanup levels and that no exposure scenarios are represented by the environmental conditions on the Property. WAC 173-340-747(9) states the following:

(b) **Requirements**. To demonstrate empirically that measured soil concentrations will not cause an exceedance of the applicable ground water cleanup levels established under WAC 173-340-720, the following shall be demonstrated:

(i) The measured ground water concentration is less than or equal to the applicable ground water cleanup level established under WAC 1733-340-720; and

(ii) The measured soil concentration will not cause an exceedance of the applicable ground water cleanup level established under WAC 173-340-720 at any time in the future. Specifically, it must be demonstrated that a sufficient amount of time has elapsed for migration of hazardous substances from soil into ground water to occur and that the characteristics of the site (e.g., depth to ground water and infiltration) are representative of future site conditions. This demonstration may also include a measurement or calculation of the attenuating capacity of soil between the source of the hazardous substance and the ground water table using site-specific data.

(c) **Evaluation criteria**. Empirical demonstrations shall be based on methods approved by the department. Those methods shall comply with WAC-173-340-702(14), (15), and (16).

As presented in Section 2.5.13 and on Figure 9, the PAH impacts in soil associated with the treated piles are present above CULs within a limited 3-inch radius around each timber pile. However, the Site meets the empirical demonstration requirements stated above from WAC 173-340-747(9). The limited PAH-impacted soil that is present immediately adjacent to the piles has not and will not cause exceedances of the applicable groundwater cleanup levels. This scenario is shown based on the following conditions:

- Soil samples and multiple groundwater samples collected from UB32/MW32 and UB33/MW33 installed in the downgradient direction from the treated pile assemblage, have not exhibited detectable concentrations of PAHs. To date, four consecutive quarterly groundwater samples have been collected from MW32 and MW33 (Table 9). These compliant soil and groundwater results for properly placed monitoring wells indicate that soil impacts associated with the creosote-treated timber piles beneath the existing building have not leached and have not caused exceedances of applicable groundwater cleanup levels.

- Since the 1968 construction of the retail structure, the Property has remained developed with the existing building encompassing a treated wood pile foundation. Property conditions have been consistent over that time, therefore the creosote-treated wood timber piles have been in place for over 52 years. This period is a sufficient amount of time for the PAHs present in soil to have leached into groundwater, however the data collected from monitoring wells MW32 and MW33 show that leaching has not occurred at the Site, and is not likely to occur in the future.

Based on these results, the soil to groundwater pathway is incomplete and human exposure scenarios can be managed through targeted remediation efforts and implementation of engineering and institutional controls where appropriate.

3.7 Exposure Pathways

This section discusses the confirmed and potential human health and ecological exposure pathways at the Site.

3.7.1 Soil Pathway

Potential exposure pathways for soil contamination include volatilization into soil vapor and subsequent exposure through the vapor pathway discussed below, or via the direct contact pathway, which comprises direct contact via dermal contact with and/or ingestion of soil beneath the Site.

Contamination at the Site is currently capped with asphalt or concrete. Until such time that the soil contamination is removed, remediated, or institutional controls are in place to prevent direct contact, this pathway will be considered complete.

3.7.2 Groundwater Pathway

Potential exposure pathways for groundwater contamination include volatilization into soil vapor and subsequent exposure through the vapor pathway discussed below, or via the direct contact pathway, which comprises both the dermal contact and ingestion pathways.

Dermal contact scenarios could include construction workers encountering shallow seated groundwater during remediation or utility work, therefore this exposure pathway will remain complete until contamination is remediated or institutional controls are in place to prevent direct contact.

Based on the groundwater use assessment discussed in Section 2.4.2, the risk of ingestion of contaminated groundwater at the Site is low, however it could be argued that this aquifer represents a potential future source of drinking water and cannot be deemed non-potable based on current conditions. Therefore, this exposure pathway will remain complete until contamination is remediated or institutional controls are in place to prevent potable groundwater classification and use.

3.7.3 Vapor Pathway

The air-filled pore space between soil grains in the unsaturated zone is referred to as soil gas or soil vapor. Soil vapor can become contaminated from the volatilization of contaminants adsorbed to soil mineral surfaces and/or dissolved in groundwater and can pose a human exposure risk via inhalation.

The CVOC concentrations detected in shallow groundwater exceed the MTCA Method B Groundwater Screening Level (SL) for indoor air risks associated with potential vapor intrusion through typical off-gassing, in addition to vapor transport within utility lines such as the adjacent sewer main. Therefore, this pathway will remain complete until soil and groundwater contamination no longer present a threat of volatilization or engineering controls are in place to prevent exposure.

Soil gas samples previously collected adjacent to the existing structure and within the sewer main are too far from the primary source area to be representative of conditions in that area, where future structures may be erected.

3.8 Terrestrial Ecological Evaluation

The Terrestrial Ecological Evaluation (TEE) is required by WAC 173-340-7940 at locations where a release of a hazardous substance to soil has occurred. The regulation requires that one of the following actions be taken to assess potential risk to plants and animals that live entirely or primarily on affected land:

- Documenting a TEE exclusion using the criteria presented in WAC 173-340-7491;
- Conducting a simplified TEE in accordance with WAC 173-340-7492; or,
- Conducting a site-specific TEE in accordance with WAC 173-340-7493.

The Site appears to qualify for a TEE exclusion given that there is less than 1.5 acres of contiguous undeveloped land on or within 500 feet of the Site and none of the following chemicals are present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

4.0 Feasibility Study

This section describes the development and evaluation of cleanup action alternatives to facilitate selection of a remedy for the Site using MTCA evaluation criteria.

4.1 Remedial Action Objectives

Remedial action objectives (RAOs) are statements of the goals that a remedial alternative should achieve in order to be retained for further consideration as part of this FS. The MTCA regulation, WAC 173-340-360(2)(a) provides that a cleanup action must include the following threshold remedial action objectives (RAOs):

- Protect human health and the environment;
- Comply with cleanup standards outlined in WAC 173-340-700 through 173-340-760;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring outlined in WAC 173-340-410.

MTCA (173-340-360(2)(b) also requires that the cleanup alternative:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns on the proposed cleanup action alternative.

The overall RAO for the Site is to address impacted subsurface soil and groundwater that represent potentially complete contaminant exposure pathways identified in the CSM above and as shown on Figure 16. Due to planned residential uses, the Site is to be compliant with unrestricted land use requirements, therefore, the cleanup objectives for the Site will address the following potential exposure pathways for current and future site uses:

- Direct contact with contaminated soil in the saturated and unsaturated zones;
- Groundwater for drinking water use; and,
- Soil gas (from impacted groundwater and soil) and vapor intrusion to indoor air.

Specific RAOs are also discussed within the remedial alternative assessment for the CVOC release(s) in Section 4.8.

4.2 Applicable or Relevant and Appropriate Requirements

Applicable or Relevant and Appropriate Requirements (ARARs) were screened to assess their applicability to the Site. Only those that were deemed appropriate and applicable were retained, those include:

- State Environmental Policy Act (Chapter 43.21C of the Revised Code of Washington [RCW 43.21C])
- Washington State Shoreline Management Act (RCW 90.58; WAC 173-18, 173- 22, and 173-27)
- The Clean Water Act (33 United States Code [USC] 1251 et seq.)
- CERCLA of 1980 (42 USC 9601 et seq. and Part 300 of Title 40 of the Code of Federal Regulations [40 CFR 300])
- The Fish and Wildlife Coordination Act
- Endangered Species Act (16 USC 1531 et seq.; 50 CFR 17, 225, and 402)
- Native American Graves Protection and Repatriation Act (25 USC 3001 through 3013; 43 CFR 10) and Washington's Indian Graves and Records Law (RCW27.44)
- Archaeological Resources Protection Act (16 USC 470aa et seq.; 43 CFR 7)
- Washington Dangerous Waste Regulations (WAC 173-303)
- Solid Waste Management Act (RCW 70.95; WAC 173-304 and 173-351)
- Air Quality Regulations (Puget Sound Clean Air Agency, Regulation I, II and III)
- Water Quality Standards for Surface Waters of the State of Washington (RCW 90.48 and 90.54; WAC 173-201A)
- Department of Transportation Hazardous Materials Regulations (40 CFR Parts 100 through 185)
- General Occupational Health Standards (Chapter 296-62 WAC)
- Washington State Water Well Construction Act (RCW 18.104; WAC 173-160)
- City of Seattle and King County regulations, codes, and standards

4.3 Proposed Cleanup Levels

4.3.1 Soil Cleanup Levels

Cleanup levels for soil are based on MTCA Method A levels for Unrestricted Land Use or the most conservative Method B calculated values. Two potential cleanup levels were compared, one for the direct contact pathway and one for protection of groundwater for drinking water beneficial use (soil leaching). The more restrictive of the two criteria was chosen, and is proposed as the Site cleanup level. Cleanup levels calculated for protection of groundwater as drinking water are also assumed to be

protective of the vapor pathway. Proposed cleanup levels for COCs in soil at the Site are presented in the table below, and also shown on attached Tables 1 and 4 with the cumulative soil sample data.

Contaminant of Concern	MTCA Method A or B Cleanup Level (mg/kg)	Sources
PCE	0.05	MTCA Method A Soil Cleanup Levels for Unrestricted Land Use; WAC 173-340-740(2)(b)(i); Table 740-1; and Method B – CLARC (2021)
TCE	0.03	
cis-1,2-DCE	160	
trans-1,2-DCE	1,600	
1,1-DCE	4000	
VC	0.67	
PAHs	0.1*	

*Total concentrations that all carcinogenic PAHs (cPAHs) must meet using the toxicity equivalency methodology.

4.3.2 Groundwater Cleanup Levels

Cleanup levels for groundwater are based on MTCA Method A Cleanup Levels (if established) or MTCA Method B Cleanup Levels (for drinking water use). Proposed cleanup levels for COCs in groundwater at the Site are presented in the table below, and are also shown on attached Tables 5, 6, and 9 with the cumulative Site groundwater data.

Contaminant of Concern	MTCA Method A or B Cleanup Level (ug/L)	Sources
PCE	5.0	MTCA Method A Groundwater Cleanup Levels for Unrestricted Land Use; WAC 173-340-740(2)(b)(i); Table 720-1; and Method B – CLARC (2021)
TCE	5.0	
cis-1,2-DCE	16.0	
trans-1,2-DCE	160.0	
1,1-DCE	400.0	
VC	0.2	
PAHs	0.1*	

*Total concentrations that all cPAHs must meet using the toxicity equivalency methodology.

4.3.3 Soil Vapor Screening Levels

Soil vapor screening levels are based on MTCA Method B calculated values considered protective of indoor air. These values are presented on Table 8 and vary based on the depth at which the vapor sample is collected.

4.4 Points of Compliance

The point of compliance is the location where the cleanup level shall be attained.

4.4.1 Point of Compliance for Soil

The standard point of compliance (POC) for direct contact is throughout the Site, from ground surface to 15 feet bgs. This is the soil depth at which one would reasonably assume workers could encounter contaminated soil during construction or development activities. In situations where achieving the standard POC is not practicable, a conditional POC may be established and institutional controls implemented to prevent direct contact and protect human health and the environment.

UEP proposes a standard POC for CVOC contamination in soil in the southern portion of the Site and a conditional POC for the PAH contaminated soil adjacent to the treated wood piles beneath the existing retail structure on the north end of the Property. The conditional POC for the PAHs was deemed necessary based on the focused feasibility analysis discussed in Section 4.5 below.

4.4.2 Point of Compliance for Groundwater

The standard point of compliance (POC) for groundwater is throughout the Site from the uppermost saturated zone extending vertically to the lowest depth which could potentially be affected by the release at the Site. In situations where achieving the standard POC is not practicable, a conditional point of compliance (CPOC) may be established and institutional controls implemented to prevent direct contact and protect human health and the environment. No CPOCs are proposed for groundwater at the Site. UEP proposes a standard POC for groundwater at the Site.

4.4.3 Point of Compliance for Soil Vapor

The point of compliance for soil vapor in throughout the Site and will be achieved when concentrations of COCs in soil gas and groundwater are below the vapor intrusion screening levels considered protective of indoor air, or when engineering controls are in place to prevent exposure.

4.5 Discussion on Creosote Treated Piles – Focused Feasibility Analysis

This focused feasibility analysis explores and compares three remedial alternatives (P1, P2 and P3) for addressing the soil contamination related to the presence of treated wood piles at the Site. The piling plan presented on Figure 10 shows the foundation system for the original construction of the Safeway building. This plan shows 3 sets of 3 piles, 20 sets of 2 piles, and 125 individual piles for a total of 148 pile systems, and a total of 174 individual piles beneath the original building.

Alternative P1 involves the full removal of all 174 existing piles and associated contaminated soil. Alternative P2 involves the removal of the top 4 feet from all 174 existing piles and associated

contaminated soil; this removal would also facilitate utility infrastructure installation for the proposed new building. Alternative P3 involves a strategy to repurpose the serviceable, existing wooden piles into the structural system for the slab-on-grade concrete floor of the planned new building on the north portion of the Property. For all 3 remedial alternatives, the existing building and floor slab would require demolition and removal to expose existing pile caps. Existing pile caps would be removed from the top of each pile, and the general area around the pile cap field would be scraped to remove surface dirt and impacted soil to expose the pile caps for inspection, and to allow survey (1 feet bgs). Based on inspection observations and as needed, additional soil may be removed to allow access to prepare deteriorated piles for removal or repair.

As described in Section 2.5.13, the development team and their structural and geotechnical engineers assessed the structural conditions of the existing pile system in representative areas within the vacant Safeway building. The assessment concluded that the piles were in a satisfactory structural condition, and the piles could be repurposed to support the new building floor slab by having the top of each existing pile system cast directly into the new concrete slab. As a result, this approach is presented as Alternative P3 for consideration.

4.5.1 Alternative P1 - Complete Removal of Piles and Surrounding Soil

This alternative serves as baseline and includes removal of the full pile sections and surrounding impacted soil within 6-inches of each pile or pile system.

As described above, this would require the demolition of the existing slab and pile caps, as well as removal of approximately 1 feet of soil throughout the pile field (approximately 2,000 tons).

After this site preparation, each pile would be extracted using a vibration hammer clamped to the pile, which will be vibrated out of the ground to full removal. Next a large diameter caisson pipe would be vibrated down around the pile extraction hole. As shown on the Figure 23 insets, a large diameter augur would advance through the caisson to remove the halo of impacted soil to a stockpile and then off-site to proper disposal (approximately 260 tons). The soil removal process by auger is facilitated by the caisson. After soil removal, the caisson would be slowly extracted by the vibration hammer as controlled density fill (CDF) is placed in the augured opening. The caisson controls sidewall caving in the saturated zone, and keeps the drilled pile hole open for complete filling to depth.

4.5.2 Alternative P2 - Removal of Piles to 4 Feet Below Grade Surface

This alternative includes removal of pile sections and contaminated soil within 6-inches of each pile or pile system to a depth of 4 feet bgs, to facilitate construction of sub-grade utilities below the planned new building floor slab.

This alternative would require similar site preparation described above.

After site preparation, the soil surrounding each pile would be excavated using conventional earthwork methods. The soil generation total for this work is estimated at 1,200 tons.

The piles would then be cut at 4-feet bgs and removed from the site.

Clean backfill material would be imported to the site and restored to original grade.

Since portions of the piles and associated contaminated soil would be left in place, engineering controls (mainly the installation of a concrete slab on grade) and institutional controls (environmental covenant) would be applied to prevent ecological receptors from direct contact and exposure from subsurface soil contamination.

4.5.3 Alternative P3 – Repurpose for Re-Use the Existing Pile for Structural Foundation of New Building Slab.

This alternative includes repurposing the existing pile structural support system for re-use as the foundation for a new slab-on-grade floor of the proposed development building on the north part of the Property.

The structural slab would be demolished and removed, and where deemed needed, the existing pile caps would also be removed. The exposed tops of the wood piles would be re-conditioned as needed, and the subgrade around each pile or pile system would be prepared in accordance with the geotechnical engineer's recommendations. The new slab-on-grade concrete floor would be reinforced with rebar to span between existing piles. In areas where existing piles are not present, or spread too far apart for the design load, then the pile system would be augmented with installation of new steel or concrete piles. When the structural system layout is fully prepared, then the new concrete slab would be poured in accordance with conventional means.

The piling plan in UEP Figure 13 from the project structural engineer shows the present pile layout and the planned integration methodology to support the new slab-on-grade floor. Additional analysis and details for construction methods are provided in the PanGeo Report (Appendix G) on the conditions and re-use of the existing piles.

Where piles and associated contaminated soil would be left in place, engineering controls (mainly the installation of a concrete slab on grade) and institutional controls (environmental covenant) would be applied to prevent ecological receptors from direct contact and exposure from subsurface soil contamination.

Any piles that would not serve a structural purpose would be fully removed along with the halo of contaminated soil. These areas would not be subject to engineering or institutional controls.

The development construction work on the Property is expected to proceed with 2 separately permitted and phased developments; the first one planned for the south portion of the Property, and followed by development of the north portion. There is an approved plan to separate the Property into 2 new, legal parcels with a Lot Boundary Adjustment (LBA) as shown on Figure 21A. This planned LBA division will create a Parcel A as a 43,754 square feet (SF) "North Parcel" as shown on Figure 21A. The remaining area of the Property will become a 67,589 SF Parcel B, as the South Parcel. The planned redevelopment uses of Parcel A (North Parcel) and Parcel B (South Parcel) are depicted on Figure 21B. Note on Figure 21B the location of the shared "drive aisle" between Parcel A and Parcel B that is intended to support access to parking for both the planned north and south developments.

The drive aisle is planned to be located on Parcel B as shown, and it contains 16 treated piles in locations shown on Figure 22. Given that these piles would not serve any structural purpose associated with the building on Parcel A, the 16 piles in the drive aisle will be removed, along with the halo of contaminated soil around each pile. Section 4.5.1 discussed the full pile removal methodology, which is also presented graphically on Figure 23.

After the former Safeway building and floor slab are demolished, but prior to pile extraction, the extent of PAH impacts in soil around the piles in the drive aisle will be confirmed by representative sampling using geoprobe borings as shown on Figures 22 and 23. At each proposed location for Borings UB43, UB44, and UB45 on the figures, a 2-inch soil core will be collected at a vertical distance of 5-feet bgs, and at a horizontal distance 6 inches away from the outer edge of the pile as illustrated on Figure 23. For example, if the pile is 2 feet (24") in diameter as illustrated, then the soil core will be collected at a distance of 18-inches to 20-inches from the center of the pile, placing the sample adjacent to the outside diameter of a 3-foot diameter caisson, and 6-inches away from the outer edge of the pile. The soil samples collected in this manner at UB43-45 will provide soil confirmation data for the removal of treated piles and impacted soil in the drive aisle area of the parcel.

4.5.4 Evaluation and Selection of Remedial Alternatives for Treated Piles and Associated Contaminated Soil

The feasibility level cost estimates for Alternatives P1, P2, and P3 are presented in Tables 11, 12, and 13, respectively. These remedial costs were obtained from the general contractor consulting with the developer, and from estimated (feasibility level) costs from their excavation subcontractors. Based on the primary MTCA feasibility selection criteria, the effectiveness and merit of each alternative, and the benefit to costs analysis is presented in the evaluation results for each of the 3 alternatives in Table 14.

Alternative P1 received the highest comparative benefit score due to the aggressiveness of the remedy; it is the most permanent, protective, and likely to achieve cleanup objectives without subjecting the Site

to any required controls. However, this alternative is by far the costliest due to the nature of the pile removal methodology, which is reflected in the alternative's benefit score per dollar spent.

Alternatives P2 and P3 received lower scores for permanence and consideration of public concerns since they involve leaving some or all of the treated piles and associated PAH-impacted soil in place, and will require an environmental covenant. These institutional controls are implemented to protect incidental human direct contact with cPAH contaminated soil, as well as ecological receptors.

The protectiveness scores for P2 and P3 were slightly lower than alternative P1, but not drastically so. Groundwater monitoring results indicate that there is no PAH contamination or impacts to groundwater. Therefore, the only complete exposure pathway associated with the treated piles is through human direct contact with PAH-impacted soil, which can be effectively mitigated.

Alternatives P1 and P2 require significant site work including drilling, excavation, handling, truck transport and/or disposal of contaminated soil with potential exposure scenarios for construction and landfill workers, consequently, these alternatives get slightly lower scores for manageability of short-term risk.

Alternative P3 is the most easily implemented choice, while Alternatives P2 and P3 are logistically challenging.

As shown on Tables 11, 12 and 14, the costs for an excavation remedy to remove all or portions of the piles and associated contaminated dirt range between $900,000 (Alternative P2-Removal to 4 feet bgs) and $3,400,000 (Alternative P1-Full Removal).

As shown on Table 13, the estimated cost for Alternative P3 is $800,000. This includes a significant amount allocated to the full removal of the 16 drive-isle piles that would not serve a structural purpose for the new building.

As shown in Table 14, the Comparative Benefit Scores (CBS) from the evaluation of the alternatives show a relatively close range between 6.7 and 8.7. However, there is a significant difference in the estimated costs for the alternatives, which is reflected in the Benefit per Dollar Spent ratio. With a benefit rate of 8.38 for Alternative P3, it is shown that re-use of the piles for structural purposes has the highest benefit per dollar score to the project while still providing an approach that is protective of human health and the environment.

The disproportionate costs comparison is presented graphically on the bottom portion of Table 14 to support the selection of Alternative 3 to address PAH contamination for the north portion of the Property.

An important footnote and detail to the benefits of Alternative P3 that are not accounted for in this FS analysis is that by repurposing the existing treated piles, the future development realizes a significant cost savings in the foundation work. If included, this extra benefit would have enhanced the feasibility evaluation outcome in Table 14 even more for the preferred Alternative P3 remedy.

The preferred treated pile Alternative P3 will be carried over for the FS analysis of the CVOC plume. Each of the 5 CVOC remediation alternatives assumes that treated pile Alternative P3 will be included. Consequently, the remedial costs for the pile re-use have not been calculated into the cleanup feasibility costs analysis for addressing the CVOC impacts at the southern portion of the Site.

4.6 Potential Remedial Technologies and Applicability for the CVOC Plume

There are a number of potentially applicable remedial technologies for addressing the remaining COCs in soil and groundwater at the South Parcel of the Site, including:

- Monitored Natural Attenuation;
- Soil Vapor Extraction;
- Air Sparging;
- Groundwater Pump and Treat;
- Dual-Phase (groundwater and soil gas) Extraction (DPE);
- In-Situ Permeable Reactive Barriers;
- In-Situ Thermal Treatment by Electrical Resistance Heating (ERH); and
- Soil Excavation and Off-site Disposal.

These technologies have been applied at sites with similar subsurface conditions and chemical occurrences. Detailed descriptions of these remedial technologies are presented below:

- **Monitored Natural Attenuation (MNA)**. Natural attenuation is “the demonstration that intrinsic degradation will reduce the concentrations of the contaminants before they pose unacceptable levels of risk to human health or the environment or exceed groundwater criteria at established points of compliance. Demonstration must be made using site data for CVOCs rate of degradation and migration across the Site. For the Site, groundwater monitoring data provides evidence that natural attenuation is occurring by reducing conditions (relatively low DO and ORP) and presence of degradation products (TCE, DCE and VC), but likely at a relatively slow rate. In order for MNA to be effective, the source area must be removed or eliminated.
- **Soil Vapor Extraction**. Soil vapor extraction (SVE) systems reduce concentrations of volatile constituents through direct extraction and through aerobic bio-stimulation of the saturated and

vadose zones. SVE systems are generally considered more effective for extraction of compounds with vapor pressures greater than 0.5 to 1 millimeters of mercury (mmHg) at 20 degrees Celsius, Henry's Law coefficient greater than 0.01, or boiling points below 250 to 300 degrees Celsius (Suthersan, 1999; EPA, 2004).

The primary remedial process of SVE at the Site is to recover soil gas from vadose zone soil that has been stripped from groundwater using air sparging or volatized through subsurface heating and extraction of the CVOCs from the vadose zone. Case studies have shown that SVE is an effective treatment technology for former dry cleaner sites contaminated with a number of CVOCs.

- **Air Sparging**. Air sparging is the process of injecting air directly into the Site's CVOC contaminated groundwater. Air sparging removes volatile organic compounds from groundwater by injected air stripping the contaminants as they travel vertically into the vadose zone. Air sparging technology effectiveness for dry cleaning solvents has a long history of demonstrated success, however the effectiveness of air sparging is dependent on soil lithology. In this case, the subsurface soil consists of heterogenous silt and sandy strata that will introduce challenges to effective treatment throughout the impacted groundwater zone.

- **Groundwater Pump and Treat**. Groundwater pump and treat (GW-P/T), a conventional technology that has been applied extensively to CVOC sites, uses groundwater extraction systems (horizontal and vertical wells) to remove large volumes of water with relatively low contaminant concentrations. In instances of complex soil lithology and slow rates of contaminant desorption and dissolution, GW-P/T requires the removal of many pore volumes of groundwater to flush out contaminants. Once the groundwater is delivered above ground, a water treatment technology (air stripping, activated carbon) is applied to the extracted groundwater before the treated water is usually discharge to the local sanitary sewer. Conventional P/T systems are inherently inefficient for removing contaminants from the subsurface. Today, GW-P/T technologies are usually selected for extracting total fluids (free-phase product and groundwater) as a source removal effort.

- **Dual-Phase (Groundwater and Soil Gas) Extraction and Treatment**. Dual-phase extraction (DPE) is a remediation technique designed to extract both groundwater and vapor from the subsurface formation. DPE can be accomplished through the use of pumps or high vacuum to lower the water table/dewater the saturated zone while simultaneously applying vacuum to recover vapor from the pore space of the formation. As the water column is evacuated, the unsaturated zone is expanded which allows removal of contaminants through the vapor phase under vacuum extraction. A DPE system typically is constructed with a series of extraction wells

installed in the contaminant source areas and also in the area of a groundwater plume. DPE is a technology that is better suited to higher permeability soils and groundwater bearing zones such as sands and gravels. Operation of a successfully-designed DPE system could reduce concentrations of CVOCs in soil vapor, soil, and groundwater to their respective cleanup levels. DPE would require treatment and disposal of extracted vapors and groundwater.

- **In-Situ Permeable Reactive Barriers**. In-situ permeable reactive barriers (PRBs) can be installed to treat groundwater contamination and prevent further migration, particularly dissolved phase contaminant plumes that are moving beyond parcel boundaries. These barriers can be constructed of zero-valent iron to treat CVOCs or using absorbent materials such as granular activated carbon (GAC) to remove petroleum hydrocarbons. Permeable barriers can achieve cleanup levels in groundwater at the location they are installed. However, they do not treat contamination in the vadose zone or in areas located hydraulically upgradient from their installed location. Rather, they are typically implemented when removal of the source is not practicable.

- **In-Situ Thermal Treatment (Electric Resistant Heating or ERH)**. In-Situ Thermal Treatment using electric resistive heating (ERH) is an aggressive and robust in-situ technology that is demonstrated to be effective for CVOCs in low permeability soils. The ERH technology applies high electricity voltages to a network of subsurface electrodes, and the resistance to electrical conductance heats soil and groundwater in the treatment area between electrodes to close to the boiling point of water (100^{o}C) when enough energy is applied. Soil vapors containing the volatilized contaminants are then collected by SVE and treated.

  ERH is an in-situ thermal treatment for soil and groundwater remediation that can reduce the time to clean up VOCs and CVOCs from years to months. The technology is now mature enough to provide site owners with both performance and financial certainty in their site-closure process. The ability of the technology to remediate soil and groundwater impacted by chlorinated solvents regardless of lithology types proves to be beneficial over conventional in-situ technologies that are dependent on advective flow (e.g., soil vapor extraction, pump and treat). The ERH technology is very tolerant of subsurface heterogeneities, and actually performs as well in low-permeability silts and clay as in higher-permeability sands and gravels. ERH may also be combined with other, less costly treatment technologies to optimize and enhance their performance and perform a full Site cleanup.

- **Soil Excavation**. Soil excavation and off-site disposal is capable of meeting remedial objectives and doing so in a reasonable timeframe. At this Site, some areas of soil have PCE contamination at concentrations that would be considered a listed hazardous waste, which could result in very

high soil disposal costs. However, in our experience at similar sites, Ecology can issue a "contained-in" determination for soil in which PCE concentrations are below the direct contact value of 14 mg/kg PCE. The majority of the Site contaminated soil is below this level, and thus will likely be disposed of as a non-hazardous waste (as Contained In Designation) at a permitted RCRA Subtitle D facility. The main limitation for soil excavation is that contaminated soils can exist below the water table, or in locations underlying structures or street ROWs, and may not be easily accessible.

- **In-situ chemical oxidation (ISCO) and in-situ chemical reduction (ISCR) with enhanced reductive dichlorination (ERD)** are also potentially applicable technologies for CVOC sites. These technologies require a detailed evaluation through field pilot tests to see if they are and will be effective for Site specific conditions. These pilot tests were completed for this Site, and results are discussed below:

4.6.1 In-Situ Chemical Oxidation Pilot Test (ISCO)

ISCO is effective for treating Site CVOCs in groundwater where Site conditions are conducive to remedial injection of aqueous based chemicals. Contaminant oxidation using permanganate treatment solutions are widely used for chemical oxidation, and several companies offer design level injection plans (formulas) for effective groundwater treatment. Permanganate has proven to be an effective chemical oxidant for the treatment of chlorinated solvents (PCE, TCE, cis-1,2-DCE, and VC) in soil and groundwater.

To evaluate this technology, two pilot injection tests were performed on April 18, 2020, using an aqueous solution of sodium permanganate ($NaMnO_4$). The purposes of the tests were to empirically evaluate and demonstrate the radius of influence for use of injection at the Site, and to evaluate the performance of field injection technology and methodology.

Two fifty-five gallon drums of $NaMnO_4$ were delivered on site for the pilot tests. Typically $NaMnO_4$ is mixed with potable water at a ratio of 6% to 8%. For the pilot tests, the $NaMnO_4$ was mixed with twice as much water, reducing the ratio to 3% to 4%, but providing a greater volume for the pilot tests. The $NaMnO_4$ and water were mixed in four 275-gallon plastic totes, with potable water supplied from a water truck. After the 2 totes containing permanganate were pumped into the injection well, the totes were refilled with water, and the injection point was flushed with two more tote volumes (550 gallons) to move the initial $NaMnO_4$ mixture outward from the injection point to extend the area of influence.

The first ISCO test was performed in injection well MW26 followed by injection well MW25. The $NaMnO_4$ mixture was injected into the subsurface through the injection point by using an air-compressor driven diaphragm pump. Injection pressures at the diaphragm pump were set to approximately 20 pounds per square inch (psi) for the test at injection well MW26 and 35 to 45 psi at

injection well MW25. Once the permanganate mixture reached the well point, the pressure dropped as the permeability of soil was sufficiently high to not cause significant resistance to flow. The observed well pressure at injection well MW26 was approximately 6 psi and the pressure at injection well MW25 ranged from approximately 12 psi initially to 18 psi at the end of injection. Flow rates of injection were monitored using the marks on the totes (25-gallon intervals) and manually timing the change between marks. The typical flow rate ranged approximately 7 to 11 gallons per minute (gpm).

During injection at MW26, the groundwater table levels were observed at monitoring wells MW09 and MW10 using a pressure transducer and datalogger set to record at 1-minute intervals. During injection at MW25, the groundwater levels were observed at monitoring wells MW16 and MW18 using the same methodology.

The radius of influence was evaluated during injection by visually observing the breakthrough of $NaMnO_4$ at the adjacent existing monitoring wells (MW09, MW10, MW16, and MW18). $NaMnO_4$ has a distinct purple color that can readily be seen in treated groundwater at low concentrations. During injection at MW26, the presence of $NaMnO_4$ was monitored by low-flow pumping and periodic bailer sampling at monitoring wells MW09 and MW10. During injection at MW25, monitoring occurred at MW16 and MW18. Given the relatively high permeability of the sand in the target soil zone and low pumping rates with the peristaltic pump, it is our opinion that use of the peristaltic pump for observations did not have a measurable influence on the spreading of the $NaMnO_4$ in the sand channel.

For the ISCO test at injection well MW26, breakthrough was observed at monitoring well MW10 after approximately 550 gallons of the $NaMnO_4$ mixture was injected, with the water changing color from relatively clear to pink and then to purple, indicating that the $NaMnO_4$ mixture had reached monitoring well MW10 at a distance of approximately 22 feet from the injection point. The same color breakthrough was then observed at monitoring well MW09 after approximately 1,100 gallons of the $NaMnO_4$ mixture was injected, with the water changing color from relatively clear to pink, and then purple.

For the test at MW25, breakthrough was not observed at either monitoring well MW16 or MW18. This observation is not surprising given that the soil conditions at UB16 and UB18 around the injection well MW25 location consists mostly of silt and clay, with the relative hydraulic conductivity there being significantly lower than in the sand channel at monitoring well MW26. The soil conditions at the screen intervals for monitoring wells MW16 and MW18 are shown on Cross-Section Figure A-A' (Figure 13), and Cross Section Figure B-B' (Figure 15), respectively.

During injection at MW26, groundwater levels in monitoring wells MW09 and MW10 showed a relatively good correlation with the injection (Graph 1). At both wells, groundwater levels rose approximately 12 to 14 feet in response to the injection, and showed drops of 3 to 4 feet while totes

were switched. This response is consistent with the relatively high hydraulic conductivity observed during slug testing at MW09 and MW26 (Section 2.6.3).

In contrast, during injection at MW25, the magnitude of changes in groundwater levels was much smaller in monitoring wells MW16 and MW18, which is consistent with relatively low hydraulic conductivity of the silts and clays at these locations (Graph 1). The groundwater level at these locations was elevated from baseline, but this a result of the soil being pressurized during injection at MW26, and slow recovery prior to injection at MW25.

These pilot test results indicate that the sand channel is conducive to the use of injection methods to remediate the dissolved chlorinated solvents in groundwater and to treat residual PCE in saturated soil. The radius of influence during injection likely ranges from approximately 15 to 25 feet, assuming injection pressures and volumes similar to those used in the pilot tests. Depending on the relative density and viscosity of the selected product used during injection, the radius of influence may vary. If the selected groundwater remedial treatment injectate selection is different than the aqueous sodium permanganate solution used during this pilot test, a second pilot should be performed to confirm the radius of influence and suitable injection pressures.

Monitoring well MW09 was also resampled after the pilot test on May 15, 2020 to evaluate the effect of the $NaMnO_4$ injection on contaminant concentrations in the downgradient location over time. The results presented in the table below indicate a likely rebound of contaminant concentrations assuming a non-detect baseline at the time of treatment. Red values indicate an exceedance of the MTCA Method A Cleanup Level for groundwater.

Boring/Well ID	Date Sampled	Analytical Results - Micrograms per Liter (µg/L)					
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
MW09	4/14/2020	**350**	**460**	**370**	**2.8**	<0.5	**5**
	5/15/2020	**99**	**87**	**48**	<1	<0.5	**0.47**

To further assess oxidizer as a viable injectate, a permanganate natural oxygen demand (PNOD) test was performed by Carus Corporation, which showed a moderate consumption of oxidizer and raised the issue of injection volume needed and commensurate cost.

The conclusion of the pilot test was that in-situ injection was confirmed as a viable technology for treating the dissolved phase CVOC plume in groundwater. However, a solution geared towards reductive dechlorination, as opposed to oxidation, would likely be a more successful treatment option because it enhances the naturally occurring bacterial degradation of CVOCs in the dissolved phase plume, which is

apparent at the Site. As discussed in Section 3.6.1, an anaerobic environment already exists in the dissolved phase CVOC plume downgradient from the source area.

4.6.2 In-Situ Chemical Reduction (ISCR) Pilot Test

As discussed above, ISCR is an effective technology for CVOC sites when an anaerobic condition exists in groundwater, and the presence of PCE degradation products (TCE, DCE, and VC) and low dissolved oxygen levels indicate that a natural biological degradation condition has been established in the dissolved-phase groundwater plume area.

A series of pilot injection tests were performed on October 28 and 29, 2020, to evaluate the use of both in-situ chemical reduction (ISCR) and enhanced reductive dechlorination (ERD) to remediate chlorinated solvents in groundwater. The purposes of the tests were to empirically evaluate and demonstrate the radius of influence (ROI) for use of injection at the Site, and to evaluate the performance of field injection technology and methodology.

The evaluated ISCR approach used Zero Valent Iron (ZVI) while the ERD analysis used a proprietary liquid compound called 3-D Microemulsion (3DME) developed by Regenesis Remediation Services (RRS) to increase the anaerobic biodegradation of chlorinated solvents. The ZVI was provided as a proprietary liquid compound called Sulfidated-MicroZVI (SMZVI) also developed by RRS, which consists of colloidal, sulfidated zero-valent iron particles suspended in glycerol. The 3DME consists of a mixture of fatty acid esters, lactate oligomers, and sodium lactate. Additionally, the RRS proprietary mixture of anaerobic microbes, called BDI PLUS (BDI) was used with the 3DME to increase the population of subsurface bacterial species that work to dechlorinate the chlorinated solvents.

The tests were performed by RRS with UEP staff observing the tests, monitoring changes in groundwater parameters at adjacent monitoring wells, and providing guidance on test locations based on our understanding of soil and groundwater conditions at the Site, as well as our experience with the previous pilot injection test. Additional information on the pilot testing, including tables of groundwater and testing parameters is provided in Appendix E.

RRS mixed a 4 percent solution of SMZVI and 3DME/BDI, with potable water in two 350-gallon plastic totes located within their remediation trailer. A total of 400 pounds of SZVI and 400 pounds of 3DME/BDI were applied during the pilot testing. The mixture was introduced to the subsurface using a positive displacement electrically powered pump. The BDI was added to the influent mixture during injection by a slip-stream method using pressurized nitrogen gas.

Three boring were drilled for the injection points using a truck-mounted direct-push drilling rig. The direct-push rig uses vibratory action to advance steel casing. A 2-foot retractable screen was used to introduce the injection fluid to the subsurface. Each injection point was initially advanced to a depth of

35 feet, initiating injection, then raising the screen at 2-foot intervals depending on the observed injection pressure and flow rate.

Additionally, 4 soil probes were drilled to observed soil conditions. Three of the probes (UB39, UB40, and UB41) were drilled prior to injection to observe the depth interval of the sand channel, and the fourth soil probe, UB42, was drilled following injection to observed the distribution of the injectate in the subsurface. The locations of the 4 probes, UB39, UB40, UB41, and UB42, are shown on Figure 3. Logs of soil observed soil conditions are provided in Appendix B.

The first injection point, DVT-1, was located approximately 10 feet northwest of monitoring well MW26. The injection was initiated at 12:20 on October 28, 2020, with an initial injection interval of 33 to 35 feet below ground surface (bgs). The injection pressure was between 45 and 55 pounds per square inch (psi) measured at the wellhead, and the flow rate ranged from approximately 3.5 to 4 gallons per minute (gpm). After 75 gallons was injected, the screen was then raised 2 feet and injection continued at a depth interval of 31 to 33 feet bgs. The screen was periodically raised at 2-foot intervals, with the final depth interval of 25 to 27 feet bgs. Injection pressures ranged from approximately 40 to 70 psi with flow rates ranging from approximately 3.5 to 5 gpm. A total of 470 gallons was injected at DVT-1.

During injection at DVT-1, groundwater parameters at monitoring well MW26 were monitored by pumping from the well using a peristaltic pump and a YSI water quality meter. The primary groundwater parameters measured to evaluate the effectiveness of the injection were DO and ORP. The DO dropped from approximately 1.2 milligrams per liter (mg/l) at the start of the test to approximately 0.04 mg/l at the end of the test while the ORP dropped from approximately 26 millivolts (mV) to approximately -141 mV at the end of the test. The drop in DO and ORP indicate that the injectate has reached the monitoring well. During testing, the color of the water was also observed and changed from clear to light gray after approximately 315 gallons had been injected.

The second injection point, DVT-2, was located approximately 10 feet northwest of monitoring well MW09. The injection was initiated at 9:30 on October 29, 2020, with an initial injection interval of 33 to 35 feet below ground surface (bgs). The injection pressure was approximately 100 psi measured at the wellhead, and the flow rate ranged from approximately 1.1 gpm. Because of the higher pressure and low flow rate, the screen was raised after 15 gallons was injected, and injection continued at a depth interval of 31 to 33 feet bgs. The screen was periodically raised at 2-foot intervals, with the final depth interval of 25 to 27 feet bgs. Injection pressures ranged from approximately 100 to 125 psi with flow rates ranging from approximately 2.2 to 4.2 gpm. A total of 470 gallons was injected at DVT-2.

During injection at DVT-2, groundwater parameters at monitoring well MW09 were monitored by pumping from the well using a peristaltic pump and a YSI water quality meter. During injection, the DO dropped from approximately 1.7 mg/l at the start of the test to approximately 0.46 mg/l at the end of

the test while the ORP dropped from approximately 69 mV to approximately 29 mV at the end of the test. The drop in DO and ORP indicate that the diluted injectate reached the monitoring well. During testing, the color of the water was also observed but no obvious color change was observed.

The third injection point, DVT-3, was located approximately 10 feet south of monitoring well MW30. The injection was initiated at 11:50 on October 29, 2020, with an initial injection interval of 33 to 35 feet bgs. The injection pressure was approximately 150 psi measured at the wellhead, with basically no flow into the soil. Because of the higher pressure and zero flow rate, the screen was raised and injection continued at a depth interval of 31 to 33 feet bgs. There was still very little flow into the soil so the screen was raised to a depth interval of 29 to 31 feet bgs. Flow started at this depth interval with an injection pressure of approximately 40 psi and flow rate of approximately 3.3 gpm. The screen was periodically raised at 2-foot intervals, with the final depth interval of 25 to 27 feet bgs. Injection pressures ranged from approximately 30 to 40 psi with flow rates ranging from approximately 2.3 to 3.5 gpm. A total of 470 gallons was injected at DVT-2.

During injection at DVT-3, groundwater parameters at monitoring well MW30 were monitored by pumping from the well using a peristaltic pump and a YSI water quality meter. During injection, the DO dropped from approximately 0.88 mg/l at the start of the test to 0 mg/l at the end of the test while the ORP dropped from approximately 38 mV to approximately -260 mV at the end of the test. The drop in DO and ORP indicate that the injectate has reached the monitoring well. During testing, the color of the water was also observed and changed from clear to gray after approximately 130 gallons had been injected.

During each of the injection tests, water levels were periodically measured in the adjacent monitoring well using an electric water level meter. During the first injection test at DVT-1, the water level in monitoring well MW26 rose from approximately 15.4 feet bgs to 11.5 bgs feet at the end of the test. During the second injection test at DVT-2, the water level in monitoring well MW09 rose from approximately 14.9 feet bgs to 12.7 feet bgs at the end of the test. During the third injection test at DVT-3, the water level in monitoring well MW30 rose from approximately 11.9 feet bgs to 1.2 feet bgs at the end of the test. During testing the water level rose to almost the top of casing and the injection pressure was reduced.

As noted above, probe UB42 was drilled following injection to observe injectate distribution. The color of the soil core was observed and a magnet was used to test for the presence of SMZVI. Because the soil in the screened intervals is naturally gray, it was difficult to visually confirm the presence of the injectate. The magnet test did indicate the presence of iron (SMZVI) in the depth interval 25 to 29 feet bgs.

A groundwater sample was also collected from monitoring well MW09 on December 7, 2020, approximately 5 weeks after the injections. The comparative CVOC concentrations between the pre- and post-injection sampling events are shown in the table below.

Boring/Well ID	Date Sampled	Analytical Results - Micrograms per Liter (µg/L)					
		PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
MW09	8/26/2020	530	300	590	<10	<10	9.9
	12/07/2020	110	140	990	<10	<10	39

These results show a dramatic decrease in PCE and TCE, with a corresponding increase in degradation compounds cis-1,2-DCE and VC, confirming the effectiveness of the injectate.

The pilot test results also confirm that the sand channel at the Property is conducive to the use of the tested injection methods. The radius of influence during the potential ISCR injection will likely range from approximately 10 to 20 feet, assuming injection pressures and volumes are designed to be similar to those used in the pilot tests. Depending on the relative density and viscosity of the selected product used during injection, the radius of influence may vary. If the selected groundwater remedial treatment injectate selection is different than the solution used during this pilot test or during the previous injection test that used $NaMnO_4$, an additional test pilot should be performed to confirm the radius of influence and suitable injection pressures.

The conclusion of the pilot test was that in-situ injection for ISCR and ERD was confirmed as a viable technology for treating the dissolved phase CVOC plume in groundwater. The evaluated ISCR solution would likely be more effective and efficient than the use of oxidative solutions because ZVI is not depleted upon injection, has an immediate effect of destruction of dissolved phase CVOCs, and the ERD effect enhances the naturally occurring bacterial degradation of CVOCs in the dissolved phase plume.

4.7 Preliminary Remedial Screening

Because each potentially applicable technology for addressing chlorinated solvents has limitations, the remedial alternatives discussed in Section 4.6 above were initially screened for the highest likely success at the Site in accordance with guidance in WAC 173-340-350(8)(b), with an emphasis on the important criteria of protectiveness, permanence, and the ability to be integrated with a post cleanup development use of the Property:

- MNA was retained as a viable alternative, but only for use in combination with another technology (excavation), which will eliminate the source area.

- SVE was retained for use in combination with other technologies (DPE and ERH) and is intended to be an ancillary part of the treatment system to address volatized organics.
- Air sparging has been shown to be effective in treating contaminated groundwater, and so has been retained for use in combination with other technologies. Air sparging can be applied as the primary treatment method to address the dissolved phase organics in groundwater.
- Traditional groundwater pump and treat has been rejected because it would be operationally difficult to integrate into the residential development, creating equipment access issues, odors/vapors, and disruption of normal residential activities.
- The DPE technology has been retained for consideration in use with a combination of similar technologies that are effective at addressing high concentration contaminants in groundwater.
- In-situ reactive barriers were rejected as they generally serve as a boundary treatment technology to prevent further migration of a contaminant plume.
- In-situ thermal treatment has been retained because it provides permanent, expeditious and reliable treatment of CVOCs, regardless of concentration or environmental media.
- Excavation and off-Site disposal has been retained because it is permanently effective and also reasonable expeditious, depending on the accessibility of the impacted media.
- ISCO and ISCR both appear to be viable alternatives; however, based on the pilot test results discussed above, only ISCR was retained due to the anaerobic environment that already exists at the Site.

4.8 Remedial Alternative Assessment – CVOCs

As presented in Section 4.5.3, the current development plans for the Property include 2 separate proposed buildings as shown on Figure 21B. The North Parcel development will contain a new slab-on-grade building with a footprint of approximately 35,000 square feet (SF) to be built over most of the area with the treated wood piles. Remedial alternatives for treated piles and PAH contaminated soil, and selection of Alternative P3 for the North Parcel has been presented above in Section 4.5.4.

The proposed building on the South Parcel will be about 68,000 SF, and contain underground parking. As shown on Figures 21A and 21B, the planned South Parcel will contain the drive aisle amenity with the 16 piles that will require removal as previously discussed in Section 4.5.3.

The development of remedial action alternatives for chlorinated solvents on the South Parcel considered and eventually included are only those remedial components that effectively treat the CVOCs in the affected media of concern and were appropriate to the future Property redevelopment

plan. A suitable alternative may include one technology or combine multiples of the retained technologies discussed above to achieve remedial objectives.

In this evaluation of remedial alternatives focus is for analysis and selection of the preferred alternative for the South Parcel CVOCs from the dry cleaner operations. The 2 buildings in total will include construction of approximately 500 units of mixed market rate and affordable housing. Figure 21B shows the planned amenities for each legal land parcel that will result from the LBA as discussed. With these development plans in mind, the following specific cleanup objectives were developed: Achieve the MTCA Method A cleanup levels for impacted soil and in a reasonable timeframe to allow the return of the Property to a constructive use;

- Select and apply a site remedy for COCs at the Site, that is consistent with redevelopment for mixed residential and commercial use, and that protects future occupants (individuals and families with children and pets) living in the building;
- Select a remedy that does not require long-term, on-going operations, like groundwater pump and treat or soil vapor extraction in-situ methods for treatment of subsurface media after occupation of the building which involve operation of an above-ground treatment unit;
- Avoid institutional controls if possible; and,
- Implement active cleanup to meet remedial goals and allow restoration and completion of development of the Property by 2022. Compliance monitoring may extend beyond this date.

Considering these objectives, in combination with those discussed in Section 4.1, five remedial alternatives were developed for further evaluation.

Each of the five remedial alternatives also include the excavation of CVOC impacted soil in the vicinity of UB15. Source removal was deemed to be the most practical and cost-effective approach in this area during preliminary remedial alternative screening and did not appear to warrant a feasibility level assessment. As such, the remedial alternatives evaluated in this FS are focused on the CVOC release from the southern dry-cleaning operation(s) only.

Below is a detailed description of each alternative along with, when appropriate, a qualitative statement of the effectiveness of the selected technologies.

4.8.1 Alternative 1: Excavation and Disposal of Soil with In-Situ Chemical Reduction (ISCR) using SZVI

Alternative 1 was developed as the baseline for comparison with other alternatives, as it is considered the most practicable permanent solution for the Site. Its objective is to permanently remove through excavation the Site's source of CVOCs in a very short timeframe, before site development begins.

Following source removal by excavation, residual groundwater impacts are treated at a relatively short time period through in-situ chemical reduction using SZVI. Remedial technologies presented for Alternative 1 are shown on Figure 24.

Excavation and Off-Site Disposal of Source Soil

A source soil excavation plan requires the removal of a total of approximately 15,000 cubic yards of soil, to depths ranging between 20- to 35 bgs, as shown on Figure 24. A breakdown of the total soil excavation and handling mass consists of: 2,800 tons of F-listed waste, requiring Subtitle C disposal; 11,600 tons of problem waste (nonhaz or Contained In), requiring Subtitle D disposal; 3,000 tons of problem waste soil (nonhaz), that is eligible for disposal as a Class 2 waste; and 3,000 tons of overburden soil that would be re-used as backfill in the excavation area. To achieve depths of up to 35 feet bgs, approximately 200 linear feet of sheet pile will be installed along the west and southern sides of the excavation. The remaining excavation will be removed using a 3:1 sloped cut. For conceptual design purposes, excavation depths beyond 15 feet bgs will required limited dewatering. Recovered groundwater and other collected water during remedial excavation will be treated on site using activated carbon and discharged to the nearest sanitary sewer under a King County wastewater discharge permit.

In-Situ Chemical Treatment for Impacted Groundwater Downgradient of the Source Area

The dissolved phase PCE groundwater plume migrating southeast from the source area, and a very small, low level PCE impact area recently showing at monitoring well MW06 (west of the source area) defines the area requiring in-situ chemical treatment of groundwater. In-situ chemical reduction or ISCR treatment will follow the completion of the source area excavation. ISCR will take advantage of the existing anaerobic condition in groundwater, as indicated by the presence of PCE degradation products (TCE, DCE, and VC) and low DO and ORP levels in Site wells within the groundwater plume area. ISCR is considered a highly effective technology for treating dissolved phase CVOCs in groundwater over a relatively short time period.

The injection delivery network includes an estimated 20 point array of ZVI injection points installed outside of and following the source area excavations. Relying on the results of the pilot test conducted by UEP summarized in Section 4.6.2, the injection well system for distribution of ISCR chemicals and the bio-degradation enhancers will be designed to deliver injectates between 20- to 35-feet bgs, and spaced at 15-feet on center, in an area approximately 6,000 square feet in the areas as shown on Figure 24. Accordingly, a mass/quantity of injectate will be designed to ensure that contact with the contaminant is achieved where COCs exceed the cleanup levels in groundwater. In this case approximately 6,000 pounds of SMZVI and 6,000 pounds of 3DME will be injected throughout the ISCR treatment area. Calculations for estimating the SMZVI-3DME injection volume are provided in Appendix E. The injection

of ISCR/ERD chemicals is anticipated to occur over 1 injection period taking approximately 2 weeks. After about 2 months of contact time for the ISCR injectates, performance monitoring would be completed on select monitoring wells to evaluate whether a second injection event should be considered in any identified recalcitrant areas that would show contaminant rebound.

Other FS design assumptions for this alternative include the following:

- Permits required to discharge groundwater captured within the remedial excavation; and,
- The site would be registered with Ecology's Underground Injection Control (UIC) program prior to initiating ISCR/ERD injections.

The scope and cost for this alternative is not dependent on development plans, since this work will be performed before development begins. Compliance groundwater monitoring may continue during or after development of the Property. The estimated cost of this alternative is $6.7 million. Details of the remediation cost estimate are provided on Table 15.

4.8.2 Alternative 2: Excavation and Disposal of Soil with Monitored Natural Attenuation of Groundwater

Alternative 2 objective is to permanently remove the Site's source of CVOCs in a very short timeframe, before site development begins. Following source removal by excavation, residual groundwater impacts are managed by monitored natural attenuation in accordance with Ecology guidance. Remedial technologies presented for Alternative 2 are shown on Figure 25.

Excavation and Off-Site Disposal of Source Soil

Similar to Alternative 1 above, a source soil excavation plan requires the removal of a total of approximately 15,000 cubic yards of soil, to depths ranging between 20- to 35-feet bgs, as shown on Figure 17. A breakdown of the total soil excavation and handling mass consists of: 2,800 tons of F-listed waste, requiring Subtitle C disposal; 11,600 tons of problem waste (nonhaz or Contained In), requiring Subtitle D disposal; 3,000 tons of problem waste soil (nonhaz), that is eligible for disposal as a Class 2 waste; and 3,000 tons of overburden soil that would be re-used as backfill in the excavation area. To achieve depths of up to 35 feet bgs, approximately 200 linear feet of sheet pile will be installed along the west and southern sides of the excavation. The remaining excavation will be removed using a 3:1 sloped cut. For conceptual design purposes, excavation depths beyond 15 feet bgs will required limited dewatering. Recovered groundwater and other collected water during remedial excavation will be treated on site using activated carbon and discharged to the nearest sanitary sewer under a King County wastewater discharge permit. The conceptual excavation plan and limits of excavation shown on Figure 25 are based on most of the soil containing CVOC concentrations that are approximately 100 times the

site cleanup levels. This remedial plan will require segregation of the hazardous waste concentration soil during excavation.

Monitored Natural Attenuation

Based on experience at similar sites, the estimated remediation timeframe after source removal for the groundwater to reach cleanup levels under monitored natural attenuation (MNA) conditions is 10 to 15 years. The relatively rapid timeframe is expected to be enhanced by the removal of the source area and improved subsurface soil conditions provided by the source area excavation and backfill.

This remedial alternative will also include the following elements:

- Installation of soil vapor controls in the future building, which includes vapor barrier, subslab passive venting, and a subslab gas collection layer for active gas venting, if necessary;
- Periodic indoor air monitoring of the new building; and
- Institutional Controls, such as deed restrictions may be required due to the prolonged restoration timeframe.

The scope and cost for this alternative is not dependent on development plans, since this work will be performed either before development (excavation) or completion after construction of the building (MNA process). The vapor mitigation features will be integrated into the architectural designs for the building. The estimated cost of this alternative is approximately $6.9 million. Details of the remediation cost estimate are provided on Table 16.

4.8.3 Alternative 3: Dual Phase Extraction (DPE) with Air Sparging (AS)

Alternative 3 applies a dual-phase extraction (DPE) technology to remediate soil and groundwater. DPE uses off-the-shelf equipment and controls capable of inducing a vacuum to simultaneously extract VOC-laden soil vapor and contaminated groundwater from the subsurface. The contaminated soil and groundwater within the area treated by the system become progressively cleaner as contaminants are removed. DPE systems are utilized to remove contaminants from shallow, low permeability or heterogeneous formations. The components of this alternative include the following:

The DPE system would consist of a network of approximately 75 groundwater recovery wells that are connected to a centralized recovery and treatment system to facilitate contaminant extraction as shown on Figure 26. A high vacuum blower, capable of inducing a vacuum of at least 15-inches of mercury, would be required to achieve a sufficient radius of influence and contaminant mass removal rate. Due to the limitation on vacuum lift of groundwater of approximately 30-feet bgs, submersible extraction

pumps may be used in deeper wells to recover groundwater and allow for vapor recovery using a high vacuum pump. The recovery wells would include a screened section in the zone of contaminated soil and groundwater. The DPE system would operate through application of the vacuum to the recovery wells via a drop pipe and/or a dedicated submersible groundwater recovery. At this “equilibrium level”, both soil vapor and recharging fluids are simultaneously removed by the drop pipe. By extracting liquids, the DPE system lowers the water table around the well, exposing more of the formation to vapor extraction. Once conveyed above ground, the extracted vapors and groundwater are separated, collected and treated, and clean effluents are discharged either to the atmosphere or to the sanitary sewer.

Because the recovery of CVOCs by groundwater pumping alone is generally not cost-effective, this technology is often applied in conjunction with air sparging to provide additional groundwater treatment.

This alternative does not include a Monitored Natural Attention task, as the alternative assumes that DPE will continue until soil and groundwater have achieved their Cleanup Levels. Due to access issues, active DPE is not planned for impacted groundwater at the southern ROW at Genesee, however performing cleanup of the upgradient source area will enhance the attenuation in this area within the operation timeframe.

DPE is a relatively mature technology, and the use of Alternative 3 translates to a permanent removal and treatment system that provides hydraulic control of chemical migration as well as on-Site treatment. However, the rate of treatment is slow and is likely to lead to a long restoration timeframe. Once the DPE equipment is in place, development in the treatment zone cannot begin until cleanup goals are met.

This remedial alternative will also include the following elements:

- Installation of soil vapor controls in the future building, which includes vapor barrier, subslab passive venting, and a subslab gas collection layer for active gas venting, if necessary;
- Periodic indoor air monitoring of the new building; and
- Institutional Controls, such as deed restrictions may be required due to the prolonged restoration timeframe.

Alternative 3 installation and operation costs are $4.4 million and assumes 10 years of operation. This cost does include vapor mitigation measures in the new building but does not include the work scope to perform MNA, if needed. Details of the remediation cost estimate are provided on Table 17.

4.8.4 Alternative 4: Electrical Resistive Heating (ERH) with Soil Vapor Extraction (SVE)

Cleanup Action Alternative 4 utilizes only ERH/SVE to treat all of the Site CVOC contaminated soil and groundwater that exceeds cleanup levels in the full on-Property impacted areas.

The ERH/SVE system for this alternative consists approximately 91 electrodes and 9 temperature monitoring points (TMPs) that are installed with spacing approximately 15 feet between each electrode, as shown on Figure 27. The 12-inch diameter electrodes are constructed with ZVI/iron shot, and graphite in vertical borings advanced within the Site parcel to depths between 30 to 35 feet bgs into the saturated zone using standard drilling techniques. The estimated six electrodes located along the southern property boundary will be installed using angle-drilled borings. The ERH electrodes are comprised of a conductive and permeable backfill material with copper electrodes placed at intervals in the un-cased backfill material. A schematic of the electrode construction is provided in Appendix C. The backfill material in each electrode consists of ZVI filings and granular iron shot mixed with graphite as filler. The electrodes serve to heat the impacted soil and groundwater area for the ERH/SVE treatment. The ZVI component of each electrode also functions to promote the electrochemical abiotic reduction of chlorinated contaminants to benign, non-toxic end products (ethene and chlorine ions), as shown in the following chemical equations:

$Fe^{o} \rightarrow Fe^{2+} + 2e(-)$ and PCE + 8e(-) + 4H(+) → Ethene + 4 Cl(-)

The ZVI electrochemical treatment of dissolved phase chlorinated solvents is on-going after ERH energy is turned off, and the electrode system in the treatment area serves as a long-term groundwater polishing stage to address potential solvent rebound or other potential anomalous irregularities of the ERH treatment process.

In the ERH/SVE stage of treatment, soil and groundwater is heated to an average temperature of approximately 100 degrees Celsius to convert the CVOCs to vapor phase for subsequent recovery by soil vapor extraction at the top of each electrode. During heating, the subsurface temperature is constantly monitored at temperature monitoring points (TMPs) located within the treatment area. As shown in the electrode diagram, steel pipes under vacuum are installed at the top of each electrode for the collection of generated soil vapor. These vacuum extraction pipes capture and convey soil vapor and steam from the subsurface treatment area to an on-site, above-ground and secure treatment building. The treatment building consists of a power control unit, steam condenser, two SVE blowers and carbon units to treat the recovered condensate and soil vapor generated by the vacuum system.

The ERH/SVE system is scheduled to operate for a period of about 6 months, with daily/weekly/monthly operations, monitoring, maintenance, and air and water discharge compliance sampling.

This alternative does not include a Monitored Natural Attention task, as the alternative assumes that ERH/SVE will continue until soil and groundwater have achieved their cleanup levels in the source area. Due to access issues, active ERH/SVE is not planned for impacted groundwater at the southern ROW at Genesee, however performing cleanup of the upgradient source area will enhance the attenuation in this area within the operation timeframe.

Following the shutdown of the ERH/SVE equipment, soil and groundwater samples will be collected in accordance with an approved Compliance Monitoring Plan.

The scope and cost for this alternative is not dependent on development plans, since this ERH is planned to be completed prior to groundbreaking for development. The implementation of this remedial alternative assumes that post cleanup site conditions will not require vapor mitigation features for the development. The estimated cost of this alternative is $5.0 million. Details of the remediation cost estimate are provided on Table 18.

4.8.5 Alternative 5: Electrical Resistive Heating (ERH)/SVE with In-Situ Chemical Treatment by Reduction/ISCR and Enhanced Reductive Dechlorination (ERD)

Remedial Alternative 5 incorporates ERH/SVE technology at the primary source area and in-situ chemical treatment by injection of electron donor reducing injectates into the dissolved phase groundwater plume outside the primary source area to augment the enhanced biological reductive dechlorination (ERD) and degradation of the CVOCs. ISCR/ERD would be performed using the injection of electron donor chemicals into the trailing plume (e.g., downgradient of the source area) of the CVOC impacted groundwater, as shown on Figure 28; the assumed radius of influence is 20 feet. ISCR/ERD would be performed using an aqueous solution of ZVI called sulfidated micro ZVI (SMZVI) combined with a bio-degradation enhancer compound called 3D micro-emulsion (3DME) with BDI, which is a proprietary and patented blend of oleic acids and lactates/polylactates, which are injected as aqueous emulsions. The goal of ERH combined with ISCR/ERD is to restore the Site source soil and impacted groundwater to concentrations that are below the Site cleanup levels within a reasonable timeframe (before development construction) and not require long term monitoring (e.g., MNA) or other engineered controls (e.g., vapor barrier or subslab venting).

The ERH/SVE with ISCR system is anticipated to occur over a total 8 to 12 month period, which includes two rounds of ISCR injection events.

<u>Electrical Resistance Heating in the Primary Source Area</u>

The ERH treatment system for this alternative has been designed to treat the CVOC contaminant distribution (vertical and horizontal extent and concentration gradient) in the Source Area only. The planned uniform spacing for electrodes is consist at approximately 15-feet in the full treatment area, but

the electrode depths vary by treatment interval, from 10 to 35 feet bgs in the center of the primary source area – Area A (green) on Figure 28, from 10 to 30 feet bgs in Area B (red), and from 10 to 20 feet bgs in Area C (brown) to the north.

The descriptions for ERH provided in Alternative 4 above for a full-scale ERH system are similar for this alternative, including installation, startup, operation, monitoring, and maintenance of the system. However, the footprint and number of electrodes and TMPs for this Alternative 5 are less than those needed for Alternative 4. In general, this ERH design for Alternative 5 requires about half the equipment and electrical power as Alternative 4, and includes approximately 54 electrodes, 8 TMPs, and a similar but smaller treatment unit consisting of electricity controllers, extraction blowers, steam condenser, and carbon cannisters to scrub or treat the recovered vapors.

The ERH/SVE system is scheduled to operate for a period of about 6 months, with daily, weekly and monthly operations, monitoring, maintenance, and air and water discharge compliance sampling. After the ERH shutdown, the soil and groundwater media of the Site area will be sampled for compliance monitoring.

Electrochemical Reduction by the ZVI Electrode System

As described above for Alternative 4, the estimated 54 point array of permeable ZVI electrodes installed for the ERH/SVE system will serve as a continual groundwater polishing system through the abiotic reduction process wherein ZVI reduces chlorinated solvents to ethene.

In Situ Chemical Treatment for Impacted Groundwater Downgradient of the Source Area

The dissolved phase PCE groundwater plume migrating southeast from the source area, and a very small, low level PCE impact area recently showing at monitoring well MW06 (west of the source area) defines the area of the ISCR/ERD treatment. ISCR/ERD treatment will follow the completion of the ERH/SVE treatment in the source area and will take advantage of the enhanced natural biological degradation when the reducing bacteria that are already present will be stimulated by the increased water temperature at the Property from the ERH treatment.

Relying on the results of the pilot test conducted by UEP, the injection well system for distribution of ISCR chemicals and the bio-degradation enhancers will be designed to deliver injectates between 20- to 35-feet bgs, and spaced at 20-feet on center, in an area approximately 6,000 square feet in the areas as shown on Figure 28. Accordingly, a mass/quantity of injectate will be designed to ensure that contact with the contaminant is achieved where COCs exceed the cleanup levels in groundwater. In this case approximately 6,000 pounds of SMZVI and 6,000 pounds of 3DME/BDI will be injected throughout the ISCR/ERD treatment area. Calculations for estimating the SMZVI-3DME/BDI injection volume are provided in Appendix E. The injection of ISCR/ERD chemicals is anticipated to occur over 1 injection

period taking approximately 2 weeks. After about 2 months of contact time for the ISCR injectates, performance monitoring will be completed on select monitoring wells to evaluate whether a second injection event should be considered in any identified recalcitrant areas that would show contaminant rebound, depending on the results of the groundwater performance sampling in the ISCR area.

Other FS design assumptions for this alternative include the following:

- Permits required to operate the ERH/SVE system would include a utility permit for a power transformer installation and service upgrade, wastewater discharge permit for the discharge of treated condensate water to the sanitary sewer, and an air discharge permit (from PSCAA) to discharge scrubbed vapors to the atmosphere following treatment by GAC.
- Reinjection of ISCR injectates will be monitored and scheduled in accordance with an approved Compliance Monitoring Plan. However, this alternative assumes one additional injection event incorporating approximately half of the injection points.
- The site would be registered with Ecology's Underground Injection Control (UIC) program prior to initiating ISCR/ERD injections; and,
- The alternative will not require any significant dewatering or treatment efforts.

The scope and cost for this alternative is not dependent on development plans, since this work will be completed before development begins. Compliance groundwater monitoring may continue during or after development of the Property. The estimated cost of this alternative is $3.2 million. Details of the remediation cost estimate are provided on Table 19.

4.9 Evaluation and Selection of Remedial Alternative

For this feasibility evaluation, five alternatives were developed, evaluated and compared to each other based on Ecology's criteria in WAC 173-340-350(8) and WAC 173-340-360[3][f] to address Site CVOC contamination in consideration of a future, at-grade, multistory, multifamily housing site with no significant subgrade parking within the contaminant plume area. The alternatives are intended to eliminate or control on-Property potential exposure routes (direct contact, leaching to groundwater, and vapor generation) in a relatively short period of performance (i.e., completed prior to the planned development construction in 2022). The cleanup action alternative evaluation is based on Ecology guidance and provides a semi-quantitative assessment of seven MTCA criteria, from protectiveness to public concerns, including costs (WAC 173-340-360[3][f]). A numeric score ranging from 0 to 10 is assigned for each of the criteria within each alternative based on best professional judgment and as routinely used in evaluating remedial alternatives. A higher score represents a more favorable or effective application of the criterion for that alternative.

The criteria scores are weighted according to Ecology's Sediment Cleanup User's Manual II, and a MTCA Comparative Benefit Score (CBS) is calculated for each cleanup action alternative by summing the mathematical product of the criterion score times the weighting factor (same for each criterion), which represents a semi-quantitative measure of environmental benefit that the alternative offers. Based on Site conditions, the weighting factors for the each criteria are: Protectiveness – 30%, Permanence – 20%, Long-Term Effectiveness – 20%, Short-Term Risks – 10%, Implementability – 10%, and Public Concerns – 10% For example, the scores for each criterion for an alternative are determined to be: 10, 8, 8, 2, 2 and 3, then the resulting MTCA Comparative Benefit Score is calculated as (10)(0.3) + (8)(0.2) + (8)(0.2) + (2)(0.1) + (2)(0.1) + (3)(0.1) = 6.1. A score of 6.1 represents a moderate CBS and environmental benefit on a scale of 0 (lowest environmental benefit) to 10 (highest environmental benefit).

Feasibility level costs criterion for each alternative are not given a score but are used to perform a disproportionate cost analysis (DCA).

A brief description of seven MTCA FS evaluation criteria is provided below along with each alternative qualitatively compared to each other with the highest to lowest ranking listed below. The resulting scores of each MTCA criteria for each alternative is presented in Table 15.

Protectiveness. The two types of exposure risk associated with the presence of CVOCs at the Site are terrestrial ecological risk and human health risk. The Site qualifies for a TEE exclusion, therefore mitigating the potential human health risk associated with exposure to the CVOCs in indoor air, soil, and groundwater are the primary objective of any cleanup action implemented. The timeframe to reduce risk and attain cleanup standards is considered.

Alternatives 1, 4 and 5 provide the highest level of protectiveness and shortest timeframe to reach compliance. The high ranking considers the level of protectiveness achieved by the alternatives and the relatively short time frame (one year or less) compared to other technologies that will take several years.

Alternatives 2 and 3 each provide some level of protectiveness, which improves over time, however the timeframe to reach compliance is estimated to be 5 years or more. More likely, Alternative 2 – Excavation and MNA timeframe is more than 10 years. Alternatives 1, 4 and 5 will provide a predictably, much shorter restoration time frame. In addition, Alternatives 2 and 3 will likely require some mitigation features to control vapor intrusion in a future building.

Permanence. Alternatives are evaluated based on their ability to permanently reduces or eliminate the toxicity, mobility or volume of hazardous substances on the Site, including the adequacy of the alternative in destroying the contaminants.

Alternatives 1, 4 and 5 both provide the highest level of permanence, as these technologies permanently remove or destroy CVOCs compounds in both soil and groundwater. And these technologies as applied in both alternatives target the entire impacted areas.

Alternative 2 provides the next highest level of permanence by excavating and permanently removing contaminated soil from the site. However, a large portion of impacted groundwater outside the excavation source area will rely on MNA resulting in a relatively moderate ranking. Similarily, Alternative 3 is designed to effectively remove (and eventually treat) CVOC compounds from the Site, however a degree of untreated zones is dependent on the hydrology and stratigraphy of the subsurface conditions. These alternatives provide a only a moderate ranking for permanence.

Effectiveness over the Long Term. Long-term effectiveness defines the degree of certainty that the alternative will effectively perform as intended and the magnitude and time frame that the remedy relies on Site controls (e.g., vapor barriers and monitoring).

Alternatives 1, 4 and 5 provide the highest level of long-term effectiveness, as all three remedies will implement a confirmation sampling program in both soil and groundwater to demonstrate attainment of cleanup levels. Compliance with cleanup levels is expected to be maintained indefinitely at these technologies permanently destroy its target contaminants.

Alternatives 2 and 3 rely on technologies that have some degree of uncertainty related to the subsurface geotechnical and chemical conditions of the soil and groundwater, including radius of influence, oxidation and degradation potential. These alternatives provide a low to moderate level of long-term effectiveness.

Management of Short-Term Risks. The risk to human health and the environment associated with the implementation and construction of the alternative.

Each of the alternatives presents moderate to significant short-term risks because each includes high-risk activities associated with implementation, including shoring and excavation, drilling and probe installation, injection of permanganate, and operation of pressurized lines for sparing and extraction. ERH presents a high level of risk due to the use of electrical control and distribution equipment and high voltage circuits.

Technical and Administrative Implementability. The ability for an alternative to be implemented – technically feasible, availability of infrastructure and services, and complexity and size of the project, to name a few criteria.

Alternative 2, followed by Alternative 1, score the highest for this criterion as soil excavation, handling and off-site disposal is regularly selected as a soil remedy. The groundwater area intended for MNA or ISCR is relatively small and accessible.

Alternatives 3, 4 and 5 have a moderate level of Implementability, as these alternatives require a large number of both below- and above-ground equipment and delivery of media (soil gas and groundwater extraction, injection of oxidants, etc.). However, all of the selected technologies have a high number of instances of successful and dependable Implementability throughout the country.

Public Concerns. This criteria weighs the relative familiarity, concerns, or support for an alternative. For this Site, the public is defined as the neighborhood community, leaders, and organizations. The project is a future low-income housing project supported by LUP Affiliates.

At this stage, there has been little to no input by the public on the project, however as soon as the Prospective Purchaser Consent Decree is initiated, a full public disclosure and comment period will be completed for the proposed remedial solution. Rainier and Genesee LLC and LUP Affiliates are in design development for their plans for constructing affordable housing at the Site, and the remedial system in the final CAP will be integrated with their plans that anticipate the future use of the Property for multifamily housing, which dictates an unrestricted land use, and protection of indoor occupants and habitants.

Cost. The relevant project cost to consider for evaluation includes the cost of design, construction, operation and maintenance and long-term monitoring. Cost estimates for treatment technologies shall describe pretreatment, analytical, labor, and waste management costs. The design life of the cleanup action shall be estimated, and the cost of replacement or repair of major elements shall be included in the cost estimate. Cost estimates generated for this assessment are feasibility-level (-30/+50%) and based on Net Present Value calculations for future costs incurred after the first year

The total estimated life-cycle costs (e.g., design, implementation, O&M and closure) for Alternatives 1 through 5 are as follows:

- Cleanup Action Alternative 1— Excavation and Disposal of Soil with Treatment of Residual Groundwater using ISCR: $6.7 million (Table 15). This alternative represents the highest cleanup cost.

- Cleanup Action Alternative 2— Excavation and Disposal of Soil with Monitored Natural Attenuation of Groundwater: $6.9 million (Table 16). This alternative represents the second highest cleanup cost, although this cost is essentially equal to Alternative 1.

- Cleanup Action Alternative 3 – Air Sparge/Soil Vapor Extraction (AS/SVE) and Groundwater Extraction (Dual Phase Extraction): $4.4 million (Table 17). This alternative represents a relatively moderate cleanup cost.
- Cleanup Action Alternative 4— Electrical Resistive Heating (ERH): $5.0 million (Table 18). This alternative represents a relatively moderate to high cleanup cost.
- Cleanup Action Alternative 5— Electrical Resistive Heating (ERH) with In-Situ Chemical Treatment: $3.2 million (Table 19). This alternative represents the most moderate cleanup cost. The cost is significantly less than Alternative 4 due to the focusing of the ERH treatment within the primary source area and implementing a more cost effective but successful technology (ISCR) within the dissolved phase plume.

Alternative 1 Summary

Excavation of source area soil combined with treating residual groundwater impacts using ISCR is comprised of two widely different treatment technologies and approaches but with a similarly high degree of protectiveness and permanence ratings. For example, excavation provides the highest degree of protectiveness, as the excavated soil is immediately and permanently removed from the Site (disregarding any gaps in confirmation sampling). And residual groundwater impacts are treated using ISCR, a tested and proven technology with several documented test cases. Moreover, the use and presence of SZVI provides an ongoing groundwater polishing function for possible rebound in the treatment area.

Alternative 2 Summary

Excavation and Monitored Natural Attenuation is comprised to two widely different treatment technologies and approaches with varying degrees of protectiveness and permanence ratings. For example, excavation provides the highest degree of protectiveness, as the excavated soil is immediately and permanently removed from the Site (disregarding any gaps in confirmation sampling); however, MNA relies on natural rates of degradation (generally takes tens of years) and is often limited by the ability to control or influence subsurface chemical conditions.

Alternative 3 Summary

Dual Phase Extraction or DPE (soil vapor and groundwater extraction) relies on well tested, conventional remediation technologies to cleanup subsurface soil and groundwater contaminated with chlorinated solvents. If the DPE can be effectively applied throughout the contaminated zone, this technology is generally effective in capturing and removing the majority of the on-site, target chemicals. However, the certainty and predictability of complete and permanent contaminant removal will likely be hindered by

the variability and channeling of sand layer occurrences, and the restoration time frame for DPE is difficult to predict and much longer than Alternatives 1, 4 and 5.

Alternative 4 Summary

Electrical Resistance Heating/Soil Vapor Extraction (ERH/SVE) is considered a confirmed and robust technology with highly reliable results in treating both soil and groundwater with CVOCs. The "steam stripping" technique is effective in all types of soil, including the dense silt and clays present at the Property. ERH is considered to have one of the highest degrees of protectiveness and permanence, including the shortest timeframe for completion to compliance (not including excavation). However, implementability is a concern for treating the full Site area due to the presence of contamination in the public ROWs.

Alternative 5 Summary

This alternative combines ERH/SVE within the source area and ISCR/ERD treatment within the leading edge of the dissolved phase plume southeast from the source area. Within the environmental consulting and regulatory communities, both treatment technologies are considered tested and very reliable for in-situ treatment of dry-cleaning solvents and their breakdown products. The relative protectiveness of ISCR compared to ERH would be considered fairly equal, because for this Site the PCE GW plume can be described as anaerobic, stable, and easily accessible within a relatively isolated sand channel. Based on field measurements of DO and ORP values within the plume area, the groundwater is already exhibiting conditions representing biological reductive dichlorination activity. Moreover, the presence of the ZVI components in the electrode system provides an ongoing groundwater polishing function for possible rebound in the treatment area, augmenting the SMZVI function of ISCR at the injection points. The predicted timeframe to compliance for this dual treatment system is very short, considered equal to that of Alternative 4.

4.10 Disproportionate Cost Analysis and Selected Remedial Alternative

The disproportionate cost analysis or DCA was conducted in general accordance with methodology provided by Ecology WAC 173-340-360(3)(e). Relying on the results of the MTCA evaluation of remedial alternatives (Table 20), a benefit-to-cost ratio was developed for each alternative by dividing the numeric comparative benefit score (CBS) total by the estimation of cost (in millions). The greater value equals a greater benefit per dollar spent. Table 21 provides a graphic representation of this relationship. The results of the DCA indicate that Alternative 5 – ERH/SVE with ISCR/ERD is the preferred remedial alternative for the site due to a higher CBS based on the weighting of the performance evaluation criteria, and the greater benefit per cost analysis as shown in Tables 20 and 21.

5.0 Preferred Remedial Alternative

For the southern area of the Site with CVOC contamination in soil and groundwater, the preferred and selected remedial technology is Alternative 5 – ERH/SVE with ISCR, which is a combination of two applicable technologies. The application of electrical resistive heating with soil vapor extraction (ERH/SVE) to the primary source area of highest soil and groundwater contamination is the use of a vigorous, robust and proven technology that will be thorough, permanent, and relatively quick with reliable results. The results of the ISCO and ISCR pilot tests also confirmed the use of injection technology as strongly applicable to the dissolved phase contaminants in the sand aquifer at a desirable radius of influence. ISCR was determined to be more appropriate than ISCO given the moderate PNOD score for the sand aquifer at 11.4 mg/kg, the observed rebound of PCE in MW10 after the ISCO pilot test, and observed effectiveness of the ISCR injection in contaminants present MW09.

The Aestus ERI results indicated the presence of high biological activity in the dissolved phase contaminant plume and monitoring well data shows the presence of transformation of PCE degradation products in the monitoring wells downgradient from the primary source area. Moreover, the average DO and ORP content in the dissolved phase plume area shows anaerobic conditions that could readily be enhanced. Based on these factors, an in-situ injection technology involving zero valent iron (sulfidated micro-ZVI) to support and continue the ZVI process from the ERH electrodes, coupled with injection of 3DME/BDI micro-emulsion to enhance the biological degradation activity already present at the Site was selected for the ISCR injectates.

For the treated pile-related PAH issue in the northern portion of the Site, the selected remedy is Alternative P3 – Repurposing of the Existing Piles for reuse as the foundation support for the slab-on-grade floor of the planned building. The selection of this remedial alternative will require a covenant on that portion of the development site.

Any piles that do not serve a structural purpose will be fully removed; this includes 16 piles that are known to be located in a shared drive isle located between the planned north and south parcels. This area will not include any engineering or institutional controls.

Engineering design information and additional details of the selected cleanup alternatives for each of the remediation areas will be presented supporting documents in a Cleanup Action Plan for the Site.

6.0 References

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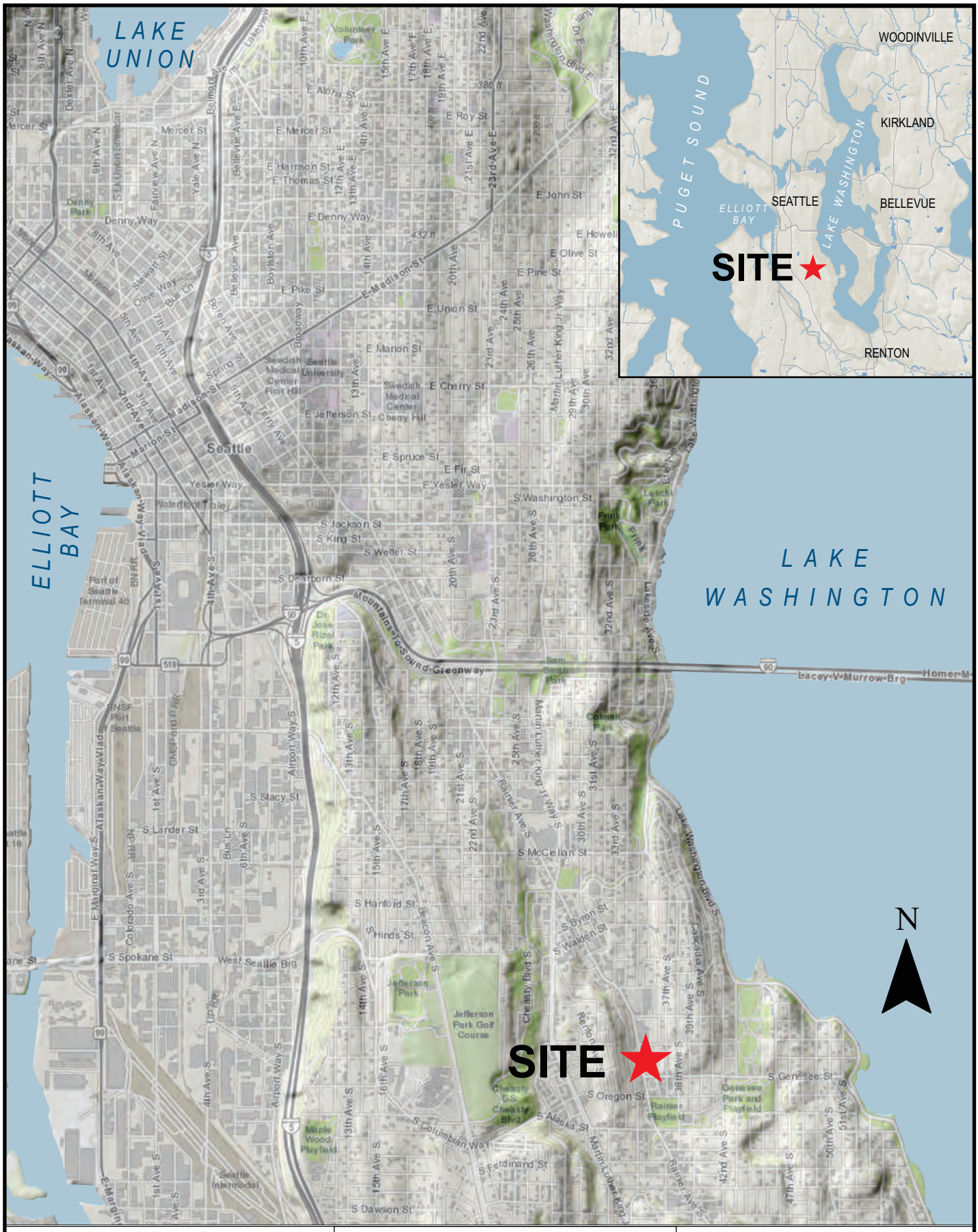
Exhibit A: Figures



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Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Figure 1
Site Location Map

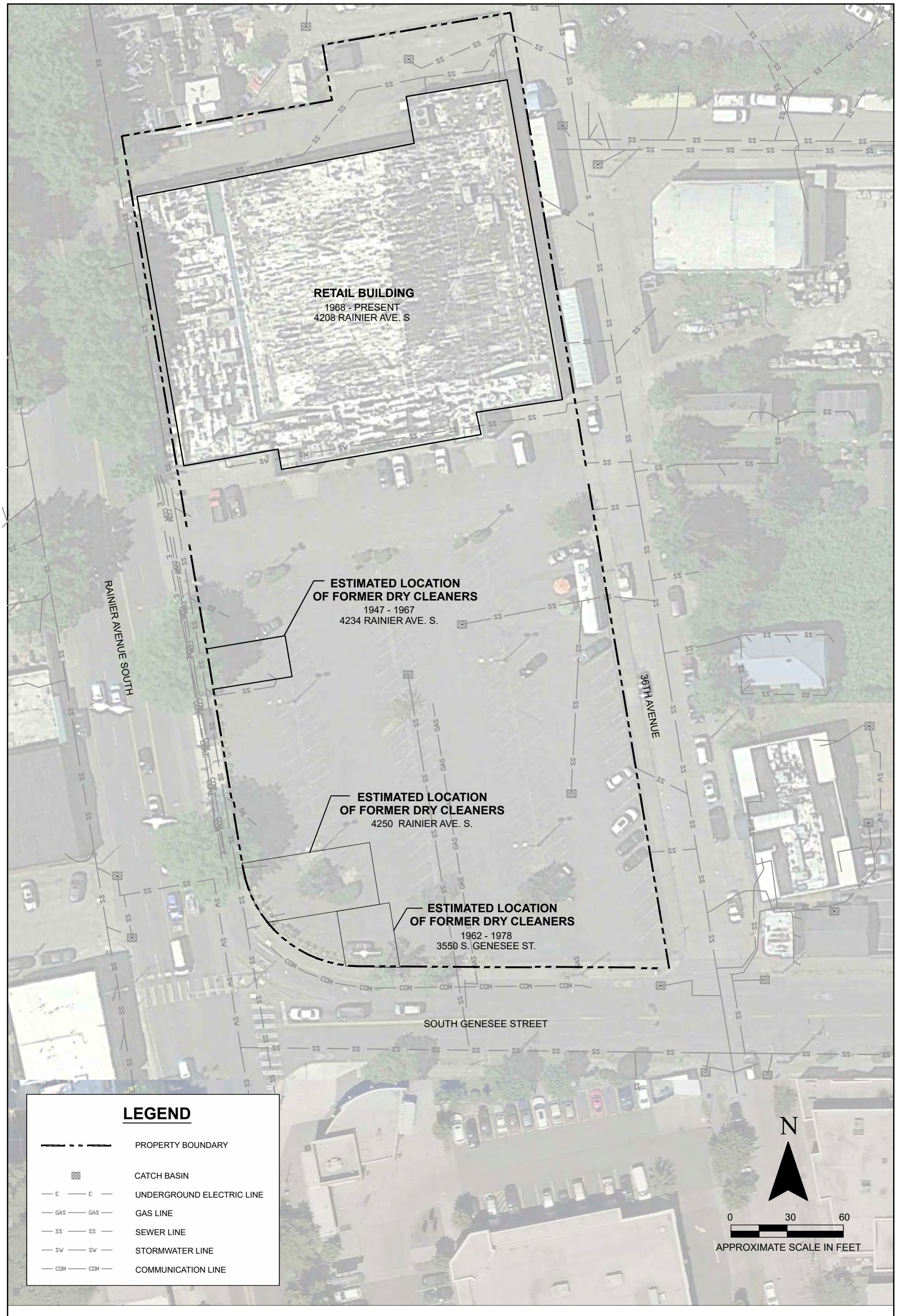

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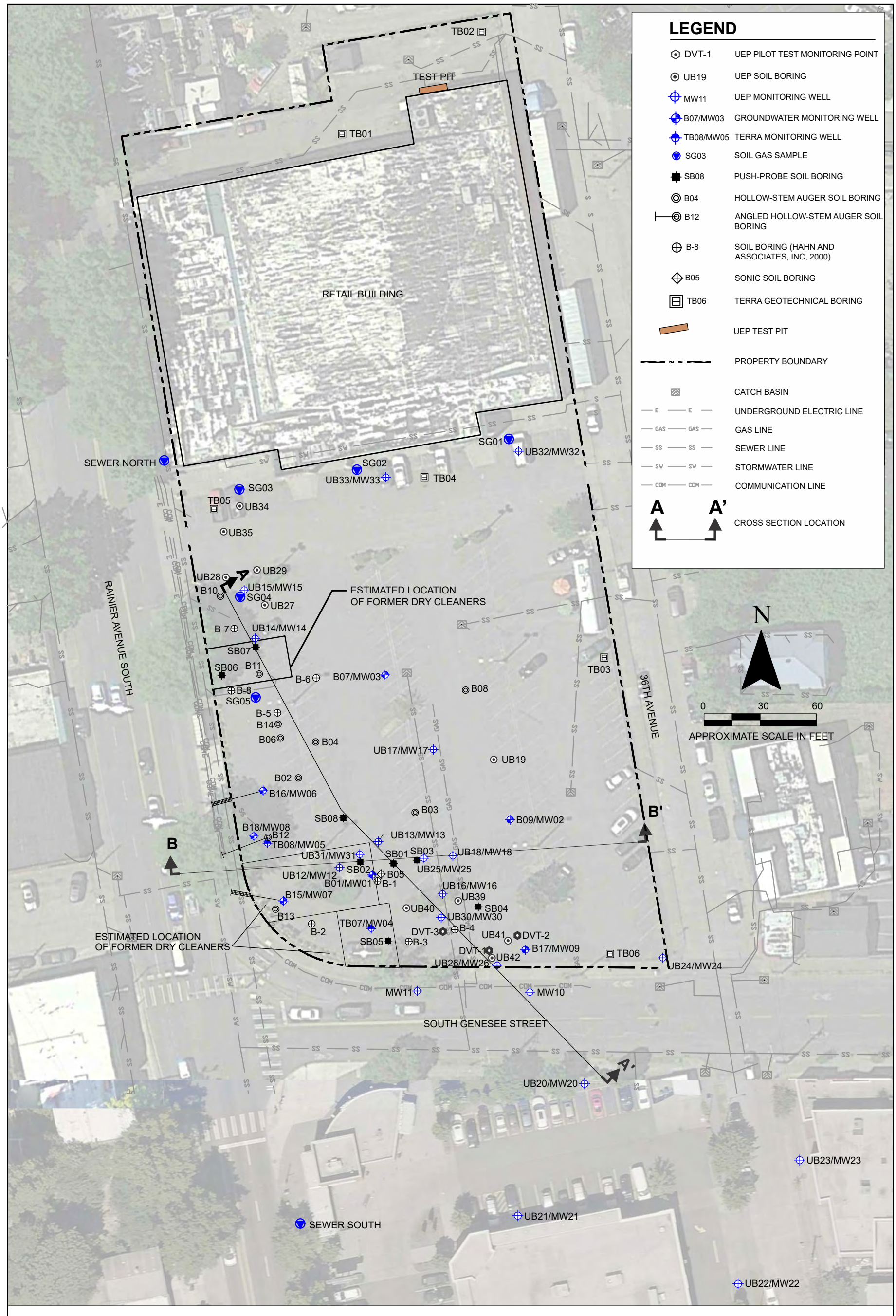
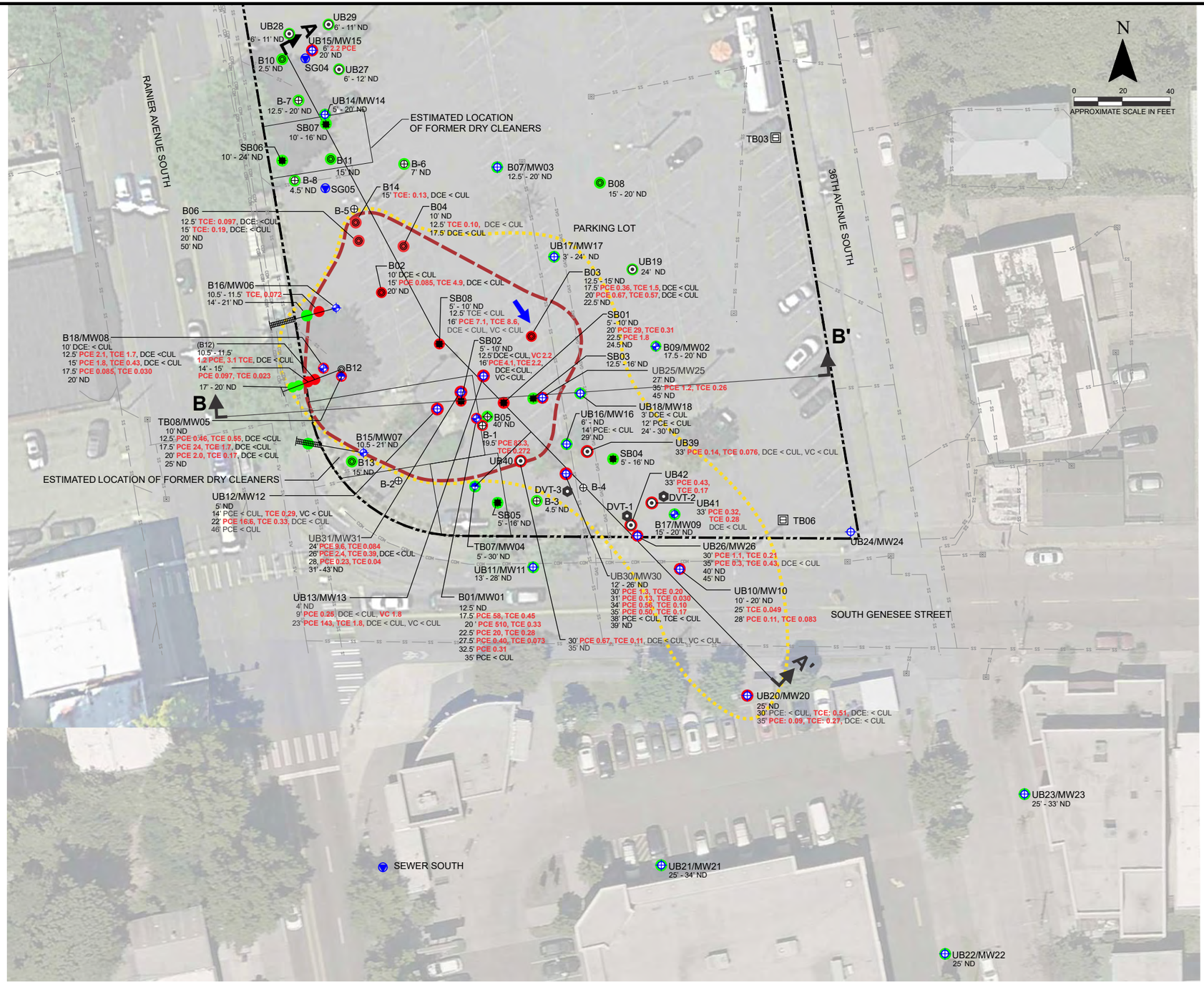
Figure 2
Site Features



Urban Environmental Partners llc Diligent, responsive, and prac cal consul ng!	Rainier Mall Site 4208 Rainier Avenue South Seattle, WA	Figure 3 Exploration Location Plan



LEGEND

- PRIMARY SOURCE AREA
- EXTENT OF CVOC GROUNDWATER IMPACTS ABOVE CULs
- DVT-1 — PILOT TEST MONITORING POINT (UEP)
- UB19 — SOIL BORING (UEP)
- MW10 — MONITORING WELL (UEP)
- B17/MW09 — GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 — TERRA MONITORING WELL
- B12 — ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 — PUSH-PROBE SOIL BORING
- B04 — HOLLOW-STEM AUGER SOIL BORING
- B12 — ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 — SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 — SONIC SOIL BORING
- T6 — TERRA GEOTECHNICAL BORING
- SG05 — SOIL GAS SAMPLE
- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY
- RED — DENOTES CONCENTRATION IN SOIL EXCEEDS MTCA METHOD A CLEANUP LEVELS
- GREEN — DENOTES CONCENTRATION IN SOIL BELOW MTCA METHOD A CLEANUP LEVELS
- 0.05 mg/kg — SOIL CLEANUP LEVEL FOR PCE
- A A' — CROSS SECTION LOCATION

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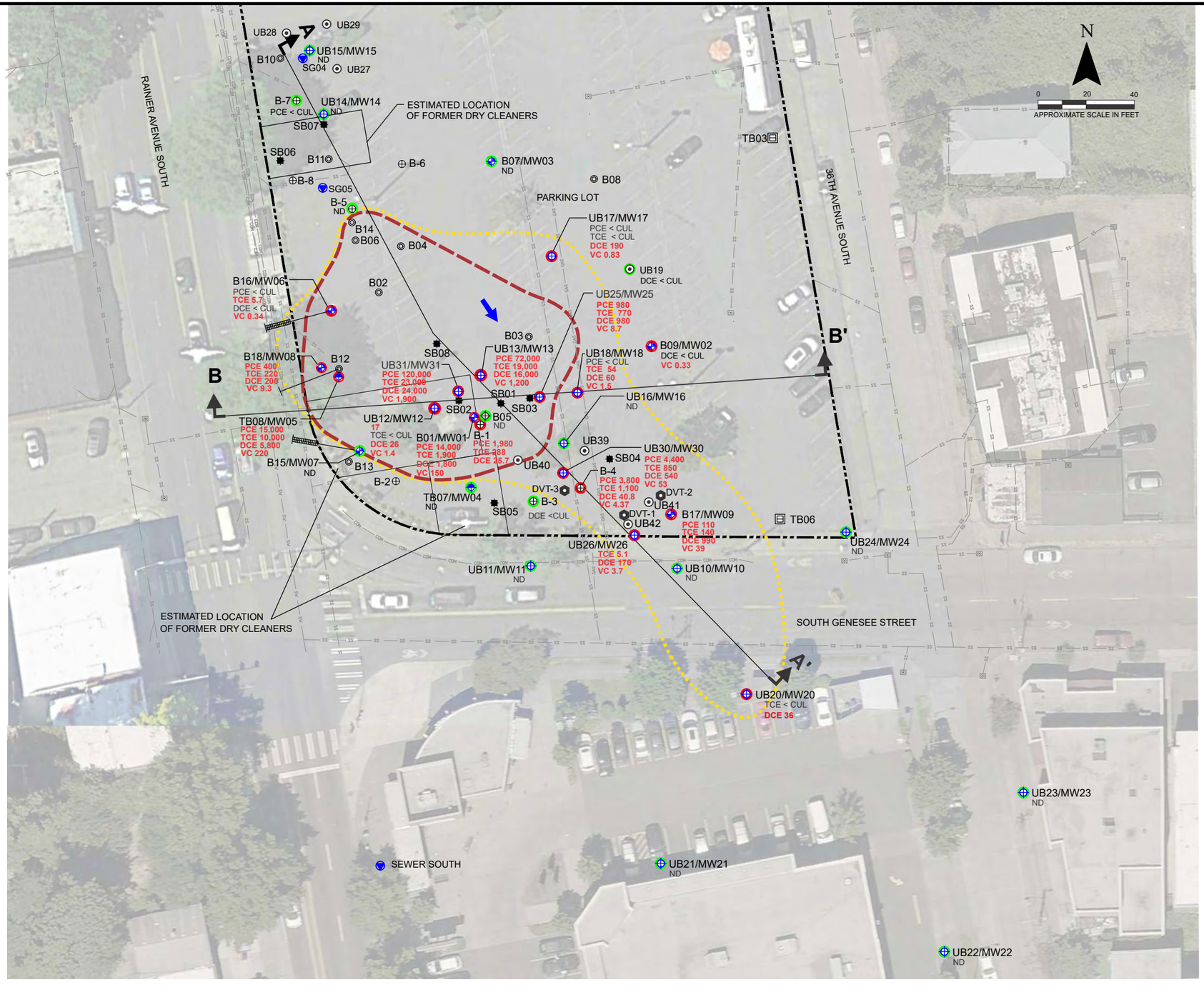
Figure 4
CVOC Concentrations in Soil



LEGEND

- PRIMARY SOURCE AREA
- EXTENT OF CVOC GROUNDWATER IMPACTS ABOVE CULs
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- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY
- RED — DENOTES CONCENTRATION IN GROUNDWATER EXCEEDS MTCA METHOD A CLEANUP LEVELS
- GREEN — DENOTES CONCENTRATION IN GROUNDWATER BELOW MTCA METHOD A CLEANUP LEVELS

GROUNDWATER CLEANUP LEVELS

PCE	5 µg/L
TCE	5 µg/L
Cis DCE	16 µg/L
VC	0.2 µg/L

A — A’ CROSS SECTION LOCATION

NOTE: GROUNDWATER CONCENTRATIONS DEPICTED ON THIS FIGURE ARE FROM MOST RECENT SAMPLING EVENTS.

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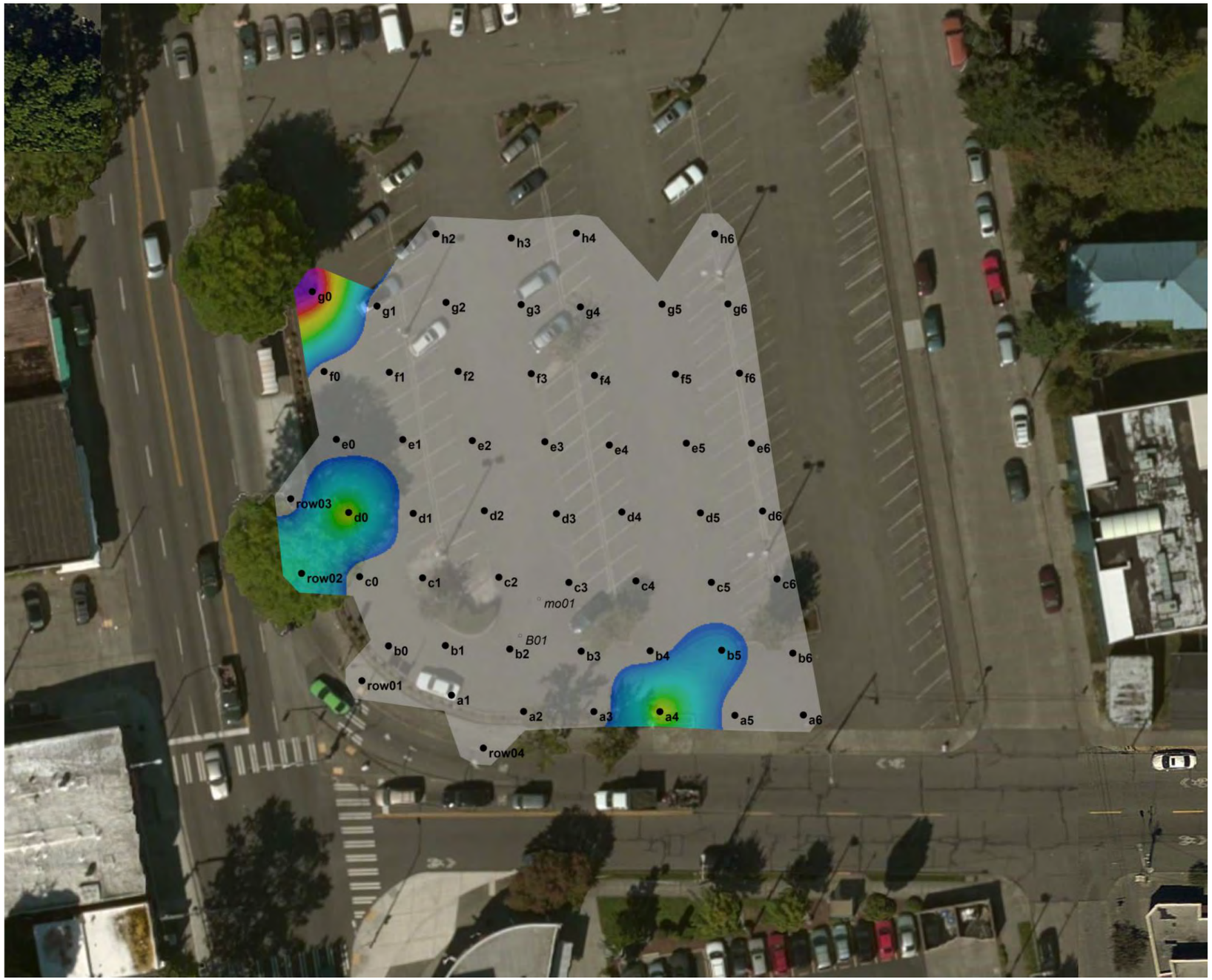
Figure 5
CVOC Concentrations in Groundwater



N

0 25 50

APPROXIMATE SCALE IN FEET

LEGEND

PCE [µg]

5.120
3.880
2.941
2.229
1.689
1.280
0.970
0.735
0.557
0.422
0.320
0.243
0.184
0.139
0.106
0.080
0.061
0.046
0.035
0.026
0.020

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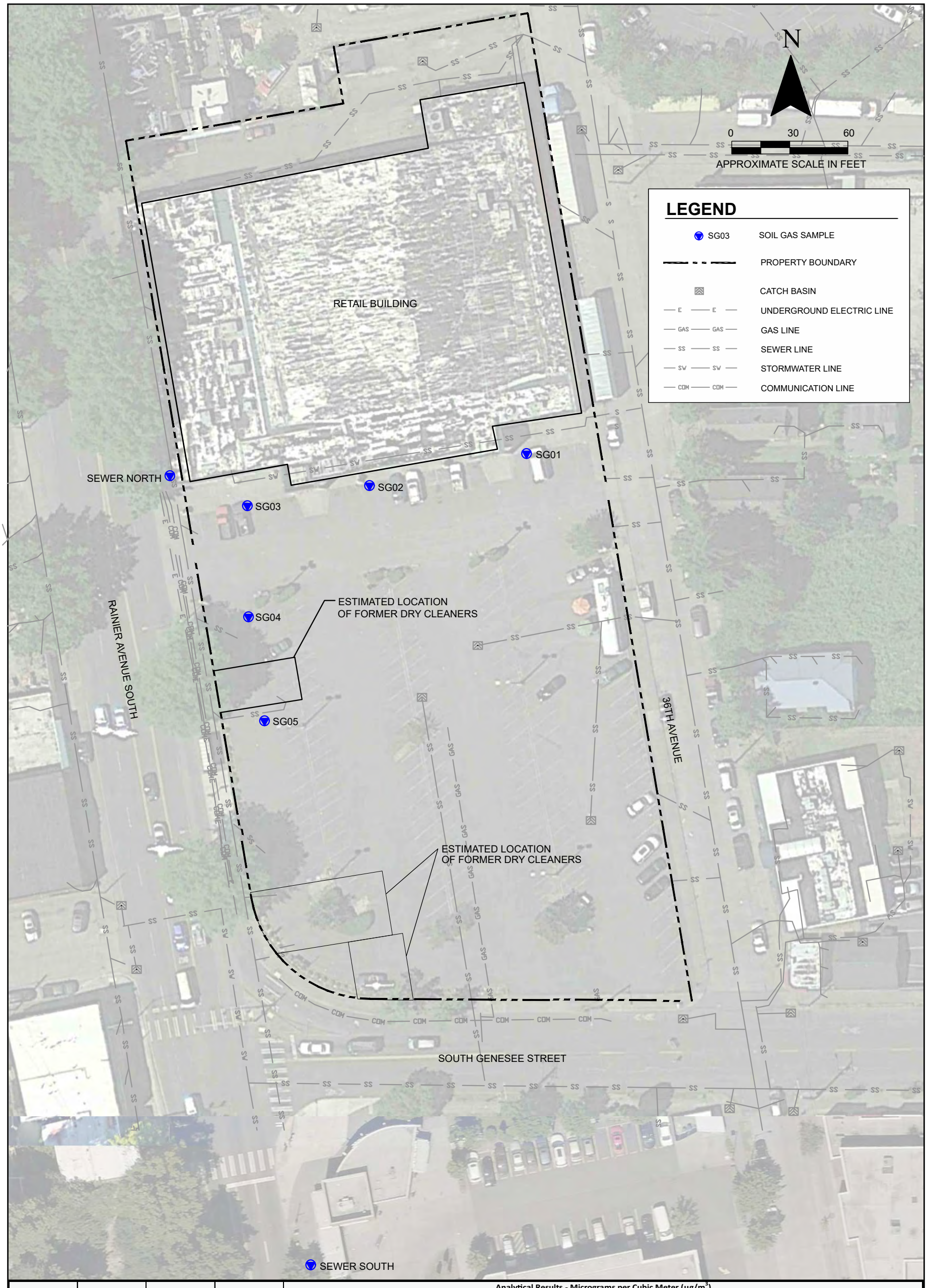
Figure 6
Passive Vapor Investigation Results



Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results - Micrograms per Cubic Meter (µg/m^3)										
				PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC	Chloroethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane
SG01	SoundEarth	1/2/2018	8	**48**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG02	SoundEarth	1/2/2018	8	**38**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG03	SoundEarth	1/2/2018	8	**25**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG04	UEP	4/10/2020	1.5	<110	<4.3	<6.3	<6.3	<6.3	<4.1	<42	<6.5	<0.65	<8.7	<1.7
SG05	UEP	4/10/2020	1.5	<110	<4.3	<6.3	<6.3	<6.3	<4.1	<42	<6.5	<0.65	<8.7	<1.7
Sewer South	UEP	5/15/2020	10	**270**	69	**340**	**3.7**	<3	22	<20	<3.1	<0.31	<4.1	<0.83
Sewer North	UEP	5/15/2020	10	<54	<2.1	<3.2	<3.2	<3.2	<2	<21	<3.2	<0.32	<4.4	<0.87
Ecology MTCA Method B Screening Levels for Sub-Slab Soil Gas				**320**	**11**	**NE**	**NE**	**3,000**	**9.50**	**NE**	**52**	**3.2**	**76,000**	**5.20**
Ecology MTCA Method B Screening Levels for Deep Soil Gas				**960**	**33**	**NE**	**NE**	**9,100**	**28**	**NE**	**160**	**9.6**	**230,000**	**16.00**

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Figure 7
CVOC Concentrations in Soil Gas and Sewer Gas

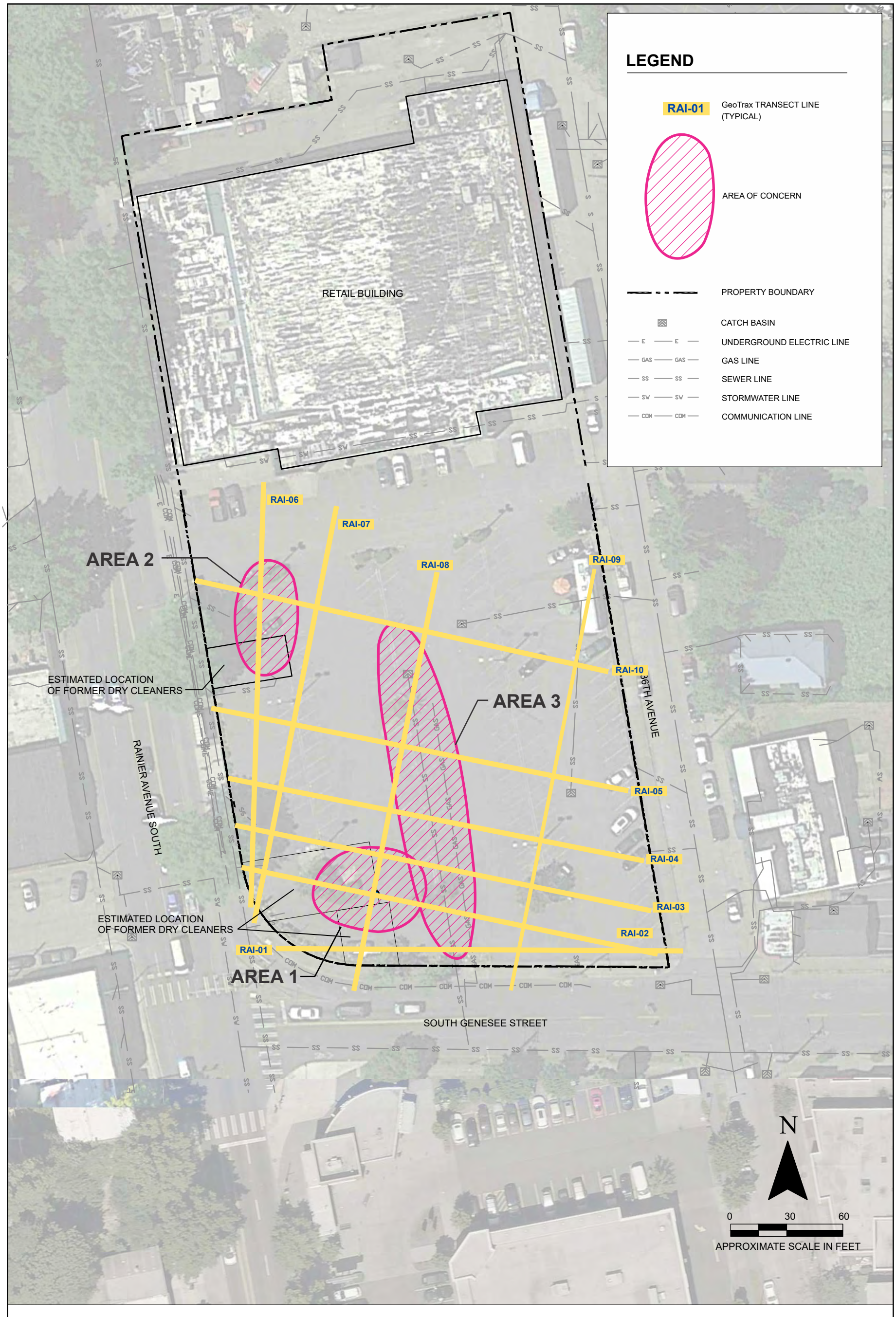

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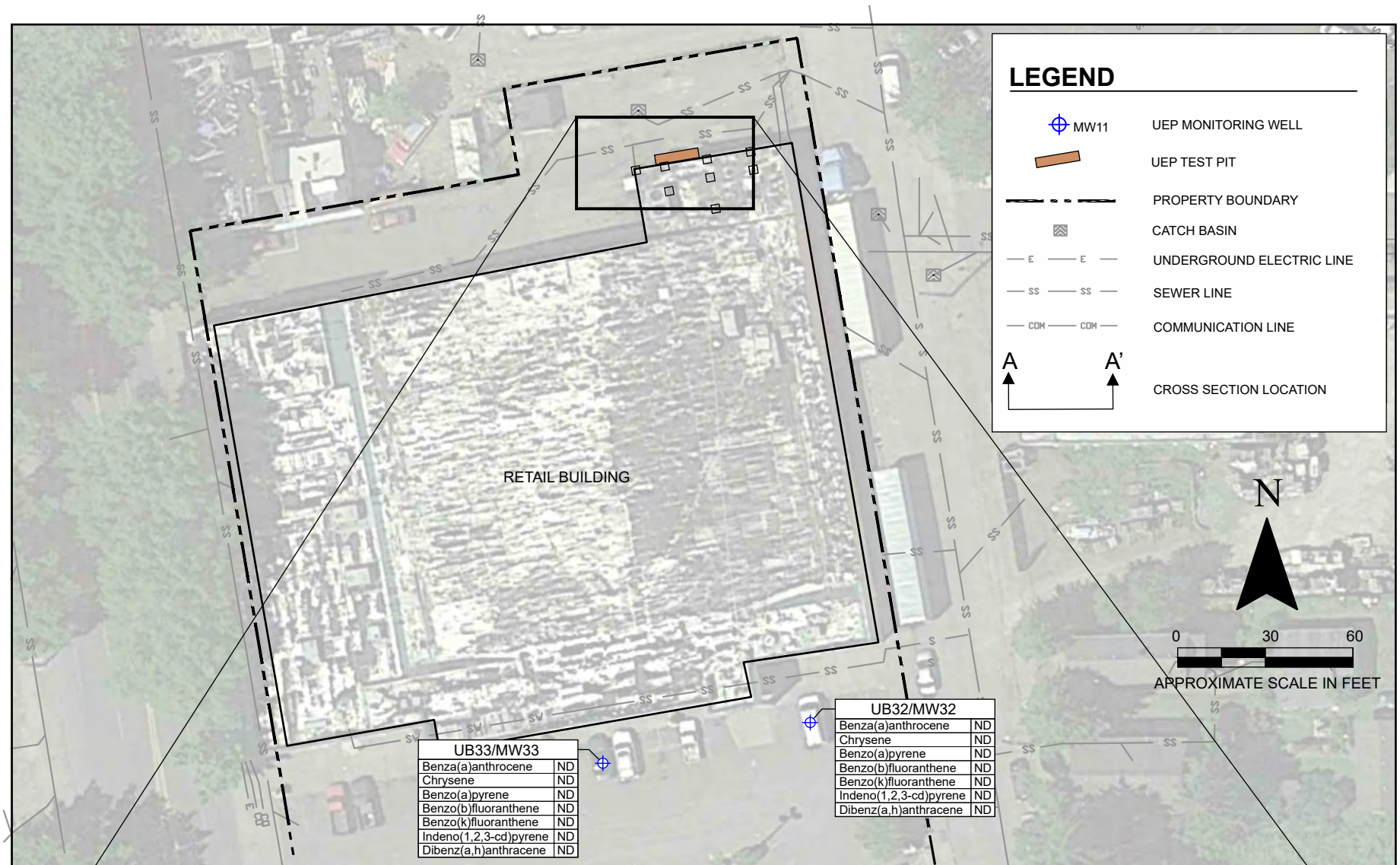
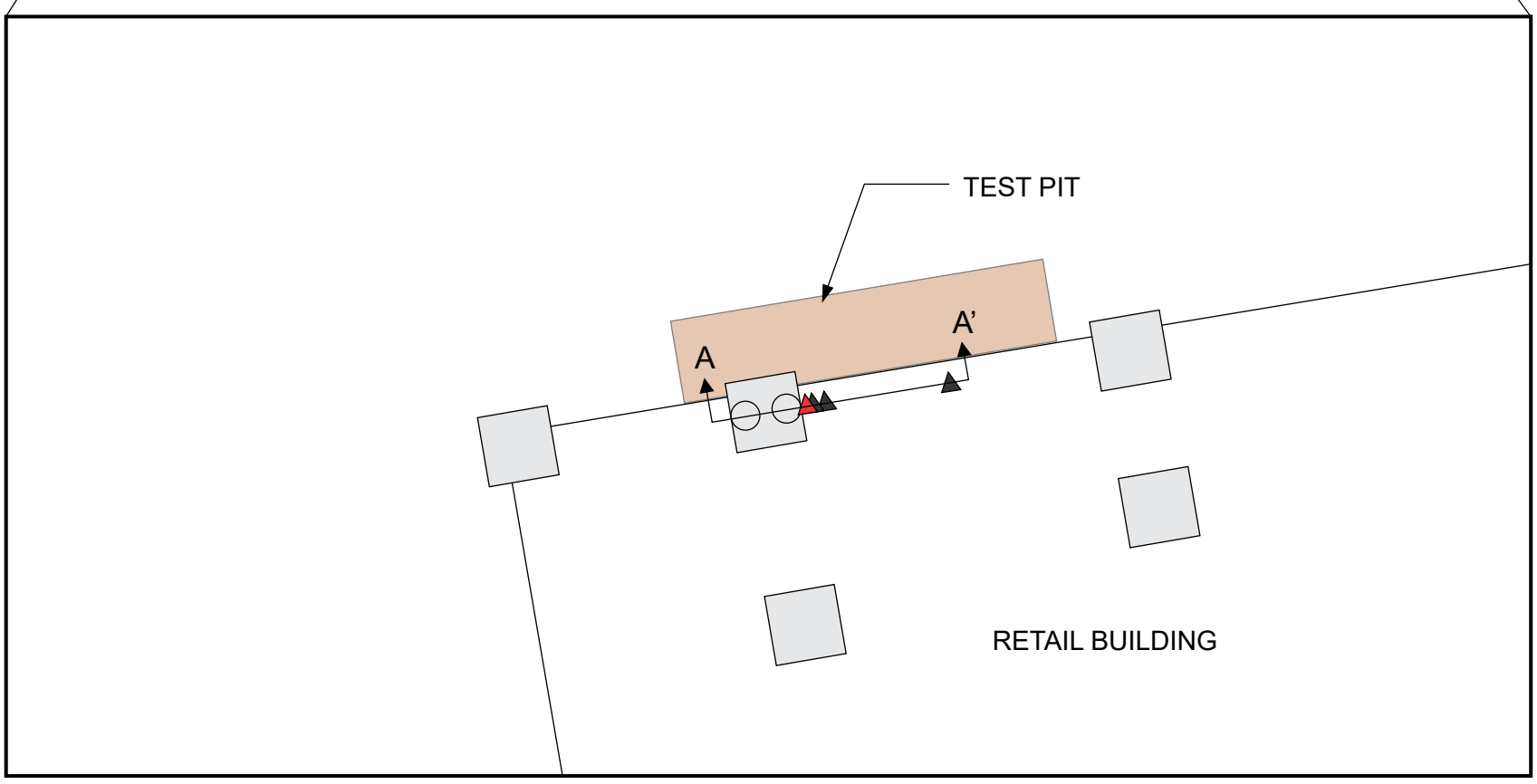
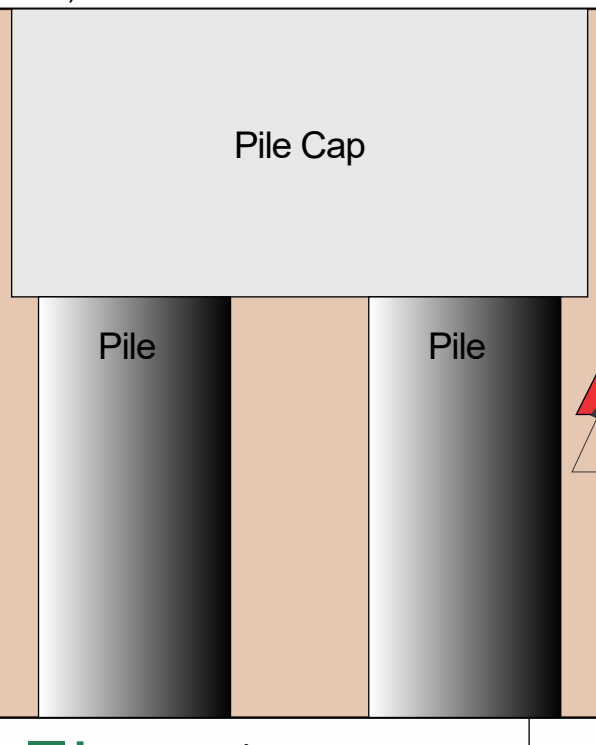
Figure 8
Geotrax Survey Results





A (WEST)

A' (EAST)



Sample ID	Depth (ft/bgs)	Analytical Results - Milligrams per Kilogram (mg/kg)							Total Toxicity Equivalency Concentration
		Benzo(a)-anthracene	Chrysene	Benzo(a) pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Indeno(1,2,3c d)-pyrene	Dibenzo(a,h)-anthracene	
Pile1-3"	2	**0.20**	**0.17**	**0.21**	**0.23**	**0.068**	**0.090**	**0.025**	**0.273**
Pile1-6"	2	<0.01	<0.01	<0.01	**0.012**	<0.01	<0.01	<0.01	**0.0083**
Pile1-12"	2	<0.01	**0.021**	**0.060**	**0.010**	**0.020**	**0.026**	<0.01	**0.0668**
Piles-Middle	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Ecology MTCA Method A Cleanup Levels		--	--	**0.1**	--	--	--	--	**0.1**

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Figure 9
PAH Assessment and
Empirical GW Data

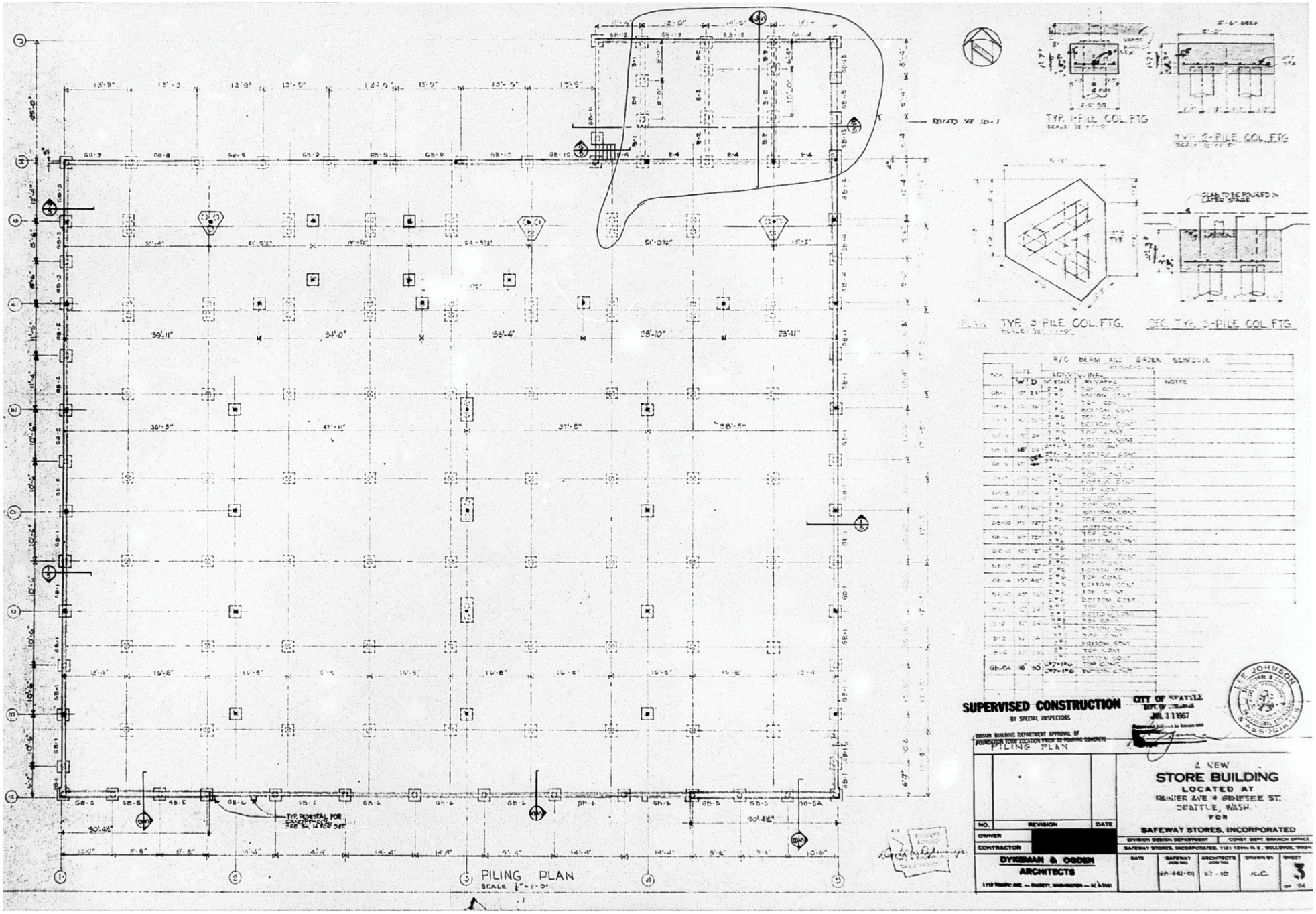

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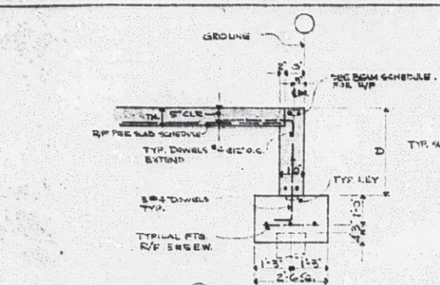
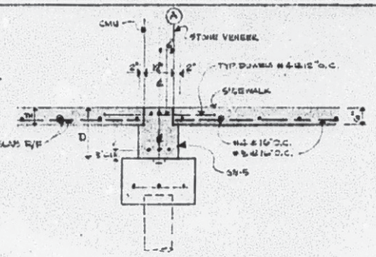
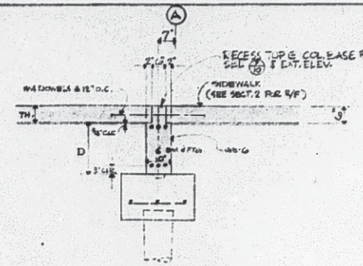
Figure 10
Pile Layout Plan for
Safeway Building - 1967



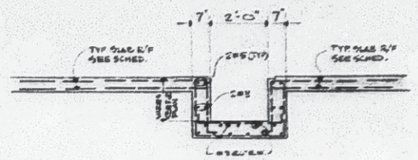
① SLAB & BM. CONNECTIONS
BMS. GB-1, 2, 3, 4, 7 & 9, 10



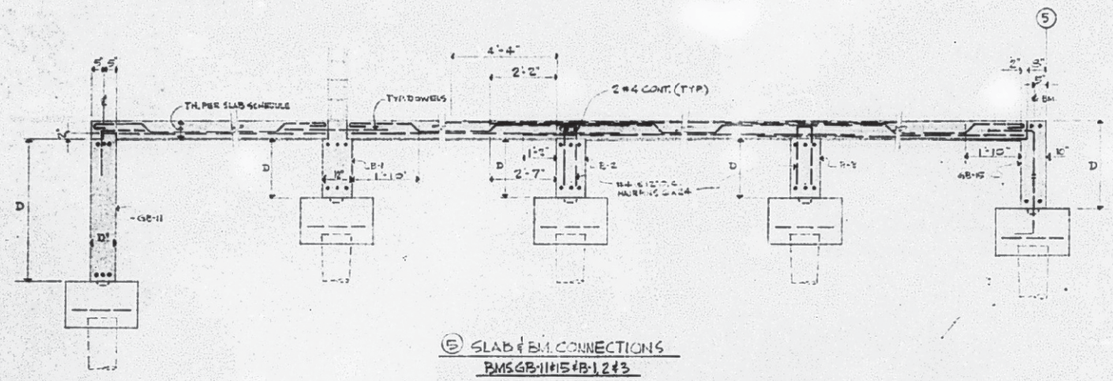
② SLAB & BM. CONN. BM. GB-5



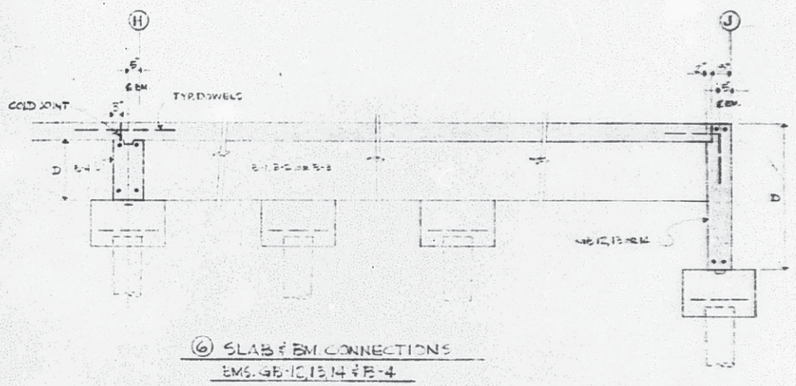
③ SLAB & BM. CONN. BM. GB-6



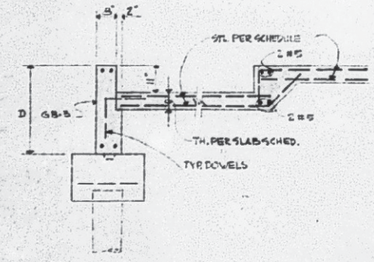
④ TYPICAL REFRIGERATOR PIT & DOOR OPER PIT



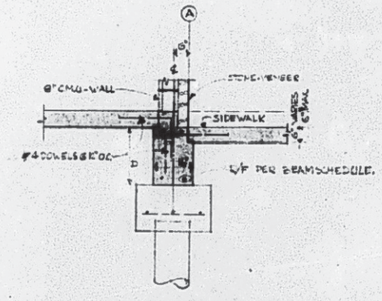
⑤ SLAB & BM. CONNECTIONS
BMS. GB-11, 11.5 & B-1, 2 & 3



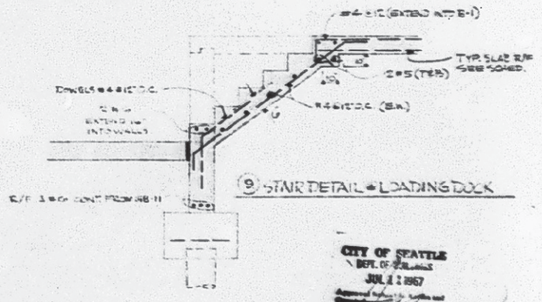
⑥ SLAB & BM. CONNECTIONS
BMS. GB-10, 13, 14 & B-4



⑦ SECTION @ N.I.C. FREEZER BOX



⑧ SLAB & BM. CONN. BM. GB-5A



⑨ STAIR DETAIL @ LOADING DOCK

SUPERVISED CONSTRUCTION
BY SPECIAL INSPECTORS
OBTAIN BUILDING DEPARTMENT APPROVAL OF FOUNDATION FORM LOCATION PRIOR TO PLACING CONCRETE

CITY OF SEATTLE
DEPT. OF [illegible]
JUL 2 1957

STRUCTURAL DETAIL

A NEW
STORE BUILDING
LOCATED AT
RAINIER AVE & GENESEE ST.
SEATTLE, WASH.
FOR
SAFEWAY STORES, INCORPORATED

NO.	REVISION	DATE
OWNER	[redacted]	
CONTRACTOR		

DIVISION DESIGN DEPARTMENT | CONST. DEPT. BRANCH OFFICE
SAFEWAY STORES INCORPORATED, 1101 130th N.E., BELLEVUE, WASH.

DYKEMAN & OGDEN
ARCHITECTS
1713 PACIFIC AVE. — EVERETT, WASHINGTON — M. 9-2661

DATE	SAFEWAY JOB NO.	ARCHITECT'S JOB NO.	DRAWN BY	SHEET
	SA-441-01	57-10	K.C.	5

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Figure 11
Safeway Foundation and Pile Construction Details

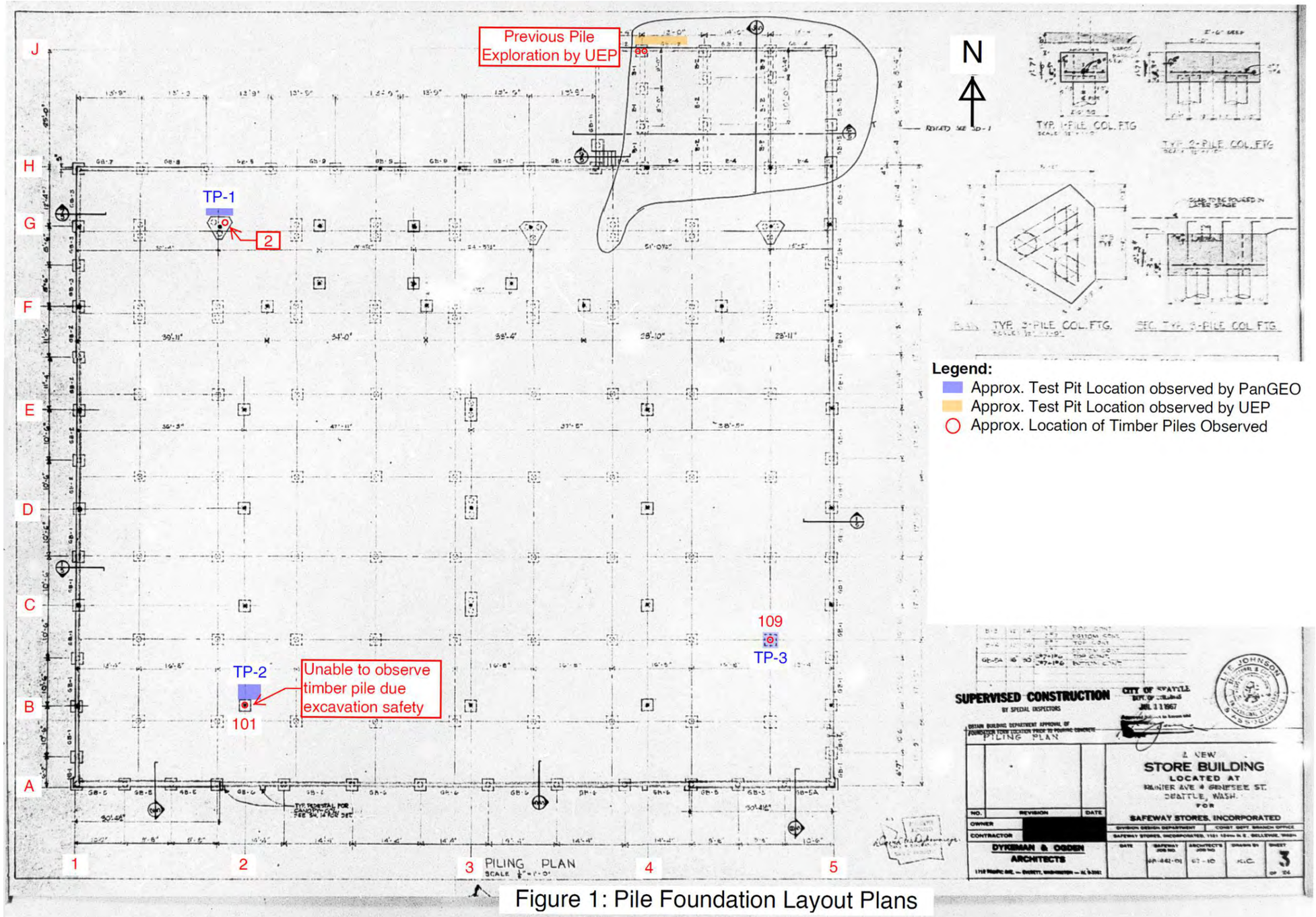
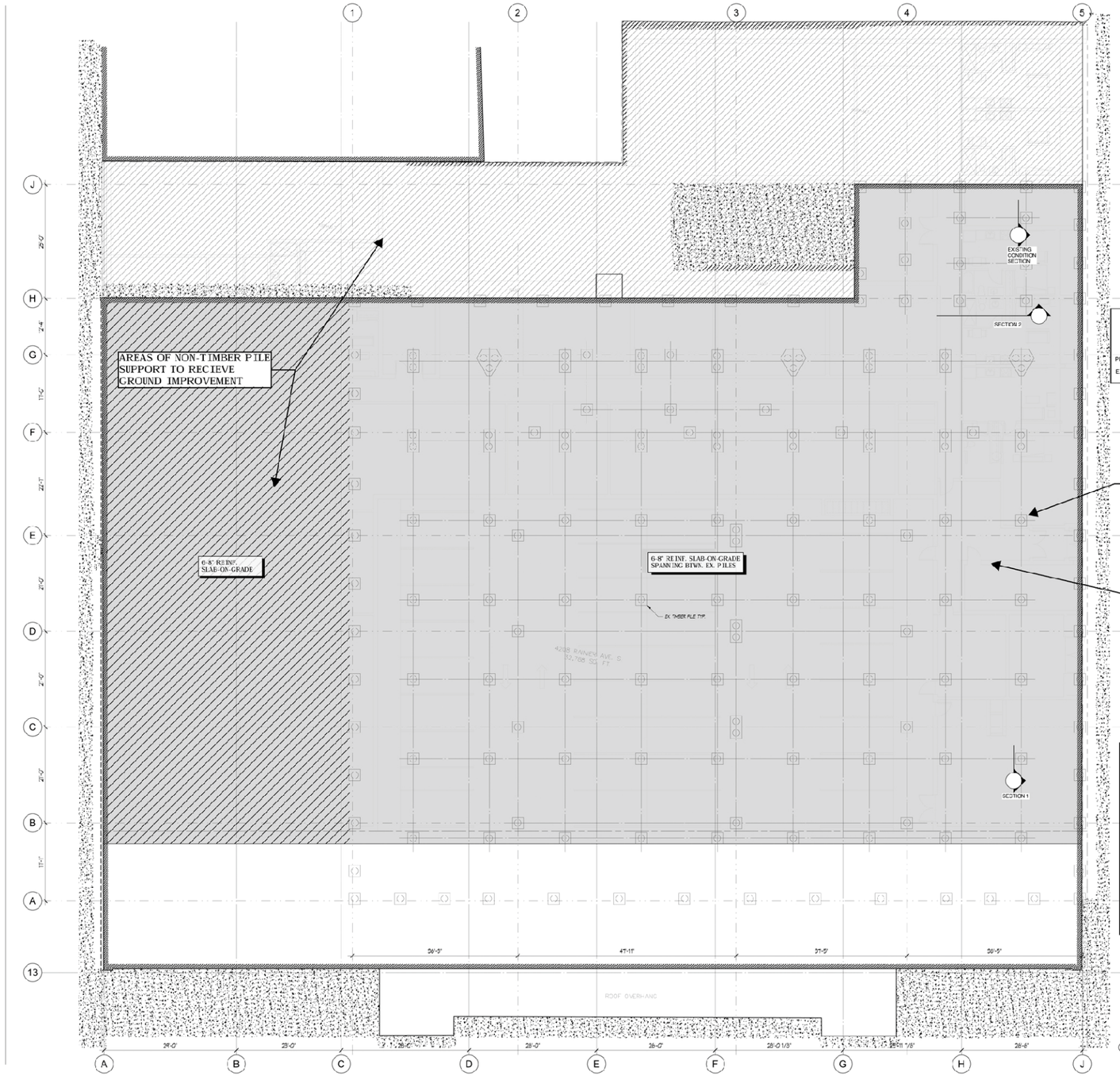
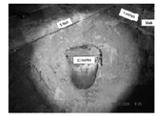


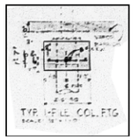
Figure 1: Pile Foundation Layout Plans

Urban Environmental Partners llc Diligent, responsive, and prac cal consul ng!	Rainier Mall Site 4208 Rainier Avenue South Seattle, WA	Figure 12 PanGeo - Existing Timber Pile Evaluation (Figure 1)

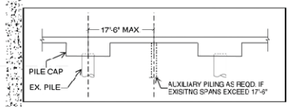




EXISTING CONDITION PHOTO



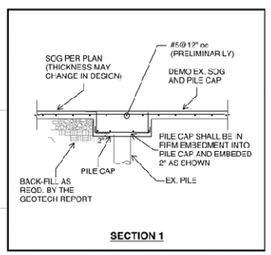
EXISTING CONDITION SECTION



SECTION 2

EXISTING PILES AND PILE CAPS SHOWN SHALL BE RE-USED TO SUPPORT NEW SLAB-ON-GRADE, TYP.

SHADED AREA REPRESENTS NEW SLAB-ON-GRADE IN NEW RESIDENTIAL BUILDING BY MOUNT BAKER HOUSING ASSOCIATION.



SECTION 1

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Rainier Mall Site
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Seattle, WA

Figure 13
Coughlin Porter Lundeen - Plan Sheet
S2.01 Piling Plan

A
NORTH

A'
SOUTH

Property Line

SOUTH GENESEE ST

B10 (3' SOUTHWEST)
UB15/MW15 (10' NORTHEAST)
B-7 (4.5' SOUTHWEST)
UB14/MW14 (3' NORTHEAST)
SB06 (22' SOUTHWEST)
B11 (4' SOUTHWEST)
B-6 (21.5' NORTHEAST)
B-5 (5' SOUTHWEST)
B14 (8' SOUTHWEST)
B06 (10' SOUTHWEST)
B04 (5' NORTHEAST)
B16/MW6 (32.5' SOUTHWEST)
B02 (12' SOUTHWEST)
B18/MW08 (47' SOUTHWEST)
TB08/MW05 (43' SOUTHWEST)
BEND IN SECTION
SB08 (2' SOUTHWEST)
UB31/MW31 (9' SOUTHWEST)
UB12/MW12 (21' SOUTHWEST)
UB13/MW13 (2' NORTHWEST)
SB02 (12' SOUTHWEST)
B03 (30' NORTHEAST)
B01/MW01 (12' SOUTHWEST)
B05 (8.5' SOUTHWEST)
SB01
B-1 (20' SOUTHWEST)
UB25/MW25 (13' NORTHEAST)
TB07/MW04 (33' SOUTHWEST)
UB40 (11' SOUTHWEST)
SB05 (31' SOUTHWEST)
UB16/MW16 (6.5' NORTHEAST)
UB30/MW30 (2' SOUTHWEST)
B-3 (18.5' SOUTHWEST)
B-4 (1' SOUTHWEST)
UB42 (5' NORTHEAST)
B17/MW09 (18' NORTHEAST)
UB26/MW26 (1.5' NORTHEAST)
UB10/MW10 (4.5' NORTHEAST)
UB20/MW20 (11.5' SOUTHWEST)

FILL
RECESSIONAL LACUSTRINE
RECESSIONAL OUTWASH
GLACIALLY CONSOLIDATED SILT AND CLAY
Silty Sand
Gravel
SP
SM
22' - 22.3'
< CUL
BOTTOM OF BORING AT 90'

DEPTH BELOW 45 FEET AMSL
0
-10
-20
-30
-40
-50
-60

ELEVATION IN FEET (AMSL)
55
45
35
25
15
5
-5
-15

LEGEND

(1' SOUTH) OFFSET 1' SOUTH
MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL
SONIC BORING
APPROXIMATE EXTENT OF SOIL SOURCE AREA

Horizontal Scale in Feet
0 20 40
0 10 20
Vertical Scale in Feet
Vertical Exaggeration X 2

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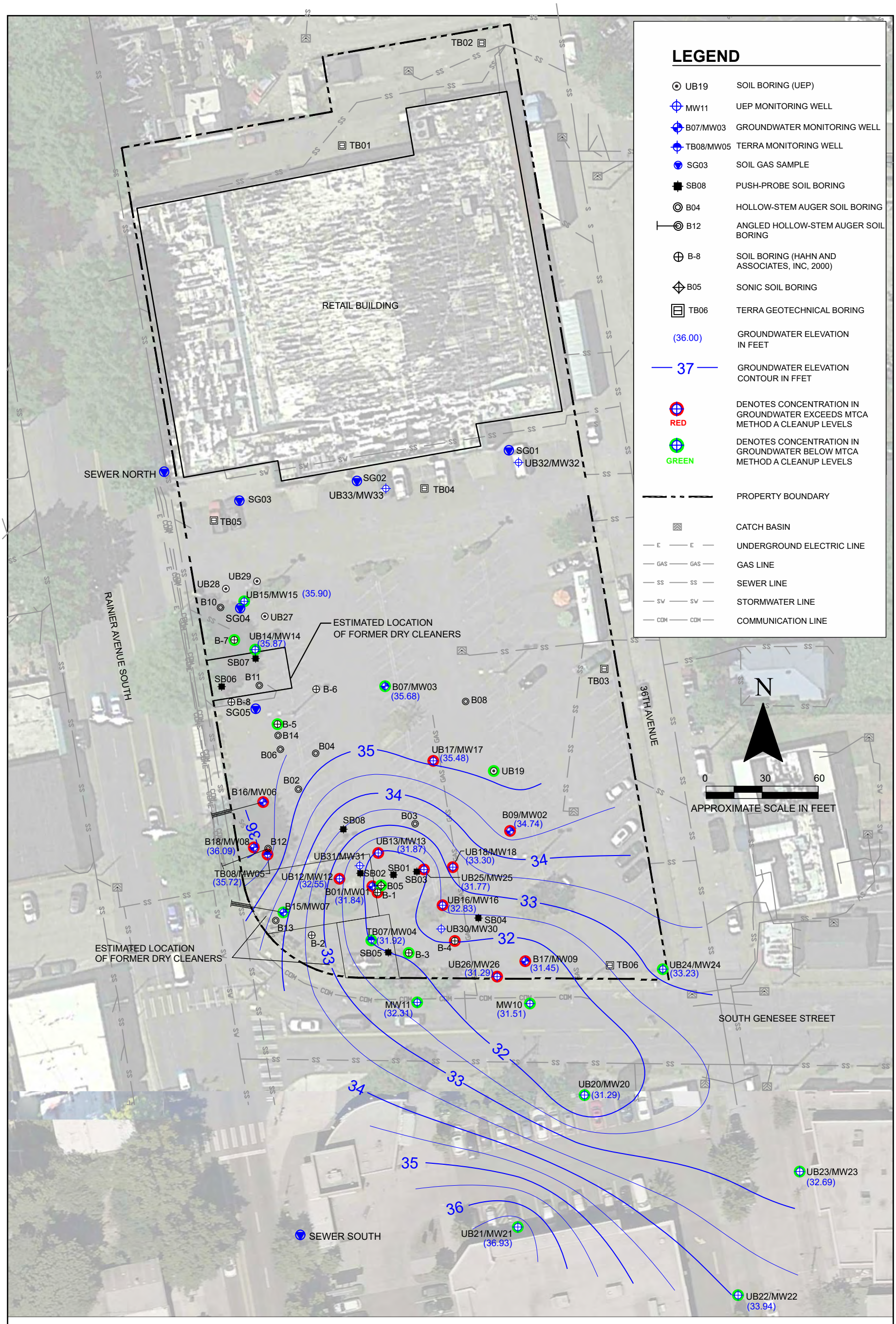
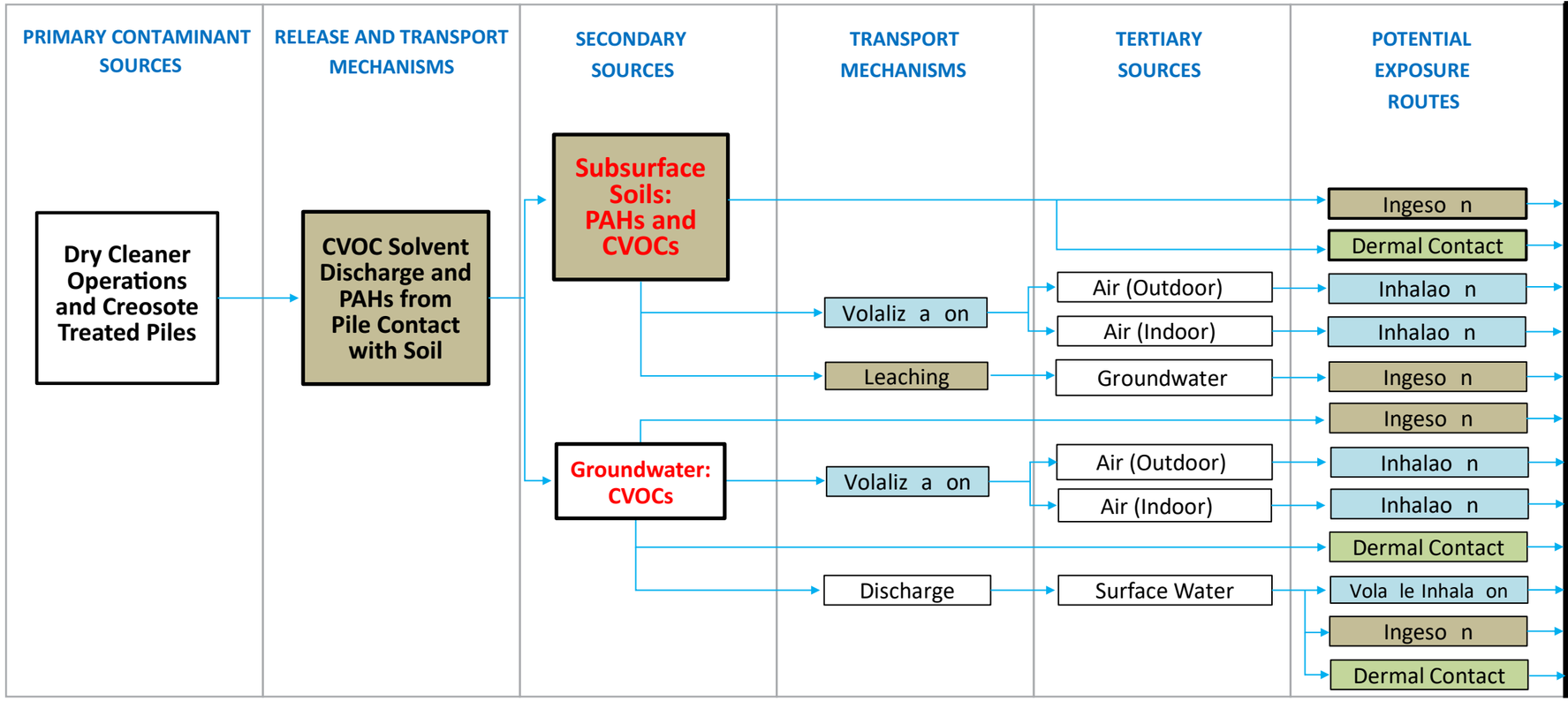
Figure 14
Geologic Cross Section A-A'



Urban Environmental Partners llc Diligent, responsive, and prac cal consul ng!	Rainier Mall Site 4208 Rainier Avenue South Seattle, WA	Figure 15 Groundwater Contour Map 4/14/2020



LAND USES - POTENTIAL RECEPTORS			
Residential	Occupational and Commercial[a]	Utility, Construction & Excavation	Terrestrial Ecological[b]
Complete?	Complete?	Complete?	Complete?
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
Y	Y	Y	X
X	X	X	X
X	X	X	X
X	X	X	X

Notes:

Y This exposure pathway is considered complete.

X This exposure pathway is deemed incomplete (no exposure).

a The occupao nal receptors include site visitors and site workers.

b Ecological receptors are incomplete because the site qualifies for an exclusion under the Terrestrial Ecological Evalua on as specified in the criteria in the Washington Administra ve Code 173-340-7491.

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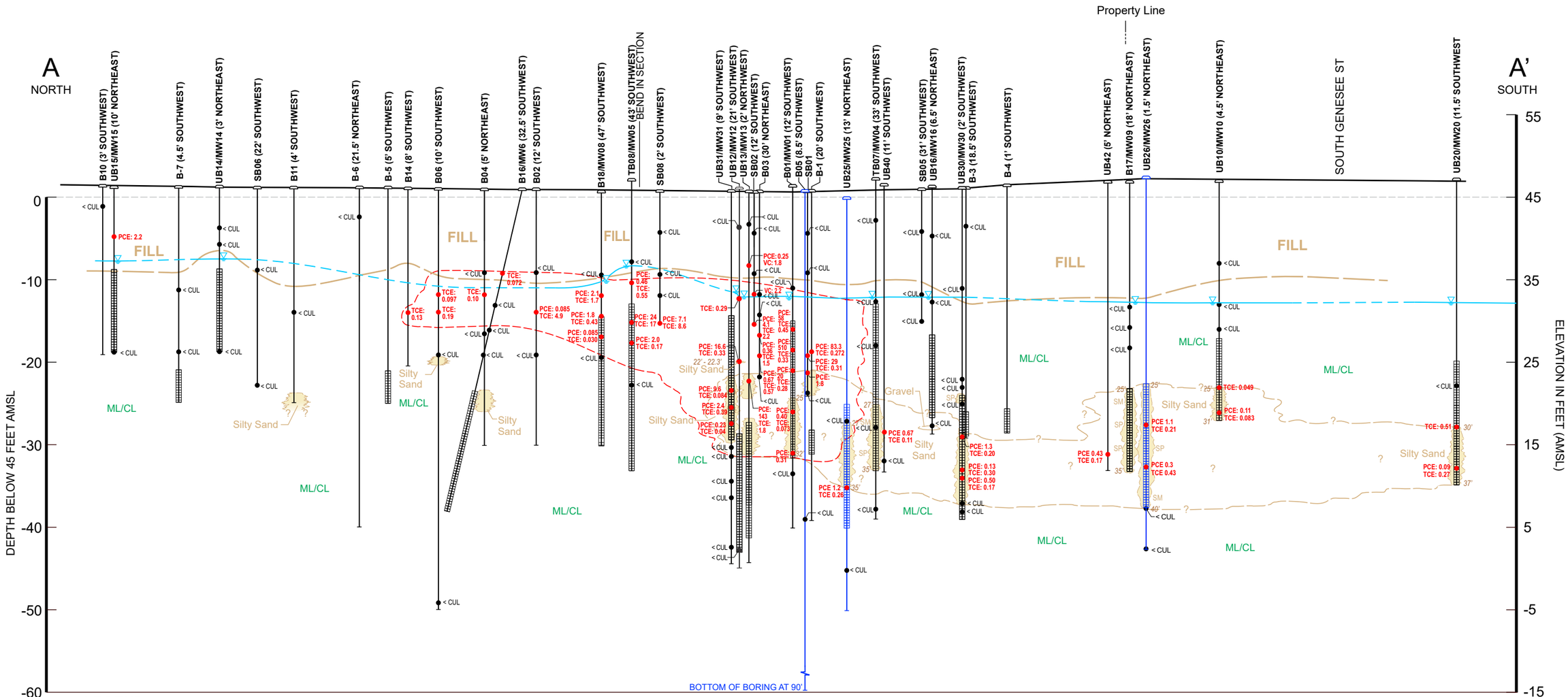
Figure 16
LUP-Rainier Mall
Conceptual Site Model



LEGEND

(1' SOUTH) OFFSET 1' SOUTH

MONITORING WELL

SCREEN INTERVAL

GROUNDWATER LEVEL

SONIC BORING

APPROXIMATE EXTENT OF SOIL SOURCE AREA

CONCENTRATIONS OF CHEMICALS OF CONCERN IN SOIL (mg/kg):

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER
RED	DENOTES CONCENTRATIONS EXCEEDING MTCA METHOD A CLEANUP LEVELS
PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
bgs	BELOW GROUND SURFACE
VC	VINYL CHLORIDE
< CUL	BELOW CLEANUP LEVEL PCE CUL (SOIL) = 0.05 mg/kg

Horizontal Scale in Feet
0 20 40
0 10 20
Vertical Scale in Feet
Vertical Exaggeration X 2

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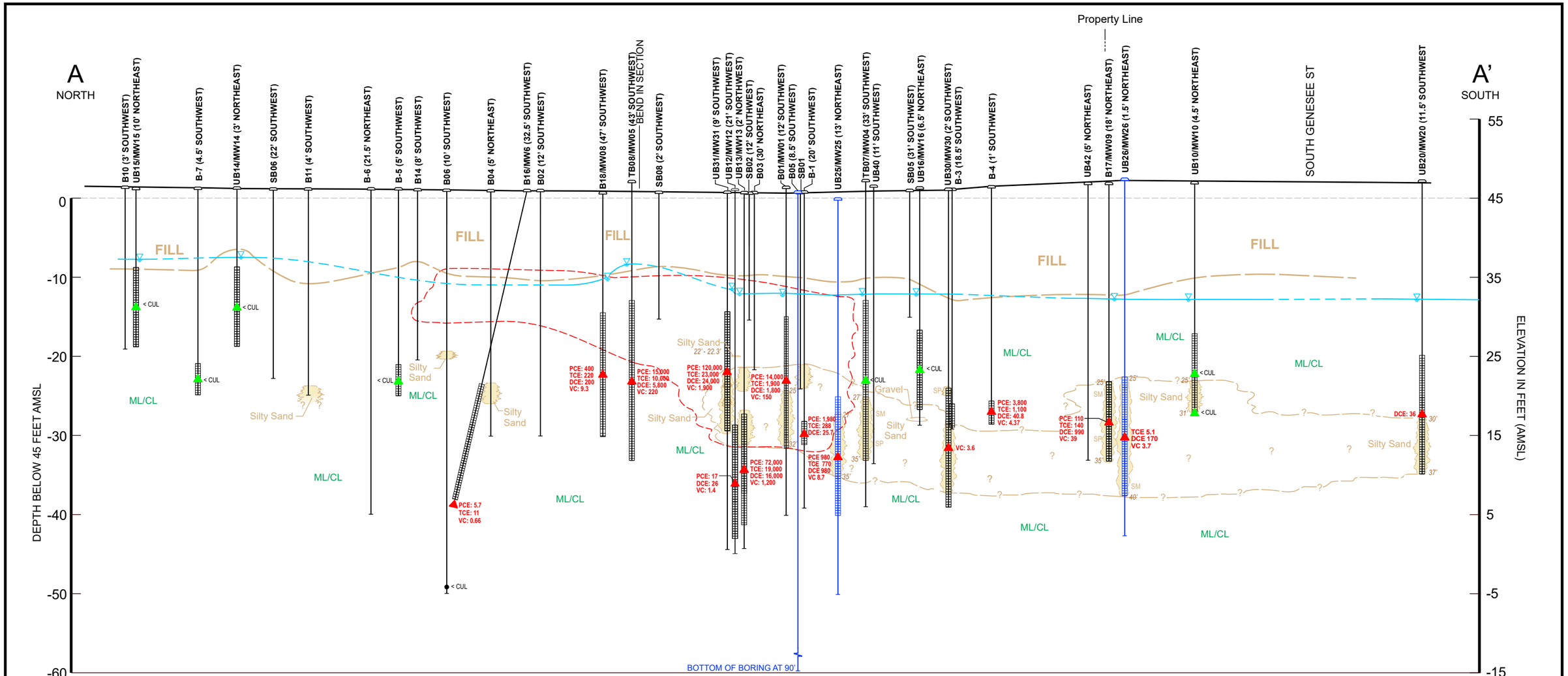
Figure 17
Cross Section A-A' with CVOC Concentrations in Soil



LEGEND

(1' SOUTH) OFFSET 1' SOUTH

MONITORING WELL

SCREEN INTERVAL

GROUNDWATER LEVEL

SONIC BORING

APPROXIMATE EXTENT OF SOIL SOURCE AREA

CONCENTRATIONS OF CHEMICALS OF CONCERN IN PERCHED GROUNDWATER

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

< CUL BELOW CLEANUP LEVEL
PCE CUL (GW) = 5.0 µg/L

NOTE: GROUNDWATER CONCENTRATIONS DEPICTED IN THIS FIGURE ARE FROM MOST RECENT SAMPLING EVENTS.

Horizontal Scale in Feet
0 20 40
0 10 20
Vertical Scale in Feet
Vertical Exaggeration X 2

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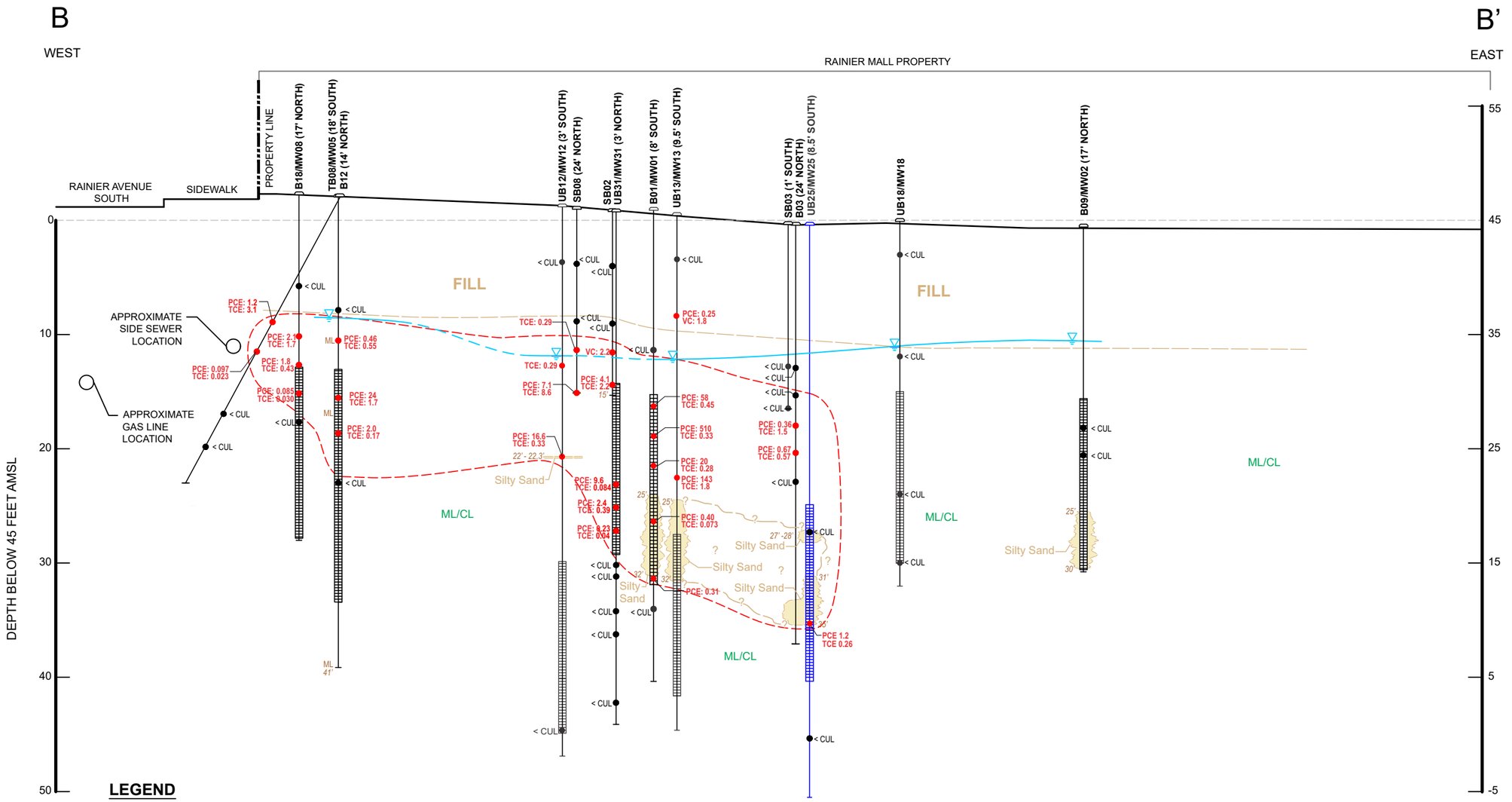
Figure 18
Cross Section A-A' with CVOC Concentrations in Groundwater



Horizontal Scale in Feet
0 10 20
0 5 10
Vertical Scale in Feet
Vertical Exaggeration X 2

(1' SOUTH) OFFSET 1' SOUTH
MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL

SONIC BORING

APPROXIMATE EXTENT OF SOIL SOURCE AREA

CONCENTRATIONS OF CHEMICALS OF CONCERN IN SOIL (mg/kg):
- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER
RED	DENOTES CONCENTRATIONS EXCEEDING MTCA METHOD A CLEANUP LEVELS

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
bgs	BELOW GROUND SURFACE
VC	VINYL CHLORIDE
< CUL	BELOW CLEANUP LEVEL PCE CUL (SOIL) = 0.05 mg/kg

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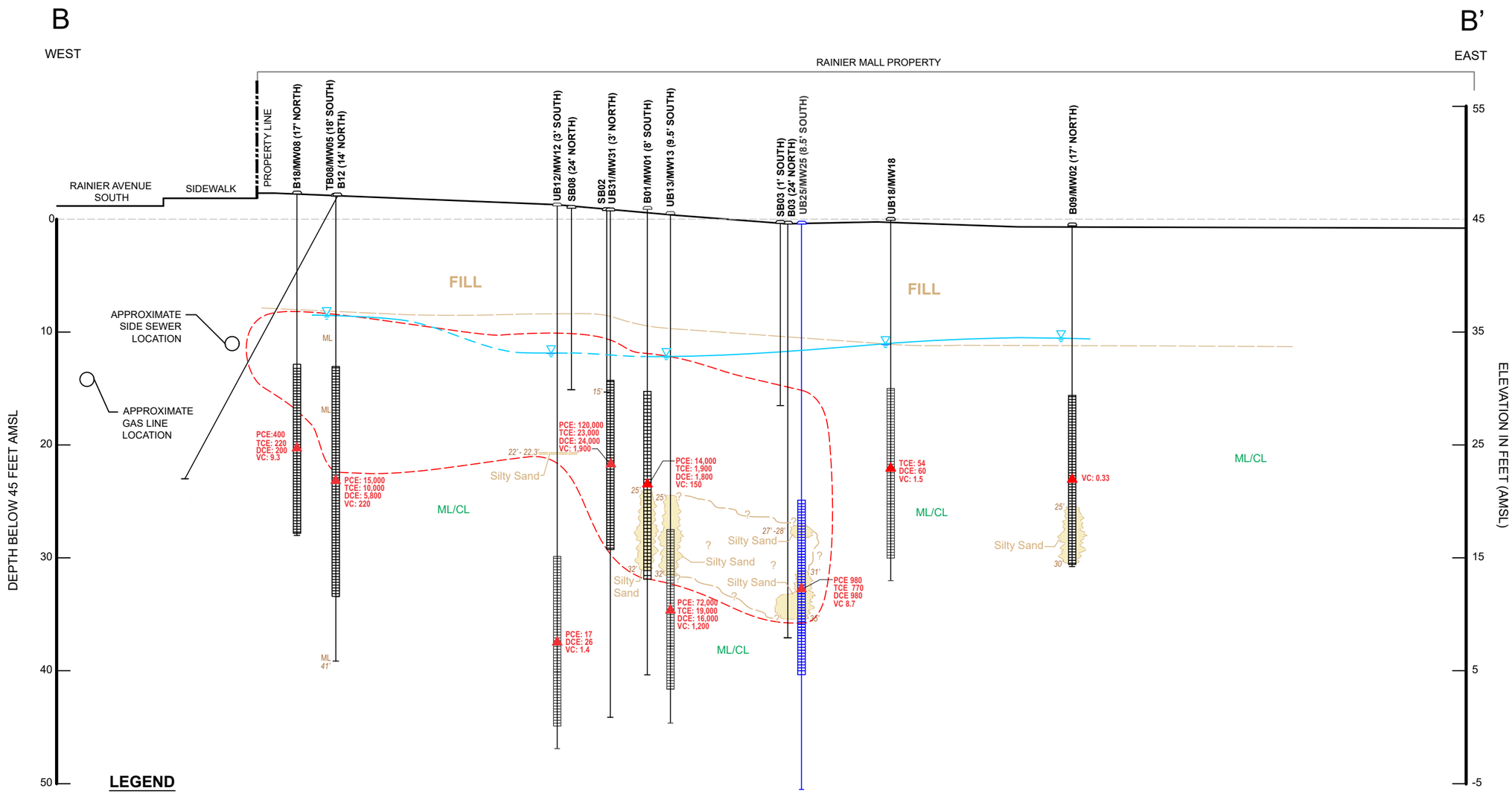
Figure 19
Cross Section B-B' with CVOC Concentrations in Soil



LEGEND

Horizontal Scale in Feet
0 10 20
0 5 10
Vertical Scale in Feet
Vertical Exaggeration X 2

(1' SOUTH) OFFSET 1' SOUTH
MONITORING WELL
SCREEN INTERVAL
GROUNDWATER LEVEL

SONIC BORING

APPROXIMATE EXTENT OF SOIL SOURCE AREA

CONCENTRATIONS OF CHEMICALS OF CONCERN IN PERCHED GROUNDWATER

- CONCENTRATION BELOW MTCA METHOD A CLEANUP LEVEL
- CONCENTRATION ABOVE MTCA METHOD A CLEANUP LEVEL

mg/kg	MILLIGRAMS PER KILOGRAM
µg/L	MICROGRAMS PER LITER
RED	DENOTES CONCENTRATIONS EXCEEDING MTCA METHOD A CLEANUP LEVELS

PCE	TETRACHLOROETHENE
TCE	TRICHLOROETHENE
MTCA	WASHINGTON STATE MODEL TOXICS CONTROL ACT
bgs	BELOW GROUND SURFACE
VC	VINYL CHLORIDE
< CUL	BELOW CLEANUP LEVEL PCE CUL (GW) = 5.0 µg/L

NOTE: GROUNDWATER CONCENTRATIONS DEPICTED IN THIS FIGURE ARE FROM MOST RECENT SAMPLING EVENTS.

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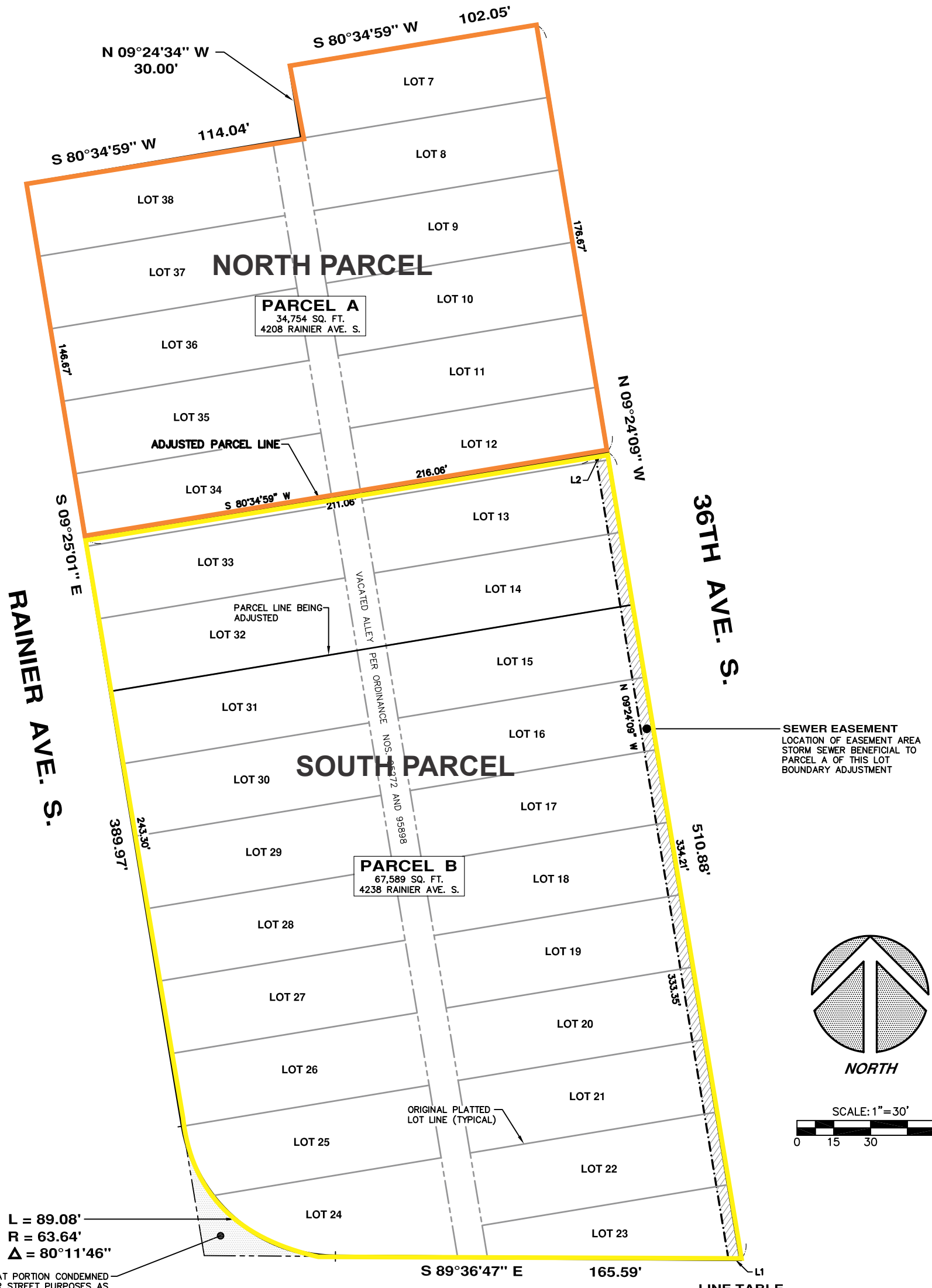
Figure 20
Cross Section B-B' with CVOC Concentrations in Groundwater

LOT BOUNDARY ADJUSTMENT NO. 3036665-LU



LINE TABLE

LINE	BEARING	LENGTH
L1	N 89°36'47" W	5.07'
L2	N 80°34'59" E	5.00'

BRANDON E. WINTERS STATE OF WASHINGTON 45803 REGISTERED PROFESSIONAL LAND SURVEYOR
PRELIMINARY
DATE: _____

CHADWICK WINTERS

LAND SURVEYING AND MAPPING
1422 N.W. 85TH ST., SEATTLE, WA 98117
PHONE: 206.297.0996
FAX: 206.297.0997
WEB: WWW.CHADWICKWINTERS.COM

SURVEY IN:
NW 1/4, SW 1/4, SEC. 15, T. 24 N., R. 4 E., W.M.
KING COUNTY, WASHINGTON

17-6015LBA-Y.DWG

DRAWN BY: SAL	*DATE:* 07-10-2020	*PROJECT #:* 17-6015
CHK. BY: RHW	*SCALE:* 1" = 30'	*SHEET:* 4 OF 5

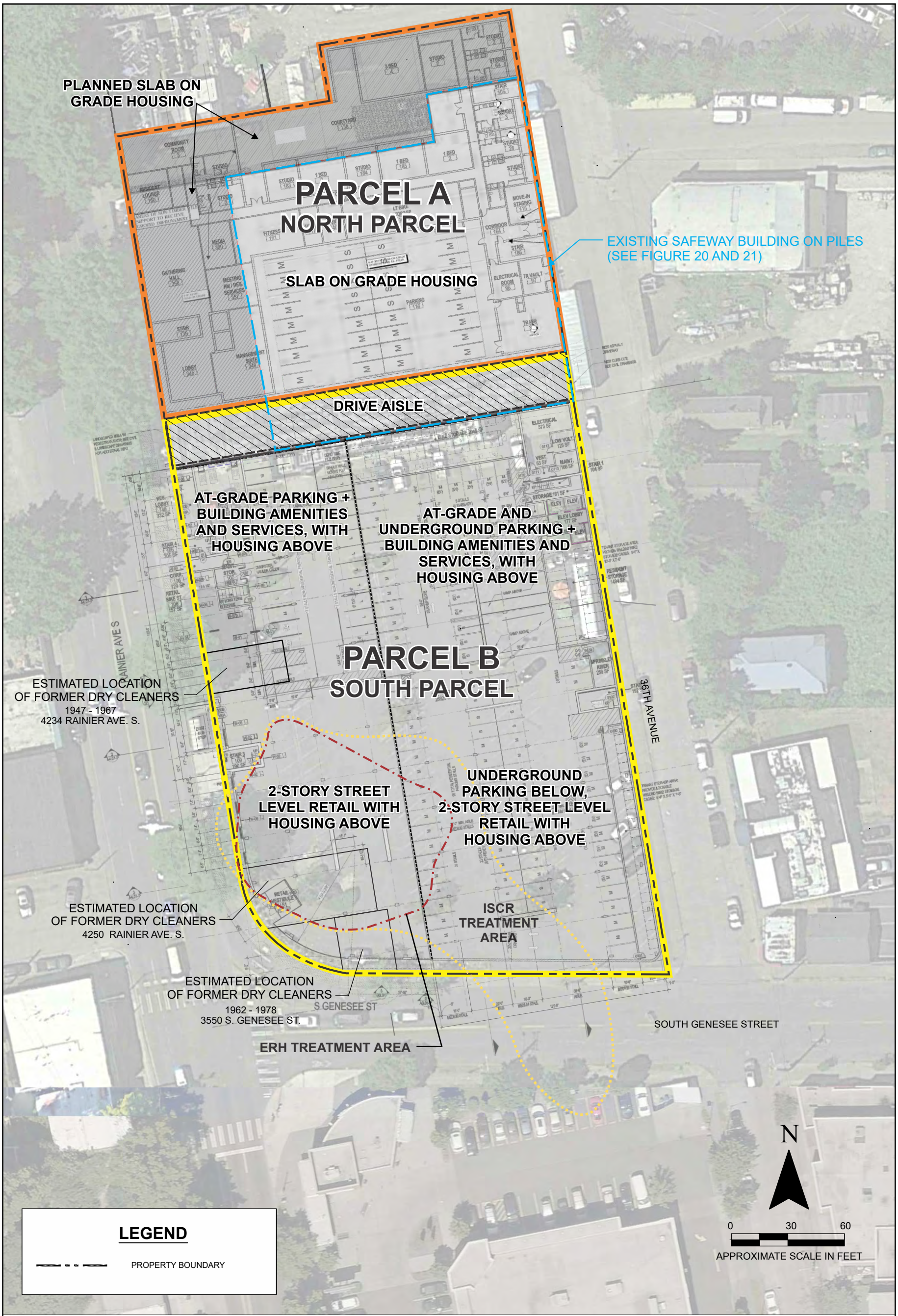


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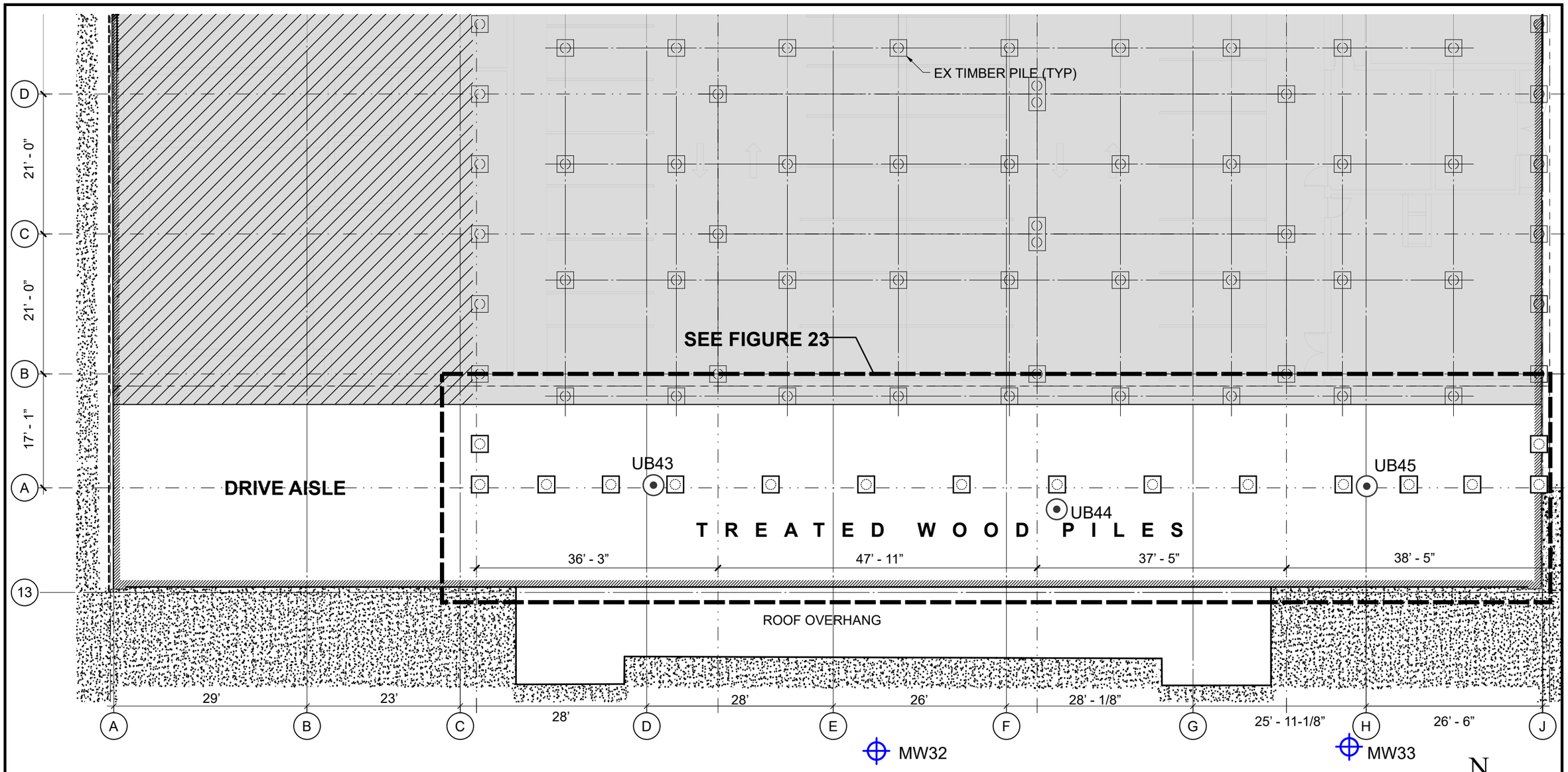
Figure 21B
Phased Development Plans
and Drive Aisle Pile Removal Area



LEGEND

UB43	PROPOSED SOIL CONFIRMATION PROBE
MW32	EXISTING GW COMPLIANCE WELL

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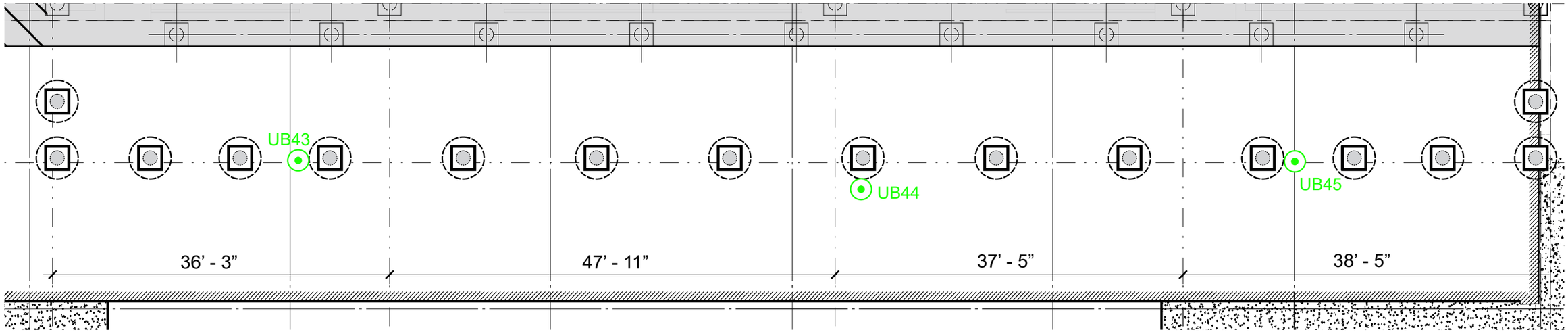
Figure 22
Drive Aisle - Planned Soil Confirmation Sampling and Pile Removal

N

0 15

APPROXIMATE SCALE IN FEET



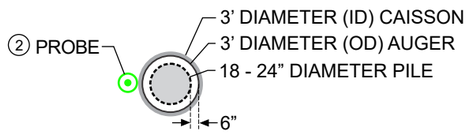
LEGEND

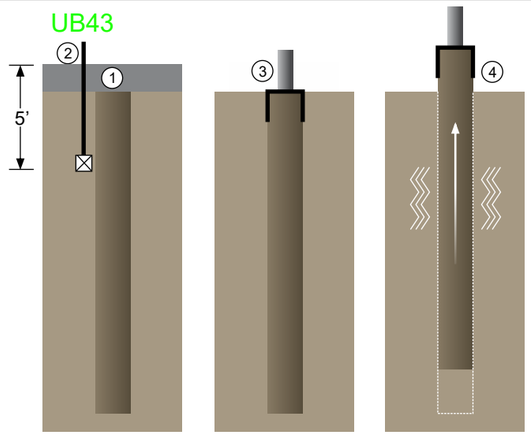
PILE CAP DEMOLISHED

PILE REMOVED

PILE REMOVAL

1. REMOVE PILE CAP
2. CONFIRMATION GEO PROBE TO 5’ BGS ☒ SAMPLE SOIL
3. ATTACH VIBRATORY HAMMER
4. VIBRATE AND REMOVE

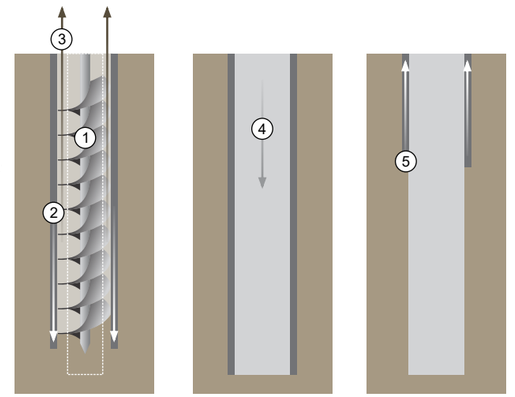




NOT TO SCALE

SOIL REMOVAL

1. LARGE DIAMETER AUGER
2. CAISSON IS ADVANCED AS
3. AUGER REMOVES SOIL
4. EXCAVATION “HOLE” IS BACKFILLED WITH CDF
5. CAISSON REMOVED



NOT TO SCALE

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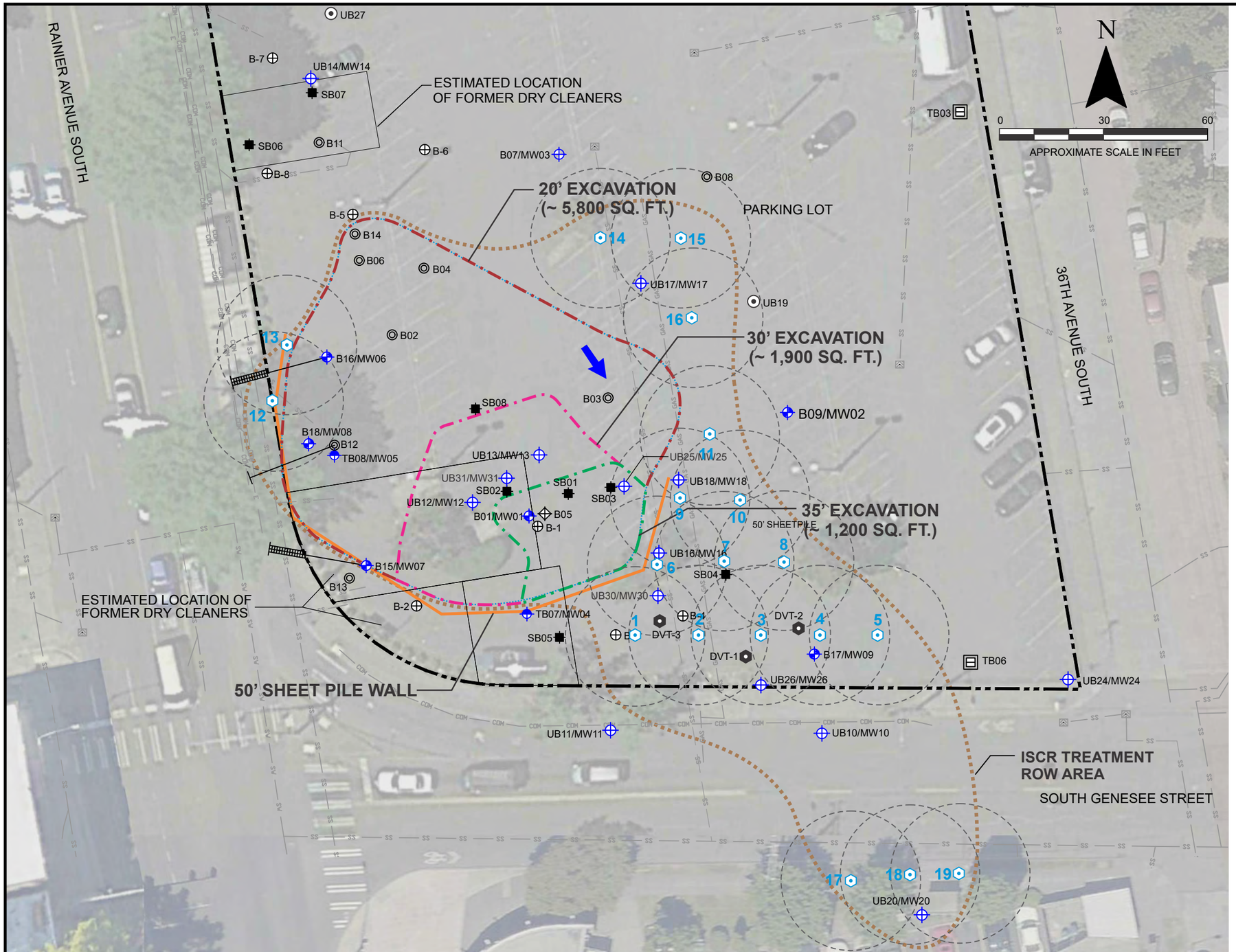
Figure 23
Treated Pile Removal - Remedial Process



LEGEND

- ISCR INJECTION POINT (QTY 19)
- 20 FOOT ROI
- GROUNDWATER ISCR TREATMENT AREA
- 50' SHEETPILE
- DVT-1 — PILOT TEST MONITORING POINT (UEP)
- UB19 — SOIL BORING (UEP)
- MW10 — MONITORING WELL (UEP)
- B17/MW09 — GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 — TERRA MONITORING WELL
- B12 — ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 — PUSH-PROBE SOIL BORING
- B04 — HOLLOW-STEM AUGER SOIL BORING
- B12 — ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 — SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 — SONIC SOIL BORING
- T6 — TERRA GEOTECHNICAL BORING
- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY

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Figure 24
Remedial Alternative 1
Excavation of Soil with In-Situ Chemical Reduction (ISCR)

RAINIER AVENUE SOUTH

36TH AVENUE SOUTH

SOUTH GENESEE STREET

ESTIMATED LOCATION OF FORMER DRY CLEANERS

20' EXCAVATION (~ 5,800 SQ. FT.)

30' EXCAVATION (~ 1,900 SQ. FT.)

35' EXCAVATION (~ 1,200 SQ. FT.)

AREA OF GROUNDWATER MNA

50' SHEET PILE WALL

PARKING LOT

UB27 B-7 UB14/MW14 SB07 SB06 B11 B-6 B07/MW03 B-8 B08 B-5 B14 B06 B04 UB17/MW17 UB19 B02 B16/MW06 SB08 B03 B09/MW02 B18/MW08 B12 TB08/MW05 UB13/MW13 UB25/MW25 UB31/MW31 SB02 SB01 SB03 UB18/MW18 UB12/MW12 B01/MW01 B05 B-1 UB16/MW16 UB39 SB04 B15/MW07 B13 UB40 UB30/MW30 B-2 TB07/MW04 B-4 DVT-2 SB05 B-3 DVT-3 UB41 DVT-1 B17/MW09 UB42 UB26/MW26 TB06 UB24/MW24 UB11/MW11 UB10/MW10 UB20/MW20 TB03

N

0 30 60

APPROXIMATE SCALE IN FEET

LEGEND

- EXTENT OF CVOC GROUNDWATER IMPACTS ABOVE CULs
- 50' SHEETPILE
- DVT-1 PILOT TEST MONITORING POINT (UEP)
- UB19 SOIL BORING (UEP)
- MW10 MONITORING WELL (UEP)
- B17/MW09 GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 TERRA MONITORING WELL
- B12 ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 PUSH-PROBE SOIL BORING
- B04 HOLLOW-STEM AUGER SOIL BORING
- B12 ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 SONIC SOIL BORING
- T6 TERRA GEOTECHNICAL BORING
- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY

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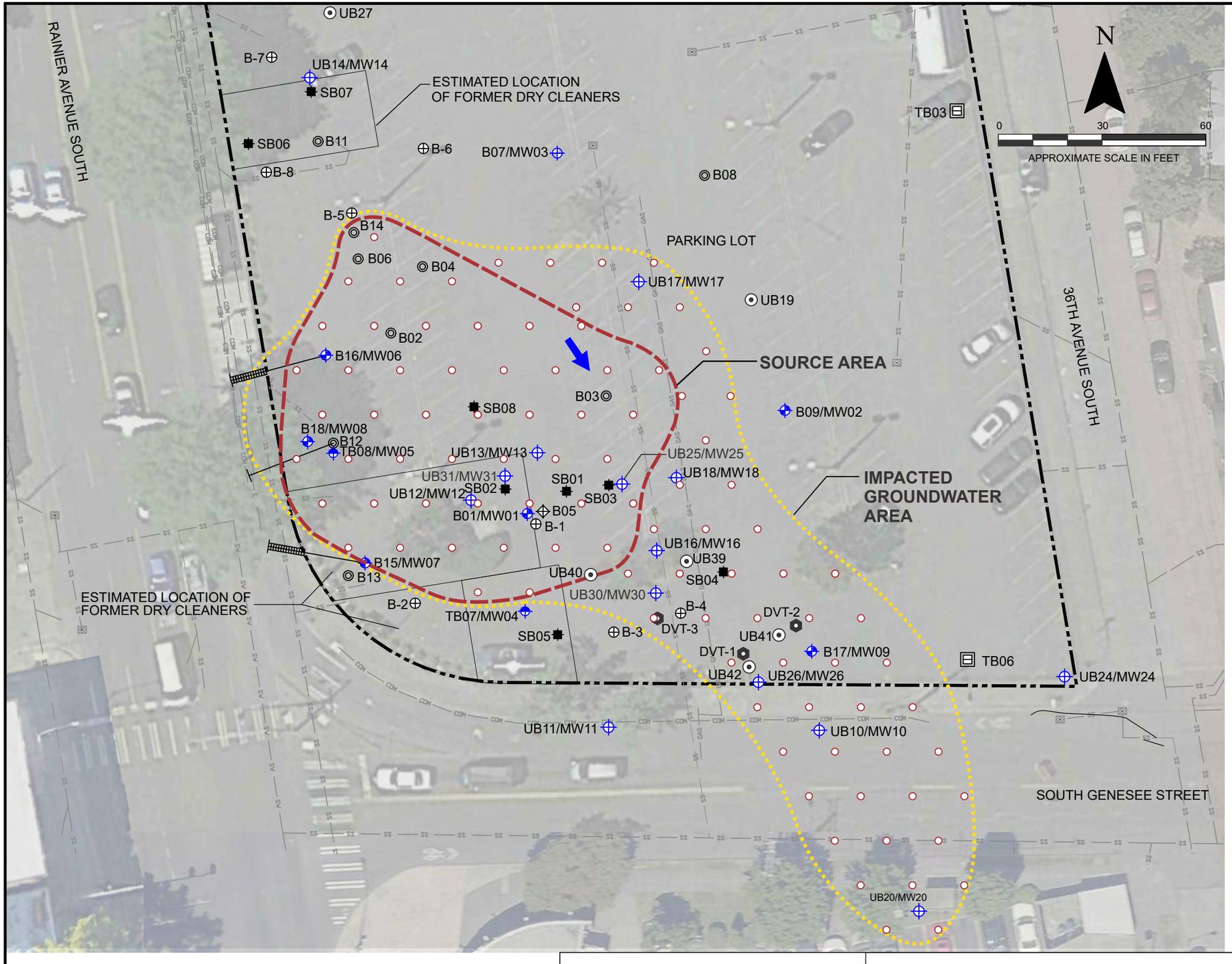
Figure 25
Remedial Alternative 2
Excavation of Soil with Monitored Natural Attenuation



LEGEND

- PRIMARY SOURCE AREA
- EXTENT OF CVOC GROUNDWATER IMPACTS ABOVE CULs
- DPE PROBE OR WELL
- DVT-1 — PILOT TEST MONITORING POINT (UEP)
- UB19 — SOIL BORING (UEP)
- MW10 — MONITORING WELL (UEP)
- B17/MW09 — GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 — TERRA MONITORING WELL
- B12 — ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 — PUSH-PROBE SOIL BORING
- B04 — HOLLOW-STEM AUGER SOIL BORING
- B12 — ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 — SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 — SONIC SOIL BORING
- T6 — TERRA GEOTECHNICAL BORING
- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY

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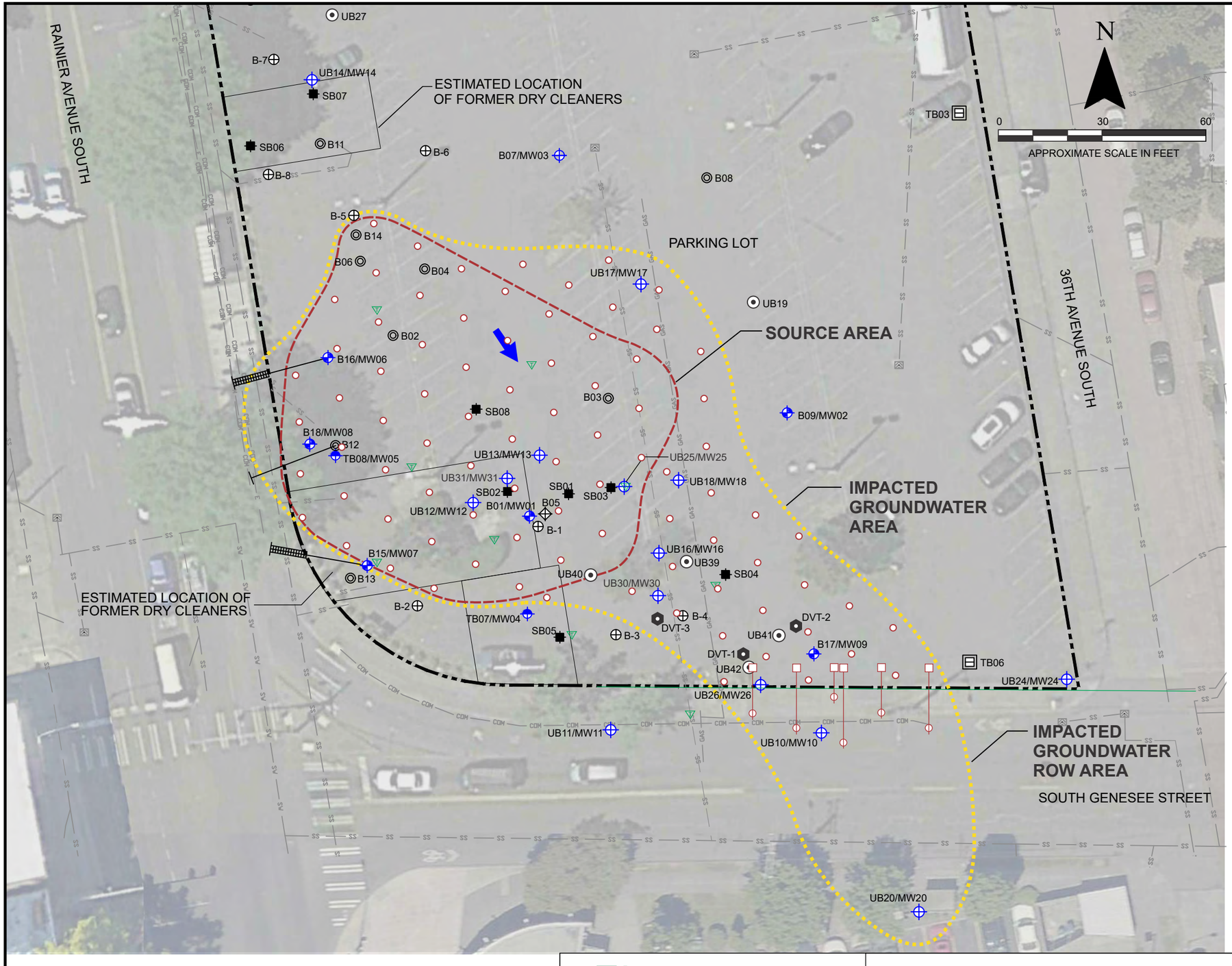
Figure 26
Remedial Alternative 3
DPE with Air Sparging



LEGEND

- ELECTRODE (QTY. 85)
- ANGLED ELECTRODE (QTY. 6)
- TEMPERATURE MONITORING POINT (QTY. 9)
- PRIMARY SOURCE AREA
- EXTENT OF CVOC GROUNDWATER IMPACTS ABOVE CULs
- DVT-1 — PILOT TEST MONITORING POINT (UEP)
- UB19 — SOIL BORING (UEP)
- MW10 — MONITORING WELL (UEP)
- B17/MW09 — GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 — TERRA MONITORING WELL
- B12 — ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 — PUSH-PROBE SOIL BORING
- B04 — HOLLOW-STEM AUGER SOIL BORING
- B12 — ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 — SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 — SONIC SOIL BORING
- T6 — TERRA GEOTECHNICAL BORING
- INFERRED GROUNDWATER FLOW DIRECTION
- CATCH BASIN
- PROPERTY BOUNDARY

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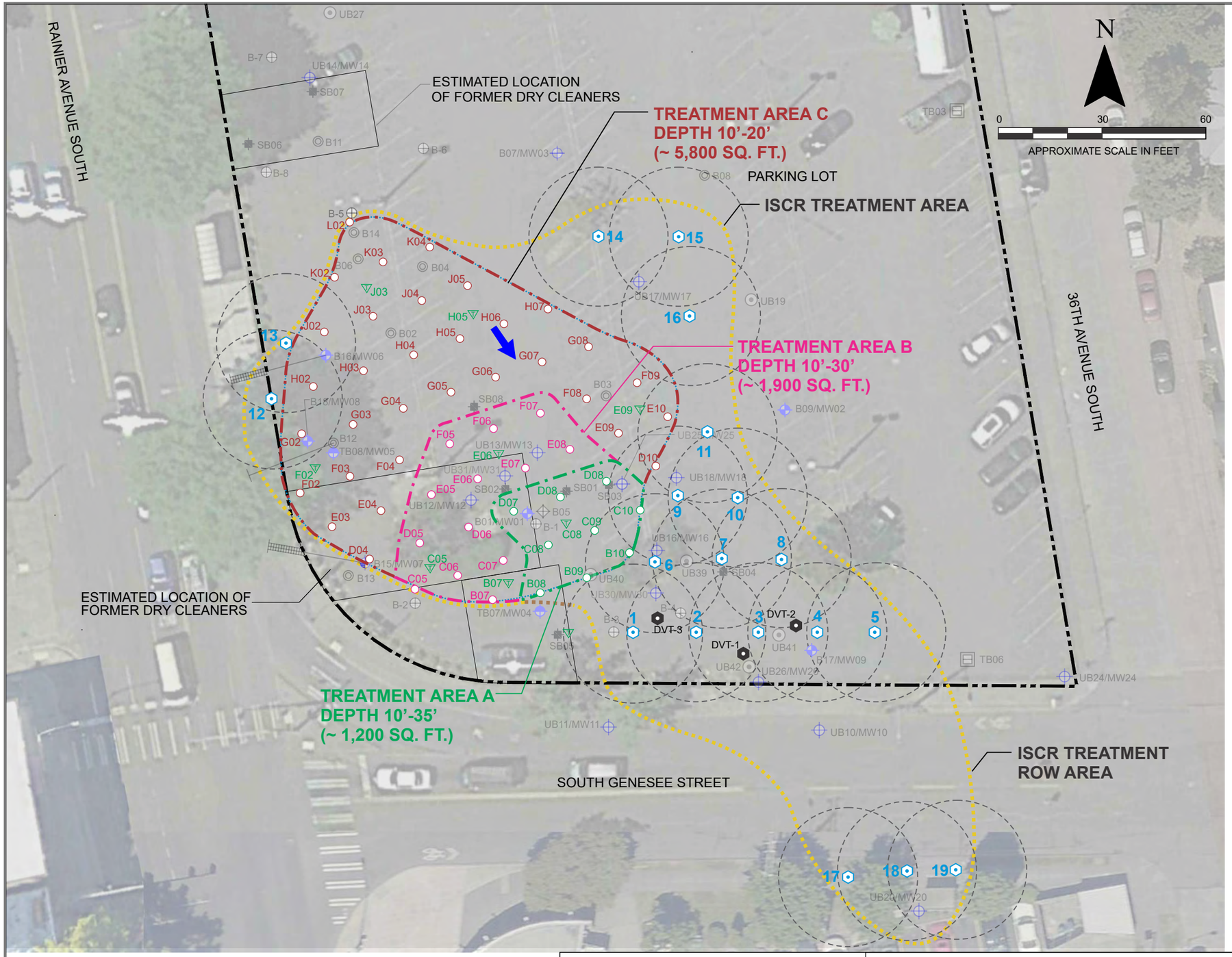
Figure 27
Remedial Alternative 4
ERH with SVE



LEGEND

- ELECTRODE (QTY. 54)
- TEMPERATURE MONITORING POINT (QTY. 9)
- ISCR INJECTION POINT (QTY 19)
- 20 FOOT ROI
- GROUNDWATER ISCR TREATMENT AREA
- DVT-1 — PILOT TEST MONITORING POINT (UEP)
- UB19 — SOIL BORING (UEP)
- MW10 — MONITORING WELL (UEP)
- B17/MW09 — GROUNDWATER MONITORING WELL (SES)
- TB08/MW05 — TERRA MONITORING WELL
- B12 — ANGLED HOLLOW-STEM AUGER GROUNDWATER MONITORING WELL
- SB08 — PUSH-PROBE SOIL BORING
- B04 — HOLLOW-STEM AUGER SOIL BORING
- B12 — ANGLED HOLLOW-STEM AUGER SOIL BORING
- B-8 — SOIL BORING (HAHN AND ASSOCIATES, INC, 2000)
- B05 — SONIC SOIL BORING
- T6 — TERRA GEOTECHNICAL BORING
- INFERRED GROUNDWATER FLOW DIRECTION
- PROPERTY BOUNDARY

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Rainier Mall Site
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Seattle, WA

Figure 28
Remedial Alternative 5 - ERH with ISCR

Exhibit B: Tables

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Table 1
Soil Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)					
					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
B-1	5015-000628-005	Hahn	6/28/2000	19.5	**83.3**	**0.272**	<0.005	--	<0.005	<0.01
B-3	5015-000628-018	Hahn	6/28/2000	4.5	<0.005	<0.005	<0.005	--	<0.005	<0.01
B-6	5015-000628-018	Hahn	6/28/2000	7	<0.005	<0.005	<0.005	--	<0.005	<0.01
B-8	5015-000629-039	Hahn	6/28/2000	4.5	<0.005	<0.005	<0.005	--	<0.005	<0.01
SB01	SB01-5.0	SoundEarth	1/18/2017	5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB01-10.0			10	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB01-20.0			20	**29**	**0.31**	<0.05	<0.05	--	<0.05
	SB01-22.5			22.5	**1.8**	<0.02	<0.05	<0.05	--	<0.05
	SB01-24.5			24.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB02	SB02-5.0	SoundEarth	1/18/2017	5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB02-10.0			10	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB02-12.5			12.5	<0.025	<0.02	**6.7**	**0.052**	--	**2.2**
	SB02-16			16	**4.1**	**2.2**	**1.1**	<0.05	--	**0.052**
SB03	SB03-12.5	SoundEarth	1/18/2017	12.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB03-16.0			16	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB04	SB04-5.0	SoundEarth	1/18/2017	5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB04-12.5			12.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB04-16.0			16	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB05	SB05-5.0	SoundEarth	1/18/2017	5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB05-12.5			12.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB05-16.0			16	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB06	SB06-10.0	SoundEarth	1/18/2017	10	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB06-24.0			24	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB07	SB07-10.0	SoundEarth	1/18/2017	10	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB07-16.0			16	<0.025	<0.02	<0.05	<0.05	--	<0.05
SB08	SB08-5.0	SoundEarth	1/18/2017	5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB08-10			10	<0.025	<0.02	<0.05	<0.05	--	<0.05
	SB08-12.5			12.5	<0.025	**0.029**	**1.3**	**0.086**	--	<0.05
	SB08-16.0			16	**7.1**	**8.6**	**10**	**0.056**	--	**0.24**
B01/MW01	B01-12.5	SoundEarth	2/9/2017	12.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	B01-17.5			17.5	**58**	**0.45**	<0.05	<0.05	--	<0.05
	B01-20			20	**510**	**0.33**	<0.05	<0.05	--	<0.05
	B01-22.5			22.5	**20**	**0.28**	<0.05	<0.05	--	<0.05
	B01-27.5			27.5	**0.40**ht	**0.073**ht	<0.05ht	<0.05ht	--	<0.05ht
	B01-32.5			32.5	**0.31**ht	<0.02ht	<0.05ht	<0.05ht	--	<0.05ht
	B01-35			35	**0.049**ht	<0.02ht	<0.05ht	<0.05ht	--	<0.05ht
B02	B02-10	SoundEarth	2/9/2017	10.0	<0.025	<0.02	**0.13**	<0.05	--	<0.05
	B02-15			15.0	**0.085**	**4.9**	**6.7**	**0.25**	--	0.097
	B02-20			20.0	<0.025	<0.02	<0.05	<0.05	--	<0.05
B03	B03-12.5	SoundEarth	2/9/2017	12.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
	B03-15			15.0	<0.025	<0.02	0.082	<0.05	--	<0.05
	B03-17.5			17.5	**0.36**	**1.5**	**1.1**	<0.05	--	<0.05
	B03-20			20.0	**0.67**	**0.57**	**0.41**	<0.05	--	<0.05
	B03-22.5			22.5	<0.025	<0.02	<0.05	<0.05	--	<0.05
B04	B04-10	SoundEarth	2/9/2017	10.0	<0.025	<0.02	<0.05	<0.05	--	<0.05
	B04-12.5			12.5	<0.025	**0.10**	**0.79**	**0.12**	--	<0.05
	B04-17.5			17.5	<0.025	<0.02	**0.32**	<0.05	--	<0.05
B05	B05-40	SoundEarth	3/22/2017	40.0	<0.025	<0.02	<0.05	<0.05	--	<0.05
TB01	TB01-15	SoundEarth	1/24/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
TB02	TB02-15	SoundEarth	1/24/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
TB05	TB05-05	SoundEarth	1/25/2018	5	<0.025	<0.02	--	--	<0.05	<0.05
TB07	TB07-05	SoundEarth	1/26/2018	5	<0.025	<0.02	<0.05	--	<0.05	<0.05
	TB07-15			15.0	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	TB07-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	TB07-30			30	<0.025	<0.02	<0.05	--	<0.05	<0.05
TB08	TB08-10	SoundEarth	1/26/2018	10.0	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	TB02-12.5			12.5	**0.46**	**0.55**	**0.21**	--	<0.05	<0.05
	TB08-17.5			17.5	**24**	**1.7**	**0.45**	--	<0.05	<0.05
	TB08-20			20.0	**2.0**	**0.17**	**0.06**	--	<0.05	<0.05
	TB08-25			25	<0.025	<0.02	<0.05	--	<0.05	<0.05

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Table 1
Soil Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)					
					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
B06	B06-12.5	SoundEarth	1/26/2018	12.5	<0.025	0.097	**0.15**	--	<0.05	<0.05
	B06-15			15	<0.025	0.19	**0.47**	<0.05	<0.05	<0.05
	B06-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B06-50			50	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B07	B07-12.5	SoundEarth	1/25/2018	12.5	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B07-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B08	B08-15	SoundEarth	1/25/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B08-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B09	B09-17.5	SoundEarth	1/25/2018	17.5	<0.025	<0.02	<0.05	--	<0.05	<0.05
	B09-20			20	<0.025	<0.02	<0.05	--	<0.05	<0.05
B10	B10-2.5	SoundEarth	1/26/2018	2.5	<0.025	<0.02	--	--	<0.05	<0.05
B11	B11-15	SoundEarth	1/26/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B12	B12-10.5	SoundEarth	2/7/2018	10.5–11.5	1.2	3.1	**0.88**	<0.05	<0.05	<0.05
	B12-14			14–15	0.097	0.023	<0.05	<0.05	<0.05	<0.05
	B12-17			17–18	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B12-20			20–21	<0.025	<0.02	<0.05	--	<0.05	<0.05
B13	B13-15	SoundEarth	2/7/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B14	B14-15	SoundEarth	2/7/2018	15	<0.025	0.13	**0.40**	<0.05	<0.05	<0.05
B15	B15-11	SoundEarth	10/1/2018	10.5–11.5	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B15-14			14–15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B15-17			17–18	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B15-20			20–21	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B16	B16-11	SoundEarth	10/1/2018	10.5–11.5	<0.025	0.072	<0.05	<0.05	<0.05	<0.05
	B16-14			14–15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B16-17			17–18	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B16-20			20–21	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B17	B17-15	SoundEarth	10/2/2018	15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B17-17.5			17.5	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	B17-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
B18	B18-10	SoundEarth	10/2/2018	10	<0.025	<0.02	**0.51**	<0.05	<0.05	<0.05
	B18-12.5			12.5	2.1	1.7	**0.93**	<0.05	<0.05	<0.05
	B18-15			15	1.8	0.43	**0.38**	<0.05	<0.05	<0.05
	B18-17.5			17.5	0.085	0.030	<0.05	<0.05	<0.05	<0.05
	B18-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB10	UB10-10	UEP	4/20/2019	10	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB10-15			15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB10-18			18	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB10-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB10-25			25	<0.025	0.049	<0.05	<0.05	<0.05	<0.05
	UB10-28			28	0.11	0.083	<0.05	<0.05	<0.05	<0.05
UB11	UB11-13	UEP	4/20/2019	13	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB11-15			15	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB11-20			20	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB11-25			25	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB11-28			28	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB12 (CD02A)	UB12-5	UEP	3/4/2020	5	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB12-14			14	<0.02	0.29	**2.06**	<0.02	<0.05	**0.34**
	UB12-22			22	16.6	0.33	**0.17**	<0.02	<0.05	<0.02
	UB12-37			37	~~0.16~~	<0.02	<0.02	<0.02	<0.05	<0.02
	UB12-46			46	~~0.028~~	<0.02	<0.02	<0.02	<0.05	<0.02
UB13 (CD08)	UB13-4	UEP	3/5/2020	4	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB13-9			9	0.25	<0.02	**33**	**0.21**	<0.05	1.8
	UB13-23			23	143	1.8	**0.16**	<0.02	<0.05	**0.033**
	UB13-43			43	~~0.39~~	<0.02	<0.02	<0.02	<0.05	<0.02
UB14 (CD06)	UB14-5	UEP	3/5/2020	5	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB14-7			7	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB14-20			20	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02

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Table 1
Soil Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)					
					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
UB15 (CD10A)	UB15-6	UEP	3/5/2020	6	**2.2**	<0.02	<0.02	<0.02	<0.05	<0.02
	UB15-20			20	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
UB16 (CD02B)	UB16-6	UEP	3/4/2020	6	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB16-14			14	**0.028**	<0.02	<0.02	<0.02	<0.05	<0.02
	UB16-29			29	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
UB17 (CD05B)	UB17-3	UEP	3/5/2020	3	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB17-11			11	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB17-24			24	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
UB18 (CD03)	UB18-3	UEP	3/5/2020	3	<0.02	<0.02	**0.022**	<0.02	<0.05	<0.02
	UB18-12			12	**0.027**	<0.02	<0.02	<0.02	<0.05	<0.02
	UB18-24			24	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB18-30			30	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
UB19	UB19-24	UEP	3/5/2020	24	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
UB20	UB20-25	UEP	3/12/2020	25	<0.02	<0.02	<0.02	<0.02	<0.05	<0.02
	UB20-30			30	**0.047**	**0.51**	**0.36**	<0.02	<0.05	<0.02
	UB20-35			35	**0.09**	**0.27**	**0.083**	<0.02	<0.05	<0.02
UB21	UB21-25	UEP	4/7/2020	25	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB21-30			30	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB21-34			34	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB22	UB22-25	UEP	4/7/2020	25	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB23	UB23-25	UEP	4/7/2020	25	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB23-30			30	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB23-33			33	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB25	UB25-27	UEP	4/10/2020	27	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB25-35			35	**1.2**	**0.26**	<0.05	<0.05	<0.05	<0.05
	UB25-45			45	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB26	UB26-30	UEP	4/10/2020	30	**1.1**	**0.21**	<0.05	<0.05	<0.05	<0.05
	UB26-35			35	**0.31**	**0.43**	**0.14**	<0.05	<0.05	<0.05
	UB26-40			40	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB26-45			45	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB27	UB27-6	UEP	4/10/2020	6	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB27-12			12	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB28	UB28-6	UEP	4/10/2020	6	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB28-11			11	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB29	UB29-6	UEP	4/10/2020	6	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB29-11			11	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB30	UB30-12	UEP	5/15/2020	12	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB30-23			23	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB30-24			24	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB30-26			26	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB30-30			30	**1.3**	**0.20**	<0.05	<0.05	<0.05	<0.05
	UB30-31			31	**0.13**	**0.030**	<0.05	<0.05	<0.05	<0.05
	UB30-34			34	**0.56**	**0.10**	<0.05	<0.05	<0.05	<0.05
	UB30-35			35	**0.50**	**0.17**	<0.05	<0.05	<0.05	<0.05
	UB30-38			38	**0.035**	**0.024**	<0.05	<0.05	<0.05	<0.05
	UB30-39			39	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB31	UB31-24	UEP	5/15/2020	24	**9.6**	**0.084**	<0.05	<0.05	<0.05	<0.05
	UB31-26			26	**2.4**	**0.39**	**0.073**	<0.05	<0.05	<0.05
	UB31-28			28	**0.23**	**0.04**	<0.05	<0.05	<0.05	<0.05
	UB31-31			31	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB31-32			32	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB31-35			35	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB31-37			37	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
	UB31-43			43	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05

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Table 1
Soil Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)					
					PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
UB39	UB39-33	UEP	10/28/2020	33	0.14	0.076	<0.05	<0.05	<0.05	<0.05
UB40	UB40-30	UEP	10/28/2020	30	0.67	0.11	<0.05	<0.05	<0.05	<0.05
	UB40-33.5			33.5	<0.025	<0.02	<0.05	<0.05	<0.05	<0.05
UB41	UB41-33	UEP	10/29/2020	33	0.32	0.28	**0.085**	<0.05	<0.05	<0.05
UB42	UB42-33	UEP	10/29/2020	33	0.43	0.17	<0.05	<0.05	<0.05	<0.05
Ecology MTCA Method A Cleanup Levels[2] Unless Otherwise Specified					**0.05**	**0.03**	**160[3]**	**1,600[3]**	**4,000[3]**	**0.67[4]**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
~~0.39~~ = Sample results was determined to be anomalous due to potential laboratory column bleed; see section 2.5.14.
< = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).(1) Analyzed by EPA Method 8260C or 8260D.
(2) MTCA Cleanup Regulation, Chapter 173-340 of WAC, Table 740-1 Method A Cleanup Levels for Soil, revised 2013.
(3) MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC Soil, Method B Noncancer, Direct Contact, CLARC Website: <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>
(4) MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC Soil, Method B Cancer, Direct Contact, CLARC Website: < https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>

-- = not analyzed/not applicable
bgs = below grade surface
UEP = Urban Environmental Partners llc
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
cVOCs: Chlorinated Volatile Organic Compounds
PCE = tetrachloroethylene
TCE = trichloroethylene
DCE = dichloroethylene
VC = Vinyl Chloride
MTCA = Washington Model Toxics Control Act.

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Table 2
Soil Analytical Results for
Petroleum Hydrocarbons and Select VOCs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results - Milligrams per Kilogram (mg/kg)						
					GRPH	DRPH	ORPH	Benzene	Toluene	Ethylbenzene	Total Xylenes
TB01	TB01-15	SoundEarth	1/24/2018	15	**15**	**110**x	<250	--	--	--	--
TB02	TB02-15	SoundEarth	1/24/2018	15	<5	<50	<250	--	--	--	--
TB05	TB05-05	SoundEarth	1/24/2018	5	<5	**190**x	**5,100**	--	--	--	--
UB12 (CD02A)	UB12-5	UEP	3/4/2020	5	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB12-14			14	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB12-22			22	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB12-37			37	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB12-46			46	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB13 (CD08)	UB13-4	UEP	3/5/2020	4	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB13-9			9	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB13-23			23	**160***	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB13-43			43	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB14 (CD06)	UB14-5	UEP	3/5/2020	5	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB14-7			7	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB14-20			20	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB15 (CD10A)	UB15-6	UEP	3/5/2020	6	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB15-20			20	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB16 (CD02B)	UB16-6	UEP	3/4/2020	6	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB16-14			14	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB16-29			29	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB17 (CD05B)	UB17-3	UEP	3/5/2020	3	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB17-11			11	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB17-24			24	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB18 (CD03)	UB18-3	UEP	3/5/2020	3	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB18-12			12	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB18-24			24	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
	UB18-30			30	<10	<50	<250	<0.02	<0.10	<0.03	<0.15
UB34	UB43-3	UEP	6/3/2020	3	--	<50	<250	--	--	--	--
	UB34-7			7	--	<50	<250	--	--	--	--
	UB34-13			13	--	<50	<250	--	--	--	--
UB35	UB35-4	UEP	6/3/2020	4	--	<50	<250	--	--	--	--
	UB35-10			10	--	<50	<250	--	--	--	--
	UB35-14			14	--	<50	<250	--	--	--	--
Ecology MTCA Method A Cleanup Levels[1] Unless Otherwise Specified					**100/30[2,3]**	**2,000[4]**	**2,000[4]**	**0.03[5]**	**7[5]**	**6[5]**	**9[5]**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) MTCA Cleanup Regulation, Chapter 173-340 of WAC, Table 740-1 Method A Cleanup Levels for Soil, revised 2013.
(2) Analyzed by Method NWTPH-Gx or NWTPH-HCID.
(3) The GRPH CUL is 30 mg/kg when benzene is present, or 100 mg/kg without benzene
(4) Analyzed by Method NWTPH-Dx or NWTPH-HCID
(5) Analyzed by EPA Method 8021B, 8260C, or 8260D.

Laboratory Notes:
x = The sample chromatographic pattern does not resemble the fuel standard used for quantitation.
* = The gasoline range value consists of a chlorinated compound with elevated concentrations.

-- = not analyzed/not applicable
bgs = below grade surface
NWTPH = Northwest Total Petroleum Hydrocarbon
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
GRPH = Gasoline-Range Petroleum Hydrocarbons
DRPH = Diesel-Range Petroleum Hydrocarbons
ORPH = Oil-Range Petroleum

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Table 3
Soil Analytical Results for Total Metals
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)							
					Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
TB01	TB01-05	SoundEarth	1/24/2018	5	2.54	--	<1	18.8	4.82	<1	--	--
TB03	TB03-05	SoundEarth	1/24/2018	5	2.39	--	<1	28.2	4.26	<1	--	--
TB04	TB04-05	SoundEarth	1/24/2018	5	1.79	--	<1	12.1	8.10	<1	--	--
B06	B06-05	SoundEarth	1/24/2018	5	6.73	--	<1	18.0	8.81	<1	--	--
B09	B09-05	SoundEarth	1/24/2018	5	3.17	--	<1	26.8	4.06	<1	--	--
Ecology MTCA Method A Cleanup Levels[2] Unless Otherwise Specified					**20**	**16,000[3]**	**2**	**2,000**	**250**	**2**	**400[3]**	**400[3]**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Samples analyzed by EPA Method 6020A.
(2) MTCA Cleanup Regulation, Chapter 173-340 of WAC, Table 740-1 Method A Cleanup Levels for Soil, revised 2013.
(3) MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Soil, Method B, Noncancer, Direct Contact, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.

-- = not analyzed/not applicable
bgs = below grade surface
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
MTCA = Washington Model Toxics Control Act.
SoundEarth = SoundEarth Strategies, Inc.

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Table 4
Soil Analytical Results for PAHs
4208 Rainier Ave South, Seattle

Boring ID	Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Milligrams per Kilogram (mg/kg)							Total Toxicity Equivalency Concentration[2]
					Benzo(a)-anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Indeno(1,2,3cd)-pyrene	Dibenzo(a,h)-anthracene	
TB01	TB01-05	SoundEarth	1/24/2018	5	<0.02	<0.02	<0.1	<0.2	<0.2	<0.2	<0.2	ND
TB03	TB03-05	SoundEarth	1/24/2018	5	<0.02	<0.02	<0.1	<0.2	<0.2	<0.2	<0.2	ND
B09	B09-05	SoundEarth	1/24/2018	5	**0.015**	**0.028**	**0.022**	**0.031**	**0.012**	<0.010	<0.010	**0.029**
NA	Pile1-3"	UEP	4/27/2020	2	**0.20**	**0.17**	**0.21**	**0.23**	**0.068**	**0.090**	**0.025**	**0.273**
NA	Pile1-6"	UEP	4/27/2020	2	<0.01	<0.01	<0.01	**0.012**	<0.01	<0.01	<0.01	**0.0083**
NA	Pile1-12"	UEP	4/27/2020	2	<0.01	**0.021**	**0.060**	**0.010**	**0.020**	**0.026**	<0.01	**0.0668**
NA	Piles-Middle	UEP	4/27/2020	2	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
UB32	UB32-13	UEP	6/3/2020	13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	**ND**
UB33	UB32-12	UEP	3/3/2020	12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	ND
Ecology MTCA Method A Cleanup Levels[3] Unless Otherwise Specified					**--**	**--**	**0.1**	**--**	**--**	**--**	**--**	**0.1**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< or ND = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Samples analyzed by GC/MS-SIM or EPA Method 8270D.
(2) Calculated Using Toxicity Equivalency Methodology in WAC 173-340-708(e)
(3) MTCA Cleanup Regulation, Chapter 173-340 of WAC, Table 740-1 Method A Cleanup Levels for Soil, revised 2013.

-- = not analyzed/not applicable
bgs = below grade surface
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
MTCA = Washington Model Toxics Control Act.
SoundEarth = SoundEarth Strategies, Inc.
UEP = Urban Environmental Partners

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Table 5
Groundwater Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring/Well ID	Sample ID	Sampled By	Date Sampled	Analytical Results - Micrograms per Liter (µg/L)					
				PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
B-1	B-1 (29-32)	Hahn	6/28/2000	1,980	288	25.7	--	<1.0	<1.2
B-3	B-3 (27-30)	Hahn	6/28/2000	<1.0	<1.0	1.8	--	<1.0	<1.2
B-4	B-4 (27-30)	Hahn	6/28/2000	3,800	1,100	40.8	--	2.94	4.37
B-5	B-5 (23-36)	Hahn	6/29/2000	<1.0	<1.0	<1.0	--	<1.0	<1.2
B-7	B-7 (23-26)	Hahn	6/29/2000	1.25	<1.0	<1.0	--	<1.0	<1.2
MW01	MW01-20180102	SoundEarth	1/2/2018	8,700	<500	<500	<500	<500	<100
	MW1-20200313	UEP	3/13/2020	16,400	3,820	3,460	37	2.4	499
	MW01-20200827	UEP	8/27/2020	14,000	1,900	1,800	28	2.0	150
MW02	MW02-20180129	SoundEarth	1/29/2018	<1	<1	7.1	<1	<1	0.33
	MW2-20200312	UEP	3/12/2020	<1	0.94	11	<1	<0.5	<0.2
	MW02-20200826	UEP	8/26/2020	<1	<1	9.8	<1	<1	0.33
	MW02-PDB20200826	UEP	8/26/2020	<1	<1	8.9	<1	<1	0.47
MW03	MW03-20180129	SoundEarth	1/29/2018	<1	<1	<1	<1	<1	<0.2
	MW3-20200312	UEP	3/12/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW03-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
	MW03-PDB20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
MW04	MW04-20180129	SoundEarth	1/29/2018	<1	<1	<1	<1	<1	<0.2
	MW4-20200312	UEP	3/12/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW04-20200827	UEP	8/27/2020	<1	<1	<1	<1	<1	<0.2
	MW04-PDB20200827	UEP	8/27/2020	<1	<1	<1	<1	<1	<0.2
MW05	MW05-20180129	SoundEarth	1/29/2018	35,000	6,600	2,600	27	2.9	240
	MW5-20200312	UEP	3/12/2020	38,900	19,800	12,200	122	8.0	138
	MW05-20200828	UEP	8/28/2020	15,000	10,000	5,800	140	<100	220
MW06	MW06-20181005	SoundEarth	10/5/2018	<1	2.4	3.5	<1	<1	<0.2
	MW6-20200312	UEP	3/12/2020	5.7	11	13	<1	<0.5	0.66
	MW06-20200827	UEP	8/27/2020	3.5	5.7	8.9	<1	<1	0.34
MW07	MW07-20181005	SoundEarth	10/5/2018	<1	<1	<1	<1	<1	<0.2
	MW7-20200312	UEP	3/12/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW07-20200827	UEP	8/27/2020	<1	<1	<1	<1	<1	<0.2
MW08	MW08-20181005	SoundEarth	10/5/2018	560	320	390	2.0	<1	16
	MW8-20200312	UEP	3/12/2020	1,200	510	420	3.1	<0.5	13
	MW08-20200828	UEP	8/28/2020	400	220	200	<5	<5	9.3
MW09	MW09-20181005	SoundEarth	10/5/2018	20	59	36	<1	<1	1.7
	MW9	UEP	4/21/2019	38	110	93	1.2	<1	7.4
	MW9-20200312	UEP	3/12/2020	300	740	1,030	11	<0.5	12
	MW9-04142020	UEP	4/14/2020	350	460	370	2.8	<0.5	5
	MW09-20200515	UEP	5/15/2020	99	87	48	<1	<0.5	0.47
	MW09-20200826	UEP	8/26/2020	530	300	590	<10	<10	9.9
	MW09-20201207	UEP	12/7/2020	110	140	990	<10	<10	39
MW10	MW10	UEP	4/21/2019	41	54	22	<1	<1	0.24
	MW10-20200312	UEP	3/12/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW10-04142020	UEP	4/14/2020	<1	<1	<1	<1	<0.5	<0.2
	MW10-04142020b	UEP	4/14/2020	<1	<1	<1	<1	<0.5	<0.2
	MW10-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
	MW10-DB-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
MW11	MW11	UEP	4/21/2019	<1	<1	<1	<1	<1	<0.2
	MW11-04142020	UEP	4/14/2020	<1	<1	<1	<1	<1	<0.2
	MW11-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
	MW11-DB-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
UB12 (CD02A) / MW12	MW12-20200313	UEP	3/13/2020	1,030	45	13	<1	<0.5	4.1
	MW12-20200827	UEP	8/27/2020	17	1.7	26	<1	<1	1.4
UB13 (CD08) / MW13	UB13W-23	UEP	3/5/2020	25,300	3,180	1,353	<1	<0.5	<0.2
	MW13-20200313	UEP	3/13/2020	2,190	5,580	1,160	3.3	22	76
	MW13-20200827	UEP	8/27/2020	72,000	19,000	16,000	140	12	1,200

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Table 5
Groundwater Analytical Results for cVOCs
4208 Rainier Ave South, Seattle

Boring/Well ID	Sample ID	Sampled By	Date Sampled	Analytical Results - Micrograms per Liter (µg/L)					
				PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC
UB14 (CD06) / MW14	MW14-20200305	UEP	3/5/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW14-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
UB15 (CD10A) / MW15	MW15-20200312	UEP	3/12/2020	<1	<0.4	<1	<1	<0.5	<0.2
	MW15-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
UB16 (CD02B) / MW16	MW16-20200304	UEP	3/4/2020	4,590	744	536	<1	<0.5	58.6
	MW16-20200312	UEP	3/12/2020	12	2.2	1.0	<1	<0.5	<0.2
	MW16-20200827	UEP	8/27/2020	<1	<1	<1	<1	<1	<0.2
UB17 (CD05B) / MW17	MW17-20200305	UEP	3/5/2020	<1	<0.4	166	<1	<0.5	<0.2
	MW17-20200312	UEP	3/12/2020	1.4	0.47	95	<1	<0.5	1.0
	MW17-20200826	UEP	8/26/2020	<1	<1	190	<1	<1	0.83
UB18 (CD03) / MW18	UB18W-24	UEP	3/5/2020	11.2	17.2	33.4	<1	<0.5	<0.2
	MW18-20200312	UEP	3/12/2020	2.8	68	97	3.5	1.3	2.8
	MW18-20200826	UEP	8/26/2020	1.8	54	60	2.1	<1	1.5
UB19	UB19W-25	UEP	3/5/2020	<1	<0.4	3.0	<1	<0.5	<0.2
UB20/MW20	MW20-20200312*	UEP	3/13/2020	2.0	38	55	<1	<0.5	0.20
	MW20-04102020	UEP	4/10/2020	<1	<1	3.8	<1	<1	<0.2
	MW20-20200828	UEP	8/28/2020	<1	2.7	36	<1	<1	<0.2
	MW20-DB-20200828	UEP	8/28/2020	<1	<1	<1	<1	<1	<0.2
UB21/MW21	MW21-04102020	UEP	4/10/2020	<1	<1	<1	<1	<1	<0.2
	MW21-20200828	UEP	8/28/2020	<1	<1	<1	<1	<1	<0.2
UB22/MW22	MW22-04102020	UEP	4/10/2020	<1	<1	<1	<1	<1	<0.2
	MW22-20200828	UEP	8/28/2020	<1	<1	<1	<1	<1	<0.2
UB23/MW23	MW23-04102020	UEP	4/10/2020	<1	<1	<1	<1	<1	<0.2
	MW23-20200828	UEP	8/28/2020	<1	<1	<1	<1	<1	<0.2
UB24/MW24	MW24-04102020	UEP	4/10/2020	<1	<1	<1	<1	<1	<0.2
	MW24-20200826	UEP	8/26/2020	<1	<1	<1	<1	<1	<0.2
UB25/MW25	MW25-04142020	UEP	4/14/2020	5,200	1,900	1,500	17	2.7	140
	MW25-20200827	UEP	8/27/2020	980	770	980	3.5	<1	8.7
	MW25-PDB20200827	UEP	8/27/2020	830	750	810	2.6	1.2	1.7
	MW25-PDB2-20200827	UEP	8/27/2020	680	670	1,100	<10	<10	2.2
UB26/MW26	MW26-04142020	UEP	4/14/2020	52	68	8.1	<1	<1	0.27
	MW26-20200826	UEP	8/26/2020	720	490	130	1.1	<1	7.80
	MW26-20201207	UEP	12/7/2020	<1	5.1	170	<1	<1	3.7
UB30/MW30	MW-30	UEP	5/23/2020	1,500	410	250	<100	<100	30
	MW30-20200827	UEP	8/27/2020	4,400	850	540	<10	<10	53
	MW30-PDB20200827	UEP	8/27/2020	6,400	1,200	740	10	1.1	69
	MW30-20201207	UEP	12/7/2020	1.1	<1	4.8	<1	<1	3.6
UB31/MW31	MW-31	UEP	5/23/2020	120,000	22,000	15,000	120	11	1,300
	MW31-20200827	UEP	8/27/2020	120,000	23,000	24,000	<1,000	<1,000	1,900
	MW31-PDB20200827	UEP	8/27/2020	120,000	25,000	20,000	190ve	12	1,900
Ecology MTCA Method A Cleanup Levels[2] Unless Otherwise Specified				5	5	16[3]	160[3]	400[3]	0.2

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Analyzed by EPA Method 8260C or 8260D.
(2) MTCA Cleanup Regulation, Chapter 173-340-900 of WAC, Table 720-1 Method A Cleanup Levels for Groundwater, revised November 2007.
(3) MTCA Cleanup Regulation, Chapter 173-340 of WAC, CLARC, Groundwater, Method B, Non cancer, CLARC Website <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>

-- = not analyzed/not applicable
bgs = below grade surface
UEP = Urban Environmental Partners llc
WAC = Washington

DCE = dichloroethylene
VC = Vinyl Chloride
MTCA = Washington Model Toxics Control Act.
Hahn = Hahn and Associates, Inc.
SoundEarth = SoundEarth Strategies, Inc.
* Labeling Error - This sample was

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Table 6
Groundwater Analytical Results for Petroleum Hydrocarbons and Select VOCs
4208 Rainier Ave South, Seattle

Boring/Well ID	Sample ID	Sampled By	Date Sampled	Analytical Results - Micrograms per Liter (µg/L)						
				GRPH[1]	DRPH[2]	ORPH[2]	Benzene[3]	Toluene[3]	Ethylbenzene[3]	Total Xylenes[3]
B-1	B-1 (29-32)	Hahn	6/28/2000	--	--	--	<1	<1	<1	<3
B-3	B-3 (27-30)	Hahn	6/28/2000	--	--	--	<1	<1	<1	<3
B-4	B-4 (27-30)	Hahn	6/28/2000	--	--	--	<1	<1	<1	<3
B-5	B-5 (23-36)	Hahn	6/29/2000	--	--	--	<1	<1	<1	<3
B-7	B-7 (23-26)	Hahn	6/29/2000	--	--	--	<1	<1	<1	<3
UB12 (CD02A) / MW12	MW12-20200313	UEP	3/13/2020	**720***	<200	<400	<1	<1	<1	<2
UB13 (CD08) / MW13	UB13W-23	UEP	3/5/2020	**25,200***	<200	<400	<10	<10	<10	<20
	MW13-20200313	UEP	3/13/2020	**8,200***	<200	<400	<1	<1	<1	<2
UB14 (CD06) / MW14	MW14-20200305	UEP	3/5/2020	<100	<200	<400	<1	<1	<1	<2
UB15 (CD10A) / MW15	MW15-20200312	UEP	3/12/2020	<100	<200	<400	<1	<1	<1	<2
UB16 (CD02B) / MW16	MW16-20200304	UEP	3/4/2020	**3,800***	<200	<400	<10	<10	<10	<20
	MW16-20200312	UEP	3/4/2020	<100	<200	<400	<1	<1	<1	<2
UB17 (CD05B) / MW17	MW17-20200305	UEP	3/5/2020	<100	<200	<400	<1	<1	<1	<2
	MW17-20200312	UEP	3/12/2020	<100	<200	<400	<1	<1	<1	<2
UB18 (CD03) / MW18	UB18W-24	UEP	3/5/2020	<100	<200	<400	<1	<1	<1	<2
	MW18-20200312	UEP	3/12/2020	**115***	<200	<400	<1	<1	<1	<2
UB34	UB34-W	UEP	6/3/2020	--	**160x**	<250	--	--	--	--
UB35	UB35-W	UEP	6/3/2020	--	<65	<320	--	--	--	--
Ecology MTCA Method A Cleanup Levels[4] Unless Otherwise Specified				**1,000/800[5]**	**500**	**500**	**5**	**1,000**	**700**	**1,000**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Analyzed by Northwest Method NWTPH-Gx or NEPTH-HCID
(2) Analyzed by Northwest Method NWTPH-Dx or NEPTH-HCID
(3) Analyzed by EPA Method 8260C or 8260D.
(4) MTCA Cleanup Regulation, Chapter 173-340-900 of WAC, Table 720-1 Method A Cleanup Levels for Groundwater, revised November 2007.
(5) For gasoline mixtures without benzene the cleanup level is 1,000 ug/l, for gasoline mixtures with benzene the cleanup level is 800 ug/l.
* = The gasoline range value consist of chlorinated compound(s) with elevated concentrations.

-- = not analyzed/not applicable
bgs = below grade surface
UEP = Urban Environmental Partners llc
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
GRPH = Gasoline-Range Petroleum Hydrocarbons

DRPH = Diesel-Range Petroleum Hydrocarbons
ORPH = Oil-Range Petroleum Hydrocarbons
MTCA = Washington Model Toxics Control Act.
Hahn = Hahn and Associates, Inc.

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Table 7
Monitoring Well Constuction Details
4208 Rainier Ave South, Seattle

Boring ID	Well ID	Screened Interval (Feet bgs)	Well Diameter
B01	MW01	18-33	2-inch
B09	MW02	15-30	2-inch
B07	MW03	15-30	2-inch
TB07	MW04	15-35	2-inch
TB08	MW05	15-35	2-inch
B16	MW08	15-30	2-inch
B15	MW09	25-35	2-inch
UB10	MW10	9.5-29.5	2-inch
UB11	MW11	15-35	2-inch
UB12	MW12	31-46	2-inch
UB13	MW13	28-42	2-inch
UB14	MW14	10-20	1-inch
UB15	MW15	10-20	1-inch
UB16	MW16	18-28	2-inch
UB17	MW17	15-25	2-inch
UB18	MW18	15-30	2-inch
UB20	MW20	22-37	2-inch
UB21	MW21	15-30	1-inch
UB22	MW22	15-30	1-inch
UB23	MW23	15-30	1-inch
UB24	MW24	14-29	1-inch
UB25	MW25	25-40	2-inch
UB26	MW26	25-40	2-inch
UB30	MW30	25-40	2-inch
UB31	MW31	15-30	2-inch
UB32	MW32	5-20	1-inch
UB33	MW33	5-20	1-inch

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Table 8
Soil Gas and Sewer Gas Results for cVOCs
4208 Rainier Ave South, Seattle

Sample ID	Sampled By	Date Sampled	Depth (ft/bgs)	Analytical Results[1] - Micrograms per Cubic Meter (µg/m^3)										
				PCE	TCE	cis-1,2-DCE	trans-1,2-DCE	1,1-DCE	VC	Chloroethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1,1-Trichloroethane	1,1,2-Trichloroethane
SG01	SoundEarth	1/2/2018	8	**48**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG02	SoundEarth	1/2/2018	8	**38**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG03	SoundEarth	1/2/2018	8	**25**	<5.4	<4	<4	<4	<2.6	<2.6	<4	<4	<5.5	<5.5
SG04	UEP	4/10/2020	1.5	<110	<4.3	<6.3	<6.3	<6.3	<4.1	<42	<6.5	<0.65	<8.7	<1.7
SG05	UEP	4/10/2020	1.5	<110	<4.3	<6.3	<6.3	<6.3	<4.1	<42	<6.5	<0.65	<8.7	<1.7
Sewer South	UEP	5/15/2020	10	**270**	69	**340**	**3.7**	<3	22	<20	<3.1	<0.31	<4.1	<0.83
Sewer North	UEP	5/15/2020	10	<54	<2.1	<3.2	<3.2	<3.2	<2	<21	<3.2	<0.32	<4.4	<0.87
Ecology MTCA Method B Screening Levels for Sub-Slab Soil Gas[2]				**320**	**11**	**NE**	**NE**	**3,000**	**9.50**	**NE**	**52**	**3.2**	**76,000**	**5.20**
Ecology MTCA Method B Screening Levels for Deep Soil Gas[3]				**960**	**33**	**NE**	**NE**	**9,100**	**28**	**NE**	**160**	**9.6**	**230,000**	**16.00**

Notes:

Red denotes concentration exceeding MTCA screening level.
< or ND = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Samples analyzed by U.S. EPA Method TO-15
(2) Most Conservative MTCA Method B Sub-Slab Soil Gas Screening Level, CLARC Master Spreadsheet January 2020.
(3) Most Conservative MTCA Method B Deep Soil Gas Screening Level, CLARC Master CLARC Master Spreadsheet January 2020..

-- = not analyzed/not applicable
NE = Not Established
bgs = below grade surface
cVOCs: Chlorinated Volatile Organic Compounds
PCE = tetrachloroethylene
TCE = trichloroethylene
DCE = dichloroethylene
VC = Vinyl Chloride
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
MTCA = Washington Model Toxics

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Table 9
Groundwater Analytical Results for PAHs
4208 Rainier Ave South, Seattle

Boring/Well ID	Sample ID	Sampled By	Date Sampled	Analytical Results[1] - Micrograms per Liter (µg/L)							Total Toxicity Equivalency Concentration[2]
				Benzo(a)-anthracene	Chrysene	Benzo(a)pyrene	Benzo(b)-fluoranthene	Benzo(k)-fluoranthene	Indeno(1,2,3cd)-pyrene	Dibenzo(a,h)-anthracene	
UB32/MW32	MW32-20200608	UEP	6/8/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
	MW32-20200826	UEP	8/26/2020	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	ND
	MW32-20201207	UEP	12/7/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
	MW32-20210311	UEP	3/11/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
UB33/MW33	MW33-20200608	UEP	6/8/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
	MW33-20200826	UEP	8/26/2020	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	ND
	MW33-20201207	UEP	12/7/2020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
	MW33-20200311	UEP	3/11/2021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	ND
Ecology MTCA Method A Cleanup Levels[3] Unless Otherwise Specified				--	--	**0.1**	--	--	--	--	**0.1**

Notes:

Red denotes concentration exceeding MTCA cleanup level.
< or ND = Not Detected at a concentration exceeding the specified laboratory reporting limit (RL).
(1) Samples analyzed by EPA Method 8270E SIM.
(2) Calculated Using Toxicity Equivalency Methodology in WAC 173-340-708(e)
(3) MTCA Cleanup Regulation, Chapter 173-340 of WAC, Table 720-1 Method A Cleanup Levels for Groundwater, revised 2013.

-- = not analyzed/not applicable
bgs = below grade surface
WAC = Washington Administrative Code
EPA = U.S. Environmental Protection Agency
MTCA = Washington Model Toxics Control Act.
UEP = Urban Environmental Partners

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Table 10
Field Parameters for Source Area Monitoring Wells (8/20)
4208 Rainier Ave South, Seattle

Well ID	Date Sampled	Groundwater Sampling Field Parameters											
		Total Manganese	Dissolved Manganese	Alkalinity	Nitrate	Total Iron	Ferrous Iron	Dissolved Iron	Temp	Dissolved Oxygen	ORP	pH	Specific Conductivity
		µg/L							°C	mg/L	mV	--	µS/cm
MW01	8/27/2020	<1	3.45	83,400	3,460	71.1	<50	74.0	17.0	0.37	29.60	6.64	1.465
MW04	8/27/2020	--	--	--	--	--	--	--	17.0	0.67	54.9	6.69	1.035
MW05	8/28/2020	--	--	--	--	--	--	--	16.8	1.53	43.4	6.38	1.767
MW06	8/27/2020	--	--	--	--	--	--	--	15.9	0.46	33.9	7.11	1.107
MW07	8/27/2020	<1	<1	81,500	3,200	88.6	<50	67.5	17.0	0.40	7.3	7.04	1.096
MW08	8/28/2020	1	<1	66,000	3,140	73.7	<50	57.3	15.4	0.70	45.5	6.44	1.063
MW09	8/26/2020	--	--	--	--	--	--	--	17.2	0.74	12.3	6.08	1.155
MW10	8/26/2020	--	--	--	--	--	--	--	17.0	0.22	20.9	6.37	1.073
MW12	8/27/2020	--	--	--	--	--	--	--	15.9	0.35	-17.8	7.85	0.425
MW13	8/27/2020	<1	<1	81,500	3,200	88.6	<50	67.5	16.9	0.61	-58.0	6.71	1.868
MW16	8/27/2020	--	--	--	--	--	--	--	16.1	0.51	14.4	6.73	1.252
MW17	8/26/2020	--	--	--	--	--	--	--	18.1	0.70	-15.0	6.57	1.497
MW18	8/26/2020	206	198	56,300	233	2,570	227	<50	18.2	0.46	22.1	6.59	1.312
MW20	8/28/2020	153	57.4	69,800	914	5,630	<50	57.8	15.7	0.77	-1.5	6.61	1.005
MW25	8/27/2020	--	--	--	--	--	--	--	18.6	0.45	-122.1	7.37	1.834
MW26	8/26/2020	--	--	--	--	--	--	--	17.4	0.55	23.4	6..82	1.204
MW30	8/27/2020	206	198	56,300	233	2,570	227	<50	16.5	0.52	-86.9	6.86	1.302
MW31	8/27/2020	--	--	--	--	--	--	--	16.3	0.36	35.5	6.57	2.070
MW32	8/26/2020	206	198	56,300	233	2,570	227	<50	19.6	0.55	-105.0	6.60	0.997
MW33	8/26/2020	153	57.4	69,800	914	5,630	<50	57.8	20.8	0.47	-101.4	6.55	0.691
Average		103	79.3	68,989	1,725	2,144	92	50.8	17.2	0.57	-8.2	6.7	1.3

Notes:

µg/L = micrograms per liter
mg/L = miligrams per liter

°C = Degrees Celsius
mV= milivolt

mV= milivolts
µS/cm = microsiemens per centimeter

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Table 11
Feasibility Level Cost Estimate
Alternative P1 - Full Pile Removal
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
Development Excavation					
Mob/demob and Site Work	1	lump sum	$ 25,000	$ 25,000	
Survey and inspection	1	lump sum	$ 10,000	$ 10,000	
Excavation and handling	2,000	tons	$ 35	$ 70,000	
Pile and Soil Removal via Overdrilling	174	piles	$ 12,500	$ 2,175,000	
Soil - Subtitle C (haz) disposal (0%)	-	tons	$ 235	$ -	
Soil - Subtitle D (CI) disposal (80%)	1,760	tons	$ 45	$ 79,200	
Soil - Class 2 overburden disposal	500	tons	$ 15	$ 7,500	
Import soil backfill for low areas	2,260	tons	$ 25	$ 56,500	
Subtotal:				***$ 2,423,200***	
Engineering Controls					
Vapor Barrier and Passive Controls	-	square feet	$ 35	$ -	
Subtotal:				***$ -***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 2,423,200**
Labor and Administration (% of construction subtotal)					
Permit and Planning	-	%	$ 2,420,000	$0	
Engineering Design and Bid	5	%	$ 2,420,000	$121,000	
Cleanup Oversight and Sampling	10	%	$ 2,420,000	$242,000	
Compliance Monitoring Plan program	1	years	$ 6,000	$ 6,000	
Subtotal:				***$ 369,000*** *ds*	
CLEANUP ACTION SUBTOTAL					**$ 2,792,200**
Contingency for Cleanup	20	%	$ 2,790,000	**$558,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 3,400,000**

Notes:
- Prelim costs provided by HOS Bros. Construction and others
- Cost estimate are feasibility-study level (+50/-30)

Excavation to Expose Piles and Full Pile Removal
- Site prepared by excavating 1 foot deep around pilefield (30K SF) to expose pile caps = 1,500 Tons PCS/500 Tons clean
- Soil Tonnage Estimage for Halo Around Piles = 260 Tons
- Creosote piles are removed by crane suspended vibratory hammer
- Contaminated soil segregated and disposed of separately

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Table 12
Feasibility Level Cost Estimate
Alternative P2 - Partial Removal of Piles to 4' bgs
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
Development Excavation					
Mob/demob and Site Work	1	lump sum	$ 25,000	$ 25,000	
Survey and inspection	1	lump sum	$ 10,000	$ 10,000	
Excavation and handling	3,200	tons	$ 35	$ 112,000	
Cut top 4' of Pile and Disposal	174	piles	$ 1,600	$ 278,400	
Soil - Subtitle C (haz) disposal (0%)	-	tons	$ 235	$ -	
Soil - Subtitle D (CI) disposal (80%)	2,700	tons	$ 45	$ 121,500	
Soil - Class 2 overburden disposal	500	tons	$ 15	$ 7,500	
Import soil backfill for low areas	3,200	tons	$ 25	$ 80,000	
Subtotal:				***$ 634,400***	
Engineering Controls					
Vapor Barrier and Passive Controls	-	square feet	$ 35	$ -	
Deed Restriction recorded with KC	1	lump sum	$ 10,000	$ 10,000	
Subtotal:				***$ 10,000***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 644,400**
Labor and Administration (% of construction subtotal)					
Permit and Planning	-	%	$ 640,000	$0	
Engineering Design and Bid	5	%	$ 640,000	$32,000	
Cleanup Oversight and Sampling	10	%	$ 640,000	$64,000	
Compliance Monitoring Plan program	1	years	$ 6,000	$ 6,000	
Subtotal:				***$ 102,000***	
CLEANUP ACTION SUBTOTAL					**$ 746,400**
Contingency for Cleanup	20	%	$ 750,000	**$150,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 900,000**

Notes:
- Prelim costs provided by HOS Bros. Construction and others
- Cost estimate are feasibility-study level (+50/-30)

Excavation to Expose Piles and Removal to 4 Feet bgs
- Site prepared by excavating 1 feet deep around pilefield (30K SF) to expose pile caps = 1,500 Tons PCS/500 Tons clean
- Creosote piles partial removal by cutting at 4 feet below top of pile
- Additional excavation and soil disposal to 4 feet bgs around each pile system = 1,200 tons
- Contaminated soil segregated and disposed of separately

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Table 13
Feasibility Level Cost Estimate
Alternative P3 - Repurpose Piles (No Removal)
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
Development Activities - Existing Piles Preparation					
Mob/demob and Site Work	1	lump sum	$ 25,000	$ 25,000	
Survey and inspection	1	lump sum	$ 10,000	$ 10,000	
Excavation and handling	2,000	tons	$ 35	$ 70,000	
Construction of new pile caps	174	ea	$ 750	$ 130,500	
Soil - Subtitle C (haz) disposal (0%)	-	tons	$ 235	$ -	
Soil - Subtitle D (CI) disposal (80%)	1,524	tons	$ 45	$ 68,580	
Soil - Class 2 overburden disposal (20%)	500	tons	$ 15	$ 7,500	
Import soil backfill for low areas	2,024	tons	$ 25	$ 50,600	
Drive Aise Pile Removal (16)	16	piles	$ 12,500	$ 200,000	
Subtotal:				***$ 562,180***	
Engineering Controls					
Vapor Barrier and Passive Controls	-	square feet	$ 35	$ -	
Deed Restriction recorded with KC	1	lump sum	$ 10,000	$ 10,000	
Subtotal:				***$ 10,000***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 572,180**
Labor and Administration (% of construction subtotal)					
Permit and Planning	-	%	$ 570,000	$0	
Engineering Design and Bid	5	%	$ 570,000	$28,500	
Cleanup Oversight and Sampling	10	%	$ 570,000	$57,000	
Compliance Monitoring Plan program	1	years	$ 6,000	$ 6,000	
Subtotal:				***$ 91,500***	
CLEANUP ACTION SUBTOTAL					**$ 663,680**
Contingency for Cleanup	20	%	$ 660,000	**$132,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 800,000**

Notes:
- Prelim costs provided by HOS Bros. Construction and others
- Cost estimate are feasibility-study level (+50/-30)

Excavation to Expose Existing Piles for Attachment
- Site prepared by excavating 1 feet deep around pilefield (30K SF) to expose pile caps = 1,500 Tons PCS/500 Tons clean
- Break existing pile caps and replace with new concrete cap
- Contaminated soil segregated and disposed of separately
- The 16 treated piles in the drive-aisle of the planned southern portion of the development will be removed, as they do not serve a structural purpose.
- Soil Tonnage Estimate for Halo Around 16 Piles = 24 Tons

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Table 14
Focused Feasibility Evaluation for Treated Piles
Summary of Evaluation Criteria and Costs
4208 Rainier Ave South, Seattle

Alternative Name/Description	Alt P1 (Baseline) - Full Removal			Alt P2 -Partial Removal to 4 Feet with CPOC			Alt P3 - Repurpose Piles for Re-Use for Structural Foundation for Slab		
MTCA Evaluation Criteria									
	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score
Protectiveness	10	0.3	3.0	8	0.3	2.4	7	0.3	2.1
Permanence	10	0.2	2.0	6	0.2	1.2	4	0.2	0.8
Long Term Effectiveness	9	0.2	1.8	7	0.2	1.4	7	0.2	1.4
Manageability of Short Term Risk	5	0.1	0.5	7	0.1	0.7	9	0.1	0.9
Implementability	6	0.1	0.6	7	0.1	0.7	9	0.1	0.9
Consideration of Public Concerns	8	0.1	0.8	6	0.1	0.6	6	0.1	0.6
Comparative Benefit Score (CBS)	**8.7**			**7.0**			**6.7**		
Estimation of Cost (in $Millions)	$ 3.4			$ 0.9			$ 0.8		
Benefit per Dollar Spent	**2.56**			**7.78**			**8.38**		

Notes:
Benefit to Cost Ratio equals the Comparative Benefit Score Divided by Cost: Higher Value Equals Greater Benefit Per Dollar Spent

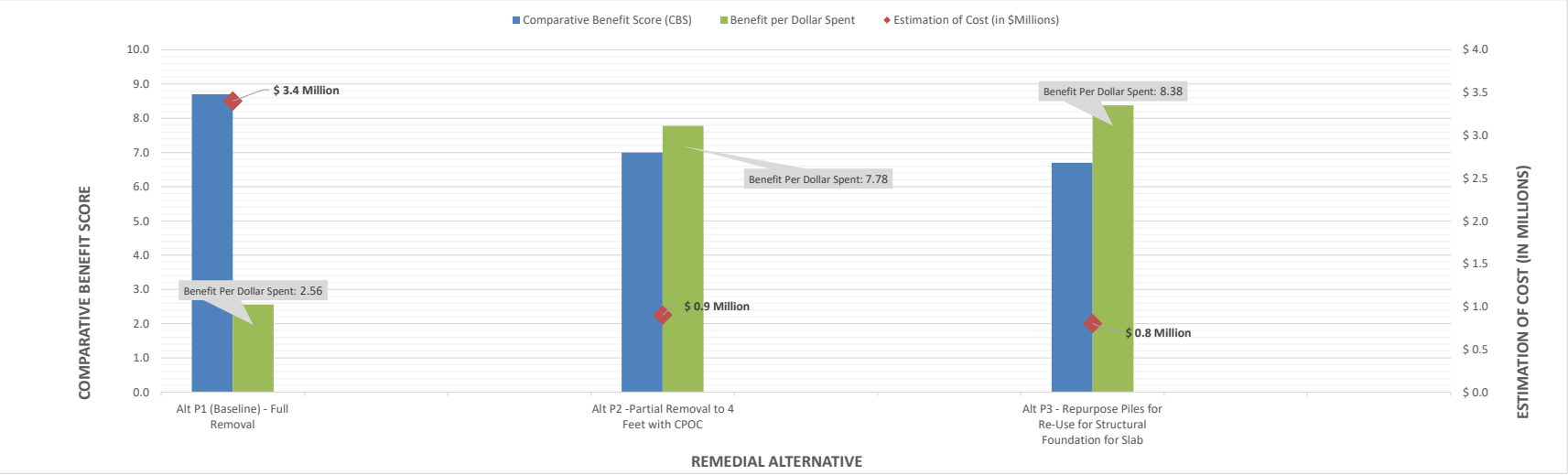

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Table 15
Feasibility Level Cost Estimate
Alternative 1 - Soil Excavation and In-Situ Chemical Reduction (ISCR)
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
Excavation and Site Restoration					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
Sheet Piling (200' x 50' deep)	12,300	cubic feet	$ 45	$ 553,500	
Excavation and handling	15,000	cubic yard	$ 25	$ 375,000	
Soil - Subtitle C (haz) disposal	2,800	tons	$ 320	$ 896,000	
Soil - Subtitle D (nonhaz/CI) disposal	11,600	tons	$ 128	$ 1,484,800	
Soil - Class 2 overburden disposal	3,000	tons	$ 25	$ 75,000	
Soil - site soil used as backfill	3,000	tons	$ 8	$ 24,000	
Import soil backfill to original grade	11,200	tons	$ 25	$ 280,000	
Water management, SW BMPs	1	lump sum	$ 125,000	$ 125,000	
Subtotal:				***$ 3,888,300***	
In-Situ Chemical Reduction (ISCR)					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
Injection Probe well installation	20	probes	$ 3,000	$ 60,000	
ZVI/3DME Injectate Purchase	1,000	gallons	$ 40	$ 40,000	
Aqueous injection and handling	20,000	gallons	$ 5	$ 100,000	
Soil cuttings disposal (CI)	250	tons	$ 168	$ 42,000	
Subtotal:				***$ 317,000***	
Engineering/Institutional Controls					
Vapor Barrier and Passive Controls	-	square feet	$ -	$ -	
Deed Restriction recorded with KC	-	lump sum	$ -	$ -	
Subtotal:				***$ -***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 4,205,300**
Labor and Administration (% of construction subtotal)					
Permit and Planning	2	%	$ 4,210,000	$84,200	
Engineering Design and Bid	10	%	$ 4,210,000	$421,000	
Construction Oversight and Sampling	10	%	$ 4,210,000	$421,000	
Compliance Monitoring	5	%	$ 4,210,000	$210,500	
Long term reporting and agency comms	5	%	$ 4,210,000	$210,500	
Subtotal:				***$ 1,347,200***	
CLEANUP ACTION SUBTOTAL					**$ 5,552,500**
Contingency for Cleanup	20	%	$ 5,550,000	**$1,110,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 6,700,000**

Notes:
- Hazardous soil disposal required for material removed from 35' Excavation (1,200 SF)
- Subtitle D (nonhaz) soil disposal required for all other excavated material (1,900 + 5,800 SF)
- Assume all of soil excavated from 0' to 10' bgs is reused as onsite backfill, incl slope cuts.
- CI - Contained In designation for F-Listed waste suitable for Subtitle D landfill.
- Excavation construction water treated onsite prior to discharge to sanitary sewer.
- Cost estimate are feasibility-study level (+50/-30)

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Table 16
Feasibility Level Cost Estimate
Alternative 2 - Soil Excavation and Monitored Natural Attenuation
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
Excavation and Site Restoration					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
Sheet Piling (200' x 50' deep)	12,300	cubic feet	$ 45	$ 553,500	
Excavation and handling	15,000	cubic yard	$ 25	$ 375,000	
Soil - Subtitle C (haz) disposal	2,800	tons	$ 320	$ 896,000	
Soil - Subtitle D (nonhaz/CI) disposal	11,600	tons	$ 128	$ 1,484,800	
Soil - Class 2 overburden disposal	3,000	tons	$ 25	$ 75,000	
Soil - site soil used as backfill	3,000	tons	$ 8	$ 24,000	
Import soil backfill to original grade	11,200	tons	$ 25	$ 280,000	
Water management, SW BMPs	1	lump sum	$ 125,000	$ 125,000	
Subtotal:				***$ 3,888,300***	
Monitored Natural Attenuation					
Well network installation	12	wells	$ 3,500	$ 42,000	
Quarterly monitoring (5 years)	20	events	$ 5,000	$ 100,000	
Semiannual monitoring (2 years)	4	events	$ 5,000	$ 20,000	
Annual monitoring (8 years)	8	events	$ 5,000	$ 40,000	
Data interpretation and reporting	15	years	$ 10,000	$ 150,000	
Subtotal:				***$ 352,000***	
Engineering/Institutional Controls					
Vapor Barrier and Passive Controls	20,000	square feet	$ 15	$ 300,000	
Deed Restriction recorded with KC	1	lump sum	$ 10,000	$ 10,000	
Subtotal:				***$ 310,000***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 4,550,300**
Labor and Administration (% of construction subtotal)					
Permit and Planning	2	%	$ 4,550,000	$91,000	
Engineering Design and Bid	10	%	$ 4,550,000	$455,000	
Cleanup Oversight and Sampling	10	%	$ 4,550,000	$455,000	
Long term reporting and agency comms	5	%	$ 4,550,000	$227,500	
Subtotal:				***$ 1,228,500***	
CLEANUP ACTION SUBTOTAL					**$ 5,778,800**
Contingency for Cleanup	20	%	$ 5,780,000	**$1,156,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 6,900,000**

Notes:
- Hazardous soil disposal required for material removed from 35' Excavation (1,200 SF)
- Subtitle D (nonhaz) soil disposal required for all other excavated material (1,900 + 5,800 SF)
- Assume all of soil excavated from 0' to 10' bgs is reused as onsite backfill, incl slope cuts.
- Monitored Natural Attenuation will require 15 years of active monitoring.
- CI - Contained In designation for F-Listed waste suitable for Subtitle D landfill.
- Excavation construction water treated onsite prior to discharge to sanitary sewer.
- Cost estimate are feasibility-study level (+50/-30)

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Table 17
Feasibility Level Cost Estimate
Alternative 3 - Dual Phase Extraction (DPE) with Air Sparging
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
DPE Installation					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
DPE and AS wells installation	75	wells	$ 2,500	$ 187,500	
Piping, connectors and controls	1	lump sum	$ 150,000	$ 150,000	
GW and vapor treatment equipment	1	lump sum	$ 250,000	$ 250,000	
Soil cuttings disposal	400	tons	$ 240	$ 96,000	
Groundwater treatment and disposal	1	lump sum	$ 150,000	$ 150,000	
Site restoration and security	1	lump sum	$ 75,000	$ 75,000	
Subtotal:				***$ 983,500***	
DPE Operation and Maintenance					
DPE and treatment system O&M	10	years	$ 100,000	$ 1,000,000	
DPE and treatment system repairs	10	years	$ 10,000	$ 100,000	
Vapor treatment oxidizer (electric)	10	years	$ 25,000	$ 250,000	
GW monitoring, data eval and report	10	years	$ 25,000	$ 250,000	
Ecology reporting and comms	10	years	$ -	$ -	
Subtotal:				***$ 1,600,000***	
Engineering/Institutional Controls					
Vapor Barrier and Passive Controls	20,000	square feet	$ 15	$ 300,000	
Deed Restriction recorded with KC	1	lump sum	$ 10,000	$ 10,000	
Subtotal:				***$ 310,000***	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 2,893,500**
Labor and Administration (% of construction subtotal)					
Permit and Planning	2	%	$ 2,890,000	57,800	
Engineering Design and Bid	15	%	$ 2,890,000	433,500	
Construction Oversight and Sampling	5	%	$ 2,890,000	144,500	
Long term reporting and agency comms	5	%	$ 2,890,000	144,500	
Subtotal:				***780,300***	
CLEANUP ACTION SUBTOTAL					**$ 3,673,800**
Contingency for Cleanup	20	%	$ 3,670,000	**734,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$4,400,000**

Notes:
- Extracted groundwater treated above ground and discharged to sanitary sewer.
- Extracted soil vapors treated above ground and discharge to atmosphere.
- Assumes 10 years of O&M, groundwater monitoring and reporting.
- DPE will achieve site CULs, no MNA as a follow up.
- Cost estimate are feasibility-study level (+50/-30)

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Table 18
Feasibility Level Cost Estimate
Alternative 4 - Electric Resistance Heating with SVE
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
ERH and SVE Installation					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
ERH, SVE and TMP (electrode) installation	100	electrodes	$ 3,000	$ 300,000	
Electrodes, piping, connectors and controls	1	lump sum	$ 600,000	$ 600,000	
Treatment system, including GAC	1	lump sum	$ 400,000	$ 400,000	
Treatment system installation by others	1	lump sum	$ 800,000	$ 800,000	
Soil cuttings disposal	100	tons	$ 320	$ 32,000	
Well and Electrode decommissioning	100	electrodes	$ 2,000	$ 200,000	
Site restoration and security	1	lump sum	$ 80,000	$ 80,000	
Subtotal:				***$ 2,487,000***	
ERH Operation and Maintenance					
ERH and SVE operations and maintenance	6	months	$ 120,000	$ 720,000	
ERH and treatment system repairs	1	lump sum	$ 100,000	$ 100,000	
Vapor treatment carbon replacement	1	lump sum	$ 20,000	$ 20,000	
Electrical power use	6	months	$ 60,000	$ 360,000	
Consulting and Project Management	12	months	$ 8,000	$ 96,000	
Subtotal:				***$ 1,296,000***	
Engineering/Institutional Controls					
Vapor Barrier and Passive Controls	-	square feet	$ -	$ -	
Deed Restriction recorded with KC	-	lump sum	$ -	$ -	
Subtotal:				$ -	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 3,783,000**
Labor and Administration (% of construction subtotal)					
Permit and Planning	5	%	$ 3,780,000	189,000	
Engineering Design and Bid	5	%	$ 3,780,000	189,000	
Construction Oversight and Sampling	5	%	$ 3,780,000	189,000	
Compliance Monitoring	5	%	$ 3,780,000	189,000	
Long term reporting and agency comms	5	%	$ 3,780,000	189,000	
Subtotal:				***945,000***	
CLEANUP ACTION SUBTOTAL					**$ 4,728,000**
Contingency for Cleanup	5	%	$ 4,730,000	**236,500**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$5,000,000**

Notes:
- ERH design by others.
- Vapor mitigation measures not required after treatment.
- Cost estimate are feasibility-study level (+50/-30%)

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Table 19
Feasibility Level Cost Estimate
Alternative 5 - Electric Resistance Heating with ISCR
Rainier Mall

CAPITAL COST ITEM	QTY	UNIT	UNIT PRICE	COST	TOTALS
ERH and SVE Installation					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
ERH, SVE and TMP (electrode) installation	62	electrode	$ 3,000	$ 186,000	
Electrodes, piping, connectors and controls	1	lump sum	$ 250,000	$ 250,000	
Treatment system, including GAC	1	lump sum	$ 200,000	$ 200,000	
Treatment system installation by others	1	lump sum	$ 400,000	$ 400,000	
Soil cuttings disposal	50	tons	$ 320	$ 16,000	
Well and electrode decommissioning	62	electrode	$ 2,000	$ 124,000	
Site restoration and security	1	lump sum	$ 50,000	$ 50,000	
Subtotal:				***$ 1,301,000***	
ERH Operation and Maintenance					
ERH and SVE operations and maintenance	6	months	$ 60,000	$ 360,000	
ERH and treatment system repairs	1	lump sum	$ 50,000	$ 50,000	
Vapor treatment carbon replacement	1	lump sum	$ 10,000	$ 10,000	
Electrical power use	6	months	$ 30,000	$ 180,000	
Consulting and Project Management	12	months	$ 8,000	$ 96,000	
Subtotal:				***$ 696,000***	
In-Situ Chemical Reduction (ISCR)					
Mobilization / demob	1	lump sum	$ 25,000	$ 25,000	
Site preparation, security, demo	1	lump sum	$ 50,000	$ 50,000	
Injection Probe well installation	30	probes	$ 3,000	$ 90,000	
ZVI/3DME Injectate Purchase	1,000	gallons	$ 40	$ 40,000	
Aqueous injection and handling	20,000	gallons	$ 5	$ 100,000	
Soil cuttings disposal (CI)	250	tons	$ 168	$ 42,000	
Subtotal:				***$ 347,000***	
Engineering/Institutional Controls					
Vapor Barrier and Passive Controls	-	square feet	$ -	$ -	
Deed Restriction recorded with KC	-	lump sum	$ -	$ -	
Subtotal:				$ -	
CAPITAL CLEANUP COSTS SUBTOTAL					**$ 2,344,000**
Labor and Administration (% of construction subtotal)					
Permit and Planning	5	%	$ 2,340,000	117,000	
Engineering Design and Bid	5	%	$ 2,340,000	117,000	
Construction Oversight and Sampling	5	%	$ 2,340,000	117,000	
Compliance Monitoring	5	%	$ 2,340,000	117,000	
Long term reporting and agency comms	5	%	$ 2,340,000	117,000	
Subtotal:				***585,000***	
CLEANUP ACTION SUBTOTAL					**$ 2,929,000**
Contingency for Cleanup	10	%	$ 2,930,000	**293,000**	
CLEANUP ACTION TOTAL CAPITAL COST (ROUNDED)					**$ 3,200,000**

Notes:
- ERH design by others.
- ISCR injection includes one additional event at half the injection points.
- Vapor mitigation measures not required after treatment.
- Cost estimate are feasibility-study level (+50/-30%)

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Table 20
Summary of Evaluation Criteria and Costs
4208 Rainier Ave South, Seattle

Alternative Name/Description	Alt 1 - Excavation and ISCR			Alt 2 - Excavation and MNA			Alt 3 - Dual-Phase Extraction (DPE) with Air Sparging			Alt 4 - Electrical Resistance Heating (ERH)			Alt 5 - ERH and In-Situ Chemical Reduction		
MTCA Evaluation Criteria															
	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score
Protectiveness	9	0.3	2.7	6	0.3	1.8	3	0.3	0.9	8	0.3	2.4	9	0.3	2.7
Permanence	10	0.2	2.0	6	0.2	1.2	5	0.2	1.0	8	0.2	1.6	9	0.2	1.8
Long Term Effectiveness	9	0.2	1.8	6	0.2	1.2	4	0.2	0.8	8	0.2	1.6	8	0.2	1.6
Manageability of Short Term Risk	7	0.1	0.7	7	0.1	0.7	5	0.1	0.5	3	0.1	0.3	2	0.1	0.2
Implementability	7	0.1	0.7	9	0.1	0.9	5	0.1	0.5	4	0.1	0.4	6	0.1	0.6
Consideration of Public Concerns	5	0.1	0.5	5	0.1	0.5	5	0.1	0.5	5	0.1	0.5	5	0.1	0.5
Comparative Benefit Score (CBS)	**8.4**			**6.3**			**4.2**			**6.8**			**7.4**		
Estimation of Cost (in millions)	$ 6.7			$ 6.9			$ 4.4			$ 5.0			$ 3.2		
Benefit per Dollar Spent	**1.25**			**0.91**			**0.95**			**1.36**			**2.31**		

Notes:
Benefit to Cost Ratio equals the Comparative Benefit Score Divided by Cost: Higher Value Equals Greater Benefit Per Dollar Spent
Alternative 2 has a relatively moderate score for protective and permanence as it relies on MNA to manage residuals

Table 21: Cost-to-Benefit Ratio for 5 Site Remedial Alternatives

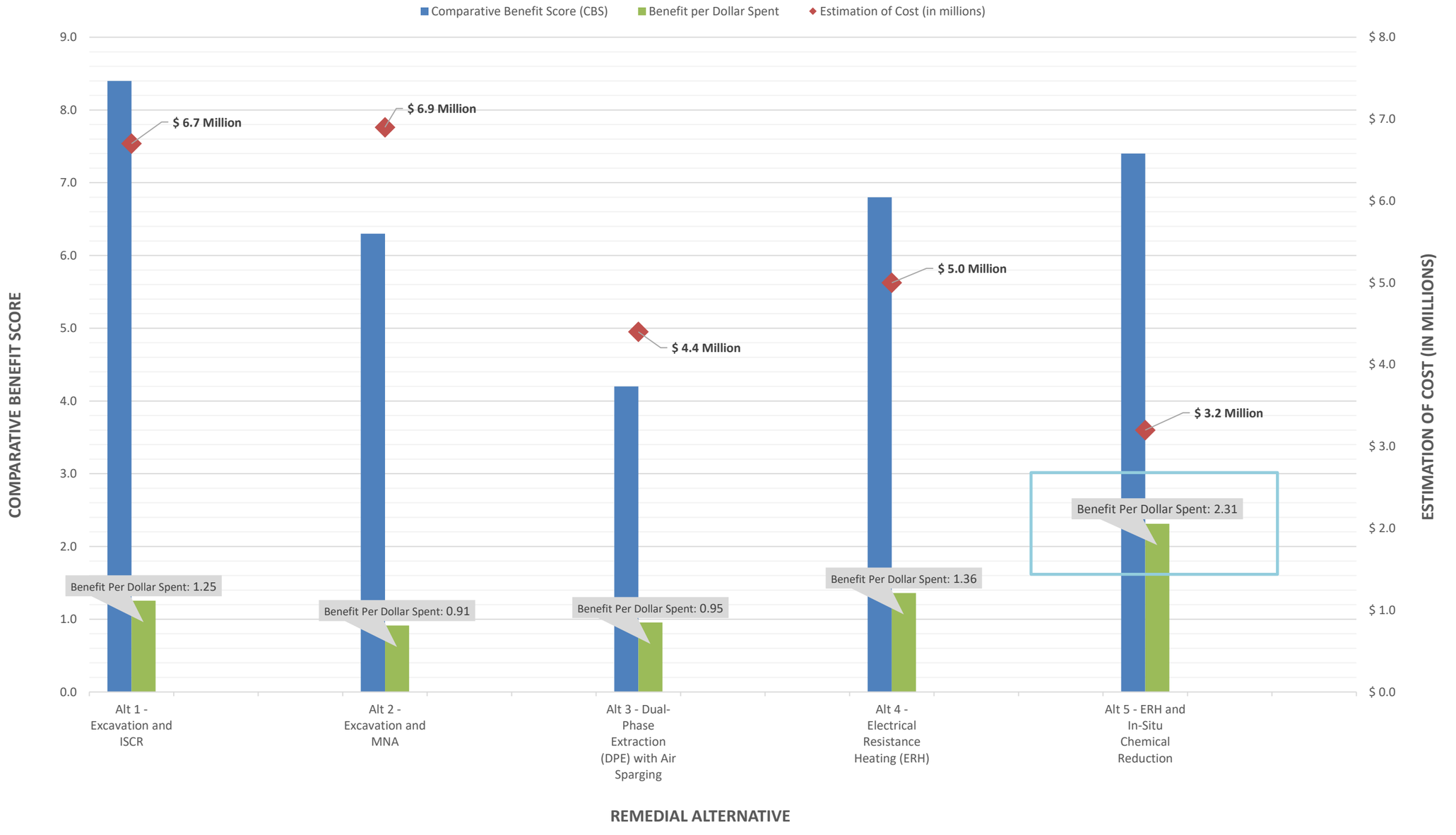
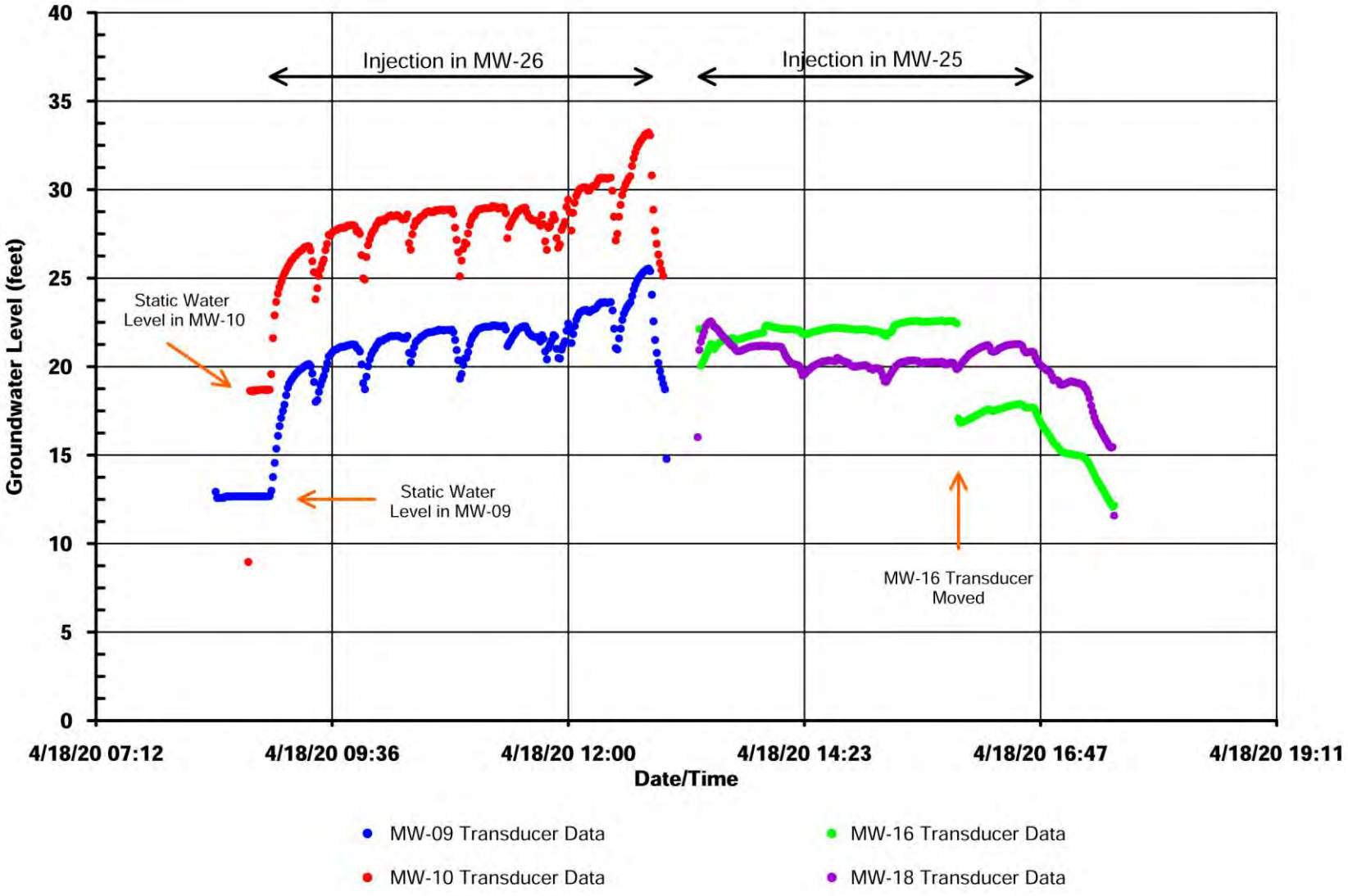


Exhibit C: Graphs



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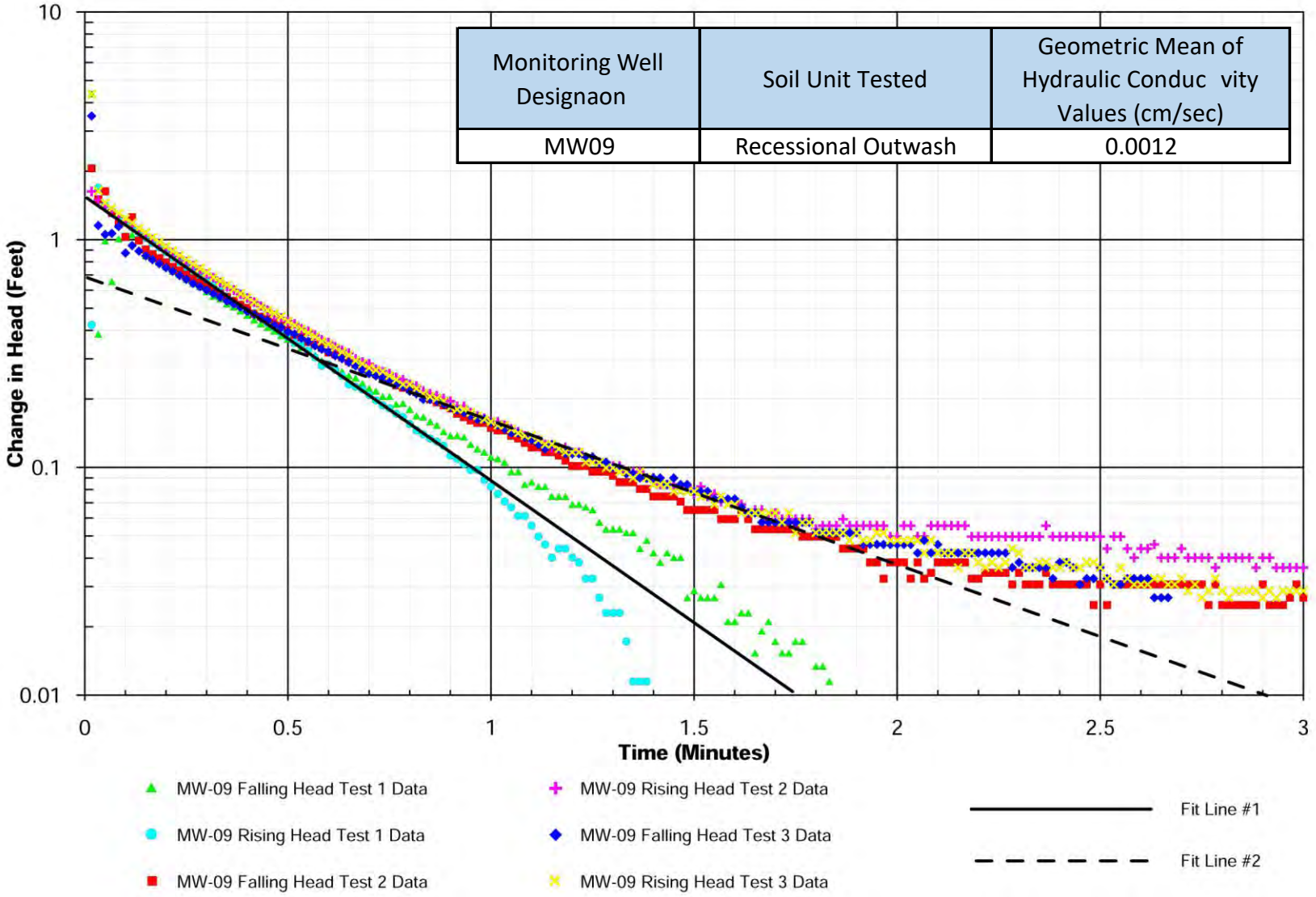
Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 1
Pilot Injection Test
Groundwater Level Data

Monitoring Well Designaon	Soil Unit Tested	Geometric Mean of Hydraulic Conduc vity Values (cm/sec)
MW09	Recessional Outwash	0.0012



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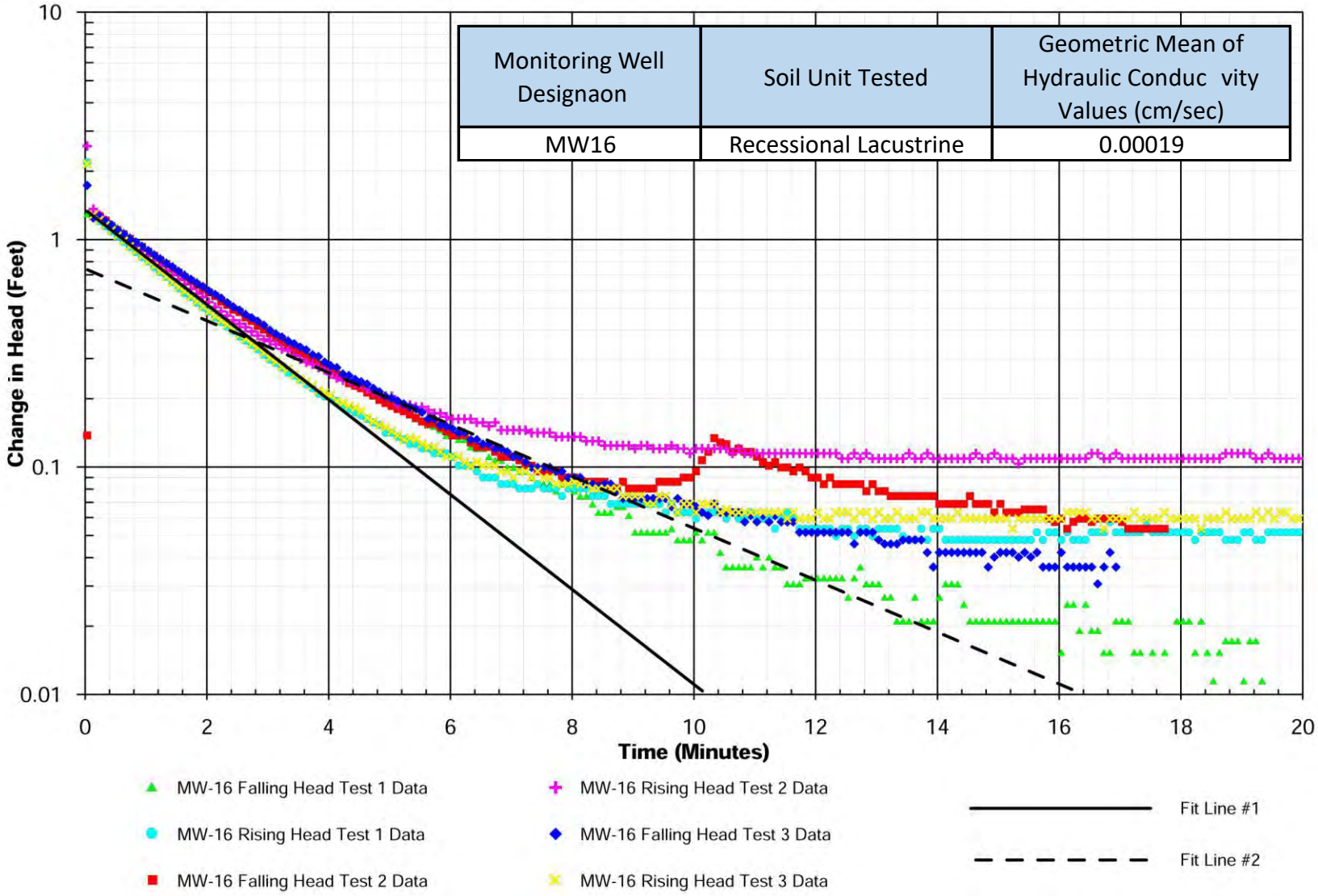
Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 2
Monitoring Well MW09 Slug Tests

Monitoring Well Designaon	Soil Unit Tested	Geometric Mean of Hydraulic Conduc vity Values (cm/sec)
MW16	Recessional Lacustrine	0.00019



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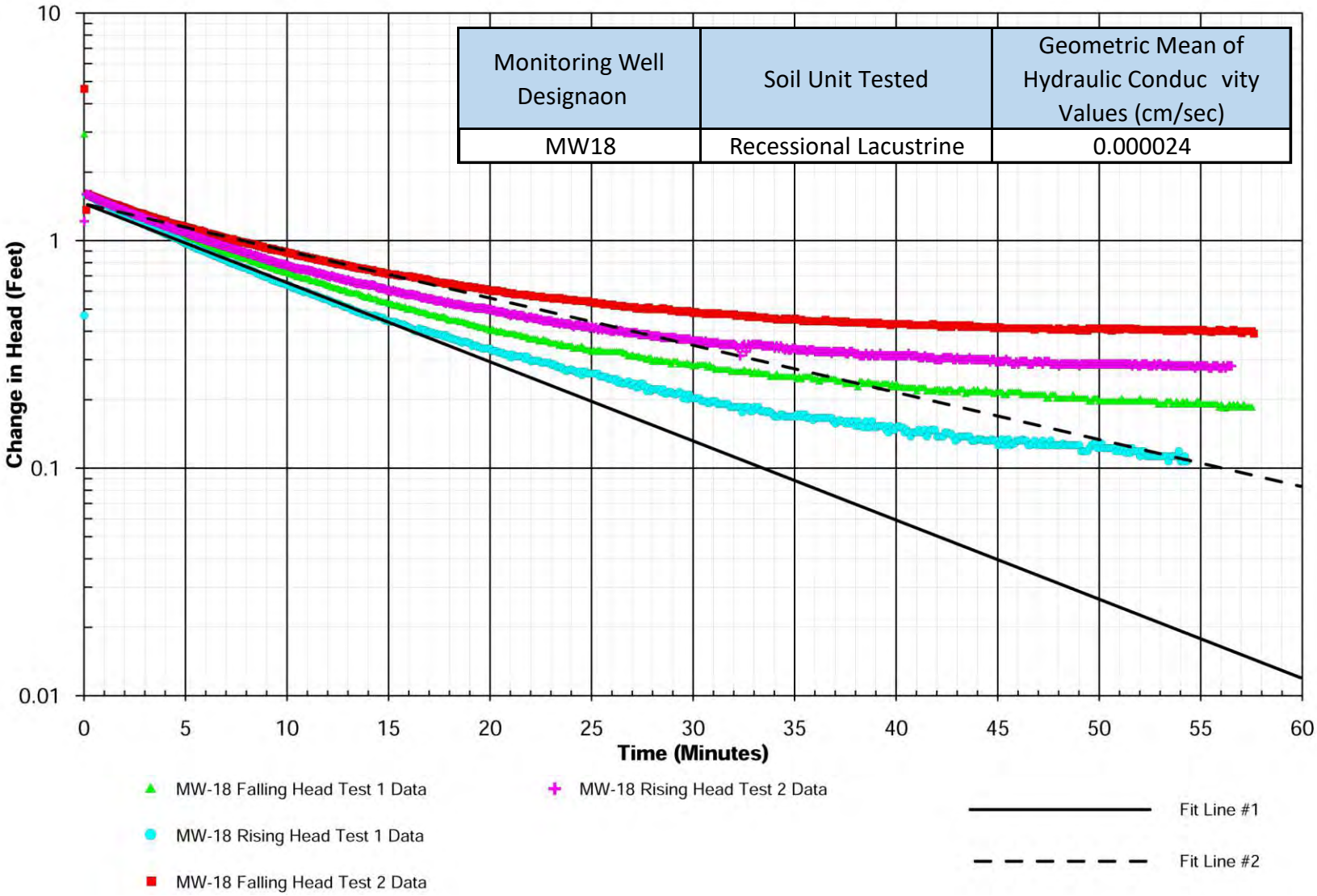
Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 3
Monitoring Well MW16 Slug Tests

Monitoring Well Designaon	Soil Unit Tested	Geometric Mean of Hydraulic Conduc vity Values (cm/sec)
MW18	Recessional Lacustrine	0.000024



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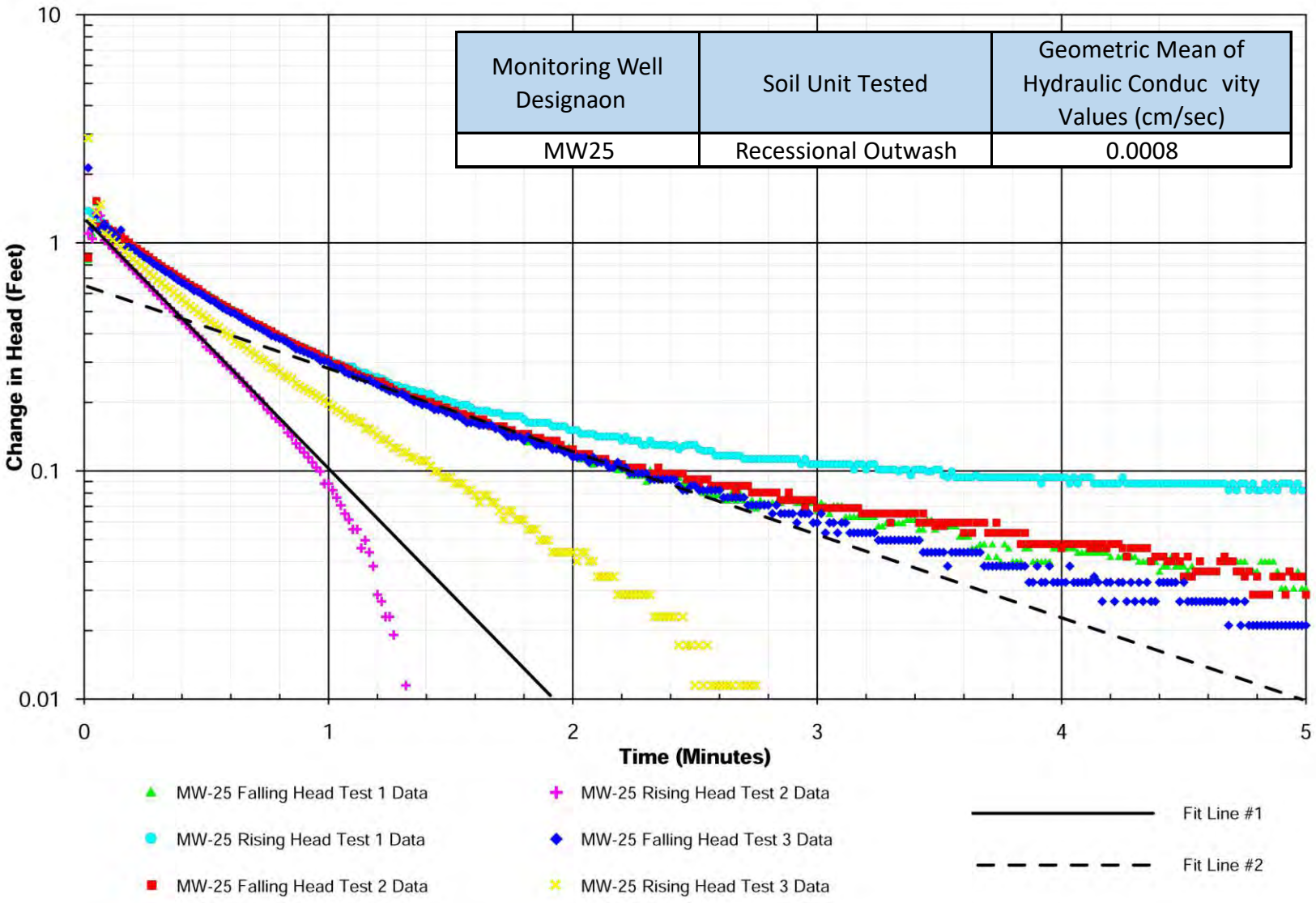
Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 4
Monitoring Well MW18 Slug Tests



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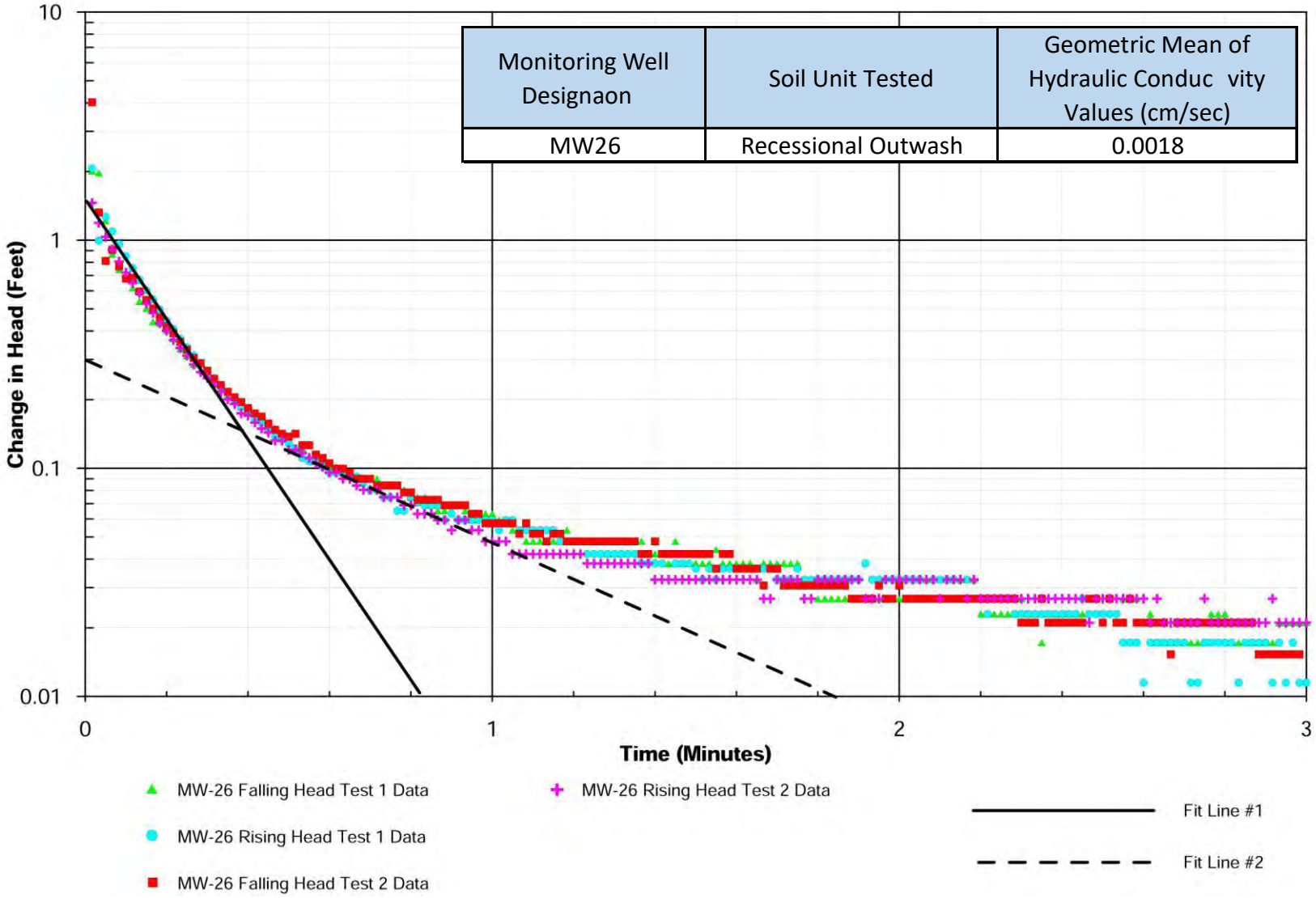
Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 5
Monitoring Well MW25 Slug Tests

Monitoring Well Designaon	Soil Unit Tested	Geometric Mean of Hydraulic Conduc vity Values (cm/sec)
MW26	Recessional Outwash	0.0018



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Rainier Mall Site
4208 Rainier Avenue South
Seattle, WA

Graph 6
Monitoring Well MW26 Slug Tests

Appendix A: Laboratory Analytical Reports

Environmental Services Laboratory, Inc. E S L

17400 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520

July 13, 2000

Mr. Guy Tanz
Hahn & Associates
434 N.W. 6th Avenue
Suite 203
Portland, OR 97209
TEL: (503)796-0717
FAX (503) 227-2209

RE: 5015/PacTrust Seattle Order No.: 0007003

Dear Mr. Guy Tanz,

Environmental Services Laboratory received 63 samples on 6/30/00 for the analyses presented in the following report.

The Samples were analyzed for the following tests:
Volatiles by GC/MS (EPA 8260B)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Nichole Karl

Nichole Karl
Project Manager

Keith Hunter

Technical Review

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-005
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-05A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2,4-Trimethylbenzene	123	5.00		µg/Kg	1	7/11/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/11/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,3,5-Trimethylbenzene	32.2	5.00		µg/Kg	1	7/11/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
2-Butanone	ND	100		µg/Kg	1	7/11/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/11/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/11/00
2-Hexanone	ND	100		µg/Kg	1	7/11/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/11/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/11/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/11/00
Acetone	ND	100		µg/Kg	1	7/11/00
Benzene	ND	5.00		µg/Kg	1	7/11/00
Bromobenzene	ND	5.00		µg/Kg	1	7/11/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/11/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/11/00
Bromoform	ND	5.00		µg/Kg	1	7/11/00
Bromomethane	ND	10.0		µg/Kg	1	7/11/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/11/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/11/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/11/00
Chloroethane	ND	10.0		µg/Kg	1	7/11/00
Chloroform	ND	5.00		µg/Kg	1	7/11/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-005
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-05A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/11/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/11/00
Dibromomethane	ND	5.00		µg/Kg	1	7/11/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/11/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/11/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/11/00
Iodomethane	ND	5.00		µg/Kg	1	7/11/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/11/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/11/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/11/00
Methylene chloride	ND	100		µg/Kg	1	7/11/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
n-Propylbenzene	16.8	5.00		µg/Kg	1	7/11/00
Naphthalene	ND	25.0		µg/Kg	1	7/11/00
o-Xylene	ND	5.00		µg/Kg	1	7/11/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
Styrene	ND	5.00		µg/Kg	1	7/11/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
Tetrachloroethene	83,300	500		µg/Kg	1	7/11/00
Toluene	ND	5.00		µg/Kg	1	7/11/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
Trichloroethene	272	5.00		µg/Kg	1	7/11/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/11/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/11/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/11/00
Surr: 4-Bromofluorobenzene	98.4	74-121		%REC	1	7/11/00
Surr: Dibromofluoromethane	97.4	80-120		%REC	1	7/11/00
Surr: Toluene-d8	101.0	81-117		%REC	1	7/11/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-018
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-18A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Acrylonitrile	ND	250		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-018
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-18A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	7/10/00
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	99.6	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	100.6	80-120		%REC	1	7/10/00
Surr: Toluene-d8	101.2	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-039
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-39A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00
Chloroform	ND	5.00		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-039
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-39A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	101.4	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	103.4	80-120		%REC	1	7/10/00
Surr: Toluene-d8	104.6	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-055
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-55A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00
Chloroform	ND	5.00		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-055
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-55A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	102.6	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	102.6	80-120		%REC	1	7/10/00
Surr: Toluene-d8	106.2	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *13-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLANK** Batch ID: **05 8260 S-7/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **7/10/00** Prep Date:

Client ID: **0007003** Run ID: **ANGSTROM_000710A** SeqNo: **46169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5									
1,1,1-Trichloroethane	ND	5									
1,1,2,2-Tetrachloroethane	ND	5									
1,1,2-Trichloroethane	ND	5									
1,1-Dichloroethane	ND	5									
1,1-Dichloroethene	ND	5									
1,1-Dichloropropene	ND	5									
1,2,3-Trichlorobenzene	ND	5									
1,2,3-Trichloropropane	ND	5									
1,2,4-Trichlorobenzene	ND	5									
1,2,4-Trimethylbenzene	ND	5									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5									
1,2-Dichlorobenzene	ND	5									
1,2-Dichloroethane	ND	5									
1,2-Dichloropropane	ND	5									
1,3,5-Trimethylbenzene	ND	5									
1,3-Dichlorobenzene	ND	5									
1,3-Dichloropropane	ND	5									
1,4-Dichlorobenzene	ND	5									
2,2-Dichloropropane	ND	5									
2-Butanone	ND	100									
2-Chloroethyl vinyl ether	ND	50									
2-Chlorotoluene	ND	5									
2-Hexanone	ND	100									
4-Chlorotoluene	ND	5									
4-Isopropyltoluene	ND	5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

4-Methyl-2-pentanone	ND	5
Acetone	ND	100
Benzene	ND	5
Bromobenzene	ND	5
Bromochloromethane	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	10
Carbon disulfide	ND	5
Carbon tetrachloride	ND	5
Chlorobenzene	ND	5
Chloroethane	ND	10
Chloroform	ND	5
Chloromethane	ND	10
cis-1,2-Dichloroethene	ND	5
cis-1,3-Dichloropropene	ND	5
Dibromochloromethane	ND	5
Dibromomethane	ND	5
Dichlorodifluoromethane	ND	10
Ethylbenzene	ND	5
Hexachlorobutadiene	ND	5
Iodomethane	ND	5
Isopropylbenzene	ND	5
m,p-Xylene	ND	10
Methyl tert-butyl ether	ND	10
Methylene chloride	ND	100
n-Butylbenzene	ND	5
n-Propylbenzene	ND	5
Naphthalene	ND	25
o-Xylene	ND	5
sec-Butylbenzene	ND	5
Styrene	ND	5
tert-Butylbenzene	ND	5

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

Tetrachloroethene	ND	5
Toluene	ND	5
trans-1,2-Dichloroethene	ND	5
trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	10
Vinyl acetate	ND	5
Vinyl chloride	ND	10

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *13-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT

Continuing Calibration Verification Standard

Sample ID: **CCV** Batch ID: **05 8260 S-7/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **7/10/00** Prep Date:

Client ID: **0007003** Run ID: **ANGSTROM_000710A** SeqNo: **46168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	54.5	5	50	0	109.0%	80	120	0			
1,2-Dichloropropane	50.4	5	50	0	100.8%	80	120	0			
Chloroform	51	5	50	0	102.0%	80	120	0			
Ethylbenzene	49.5	5	50	0	99.0%	80	120	0			
Toluene	51.4	5	50	0	102.8%	80	120	0			
Vinyl chloride	51.3	10	50	0	102.6%	80	120	0			
4-Bromofluorobenzene	47.2	0	50	0	94.4%	86	115	0			
Dibromofluoromethane	49.6	0	50	0	99.2%	86	118	0			
Toluene-d8	49.8	0	50	0	99.6%	88	110	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

APPENDIX C

Laboratory Analytical Reports and Chain-of-Custody Documentation - Groundwater Samples

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory EP

Lab Project No.

CHAIN OF CUSTODY

Chain of Custody No. 3

Project Manager: Guy Thiltz
Project No.: 5015
Project Name: Pac Trust Seattle
Collected by: Jay Greifer

Liquid with Sediment Sample
____ Test Filtrate ____ Test Sediment ____ Test Both

Multi-Phase Sample
____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N)
Appropriate Containers Used (Y or N)
Provide Verbal Results (Y or N)
Provide Preliminary Fax Results

Comments

Sample Number Prefix: 505-000638-
000628

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	Analyses to be Performed: EPA 8260	RUSH	Remarks
01	101	6-25-00	1016	B1		X		4	X		3 VOA/1L
02	102	"	1444	B3		X		4	X		3 VOA/1L
03	103	"	1704	B4		X		4	X		3 VOA/1L

Relinquished by	Company	Date	Time	Received by	Company
	HAHN & ASSOC				
Relinquished by	Company	Date	Time	Received by	Company

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory CAL
Lab Project No.

CHAIN OF CUSTODY
Chain of Custody No. 6

Project Manager GUY TAYLOR
Project No. 5015
Project Name PAC TRUST
Collected by Jay Greifer

Liquid with Sediment Sample
____ Test Filtrate ____ Test Sediment ____ Test Both
Multi-Phase Sample
____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N)
Appropriate Containers Used (Y or N)
Provide Verbal Results (Y or N)
Provide Preliminary Fax Results

Comments
Sample Number Prefix: 5015-001029-

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	Analyses to be Performed: EPA 8260	RUSH	Remarks
04	104	6/09/00	830	B 5		X		4	X		3 HCl/L
05	105	"	1345	B 7		X		4	X		3 HCl/L

Relinquished by	Company	Date	Time	Received by	Company
[signature]	HAHN & ASSOC	6/13/00	1430	[signature]	CAL
Relinquished by	Company	Date	Time	Received by	Company

Environmental Services Laboratory, Inc. E S L

17400 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520

July 10, 2000

Mr. Guy Tanz
Hahn & Associates
434 N.W. 6th Avenue
Suite 203
Portland, OR 97209
TEL: (503)796-0717
FAX (503) 227-2209

RE: 5015/PacTrust Seattle Order No.: 0007004

Dear Mr. Guy Tanz,

Environmental Services Laboratory received 5 samples on 6/30/00 for the analyses presented in the following report.

The Samples were analyzed for the following tests:
Volatiles by GC/MS (EPA 8260B)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Nichole Karl

Nichole Karl
Project Manager

Keith Hunter

Technical Review

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-101
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-01A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,1-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethene	ND	1.00		µg/L	1	7/7/00
1,1-Dichloropropene	ND	1.00		µg/L	1	7/7/00
1,2,3-Trichlorobenzene	ND	1.80		µg/L	1	7/7/00
1,2,3-Trichloropropane	ND	1.00		µg/L	1	7/7/00
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dibromo-3-chloropropane	ND	1.80		µg/L	1	7/7/00
1,2-Dibromoethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,4-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
2,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
2-Butanone	ND	20.0		µg/L	1	7/7/00
2-Chloroethyl vinyl ether	ND	5.00		µg/L	1	7/7/00
2-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
2-Hexanone	ND	20.0		µg/L	1	7/7/00
4-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
4-Isopropyltoluene	ND	1.00		µg/L	1	7/7/00
4-Methyl-2-pentanone	ND	1.00		µg/L	1	7/7/00
Acetone	ND	20.0		µg/L	1	7/7/00
Benzene	ND	1.00		µg/L	1	7/7/00
Bromobenzene	ND	1.00		µg/L	1	7/7/00
Bromochloromethane	ND	1.00		µg/L	1	7/7/00
Bromodichloromethane	ND	1.00		µg/L	1	7/7/00
Bromoform	ND	1.00		µg/L	1	7/7/00
Bromomethane	ND	5.00		µg/L	1	7/7/00
Carbon disulfide	ND	1.00		µg/L	1	7/7/00
Carbon tetrachloride	ND	1.00		µg/L	1	7/7/00
Chlorobenzene	ND	1.00		µg/L	1	7/7/00
Chloroethane	ND	1.80		µg/L	1	7/7/00
Chloroform	ND	1.00		µg/L	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-101
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-01A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	2.00		µg/L	1	7/7/00
cis-1,2-Dichloroethene	25.7	1.80		µg/L	1	7/7/00
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Dibromochloromethane	ND	1.00		µg/L	1	7/7/00
Dibromomethane	ND	1.00		µg/L	1	7/7/00
Dichlorodifluoromethane	ND	2.00		µg/L	1	7/7/00
Ethylbenzene	ND	1.00		µg/L	1	7/7/00
Hexachlorobutadiene	ND	2.00		µg/L	1	7/7/00
Iodomethane	ND	1.00		µg/L	1	7/7/00
Isopropylbenzene	ND	1.00		µg/L	1	7/7/00
m,p-Xylene	ND	2.00		µg/L	1	7/7/00
Methyl tert-butyl ether	ND	2.00		µg/L	1	7/7/00
Methylene chloride	ND	10.0		µg/L	1	7/7/00
n-Butylbenzene	ND	1.00		µg/L	1	7/7/00
n-Propylbenzene	ND	1.00		µg/L	1	7/7/00
Naphthalene	ND	2.00		µg/L	1	7/7/00
o-Xylene	ND	1.00		µg/L	1	7/7/00
sec-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Styrene	ND	1.00		µg/L	1	7/7/00
tert-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Tetrachloroethene	1,980	20.0		µg/L	1	7/7/00
Toluene	ND	1.00		µg/L	1	7/7/00
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	7/7/00
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Trichloroethene	288	20.0		µg/L	1	7/7/00
Trichlorofluoromethane	ND	2.00		µg/L	1	7/7/00
Vinyl acetate	ND	1.00		µg/L	1	7/7/00
Vinyl chloride	ND	1.20		µg/L	1	7/7/00
Surr: 4-Bromofluorobenzene	98.8	86-115		%REC	1	7/7/00
Surr: Dibromofluoromethane	100.6	86-118		%REC	1	7/7/00
Surr: Toluene-d8	102.2	88-110		%REC	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-102
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-02A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,1-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethene	ND	1.00		µg/L	1	7/7/00
1,1-Dichloropropene	ND	1.00		µg/L	1	7/7/00
1,2,3-Trichlorobenzene	ND	1.80		µg/L	1	7/7/00
1,2,3-Trichloropropane	ND	1.00		µg/L	1	7/7/00
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dibromo-3-chloropropane	ND	1.80		µg/L	1	7/7/00
1,2-Dibromoethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,4-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
2,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
2-Butanone	ND	20.0		µg/L	1	7/7/00
2-Chloroethyl vinyl ether	ND	5.00		µg/L	1	7/7/00
2-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
2-Hexanone	ND	20.0		µg/L	1	7/7/00
4-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
4-Isopropyltoluene	ND	1.00		µg/L	1	7/7/00
4-Methyl-2-pentanone	ND	1.00		µg/L	1	7/7/00
Acetone	ND	20.0		µg/L	1	7/7/00
Benzene	ND	1.00		µg/L	1	7/7/00
Bromobenzene	ND	1.00		µg/L	1	7/7/00
Bromochloromethane	ND	1.00		µg/L	1	7/7/00
Bromodichloromethane	ND	1.00		µg/L	1	7/7/00
Bromoform	ND	1.00		µg/L	1	7/7/00
Bromomethane	ND	5.00		µg/L	1	7/7/00
Carbon disulfide	ND	1.00		µg/L	1	7/7/00
Carbon tetrachloride	ND	1.00		µg/L	1	7/7/00
Chlorobenzene	ND	1.00		µg/L	1	7/7/00
Chloroethane	ND	1.80		µg/L	1	7/7/00
Chloroform	ND	1.00		µg/L	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-102
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-02A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	2.00		µg/L	1	7/7/00
cis-1,2-Dichloroethene	ND	1.80		µg/L	1	7/7/00
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Dibromochloromethane	ND	1.00		µg/L	1	7/7/00
Dibromomethane	ND	1.00		µg/L	1	7/7/00
Dichlorodifluoromethane	ND	2.00		µg/L	1	7/7/00
Ethylbenzene	ND	1.00		µg/L	1	7/7/00
Hexachlorobutadiene	ND	2.00		µg/L	1	7/7/00
Iodomethane	ND	1.00		µg/L	1	7/7/00
Isopropylbenzene	ND	1.00		µg/L	1	7/7/00
m,p-Xylene	ND	2.00		µg/L	1	7/7/00
Methyl tert-butyl ether	ND	2.00		µg/L	1	7/7/00
Methylene chloride	ND	10.0		µg/L	1	7/7/00
n-Butylbenzene	ND	1.00		µg/L	1	7/7/00
n-Propylbenzene	ND	1.00		µg/L	1	7/7/00
Naphthalene	ND	2.00		µg/L	1	7/7/00
o-Xylene	ND	1.00		µg/L	1	7/7/00
sec-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Styrene	ND	1.00		µg/L	1	7/7/00
tert-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Tetrachloroethene	ND	1.00		µg/L	1	7/7/00
Toluene	ND	1.00		µg/L	1	7/7/00
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	7/7/00
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Trichloroethene	ND	1.00		µg/L	1	7/7/00
Trichlorofluoromethane	ND	2.00		µg/L	1	7/7/00
Vinyl acetate	ND	1.00		µg/L	1	7/7/00
Vinyl chloride	ND	1.20		µg/L	1	7/7/00
Surr: 4-Bromofluorobenzene	99.6	86-115		%REC	1	7/7/00
Surr: Dibromofluoromethane	102.6	86-118		%REC	1	7/7/00
Surr: Toluene-d8	102.4	88-110		%REC	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-103
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-03A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,1-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethene	2.94	1.00		µg/L	1	7/7/00
1,1-Dichloropropene	ND	1.00		µg/L	1	7/7/00
1,2,3-Trichlorobenzene	ND	1.80		µg/L	1	7/7/00
1,2,3-Trichloropropane	ND	1.00		µg/L	1	7/7/00
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dibromo-3-chloropropane	ND	1.80		µg/L	1	7/7/00
1,2-Dibromoethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,4-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
2,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
2-Butanone	ND	20.0		µg/L	1	7/7/00
2-Chloroethyl vinyl ether	ND	5.00		µg/L	1	7/7/00
2-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
2-Hexanone	ND	20.0		µg/L	1	7/7/00
4-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
4-Isopropyltoluene	ND	1.00		µg/L	1	7/7/00
4-Methyl-2-pentanone	ND	1.00		µg/L	1	7/7/00
Acetone	ND	20.0		µg/L	1	7/7/00
Benzene	ND	1.00		µg/L	1	7/7/00
Bromobenzene	ND	1.00		µg/L	1	7/7/00
Bromochloromethane	ND	1.00		µg/L	1	7/7/00
Bromodichloromethane	ND	1.00		µg/L	1	7/7/00
Bromoform	ND	1.00		µg/L	1	7/7/00
Bromomethane	ND	5.00		µg/L	1	7/7/00
Carbon disulfide	ND	1.00		µg/L	1	7/7/00
Carbon tetrachloride	ND	1.00		µg/L	1	7/7/00
Chlorobenzene	ND	1.00		µg/L	1	7/7/00
Chloroethane	ND	1.80		µg/L	1	7/7/00
Chloroform	ND	1.00		µg/L	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

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* - Value exceeds Maximum Contaminant Level

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Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-103
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-03A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	2.00		µg/L	1	7/7/00
cis-1,2-Dichloroethene	40.8	1.80		µg/L	1	7/7/00
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Dibromochloromethane	ND	1.00		µg/L	1	7/7/00
Dibromomethane	ND	1.00		µg/L	1	7/7/00
Dichlorodifluoromethane	ND	2.00		µg/L	1	7/7/00
Ethylbenzene	ND	1.00		µg/L	1	7/7/00
Hexachlorobutadiene	ND	2.00		µg/L	1	7/7/00
Iodomethane	ND	1.00		µg/L	1	7/7/00
Isopropylbenzene	ND	1.00		µg/L	1	7/7/00
m,p-Xylene	ND	2.00		µg/L	1	7/7/00
Methyl tert-butyl ether	ND	2.00		µg/L	1	7/7/00
Methylene chloride	ND	10.0		µg/L	1	7/7/00
n-Butylbenzene	ND	1.00		µg/L	1	7/7/00
n-Propylbenzene	ND	1.00		µg/L	1	7/7/00
Naphthalene	ND	2.00		µg/L	1	7/7/00
o-Xylene	ND	1.00		µg/L	1	7/7/00
sec-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Styrene	ND	1.00		µg/L	1	7/7/00
tert-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Tetrachloroethene	3,800	50.0		µg/L	1	7/7/00
Toluene	ND	1.00		µg/L	1	7/7/00
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	7/7/00
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Trichloroethene	1,100	20.0		µg/L	1	7/7/00
Trichlorofluoromethane	ND	2.00		µg/L	1	7/7/00
Vinyl acetate	ND	1.00		µg/L	1	7/7/00
Vinyl chloride	4.37	1.20		µg/L	1	7/7/00
Surr: 4-Bromofluorobenzene	100.2	86-115		%REC	1	7/7/00
Surr: Dibromofluoromethane	99.2	86-118		%REC	1	7/7/00
Surr: Toluene-d8	101.2	88-110		%REC	1	7/7/00

Qualifiers:

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Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-104
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-04A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,1-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	7/7/00
1,1,2-Trichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,1-Dichloroethene	ND	1.00		µg/L	1	7/7/00
1,1-Dichloropropene	ND	1.00		µg/L	1	7/7/00
1,2,3-Trichlorobenzene	ND	1.80		µg/L	1	7/7/00
1,2,3-Trichloropropane	ND	1.00		µg/L	1	7/7/00
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dibromo-3-chloropropane	ND	1.80		µg/L	1	7/7/00
1,2-Dibromoethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,2-Dichloroethane	ND	1.00		µg/L	1	7/7/00
1,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
1,3-Dichloropropane	ND	1.00		µg/L	1	7/7/00
1,4-Dichlorobenzene	ND	1.00		µg/L	1	7/7/00
2,2-Dichloropropane	ND	1.00		µg/L	1	7/7/00
2-Butanone	ND	20.0		µg/L	1	7/7/00
2-Chloroethyl vinyl ether	ND	5.00		µg/L	1	7/7/00
2-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
2-Hexanone	ND	20.0		µg/L	1	7/7/00
4-Chlorotoluene	ND	1.00		µg/L	1	7/7/00
4-Isopropyltoluene	ND	1.00		µg/L	1	7/7/00
4-Methyl-2-pentanone	ND	1.00		µg/L	1	7/7/00
Acetone	ND	20.0		µg/L	1	7/7/00
Benzene	ND	1.00		µg/L	1	7/7/00
Bromobenzene	ND	1.00		µg/L	1	7/7/00
Bromochloromethane	ND	1.00		µg/L	1	7/7/00
Bromodichloromethane	ND	1.00		µg/L	1	7/7/00
Bromoform	ND	1.00		µg/L	1	7/7/00
Bromomethane	ND	5.00		µg/L	1	7/7/00
Carbon disulfide	ND	1.00		µg/L	1	7/7/00
Carbon tetrachloride	ND	1.00		µg/L	1	7/7/00
Chlorobenzene	ND	1.00		µg/L	1	7/7/00
Chloroethane	ND	1.80		µg/L	1	7/7/00
Chloroform	ND	1.00		µg/L	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-104
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-04A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	2.00		µg/L	1	7/7/00
cis-1,2-Dichloroethene	ND	1.80		µg/L	1	7/7/00
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Dibromochloromethane	ND	1.00		µg/L	1	7/7/00
Dibromomethane	ND	1.00		µg/L	1	7/7/00
Dichlorodifluoromethane	ND	2.00		µg/L	1	7/7/00
Ethylbenzene	ND	1.00		µg/L	1	7/7/00
Hexachlorobutadiene	ND	2.00		µg/L	1	7/7/00
Iodomethane	ND	1.00		µg/L	1	7/7/00
Isopropylbenzene	ND	1.00		µg/L	1	7/7/00
m,p-Xylene	ND	2.00		µg/L	1	7/7/00
Methyl tert-butyl ether	ND	2.00		µg/L	1	7/7/00
Methylene chloride	ND	10.0		µg/L	1	7/7/00
n-Butylbenzene	ND	1.00		µg/L	1	7/7/00
n-Propylbenzene	ND	1.00		µg/L	1	7/7/00
Naphthalene	ND	2.00		µg/L	1	7/7/00
o-Xylene	ND	1.00		µg/L	1	7/7/00
sec-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Styrene	ND	1.00		µg/L	1	7/7/00
tert-Butylbenzene	ND	1.00		µg/L	1	7/7/00
Tetrachloroethene	ND	1.00		µg/L	1	7/7/00
Toluene	ND	1.00		µg/L	1	7/7/00
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	7/7/00
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	7/7/00
Trichloroethene	ND	1.00		µg/L	1	7/7/00
Trichlorofluoromethane	ND	2.00		µg/L	1	7/7/00
Vinyl acetate	ND	1.00		µg/L	1	7/7/00
Vinyl chloride	ND	1.20		µg/L	1	7/7/00
Surr: 4-Bromofluorobenzene	101.0	86-115		%REC	1	7/7/00
Surr: Dibromofluoromethane	102.8	86-118		%REC	1	7/7/00
Surr: Toluene-d8	100.8	88-110		%REC	1	7/7/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-105
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-05A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	1.00		µg/L	1	7/6/00
1,1,1-Trichloroethane	ND	1.00		µg/L	1	7/6/00
1,1,2,2-Tetrachloroethane	ND	1.00		µg/L	1	7/6/00
1,1,2-Trichloroethane	ND	1.00		µg/L	1	7/6/00
1,1-Dichloroethane	ND	1.00		µg/L	1	7/6/00
1,1-Dichloroethene	ND	1.00		µg/L	1	7/6/00
1,1-Dichloropropene	ND	1.00		µg/L	1	7/6/00
1,2,3-Trichlorobenzene	ND	1.80		µg/L	1	7/6/00
1,2,3-Trichloropropane	ND	1.00		µg/L	1	7/6/00
1,2,4-Trichlorobenzene	ND	1.00		µg/L	1	7/6/00
1,2,4-Trimethylbenzene	ND	1.00		µg/L	1	7/6/00
1,2-Dibromo-3-chloropropane	ND	1.80		µg/L	1	7/6/00
1,2-Dibromoethane	ND	1.00		µg/L	1	7/6/00
1,2-Dichlorobenzene	ND	1.00		µg/L	1	7/6/00
1,2-Dichloroethane	ND	1.00		µg/L	1	7/6/00
1,2-Dichloropropane	ND	1.00		µg/L	1	7/6/00
1,3,5-Trimethylbenzene	ND	1.00		µg/L	1	7/6/00
1,3-Dichlorobenzene	ND	1.00		µg/L	1	7/6/00
1,3-Dichloropropane	ND	1.00		µg/L	1	7/6/00
1,4-Dichlorobenzene	ND	1.00		µg/L	1	7/6/00
2,2-Dichloropropane	ND	1.00		µg/L	1	7/6/00
2-Butanone	ND	20.0		µg/L	1	7/6/00
2-Chloroethyl vinyl ether	ND	5.00		µg/L	1	7/6/00
2-Chlorotoluene	ND	1.00		µg/L	1	7/6/00
2-Hexanone	ND	20.0		µg/L	1	7/6/00
4-Chlorotoluene	ND	1.00		µg/L	1	7/6/00
4-Isopropyltoluene	ND	1.00		µg/L	1	7/6/00
4-Methyl-2-pentanone	ND	1.00		µg/L	1	7/6/00
Acetone	ND	20.0		µg/L	1	7/6/00
Benzene	ND	1.00		µg/L	1	7/6/00
Bromobenzene	ND	1.00		µg/L	1	7/6/00
Bromochloromethane	ND	1.00		µg/L	1	7/6/00
Bromodichloromethane	ND	1.00		µg/L	1	7/6/00
Bromoform	ND	1.00		µg/L	1	7/6/00
Bromomethane	ND	5.00		µg/L	1	7/6/00
Carbon disulfide	ND	1.00		µg/L	1	7/6/00
Carbon tetrachloride	ND	1.00		µg/L	1	7/6/00
Chlorobenzene	ND	1.00		µg/L	1	7/6/00
Chloroethane	ND	1.80		µg/L	1	7/6/00
Chloroform	ND	1.00		µg/L	1	7/6/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-105
Lab Order:	0007004	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007004-05A	**Matrix:**	AQUEOUS

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	2.00		µg/L	1	7/6/00
cis-1,2-Dichloroethene	ND	1.80		µg/L	1	7/6/00
cis-1,3-Dichloropropene	ND	1.00		µg/L	1	7/6/00
Dibromochloromethane	ND	1.00		µg/L	1	7/6/00
Dibromomethane	ND	1.00		µg/L	1	7/6/00
Dichlorodifluoromethane	ND	2.00		µg/L	1	7/6/00
Ethylbenzene	ND	1.00		µg/L	1	7/6/00
Hexachlorobutadiene	ND	2.00		µg/L	1	7/6/00
Iodomethane	ND	1.00		µg/L	1	7/6/00
Isopropylbenzene	ND	1.00		µg/L	1	7/6/00
m,p-Xylene	ND	2.00		µg/L	1	7/6/00
Methyl tert-butyl ether	ND	2.00		µg/L	1	7/6/00
Methylene chloride	ND	10.0		µg/L	1	7/6/00
n-Butylbenzene	ND	1.00		µg/L	1	7/6/00
n-Propylbenzene	ND	1.00		µg/L	1	7/6/00
Naphthalene	ND	2.00		µg/L	1	7/6/00
o-Xylene	ND	1.00		µg/L	1	7/6/00
sec-Butylbenzene	ND	1.00		µg/L	1	7/6/00
Styrene	ND	1.00		µg/L	1	7/6/00
tert-Butylbenzene	ND	1.00		µg/L	1	7/6/00
Tetrachloroethene	1.25	1.00		µg/L	1	7/6/00
Toluene	ND	1.00		µg/L	1	7/6/00
trans-1,2-Dichloroethene	ND	1.00		µg/L	1	7/6/00
trans-1,3-Dichloropropene	ND	1.00		µg/L	1	7/6/00
Trichloroethene	ND	1.00		µg/L	1	7/6/00
Trichlorofluoromethane	ND	2.00		µg/L	1	7/6/00
Vinyl acetate	ND	1.00		µg/L	1	7/6/00
Vinyl chloride	ND	1.20		µg/L	1	7/6/00
Surr: 4-Bromofluorobenzene	101.8	86-115		%REC	1	7/6/00
Surr: Dibromofluoromethane	104.4	86-118		%REC	1	7/6/00
Surr: Toluene-d8	102.4	88-110		%REC	1	7/6/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

CLIENT: Hahn & Associates
Work Order: 0007004
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT

Method Blank

Sample ID: **MBLANK** Batch ID: **05 8260 A-7/7** Test Code: **EPA 8260B** Units: µg/L Analysis Date **7/6/00** Prep Date:

Client ID: **0007004** Run ID: **ANGSTROM_000706A** SeqNo: **45882**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	1									
1,1,1-Trichloroethane	ND	1									
1,1,2,2-Tetrachloroethane	ND	1									
1,1,2-Trichloroethane	ND	1									
1,1-Dichloroethane	ND	1									
1,1-Dichloroethene	ND	1									
1,1-Dichloropropene	ND	1									
1,2,3-Trichlorobenzene	ND	1.8									
1,2,3-Trichloropropane	ND	1									
1,2,4-Trichlorobenzene	ND	1									
1,2,4-Trimethylbenzene	ND	1									
1,2-Dibromo-3-chloropropane	ND	1.8									
1,2-Dibromoethane	ND	1									
1,2-Dichlorobenzene	ND	1									
1,2-Dichloroethane	ND	1									
1,2-Dichloropropane	ND	1									
1,3,5-Trimethylbenzene	ND	1									
1,3-Dichlorobenzene	ND	1									
1,3-Dichloropropane	ND	1									
1,4-Dichlorobenzene	ND	1									
2,2-Dichloropropane	ND	1									
2-Butanone	ND	20									
2-Chloroethyl vinyl ether	ND	5									
2-Chlorotoluene	ND	1									
2-Hexanone	ND	20									
4-Chlorotoluene	ND	1									
4-Isopropyltoluene	ND	1									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007004
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

4-Methyl-2-pentanone	ND	1
Acetone	ND	20
Benzene	ND	1
Bromobenzene	ND	1
Bromochloromethane	ND	1
Bromodichloromethane	ND	1
Bromoform	ND	1
Bromomethane	ND	5
Carbon disulfide	ND	1
Carbon tetrachloride	ND	1
Chlorobenzene	ND	1
Chloroethane	ND	1.8
Chloroform	ND	1
Chloromethane	ND	2
cis-1,2-Dichloroethene	ND	1.8
cis-1,3-Dichloropropene	ND	1
Dibromochloromethane	ND	1
Dibromomethane	ND	1
Dichlorodifluoromethane	ND	2
Ethylbenzene	ND	1
Hexachlorobutadiene	ND	2
Iodomethane	ND	1
Isopropylbenzene	ND	1
m,p-Xylene	ND	2
Methyl tert-butyl ether	ND	2
Methylene chloride	ND	10
n-Butylbenzene	ND	1
n-Propylbenzene	ND	1
Naphthalene	ND	2
o-Xylene	ND	1
sec-Butylbenzene	ND	1
Styrene	ND	1
tert-Butylbenzene	ND	1

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007004
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

Tetrachloroethene	ND	1
Toluene	ND	1
trans-1,2-Dichloroethene	ND	1
trans-1,3-Dichloropropene	ND	1
Trichloroethene	ND	1
Trichlorofluoromethane	ND	2
Vinyl acetate	ND	1
Vinyl chloride	ND	1.2

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007004
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: 0007001-01A MS	Batch ID: 05 8260 A-7/7	Test Code: EPA 8260B	Units: µg/L	Analysis Date 7/6/00	Prep Date:
Client ID:	0007004	Run ID: ANGSTROM_000706A		SeqNo: 45884	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	52.8	1	50	0	105.6%	0	234	0			
Benzene	51.8	1	50	0	103.6%	37	151	0			
Chlorobenzene	47.8	1	50	0	95.6%	37	160	0			
Toluene	52.9	1	50	0	105.8%	47	150	0			
Trichloroethene	52.9	1	50	0	105.8%	71	157	0			

Sample ID: 0007001-01A MSD	Batch ID: 05 8260 A-7/7	Test Code: EPA 8260B	Units: µg/L	Analysis Date 7/6/00	Prep Date:
Client ID:	0007004	Run ID: ANGSTROM_000706A		SeqNo: 45885	

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	53.7	1	50	0	107.4%	0	234	52.8	1.7%	20	
Benzene	47.4	1	50	0	94.8%	37	151	51.8	8.9%	20	
Chlorobenzene	49	1	50	0	98.0%	37	160	47.8	2.5%	20	
Toluene	49.9	1	50	0	99.8%	47	150	52.9	5.8%	20	
Trichloroethene	50.4	1	50	0	100.8%	71	157	52.9	4.8%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *10-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007004
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT

Continuing Calibration Verification Standard

Sample ID: CCV | Batch ID: 05 8260 A-7/7 | Test Code: EPA 8260B | Units: µg/L | Analysis Date 7/6/00 | Prep Date:

Client ID: 0007004 | Run ID: ANGSTROM_000706A | SeqNo: 45881

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	52.7	1	50	0	105.4%	80	120	0			
1,2-Dichloropropane	51.3	1	50	0	102.6%	80	120	0			
Chloroform	51.1	1	50	0	102.2%	80	120	0			
Ethylbenzene	52	1	50	0	104.0%	80	120	0			
Toluene	52.5	1	50	0	105.0%	80	120	0			
Vinyl chloride	43.9	1.2	50	0	87.8%	80	120	0			
4-Bromofluorobenzene	47.9	0	50	0	95.8%	86	115	0			
Dibromofluoromethane	49.1	0	50	0	98.2%	86	118	0			
Toluene-d8	49.8	0	50	0	99.6%	88	110	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CONTAINED-IN ASSESSMENT

Rainier Mall
4208 Rainier Avenue South
Seattle, Washington

October 4, 2000

Prepared for:

PacTrust
Portland, Oregon

Prepared by:

Hahn and Associates, Inc.
Portland, Oregon

HAI Project No. 5015

HAHN AND ASSOCIATES, INC.
ENVIRONMENTAL CONSULTANTS

October 4, 2000

Mr. Dean Yasuda
Washington Department of Ecology – NWRO
3190 160th Avenue S.E.
Bellevue, Washington 98006-5452

HAI Project No. 5015

Subject: Request for Contained-In Determination, Rainier Mall Site, 4208 Rainier Avenue South, Seattle Washington

Dear Mr. Yasuda:

1.0 Introduction

At the request of PacTrust, Hahn and Associates, Inc. (HAI) has conducted a "contained-in" assessment regarding investigative-derived soil media at the above-referenced site (Figure 1). PacTrust understands, that at Washington Department of Ecology (WDOE) discretion, the agency will evaluate soil media on a case-by-case basis for a "contained-in" determination. The "contained-in" determination may identify media that does not need to be managed as a Resource Conservation and Recovery Act (RCRA) hazardous waste, but instead, could potentially be disposed at a permitted RCRA Subtitle D landfill. Please consider this letter a request for the WDOE to conduct a contained-in determination of 16 55-gallon drums of investigative-derived soil media currently stored at the subject property.

2.0 Site Assessment Activities

In August 2000, HAI conducted Phase II Environmental Site Assessment[1] (ESA) activities to assess the quality of subsurface soils and groundwater relating to two former dry cleaning operations at the subject property. The Phase II ESA report was submitted to WDOE by PacTrust under separate cover on October 2, 2000, fulfilling their obligation to report a release at the site under Washington Administrative Code (WAC) 173-340-300. As part of the Phase II ESA, 4 worst-case soil samples from 8 soil borings (Figure 2) were selected for laboratory analysis of volatile organic compounds (VOCs) by U. S. Environmental Protection Agency (EPA) Method 8260. The results indicated that halogenated VOCs, specifically tetrachloroethene (PCE) and trichloroethene (TCE) were detected in two of four worst-case samples (Table 1). Various volatile aromatic compounds including toluene, xylenes, n-propylbenzene, and trimethylbenzenes were also detected. The laboratory analytical reports and chain-of-custody documentation for the Phase II ESA soil sampling are included in Appendix A. In total 16 55-gallon drums of investigative-derived soil media were generated during the Phase II ESA investigation activities.

[1] Hahn and Associates, Inc. (2000) *Phase II Environmental Site Assessment, Rainier Mall, 4208 Rainier Avenue South, Seattle, Washington* August 1, 2000

3.0 Drum Characterization Activities

Based on the Phase II ESA analytical results, additional soil samples were collected from the drummed soil media to: 1) better characterize soil cuttings from boring B-1; and 2) to characterize soils cuttings from borings where laboratory analyses were not conducted. Accordingly, one discrete soil sample was collected from soil cuttings in drums #1, #2, #3, #4, #7, #8, #9, #10, #12, and #13. Soil samples from each pair of drums representing each specific soil boring were composited at the analytical laboratory and analyzed for VOCs by EPA Method 8260. Based on the detected total concentrations of VOCs, analytical testing for leachable VOCs by the toxicity characteristic leaching procedure (TCLP) was not deemed necessary.

The results of the drum characterization activities are included on Table 1 and the laboratory analytical reports and chain-of-custody documentation are included in Appendix B. A summary of what is considered to be the final representative VOC concentrations contained-in the investigative-derived soil media is included as Table 2.

Analytical testing detected only two halogenated VOCs (PCE and TCE) in the investigative-derived soil media. PCE and TCE were detected at concentrations up to 863 parts per billion (ppb) and 7.07 ppb respectively (Table 2).

4.0 Waste Determination

According to RCRA, the soil media at the site is considered a solid waste. In addition, the waste determination indicates that any environmental media generated at the site located within the area of contamination could be interpreted to contain a RCRA listed waste (F002). Based on communications with the W DOE Hazardous Waste program and EPA RCRA Hotline, both agencies agreed with this interpretation. Accordingly, the soil media appears to warrant management as if it contains a RCRA hazardous waste.

The concentrations of PCE and TCE detected at the site indicate that the soil media is not corrosive or ignitable as defined in 40 Code of Federal Regulations (CFR) Part 261.2. In addition, PCE or TCE are not reactive as defined in 40 CFR Part 261.2. Furthermore, a comparison of worst-case total concentrations of PCE and TCE, divided by a factor of 20, indicates that the resulting concentrations do not exceed the TCLP limit for toxicity. Accordingly, the soil media is not considered to be a RCRA characteristic hazardous waste.

5.0 Contained-In Assessment

A "contained-in" assessment of the soil media was conducted based on criteria given to HAI in a September 15, 2000, telephone communication with the WDOE (Guy Tanz to Dave Misko). The assessment indicates that the concentrations of PCE and TCE detected in the worst-case soil media (Table 3) are below the required reference levels:

1) The Toxicity Characteristic as defined in 40 CFR Part 261.2

2) Land Disposal Restrictions (LDRs) as defined in 40 CFR Part 268.40

3) Health-based levels according to WDOE Model Toxics Control Act (MTCA) Method B standards for residential soils (CLARC II Table, February 1996)

Based on this evaluation, PacTrust requests that the WDOE conduct a "contained-in" determination on the stored soil media. In the event that the WDOE agrees with the findings of this assessment, PacTrust desires to dispose of the soil at the Waste Management RCRA Subtitle D landfill located in Seattle, Washington.

Upon your review, please contact the undersigned with your comments or questions.

Sincerely,

Guy H. Tanz
Associate

c: Mr. Richard Buono, PacTrust

TABLE 1 – Summary of Analytical Results for Soil Samples
Volatile Organic Compounds (VOCs) by EPA Method 8260

Contained-In Assessment
Rainier Mall
4208 Rainier Avenue South
Seattle, Washington

Project No. 5015

Drum Number	Boring Number	Sample Number	Sample Date	Top of Sample Depth (feet bgs)	Sample Type	Analytical Results ug/kg (ppb)						
						1,1-DCE	cis-1,2-DCE	PCE	TCE	Vinyl Chloride	Other VOCs	Total HVOCs
Site Assessment (June 2000)												
-	B-1	5015-000628-005	28-Jun-00	19.5	Boring	ND>5.0	ND>5.0	83,300.	272.	ND>10.0	1,2,4-TMB = 123 1,3,5-TMB = 32.2 n-propylbenzene = 16.8	83,572.
-	B-3	5015-000628-018	28-Jun-00	4.5	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND	ND
-	B-6	5015-000629-039	29-Jun-00	7.0	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND	ND
-	B-8	5015-000629-055	29-Jun-00	4.5	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND	ND
Soil Drum Characterization (August 2000)												
1 & 2	B-1	Composite of 001&002	4-Aug-00	-	Drum	ND>5.0	ND>5.0	863.	7.07	ND>10.0	toluene = 15.5 m,p-xylene = 12.4 o-xylene = 5.14	870.
3 & 4	B-1 & B-2	Composite of 003&004	4-Aug-00	-	Drum	ND>5.0	ND>5.0	80.8	ND>5.0	ND>10.0	toluene = 5.68	80.8
7 & 8	B-4	Composite of 007&008	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND	ND
9 & 10	B-5	Composite of 009&010	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	1,3,5-TMB = 5.89	ND
12 & 13	B-7	Composite of 012&013	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND	ND

Note: bgs = below ground surface
DCE = dichloroethene
EPA = U.S. Environmental Protection Agency
ND = not detected above detection limit indicated
PCE = tetrachloroethene
ppb = parts per billion
TCE = trichloroethene
TMB = trimethylbenzene
ug/kg = micrograms/kilogram
VOCs = volatile organic compounds

TABLE 2 – Summary of Analytical Results for Soil Samples - Final VOC Concentrations For Media Characterization and Assessment Purposes
Volatile Organic Compounds (VOCs) by EPA Method 8260

Contained-In Assessment
Rainier Mall
4208 Rainier Avenue South
Seattle, Washington

Project No. 5015

Drum Number	Boring Number	Sample Number	Sample Date	Top of Sample Depth (feet bgs)	Sample Type	Analytical Results ug/kg (ppb)					
						1,1-DCE	cis-1,2-DCE	PCE	TCE	Vinyl Chloride	Other VOCs
1 & 2	B-1	Composite of 001&002	4-Aug-00	-	Drum	ND>5.0	ND>5.0	863.	7.07	ND>10.0	toluene = 15.5 m,p-xylene = 12.4 o-xylene = 5.14
3 & 4	B-1 & B-2	Composite of 003&004	4-Aug-00	-	Drum	ND>5.0	ND>5.0	80.8	ND>5.0	ND>10.0	toluene = 5.68
5 & 6	B-3	5015-000628-018	28-Jun-00	4.5	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND
7 & 8	B-4	Composite of 007&008	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND
9 & 10	B-5	Composite of 009&010	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	1,3,5-TMB = 5.89
10, 11 & 12	B-6	5015-000629-039	29-Jun-00	7.0	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND
12 & 13	B-7	Composite of 012&013	4-Aug-00	-	Drum	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND
14, 15 & 16	B-8	5015-000629-055	29-Jun-00	4.5	Boring	ND>5.0	ND>5.0	ND>5.0	ND>5.0	ND>10.0	ND

Note:
bgs = below ground surface
DCE = dichloroethene
EPA = U.S. Environmental Protection Agency
ND = not detected above detection limit indicated
PCE = tetrachloroethene
ppb = parts per billion
TCE = trichloroethene
TMB = trimethylbenzene
ug/kg = micrograms/kilogram
VOCs = volatile organic compounds

TABLE 3 - Comparison of Worst-Case VOCs to Reference Levels: Investigative-Derived Soil Media

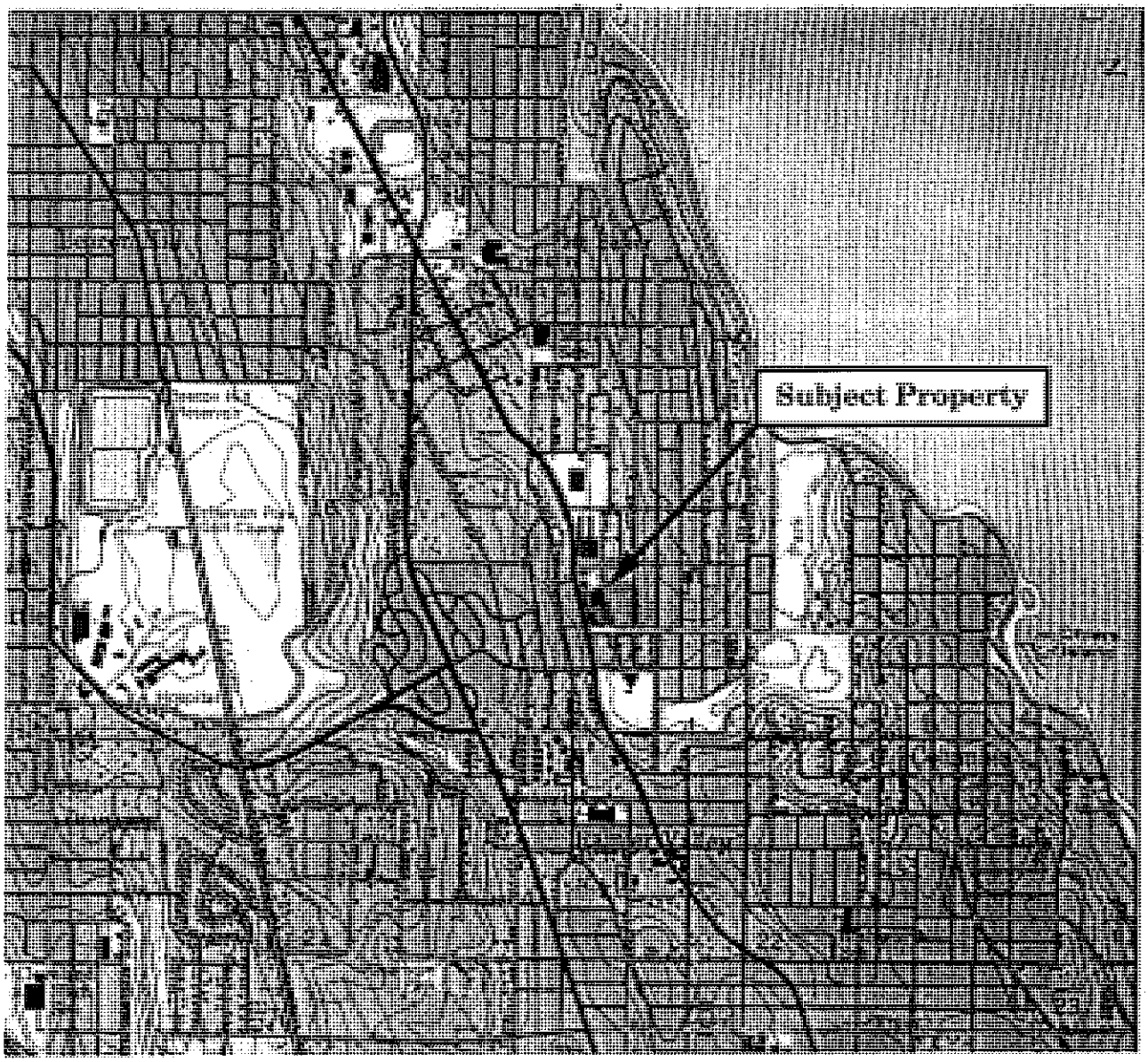
Contained-In Assessment
Rainier Mall
4208 Rainier Avenue South
Seattle, Washington

Project No. 5015

Constituent	Maximum Total Concentration mg/kg (ppm)			Calculated Worst-Case TCLP Concentration [1] mg/l (ppm)	
	Analytical Results	Reference Levels		Analytical Results	Reference Levels
	Soil Drum Sample No. 5015-000804-001&002	MTCA Method B [2]	LDR [3]	Soil Drum Sample No. 5015-000804-001&002	Toxicity [4]
Tetrachloroethene (PCE) ==>	0.863	19.6	5.6	0.0432	0.7
Trichloroethene (TCE) ==>	0.00707	90.9	5.6	0.0004	0.5

Note:
EPA = U.S. Environmental Protection Agency
LDR = Land Disposal Restriction (see note 3)
mg/kg = milligrams/kilogram
mg/l = milligrams/liter
MTCA = Model Toxics Control Act
ND = not detected above detection limit indicated
ppm = parts per million
TCLP = toxicity characteristic leaching procedure
VOCs = volatile organic compounds

1 = Worst-case TCLP is calculated by dividing the maximum total constituent concentration by a factor of 20
2 = Reference Level based on MTCA Method B Level for Residential Soil (CLARC II Table, February 1996)
3 = Reference Level based on EPA Land Disposal Restrictions as defined in 40 CFR Part 268.40.
4 = Reference Level based on EPA Toxicity Characteristic as defined in 40 CFR Part 261.2.



0 2000 4000

Scale in Feet

N

Note: Base Map from the Seattle South, Washington (1973) USGS 7.5 Minute Quadrangle
Contour Interval: 25 Feet

HAI Project No. 5015	**HAHN AND ASSOCIATES** INCORPORATED	**Location Map**	**FIGURE**
October 2000	ENVIRONMENTAL MANAGEMENT 434 NW SIXTH AVENUE, SUITE 203 PORTLAND, OREGON 97209 503/796-0717	Contained-In Assessment Rainier Mall 4208 Rainier Avenue South Seattle, Washington	**1**

Figure 2	Site Map	HAHN AND ASSOCIATES, INC.	October 2000	Project No. 5015
	Contained-In Assessment Rainier Mall 4208 Rainier Avenue South Seattle, Washington	ENVIRONMENTAL MANAGEMENT 434 NW SIXTH AVENUE, SUITE 203 PORTLAND, OREGON 97209 (503) 796-0717		

APPENDIX A

Laboratory Analytical Reports and Chain-of-Custody Documentation - June 2000 Phase II Environmental Site Assessment Soil Samples

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory: EIL
Lab Project No.: 0007003

CHAIN OF CUSTODY

Chain of Custody No.: 3

Project Manager: GUY TAUZ
Project No.: 5015
Project Name: PacTrust Seattle
Collected by: Jay Greifer

Liquid with Sediment Sample
____ Test Filtrate ____ Test Sediment ____ Test Both

Multi-Phase Sample
____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N) ____
Appropriate Containers Used (Y or N) ____
Provide Verbal Results (Y or N) ____
Provide Preliminary Fax Results ____

Comments
Sample Number Prefix: 5015-000628-

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	Analyses to be Performed: EPA 8260	RUSH	Remarks
04	004	6/26	830	B1 @ 15	X			1			
05	005		844	@ 20	X			1	X		
06	006		853	@ 25	X			1			
07	007		909	@ 30	X			1			
08	008		938	@ 35	X			1			
09	009		955	@ 40	X			1			
10	010		1116	B7 @ 5	X			1			
11	011		1126	7½	X			1			
12	012		1133	10	X			1			
13	013		1145	15	X			1			
14	014		1159	20	X			1			
15	015		1215	25	X			1			
16	016		1234	30	X			1			
17	017		1327	B3 @ 2½	X			1			
18	018		1337	5	X			1	X		
19	019		1341	7½	X			1			
20	020		1347	10	X			1			
21	021		1400	15	X			1			
22	022		1411	20	X			1			
23	023		1424	25	X			1			
24	024		1555	B4 @ 2½	X			1			
25	025		1604	5	X			1			
26	026		1610	7½	X			1			
27	027		1623	10	X			1			
28	028		1627	15	X			1			
29	029		1632	28	X			1			

Relinquished by	Company	Date	Time	Received by	Company
	HAHN & ASSOC	6/30/00	1430		EIL
Relinquished by	Company	Date	Time	Received by	Company

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory EJL
Lab Project No. C007003

CHAIN OF CUSTODY
Chain of Custody No. 4

Project Manager Jay Talbe
Project No. 5015
Project Name Pac Trust Seattle
Collected by Jay Greifer

Liquid with Sediment Sample
____ Test Filtrate ____ Test Sediment ____ Test Both
Multi-Phase Sample
____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N) ____
Appropriate Containers Used (Y or N) ____
Provide Verbal Results (Y or N) ____
Provide Preliminary Fax Results ____

Comments
Sample Number Prefix: 5015-000628-

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	Analyses to be Performed: EPA 8260	RUSH	Remarks
30	030	6-26-16	1644	B4825	X			1			

Relinquished by	Company	Date	Time	Received by	Company
	HAHN & ASSOC	6/24/16	1430		EJL
Relinquished by	Company	Date	Time	Received by	Company

5

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory: ESL
Lab Project No.: 000703

CHAIN OF CUSTODY
Chain of Custody No.: 5

Project Manager: GUY HAHN
Project No.: 5015
Project Name: PacTrust Seattle
Collected by: Jay Greifer

Liquid with Sediment Sample: ____ Test Filtrate ____ Test Sediment ____ Test Both
Multi-Phase Sample: ____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N)
Appropriate Containers Used (Y or N)
Provide Verbal Results (Y or N)
Provide Preliminary Fax Results

Comments
Sample Number Prefix: 5015-000039

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	Analyses to be Performed: EPA 8260	RUSH	Remarks
31	031	6-29-00	701	B5 @ 2½	X			1			
32	032		711	5	X			1			
33	033		718	7½	X			1			
34	034		727	10	X			1			
35	035		735	15	X			1			
36	036		745	20	X			1			
37	037		758	25	X			1			
38	038		918	B6 2½	X			1			
39	039		934	7½	X			1	*		
40	040		946	10	X			1			
41	041		947	15	X			1			
42	042		953	20	X			1			
43	043		1015	25	X			1			
44	044		1023	30	X			1			
45	045		1038	35	X			1			
46	046		1055	40	X			1			
47	047		1216	B7 @ 2½	X			1			
48	048		1231	5	X			1			
49	049		1247	7½	X			1			
50	050		1255	10	X			1			
51	051		1304	15	X			1			
52	052		1314	20	X			1			
53	053		1320	25	X			1			
54	054		1433	B8 @ 2½	X			1			
55	055		1445	5	X			1	*		
56	056		1451	7½	X			1			

Relinquished by	Company	Date	Time	Received by	Company
	HAHN & ASSOC	6/30/00	1430		ESL
Relinquished by	Company	Date	Time	Received by	Company

1 of 1

HAHN AND ASSOCIATES, INC.
Environmental Management
434 NW Sixth Avenue, Suite 203 • Portland OR 97209
(503) 796-0717 • Fax (503) 227-2209

Laboratory ESL
Lab Project No. 0007003

CHAIN OF CUSTODY

Chain of Custody No. 17

Project Manager Guthrie
Project No. # 505
Project Name Fac Truck Seattle
Collected by Jay Greifer

Liquid with Sediment Sample
____ Test Filtrate ____ Test Sediment ____ Test Both
Multi-Phase Sample
____ Test One (which) ____ Test Separately ____ Shake

Samples Received at 4C (Y or N) ____
Appropriate Containers Used (Y or N) ____
Provide Verbal Results (Y or N) ____
Provide Preliminary Fax Results ____

Comments
Sample Number Prefix: 505-000629-

Lab ID	Sample #	Date	Time	Sample Description	Matrix: Soil	Matrix: Water	Matrix: Other	Number of Containers	EPA 8260	RUSH	Remarks
57	057	6-29-99	1459	B8 @ 10	X			1			
58	058		1511	15	X			1			
59	059		1517	20	X			1			
60	060		1530	25	X			1			
61	061		1544	30	X			1			
62	062		1600	35	X			1			
63	063		1615	40	X			1			

Relinquished by	Company	Date	Time	Received by	Company
	HAHN & ASSOC	6/30/99	1470		ESL
Relinquished by	Company	Date	Time	Received by	Company

Environmental Services Laboratory, Inc. E S L

17400 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520

July 13, 2000

Mr. Guy Tanz
Hahn & Associates
434 N.W. 6th Avenue
Suite 203
Portland, OR 97209
TEL: (503)796-0717
FAX (503) 227-2209

RE: 5015/PacTrust Seattle Order No.: 0007003

Dear Mr. Guy Tanz,

Environmental Services Laboratory received 63 samples on 6/30/00 for the analyses presented in the following report.

The Samples were analyzed for the following tests:
Volatiles by GC/MS (EPA 8260B)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Nichole Karl

Nichole Karl
Project Manager

Keith Hunter

Technical Review

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-005
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-05A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2,4-Trimethylbenzene	123	5.00		µg/Kg	1	7/11/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/11/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/11/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,3,5-Trimethylbenzene	32.2	5.00		µg/Kg	1	7/11/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/11/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/11/00
2-Butanone	ND	100		µg/Kg	1	7/11/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/11/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/11/00
2-Hexanone	ND	100		µg/Kg	1	7/11/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/11/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/11/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/11/00
Acetone	ND	100		µg/Kg	1	7/11/00
Benzene	ND	5.00		µg/Kg	1	7/11/00
Bromobenzene	ND	5.00		µg/Kg	1	7/11/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/11/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/11/00
Bromoform	ND	5.00		µg/Kg	1	7/11/00
Bromomethane	ND	10.0		µg/Kg	1	7/11/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/11/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/11/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/11/00
Chloroethane	ND	10.0		µg/Kg	1	7/11/00
Chloroform	ND	5.00		µg/Kg	1	7/11/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-005
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-05A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/11/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/11/00
Dibromomethane	ND	5.00		µg/Kg	1	7/11/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/11/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/11/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/11/00
Iodomethane	ND	5.00		µg/Kg	1	7/11/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/11/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/11/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/11/00
Methylene chloride	ND	100		µg/Kg	1	7/11/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
n-Propylbenzene	16.8	5.00		µg/Kg	1	7/11/00
Naphthalene	ND	25.0		µg/Kg	1	7/11/00
o-Xylene	ND	5.00		µg/Kg	1	7/11/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
Styrene	ND	5.00		µg/Kg	1	7/11/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/11/00
Tetrachloroethene	83,300	500		µg/Kg	1	7/11/00
Toluene	ND	5.00		µg/Kg	1	7/11/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/11/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/11/00
Trichloroethene	272	5.00		µg/Kg	1	7/11/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/11/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/11/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/11/00
Surr: 4-Bromofluorobenzene	98.4	74-121		%REC	1	7/11/00
Surr: Dibromofluoromethane	97.4	80-120		%REC	1	7/11/00
Surr: Toluene-d8	101.0	81-117		%REC	1	7/11/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-018
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-18A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Acrylonitrile	ND	250		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000628-018
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/28/00
Lab ID:	0007003-18A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	7/10/00
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	99.6	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	100.6	80-120		%REC	1	7/10/00
Surr: Toluene-d8	101.2	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-039
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-39A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00
Chloroform	ND	5.00		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-039
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-39A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	101.4	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	103.4	80-120		%REC	1	7/10/00
Surr: Toluene-d8	104.6	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-055
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-55A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	7/10/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	7/10/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	7/10/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	7/10/00
2-Butanone	ND	100		µg/Kg	1	7/10/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	7/10/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
2-Hexanone	ND	100		µg/Kg	1	7/10/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	7/10/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	7/10/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	7/10/00
Acetone	ND	100		µg/Kg	1	7/10/00
Benzene	ND	5.00		µg/Kg	1	7/10/00
Bromobenzene	ND	5.00		µg/Kg	1	7/10/00
Bromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromodichloromethane	ND	5.00		µg/Kg	1	7/10/00
Bromoform	ND	5.00		µg/Kg	1	7/10/00
Bromomethane	ND	10.0		µg/Kg	1	7/10/00
Carbon disulfide	ND	5.00		µg/Kg	1	7/10/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	7/10/00
Chlorobenzene	ND	5.00		µg/Kg	1	7/10/00
Chloroethane	ND	10.0		µg/Kg	1	7/10/00
Chloroform	ND	5.00		µg/Kg	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Jul-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	5015-000629-055
Lab Order:	0007003	**Tag Number:**	
Project:	5015/PacTrust Seattle	**Collection Date:**	6/29/00
Lab ID:	0007003-55A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloromethane	ND	10.0		µg/Kg	1	7/10/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Dibromochloromethane	ND	5.00		µg/Kg	1	7/10/00
Dibromomethane	ND	5.00		µg/Kg	1	7/10/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	7/10/00
Ethylbenzene	ND	5.00		µg/Kg	1	7/10/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	7/10/00
Iodomethane	ND	5.00		µg/Kg	1	7/10/00
Isopropylbenzene	ND	5.00		µg/Kg	1	7/10/00
m,p-Xylene	ND	10.0		µg/Kg	1	7/10/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	7/10/00
Methylene chloride	ND	100		µg/Kg	1	7/10/00
n-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
n-Propylbenzene	ND	5.00		µg/Kg	1	7/10/00
Naphthalene	ND	25.0		µg/Kg	1	7/10/00
o-Xylene	ND	5.00		µg/Kg	1	7/10/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Styrene	ND	5.00		µg/Kg	1	7/10/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	7/10/00
Tetrachloroethene	ND	5.00		µg/Kg	1	7/10/00
Toluene	ND	5.00		µg/Kg	1	7/10/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	7/10/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	7/10/00
Trichloroethene	ND	5.00		µg/Kg	1	7/10/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	7/10/00
Vinyl acetate	ND	5.00		µg/Kg	1	7/10/00
Vinyl chloride	ND	10.0		µg/Kg	1	7/10/00
Surr: 4-Bromofluorobenzene	102.6	74-121		%REC	1	7/10/00
Surr: Dibromofluoromethane	102.6	80-120		%REC	1	7/10/00
Surr: Toluene-d8	106.2	81-117		%REC	1	7/10/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *13-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLANK** Batch ID: **05 8260 S-7/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **7/10/00** Prep Date:

Client ID: **0007003** Run ID: **ANGSTROM_000710A** SeqNo: **46169**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5									
1,1,1-Trichloroethane	ND	5									
1,1,2,2-Tetrachloroethane	ND	5									
1,1,2-Trichloroethane	ND	5									
1,1-Dichloroethane	ND	5									
1,1-Dichloroethene	ND	5									
1,1-Dichloropropene	ND	5									
1,2,3-Trichlorobenzene	ND	5									
1,2,3-Trichloropropane	ND	5									
1,2,4-Trichlorobenzene	ND	5									
1,2,4-Trimethylbenzene	ND	5									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5									
1,2-Dichlorobenzene	ND	5									
1,2-Dichloroethane	ND	5									
1,2-Dichloropropane	ND	5									
1,3,5-Trimethylbenzene	ND	5									
1,3-Dichlorobenzene	ND	5									
1,3-Dichloropropane	ND	5									
1,4-Dichlorobenzene	ND	5									
2,2-Dichloropropane	ND	5									
2-Butanone	ND	100									
2-Chloroethyl vinyl ether	ND	50									
2-Chlorotoluene	ND	5									
2-Hexanone	ND	100									
4-Chlorotoluene	ND	5									
4-Isopropyltoluene	ND	5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

4-Methyl-2-pentanone	ND	5
Acetone	ND	100
Benzene	ND	5
Bromobenzene	ND	5
Bromochloromethane	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	10
Carbon disulfide	ND	5
Carbon tetrachloride	ND	5
Chlorobenzene	ND	5
Chloroethane	ND	10
Chloroform	ND	5
Chloromethane	ND	10
cis-1,2-Dichloroethene	ND	5
cis-1,3-Dichloropropene	ND	5
Dibromochloromethane	ND	5
Dibromomethane	ND	5
Dichlorodifluoromethane	ND	10
Ethylbenzene	ND	5
Hexachlorobutadiene	ND	5
Iodomethane	ND	5
Isopropylbenzene	ND	5
m,p-Xylene	ND	10
Methyl tert-butyl ether	ND	10
Methylene chloride	ND	100
n-Butylbenzene	ND	5
n-Propylbenzene	ND	5
Naphthalene	ND	25
o-Xylene	ND	5
sec-Butylbenzene	ND	5
Styrene	ND	5
tert-Butylbenzene	ND	5

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT
Method Blank

Tetrachloroethene	ND	5
Toluene	ND	5
trans-1,2-Dichloroethene	ND	5
trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	10
Vinyl acetate	ND	5
Vinyl chloride	ND	10

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *13-Jul-00*

CLIENT: Hahn & Associates
Work Order: 0007003
Project: 5015/PacTrust Seattle

QC SUMMARY REPORT

Continuing Calibration Verification Standard

Sample ID: **CCV** Batch ID: **05 8260 S-7/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **7/10/00** Prep Date:

Client ID: **0007003** Run ID: **ANGSTROM_000710A** SeqNo: **46168**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	54.5	5	50	0	109.0%	80	120	0			
1,2-Dichloropropane	50.4	5	50	0	100.8%	80	120	0			
Chloroform	51	5	50	0	102.0%	80	120	0			
Ethylbenzene	49.5	5	50	0	99.0%	80	120	0			
Toluene	51.4	5	50	0	102.8%	80	120	0			
Vinyl chloride	51.3	10	50	0	102.6%	80	120	0			
4-Bromofluorobenzene	47.2	0	50	0	94.4%	86	115	0			
Dibromofluoromethane	49.6	0	50	0	99.2%	86	118	0			
Toluene-d8	49.8	0	50	0	99.6%	88	110	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

APPENDIX B

Laboratory Analytical Reports and Chain-of-Custody Documentation - August 2000 Investigative-Derived Soil Media Drum Characterization Samples

nca™ ESL
Environmental Laboratory Network
www.ncalabs.com

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508 (425) 420-9200 FAX 420-9210
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776 (509) 924-9200 FAX 924-9290
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132 (503) 906-9200 FAX 906-9210
20332 Empire Avenue, Suite F-1, Bend, OR 97701-5711 (541) 383-9310 FAX 382-7588

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: Hahn Associates

REPORT TO: Guy Tang

ADDRESS: 434 NW 6th Suite 203
Portland OR 97209

PHONE: 503 726-6717 FAX: 227-2209

INVOICE TO: Same
ESC QUOTE # 69
MAI # 5015
RAINIER MALL

P.O. NUMBER:

PROJECT NAME: Rainer market

PROJECT NUMBER:

SAMPLED BY: JEFF WALTERS

TURNAROUND REQUEST in Business Days*

Organic & Inorganic Analyses: 10 | 7 | 5 | 4 | 3 | 2 | 1 | <1

STD. Petroleum Hydrocarbon Analyses: 5 | 4 | 3 | 2 | 1 | <1

STD. OTHER Please Specify NORMAL TAT

*Turnaround Requests less than standard may incur Rush Charges.

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	COMPOSITE	VOCs BY EPA 8260B												MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WO ID
1.	1080400 01	08/04/00 0830	*	11		*										S	1		
2.	2-080400 02	08/04/00 0835	*	12		*										S	1		
3.	3-080400 03	08/04/00 0840	*	13		*										S	1		
4.	4-080400 04	08/04/00 0845	*	14		*										S	1		
5.	7-080400 05	08/04/00 0850	*	15		*										S	1		
6.	8-080400 06	08/04/00 0855														S	1		
7.	9-080400 07	08/04/00 0900														S	1		
8.	10-080400 08	08/04/00 0905														S	1		
9.	12-080400 09	08/04/00 0910														S	1		
10.	13-080400 10	08/04/00 0915														S	1		
11.																			
12.																			
13.																			
14.																			
15.																			

RELINQUISHED BY: Jeff Walters DATE: 08/04/00
PRINT NAME: Jeff Walters FIRM: Same TIME: 1330

RECEIVED BY: [signature] DATE: 7/4/00
PRINT NAME: Guy H Tang FIRM: HAI TIME: 1330

RELINQUISHED BY: [signature] DATE:
PRINT NAME: Guy H Tang FIRM: HAI TIME:

RECEIVED BY: [signature] DATE: 8/9/00
PRINT NAME: Dellen Dun FIRM: ESL TIME:

ADDITIONAL REMARKS:

COC REV 3/99

TEMP:

Environmental Services Laboratory, Inc. E S L

17400 SW Upper Boones Ferry Road • Suite 270 • Portland, OR 97224 • (503) 670-8520

August 17, 2000

Mr. Guy Tanz
Hahn & Associates
434 N.W. 6th Avenue
Suite 203
Portland, OR 97209
TEL: (503)796-0717
FAX (503) 227-2209

RE: 5015/Ranier Market Order No.: 0008060

Dear Mr. Guy Tanz,

Environmental Services Laboratory received 15 samples on 8/9/00 for the analyses presented in the following report.

The Samples were analyzed for the following tests:
Volatiles by GC/MS (EPA 8260B)

There were no problems with the analyses and all data for associated QC met EPA or laboratory specifications except where noted in the Case Narrative. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety, without the written approval from the Laboratory.

If you have any questions regarding these test results, please feel free to call.

Sincerely,

Nichole Karl
Nichole Karl
Project Manager

Keith Hunter
Technical Review

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 001&002
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-11A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	8/16/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
2-Butanone	ND	100		µg/Kg	1	8/16/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	8/16/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
2-Hexanone	ND	100		µg/Kg	1	8/16/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	8/16/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	8/16/00
Acetone	ND	100		µg/Kg	1	8/16/00
Acrylonitrile	ND	250		µg/Kg	1	8/16/00
Benzene	ND	5.00		µg/Kg	1	8/16/00
Bromobenzene	ND	5.00		µg/Kg	1	8/16/00
Bromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromodichloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromoform	ND	5.00		µg/Kg	1	8/16/00
Bromomethane	ND	10.0		µg/Kg	1	8/16/00
Carbon disulfide	ND	5.00		µg/Kg	1	8/16/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	8/16/00
Chlorobenzene	ND	5.00		µg/Kg	1	8/16/00
Chloroethane	ND	10.0		µg/Kg	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 001&002
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-11A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	8/16/00
Chloromethane	ND	10.0		µg/Kg	1	8/16/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Dibromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Dibromomethane	ND	5.00		µg/Kg	1	8/16/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	8/16/00
Ethylbenzene	ND	5.00		µg/Kg	1	8/16/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	8/16/00
Iodomethane	ND	5.00		µg/Kg	1	8/16/00
Isopropylbenzene	ND	5.00		µg/Kg	1	8/16/00
m,p-Xylene	12.4	10.0		µg/Kg	1	8/16/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	8/16/00
Methylene chloride	ND	100		µg/Kg	1	8/16/00
n-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
n-Propylbenzene	ND	5.00		µg/Kg	1	8/16/00
Naphthalene	ND	25.0		µg/Kg	1	8/16/00
o-Xylene	5.14	5.00		µg/Kg	1	8/16/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Styrene	ND	5.00		µg/Kg	1	8/16/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Tetrachloroethene	863	20.0		µg/Kg	1	8/16/00
Toluene	15.5	5.00		µg/Kg	1	8/16/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Trichloroethene	7.07	5.00		µg/Kg	1	8/16/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	8/16/00
Vinyl acetate	ND	5.00		µg/Kg	1	8/16/00
Vinyl chloride	ND	10.0		µg/Kg	1	8/16/00
Surr: 4-Bromofluorobenzene	102.4	74-121		%REC	1	8/16/00
Surr: Dibromofluoromethane	103.2	80-120		%REC	1	8/16/00
Surr: Toluene-d8	98.6	81-117		%REC	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 003&004
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-12A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	8/16/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
2-Butanone	ND	100		µg/Kg	1	8/16/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	8/16/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
2-Hexanone	ND	100		µg/Kg	1	8/16/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	8/16/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	8/16/00
Acetone	ND	100		µg/Kg	1	8/16/00
Acrylonitrile	ND	250		µg/Kg	1	8/16/00
Benzene	ND	5.00		µg/Kg	1	8/16/00
Bromobenzene	ND	5.00		µg/Kg	1	8/16/00
Bromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromodichloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromoform	ND	5.00		µg/Kg	1	8/16/00
Bromomethane	ND	10.0		µg/Kg	1	8/16/00
Carbon disulfide	ND	5.00		µg/Kg	1	8/16/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	8/16/00
Chlorobenzene	ND	5.00		µg/Kg	1	8/16/00
Chloroethane	ND	10.0		µg/Kg	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 003&004
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-12A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	8/16/00
Chloromethane	ND	10.0		µg/Kg	1	8/16/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Dibromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Dibromomethane	ND	5.00		µg/Kg	1	8/16/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	8/16/00
Ethylbenzene	ND	5.00		µg/Kg	1	8/16/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	8/16/00
Iodomethane	ND	5.00		µg/Kg	1	8/16/00
Isopropylbenzene	ND	5.00		µg/Kg	1	8/16/00
m,p-Xylene	ND	10.0		µg/Kg	1	8/16/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	8/16/00
Methylene chloride	ND	100		µg/Kg	1	8/16/00
n-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
n-Propylbenzene	ND	5.00		µg/Kg	1	8/16/00
Naphthalene	ND	25.0		µg/Kg	1	8/16/00
o-Xylene	ND	5.00		µg/Kg	1	8/16/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Styrene	ND	5.00		µg/Kg	1	8/16/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Tetrachloroethene	80.8	5.00		µg/Kg	1	8/16/00
Toluene	5.68	5.00		µg/Kg	1	8/16/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Trichloroethene	ND	5.00		µg/Kg	1	8/16/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	8/16/00
Vinyl acetate	ND	5.00		µg/Kg	1	8/16/00
Vinyl chloride	ND	10.0		µg/Kg	1	8/16/00
Surr: 4-Bromofluorobenzene	109.6	74-121		%REC	1	8/16/00
Surr: Dibromofluoromethane	98.4	80-120		%REC	1	8/16/00
Surr: Toluene-d8	102.0	81-117		%REC	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 007&008
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-13A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: tmh
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	8/16/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
2-Butanone	ND	100		µg/Kg	1	8/16/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	8/16/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
2-Hexanone	ND	100		µg/Kg	1	8/16/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	8/16/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	8/16/00
Acetone	ND	100		µg/Kg	1	8/16/00
Acrylonitrile	ND	250		µg/Kg	1	8/16/00
Benzene	ND	5.00		µg/Kg	1	8/16/00
Bromobenzene	ND	5.00		µg/Kg	1	8/16/00
Bromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromodichloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromoform	ND	5.00		µg/Kg	1	8/16/00
Bromomethane	ND	10.0		µg/Kg	1	8/16/00
Carbon disulfide	ND	5.00		µg/Kg	1	8/16/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	8/16/00
Chlorobenzene	ND	5.00		µg/Kg	1	8/16/00
Chloroethane	ND	10.0		µg/Kg	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 007&008
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-13A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	8/16/00
Chloromethane	ND	10.0		µg/Kg	1	8/16/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Dibromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Dibromomethane	ND	5.00		µg/Kg	1	8/16/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	8/16/00
Ethylbenzene	ND	5.00		µg/Kg	1	8/16/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	8/16/00
Iodomethane	ND	5.00		µg/Kg	1	8/16/00
Isopropylbenzene	ND	5.00		µg/Kg	1	8/16/00
m,p-Xylene	ND	10.0		µg/Kg	1	8/16/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	8/16/00
Methylene chloride	ND	100		µg/Kg	1	8/16/00
n-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
n-Propylbenzene	ND	5.00		µg/Kg	1	8/16/00
Naphthalene	ND	25.0		µg/Kg	1	8/16/00
o-Xylene	ND	5.00		µg/Kg	1	8/16/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Styrene	ND	5.00		µg/Kg	1	8/16/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Tetrachloroethene	ND	5.00		µg/Kg	1	8/16/00
Toluene	ND	5.00		µg/Kg	1	8/16/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Trichloroethene	ND	5.00		µg/Kg	1	8/16/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	8/16/00
Vinyl acetate	ND	5.00		µg/Kg	1	8/16/00
Vinyl chloride	ND	10.0		µg/Kg	1	8/16/00
Surr: 4-Bromofluorobenzene	112.0	74-121		%REC	1	8/16/00
Surr: Dibromofluoromethane	99.8	80-120		%REC	1	8/16/00
Surr: Toluene-d8	104.6	81-117		%REC	1	8/16/00

Qualifiers:

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 009&010
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-14A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	8/16/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,3,5-Trimethylbenzene	5.89	5.00		µg/Kg	1	8/16/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
2-Butanone	ND	100		µg/Kg	1	8/16/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	8/16/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
2-Hexanone	ND	100		µg/Kg	1	8/16/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	8/16/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	8/16/00
Acetone	ND	100		µg/Kg	1	8/16/00
Acrylonitrile	ND	250		µg/Kg	1	8/16/00
Benzene	ND	5.00		µg/Kg	1	8/16/00
Bromobenzene	ND	5.00		µg/Kg	1	8/16/00
Bromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromodichloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromoform	ND	5.00		µg/Kg	1	8/16/00
Bromomethane	ND	10.0		µg/Kg	1	8/16/00
Carbon disulfide	ND	5.00		µg/Kg	1	8/16/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	8/16/00
Chlorobenzene	ND	5.00		µg/Kg	1	8/16/00
Chloroethane	ND	10.0		µg/Kg	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 009&010
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-14A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	8/16/00
Chloromethane	ND	10.0		µg/Kg	1	8/16/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Dibromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Dibromomethane	ND	5.00		µg/Kg	1	8/16/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	8/16/00
Ethylbenzene	ND	5.00		µg/Kg	1	8/16/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	8/16/00
Iodomethane	ND	5.00		µg/Kg	1	8/16/00
Isopropylbenzene	ND	5.00		µg/Kg	1	8/16/00
m,p-Xylene	ND	10.0		µg/Kg	1	8/16/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	8/16/00
Methylene chloride	ND	100		µg/Kg	1	8/16/00
n-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
n-Propylbenzene	ND	5.00		µg/Kg	1	8/16/00
Naphthalene	ND	25.0		µg/Kg	1	8/16/00
o-Xylene	ND	5.00		µg/Kg	1	8/16/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Styrene	ND	5.00		µg/Kg	1	8/16/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Tetrachloroethene	ND	5.00		µg/Kg	1	8/16/00
Toluene	ND	5.00		µg/Kg	1	8/16/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Trichloroethene	ND	5.00		µg/Kg	1	8/16/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	8/16/00
Vinyl acetate	ND	5.00		µg/Kg	1	8/16/00
Vinyl chloride	ND	10.0		µg/Kg	1	8/16/00
Surr: 4-Bromofluorobenzene	107.0	74-121		%REC	1	8/16/00
Surr: Dibromofluoromethane	100.4	80-120		%REC	1	8/16/00
Surr: Toluene-d8	102.0	81-117		%REC	1	8/16/00

Qualifiers:

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 012&013
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-15A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
VOLATILES BY GC/MS		**EPA 8260B**				Analyst: **tmh**
1,1,1,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,1-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2,2-Tetrachloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1,2-Trichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
1,1-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,3-Trichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2,4-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dibromo-3-chloropropane	ND	10.0		µg/Kg	1	8/16/00
1,2-Dibromoethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloroethane	ND	5.00		µg/Kg	1	8/16/00
1,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,3,5-Trimethylbenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
1,3-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
1,4-Dichlorobenzene	ND	5.00		µg/Kg	1	8/16/00
2,2-Dichloropropane	ND	5.00		µg/Kg	1	8/16/00
2-Butanone	ND	100		µg/Kg	1	8/16/00
2-Chloroethyl vinyl ether	ND	50.0		µg/Kg	1	8/16/00
2-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
2-Hexanone	ND	100		µg/Kg	1	8/16/00
4-Chlorotoluene	ND	5.00		µg/Kg	1	8/16/00
4-Isopropyltoluene	ND	5.00		µg/Kg	1	8/16/00
4-Methyl-2-pentanone	ND	5.00		µg/Kg	1	8/16/00
Acetone	ND	100		µg/Kg	1	8/16/00
Acrylonitrile	ND	250		µg/Kg	1	8/16/00
Benzene	ND	5.00		µg/Kg	1	8/16/00
Bromobenzene	ND	5.00		µg/Kg	1	8/16/00
Bromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromodichloromethane	ND	5.00		µg/Kg	1	8/16/00
Bromoform	ND	5.00		µg/Kg	1	8/16/00
Bromomethane	ND	10.0		µg/Kg	1	8/16/00
Carbon disulfide	ND	5.00		µg/Kg	1	8/16/00
Carbon tetrachloride	ND	5.00		µg/Kg	1	8/16/00
Chlorobenzene	ND	5.00		µg/Kg	1	8/16/00
Chloroethane	ND	10.0		µg/Kg	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT:	Hahn & Associates	**Client Sample ID:**	comp 012&013
Lab Order:	0008060	**Tag Number:**	
Project:	5015/Ranier Market	**Collection Date:**	8/4/00
Lab ID:	0008060-15A	**Matrix:**	SOIL

Analyses	Result	Limit	Qual	Units	DF	Date Analyzed
Chloroform	ND	5.00		µg/Kg	1	8/16/00
Chloromethane	ND	10.0		µg/Kg	1	8/16/00
cis-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
cis-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Dibromochloromethane	ND	5.00		µg/Kg	1	8/16/00
Dibromomethane	ND	5.00		µg/Kg	1	8/16/00
Dichlorodifluoromethane	ND	10.0		µg/Kg	1	8/16/00
Ethylbenzene	ND	5.00		µg/Kg	1	8/16/00
Hexachlorobutadiene	ND	5.00		µg/Kg	1	8/16/00
Iodomethane	ND	5.00		µg/Kg	1	8/16/00
Isopropylbenzene	ND	5.00		µg/Kg	1	8/16/00
m,p-Xylene	ND	10.0		µg/Kg	1	8/16/00
Methyl tert-butyl ether	ND	10.0		µg/Kg	1	8/16/00
Methylene chloride	ND	100		µg/Kg	1	8/16/00
n-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
n-Propylbenzene	ND	5.00		µg/Kg	1	8/16/00
Naphthalene	ND	25.0		µg/Kg	1	8/16/00
o-Xylene	ND	5.00		µg/Kg	1	8/16/00
sec-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Styrene	ND	5.00		µg/Kg	1	8/16/00
tert-Butylbenzene	ND	5.00		µg/Kg	1	8/16/00
Tetrachloroethene	ND	5.00		µg/Kg	1	8/16/00
Toluene	ND	5.00		µg/Kg	1	8/16/00
trans-1,2-Dichloroethene	ND	5.00		µg/Kg	1	8/16/00
trans-1,3-Dichloropropene	ND	5.00		µg/Kg	1	8/16/00
Trichloroethene	ND	5.00		µg/Kg	1	8/16/00
Trichlorofluoromethane	ND	10.0		µg/Kg	1	8/16/00
Vinyl acetate	ND	5.00		µg/Kg	1	8/16/00
Vinyl chloride	ND	10.0		µg/Kg	1	8/16/00
Surr: 4-Bromofluorobenzene	109.8	74-121		%REC	1	8/16/00
Surr: Dibromofluoromethane	102.8	80-120		%REC	1	8/16/00
Surr: Toluene-d8	102.2	81-117		%REC	1	8/16/00

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT: Hahn & Associates
Work Order: 0008060
Project: 5015/Ranier Market

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLANK** Batch ID: **05 8260 S-8/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **8/16/00** Prep Date:
Client ID: **0008060** Run ID: **ANGSTROM_000816A** SeqNo: **49711**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1,1,2-Tetrachloroethane	ND	5									
1,1,1-Trichloroethane	ND	5									
1,1,2,2-Tetrachloroethane	ND	5									
1,1,2-Trichloroethane	ND	5									
1,1-Dichloroethane	ND	5									
1,1-Dichloroethene	ND	5									
1,1-Dichloropropene	ND	5									
1,2,3-Trichlorobenzene	ND	5									
1,2,3-Trichloropropane	ND	5									
1,2,4-Trichlorobenzene	ND	5									
1,2,4-Trimethylbenzene	ND	5									
1,2-Dibromo-3-chloropropane	ND	10									
1,2-Dibromoethane	ND	5									
1,2-Dichlorobenzene	ND	5									
1,2-Dichloroethane	ND	5									
1,2-Dichloropropane	ND	5									
1,3,5-Trimethylbenzene	ND	5									
1,3-Dichlorobenzene	ND	5									
1,3-Dichloropropane	ND	5									
1,4-Dichlorobenzene	ND	5									
2,2-Dichloropropane	ND	5									
2-Butanone	ND	100									
2-Chloroethyl vinyl ether	ND	50									
2-Chlorotoluene	ND	5									
2-Hexanone	ND	100									
4-Chlorotoluene	ND	5									
4-Isopropyltoluene	ND	5									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Hahn & Associates
Work Order: 0008060
Project: 5015/Ranier Market

QC SUMMARY REPORT
Method Blank

4-Methyl-2-pentanone	ND	5
Acetone	ND	100
Acrylonitrile	ND	250
Benzene	ND	5
Bromobenzene	ND	5
Bromochloromethane	ND	5
Bromodichloromethane	ND	5
Bromoform	ND	5
Bromomethane	ND	10
Carbon disulfide	ND	5
Carbon tetrachloride	ND	5
Chlorobenzene	ND	5
Chloroethane	ND	10
Chloroform	ND	5
Chloromethane	ND	10
cis-1,2-Dichloroethene	ND	5
cis-1,3-Dichloropropene	ND	5
Dibromochloromethane	ND	5
Dibromomethane	ND	5
Dichlorodifluoromethane	ND	10
Ethylbenzene	ND	5
Hexachlorobutadiene	ND	5
Iodomethane	ND	5
Isopropylbenzene	ND	5
m,p-Xylene	ND	10
Methyl tert-butyl ether	ND	10
Methylene chloride	ND	100
n-Butylbenzene	ND	5
n-Propylbenzene	ND	5
Naphthalene	ND	25
o-Xylene	ND	5
sec-Butylbenzene	ND	5
Styrene	ND	5

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT:	Hahn & Associates
Work Order:	0008060
Project:	5015/Ranier Market

QC SUMMARY REPORT

Method Blank

tert-Butylbenzene	ND	5
Tetrachloroethene	ND	5
Toluene	ND	5
trans-1,2-Dichloroethene	ND	5
trans-1,3-Dichloropropene	ND	5
Trichloroethene	ND	5
Trichlorofluoromethane	ND	10
Vinyl acetate	ND	5
Vinyl chloride	ND	10

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT: Hahn & Associates
Work Order: 0008060
Project: 5015/Ranier Market

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0008060-11A MS** Batch ID: **05 8260 S-8/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **8/16/00** Prep Date:
Client ID: **comp 001&002** **0008060** Run ID: **ANGSTROM_000816A** SeqNo: **49713**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	253	5	250	0	101.2%	0	234	0			
Benzene	242	5	250	0	96.8%	37	151	0			
Chlorobenzene	258.5	5	250	0	103.4%	37	160	0			
Toluene	254.5	5	250	15.5	95.6%	47	150	0			
Trichloroethene	258	5	250	7.07	100.4%	71	157	0			

Sample ID: **0008060-11A MSD** Batch ID: **05 8260 S-8/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **8/16/00** Prep Date:
Client ID: **comp 001&002** **0008060** Run ID: **ANGSTROM_000816A** SeqNo: **49714**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	264.5	5	250	0	105.8%	0	234	253	4.4%	20	
Benzene	254	5	250	0	101.6%	37	151	242	4.8%	20	
Chlorobenzene	273	5	250	0	109.2%	37	160	258.5	5.5%	20	
Toluene	268	5	250	15.5	101.0%	47	150	254.5	5.2%	20	
Trichloroethene	272	5	250	7.07	106.0%	71	157	258	5.3%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Environmental Services Laboratory

Date: *17-Aug-00*

CLIENT: Hahn & Associates
Work Order: 0008060
Project: 5015/Ranier Market

QC SUMMARY REPORT
Continuing Calibration Verification Standard

Sample ID: **CCV** Batch ID: **05 8260 S-8/1** Test Code: **EPA 8260B** Units: **µg/Kg** Analysis Date **8/16/00** Prep Date:

Client ID: **0008060** Run ID: **ANGSTROM_000816A** SeqNo: **49710**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
1,1-Dichloroethene	51.1	5	50	0	102.2%	80	120	0			
1,2-Dichloropropane	48.8	5	50	0	97.6%	80	120	0			
Chloroform	49.1	5	50	0	98.2%	80	120	0			
Ethylbenzene	48.6	5	50	0	97.2%	80	120	0			
Toluene	48.9	5	50	0	97.8%	80	120	0			
Vinyl chloride	50.4	10	50	0	100.8%	80	120	0			
4-Bromofluorobenzene	49.7	0	50	0	99.4%	86	115	0			
Dibromofluoromethane	50.9	0	50	0	101.8%	86	118	0			
Toluene-d8	49.7	0	50	0	99.4%	88	110	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Friedman & Bruya, Inc. #801002

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 9, 2018

Suzy Stumpf, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Stumpf:

Included are the results from the testing of material submitted on January 2, 2018 from the SOU_0611-017_ 20180102, F&BI 801002 project. There are 7 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish
SOU0109R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 2, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180102, F&BI 801002 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801002 -01	SG01-20180102
801002 -02	SG02-20180102
801002 -03	SG03-20180102

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG01-20180102	Client:	SoundEarth Strategies
Date Received:	01/02/18	Project:	SOU_0611-017_ 20180102, F&BI 801002
Date Collected:	01/02/18	Lab ID:	801002-01 1/10
Date Analyzed:	01/04/18	Data File:	010413.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	104	70	130

Compounds:	Concentration ug/m3	Concentration ppbv
Vinyl chloride	<2.6	<1
Chloroethane	<2.6	<1
1,1-Dichloroethene	<4	<1
trans-1,2-Dichloroethene	<4	<1
1,1-Dichloroethane	<4	<1
cis-1,2-Dichloroethene	<4	<1
1,2-Dichloroethane (EDC)	<4	<1
1,1,1-Trichloroethane	<5.5	<1
Trichloroethene	<5.4	<1
1,1,2-Trichloroethane	<5.5	<1
Tetrachloroethene	48	7.1

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG02-20180102	Client:	SoundEarth Strategies
Date Received:	01/02/18	Project:	SOU_0611-017_ 20180102, F&BI 801002
Date Collected:	01/02/18	Lab ID:	801002-02 1/10
Date Analyzed:	01/04/18	Data File:	010414.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	96	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<2.6	<1
Chloroethane	<2.6	<1
1,1-Dichloroethene	<4	<1
trans-1,2-Dichloroethene	<4	<1
1,1-Dichloroethane	<4	<1
cis-1,2-Dichloroethene	<4	<1
1,2-Dichloroethane (EDC)	<4	<1
1,1,1-Trichloroethane	<5.5	<1
Trichloroethene	<5.4	<1
1,1,2-Trichloroethane	<5.5	<1
Tetrachloroethene	38	5.6

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG03-20180102	Client:	SoundEarth Strategies
Date Received:	01/02/18	Project:	SOU_0611-017_ 20180102, F&BI 801002
Date Collected:	01/02/18	Lab ID:	801002-03 1/10
Date Analyzed:	01/04/18	Data File:	010415.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	90	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<2.6	<1
Chloroethane	<2.6	<1
1,1-Dichloroethene	<4	<1
trans-1,2-Dichloroethene	<4	<1
1,1-Dichloroethane	<4	<1
cis-1,2-Dichloroethene	<4	<1
1,2-Dichloroethane (EDC)	<4	<1
1,1,1-Trichloroethane	<5.5	<1
Trichloroethene	<5.4	<1
1,1,2-Trichloroethane	<5.5	<1
Tetrachloroethene	25	3.6

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180102, F&BI 801002
Date Collected:	Not Applicable	Lab ID:	08-0043 mb
Date Analyzed:	01/04/18	Data File:	010407.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MP

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	93	70	130

Compounds:	Concentration ug/m3	Concentration ppbv
Vinyl chloride	<0.26	<0.1
Chloroethane	<0.26	<0.1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.4	<0.1
1,1,1-Trichloroethane	<0.55	<0.1
Trichloroethene	<0.54	<0.1
1,1,2-Trichloroethane	<0.55	<0.1
Tetrachloroethene	<0.68	<0.1

Date of Report: 01/09/18
Date Received: 01/02/18
Project: SOU_0611-017_ 20180102, F&BI 801002

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ppbv	10	114	70-130
Chloroethane	ppbv	10	95	70-130
1,1-Dichloroethene	ppbv	10	104	70-130
trans-1,2-Dichloroethene	ppbv	10	109	70-130
1,1-Dichloroethane	ppbv	10	119	70-130
cis-1,2-Dichloroethene	ppbv	10	114	70-130
1,2-Dichloroethane (EDC)	ppbv	10	115	70-130
1,1,1-Trichloroethane	ppbv	10	109	70-130
Trichloroethene	ppbv	10	112	70-130
1,1,2-Trichloroethane	ppbv	10	116	70-130
Tetrachloroethene	ppbv	10	101	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801002

SAMPLE CHAIN OF CUSTODY

ME 01/02/18

Page # 1 of 1

Report To Suzy S., Logan S., Gary F.

Company SoundEarth Strategies

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: 0611-017

PO #

REMARKS

INVOICE TO

TURNAROUND TIME
- ☑ Standard
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Archive Samples
- ☐ Other

ANALYSIS REQUESTED

Sample Name	Lab ID	Canister ID	Flow Contr. ID	Date Sampled	Field Initial Press. (Hg)	Field Initial Time	Field Final Press. (Hg)	Field Final Time	TO-15 Full Scan	TO-15 BTEXN	TO-15 cVOCs		Notes
SG01-20180102	-01	3677	88	1/2/18	28.8	0837	5.0	0843			X		PID=1.1
SG02-20180102	-02	3255	109	↓	29.6	0933	5.0	0937			X		PID=0.4
SG03-20180102	-03	3261	108	↓	30.0	1025	5.0	1034			X		PID=1.7
													Samples received at 22 °C

COC 1/2/18

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SES	1/2/18	1535
Received by:	Michael Erdahl	TRA	↓	↓
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

Friedman & Bruya, Inc. #801334 and additional

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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www.friedmanandbruya.com

February 2, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 24, 2018 from the SOU_0611-017_ 20180124, F&BI 801334 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Jonathan Loeffler
SOU0202R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 24, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180124, F&BI 801334 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801334 -01	TB01-05
801334 -02	TB01-10
801334 -03	TB01-15
801334 -04	TB01-20
801334 -05	TB02-05
801334 -06	TB02-10
801334 -07	TB02-15
801334 -08	TB02-20
801334 -09	TB03-05
801334 -10	TB03-10

All quality control requirements were acceptable.

Date of Report: 02/02/18
Date Received: 01/24/18
Project: SOU_0611-017_ 20180124, F&BI 801334
Date Extracted: 01/31/18
Date Analyzed: 01/31/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
TB01-15 801334-03	15	110
TB02-15 801334-07	<5	102
Method Blank 08-226 MB	<5	110

Date of Report: 02/02/18
Date Received: 01/24/18
Project: SOU_0611-017_ 20180124, F&BI 801334
Date Extracted: 01/31/18
Date Analyzed: 01/31/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 56-165)
TB01-15 801334-03	110 x	<250	103
TB02-15 801334-07	<50	<250	94
Method Blank 08-263 MB	<50	<250	96

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB01-15	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	01/30/18	Lab ID:	801334-03
Date Analyzed:	01/30/18	Data File:	013025.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB02-15	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	01/30/18	Lab ID:	801334-07
Date Analyzed:	01/30/18	Data File:	013026.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180124
Date Extracted:	01/30/18	Lab ID:	08-0210 mb
Date Analyzed:	01/30/18	Data File:	013007.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/02/18
Date Received: 01/24/18
Project: SOU_0611-017_ 20180124, F&BI 801334

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 801334-03 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	5.4	14	89 a

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	71-131

Date of Report: 02/02/18
Date Received: 01/24/18
Project: SOU_0611-017_ 20180124, F&BI 801334

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 801421-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	106	106	63-146	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	106	79-144

Date of Report: 02/02/18
Date Received: 01/24/18
Project: SOU_0611-017_ 20180124, F&BI 801334

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801325-09 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	46	46	10-138	0
Chloroethane	mg/kg (ppm)	2.5	<0.5	61	57	10-176	7
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	67	70	10-160	4
Methylene chloride	mg/kg (ppm)	2.5	<0.5	74	74	10-156	0
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	75	75	14-137	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	79	77	19-140	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	82	82	25-135	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	81	80	12-160	1
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	78	77	10-156	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	83	81	21-139	2
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	79	80	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	73	22-139
Chloroethane	mg/kg (ppm)	2.5	78	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	94	47-128
Methylene chloride	mg/kg (ppm)	2.5	101	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	98	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	100	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	62-131
Trichloroethene	mg/kg (ppm)	2.5	99	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	97	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

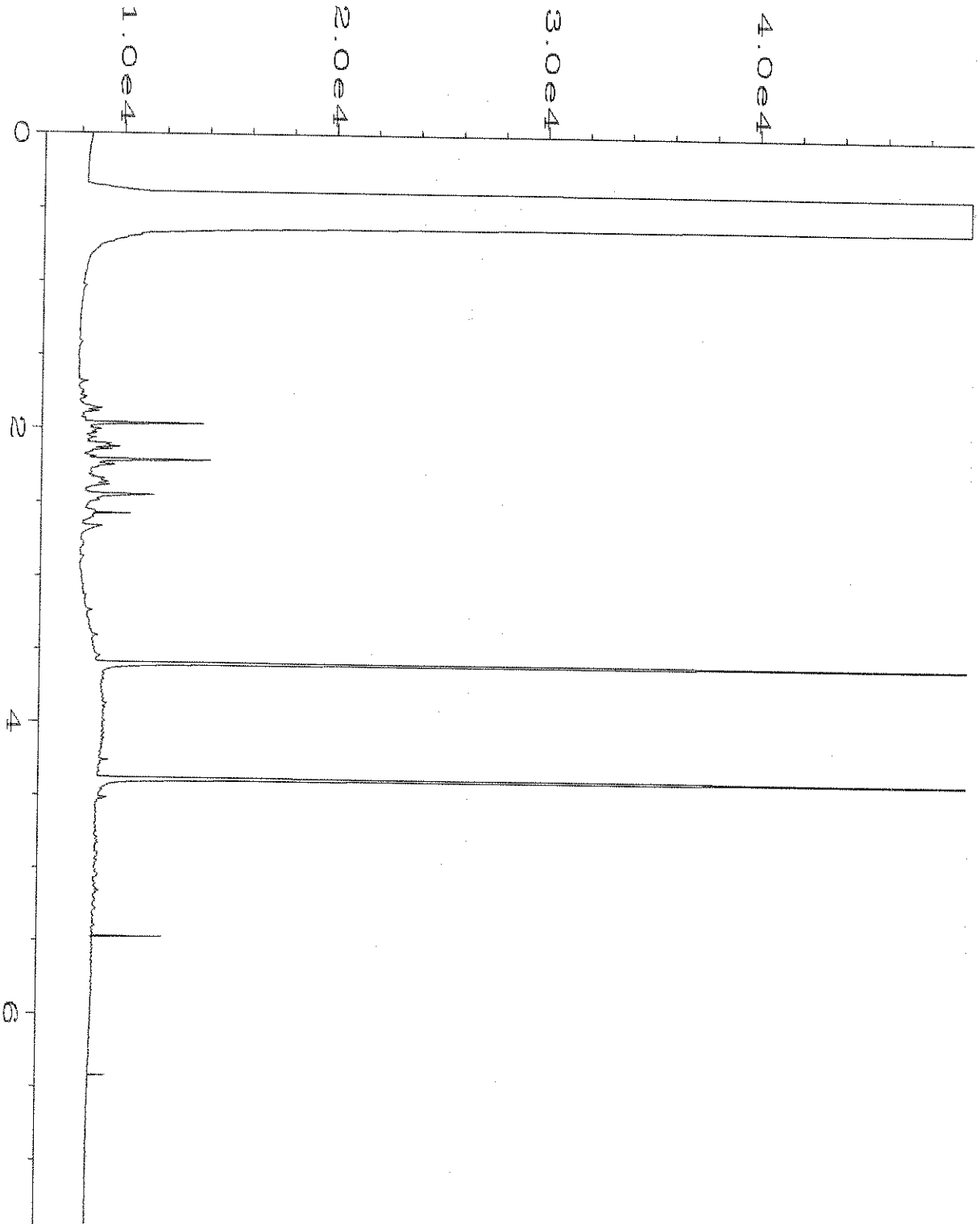
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

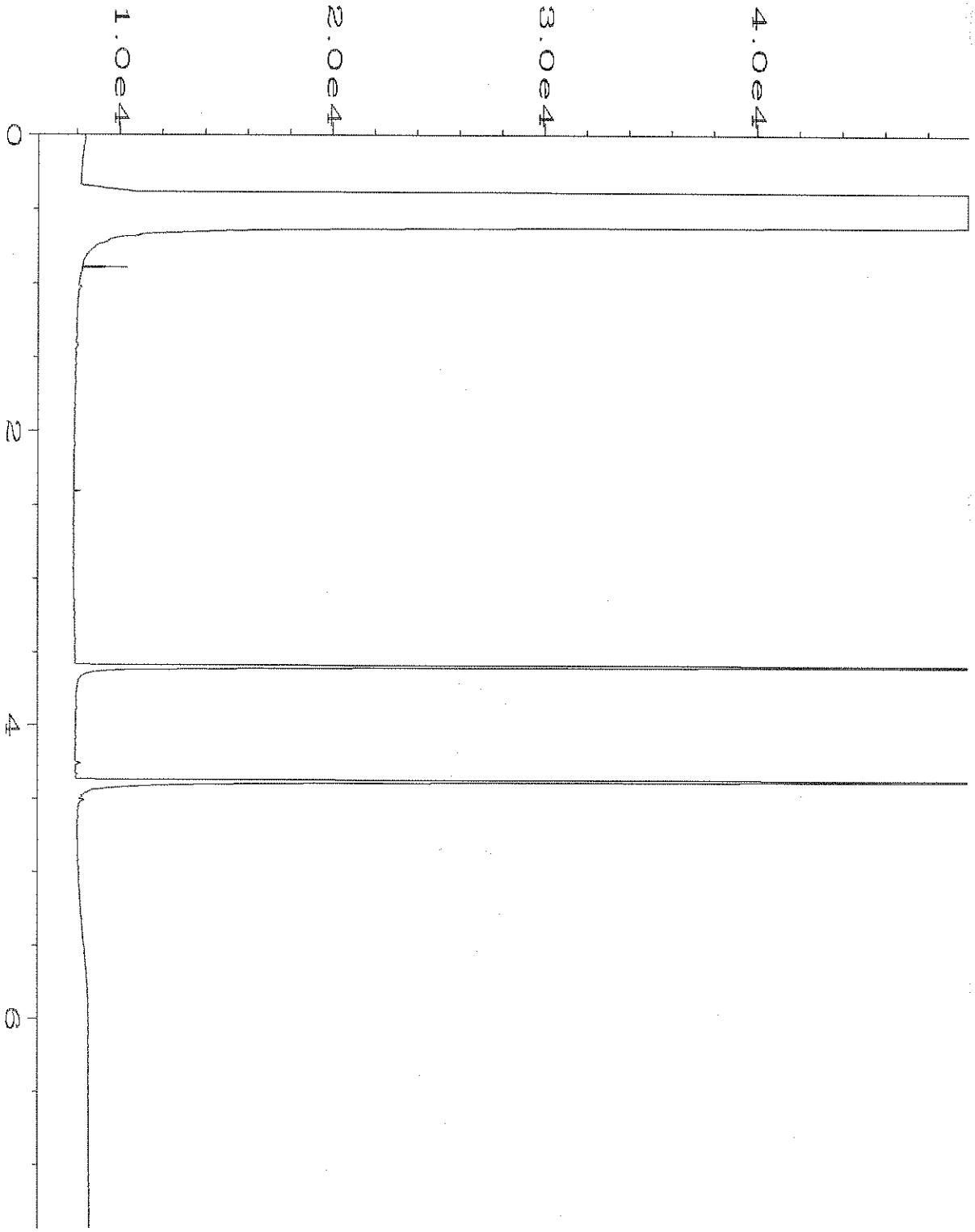
vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



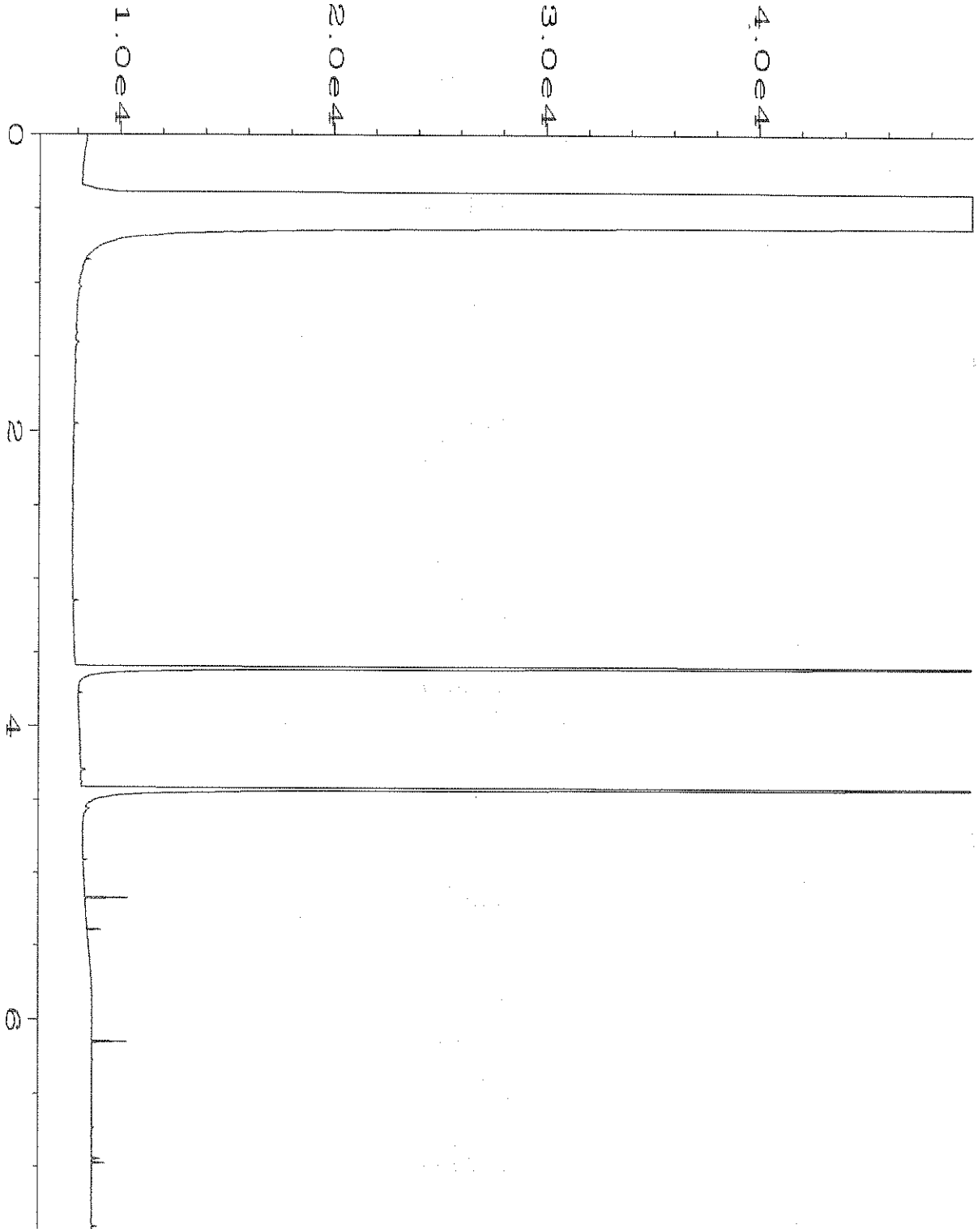
Data File Name : C:\HPCHEM\1\DATA\01-31-18\035F0301.D
Operator : mwdl
Instrument : GC1
Sample Name : 801334-03
Run Time Bar Code:
Acquired on : 31 Jan 18 02:23 PM
Report Created on: 01 Feb 18 07:34 AM

Page Number : 1
Vial Number : 35
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH

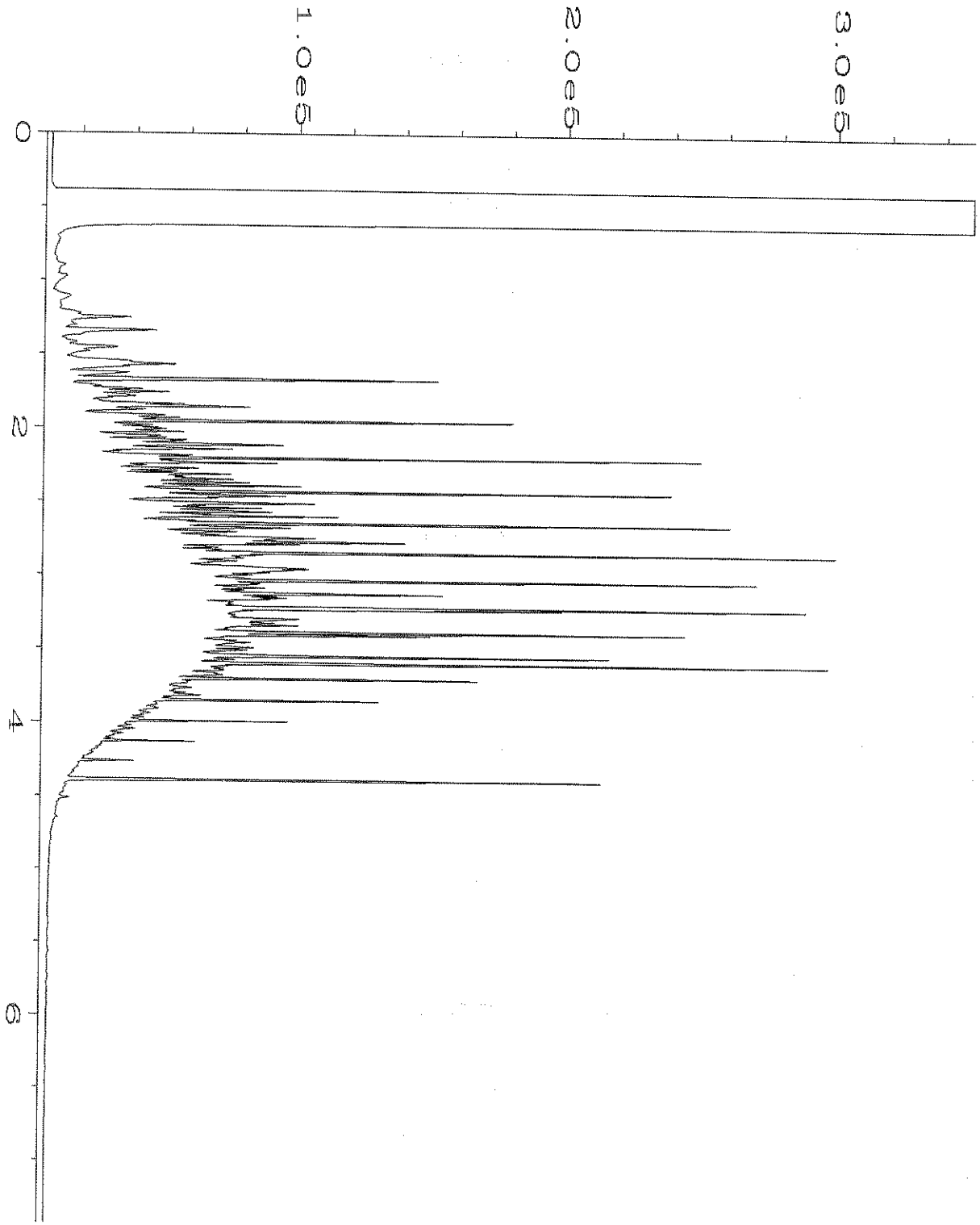


Data File Name : C:\HPCHEM\1\DATA\01-31-18\036F0301.D
Operator : mwdl
Instrument : GC1
Sample Name : 801334-07
Run Time Bar Code:
Acquired on : 31 Jan 18 02:35 PM
Report Created on: 01 Feb 18 07:34 AM

Page Number : 1
Vial Number : 36
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\01-31-18\013F0301.D		
Operator	: mwdl	Page Number	: 1
Instrument	: GC1	Vial Number	: 13
Sample Name	: 08-263 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 31 Jan 18 10:18 AM	Instrument Method	: DX.MTH
Report Created on	: 01 Feb 18 07:34 AM	Analysis Method	: DX.MTH



Data File Name	: C:\HPCHEM\1\DATA\01-31-18\005F0401.D		
Operator	: mwdl	Page Number	: 1
Instrument	: GC1	Vial Number	: 5
Sample Name	: 1000 Dx 52-185B	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 4
Acquired on	: 31 Jan 18 02:57 PM	Instrument Method	: DX.MTH
Report Created on:	01 Feb 18 07:34 AM	Analysis Method	: DX.MTH

801334 LIZ [redacted]

SAMPLE CHAIN OF CUSTODY

ME 01-24-18 A02 / VW2

Page # 1 of 1

Send Report to [redacted] Grayson Fish, JON LOEFFLER

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO.	PO #
Rainier Mall / 0611-017	

REMARKS ⊗ 2 DAY Turn Run per EBF

TURNAROUND TIME
- ☒ Standard (2 Weeks) (circled)
- RUSH 2 DAY
- Rush charges authorized by:

SAMPLE DISPOSAL
- Dispose after 30 days
- Return samples
- Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270			HOLD	Notes
TB01-05	TB01	5'	01 A-E	1/24/18	0938	SOIL	5								X	
TB01-10	TB01	10'	02		0945		5								X	
TB01-15	TB01	15'	03		0950		5				⊗				X	
TB01-20	TB01	20'	04		0955		5								X	
TB02-05	TB02	5'	05 A-D		1035		4								X	
TB02-10	TB02	10'	06 A-E		1045		5								X	
TB02-15	TB02	15'	07		1055		5				⊗				X	
TB02-20	TB02	20'	08		1105		5								X	
TB03-05	TB03	5'	09		1300		5								X	
TB03-10	TB03	10'	10		1305		5								X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	JONATHAN LOEFFLER	SOUNDEARTH	1/24/18	1600
Received by: [signature]	VINH	FBI	1/24/18	1600
Relinquished by:				
Received by:		Samples received at 6 °C		

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 13, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 24, 2018 from the SOU_0611-017_ 20180124, F&BI 801334 project. There are 10 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Jonathan Loeffler
SOU0213R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 24, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180124, F&BI 801334 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801334 -01	TB01-05
801334 -02	TB01-10
801334 -03	TB01-15
801334 -04	TB01-20
801334 -05	TB02-05
801334 -06	TB02-10
801334 -07	TB02-15
801334 -08	TB02-20
801334 -09	TB03-05
801334 -10	TB03-10

An 8270D internal standard failed the acceptance criteria for sample TB03-05 due to matrix interferences. The data were flagged accordingly.

The benzo(a) pyrene reporting limit was lowered below the standard reporting limit. The data were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020A

Client ID:	TB01-05	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/09/18	Lab ID:	801334-01
Date Analyzed:	02/09/18	Data File:	801334-01.067
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.54
Cadmium	<1
Chromium	18.8
Lead	4.82
Mercury	<1

Analysis For Total Metals By EPA Method 6020A

Client ID:	TB03-05	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/09/18	Lab ID:	801334-09
Date Analyzed:	02/09/18	Data File:	801334-09.068
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	2.39
Cadmium	<1
Chromium	28.2
Lead	4.26
Mercury	<1

Analysis For Total Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/09/18	Lab ID:	I8-095 mb
Date Analyzed:	02/09/18	Data File:	I8-095 mb.050
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	TB01-05	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/07/18	Lab ID:	801334-01 1/100
Date Analyzed:	02/08/18	Data File:	020809.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	137 d	31	163
Benzo(a)anthracene-d12	121 d	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.2
Acenaphthylene	<0.2
Acenaphthene	<0.2
Fluorene	<0.2
Phenanthrene	<0.2
Anthracene	<0.2
Fluoranthene	<0.2
Pyrene	<0.2
Benz(a)anthracene	<0.2
Chrysene	<0.2
Benzo(a)pyrene	<0.1 j
Benzo(b)fluoranthene	<0.2
Benzo(k)fluoranthene	<0.2
Indeno(1,2,3-cd)pyrene	<0.2
Dibenz(a,h)anthracene	<0.2
Benzo(g,h,i)perylene	<0.2

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	TB03-05	Client:	SoundEarth Strategies
Date Received:	01/24/18	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/07/18	Lab ID:	801334-09 1/100
Date Analyzed:	02/08/18	Data File:	020810.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	97 d	31	163
Benzo(a)anthracene-d12	138 d	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.2
Acenaphthylene	<0.2
Acenaphthene	<0.2
Fluorene	<0.2
Phenanthrene	<0.2
Anthracene	<0.2
Fluoranthene	<0.2
Pyrene	<0.2
Benz(a)anthracene	<0.2
Chrysene	<0.2
Benzo(a)pyrene	<0.1 j J
Benzo(b)fluoranthene	<0.2 J
Benzo(k)fluoranthene	<0.2 J
Indeno(1,2,3-cd)pyrene	<0.2 J
Dibenz(a,h)anthracene	<0.2 J
Benzo(g,h,i)perylene	<0.2 J

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180124
Date Extracted:	02/07/18	Lab ID:	08-290 mb2 1/5
Date Analyzed:	02/07/18	Data File:	020713.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	105	31	163
Benzo(a)anthracene-d12	108	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 02/13/18
Date Received: 01/24/18
Project: SOU_ 0611-017_ 20180124, F&BI 801334

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020A

Laboratory Code: 802102-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.30	88	87	75-125	1
Cadmium	mg/kg (ppm)	10	<1	88	84	75-125	5
Chromium	mg/kg (ppm)	50	8.24	81	80	75-125	1
Lead	mg/kg (ppm)	50	2.92	82	78	75-125	5
Mercury	mg/kg (ppm	5	<1	79	81	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Cadmium	mg/kg (ppm)	10	106	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Lead	mg/kg (ppm)	50	101	80-120
Mercury	mg/kg (ppm)	5	100	80-120

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 802035-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	88	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	86	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	87	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	86	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	86	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	81	32-124
Fluoranthene	mg/kg (ppm)	0.17	<0.01	87	16-160
Pyrene	mg/kg (ppm)	0.17	<0.01	89	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	91	23-144
Chrysene	mg/kg (ppm)	0.17	<0.01	94	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	91	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	97	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	85	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	87	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	86	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	<0.01	83	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	88	91	58-121	3
Acenaphthylene	mg/kg (ppm)	0.17	85	88	54-121	3
Acenaphthene	mg/kg (ppm)	0.17	87	91	54-123	4
Fluorene	mg/kg (ppm)	0.17	86	89	56-127	3
Phenanthrene	mg/kg (ppm)	0.17	87	90	55-122	3
Anthracene	mg/kg (ppm)	0.17	84	86	50-120	2
Fluoranthene	mg/kg (ppm)	0.17	86	92	54-129	7
Pyrene	mg/kg (ppm)	0.17	84	91	53-127	8
Benz(a)anthracene	mg/kg (ppm)	0.17	90	95	51-115	5
Chrysene	mg/kg (ppm)	0.17	93	97	55-129	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	94	100	56-123	6
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	94	100	54-131	6
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	84	51-118	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	86	86	49-148	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	87	89	50-141	2
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	84	84	52-131	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

) 801234

SAMPLE CHAIN OF CUSTODY

ME 01-24-18 A02) / VW2

Send Report to [redacted] Grayson Fish, JON LOEFFLER

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS ⊗ 2 DAY Turn Run per EBF

Page # 1 of

TURNAROUND TIME
Standard (2 Weeks) (circled)
RUSH 2 DAY
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270	MTCA 5 METALS	PAHs 8270D	~~HOLD~~	Notes
TB01-05	TB01	5'	01 A-E	1/24/18	0938	SOIL	5						⊗	⊗	X	RUN 5-DAY TURN (EBF 2/7)
TB01-10	TB01	10'	02		0945		5								X	
TB01-15	TB01	15'	03		0950		5				⊗				X	
TB01-20	TB01	20'	04		0955		5								X	
TB02-05	TB02	5'	05 A-D		1035		4								X	
TB02-10	TB02	10'	06 A-E		1045		5								X	
TB02-15	TB02	15'	07		1055		5				⊗				X	
TB02-20	TB02	20'	08		1105		5								X	
TB03-05	TB03	5'	09		1300		5						⊗	⊗	X	RUN 5-DAY TURN
TB03-10	TB03	10'	10		1305		5								X	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	JONATHAN LOEFFLER	SOUNDEARTH	1/24/18	1600
Received by: [signature]	VINH	FBI	1/24/18	1600
Relinquished by:				
Received by:		Samples received at 6 °C		

FORMS\COC\COC.DOC

Friedman & Bruya, Inc. #801363

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 13, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801363 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0213R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801363 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801363 -01	TB04-05
801363 -02	TB04-10
801363 -03	TB04-15
801363 -04	TB05-05
801363 -05	TB05-10
801363 -06	TB05-15
801363 -07	TB06-05
801363 -08	TB06-10
801363 -09	TB06-15

The 8260C matrix spike and matrix spike duplicate failed the relative percent difference for hexachlorobutadiene. The analyte was not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363
Date Extracted: 02/05/18
Date Analyzed: 02/05/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
TB05-05 801363-04	<5	98
Method Blank 08-231 MB	<5	99

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363
Date Extracted: 02/02/18
Date Analyzed: 02/02/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
TB05-05 801363-04	190 x	5,100	122
Method Blank 08-271 MB	<50	<250	108

Analysis For Total Metals By EPA Method 6020A

Client ID:	TB04-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	801363-01
Date Analyzed:	02/09/18	Data File:	801363-01.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.79
Cadmium	<1
Chromium	12.1
Lead	8.10
Mercury	<1

Analysis For Total Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	NA	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	I8-095 mb
Date Analyzed:	02/09/18	Data File:	I8-095 mb.050
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	TB04-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801363-01 1/5
Date Analyzed:	02/07/18	Data File:	020717.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	103	31	163
Benzo(a)anthracene-d12	106	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.046
Anthracene	<0.01
Fluoranthene	0.058
Pyrene	0.073
Benz(a)anthracene	0.015
Chrysene	0.028
Benzo(a)pyrene	0.022
Benzo(b)fluoranthene	0.031
Benzo(k)fluoranthene	0.012
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-290 mb2 1/5
Date Analyzed:	02/07/18	Data File:	020713.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	105	31	163
Benzo(a)anthracene-d12	108	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB05-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/05/18	Lab ID:	801363-04
Date Analyzed:	02/05/18	Data File:	020511.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/05/18	Lab ID:	08-218 mb2
Date Analyzed:	02/05/18	Data File:	020508.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	102	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 802022-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	100	71-131

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 802032-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	88	102	73-135	15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	74-139

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020A

Laboratory Code: 802102-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.30	88	87	75-125	1
Cadmium	mg/kg (ppm)	10	<1	88	84	75-125	5
Chromium	mg/kg (ppm)	50	8.24	81	80	75-125	1
Lead	mg/kg (ppm)	50	2.92	82	78	75-125	5
Mercury	mg/kg (ppm	5	<1	79	81	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Cadmium	mg/kg (ppm)	10	106	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Lead	mg/kg (ppm)	50	101	80-120
Mercury	mg/kg (ppm)	5	100	80-120

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 802035-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	88	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	86	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	87	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	86	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	86	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	81	32-124
Fluoranthene	mg/kg (ppm)	0.17	<0.01	87	16-160
Pyrene	mg/kg (ppm)	0.17	<0.01	89	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	91	23-144
Chrysene	mg/kg (ppm)	0.17	<0.01	94	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	91	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	97	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	85	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	87	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	86	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	<0.01	83	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	88	91	58-121	3
Acenaphthylene	mg/kg (ppm)	0.17	85	88	54-121	3
Acenaphthene	mg/kg (ppm)	0.17	87	91	54-123	4
Fluorene	mg/kg (ppm)	0.17	86	89	56-127	3
Phenanthrene	mg/kg (ppm)	0.17	87	90	55-122	3
Anthracene	mg/kg (ppm)	0.17	84	86	50-120	2
Fluoranthene	mg/kg (ppm)	0.17	86	92	54-129	7
Pyrene	mg/kg (ppm)	0.17	84	91	53-127	8
Benz(a)anthracene	mg/kg (ppm)	0.17	90	95	51-115	5
Chrysene	mg/kg (ppm)	0.17	93	97	55-129	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	94	100	56-123	6
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	94	100	54-131	6
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	84	51-118	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	86	86	49-148	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	87	89	50-141	2
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	84	84	52-131	0

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801364-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	81	69	10-138	16
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	79	10-160	18
Trichloroethene	mg/kg (ppm)	2.5	<0.02	103	86	21-139	18
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	111	95	20-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	47-128
Trichloroethene	mg/kg (ppm)	2.5	91	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

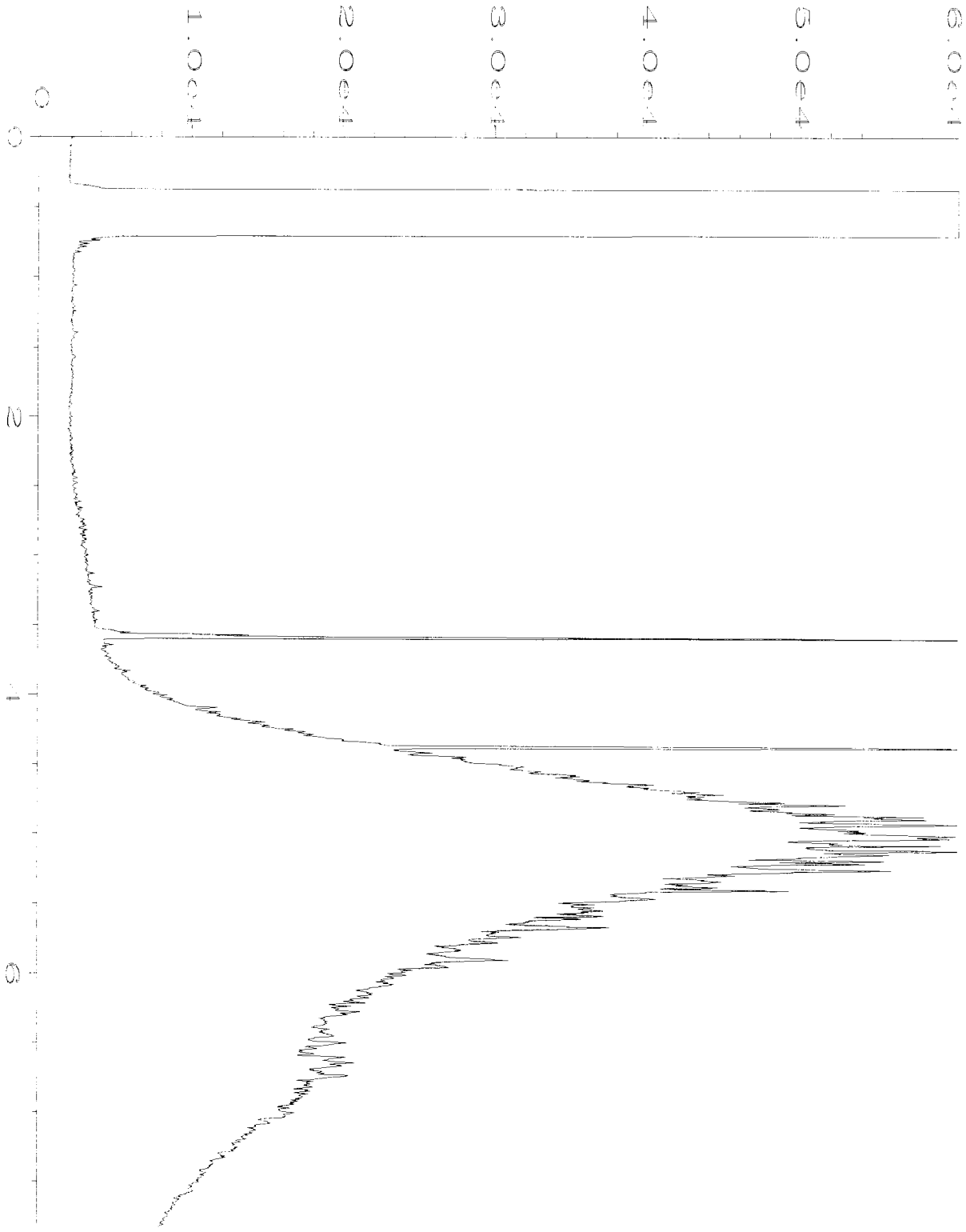
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

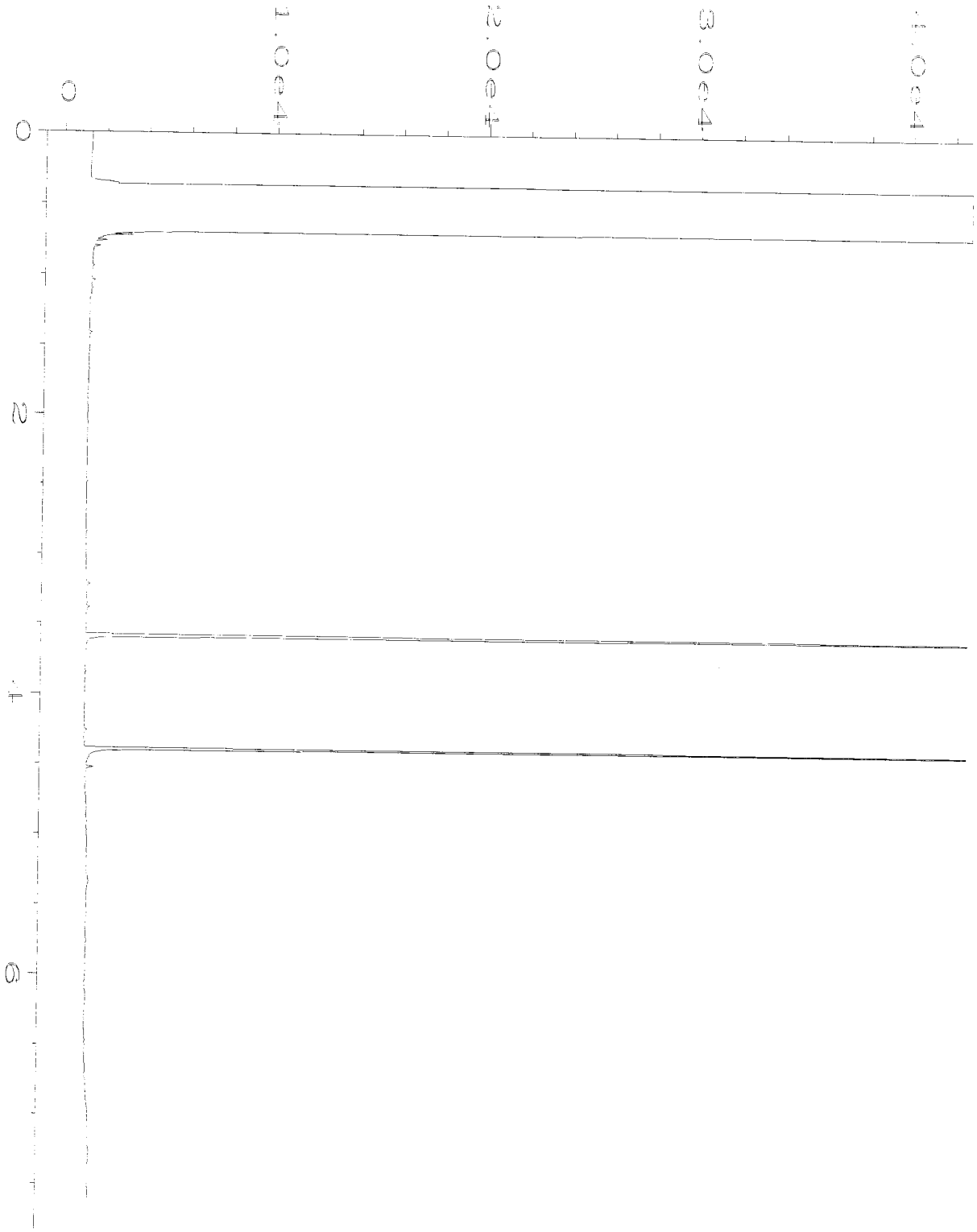
vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



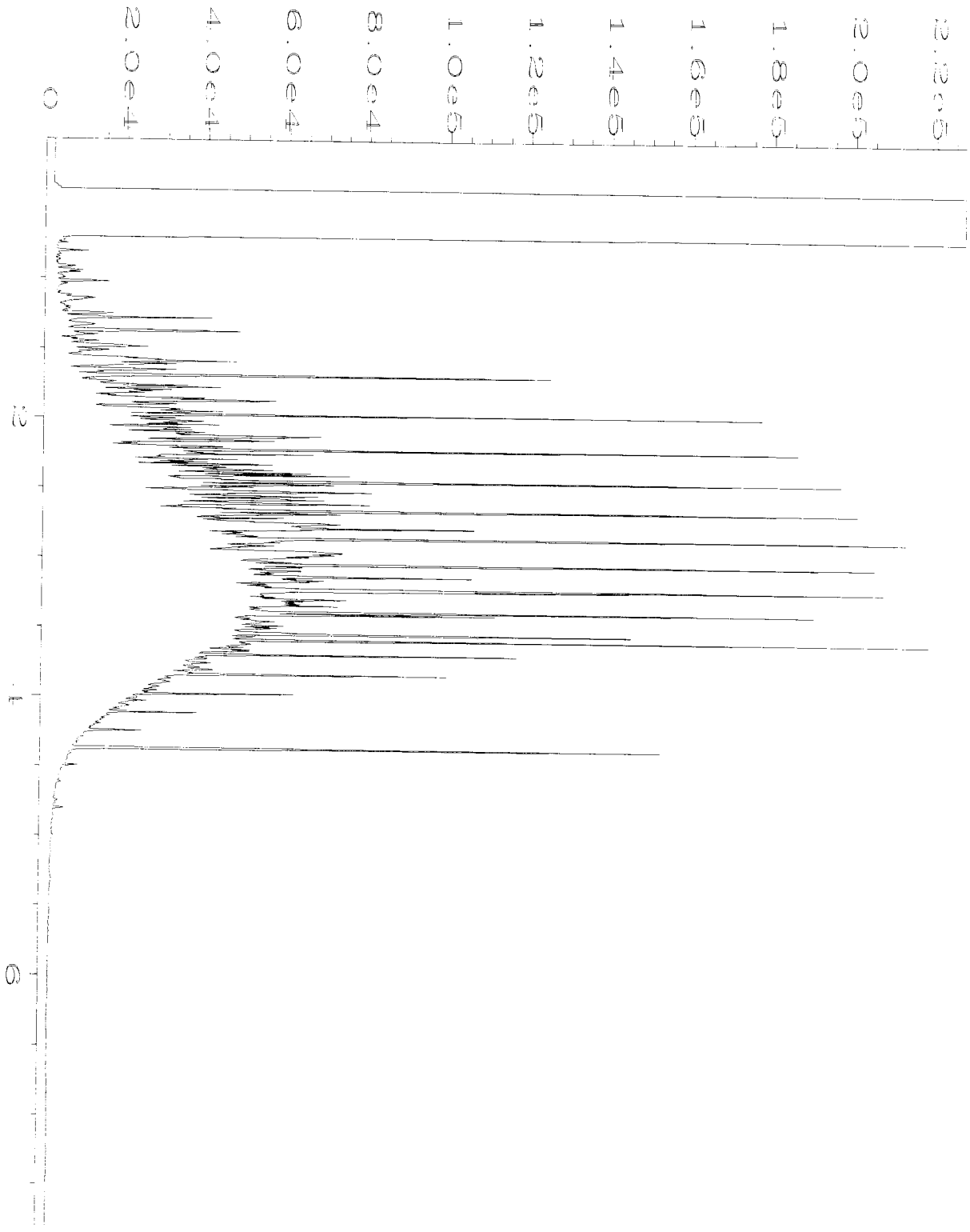
Data File Name : C:\HPCHEM\4\DATA\02-02-18\018F0301.D
Operator : mwdl
Instrument : GC#4
Sample Name : 801363-04
Run Time Bar Code:
Acquired on : 02 Feb 18 02:36 PM
Report Created on: 05 Feb 18 07:54 AM

Page Number : 1
Vial Number : 18
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\02-02-18\006F0301.D
Operator : mwdl
Instrument : GC#4
Sample Name : 08-271 mb
Run Time Bar Code:
Acquired on : 02 Feb 18 12:06 PM
Report Created on: 05 Feb 18 07:54 AM

Page Number : 1
Vial Number : 6
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\02-02-18\005F0501.D
Operator : mwdl
Instrument : GC#4
Sample Name : 1000 Dx 52-185B
Run Time Bar Code:
Acquired on : 02 Feb 18 03:23 PM
Report Created on: 05 Feb 18 07:55 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH

80?363 [redacted]

SAMPLE CHAIN OF CUSTODY

ME 01/26/18 [redacted]

VS2/A03

Page # 1 of 1

Send Report to	~~Gary Stampf~~ Grayson Fish — Liz Forbes, Logan Schumacher
Company	SoundEarth Strategies, Inc.
Address	2811 Fairview Avenue E, Suite 2000
City, State, ZIP	Seattle, Washington 98102
Phone #	206-306-1900
Fax #	206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO.	PO #
Rainier Mall / 0611-017	

REMARKS: ~~Hold all~~ • Std TAT PCE, TCE, 1,1DCE, cis 1,2DCE, VC

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270	MTCA 5 Metals	PAHs		Notes
TB04-05	TB04	5	01 A-E	1/23/18	0805	Soil	5						⊗	⊗		~~per EBP 2/7~~ Run 5-day turn
TB04-10	↓	10	02	↓	0810	↓	↓									
TB04-15	↓	15	03	↓	0815	↓	↓									
TB05-05	TB05	5	04	↓	0945	↓	↓	•	•		•					
TB05-10	↓	10	05	↓	0950	↓	↓									• per LS
TB05-15	↓	15	06	↓	0955	↓	↓									2/2/18
TB06-05	TB06	5	07	↓	1110	↓	↓									MS
TB06-10	↓	10	08	↓	1115	↓	↓									
TB06-15	↓	15	09	↓	1120	↓	↓									

GFS 1/25/18

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SoundEarth	1/26/18	1020
Received by: [signature]	VINH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc. #801365

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 12, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801365 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Logan Schumacher
SOU0212R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801365 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801365 -01	B10-2.5
801365 -02	B10-05
801365 -03	B10-10
801365 -04	B10-15
801365 -05	B10-20

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B10-2.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801365-01
Date Analyzed:	02/07/18	Data File:	020719.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	94	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-0283 mb
Date Analyzed:	02/07/18	Data File:	020710.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	95	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/12/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801365

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801364-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	81	69	10-138	16
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	79	10-160	18
Trichloroethene	mg/kg (ppm)	2.5	<0.02	103	86	21-139	18
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	111	95	20-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	47-128
Trichloroethene	mg/kg (ppm)	2.5	91	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Liz Fabs 801365 [redacted]

SAMPLE CHAIN OF CUSTODY

ME 01/26/18 [redacted] VS2/A02

Send Report to ~~Suzy Stumpf,~~ Grayson Fish Logan S.

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS ~~Hold all, contact PM~~
CVOCs = PCE, TCE, DCE, VC

Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260c	SVOCs by 8270	MTCA 5 Metals			Notes
B10-025	B10	2.5	01 A-E	1/26/18	0825	Soil	5				⊗					RUN PER EBF 2/7 STANDARD 5-DAY
B10-05	↓	05	02		0831	↓	↓									
B10-10	↓	10	03		0835	↓	↓									
B10-15	↓	15	04		0840	↓	↓									
B10-20	↓	20	05		0845	↓	↓									

GCF 1/26/18

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	[signature]	Grayson Fish	SoundEarth	1/26/18	1020
Received by:	[signature]	VINH	FBI	1/26/18	1020
Relinquished by:					
Received by:					

Friedman & Bruya, Inc. #801370 and additional

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 1, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801370 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0201R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801370 -01	B06-05
801370 -02	B06-10
801370 -03	B06-12.5
801370 -04	B06-15
801370 -05	B06-17.5
801370 -06	B06-20
801370 -07	B06-25
801370 -08	B06-30
801370 -09	B06-35
801370 -10	B06-40
801370 -11	B06-45
801370 -12	B06-50
801370 -13	B11-10
801370 -14	B11-15
801370 -15	B11-20
801370 -16	B11-25
801370 -17	B06-B11-Comp

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801370-04
Date Analyzed:	01/29/18	Data File:	012924.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.47
Trichloroethene	0.19
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801370-06
Date Analyzed:	01/29/18	Data File:	012914.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	08-0209 mb
Date Analyzed:	01/29/18	Data File:	012908.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/01/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	67	61	10-138	9
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	84	10-160	6
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	99	98	25-135	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	99	99	21-139	0
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	97	98	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	93	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	96	72-113
Trichloroethene	mg/kg (ppm)	2.5	95	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	94	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

80|370

SAMPLE CHA( )F CUSTODY ME 01/26/18

Page # 1 of 2

Send Report to ~~Suzy Stumpf~~, Grayson Fish Liz Forbes, Logan S

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS * CVOCs = (PCE, TCE, 1,1-DCE, cis-1,2-DCE, VC)

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	*CVOCs by 8260	SVOCs by 8270				Notes
B06-05	B06	5	01 A-E	1/26/18	0945	Soil	5									
B06-10	↓	10	02	↓	0950	↓	↓									
B06-12.5		12.5	03		0955						⊗					RUN PER EBF 1/31
B06-15		15	04		1005						X					
B06-17.5		17.5	05		1010											
B06-20		20	06		1015						X					
B06-25		25	07		1030											
B06-30		30	08		1040											Samples received at 2 °C
B06-35		35	09		1050											
B06-40	↓	40	10	↓	1105	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
C\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	[signature]	Logan Schwenk	SoundEarth	1/26/18	1428
Received by:	[signature]	VINH	FBI	1/26/18	1425
Relinquished by:					
Received by:					

801370
LC Forbes, Logan S

SAMPLE CHAIN OF CUSTODY ME 1/26/18

Page # 2 of 2 1/04/18

Send Report to ~~Suzy Stumpf~~ Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS See Page 1 for *

TURNAROUND TIME
Standard (2 Weeks)
RUSH 1 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* VOCs by 8260	SVOCs by 8270					Notes
B06-45	B06	45	11	1/26/18	1115	Soil	5										
B06-50	↓	50	12		1120						X						RUN PER EDF 1131
B11-10	B11	10	13		1250												
B11-15		15	14		1255												
B11-20		20	15		1305												
B11-25		25	16		1310		1										
B06-B11-COMP	B06-B11		17	1/26/18	1330		1										
							EDF	1/26/18									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SoundEarth	1/26/18	1425
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

MS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 7, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801370 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher
SOU0207R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801370 -01	B06-05
801370 -02	B06-10
801370 -03	B06-12.5
801370 -04	B06-15
801370 -05	B06-17.5
801370 -06	B06-20
801370 -07	B06-25
801370 -08	B06-30
801370 -09	B06-35
801370 -10	B06-40
801370 -11	B06-45
801370 -12	B06-50
801370 -13	B11-10
801370 -14	B11-15
801370 -15	B11-20
801370 -16	B11-25
801370 -17	B06-B11-Comp

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-12.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801370-03
Date Analyzed:	02/02/18	Data File:	020221.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.15
Trichloroethene	0.097
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-50	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801370-12
Date Analyzed:	02/02/18	Data File:	020222.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B11-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/02/18	Lab ID:	801370-14
Date Analyzed:	02/02/18	Data File:	020218.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm) Dry Weight
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	ClientID
Date Received:	Not Applicable	Project:	ProjectID
Date Extracted:	02/02/18	Lab ID:	08-0215 mb2
Date Analyzed:	02/02/18 10:35	Data File:	020205.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm) Dry Weight
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	08-0215 mb
Date Analyzed:	02/01/18	Data File:	020121.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/07/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	40	39	10-138	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	58	56	10-160	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	71	25-135	4
Trichloroethene	mg/kg (ppm)	2.5	<0.02	73	70	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	0.024	71	67	20-133	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	79	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	95	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
Trichloroethene	mg/kg (ppm)	2.5	98	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	95	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

80137O
LL Forbes, Logan S

SAMPLE CHAIN OF CUSTODY

MTG 01/26/18

Page # 1 of 2

Send Report to: ~~Suzy Stumpf~~, Grayson Fish

Company: SoundEarth Strategies, Inc.

Address: 2811 Fairview Avenue E, Suite 2000

City, State, ZIP: Seattle, Washington 98102

Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature):

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #:

REMARKS: * CVOCs = (PCE, TCE, 1,1-DCE, cis-1,2-DCE, VC)

TURNAROUND TIME
Standard (2 Weeks)
(RUSH) 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* CVOCs by 8260	SVOCs by 8270				Notes
B06-05	B06	5	01	1/26/18	0945	Soil	5									
B06-10		10	02		0950											
B06-12.5		12.5	03		0955						X					RUN PER EDF 1/31
B06-15		15	04		1005						X					
B06-17.5		17.5	05		1010											
B06-20		20	06		1015						X					
B06-25		25	07		1030											
B06-30		30	08		1040											Samples received at 2 °C
B06-35		35	09		1050											
B06-40	↓	40	10	↓	1105	↓	↓									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SoundEarth	1/26/18	1428
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

COC.DOC

801370
La Fortuna, Logan S

SAMPLE CHAIN OF CUSTODY MO 1/26/18

Page # 2 of 2 1/04/18

Send Report to ~~Stacy Stumbf~~ Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS See Page 1 for *

TURNAROUND TIME
Standard (2 Weeks)
RUSH 1 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* VOCs by 8260	SVOCs by 8270				Notes
B06-45	B06	45	11	1/26/18	1115	Soil	5									
B06-50	↓	50	12		1120						X					RUN PER EGF 1/31
B11-10	B11	10	13		1250											
B11-15		15	14		1255						X					
B11-20		20	15		1305											
B11-25		25	16		1310											
B06-B11-COMP	B06-B11		17	1/26/18	1330		1									
							EGF	1/26/18								

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Sakamachi	SoundEarth	1/26/18	1425
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

MS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 27, 2017

Courtney Schaumberg, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Schaumberg:

Included are the results from the testing of material submitted on January 19, 2017 from the SOU_1276-001_ 20170119, F&BI 701209 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU0127R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 19, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170119, F&BI 701209 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
701209 -01	SB01-2.5
701209 -02	SB01-5.0
701209 -03	SB01-7.5
701209 -04	SB01-10.0
701209 -05	SB01-12.5
701209 -06	SB01-15.0
701209 -07	SB01-17.5
701209 -08	SB01-20.0
701209 -09	SB01-22.5
701209 -10	SB01-24.5
701209 -11	SB02-2.5
701209 -12	SB02-5.0
701209 -13	SB02-7.5
701209 -14	SB02-10.0
701209 -15	SB02-12.5
701209 -16	SB02-16.0
701209 -17	SB03-2.5
701209 -18	SB03-5.0
701209 -19	SB03-7.5
701209 -20	SB03-10.0
701209 -21	SB03-12.5
701209 -22	SB03-16.0
701209 -23	SB04-2.5
701209 -24	SB05-5.0
701209 -25	SB04-7.5
701209 -26	SB04-10.0
701209 -27	SB04-12.5
701209 -28	SB04-16.0
701209 -29	SB05-2.5
701209 -30	SB05-5.0
701209 -31	SB05-7.5
701209 -32	SB05-10.0
701209 -33	SB05-12.5
701209 -34	SB05-16.0
701209 -35	SB06-2.5
701209 -36	SB06-5.0

CASE NARRATIVE (CONTINUED)

Laboratory ID	SoundEarth Strategies
701209 -37	SB06-7.5
701209 -38	SB06-10.0
701209 -39	SB06-12.5
701209 -40	SB06-15.0
701209 -41	SB06-17.5
701209 -42	SB06-20.0
701209 -43	SB06-22.5
701209 -44	SB06-24.0
701209 -45	SB07-2.5
701209 -46	SB07-5.0
701209 -47	SB07-7.5
701209 -48	SB07-10.0
701209 -49	SB07-12.5
701209 -50	SB07-16.0
701209 -51	SB08-2.5
701209 -52	SB08-5.0
701209 -53	SB08-7.5
701209 -54	SB08-10.0
701209 -55	SB08-12.5
701209 -56	SB08-16.0

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB01-5.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-02
Date Analyzed:	01/20/17	Data File:	012007.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB01-20.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-08
Date Analyzed:	01/20/17	Data File:	012036.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.31
Tetrachloroethene	29

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB01-22.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/23/17	Lab ID:	701209-09
Date Analyzed:	01/23/17	Data File:	012308.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	1.8

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB01-24.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-10
Date Analyzed:	01/20/17	Data File:	012038.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	104	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB02-5.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-12
Date Analyzed:	01/20/17	Data File:	012039.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB02-12.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-15
Date Analyzed:	01/20/17	Data File:	012040.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	2.2
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	0.052
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	6.7
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB02-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-16
Date Analyzed:	01/21/17	Data File:	012041.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	0.052
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	1.1
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	2.2
Tetrachloroethene	4.1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB03-12.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-21
Date Analyzed:	01/21/17	Data File:	012042.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB03-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-22
Date Analyzed:	01/21/17	Data File:	012043.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB05-5.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-24
Date Analyzed:	01/21/17	Data File:	012044.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB04-12.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-27
Date Analyzed:	01/21/17	Data File:	012045.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	103	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB04-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-28
Date Analyzed:	01/21/17	Data File:	012046.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB05-5.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-30
Date Analyzed:	01/21/17	Data File:	012047.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB05-12.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-33
Date Analyzed:	01/21/17	Data File:	012048.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB05-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-34
Date Analyzed:	01/21/17	Data File:	012049.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB06-10.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-38
Date Analyzed:	01/21/17	Data File:	012050.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB06-24.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-44
Date Analyzed:	01/21/17	Data File:	012051.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB07-10.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-48
Date Analyzed:	01/21/17	Data File:	012052.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB07-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-50
Date Analyzed:	01/21/17	Data File:	012053.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB08-12.5	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-55
Date Analyzed:	01/21/17	Data File:	012054.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	0.086
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	1.3
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.29
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB08-16.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	701209-56
Date Analyzed:	01/21/17	Data File:	012055.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	0.24
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	0.056
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	10
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	8.6
Tetrachloroethene	7.1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	07-082 mb
Date Analyzed:	01/20/17	Data File:	012015.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/20/17	Lab ID:	07-081 mb2
Date Analyzed:	01/20/17	Data File:	012005.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 01/27/17
Date Received: 01/19/17
Project: SOU_1276-001_ 20170119, F&BI 701209

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 701209-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	60	59	10-138	2
Chloroethane	mg/kg (ppm)	2.5	<0.5	69	68	10-176	1
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	80	79	10-160	1
Methylene chloride	mg/kg (ppm)	2.5	<0.5	100	100	10-156	0
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	90	91	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	92	93	19-140	1
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	93	95	25-135	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	100	99	12-160	1
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	98	99	10-156	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	95	95	21-139	0
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	94	95	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
Chloroethane	mg/kg (ppm)	2.5	87	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	98	47-128
Methylene chloride	mg/kg (ppm)	2.5	123	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	104	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	104	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	105	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	112	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	112	62-131
Trichloroethene	mg/kg (ppm)	2.5	106	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	106	72-114

Date of Report: 01/27/17
Date Received: 01/19/17
Project: SOU_1276-001_ 20170119, F&BI 701209

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 701209-50 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	43	43	10-138	0
Chloroethane	mg/kg (ppm)	2.5	<0.5	56	55	10-176	2
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	61	64	10-160	5
Methylene chloride	mg/kg (ppm)	2.5	<0.5	85	86	10-156	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	76	77	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	80	82	19-140	2
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	84	85	25-135	1
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	88	90	12-160	2
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	86	88	10-156	2
Trichloroethene	mg/kg (ppm)	2.5	<0.02	84	87	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	84	86	20-133	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
Chloroethane	mg/kg (ppm)	2.5	85	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	101	47-128
Methylene chloride	mg/kg (ppm)	2.5	122	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	110	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	110	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	110	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	116	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	118	62-131
Trichloroethene	mg/kg (ppm)	2.5	114	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	110	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

VS4/A A05

Page # 1 of 6

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochilin

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS
PM will determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HOLD	cVOCs by 8260C		Notes
SB01-2.5	SB01	2.5	01 AE	1/18/17	0830	Soil	5									x per CMS ml 1/19/17
SB01-5.0		5	02		0835									x		
SB01-7.5		7.5	03		0836											
SB01-10.0		10	04		0840											
SB01-12.5		12.5	05		0850											
SB01-15.0		15	06		0855											
SB01-17.5		17.5	07		0900											
SB01-20.0		20	08		0905									x		
SB01-22.5		22.5	09		0915									x		
SB01-24.5		24.5	10		0920									x		

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tochilin	Clare Tochilin	SoundEarth	1/19/17	1030
Received by: Nhan Pham	Nhan Pham	FCBT	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

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SAMPLE CHAIN OF CUSTODY

ME 01-19-17

VSY/ AOS

Page # 2 of 6

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tachiki

PROJECT NAME/NO.: Rainier Mall Property

PO #: 1276-001

REMARKS: PM will determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HOLD	cVOCs by 8260C		Notes
SB02-2.5	SB02	2.5	11 AE	1/18/17	0940	Soil	5									
SB02-5.0		5	12		0945									X		
SB02-7.5		7.5	13		0950											
SB02-10.0		10	14		0955											
SB02-12.5		12.5	15		1000									X		
SB02-16.0		16	16		1005									X		
SB03-2.5	SB03	2.5	17		1025											
SB03-5.0		5	18		1030											
SB03-7.5		7.5	19		1040											
SB03-10.0		10	20		1045											

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Seattle, WA 98119-2029
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Fax (206) 283-5044

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tachiki	Clare Tachiki	SoundEarth	1/19/17	1630
Received by: Khan Phan	Khan Phan	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3		

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17 — VS4/A05

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS PM will determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID (ND)	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	~~Hold~~	cVOCs by 8260		Notes
SB03-12.5	SB03	12.5	21 A-E	1/18/17	1050	Soil	5							X		
SB03-16.0	⊥	16	22		1055									X		
SB04-2.5	SB04	2.5	23		1100											
SB04-5.0		5	24		1105									X		
SB04-7.5		7.5	25		1115											
SB04-10.0		10	26		1120											
SB04-12.5		12.5	27		1122									X		
SB04-16.0	⊥	16	28		1125									X		
SB05-2.5	SB05	2.5	29		1140											
SB05-5.0	⊥	5	30	⊥	1145	⊥	⊥							X		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Clare Tochilin	SoundEarth	1/19/17	1030
Received by: [signature]	Nhan Phan	FeBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3 °C		

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SAMPLE CHAIN OF CUSTODY

ME 01-19-17

Page # 4 of 6 VSA/A05

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochlin

PROJECT NAME/NO.: Rainier Mall Property

PO #: 1276-001

REMARKS: PM to determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HOLD	cVOCs by 8260		Notes
SB05-7.5	SB05	7.5	31	1/18/17	1150	Soil	5									
SB05-10.0		10	32		1152											
SB05-12.5		12.5	33		1155									X		
SB05-16.0		16	34		1200									X		
SB06-2.5	SB06	2.5	35		1215											
SB06-5.0		5	36		1220											
SB06-7.5		7.5	37		1405											
SB06-10.0		10	38		1410									X		
SB06-12.5		12.5	39		1415											
SB06-15.0		15	40		1417											

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Clare Tochlin	SoundEarth	1/19/17	1036
Received by:		Nham Pham	FEBI	1/19/17	1030
Relinquished by:					
Received by:					

Samples received at 3 °C

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SAMPLE CHAIN OF CUSTODY ME 01-19-17

Page # 5 of 6 VSG/ADS

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochilin

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS PM will determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	PAHs	cVOCs by 8260		Notes
SB06-17.5	SB06	17.5	41	1/18/17	1420	soil	5									
SB06-20.0		20	42		1425											
SB06-22.5		22.5	43		1430											
SB06-24.0		24	44		1435									X		
SB07-2.5	SB07	2.5	45		1450											
SB07-5.0		5	46		1453											
SB07-7.5		~~10~~ 7.5	47		1455											
SB07-10.0		10	48		1500									X		
SB07-12.5		12.5	49		1505											
SB07-16.0		16	50		1510									X		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tochilin	Clare Tochilin	SoundEarth	1/19/17	1030
Received by: Nhan Phan	Nhan Phan	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3 °C		

FORMS\COC\COC.DOC

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

Page # 6 of 6 VSY/A05

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochilin

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS PM will determine analyses

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	cPAHs	cVOCs by 8260		Notes
SB08-2.5	SB08	2.5	51	1/18/17	1520	Soil	5									
SB08-5.0		5	52		1525											
SB08-7.5		7.5	53		1527											
SB08-10.0		10	54		1530											
SB08-12.5		12.5	55		1535									X		
SB08-16.0		16	56		1540									X		
					GT 1/18/17											

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tochilin	Clare Tochilin	SoundEarth	1/19/17	1030
Received by: Nhan Pham	Nhan Pham	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3		°C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 2, 2017

Courtney Schaumberg, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Schaumberg:

Included are the additional results from the testing of material submitted on January 19, 2017 from the SOU_1276-001_ 20170119, F&BI 701209 project. There are 9 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU0202R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 19, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170119, F&BI 701209 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
701209 -01	SB01-2.5
701209 -02	SB01-5.0
701209 -03	SB01-7.5
701209 -04	SB01-10.0
701209 -05	SB01-12.5
701209 -06	SB01-15.0
701209 -07	SB01-17.5
701209 -08	SB01-20.0
701209 -09	SB01-22.5
701209 -10	SB01-24.5
701209 -11	SB02-2.5
701209 -12	SB02-5.0
701209 -13	SB02-7.5
701209 -14	SB02-10.0
701209 -15	SB02-12.5
701209 -16	SB02-16.0
701209 -17	SB03-2.5
701209 -18	SB03-5.0
701209 -19	SB03-7.5
701209 -20	SB03-10.0
701209 -21	SB03-12.5
701209 -22	SB03-16.0
701209 -23	SB04-2.5
701209 -24	SB04-5.0
701209 -25	SB04-7.5
701209 -26	SB04-10.0
701209 -27	SB04-12.5
701209 -28	SB04-16.0
701209 -29	SB05-2.5
701209 -30	SB05-5.0
701209 -31	SB05-7.5
701209 -32	SB05-10.0
701209 -33	SB05-12.5
701209 -34	SB05-16.0
701209 -35	SB06-2.5

CASE NARRATIVE (CONTINUED)

Laboratory ID	SoundEarth Strategies
701209 -36	SB06-5.0
701209 -37	SB06-7.5
701209 -38	SB06-10.0
701209 -39	SB06-12.5
701209 -40	SB06-15.0
701209 -41	SB06-17.5
701209 -42	SB06-20.0
701209 -43	SB06-22.5
701209 -44	SB06-24.0
701209 -45	SB07-2.5
701209 -46	SB07-5.0
701209 -47	SB07-7.5
701209 -48	SB07-10.0
701209 -49	SB07-12.5
701209 -50	SB07-16.0
701209 -51	SB08-2.5
701209 -52	SB08-5.0
701209 -53	SB08-7.5
701209 -54	SB08-10.0
701209 -55	SB08-12.5
701209 -56	SB08-16.0

The 8260C calibration standard for chloroethane did not pass the acceptance criteria for several samples. The data were flagged accordingly.

The 8260C matrix spike and matrix spike duplicate failed the relative percent difference for several compounds. The analytes were not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB01-10.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/31/17	Lab ID:	701209-04
Date Analyzed:	01/31/17	Data File:	013108.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	96	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB02-10.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/31/17	Lab ID:	701209-14
Date Analyzed:	01/31/17	Data File:	013125.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	93	64	137
4-Bromofluorobenzene	97	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5 ca
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB08-5.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/31/17	Lab ID:	701209-52
Date Analyzed:	01/31/17	Data File:	013110.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	95	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	SB08-10.0	Client:	SoundEarth Strategies
Date Received:	01/19/17	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/31/17	Lab ID:	701209-54
Date Analyzed:	01/31/17	Data File:	013126.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	89	113
Toluene-d8	94	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5 ca
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170119
Date Extracted:	01/31/17	Lab ID:	07-0185 mb
Date Analyzed:	01/31/17	Data File:	013105.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	93	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/02/17
Date Received: 01/19/17
Project: SOU_1276-001_ 20170119, F&BI 701209

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 701359-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	16	12	10-91	29 vo
Chloroethane	mg/kg (ppm)	2.5	<0.5	22	18	10-101	20
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	23	18	11-103	24 vo
Methylene chloride	mg/kg (ppm)	2.5	<0.5	42	35	14-128	18
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	36	30	13-112	18
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	42	35	23-115	18
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	46	40	25-120	14
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	45	41	22-124	9
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	35	28	27-112	22 vo
Trichloroethene	mg/kg (ppm)	2.5	<0.02	39	31	30-112	23 vo
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	36	27	25-114	29 vo

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	67	42-107
Chloroethane	mg/kg (ppm)	2.5	67	47-115
1,1-Dichloroethene	mg/kg (ppm)	2.5	81	65-110
Methylene chloride	mg/kg (ppm)	2.5	76	50-127
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	90	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	89	74-109
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	91	73-110
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	83	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	84	72-116
Trichloroethene	mg/kg (ppm)	2.5	89	72-107
Tetrachloroethene	mg/kg (ppm)	2.5	102	73-111

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

U54/A
A05

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochilin

Page # 1 of 6

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS
PM will determine analyses
✓ analyze per CMS 1/30/17

TURNAROUND TIME
(X) Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	~~Hold~~	cVOCs by 8260C		Notes x per CMS ML 1/19/17
SB01-2.5	SB01	2.5	01 A-E	1/18/17	0830	Soil	5						↓			
SB01-5.0	↓	5	02	↓	0835	↓	↓						↓	x		
SB01-7.5	↓	7.5	03	↓	0836	↓	↓						↓			
SB01-10.0	↓	10	04	↓	0840	↓	↓						↓	✓		
SB01-12.5	↓	12.5	05	↓	0850	↓	↓						↓			
SB01-15.0	↓	15	06	↓	0855	↓	↓						↓			
SB01-17.5	↓	17.5	07	↓	0900	↓	↓						↓			
SB01-20.0	↓	20	08	↓	0905	↓	↓						↓	x		
SB01-22.5	↓	22.5	09	↓	0915	↓	↓						↓	x		
SB01-24.5	↓	24.5	10	↓	0920	↓	↓						↓	x		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Clare Tochilin	Clare Tochilin	SoundEarth	1/19/17	1030
Received by:	Nhan Phan	Nhan Phan	FEBI	1/19/17	1030
Relinquished by:					
Received by:			Samples received at 3 °C		

FORMS\COC\COC.DOC

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

1254/ A05

Page # 2 of 6

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clar Tach

PROJECT NAME/NO. Rainier Mall Property

PO # 1276-001

REMARKS PM with determine analytes

√ run per CMS 1/30/17

TURNAROUND TIME
(Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HOLD	cVOCs by 8260C		Notes
SB02-2.5	SB02	2.5	11	1/18/17	0940	Soil	5									
SB02-5.0		5	12		0945									X		
SB02-7.5		7.5	13		0950											
SB02-10.0		10	14		0955									✓		
SB02-12.5		12.5	15		1000									X		
SB02-16.0		16	16		1005									X		
SB03-2.5	SB03	2.5	17		1025											
SB03-5.0		5	18		1030											
SB03-7.5		7.5	19		1040											
SB03-10.0		10	20		1045											

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

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SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clar Tach	Clar Tachiki	SoundEarth	1/19/17	1130
Received by: Phan	Khan Phan	FEBT	1/19/17	1050
Relinquished by:				
Received by:		Samples received at 3		

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

Page # 3 of 6

154/405

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tachlin

PROJECT NAME/NO. Rainier Mall Property

PO # 1276-001

REMARKS PM will determine analyses

✓ run per CMS 1/30/17

TURNAROUND TIME
⊗ Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID (ND)	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	Hold	cVOCs by 8260		Notes
SB03-12.5	SB03	12.5	22	1/18/17	1050	Soil	5							X		
SB03-16.0	"	16	23		1055									X		
SB04-2.5	SB04	2.5	33		1100											
SB04-5.0		5	24		1105									X		
SB04-7.5		7.5	25		1115											
SB04-10.0		10	27		1120											
SB04-12.5		12.5	28		1122									X		
SB04-16.0	"	16	26		1125									X		
SB05-2.5	SB05	2.5	29		1140											
SB05-5.0	"	5	30	"	1145	"	"						"	X		

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tachlin	Clare Tachlin	SoundEarth	1/19/17	1030
Received by: Nham Pham	Nham Pham	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

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SAMPLE CHAIN OF CUSTODY

ME 01-19-17

Page # 4 of 6 1544/1605

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochlin

PROJECT NAME/NO.: Rainier Mall Property

PO#: 1276-001

REMARKS: PM to determine analysis

✓ run per CMS 1/30/17

TURNAROUND TIME
☒ Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	Hold	cVOCs by 8260		Notes
SB05-7.5	SB05	7.5	31	1/18/17	1150	Soil	5									
SB05-10.0		10	32		1152											
SB05-12.5		12.5	33		1155									X		
SB05-16.0		16	34		1200									X		
SB06-2.5	SB06	2.5	35		1215											
SB06-5.0		5	36		1220											
SB06-7.5		7.5	37		1405											
SB06-10.0		10	38		1410									X		
SB06-12.5		12.5	39		1415											
SB06-15.0		15	40		1417											

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Clare Tochlin	SoundEA	1/19/17	1036
Received by:	Nhan Phan	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
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701209

SAMPLE CHAIN OF CUSTODY ME 01-19-17

Page # 5 of 6 VSG/AMS

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tobin

PROJECT NAME/NO.	PO #
Rainier Mall Property	1276-001

REMARKS PM will determine analyses

✓ run per CMS 1/30/17

TURNAROUND TIME
(S) Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	PAHs by 8270	cVOCs by 8260		Notes
SB06-17.5	SB06	17.5	41	1/18/17	1420	soil	5									
SB06-20.0		20	42		1425											
SB06-22.5		22.5	43		1430											
SB06-24.0		24	44		1435									X		
SB07-2.5	SB07	2.5	45		1450											
SB07-5.0		5	46		1453											
SB07-7.5		~~7.5~~ 10.5	47		1455											
SB07-10.0		10	48		1500									X		
SB07-12.5		12.5	49		1505											
SB07-16.0		16	50		1510									X		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tobin	Clare Tobin	SoundEarth	1/19/17	1030
Received by: Nhan Phan	Nhan Phan	FEB_I	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3 °C		

701209

SAMPLE CHAIN OF CUSTODY

ME 01-19-17

VSY/AOS

Page # 6 of 6

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Clare Tochilin

PROJECT NAME/NO. Rainier Mall Property

PO # 1276-001

REMARKS PM will determine analyses

✓ run per CMS 1/30/17

TURNAROUND TIME
⊗ Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	cPAHs	cVOCs by 8260		Notes
SB08-2.5	SB08	2.5	51	1/18/17	1520	Soil	5									
SB08-5.0		5	52		1525									✓		
SB08-7.5		7.5	53		1527											
SB08-10.0		10	54		1530									✓		
SB08-12.5		12.5	55		1535									X		
SB08-16.0		16	56		1540									X		

GT 1/18/17

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Clare Tochilin	Clare Tochilin	SoundEarth	1/19/17	1030
Received by: Nhan Pham	Nhan Pham	FEBI	1/19/17	1030
Relinquished by:				
Received by:		Samples received at 3		°C

Friedman & Bruya, Inc. #702165 and additional

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 28, 2017

Clare Tochilin, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Tochilin:

Included are the results from the testing of material submitted on February 10, 2017 from the SOU_1276-001_ 20170210, F&BI 702165 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU0228R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on February 10, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170210, F&BI 702165 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
702165 -01	B01-02.5
702165 -02	B01-05
702165 -03	B01-07.5
702165 -04	B01-10
702165 -05	B01-12.5
702165 -06	B01-17.5
702165 -07	B01-20
702165 -08	B01-22.5
702165 -09	B01-25
702165 -10	B01-27.5
702165 -11	B01-30
702165 -12	B01-32.5
702165 -13	B01-35
702165 -14	B01-37.5
702165 -15	B01-40
702165 -16	B02-02.5
702165 -17	B02-05
702165 -18	B02-07.5
702165 -19	B02-10
702165 -20	B02-12.5
702165 -21	B02-15
702165 -22	B02-17.5
702165 -23	B02-20
702165 -24	B02-22.5
702165 -25	B02-25
702165 -26	B02-27.5
702165 -27	B02-30

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-12.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-05
Date Analyzed:	02/15/17	Data File:	021508.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	102	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-17.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-06
Date Analyzed:	02/15/17	Data File:	021509.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	102	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.45
Tetrachloroethene	59 ve

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-17.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-06 1/10
Date Analyzed:	02/16/17	Data File:	021611.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.5
Chloroethane	<5
1,1-Dichloroethene	<0.5
Methylene chloride	<5
trans-1,2-Dichloroethene	<0.5
1,1-Dichloroethane	<0.5
cis-1,2-Dichloroethene	<0.5
1,2-Dichloroethane (EDC)	<0.5
1,1,1-Trichloroethane	<0.5
Trichloroethene	0.42
Tetrachloroethene	58

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-20	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	702165-07
Date Analyzed:	02/21/17	Data File:	022123.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	89	113
Toluene-d8	103	64	137
4-Bromofluorobenzene	94	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.33
Tetrachloroethene	280 ve

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-20	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	702165-07 1/50
Date Analyzed:	02/23/17	Data File:	022241.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<2.5
Chloroethane	<25
1,1-Dichloroethene	<2.5
Methylene chloride	<25
trans-1,2-Dichloroethene	<2.5
1,1-Dichloroethane	<2.5
cis-1,2-Dichloroethene	<2.5
1,2-Dichloroethane (EDC)	<2.5
1,1,1-Trichloroethane	<2.5
Trichloroethene	<1
Tetrachloroethene	510

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-22.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	702165-08
Date Analyzed:	02/21/17	Data File:	022137.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.28
Tetrachloroethene	20

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B02-10	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-19
Date Analyzed:	02/16/17	Data File:	021612.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.13
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B02-15	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-21
Date Analyzed:	02/16/17	Data File:	021613.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	94	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	0.097
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	0.25
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	6.7
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	4.9
Tetrachloroethene	0.085

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B02-20	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702165-23
Date Analyzed:	02/15/17	Data File:	021512.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	102	64	137
4-Bromofluorobenzene	96	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	07-0343 mb
Date Analyzed:	02/21/17	Data File:	022105.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	104	64	137
4-Bromofluorobenzene	97	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	07-0267 mb2
Date Analyzed:	02/15/17	Data File:	021505.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/28/17
Date Received: 02/10/17
Project: SOU_1276-001_ 20170210, F&BI 702165

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 702201-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	31	10-91
Chloroethane	mg/kg (ppm)	2.5	<0.5	39	10-101
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	50	11-103
Methylene chloride	mg/kg (ppm)	2.5	<0.5	71	14-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	62	13-112
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	67	23-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	25-120
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	66	22-124
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	62	27-112
Trichloroethene	mg/kg (ppm)	2.5	<0.02	61	30-112
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	46	25-114

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	65	64	42-107	2
Chloroethane	mg/kg (ppm)	2.5	66	69	47-115	4
1,1-Dichloroethene	mg/kg (ppm)	2.5	86	87	65-110	1
Methylene chloride	mg/kg (ppm)	2.5	98	99	50-127	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	100	71-113	2
1,1-Dichloroethane	mg/kg (ppm)	2.5	95	98	74-109	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	102	73-110	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	89	92	73-111	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	100	101	72-116	1
Trichloroethene	mg/kg (ppm)	2.5	97	100	72-107	3
Tetrachloroethene	mg/kg (ppm)	2.5	104	102	73-111	2

Date of Report: 02/28/17
Date Received: 02/10/17
Project: SOU_1276-001_ 20170210, F&BI 702165

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 702280-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	47	10-91
Chloroethane	mg/kg (ppm)	2.5	<0.5	51	10-101
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	71	11-103
Methylene chloride	mg/kg (ppm)	2.5	<0.5	88	14-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	84	13-112
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	81	23-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	87	25-120
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	82	22-124
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	94	27-112
Trichloroethene	mg/kg (ppm)	2.5	<0.02	86	30-112
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	96	25-114

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	66	67	42-107	2
Chloroethane	mg/kg (ppm)	2.5	68	70	47-115	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	91	93	65-110	2
Methylene chloride	mg/kg (ppm)	2.5	97	99	50-127	2
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	100	71-113	1
1,1-Dichloroethane	mg/kg (ppm)	2.5	95	95	74-109	0
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	101	73-110	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	93	94	73-111	1
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	112	112	72-116	0
Trichloroethene	mg/kg (ppm)	2.5	98	99	72-107	1
Tetrachloroethene	mg/kg (ppm)	2.5	109	110	73-111	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

(70165

SAMPLE CHAIN OF CUSTODY ME 02/10/17

(KD/BOS

Send Report to Courtney Schaumburg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (Signature)

PROJECT NAME/NO. 1276-001

PO#

REMARKS Hold PM with detection analytes request. ✓ run per CMS 2/2/17 Run per CMS 2/14/17

Page # 1 of 3

TURNAROUND TIME
Standard (1 Week)
RUSH Hold
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
Bol-02.5	Bol	2.5	01	2/9/17	0830	Soil	5									
Bol-05		5	02		0835											
Bol-07.5		7.5	03		0840											
Bol-10		10	04		0845											
Bol-12.5		12.5	05		0850								⊗			
Bol-17.5		17.5	06		0905								⊗			
Bol-20		20	07		0910								✓			
Bol-22.5		22.5	08		0920								✓			
Bol-25		25	09		0925											
Bol-27.5	↓	27.5	10	↓	0935	↓	↓							Samples received at 3 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SES	2/10/17	0750
Received by:	Nhan Phan	FB T	2/10/17	0750
Relinquished by:				
Received by:				

702165 SAMPLE CHAIN OF CUSTODY ME 02/10/17 VS2/ B05

Send Report to Courtney Schaumburg
Company SoundEarth Strategies, Inc.
Address 2811 Fairview Avenue E, Suite 2000
City, State, ZIP Seattle, Washington 98102
Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)
PROJECT NAME/NO. 1276-001
PO #
REMARKS
⊗ run per CMS 2/14/17

Page # 2 of 3
TURNAROUND TIME
Standard (2 Weeks)
RUSH (72 hr)
Rush charges authorized by:
SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B01-30	B01	30	11 E	2/9/17	0940	Soil	5									
B01-32.5	↓	32.5	12	↓	0955	↓	↓									
B01-35	↓	35	13	↓	1010	↓	↓									
B01-37.5	↓	37.5	14	↓	1020	↓	↓									
B01-40	↓	40	15	↓	1035	↓	↓									
B02-02.5	B02	2.5	16	↓	1340	↓	↓									
B02-05	↓	5	17	↓	1345	↓	↓									
B02-07.5	↓	7.5	18	↓	1350	↓	↓									
B02-10	↓	10	19	↓	1355	↓	↓						⊗			
B02-12.5	↓	12.5	20	↓	1400	↓	↓									

Samples received at 3 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SES	2/10/17	0750
Received by:	Nhan Phan	FeBI	2/10/17	0750
Relinquished by:				
Received by:				

(702165

SAMPLE CHAIN OF CUSTODY ME 02/10/17

(VS2/

Page # 3 of 3 /BOS

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS field

Brun per QAS 2/14/17

TURNAROUND TIME
Standard (2 Weeks)
RUSH 1 Day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	cPAHs by 8270SIM			Notes
B02-15	B02	15	21	2/9/17	1410	Soil	5						⊗			
B02-17.5		17.5	22		1415											
B02-20		20	23		1420								⊗			
B02-22.5		22.5	24		1425											
B02-25		25	25		1430											
B02-27.5		27.5	26		1440											
B02-30	↓	30	27	↓	1455	↓	↓									
		BOS 2/9/17														
													Samples received at 3.1C			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SES	2/10/17	0760
Received by:	Nhan Phan	FB	2/10/17	0750
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 9, 2017

Clare Tochilin, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Tochilin:

Included are the additional results from the testing of material submitted on February 10, 2017 from the SOU_1276-001_ 20170210, F&BI 702165 project. There are 7 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU0309R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on February 10, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170210, F&BI 702165 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
702165 -01	B01-02.5
702165 -02	B01-05
702165 -03	B01-07.5
702165 -04	B01-10
702165 -05	B01-12.5
702165 -06	B01-17.5
702165 -07	B01-20
702165 -08	B01-22.5
702165 -09	B01-25
702165 -10	B01-27.5
702165 -11	B01-30
702165 -12	B01-32.5
702165 -13	B01-35
702165 -14	B01-37.5
702165 -15	B01-40
702165 -16	B02-02.5
702165 -17	B02-05
702165 -18	B02-07.5
702165 -19	B02-10
702165 -20	B02-12.5
702165 -21	B02-15
702165 -22	B02-17.5
702165 -23	B02-20
702165 -24	B02-22.5
702165 -25	B02-25
702165 -26	B02-27.5
702165 -27	B02-30

Samples B01-27.5, B01-32.5 and B01-35 were requested outside of holding time. The data were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-27.5 ht	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	03/03/17	Lab ID:	702165-10
Date Analyzed:	03/03/17	Data File:	030324.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	103	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.073
Tetrachloroethene	0.40

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-32.5 ht	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	03/03/17	Lab ID:	702165-12
Date Analyzed:	03/03/17	Data File:	030325.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	103	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	0.31

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B01-35 ht	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	03/03/17	Lab ID:	702165-13
Date Analyzed:	03/03/17	Data File:	030326.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	0.049

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170210
Date Extracted:	03/03/17	Lab ID:	07-440 mb
Date Analyzed:	03/03/17	Data File:	030323.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	104	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 03/09/17
Date Received: 02/10/17
Project: SOU_1276-001_ 20170210, F&BI 702165

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 702165-10 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	43	42	10-138	2
Chloroethane	mg/kg (ppm)	2.5	<0.5	57	57	10-176	0
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	64	62	10-160	3
Methylene chloride	mg/kg (ppm)	2.5	<0.5	74	75	10-156	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	68	68	14-137	0
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	70	71	19-140	1
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	77	78	25-135	1
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	74	74	12-160	0
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	73	74	10-156	1
Trichloroethene	mg/kg (ppm)	2.5	0.062	71	70	21-139	1
Tetrachloroethene	mg/kg (ppm)	2.5	0.34	68	69	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	75	22-139
Chloroethane	mg/kg (ppm)	2.5	93	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	96	47-128
Methylene chloride	mg/kg (ppm)	2.5	92	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	91	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	92	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	93	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	95	62-131
Trichloroethene	mg/kg (ppm)	2.5	90	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	91	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

(702165

SAMPLE CHAIN OF CUSTODY ME 02/10/17 (VO/B05

Send Report to Courtney Schaumberg
Company SoundEarth Strategies, Inc.
Address 2811 Fairview Avenue E, Suite 2000
City, State, ZIP Seattle, Washington 98102
Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)
PROJECT NAME/NO. 1276-001
PO #
REMARKS (Hold) PM will determine analyses request. ✓ run per CMS 2/21/17 ⊗ run per CMS 2/14/17

Page # 1 of 3
TURNAROUND TIME
Standard (2 Weeks)
RUSH (Hold)
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B01-02.5	B01	2.5	01 A-E	2/9/17	0830	Soil	5									
B01-05	↓	5	02	↓	0835	↓	↓									
B01-07.5		7.5	03		0840											
B01-10		10	04		0845											
B01-12.5		12.5	05		0850											
B01-17.5		17.5	06		0905								⊗			
B01-20		20	07		0910								⊗ ✓			
B01-22.5		22.5	08		0920								✓			
B01-25		25	09		0925											
B01-27.5	↓	27.5	10 ↓	↓	0935	↓	↓						X			Samples received at 3 °C

X-per CT 3/2/17 MK

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SES	2/10/17	0750
Received by: [signature]	Nhan Phan	FBI	2/10/17	0750
Relinquished by:				
Received by:				

702165 **SAMPLE CHAIN OF CUSTODY** ME 02/10/17 VS2/

Send Report to: Courtney Schaumberg

Company: SoundEarth Strategies, Inc.

Address: 2811 Fairview Avenue E, Suite 2000

City, State, ZIP: Seattle, Washington 98102

Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature): [signature]

PROJECT NAME/NO.: 1276-001

PO #:

REMARKS: Hold

⊗ run per CMS 2/14/17

Page # 2 of 3 /B05

TURNAROUND TIME
Standard (2 Weeks)
RUSH (HOLD)
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B01-30	B01	30	11 A-E	2/9/17	0940	Soil	5									
B01-32.5	↓	32.5	12	↓	0955	↓	↓						X			
B01-35	↓	35	13	↓	1010	↓	↓						X			
B01-37.5	↓	37.5	14	↓	1020	↓	↓									
B01-40	↓	40	15	↓	1035	↓	↓									
B02-02.5	B02	2.5	16	↓	1340	↓	↓									
B02-05	↓	5	17	↓	1345	↓	↓									
B02-07.5	↓	7.5	18	↓	1350	↓	↓									
B02-10	↓	10	19	↓	1355	↓	↓						⊗			
B02-12.5	↓	12.5	20 ↓	↓	1400	↓	↓									

Samples received at 3 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SES	2/10/17	0750
Received by: [signature]	Nhan Phan	FBI	2/10/17	0750
Relinquished by:				
Received by:				

Friedman & Bruya, Inc. #702170

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 24, 2017

Courtney Schaumberg, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Schaumberg:

Included are the results from the testing of material submitted on February 10, 2017 from the SOU_1276-001_ 20170210, F&BI 702170 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Clare Tochilin
SOU0224R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on February 10, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170210, F&BI 702170 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
702170 -01	B03-02.5
702170 -02	B03-05
702170 -03	B03-07.5
702170 -04	B03-10
702170 -05	B03-12.5
702170 -06	B03-15
702170 -07	B03-17.5
702170 -08	B03-20
702170 -09	B03-22.5
702170 -10	B03-25
702170 -11	B03-27.5
702170 -12	B03-30
702170 -13	B03-32.5
702170 -14	B03-35
702170 -15	B04-02.5
702170 -16	B04-05
702170 -17	B04-07.5
702170 -18	B04-10
702170 -19	B04-12.5
702170 -20	B04-15
702170 -21	B04-17.5
702170 -22	B04-20
702170 -23	B04-22.5
702170 -24	B04-25
702170 -25	B04-27.5
702170 -26	B04-30

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B03-12.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-05
Date Analyzed:	02/15/17	Data File:	021513.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	97	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B03-15	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-06
Date Analyzed:	02/15/17	Data File:	021514.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.082
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B03-17.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-07
Date Analyzed:	02/15/17	Data File:	021515.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	94	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	1.1
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	1.5
Tetrachloroethene	0.36

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B03-20	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	702170-08
Date Analyzed:	02/21/17	Data File:	022138.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	99	64	137
4-Bromofluorobenzene	96	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.41
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.57
Tetrachloroethene	0.67

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B03-22.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	702170-09
Date Analyzed:	02/21/17	Data File:	022139.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	96	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B04-10	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-18
Date Analyzed:	02/15/17	Data File:	021516.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B04-12.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-19
Date Analyzed:	02/15/17	Data File:	021517.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	95	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	0.12
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.79
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.10
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B04-17.5	Client:	SoundEarth Strategies
Date Received:	02/10/17	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	702170-21
Date Analyzed:	02/15/17	Data File:	021518.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	97	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.32
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/21/17	Lab ID:	07-0343 mb
Date Analyzed:	02/21/17	Data File:	022105.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	104	64	137
4-Bromofluorobenzene	97	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170210
Date Extracted:	02/15/17	Lab ID:	07-0267 mb2
Date Analyzed:	02/15/17	Data File:	021505.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/24/17
Date Received: 02/10/17
Project: SOU_1276-001_ 20170210, F&BI 702170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 702201-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	31	10-91
Chloroethane	mg/kg (ppm)	2.5	<0.5	39	10-101
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	50	11-103
Methylene chloride	mg/kg (ppm)	2.5	<0.5	71	14-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	62	13-112
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	67	23-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	25-120
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	66	22-124
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	62	27-112
Trichloroethene	mg/kg (ppm)	2.5	<0.02	61	30-112
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	46	25-114

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	65	64	42-107	2
Chloroethane	mg/kg (ppm)	2.5	66	69	47-115	4
1,1-Dichloroethene	mg/kg (ppm)	2.5	86	87	65-110	1
Methylene chloride	mg/kg (ppm)	2.5	98	99	50-127	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	100	71-113	2
1,1-Dichloroethane	mg/kg (ppm)	2.5	95	98	74-109	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	102	73-110	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	89	92	73-111	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	100	101	72-116	1
Trichloroethene	mg/kg (ppm)	2.5	97	100	72-107	3
Tetrachloroethene	mg/kg (ppm)	2.5	104	102	73-111	2

Date of Report: 02/24/17
Date Received: 02/10/17
Project: SOU_1276-001_ 20170210, F&BI 702170

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 702280-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	47	10-91
Chloroethane	mg/kg (ppm)	2.5	<0.5	51	10-101
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	71	11-103
Methylene chloride	mg/kg (ppm)	2.5	<0.5	88	14-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	84	13-112
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	81	23-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	87	25-120
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	82	22-124
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	94	27-112
Trichloroethene	mg/kg (ppm)	2.5	<0.02	86	30-112
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	96	25-114

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	66	67	42-107	2
Chloroethane	mg/kg (ppm)	2.5	68	70	47-115	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	91	93	65-110	2
Methylene chloride	mg/kg (ppm)	2.5	97	99	50-127	2
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	100	71-113	1
1,1-Dichloroethane	mg/kg (ppm)	2.5	95	95	74-109	0
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	101	73-110	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	93	94	73-111	1
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	112	112	72-116	0
Trichloroethene	mg/kg (ppm)	2.5	98	99	72-107	1
Tetrachloroethene	mg/kg (ppm)	2.5	109	110	73-111	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

(702170

SAMPLE CHAIN OF CUSTODY ME 02/10/17

(VSY/ BOY

Page # 1 of 3

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS ~~Hold~~ ✓ run per cms 2/21/17

⊗ run per cms 2/14/17

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	sVOCs by 8270	cVOCs by 8260D			Notes
B03-02.5	B03	2.5	01 AF	2/10/17	0815	Soil	5									
B03-05		5	02		0820											
B03-07.5		7.5	03		0825											
B03-10		10	04		0830											
B03-12.5		12.5	05		0835								⊗			
B03-15		15	06		0840								⊗			
B03-17.5		17.5	07		0845								⊗			
B03-20		20	08		0850								✓			
B03-22.5		22.5	09		0855								✓			
B03-25	↓	25	10 ↓	↓	0900	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Courtney Schaumberg	SoundEarth	2/14/17	12:45
Received by:	DA VO	FEBE	2-10-17	12:45
Relinquished by:				
Received by:		Samples received at	4	°C

(702170

SAMPLE CHAIN (CUSTODY ME 02/10/17 (1054/B04

Page # 2 of 3

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS (H.C. D)

⊗ run for CMS 2/14/17

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B3-27.5	B03	27.5	11	2/14/17	0105	Soil	5									
B3-30		30	12		0120											
B3-32.5		32.5	13		0125											
B03-35		35	14		0950											
B04-02.5	B04	2.5	15		1045											
B04-05		5	16		1050											
B04-07.5		7.5	17		1055											
B04-10		10	18		1100								⊗			
B04-12.5		12.5	19		1105								⊗			
B04-15		15	20		1110											

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax: (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Courtney Schaumberg	SoundEarth	2/14/17	12:45
Received by:	DAVID	FEBC	2-14-17	12:45
Relinquished by:				
Received by:		Samples received at 4 °C		

702170

SAMPLE CHAIN OF CUSTODY ME 02/10/17

USY/B04

Send Report to Courtney Schaumberg

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS

⊗ run per CMS 2/14/17

Page # 3 of 3

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B04-17.5	B04	17.5	21 A-E	2/10/17	1115	soil	5						⊗			
B04-20		20	22		1120											
B04-22.5		22.5	23		1125											
B04-25		25	24		1130											
B04-27.5		27.5	25		1135											
B04-30		30	26		1145											

2/10/17

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Courtney Schaumberg	SoundEarth	2/10/17	12:45
Received by:	DO LO	FBI	2-10-17	12:45
Relinquished by:				
Received by:		Samples received at 4 °C		

FORMS\COC\COC.DOC

Friedman & Bruya, Inc. #703403

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 30, 2017

Clare Tochilin, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Tochilin:

Included are the results from the testing of material submitted on March 23, 2017 from the SOU_1276-001_ 20170323, F&BI 703403 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Suzy Stumpf, Chris Cass
SOU0330R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 23, 2017 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20170323, F&BI 703403 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
703403 -01	B05-24
703403 -02	B05-28
703403 -03	B05-31
703403 -04	B05-35
703403 -05	B05-40
703403 -06	B05-90

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B05-40	Client:	SoundEarth Strategies
Date Received:	03/23/17	Project:	SOU_1276-001_ 20170323
Date Extracted:	03/27/17	Lab ID:	703403-05
Date Analyzed:	03/27/17	Data File:	032709.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20170323
Date Extracted:	03/27/17	Lab ID:	07-551 mb
Date Analyzed:	03/27/17	Data File:	032708.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 03/30/17
Date Received: 03/23/17
Project: SOU_ 1276-001_ 20170323, F&BI 703403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 703403-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	34	34	10-138	0
Chloroethane	mg/kg (ppm)	2.5	<0.5	46	45	10-176	2
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	52	50	10-160	4
Methylene chloride	mg/kg (ppm)	2.5	<0.5	67	65	10-156	3
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	63	61	14-137	3
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	67	66	19-140	2
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	68	67	25-135	1
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	72	71	12-160	1
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	65	64	10-156	2
Trichloroethene	mg/kg (ppm)	2.5	<0.02	67	66	21-139	2
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	68	67	20-133	1

Date of Report: 03/30/17
Date Received: 03/23/17
Project: SOU_ 1276-001_ 20170323, F&BI 703403

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	83	22-139
Chloroethane	mg/kg (ppm)	2.5	87	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	101	47-128
Methylene chloride	mg/kg (ppm)	2.5	105	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	104	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	104	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	101	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	103	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	103	62-131
Trichloroethene	mg/kg (ppm)	2.5	101	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

) 703403

SAMPLE CHAIN OF CUSTODY ME 03/23/17

Send Report to Courtney Schaumberg CC: Suzy Stumof & Chris Cass

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) Chris Cass

PROJECT NAME/NO. Rainier Mall Property 1276-001

PO #

REMARKS Hold! - Sample and SIM Selections to be made by PM

Page # 1 of 1 VS2

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	Chlorinated Hydrocarbons by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
805								ANALYSES REQUESTED								
~~MW02~~ 805 MW02-24	MW02	24	01	03/22/17	1100	Soil	4						X			X - per CT
~~MW02~~ 805 MW02-28	"	28	02	"	1125	"	4									24hr TAT
~~MW03~~ 805 MW03-31	"	31	03	"	1140	"	4									3/24/17 MS
~~MW03~~ 805 MW03-35	"	35	04	"	1145	"	4									
~~MW03~~ 805 MW03-40	"	40	05	"	1340	"	4									
805 ~~MW02~~ MW02-90			06	3/20/17	1555		4						X			
																Standard at lab (WP) 3/23/17
				C&L 03/22/17												
																Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Chris Cass	Chris Cass	SoundEarth	03/23/17	1250
Received by: [illegible]	HONG NGUYEN	FBI	"	"
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 11, 2018

Logan Schumacher, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Mr Schumacher:

Included are the results from the testing of material submitted on October 2, 2018 from the SOU_1276-001_ 20181002, F&BI 810054 project. There are 20 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU1011R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 2, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20181002, F&BI 810054 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
810054 -01	B16-07
810054 -02	B16-11
810054 -03	B16-14
810054 -04	B16-17
810054 -05	B16-20
810054 -06	B16-25
810054 -07	B16-28
810054 -08	B15-07
810054 -09	B15-11
810054 -10	B15-14
810054 -11	B15-17
810054 -12	B15-20
810054 -13	B15-25
810054 -14	B15-28
810054 -15	B18-05
810054 -16	B18-10
810054 -17	B18-12.5
810054 -18	B18-15
810054 -19	B18-17.5
810054 -20	B18-20
810054 -21	B18-25
810054 -22	B18-30
810054 -23	B17-05
810054 -24	B17-10
810054 -25	B17-12.5
810054 -26	B17-15
810054 -27	B17-17.5
810054 -28	B17-20
810054 -29	B17-25
810054 -30	B17-30
810054 -31	B17-35

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B16-11	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-02
Date Analyzed:	10/08/18	Data File:	100823.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	0.072
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B16-14	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-03
Date Analyzed:	10/08/18	Data File:	100824.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B16-17	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-04
Date Analyzed:	10/08/18	Data File:	100825.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	97	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B16-20	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-05
Date Analyzed:	10/08/18	Data File:	100826.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B15-11	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-09
Date Analyzed:	10/08/18	Data File:	100827.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B15-14	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-10
Date Analyzed:	10/08/18	Data File:	100828.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B15-17	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-11
Date Analyzed:	10/08/18	Data File:	100829.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	97	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B15-20	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-12
Date Analyzed:	10/08/18	Data File:	100830.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B18-10	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-16
Date Analyzed:	10/08/18	Data File:	100831.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.51
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B18-12.5	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-17
Date Analyzed:	10/08/18	Data File:	100832.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.93
Trichloroethene	1.7
Tetrachloroethene	2.1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B18-15	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-18
Date Analyzed:	10/08/18	Data File:	100833.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.38
Trichloroethene	0.43
Tetrachloroethene	1.8

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B18-17.5	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-19
Date Analyzed:	10/08/18	Data File:	100834.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	0.030
Tetrachloroethene	0.085

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B18-20	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-20
Date Analyzed:	10/08/18	Data File:	100835.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B17-15	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-26
Date Analyzed:	10/08/18	Data File:	100836.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B17-17.5	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-27
Date Analyzed:	10/08/18	Data File:	100837.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B17-20	Client:	SoundEarth Strategies
Date Received:	10/02/18	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	810054-28
Date Analyzed:	10/09/18	Data File:	100838.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20181002
Date Extracted:	10/08/18	Lab ID:	08-2226 mb
Date Analyzed:	10/08/18	Data File:	100807.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	99	55	145
4-Bromofluorobenzene	95	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 10/11/18
Date Received: 10/02/18
Project: SOU_1276-001_ 20181002, F&BI 810054

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 810054-28 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	44	43	10-138	2
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	65	65	10-160	0
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	72	71	14-137	1
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	81	82	25-135	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	79	80	21-139	1
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	80	80	20-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	80	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	97	47-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	95	67-127
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	72-113
Trichloroethene	mg/kg (ppm)	2.5	95	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	95	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

810054

SAMPLE CHAIN OF CUSTODY ME 10-02-18 D04 / VS

Page # 1 of 4

Send Report to Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO. 1276-001

PO #

REMARKS Hold All, PM to determine analysis request.

TURNAROUND TIME
Standard (2 Weeks) (circled)
RUSH Hold
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B16-07	B16	7	01A-E	10/1/18	0905	Soil	5									X-per LS 10/3/18 ME
B16-11	↓	11	02	↓	0915	↓	↓									
B16-14		14	03		0930								X			
B16-17		17	04		0940								X			
B16-20		20	05		0950								X			
B16-25		25	06		1010								X			
B16-28	↓	28	07		1015											
B15-07	B15	7	08		1335											
B15-11	↓	11	09		1340											
B15-14	↓	14	10	↓	1400	↓	↓						X			

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Sarah Welter	SES	10/2/18	1057
Received by: [signature]	Matt Langston	FBInc	10/2/18	1057
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SAMPLE CHAIN OF CUSTODY

810054 HE10-02-18 004 VES

Page # 2 of 4

Send Report to: Logan Schumacher
Company: SoundEarth Strategies, Inc.
Address: 2811 Fairview Avenue E, Suite 2000
City, State, ZIP: Seattle, Washington 98102
Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature):
PROJECT NAME/NO.: 1276-001
PO #:
REMARKS: Hold AM

TURNAROUND TIME
Standard (2 Weeks)
RUSH Hold
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B15-17	B15	17	11	10/1/18	1410	Soil	5						X			
B15-20		20	12		1420								X			
B15-25		25	13		1435											
B15-28		28	14		1445											
B18-05	B18	5	15	10/2/18	0810	Soil	5									
B18-10		10	16		0845								X			
B18-12.5		12.5	17		0850								X			
B18-15		15	18		0906								X			
B18-17.5		17.5	19		0902								X			Samples received at 4 °C
B18-20		20	20		0905								X			

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Sarah Walter	Sarah Walter	SES	10/2/18	1657
Received by:	Matt Langstaff	FBTA	10/2/18	1657
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

810054

SAMPLE CHAIN OF CUSTODY

ME 10-02-18 D04 V35

Page # 3 of 4

Send Report to Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS Hold All

TURNAROUND TIME
Standard (2 Weeks)
RUSH Hold
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B18-25	B18	25	21	10/2/18	0912	Soil	5									
B18-30	↓	30	22	↓	0920	↓	↓									
B17-05	B17	05	23	10/2/18	1030	Soil	5									
B17-10		10	24		1033											
B17-12.5		12.5	25		1037											
B17-15		15	26		1042								X			
B17-17.5		17.5	27		1048								X			
B17-20		20	28		1053								X			
B17-25		25	29		1058											
B17-30	↓	30	30	↓	1107	↓	↓									

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Sarah Walter	Sarah Walter	SES	10/2/18	1657
Received by:		Matt Langston	FBI	10/2/18	1657
Relinquished by:					
Received by:					

SAMPLE CHAIN OF CUSTODY

810054 ME 10-02-18 D04 Page # 4 of 4 V55

Send Report to Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001 PO #

REMARKS Hold AM

TURNAROUND TIME
Standard (2 Weeks)
RUSH Hold
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
B17-35	B17	35	3	10/2/18	1135	S	5									

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Sarah Welty	SES	10/2/18	1657
Received by:	Matt Langston	FB	10/2/18	1657
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
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www.friedmanandbruya.com

October 12, 2018

Logan Schumacher, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Mr Schumacher:

Included are the results from the testing of material submitted on October 5, 2018 from the SOU_1276-001_ 20181005, F&BI 810141 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU1012R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 5, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_1276-001_ 20181005, F&BI 810141 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
810141 -01	MW09-20181005
810141 -02	MW07-20181005
810141 -03	MW06-20181005

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW09-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810141-01
Date Analyzed:	10/08/18	Data File:	100809.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.7
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	36
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	59
Tetrachloroethene	20

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW07-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810141-02
Date Analyzed:	10/08/18	Data File:	100810.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW06-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810141-03
Date Analyzed:	10/08/18	Data File:	100811.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	3.5
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	2.4
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_1276-001_ 20181005
Date Extracted:	10/18/18	Lab ID:	08-2224 mb
Date Analyzed:	10/08/18	Data File:	100806.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 10/12/18
Date Received: 10/05/18
Project: SOU_1276-001_ 20181005, F&BI 810141

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 810158-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.34	95	61-139
Chloroethane	ug/L (ppb)	50	<1	98	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	96	71-123
Methylene chloride	ug/L (ppb)	50	<5	96	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	95	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	98	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	103	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	98	75-121
Trichloroethene	ug/L (ppb)	50	<1	96	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	96	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	95	95	70-128	0
Chloroethane	ug/L (ppb)	50	97	97	66-149	0
1,1-Dichloroethene	ug/L (ppb)	50	100	99	75-119	1
Methylene chloride	ug/L (ppb)	50	100	100	63-132	0
trans-1,2-Dichloroethene	ug/L (ppb)	50	95	95	76-118	0
1,1-Dichloroethane	ug/L (ppb)	50	98	97	77-119	1
cis-1,2-Dichloroethene	ug/L (ppb)	50	96	96	76-119	0
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	101	100	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	99	98	80-116	1
Trichloroethene	ug/L (ppb)	50	96	95	72-119	1
Tetrachloroethene	ug/L (ppb)	50	94	93	78-109	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

810141

SAMPLE CH(N OF CUSTODY

ME 10-05-18 | Page # 1 of 1 | P04/ VW2

Send Report to Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO. 1276-001

PO #

REMARKS

TURNAROUND TIME
Standard (2 Weeks) (circled)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
MW09-20181005	MW09	—	01 A-D	10/5/18	0835	H2O	4				X					
MW07-20181005	MW07	—	02	|	0907	|	|				X					
MW06-20181005	MW06	—	03	|	0944	|	|				X					

CJ 10/5/18

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Clar Toulin	SoundEarth	10/5/18	1445
Received by: [signature]	Liz Webber-Bruya	F&BI	10/5/18	1445
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 15, 2018

Logan Schumacher, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Mr Schumacher:

Included are the results from the testing of material submitted on October 5, 2018 from the SOU_ 1276-001_ 20181005, F&BI 810142 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
SOU1015R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 5, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies 1276-001 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
810142 -01	MW08-20181005
810142 -02	MW99-20181005

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW08-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_ 1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810142-01
Date Analyzed:	10/08/18	Data File:	100817.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	16
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	2.0
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	390 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	330 ve
Tetrachloroethene	600 ve

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW08-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_ 1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810142-01 1/10
Date Analyzed:	10/10/18	Data File:	101029.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	95	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	16
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	390
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	320
Tetrachloroethene	560

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW99-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_ 1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810142-02
Date Analyzed:	10/08/18	Data File:	100818.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	16
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.9
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	380 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	330 ve
Tetrachloroethene	590 ve

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW99-20181005	Client:	SoundEarth Strategies
Date Received:	10/05/18	Project:	SOU_ 1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	810142-02 1/10
Date Analyzed:	10/10/18	Data File:	101030.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	16
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	380
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	320
Tetrachloroethene	560

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_ 1276-001_ 20181005
Date Extracted:	10/08/18	Lab ID:	08-2224 mb
Date Analyzed:	10/08/18	Data File:	100806.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 10/15/18
Date Received: 10/05/18
Project: SOU_ 1276-001_ 20181005, F&BI 810142

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 810158-04 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.34	95	61-139
Chloroethane	ug/L (ppb)	50	<1	98	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	96	71-123
Methylene chloride	ug/L (ppb)	50	<5	96	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	95	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	98	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	103	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	98	75-121
Trichloroethene	ug/L (ppb)	50	<1	96	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	96	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	95	95	70-128	0
Chloroethane	ug/L (ppb)	50	97	97	66-149	0
1,1-Dichloroethene	ug/L (ppb)	50	100	99	75-119	1
Methylene chloride	ug/L (ppb)	50	100	100	63-132	0
trans-1,2-Dichloroethene	ug/L (ppb)	50	95	95	76-118	0
1,1-Dichloroethane	ug/L (ppb)	50	98	97	77-119	1
cis-1,2-Dichloroethene	ug/L (ppb)	50	96	96	76-119	0
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	101	100	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	99	98	80-116	1
Trichloroethene	ug/L (ppb)	50	96	95	72-119	1
Tetrachloroethene	ug/L (ppb)	50	94	93	78-109	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

B10142

SAMPLE CHAIN OF CUSTODY

ME 10-05-18

Page # 1 of 1 VW1/004

Send Report to Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. 1276-001

PO #

REMARKS

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270	CVOCs by 8260C			Notes
MW08-20181005	MW08	—	01A	10/5/18	1023	H2O	4				X					
MW99-20181005	MW99	—	021	1	1053	1	4				X					

GT 10/5/18

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Clare Tarvin	SoundEarth	10/5/18	1445
Received by:	Liz Webber-Bye	FBI	10/5/18	1445
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 10, 2018

Suzy Stumpf, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Stumpf:

Included are the results from the testing of material submitted on January 2, 2018 from the SOU_0611-017_ 20180102, F&BI 801003 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish
SOU0110R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 2, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180102, F&BI 801003 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801003 -01	MW01-20180102

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW01-20180102	Client:	SoundEarth Strategies
Date Received:	01/02/18	Project:	SOU_0611-017_ 20180102
Date Extracted:	01/05/18	Lab ID:	801003-01 1/500
Date Analyzed:	01/05/18	Data File:	010517.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	98	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<100
Chloroethane	<500
1,1-Dichloroethene	<500
Methylene chloride	<2,500
trans-1,2-Dichloroethene	<500
1,1-Dichloroethane	<500
cis-1,2-Dichloroethene	<500
1,2-Dichloroethane (EDC)	<500
1,1,1-Trichloroethane	<500
Trichloroethene	<500
Tetrachloroethene	8,700

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180102
Date Extracted:	01/05/18	Lab ID:	08-045 mb
Date Analyzed:	01/05/18	Data File:	010516.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	85	117
Toluene-d8	98	91	108
4-Bromofluorobenzene	101	76	126

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 01/10/18
Date Received: 01/02/18
Project: SOU_0611-017_ 20180102, F&BI 801003

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801053-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	89	61-139
Chloroethane	ug/L (ppb)	50	<1	86	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	86	71-123
Methylene chloride	ug/L (ppb)	50	<5	92	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	90	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	93	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	91	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	92	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	91	75-121
Trichloroethene	ug/L (ppb)	50	<1	92	73-122
Tetrachloroethene	ug/L (ppb)	50	<1	94	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	92	91	70-128	1
Chloroethane	ug/L (ppb)	50	89	89	66-149	0
1,1-Dichloroethene	ug/L (ppb)	50	88	88	75-119	0
Methylene chloride	ug/L (ppb)	50	97	97	63-132	0
trans-1,2-Dichloroethene	ug/L (ppb)	50	92	93	76-118	1
1,1-Dichloroethane	ug/L (ppb)	50	93	94	77-119	1
cis-1,2-Dichloroethene	ug/L (ppb)	50	92	92	76-119	0
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	92	93	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	91	93	80-116	2
Trichloroethene	ug/L (ppb)	50	91	93	72-119	2
Tetrachloroethene	ug/L (ppb)	50	91	93	78-109	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801003

SAMPLE CHAIN OF CUSTODY

ME 01/02/18

VW1

Page # 1 of 1

Send Report to **Suzy Stumpf, Grayson Fish**

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS *(signature)*

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #

REMARKS

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270				Notes
MW01-20180102	MW01	–	01A-G	1/2/18	1225	H_2O	7				X					
				LDS 1/2/18												

Samples received at 4 °C

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Logan Schumacher	SES	1/2/18	1535
Received by:		Michael Erdahl	FedEx	↓	↓
Relinquished by:					
Received by:					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
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fbi@isomedia.com
www.friedmanandbruya.com

February 5, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 30, 2018 from the SOU_0611-017_ 20180130, F&BI 801404 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Jonathan Loeffler
SOU0205R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 30, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180130, F&BI 801404 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801404 -01	MW02-20180129
801404 -02	MW03-20180129
801404 -03	MW04-20180129
801404 -04	MW05-20180129

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW02-20180129	Client:	SoundEarth Strategies
Date Received:	01/30/18	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	801404-01
Date Analyzed:	01/31/18	Data File:	013112.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.33
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	7.1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW03-20180129	Client:	SoundEarth Strategies
Date Received:	01/30/18	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	801404-02
Date Analyzed:	01/31/18	Data File:	013113.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW04-20180129	Client:	SoundEarth Strategies
Date Received:	01/30/18	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	801404-03
Date Analyzed:	01/31/18	Data File:	013114.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW05-20180129	Client:	SoundEarth Strategies
Date Received:	01/30/18	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	801404-04
Date Analyzed:	01/31/18	Data File:	013115.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	92	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	200 ve
Chloroethane	<1
1,1-Dichloroethene	2.9
Methylene chloride	<5
trans-1,2-Dichloroethene	27
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1,700 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	2,500 ve
Tetrachloroethene	7,500 ve

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW05-20180129	Client:	SoundEarth Strategies
Date Received:	01/30/18	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	801404-04 1/1000
Date Analyzed:	02/01/18	Data File:	020112.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	240
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	2,600
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	6,600
Tetrachloroethene	35,000

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180130
Date Extracted:	01/31/18	Lab ID:	08-0213 mb
Date Analyzed:	01/31/18	Data File:	013108.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 02/05/18
Date Received: 01/30/18
Project: SOU_0611-017_ 20180130, F&BI 801404

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801398-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	104	36-166
Chloroethane	ug/L (ppb)	50	<1	117	46-160
1,1-Dichloroethene	ug/L (ppb)	50	<1	103	60-136
Methylene chloride	ug/L (ppb)	50	<5	101	67-132
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	102	72-129
1,1-Dichloroethane	ug/L (ppb)	50	<1	100	70-128
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	102	71-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	98	69-133
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	99	60-146
Trichloroethene	ug/L (ppb)	50	<1	98	66-135
Tetrachloroethene	ug/L (ppb)	50	<1	99	10-226

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	106	110	50-154	4
Chloroethane	ug/L (ppb)	50	113	118	58-146	4
1,1-Dichloroethene	ug/L (ppb)	50	112	112	67-136	0
Methylene chloride	ug/L (ppb)	50	105	106	39-148	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	106	107	68-128	1
1,1-Dichloroethane	ug/L (ppb)	50	103	105	79-121	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	105	107	80-123	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	102	104	73-132	2
1,1,1-Trichloroethane	ug/L (ppb)	50	106	107	83-130	1
Trichloroethene	ug/L (ppb)	50	104	105	80-120	1
Tetrachloroethene	ug/L (ppb)	50	101	101	76-121	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801404
LIZ FORBES

SAMPLE CHAIN OF CUSTODY

ME 01/30/18

Page # 1 of 1 UW1

Send Report to ~~Suzy Stumpf~~, Grayson Fish, JON LOEFFLER

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #

REMARKS: CVOCs : PCE, TCE, 1,1-DCE, CIS-1,2-DCE, VC

TURNAROUND TIME
Standard (2 Weeks)
X RUSH 3 day TAT
Rush charges authorized by: LIZ FORBES

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260	SVOCs by 8270				Notes
MW02-20180129	MW02	—	01	1/29/18	1400	WATER	3				X					
MW03-20180129	MW03	—	02	1/29/18	1453	WATER	3				X					
MW04-20180129	MW04	—	03	1/29/18	1601	WATER	3				X					
MW05-20180129	MW05	—	04	1/29/18	1700	WATER	3				X					

Samples received at 4 °C

1/29/18

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	JONATHAN LOEFFLER	SOUNDEARTH	1/30/18	1040
Received by:	DAVID NICACIO	FEDEX	1/30/18	1050
Relinquished by:				
Received by:	Nhan Phan	FEB I	1/30/18	1230

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 13, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801363 project. There are 15 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0213R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801363 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801363 -01	TB04-05
801363 -02	TB04-10
801363 -03	TB04-15
801363 -04	TB05-05
801363 -05	TB05-10
801363 -06	TB05-15
801363 -07	TB06-05
801363 -08	TB06-10
801363 -09	TB06-15

The 8260C matrix spike and matrix spike duplicate failed the relative percent difference for hexachlorobutadiene. The analyte was not detected therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363
Date Extracted: 02/05/18
Date Analyzed: 02/05/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
TB05-05 801363-04	<5	98
Method Blank 08-231 MB	<5	99

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363
Date Extracted: 02/02/18
Date Analyzed: 02/02/18

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
TB05-05 801363-04	190 x	5,100	122
Method Blank 08-271 MB	<50	<250	108

Analysis For Total Metals By EPA Method 6020A

Client ID:	TB04-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	801363-01
Date Analyzed:	02/09/18	Data File:	801363-01.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	1.79
Cadmium	<1
Chromium	12.1
Lead	8.10
Mercury	<1

Analysis For Total Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	NA	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	I8-095 mb
Date Analyzed:	02/09/18	Data File:	I8-095 mb.050
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	TB04-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801363-01 1/5
Date Analyzed:	02/07/18	Data File:	020717.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	103	31	163
Benzo(a)anthracene-d12	106	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.046
Anthracene	<0.01
Fluoranthene	0.058
Pyrene	0.073
Benz(a)anthracene	0.015
Chrysene	0.028
Benzo(a)pyrene	0.022
Benzo(b)fluoranthene	0.031
Benzo(k)fluoranthene	0.012
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-290 mb2 1/5
Date Analyzed:	02/07/18	Data File:	020713.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	105	31	163
Benzo(a)anthracene-d12	108	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB05-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/05/18	Lab ID:	801363-04
Date Analyzed:	02/05/18	Data File:	020511.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/05/18	Lab ID:	08-218 mb2
Date Analyzed:	02/05/18	Data File:	020508.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	89	113
Toluene-d8	102	64	137
4-Bromofluorobenzene	98	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 802022-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	100	71-131

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 802032-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	88	102	73-135	15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	74-139

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020A

Laboratory Code: 802102-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.30	88	87	75-125	1
Cadmium	mg/kg (ppm)	10	<1	88	84	75-125	5
Chromium	mg/kg (ppm)	50	8.24	81	80	75-125	1
Lead	mg/kg (ppm)	50	2.92	82	78	75-125	5
Mercury	mg/kg (ppm	5	<1	79	81	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Cadmium	mg/kg (ppm)	10	106	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Lead	mg/kg (ppm)	50	101	80-120
Mercury	mg/kg (ppm)	5	100	80-120

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 802035-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	88	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	86	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	87	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	86	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	86	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	81	32-124
Fluoranthene	mg/kg (ppm)	0.17	<0.01	87	16-160
Pyrene	mg/kg (ppm)	0.17	<0.01	89	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	91	23-144
Chrysene	mg/kg (ppm)	0.17	<0.01	94	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	91	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	97	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	85	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	87	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	86	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	<0.01	83	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	88	91	58-121	3
Acenaphthylene	mg/kg (ppm)	0.17	85	88	54-121	3
Acenaphthene	mg/kg (ppm)	0.17	87	91	54-123	4
Fluorene	mg/kg (ppm)	0.17	86	89	56-127	3
Phenanthrene	mg/kg (ppm)	0.17	87	90	55-122	3
Anthracene	mg/kg (ppm)	0.17	84	86	50-120	2
Fluoranthene	mg/kg (ppm)	0.17	86	92	54-129	7
Pyrene	mg/kg (ppm)	0.17	84	91	53-127	8
Benz(a)anthracene	mg/kg (ppm)	0.17	90	95	51-115	5
Chrysene	mg/kg (ppm)	0.17	93	97	55-129	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	94	100	56-123	6
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	94	100	54-131	6
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	84	51-118	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	86	86	49-148	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	87	89	50-141	2
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	84	84	52-131	0

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801363

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801364-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	81	69	10-138	16
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	79	10-160	18
Trichloroethene	mg/kg (ppm)	2.5	<0.02	103	86	21-139	18
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	111	95	20-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	47-128
Trichloroethene	mg/kg (ppm)	2.5	91	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

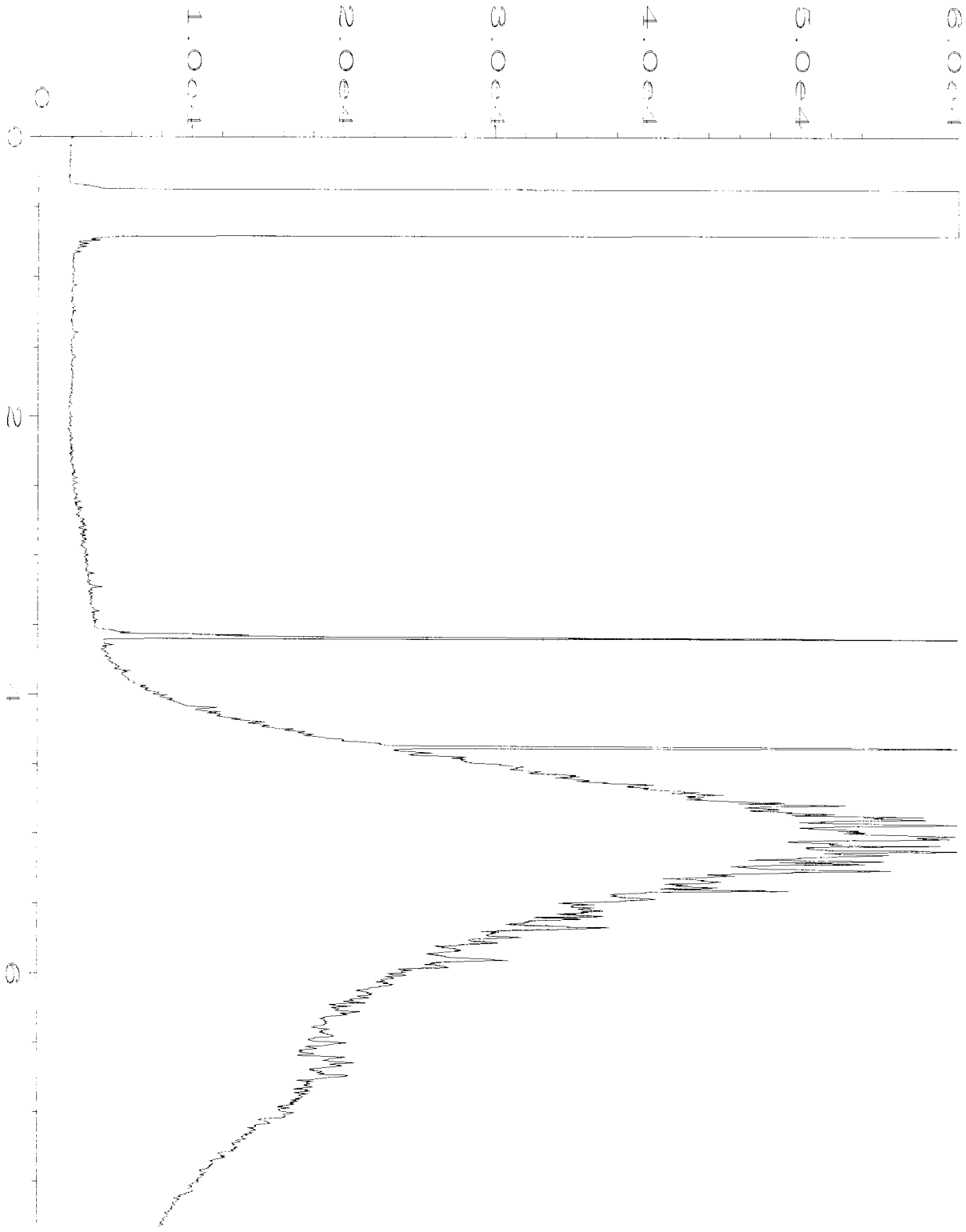
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

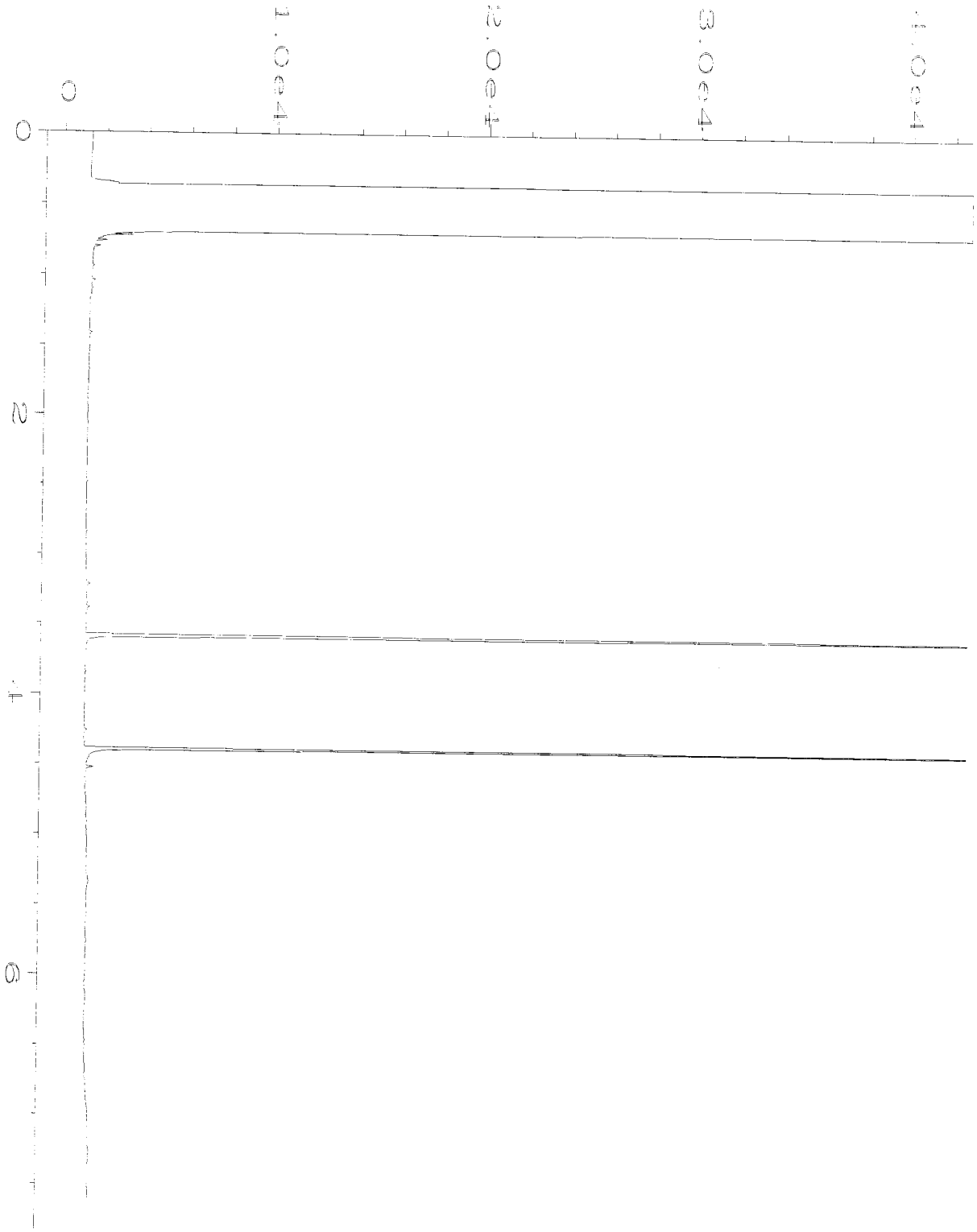
vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



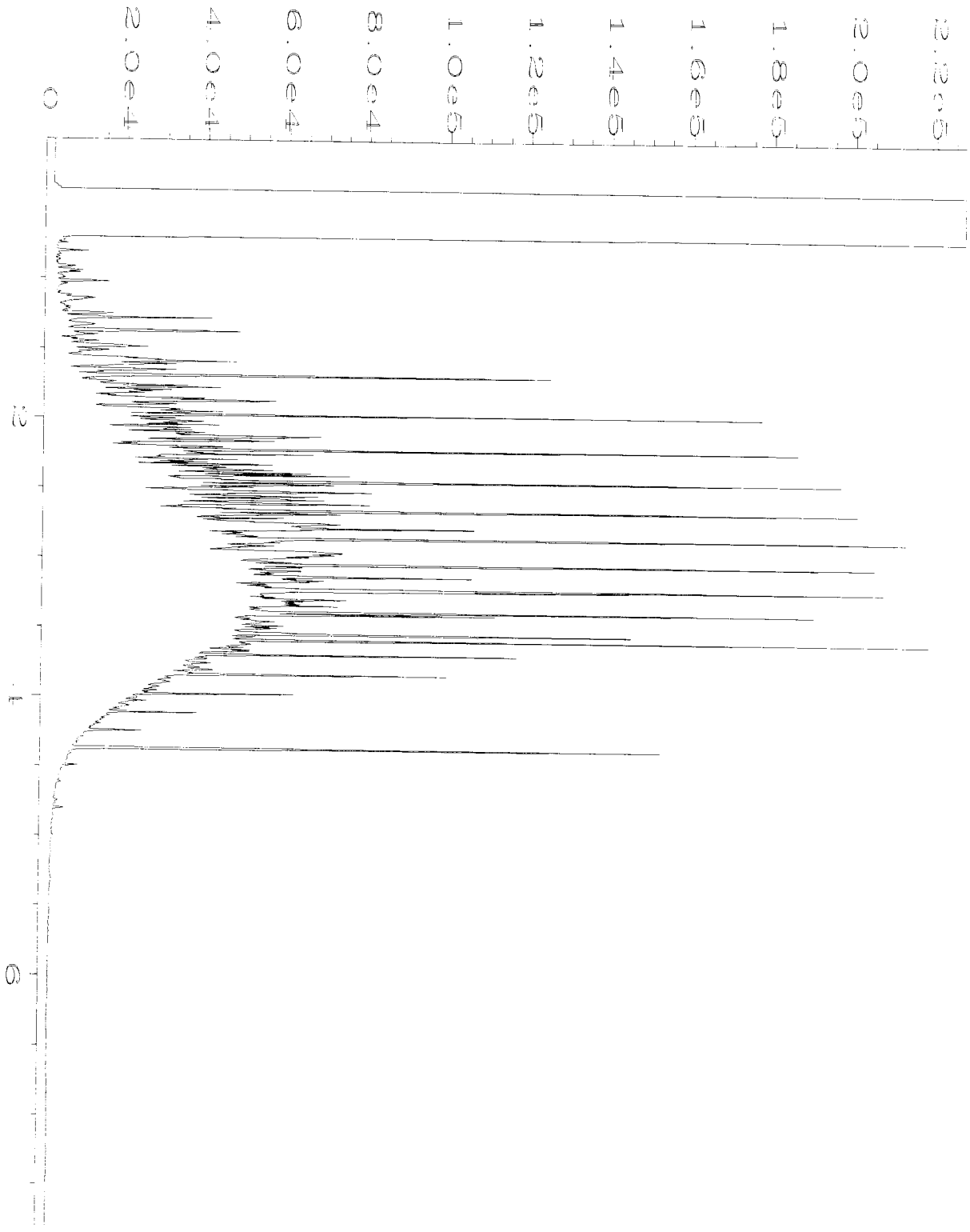
Data File Name : C:\HPCHEM\4\DATA\02-02-18\018F0301.D
Operator : mwdl
Instrument : GC#4
Sample Name : 801363-04
Run Time Bar Code:
Acquired on : 02 Feb 18 02:36 PM
Report Created on: 05 Feb 18 07:54 AM

Page Number : 1
Vial Number : 18
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\02-02-18\006F0301.D
Operator : mwdl
Instrument : GC#4
Sample Name : 08-271 mb
Run Time Bar Code:
Acquired on : 02 Feb 18 12:06 PM
Report Created on: 05 Feb 18 07:54 AM

Page Number : 1
Vial Number : 6
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\4\DATA\02-02-18\005F0501.D
Operator : mwdl
Instrument : GC#4
Sample Name : 1000 Dx 52-185B
Run Time Bar Code:
Acquired on : 02 Feb 18 03:23 PM
Report Created on: 05 Feb 18 07:55 AM

Page Number : 1
Vial Number : 5
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DX.MTH

801363
[redacted]

SAMPLE CHAIN OF CUSTODY

ME 01/26/18
[redacted]

VS2/A03

Send Report to ~~Gary Stumpf~~ Grayson Fish Liz Forbes, Logan Schumacher

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #

REMARKS: ~~Hold all~~ • Std TAT PCE, TCE, 1,1 DCE, cis 1,2 DCE, VC

Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	MTCA 5 Metals	PAHs		Notes
TB04-05	TB04	5	01 A-E	1/25/18	0805	Soil	5						⊗	⊗		~~Per BSF 2/7~~ Run 5-DAY TURN
TB04-10	↓	10	02	↓	0810	↓	↓									
TB04-15	↓	15	03	↓	085	↓	↓									
TB05-05	TB05	5	04	↓	0945	↓	↓	•	•		•					
TB05-10	↓	10	05	↓	0950	↓	↓									• per LS
TB05-15	↓	15	06	↓	0955	↓	↓									2/2/18
TB06-05	TB06	5	07	↓	1110	↓	↓									MS
TB06-10	↓	10	08	↓	1115	↓	↓									
TB06-15	↓	15	09	↓	1120	↓	↓									
~~CFS 1/25/18~~																

Samples received at [illegible] °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SoundEarth	1/26/18	1020
Received by: [signature]	VINH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 6, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_ 0611-017_ 20180126, F&BI 801364 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0206R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_ 0611-017_ 20180126, F&BI 801364 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801364 -01	TB07-05
801364 -02	TB07-10
801364 -03	TB07-12.5
801364 -04	TB07-15
801364 -05	TB07-17.5
801364 -06	TB07-20
801364 -07	TB07-25
801364 -08	TB07-30
801364 -09	TB07-35
801364 -10	TB07-40

Tetrachloroethene was detected in method blank associated with the samples due to carryover from a previous sample. The data were flagged accordingly. No tetrachloroethene was detected in the samples, therefore the data were acceptable.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB07-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_ 0611-017_ 20180126
Date Extracted:	02/02/18	Lab ID:	801364-04
Date Analyzed:	02/02/18	Data File:	020216.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB07-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_ 0611-017_ 20180126
Date Extracted:	02/02/18	Lab ID:	801364-06
Date Analyzed:	02/02/18	Data File:	020217.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_ 0611-017_ 20180126
Date Extracted:	02/02/18	Lab ID:	08-0215 mb2
Date Analyzed:	02/02/18	Data File:	020205.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	0.061 c

Date of Report: 02/06/18
Date Received: 01/26/18
Project: SOU_ 0611-017_ 20180126, F&BI 801364

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	40	39	10-138	3
Chloroethane	mg/kg (ppm)	2.5	<0.5	50	52	10-176	4
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	58	56	10-160	4
Methylene chloride	mg/kg (ppm)	2.5	<0.5	70	69	10-156	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	66	64	14-137	3
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	70	67	19-140	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	71	25-135	4
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	74	72	12-160	3
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	69	67	10-156	3
Trichloroethene	mg/kg (ppm)	2.5	<0.02	73	70	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	0.024	71	67	20-133	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	79	22-139
Chloroethane	mg/kg (ppm)	2.5	84	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	95	47-128
Methylene chloride	mg/kg (ppm)	2.5	99	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	98	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	98	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	98	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	97	62-131
Trichloroethene	mg/kg (ppm)	2.5	98	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	95	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

( ) ~~801364~~
LR ~~Faber~~, Logan S.

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

) VSO/
A0:

Send Report to ~~Suzy Stumpf~~, Grayson Fish
Company SoundEarth Strategies, Inc.
Address 2811 Fairview Avenue E, Suite 2000
City, State, ZIP Seattle, Washington 98102
Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS Hold AM
* CVOCs = (PCE, TCE, 1,1-DCE, Cis-1,2-DCE, VC)
● = Results by 8 AM on Mon 2/5/18

Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH B, 8am 2/5/18
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* (VOCs by 8260	SVOCs by 8270				Notes
TB07-05	TB07	5	01 A-E	1/26/18	0810	Soil	5									
TB07-10	↓	10	02	↓	0815	↓	↓									● -per LS
TB07-12.5		12.5	03		0820											2/2/18
TB07-15		15	04		0825						●					AA
TB07-17.5		17.5	05		0830											
TB07-20		20	06		0835						●					
TB07-25		25	07		0840											
TB07-30		30	08		0845											
TB07-35		35	09		0850											Samples received at 3 °C
TB07-40	↓	40	10	↓	0900	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SoundEarth	1/26/18	1020
Received by: [signature]	VINH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 12, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801364 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Logan Schumacher
SOU0212R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_ 0611-017_ 20180126, F&BI 801364 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801364 -01	TB07-05
801364 -02	TB07-10
801364 -03	TB07-12.5
801364 -04	TB07-15
801364 -05	TB07-17.5
801364 -06	TB07-20
801364 -07	TB07-25
801364 -08	TB07-30
801364 -09	TB07-35
801364 -10	TB07-40

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB07-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801364-01
Date Analyzed:	02/07/18	Data File:	020712.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	95	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB07-30	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801364-08
Date Analyzed:	02/07/18	Data File:	020718.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	62	142
Toluene-d8	95	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-0283 mb
Date Analyzed:	02/07/18	Data File:	020710.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	95	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/12/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801364

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801364-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	81	69	10-138	16
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	79	10-160	18
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	102	85	25-135	18
Trichloroethene	mg/kg (ppm)	2.5	<0.02	103	86	21-139	18
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	111	95	20-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	91	72-113
Trichloroethene	mg/kg (ppm)	2.5	91	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogen eity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

( ) 80364 ~~[illegible]~~, Logan & ME 01/26/18) V3o/ A0:

SAMPLE CHAIN OF CUSTODY

Send Report to: ~~[illegible]~~, Grayson Fish

Company: SoundEarth Strategies, Inc.

Address: 2811 Fairview Avenue E, Suite 2000

City, State, ZIP: Seattle, Washington 98102

Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature): [signature]

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO#:

REMARKS: Hold All
* CVOCs = (PCE, TCE, 1,1-DCE, cis-1,2-DCE, VC)
● = Results by 8 AM on Mon. 2/5/18

Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH By 8am 2/5/18
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* CVOCs by 8260	SVOCs by 8270				Notes
TB07-05	TB07	5	01 A-E	1/26/18	0810	Soil	5				⊗					① per GBF 2/7
TB07-10	↓	10	02	↓	0815	↓	↓									● per LS
TB07-12.5		12.5	03		0820											2/2/18 ME
TB07-15		15	04		0825											
TB07-17.5		17.5	05		0830						●					
TB07-20		20	06		0835						●					
TB07-25		25	07		0840											
TB07-30		30	08		0845						⊗					
TB07-35		35	09		0850											Samples received at 3 °C
TB07-40	↓	40	10	↓	0900	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schumacher	SoundEarth	1/26/18	1020
Received by: [signature]	VINH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 12, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801365 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Logan Schumacher
SOU0212R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801365 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801365 -01	B10-2.5
801365 -02	B10-05
801365 -03	B10-10
801365 -04	B10-15
801365 -05	B10-20

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B10-2.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801365-01
Date Analyzed:	02/07/18	Data File:	020719.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	94	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-0283 mb
Date Analyzed:	02/07/18	Data File:	020710.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	62	142
Toluene-d8	95	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/12/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801365

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801364-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	81	69	10-138	16
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	95	79	10-160	18
Trichloroethene	mg/kg (ppm)	2.5	<0.02	103	86	21-139	18
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	111	95	20-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	82	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	89	47-128
Trichloroethene	mg/kg (ppm)	2.5	91	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	101	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Liz Fabs 801365 [redacted]

SAMPLE CHAIN OF CUSTODY

ME 01/26/18 [redacted] VS2/A02

Page # 1 of 1

Send Report to ~~Suzy Stumpf,~~ Grayson Fish, Logan S.

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature) [signature]

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS ~~Hold all, contact PM~~

CVOCs = PCE, TCE, DCE, VC

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260c	SVOCs by 8270	MTCA 5 Metals			Notes
B10-2.5	B10	2.5	01 A-E	1/26/18	0825	Soil	5				⊗					RUN PER EBF 2/7 STANDARD 5-DAY
B10-05	↓	05	02		0831	↓	↓									
B10-10		10	03		0835											
B10-15		15	04		0840											
B10-20		20	05		0845											

GCF 1/26/18

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Grayson Fish	SoundEarth	1/26/18	1020
Received by: [signature]	VINH	FBI	1/26/18	1020
Relinquished by:				
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 1, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801366 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Logan Schumacher
SOU0201R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801366 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801366 -01	B09-05
801366 -02	B09-10
801366 -03	B09-12.5
801366 -04	B09-15
801366 -05	B09-17.5
801366 -06	B09-20
801366 -07	B09-25
801366 -08	B09-30
801366 -09	B07-05
801366 -10	B07-10
801366 -11	B07-12.5
801366 -12	B07-15
801366 -13	B07-17.5
801366 -14	B07-20
801366 -15	B07-25
801366 -16	B07-30
801366 -17	B08-05
801366 -18	B08-10
801366 -19	B08-12.5
801366 -20	B08-15
801366 -21	B08-17.5
801366 -22	B08-20
801366 -23	B08-25
801366 -24	B08-30
801366 -25	B08-35
801366 -26	B08-45
801366 -27	B08-50

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B09-17.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-05
Date Analyzed:	01/29/18	Data File:	012918.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B09-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-06
Date Analyzed:	01/29/18	Data File:	012919.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B07-12.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-11
Date Analyzed:	01/29/18	Data File:	012920.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B07-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-14
Date Analyzed:	01/29/18	Data File:	012921.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B08-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-20
Date Analyzed:	01/29/18	Data File:	012922.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B08-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801366-22
Date Analyzed:	01/29/18	Data File:	012923.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	08-0209 mb
Date Analyzed:	01/29/18	Data File:	012908.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/01/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801366

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	67	61	10-138	9
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	84	10-160	6
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	99	98	25-135	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	99	99	21-139	0
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	97	98	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	93	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	96	72-113
Trichloroethene	mg/kg (ppm)	2.5	95	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	94	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801366

Liz Forbes

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

VSS 3/404

Send Report to Suzy Stumpf, Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS
cVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE, and VC

Page # 1 of 3

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	cVOCs by 8260C	SVOCs by 8270					Notes
								ANALYSES REQUESTED									
B09-05	B09	5	01AE	1/25/18	0820	Soil	5										
B09-10		10	02		0825												
B09-12.5		12.5	03		0835												
B09-15		15	04		0840												
B09-17.5		17.5	05		0845						X						
B09-20		20	06		0850						X						
B09-25		25	07		0855												
B09-30		30	08		0900												
B07-05	B07	5	09		1025												
B07-10		10	10		1030												

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Grayson Fish	SoundEarth	1/25/18	1020
Received by:	VWH	EBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

801366

Liz Fobes Logan Schumacher

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

VSS/A04

Send Report to: ~~Suzy Stumpf~~, Grayson Fish

Company: SoundEarth Strategies, Inc.

Address: 2811 Fairview Avenue E, Suite 2000

City, State, ZIP: Seattle, Washington 98102

Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature):

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #:

REMARKS: * CVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE and VC

TURNAROUND TIME: Standard (2 Weeks) RUSH 3 DAY

Rush charges authorized by:

SAMPLE DISPOSAL: Dispose after 30 days / Return samples / Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* VOCs by 8260C	SVOCs by 8270				Notes
B07-12.5	B07	12.5	11	1/25/18	1035	Soil	5				X					
B07-15		15	12		1100											
B07-17.5		17.5	13		1105											
B07-20		20	14		1110						X					
B07-25		25	15		1115											
B07-30		30	16		1120											
B08-05	B08	5	17		1335											
B08-10		10	18		1345											
B08-12.5		12.5	19		1355											
B08-15		15	20		1400						X					

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		SoundEarth	1/25/18	1500
Received by:	JNH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

Liz Forbes 801366

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

VSS/A04

Send Report to Suzy Stumpf, Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS
* cVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE and VC

Page # 3 of 3

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	VOCs by 8260 *	SVOCs by 8270				Notes
B08-12.5	B08	12.5	21	1/25/18	1405	Soil	5									
B08-20		20	22		1410						X					
B08-25		25	23		1420											
B08-30		30	24		1425											
B08-35		35	25		1430											
B08-45		45	26		1505											
B08-50		50	27		1530											
									Send 1/29/18							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by:	VIN LY	EBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 13, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801366 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Grayson Fish, Logan Schumacher
SOU0213R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801366 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801366 -01	B09-05
801366 -02	B09-10
801366 -03	B09-12.5
801366 -04	B09-15
801366 -05	B09-17.5
801366 -06	B09-20
801366 -07	B09-25
801366 -08	B09-30
801366 -09	B07-05
801366 -10	B07-10
801366 -11	B07-12.5
801366 -12	B07-15
801366 -13	B07-17.5
801366 -14	B07-20
801366 -15	B07-25
801366 -16	B07-30
801366 -17	B08-05
801366 -18	B08-10
801366 -19	B08-12.5
801366 -20	B08-15
801366 -21	B08-17.5
801366 -22	B08-20
801366 -23	B08-25
801366 -24	B08-30
801366 -25	B08-35
801366 -26	B08-45
801366 -27	B08-50

All quality control requirements were acceptable.

Analysis For Total Metals By EPA Method 6020A

Client ID:	B09-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	801366-01
Date Analyzed:	02/09/18	Data File:	801366-01.071
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	3.17
Cadmium	<1
Chromium	26.8
Lead	4.06
Mercury	<1

Analysis For Total Metals By EPA Method 6020A

Client ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/09/18	Lab ID:	I8-095 mb
Date Analyzed:	02/09/18	Data File:	I8-095 mb.050
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	<1
Cadmium	<1
Chromium	<1
Lead	<1
Mercury	<1

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	B09-05	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	801366-01 1/5
Date Analyzed:	02/07/18	Data File:	020716.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	99	31	163
Benzo(a)anthracene-d12	105	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/07/18	Lab ID:	08-290 mb2 1/5
Date Analyzed:	02/07/18	Data File:	020713.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	105	31	163
Benzo(a)anthracene-d12	108	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801366

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020A

Laboratory Code: 802102-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	1.30	88	87	75-125	1
Cadmium	mg/kg (ppm)	10	<1	88	84	75-125	5
Chromium	mg/kg (ppm)	50	8.24	81	80	75-125	1
Lead	mg/kg (ppm)	50	2.92	82	78	75-125	5
Mercury	mg/kg (ppm	5	<1	79	81	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	100	80-120
Cadmium	mg/kg (ppm)	10	106	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Lead	mg/kg (ppm)	50	101	80-120
Mercury	mg/kg (ppm)	5	100	80-120

Date of Report: 02/13/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801366

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270D SIM

Laboratory Code: 802035-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	88	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	86	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	87	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	86	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	86	34-141
Anthracene	mg/kg (ppm)	0.17	<0.01	81	32-124
Fluoranthene	mg/kg (ppm)	0.17	<0.01	87	16-160
Pyrene	mg/kg (ppm)	0.17	<0.01	89	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	91	23-144
Chrysene	mg/kg (ppm)	0.17	<0.01	94	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	91	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	97	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	85	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	87	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	86	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	<0.01	83	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	88	91	58-121	3
Acenaphthylene	mg/kg (ppm)	0.17	85	88	54-121	3
Acenaphthene	mg/kg (ppm)	0.17	87	91	54-123	4
Fluorene	mg/kg (ppm)	0.17	86	89	56-127	3
Phenanthrene	mg/kg (ppm)	0.17	87	90	55-122	3
Anthracene	mg/kg (ppm)	0.17	84	86	50-120	2
Fluoranthene	mg/kg (ppm)	0.17	86	92	54-129	7
Pyrene	mg/kg (ppm)	0.17	84	91	53-127	8
Benz(a)anthracene	mg/kg (ppm)	0.17	90	95	51-115	5
Chrysene	mg/kg (ppm)	0.17	93	97	55-129	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	94	100	56-123	6
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	94	100	54-131	6
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	84	51-118	2
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	86	86	49-148	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	87	89	50-141	2
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	84	84	52-131	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801366

Liz Forbes

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

VSS/A04

Page # 1 of 3

Send Report to Suzy Stumpf, Grayson Fish, Logan S.

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS

cVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE, and VC

TURNAROUND TIME

Standard (2 Weeks)

RUSH 3 day

Rush charges authorized by:

SAMPLE DISPOSAL

Dispose after 30 days

Return samples

Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	cVOCs by 8260	SVOCs by 8270	MTCA-5 Metals	PAHs		Notes
B09-05	B09	5	01AE	1/25/18	0820	Soil	5						X	X		
B09-10		10	02		0825											RUN PER EDF 1/17 5-DAY TURN
B09-12.5		12.5	03		0835											
B09-15		15	04		0840											
B09-17.5		17.5	05		0845											
B09-20		20	06		0850						X					
B09-25		25	07		0855						X					
B09-30		30	08		0900											
B07-05	B07	5	09		1025											
B07-10		10	10		1030											

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Grayson Fish	SoundEarth	1/25/18	1020
Received by:	VWH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

801366
Liz Fobes Logan Schumacher

SAMPLE CHAIN OF CUSTODY ME 01/26/18

VSS/A04

Send Report to ~~Suzy Stumpf~~ Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS
* cVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE and VC

Page # 2 of 3

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 days
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	cVOCs by 8260C *	SVOCs by 8270				Notes
B07-12.5	B07	12.5	11	1/25/18	1035	Soil	5				X					
B07-15		15	12		1100											
B07-17.5		17.5	13		1105											
B07-20		20	14		1110						X					
B07-25		25	15		1115											
B07-30		30	16		1120											
B08-05	B08	5	17		1335											
B08-10		10	18		1345											
B08-12.5		12.5	19		1353											
B08-15		15	20		1400						X					

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		SoundEarth	1/26/18	1030
Received by:	VNH	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

Liz Forbes 801366

SAMPLE CHAIN OF CUSTODY

ME 01/26/18

VSS/A04

Page # 3 of 3

Send Report to ~~Suzy Stumpf~~, Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS
* CVOCs = PCE, TCE, 1,1-DCE, cis-1,2-DCE and VC

TURNAROUND TIME
Standard (2 Weeks)
RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260C *	SVOCs by 8270				Notes
B08-17.5	B08	17.5	21	1/25/18	1405	Soil	5									
B08-20		20	22		1410						X					
B08-25		25	23		1420											
B08-30		30	24		1425											
B08-35		35	25		1430											
B08-45		45	26		1505											
B08-50		50	27		1530											
									Cancel 1/25/18							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		SoundEarth	1/26/18	1000
Received by:	VIN LY	FBI	1/26/18	10:20
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 1, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801370 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0201R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801370 -01	B06-05
801370 -02	B06-10
801370 -03	B06-12.5
801370 -04	B06-15
801370 -05	B06-17.5
801370 -06	B06-20
801370 -07	B06-25
801370 -08	B06-30
801370 -09	B06-35
801370 -10	B06-40
801370 -11	B06-45
801370 -12	B06-50
801370 -13	B11-10
801370 -14	B11-15
801370 -15	B11-20
801370 -16	B11-25
801370 -17	B06-B11-Comp

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801370-04
Date Analyzed:	01/29/18	Data File:	012924.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.47
Trichloroethene	0.19
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801370-06
Date Analyzed:	01/29/18	Data File:	012914.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	142
Toluene-d8	103	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	08-0209 mb
Date Analyzed:	01/29/18	Data File:	012908.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/01/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	67	61	10-138	9
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	84	10-160	6
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	99	98	25-135	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	99	99	21-139	0
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	97	98	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	93	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	96	72-113
Trichloroethene	mg/kg (ppm)	2.5	95	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	94	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

801370

SAMPLE CHAIN OF CUSTODY ME 01/26/18

Page # 1 of 2

Send Report to ~~Suzy Stumpf,~~ Grayson Fish Liz Forbes, Logan S

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS * CVOCs = (PCE, TCE, 1,1-DCE, cis-1,2-DCE, VC)

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

ANALYSES REQUESTED

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	CVOCs by 8260 *	SVOCs by 8270				Notes
B06-05	B06	5	01 A-E	1/26/18	0945	Soil	5									
B06-10	↓	10	02	↓	0950	↓	↓									
B06-12.5		12.5	03		0955						⊗					RUN PER EBF 1/31
B06-15		15	04		1005						X					
B06-17.5		17.5	05		1010											
B06-20		20	06		1015						X					
B06-25		25	07		1030											
B06-30		30	08		1040											Samples received at 2 °C
B06-35		35	09		1050											
B06-40	↓	40	10	↓	1105	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	[signature]	Logan Schwenk	SoundEarth	1/26/18	1425
Received by:	[signature]	VINH	FBI	1/26/18	1425
Relinquished by:					
Received by:					

C\COC.DOC

801370
LC Forbes, Logan S

SAMPLE CHAIN OF CUSTODY ME 1/26/18

Page # 2 of 2 1/04/18

Send Report to ~~Suzy Stumpf~~ Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS See Page 1 for *

TURNAROUND TIME
Standard (2 Weeks)
RUSH 1 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* VOCs by 8260	SVOCs by 8270					Notes
B06-45	B06	45	11	1/26/18	1115	Soil	5										
B06-50	↓	50	12		1120						X						RUN PER EDF 1131
B11-10	B11	10	13		1250												
B11-15		15	14		1255												
B11-20		20	15		1305												
B11-25		25	16		1310		1										
B06-B11-COMP	B06-B11		17	1/26/18	1330		1										
							EDF	1/26/18									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SoundEarth	1/26/18	1425
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

MS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 7, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801370 project. There are 8 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher
SOU0207R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801370 -01	B06-05
801370 -02	B06-10
801370 -03	B06-12.5
801370 -04	B06-15
801370 -05	B06-17.5
801370 -06	B06-20
801370 -07	B06-25
801370 -08	B06-30
801370 -09	B06-35
801370 -10	B06-40
801370 -11	B06-45
801370 -12	B06-50
801370 -13	B11-10
801370 -14	B11-15
801370 -15	B11-20
801370 -16	B11-25
801370 -17	B06-B11-Comp

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-12.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801370-03
Date Analyzed:	02/02/18	Data File:	020221.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.15
Trichloroethene	0.097
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B06-50	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801370-12
Date Analyzed:	02/02/18	Data File:	020222.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	B11-15	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/02/18	Lab ID:	801370-14
Date Analyzed:	02/02/18	Data File:	020218.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	101	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm) Dry Weight
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	ClientID
Date Received:	Not Applicable	Project:	ProjectID
Date Extracted:	02/02/18	Lab ID:	08-0215 mb2
Date Analyzed:	02/02/18 10:35	Data File:	020205.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm) Dry Weight
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	08-0215 mb
Date Analyzed:	02/01/18	Data File:	020121.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/07/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	40	39	10-138	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	58	56	10-160	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	71	25-135	4
Trichloroethene	mg/kg (ppm)	2.5	<0.02	73	70	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	0.024	71	67	20-133	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	79	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	95	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
Trichloroethene	mg/kg (ppm)	2.5	98	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	95	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

80137O
LL Forbes, Logan S

SAMPLE CHAIN OF CUSTODY

MTG 01/26/18

Page # 1 of 2

Send Report to: ~~Suzy Stumpf~~, Grayson Fish

Company: SoundEarth Strategies, Inc.

Address: 2811 Fairview Avenue E, Suite 2000

City, State, ZIP: Seattle, Washington 98102

Phone #: 206-306-1900 Fax #: 206-306-1907

SAMPLERS (signature):

PROJECT NAME/NO.: Rainier Mall / 0611-017

PO #:

REMARKS: * CVOCs = (PCE, TCE, 1,1-DCE, cis-1,2-DCE, VC)

TURNAROUND TIME
Standard (2 Weeks)
(RUSH) 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* CVOCs by 8260	SVOCs by 8270				Notes
B06-05	B06	5	01	1/26/18	0945	Soil	5									
B06-10		10	02		0950											
B06-12.5		12.5	03		0955						X					RUN PER EDF 1/31
B06-15		15	04		1005						X					
B06-17.5		17.5	05		1010											
B06-20		20	06		1015						X					
B06-25		25	07		1030											
B06-30		30	08		1040											Samples received at 2 °C
B06-35		35	09		1050											
B06-40	↓	40	10	↓	1105	↓	↓									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schumacher	SoundEarth	1/26/18	1428
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

COC.DOC

801370
La Fortuna, Logan S

SAMPLE CHAIN OF CUSTODY MO 1/26/18

Page # 2 of 2 1/04/18

Send Report to ~~Stacy Stumbf~~ Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E, Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS See Page 1 for *

TURNAROUND TIME
Standard (2 Weeks)
RUSH 1 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* VOCs by 8260	SVOCs by 8270				Notes
B06-45	B06	45	11	1/26/18	1115	Soil	5									
B06-50	↓	50	12		1120						X					RUN PER EGF 1/31
B11-10	B11	10	13		1250											
B11-15		15	14		1255						X					
B11-20		20	15		1305											
B11-25		25	16		1310											
B06-B11-COMP	B06-B11		17	1/26/18	1330		1									
							EGF	1/26/18								

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Sakamachi	SoundEarth	1/26/18	1425
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

MS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 1, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801371 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0201R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801371 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801371 -01	TB08-05
801371 -02	TB08-10
801371 -03	TB08-12.5
801371 -04	TB08-15
801371 -05	TB08-17.5
801371 -06	TB08-20
801371 -07	TB08-25
801371 -08	TB08-30
801371 -09	TB08-35
801371 -10	TB08-40

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB08-12.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801371-03
Date Analyzed:	01/29/18	Data File:	012915.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.21
Trichloroethene	0.55
Tetrachloroethene	0.46

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB08-17.5	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801371-05
Date Analyzed:	01/29/18	Data File:	012917.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	89	113
Toluene-d8	101	64	137
4-Bromofluorobenzene	100	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.45
Trichloroethene	1.7
Tetrachloroethene	24

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB08-25	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	801371-07
Date Analyzed:	01/29/18	Data File:	012916.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	89	113
Toluene-d8	100	64	137
4-Bromofluorobenzene	99	81	119

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	01/29/18	Lab ID:	08-0209 mb
Date Analyzed:	01/29/18	Data File:	012908.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/01/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801371

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	67	61	10-138	9
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	84	10-160	6
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	99	98	25-135	1
Trichloroethene	mg/kg (ppm)	2.5	<0.02	99	99	21-139	0
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	97	98	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	77	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	93	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	96	72-113
Trichloroethene	mg/kg (ppm)	2.5	95	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	94	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

( ) 801371 [redacted]

LR Forbes, [redacted] Logan S

SAMPLE CHA OF CUSTODY ME 01/26/18) VS3/A03

Send Report to ~~Sara Stumpf~~, Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS * cVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE + VC) ⓧ Run per EBF 2/1

[redacted] Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* cVOCs by 8260	SVOCs by 8270				Notes
TB08-05	TB08	5	01 A-E	1/26/18	1100	Soil	5									
TB08-10	↓	10	02	↓	1105	↓	↓				ⓧ					
TB08-12.5		12.5	03		1110						X					
TB08-15		15	04		1115											
TB08-17.5		17.5	05		1120						X					
TB08-20		20	06		1125						ⓧ					
TB08-25		25	07		1130						X					
TB08-30		30	08		1135											
TB08-35		35	09		1145											Samples received at 2 °C
TB08-40	↓	40	10	↓	1155	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Logan Schmuler	SoundEarth	1/26/18	1423
Received by:	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

FORMS\COC\COC.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

February 7, 2018

Liz Forbes, Project Manager
SoundEarth Strategies
2811 Fairview Ave. East, Suite 2000
Seattle, WA 98102

Dear Ms Forbes:

Included are the additional results from the testing of material submitted on January 26, 2018 from the SOU_0611-017_ 20180126, F&BI 801371 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Logan Schumacher, Grayson Fish
SOU0207R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on January 26, 2018 by Friedman & Bruya, Inc. from the SoundEarth Strategies SOU_0611-017_ 20180126, F&BI 801371 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	SoundEarth Strategies
801371 -01	TB08-05
801371 -02	TB08-10
801371 -03	TB08-12.5
801371 -04	TB08-15
801371 -05	TB08-17.5
801371 -06	TB08-20
801371 -07	TB08-25
801371 -08	TB08-30
801371 -09	TB08-35
801371 -10	TB08-40

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB08-10	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801371-02
Date Analyzed:	02/02/18	Data File:	020223.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	TB08-20	Client:	SoundEarth Strategies
Date Received:	01/26/18	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	801371-06
Date Analyzed:	02/01/18	Data File:	020127.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	142
Toluene-d8	102	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	0.064
Trichloroethene	0.17
Tetrachloroethene	2.0

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	SoundEarth Strategies
Date Received:	Not Applicable	Project:	SOU_0611-017_ 20180126
Date Extracted:	02/01/18	Lab ID:	08-0215 mb
Date Analyzed:	02/01/18	Data File:	020121.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	142
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 02/07/18
Date Received: 01/26/18
Project: SOU_0611-017_ 20180126, F&BI 801371

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 801370-12 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	40	39	10-138	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	58	56	10-160	4
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	74	71	25-135	4
Trichloroethene	mg/kg (ppm)	2.5	<0.02	73	70	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	0.024	71	67	20-133	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	79	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	95	47-128
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
Trichloroethene	mg/kg (ppm)	2.5	98	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	95	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

( ) 801371
[redacted]
Lz Forbes, [redacted] Logan S

SAMPLE CHAIN OF CUSTODY

ME 01/26/18) VS3/A03

Send Report to ~~[illegible]~~, Grayson Fish

Company SoundEarth Strategies, Inc.

Address 2811 Fairview Avenue E. Suite 2000

City, State, ZIP Seattle, Washington 98102

Phone # 206-306-1900 Fax # 206-306-1907

SAMPLERS (signature)

PROJECT NAME/NO. Rainier Mall / 0611-017

PO #

REMARKS * cVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE + VC) ⊗ Run per EBF 2/1

[redacted] Page # 1 of 1

TURNAROUND TIME
Standard (2 Weeks)
RUSH 3 day
Rush charges authorized by:

SAMPLE DISPOSAL
Dispose after 30 days
Return samples
Will call with instructions

Sample ID	Sample Location	Sample Depth	Lab ID	Date Sampled	Time Sampled	Matrix	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX by 8021B	* cVOCs by 8260	SVOCs by 8270				Notes
TB08-05	TB08	5	01 A-E	1/26/18	1100	Soil	5									
TB08-10	↓	10	02	↓	1105	↓	↓				⊗					
TB08-12.5		12.5	03		1110						X					
TB08-15		15	04		1115											
TB08-17.5		17.5	05		1120						X					
TB08-20		20	06		1125						⊗					
TB08-25		25	07		1130						X					
TB08-30		30	08		1135											
TB08-35		35	09		1145											Samples received at 2 °C
TB08-40	↓	40	10	↓	1155	↓	↓									

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044
FORMS\COC\COC.DOC

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Logan Schmuller	SoundEarth	1/26/18	1423
Received by: [signature]	VINH	FBI	1/26/18	1425
Relinquished by:				
Received by:				

Libby Environmental, Inc.

3322 South Bay Road NE • Olympia, WA 98506-2957

March 9, 2020

John Funderbuck
Urban Environmental Partners, LLC
2324 First Avenue, Suite 203
Seattle, WA 98121

Dear Mr. Funderbuck:

Please find enclosed the analytical data report for the Rainier Mall Project located in Seattle, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of within 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

3322 South Bay Road NE Funderburk Ph: 360-352-2110
Olympia, WA 98506 John Fax: 360-352-4154

Client: Urban Environmental Partners / Brian Diton Environmental
Address: 2324 First Avenue Suite 203
City: Seattle State: WA Zip: 98121
Phone: 206-229-6804 Fax:
Client Project #

Date: 3/4/20 Page: 1 of 1
Project Manager: Brian Diton John Funderburk
Project Name: Rainier Mall
Location: 4208 Rainier Ave S City, State: Seattle, WA
Collector: Brian Diton Date of Collection: 3/4/20
Email: johnf@uepconsulting.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals			Field Notes
1	UB12-5	5	920	S		X	X			X										
2	UB12-14	14	935	S		X	X			X										
3	UB12-22	22	1000	S		X	X			X										
4	~~UB~~ UB12-37	37	1045	S		X	X			X										
5	UB12-46	46	1140	S		X	X			X										
6	UB16-6	6	1325	S		X	X			X										LAST
7	UB16-14	14	1340	S		X	X			X										
8	UB16-29	29	1410	S		X	X			X										Priority
9	UB16-29.5	29.5	1415	S		X	X			X										HOLD
10	MW16-20200304	~28'	340	W		X	X			X										
11																				
12																				
13																				
14																				
15																				
16																				
17																				

Relinquished by:	Date / Time	Received by:	Date / Time
	3-4-20 1705	3/4/20	1705
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks: ML

TAT: 24HR 48HR 5-DAY

LEGAL ACTION CLAUSE: *In the event of default of payment and/or failure to pay, Client agrees to pay the costs of collection including court costs and reasonable attorney fees to be determined by a cout of law.*

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB12-5	UB12-14	UB12-22	UB12-37	UB12-46
Date Sampled	Reporting	N/A	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd	nd	nd	nd	nd
Chloromethane	0.06	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	0.34	nd	nd	nd
Bromomethane	0.09	nd	nd	nd	nd	nd	nd
Chloroethane	0.06	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.02	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.03	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd	2.1	0.17	nd	nd
Chloroform	0.02	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.03	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	0.29	0.33	nd	nd
1,2-Dichloropropane	0.02	nd	nd	nd	nd	nd	nd
Dibromomethane	0.04	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.02	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	17 E	0.16	0.038
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.03	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.02	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.02	nd	nd	nd	nd	nd	nd

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB12-5	UB12-14	UB12-22	UB12-37	UB12-46
Date Sampled	Reporting	N/A	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020	3/4/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Propylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	0.03	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd	nd	nd	nd	nd
Naphthalenes	0.10	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		77	87	88	86	83	83
1,2-Dichloroethane-d4		93	106	109	108	103	100
Toluene-d8		118	87	86	84	85	84
4-Bromofluorobenzene		68	84	96	96	94	95

"E" Indicates reported result is an estimate because it exceeded the calibration range.
"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB12-46 Dup	UB16-6	UB16-14	UB16-29
Date Sampled	Reporting	N/A	3/4/2020	3/4/2020	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020	3/4/2020	3/4/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd	nd	nd
Chloromethane	0.06	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd
Bromomethane	0.09	nd	nd	nd	nd
Chloroethane	0.06	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd
Methylene chloride	0.02	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd	nd	nd
1,1-Dichloroethane	0.03	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd	nd	nd
Chloroform	0.02	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd	nd	nd
Carbon tetrachloride	0.03	nd	nd	nd	nd
1,1-Dichloropropene	0.02	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd
1,2-Dichloropropane	0.02	nd	nd	nd	nd
Dibromomethane	0.04	nd	nd	nd	nd
Bromodichloromethane	0.02	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	0.098	nd	0.028	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd
Dibromochloromethane	0.03	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd	nd	nd
Chlorobenzene	0.02	nd	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd
Styrene	0.02	nd	nd	nd	nd

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Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB12-46 Dup	UB16-6	UB16-14	UB16-29
Date Sampled	Reporting	N/A	3/4/2020	3/4/2020	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020	3/4/2020	3/4/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd
Bromobenzene	0.03	nd	nd	nd	nd
n-Propylbenzene	0.03	nd	nd	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd	nd	nd
2-Chlorotoluene	0.03	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd	nd	nd
4-Chlorotoluene	0.03	nd	nd	nd	nd
tert-Butylbenzene	0.03	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd	nd	nd
sec-Butylbenzene	0.03	nd	nd	nd	nd
p-Isopropyltoluene	0.03	nd	nd	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd	nd	nd
n-Butylbenzene	0.03	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd	nd	nd
Naphthalenes	0.10	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd	nd	nd
Surrogate Recovery					
Dibromofluoromethane		87	82	82	85
1,2-Dichloroethane-d4		104	107	102	107
Toluene-d8		85	85	86	82
4-Bromofluorobenzene		92	89	115	93

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
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Libby Project # L200304-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB16-6

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	0.25	0.20	0.30	80	120	40.0	65-135	R
Chloromethane	0.25	0.24	0.21	96	84	13.3	65-135	
Vinyl chloride	0.25	0.19	0.22	76	88	14.6	65-135	
Bromomethane	0.25	0.21	0.24	84	96	13.3	65-135	
Chloroethane	0.25	0.18	0.21	72	84	15.4	65-135	
Trichlorofluoromethane	0.25	0.27	0.21	108	84	25.0	65-135	
1,1-Dichloroethene	0.25	0.17	0.22	68	88	25.6	65-135	
Methylene chloride	0.25	0.17	0.17	68	68	0.0	65-135	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.26	0.26	104	104	0.0	65-135	
trans -1,2-Dichloroethene	0.25	0.24	0.24	96	96	0.0	65-135	
1,1-Dichloroethane	0.25	0.26	0.26	104	104	0.0	65-135	
2,2-Dichloropropane	0.25	0.19	0.19	76	76	0.0	65-135	
cis -1,2-Dichloroethene	0.25	0.28	0.26	112	104	7.4	65-135	
Chloroform	0.25	0.25	0.27	100	108	7.7	65-135	
1,1,1-Trichloroethane (TCA)	0.25	0.24	0.22	96	88	8.7	65-135	
Carbon tetrachloride	0.25	0.17	0.18	68	72	5.7	65-135	
1,1-Dichloropropene	0.25	0.26	0.27	104	108	3.8	65-135	
Benzene	0.25	0.28	0.28	112	112	0.0	65-135	
1,2-Dichloroethane (EDC)	0.25	0.29	0.29	116	116	0.0	65-135	
Trichloroethene (TCE)	0.25	0.28	0.28	112	112	0.0	65-135	
1,2-Dichloropropane	0.25	0.22	0.24	88	96	8.7	65-135	
Dibromomethane	0.25	0.24	0.26	96	104	8.0	65-135	
Bromodichloromethane	0.25	0.17	0.17	68	68	0.0	65-135	
cis-1,3-Dichloropropene	0.25	0.19	0.17	76	68	11.1	65-135	
Toluene	0.25	0.20	0.22	80	88	9.5	65-135	
Trans-1,3-Dichloropropene	0.25	0.18	0.18	72	72	0.0	65-135	
1,1,2-Trichloroethane	0.25	0.31	0.32	124	128	3.2	65-135	
Tetrachloroethene (PCE)	0.25	0.29	0.32	116	128	9.8	65-135	
1,3-Dichloropropane	0.25	0.30	0.29	120	116	3.4	65-135	
Dibromochloromethane	0.25	0.17	0.17	68	68	0.0	65-135	
1,2-Dibromoethane (EDB)	0.25	0.300	0.29	120	116	3.4	65-135	
Chlorobenzene	0.25	0.26	0.28	104	112	7.4	65-135	
Ethylbenzene	0.25	0.26	0.28	104	112	7.4	65-135	
1,1,1,2-Tetrachloroethane	0.25	0.18	0.15	72	60	18.2	65-135	
Total Xylenes	0.75	0.82	0.83	109	111	1.2	65-135	
Styrene	0.25	0.29	0.27	116	108	7.1	65-135	

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Libby Project # L200304-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB16-6

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	0.25	0.23	0.22	92	88	4.4	65-135	
Isopropylbenzene	0.25	0.25	0.25	100	100	0.0	65-135	
1,1,2,2-Tetrachloroethane	0.25	0.19	0.15	76	60	23.5	65-135	
Bromobenzene	0.25	0.17	0.14	68	56	19.4	65-135	S
n-Propylbenzene	0.25	0.19	0.14	76	56	30.3	65-135	S
1,2,3-Trichloropropane	0.25	0.19	0.17	76	68	11.1	65-135	
2-Chlorotoluene	0.25	0.24	0.18	96	72	28.6	65-135	
1,3,5-Trimethylbenzene	0.25	0.17	0.22	68	88	25.6	65-135	
4-Chlorotoluene	0.25	0.21	0.22	84	88	4.7	65-135	
tert-Butylbenzene	0.25	0.26	0.23	104	92	12.2	65-135	
1,2,4-Trimethylbenzene	0.25	0.28	0.24	112	96	15.4	65-135	
sec-Butylbenzene	0.25	0.30	0.26	120	104	14.3	65-135	
Isopropyltoluene	0.25	0.33	0.27	132	108	20.0	65-135	
1,3-Dichlorobenzene	0.25	0.30	0.26	120	104	14.3	65-135	
1,4-Dichlorobenzene	0.25	0.32	0.27	128	108	16.9	65-135	
n-Butylbenzene	0.25	0.28	0.25	112	100	11.3	65-135	
1,2-Dichlorobenzene	0.25	0.33	0.28	132	112	16.4	65-135	
1,2-Dibromo-3-Chloropropane	0.25	0.27	0.18	108	72	40.0	65-135	R
1,2,4-Trichlorolbenzene	0.25	0.33	0.29	132	116	12.9	65-135	
Hexachloro-1,3-butadiene	0.25	0.29	0.26	116	104	10.9	65-135	
Naphthalene	0.25	0.33	0.30	132	120	9.5	65-135	
1,2,3-Trichlorobenzene	0.25	0.28	0.31	112	124	10.2	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	93	90	65-135
1,2-Dichloroethane-d4	108	107	65-135
Toluene-d8	89	83	65-135
4-Bromofluorobenzene	98	93	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.
"S" Spike recovery outside accepted recovery limits.

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Libby Project # L200304-40

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	0.25	0.26	104	80-120	
Chloromethane	0.25	0.21	84	80-120	
Vinyl chloride	0.25	0.28	112	80-120	
Bromomethane	0.25	0.25	100	80-120	
Chloroethane	0.25	0.20	80	80-120	
Trichlorofluoromethane	0.25	0.29	116	80-120	
1,1-Dichloroethene	0.25	0.25	100	80-120	
Methylene chloride	0.25	0.24	96	80-120	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.28	112	80-120	
trans -1,2-Dichloroethene	0.25	0.23	92	80-120	
1,1-Dichloroethane	0.25	0.25	100	80-120	
2,2-Dichloropropane	0.25	0.22	88	80-120	
cis -1,2-Dichloroethene	0.25	0.29	116	80-120	
Chloroform	0.25	0.26	104	80-120	
1,1,1-Trichloroethane (TCA)	0.25	0.27	108	80-120	
Carbon tetrachloride	0.25	0.27	108	80-120	
1,1-Dichloropropene	0.25	0.27	108	80-120	
Benzene	0.25	0.27	108	80-120	
1,2-Dichloroethane (EDC)	0.25	0.28	112	80-120	
Trichloroethene (TCE)	0.25	0.30	120	80-120	
1,2-Dichloropropane	0.25	0.24	96	80-120	
Dibromomethane	0.25	0.27	108	80-120	
Bromodichloromethane	0.25	0.22	88	80-120	
cis-1,3-Dichloropropene	0.25	0.22	88	80-120	
Toluene	0.25	0.23	92	80-120	
Trans-1,3-Dichloropropene	0.25	0.23	92	80-120	
1,1,2-Trichloroethane	0.25	0.22	88	80-120	
Tetrachloroethene (PCE)	0.25	0.29	116	80-120	
1,3-Dichloropropane	0.25	0.30	120	80-120	
Dibromochloromethane	0.25	0.21	84	80-120	
1,2-Dibromoethane (EDB)	0.25	0.29	116	80-120	
Chlorobenzene	0.25	0.26	104	80-120	
Ethylbenzene	0.25	0.25	100	80-120	
1,1,1,2-Tetrachloroethane	0.25	0.23	92	80-120	
Total Xylenes	0.75	0.54	72	80-120	
Styrene	0.25	0.26	104	80-120	

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Libby Project # L200304-40

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	0.25	0.22	88	80-120	
Isopropylbenzene	0.25	0.24	94	80-120	
1,1,2,2-Tetrachloroethane	0.25	0.28	112	80-120	
Bromobenzene	0.25	0.20	80	80-120	
n-Propylbenzene	0.25	0.21	84	80-120	
1,2,3-Trichloropropane	0.25	0.29	116	80-120	
2-Chlorotoluene	0.25	0.22	88	80-120	
1,3,5-Trimethylbenzene	0.25	0.22	88	80-120	
4-Chlorotoluene	0.25	0.21	84	80-120	
tert-Butylbenzene	0.25	0.21	84	80-120	
1,2,4-Trimethylbenzene	0.25	0.22	88	80-120	
sec-Butylbenzene	0.25	0.24	96	80-120	
Isopropyltoluene	0.25	0.23	92	80-120	
1,3-Dichlorobenzene	0.25	0.24	96	80-120	
1,4-Dichlorobenzene	0.25	0.29	116	80-120	
n-Butylbenzene	0.25	0.29	116	80-120	
1,2-Dichlorobenzene	0.25	0.29	116	80-120	
1,2-Dibromo-3-Chloropropane	0.25	0.26	104	80-120	
1,2,4-Trichlorolbenzene	0.25	0.24	96	80-120	
Hexachloro-1,3-butadiene	0.25	0.25	100	80-120	
Naphthalene	0.25	0.22	88	80-120	
1,2,3-Trichlorobenzene	0.25	0.28	112	80-120	

Surrogate Recovery			
Dibromofluoromethane	101	65-135	
1,2-Dichloroethane-d4	111	65-135	
Toluene-d8	89	65-135	
4-Bromofluorobenzene	92	65-135	

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Analyses of Gasoline (NWTPH-Gx) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (mg/kg)
Method Blank	3/4/2020	118	nd
UB12-5	3/4/2020	87	nd
UB12-14	3/4/2020	86	nd
UB12-22	3/4/2020	84	nd
UB12-37	3/4/2020	85	nd
UB12-46	3/4/2020	84	nd
UB12-46 Dup	3/4/2020	85	nd
UB16-6	3/4/2020	85	nd
UB16-14	3/4/2020	86	nd
UB16-29	3/4/2020	82	nd
Practical Quantitation Limit			10

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (mg/kg)	Oil (mg/kg)
Method Blank	3/4/2020	97	nd	nd
UB12-5	3/4/2020	101	nd	nd
UB12-14	3/4/2020	101	nd	nd
UB12-14 Dup	3/4/2020	108	nd	nd
UB12-22	3/4/2020	104	nd	nd
UB12-37	3/4/2020	102	nd	nd
UB12-46	3/4/2020	94	nd	nd
UB16-6	3/4/2020	118	nd	nd
UB16-14	3/4/2020	100	nd	nd
UB16-29	3/4/2020	106	nd	nd
Practical Quantitation Limit			50	250

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

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RAINIER MALL PROJECT
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Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW16-20200304
Date Sampled	Reporting	N/A	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020
	(µg/L)	(µg/L)	(µg/L)
Dichlorodifluoromethane	2.0	nd	<20
Chloromethane	2.0	nd	<20
Vinyl chloride	0.2	nd	59
Bromomethane	2.0	nd	<20
Chloroethane	2.0	nd	<20
Trichlorofluoromethane	2.0	nd	<20
1,1-Dichloroethene	0.5	nd	<5
Methylene chloride	1.0	nd	<10
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	<50
trans -1,2-Dichloroethene	1.0	nd	<10
1,1-Dichloroethane	1.0	nd	<10
2,2-Dichloropropane	2.0	nd	<20
cis -1,2-Dichloroethene	1.0	nd	536
Chloroform	1.0	nd	<10
1,1,1-Trichloroethane (TCA)	1.0	nd	<10
Carbon tetrachloride	1.0	nd	<10
1,1-Dichloropropene	1.0	nd	<10
Benzene	1.0	nd	<10
1,2-Dichloroethane (EDC)	1.0	nd	<10
Trichloroethene (TCE)	0.4	nd	744
1,2-Dichloropropane	1.0	nd	<10
Dibromomethane	1.0	nd	<10
Bromodichloromethane	1.0	nd	<10
cis-1,3-Dichloropropene	1.0	nd	<10
Toluene	1.0	nd	<10
Trans-1,3-Dichloropropene	1.0	nd	<10
1,1,2-Trichloroethane	1.0	nd	<10
Tetrachloroethene (PCE)	1.0	nd	4590
1,3-Dichloropropane	1.0	nd	<10
Dibromochloromethane	1.0	nd	<10
1,2-Dibromoethane (EDB) *	0.01	nd	<0.1
Chlorobenzene	1.0	nd	<10
Ethylbenzene	1.0	nd	<10
1,1,1,2-Tetrachloroethane	1.0	nd	<10
Total Xylenes	2.0	nd	<20
Styrene	1.0	nd	<10

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW16-20200304
Date Sampled	Reporting	N/A	3/4/2020
Date Analyzed	Limits	3/4/2020	3/4/2020
	(µg/L)	(µg/L)	(µg/L)
Bromoform	1.0	nd	<10
Isopropylbenzene	4.0	nd	<40
1,1,2,2-Tetrachloroethane	1.0	nd	<10
Bromobenzene	1.0	nd	<10
n-Propylbenzene	1.0	nd	<10
1,2,3-Trichloropropane	1.0	nd	<10
2-Chlorotoluene	1.0	nd	<10
1,3,5-Trimethylbenzene	1.0	nd	<10
4-Chlorotoluene	1.0	nd	<10
tert-Butylbenzene	1.0	nd	<10
1,2,4-Trimethylbenzene	1.0	nd	<10
sec-Butylbenzene	1.0	nd	<10
p-Isopropyltoluene	1.0	nd	<10
1,3-Dichlorobenzene	1.0	nd	<10
1,4-Dichlorobenzene	1.0	nd	<10
n-Butylbenzene	1.0	nd	<10
1,2-Dichlorobenzene	1.0	nd	<10
1,2-Dibromo-3-Chloropropane	1.0	nd	<10
1,2,4-Trichlorolbenzene	2.0	nd	<20
Hexachloro-1,3-butadiene	5.0	nd	<50
Naphthalenes	5.0	nd	<50
1,2,3-Trichlorobenzene	5.0	nd	<50
Surrogate Recovery			
Dibromofluoromethane		77	95
1,2-Dichloroethane-d4		93	110
Toluene-d8		118	81
4-Bromofluorobenzene		68	126

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW16-20200304

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	5.0	4.0	5.8	80	116	36.7	65-135	R
Chloromethane	5.0	4.3	6.3	86	126	37.7	65-135	R
Vinyl chloride	5.0	4.7	5.9	94	118	22.6	65-135	
Bromomethane	5.0	4.1	5.1	82	102	21.7	65-135	
Chloroethane	5.0	4.8	5.5	96	110	13.6	65-135	
Trichlorofluoromethane	5.0	5.1	5.7	102	114	11.1	65-135	
1,1-Dichloroethene	5.0	5.0	4.6	100	92	8.3	65-135	
Methylene chloride	5.0	3.6	5.4	72	108	40.0	65-135	R
Methyl *tert*- Butyl Ether (MTBE)	5.0	3.7	4.3	74	86	15.0	65-135	
trans -1,2-Dichloroethene	5.0	5.1	5.5	102	110	7.5	65-135	
1,1-Dichloroethane	5.0	5.2	5.5	104	110	5.6	65-135	
2,2-Dichloropropane	5.0	4.7	4.1	94	82	13.6	65-135	
cis -1,2-Dichloroethene	5.0	5.2	4.9	104	98	5.9	65-135	
Chloroform	5.0	4.7	4.6	94	92	2.2	65-135	
1,1,1-Trichloroethane (TCA)	5.0	4.8	4.7	96	94	2.1	65-135	
Carbon tetrachloride	5.0	3.8	3.5	76	70	8.2	65-135	
1,1-Dichloropropene	5.0	5.5	4.5	110	90	20.0	65-135	
Benzene	5.0	5.3	4.9	106	98	7.8	65-135	
1,2-Dichloroethane (EDC)	5.0	5.6	5.3	112	106	5.5	65-135	
Trichloroethene (TCE)	5.0	5.3	4.3	106	86	20.8	65-135	
1,2-Dichloropropane	5.0	5.2	4.6	104	92	12.2	65-135	
Dibromomethane	5.0	5.3	4.4	106	88	18.6	65-135	
Bromodichloromethane	5.0	3.6	3.9	72	78	8.0	65-135	
cis-1,3-Dichloropropene	5.0	3.6	3.9	72	78	8.0	65-135	
Toluene	5.0	4.8	3.8	96	76	23.3	65-135	
Trans-1,3-Dichloropropene	5.0	3.5	3.4	70	68	2.9	65-135	
1,1,2-Trichloroethane	5.0	6.3	4.6	126	92	31.2	65-135	
Tetrachloroethene (PCE)	5.0	2.4	3.5	48	70	37.3	65-135	S, R
1,3-Dichloropropane	5.0	6.2	5.1	124	102	19.5	65-135	
Dibromochloromethane	5.0	4.9	3.3	98	66	39.0	65-135	R
1,2-Dibromoethane (EDB)	5.0	6.4	5.2	128	104	20.7	65-135	
Chlorobenzene	5.0	5.6	5.2	112	104	7.4	65-135	
Ethylbenzene	5.0	5.4	4.7	108	94	13.9	65-135	
1,1,1,2-Tetrachloroethane	5.0	3.5	3.3	70	66	5.9	65-135	
Total Xylenes	15.0	16.7	14.5	111	97	14.1	65-135	
Styrene	5.0	5.3	4.6	106	92	14.1	65-135	

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW16-20200304

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	5.0	4.7	4.9	94	98	4.2	65-135	
Isopropylbenzene	5.0	5.5	4.9	110	98	11.5	65-135	
1,1,2,2-Tetrachloroethane	5.0	4.3	4.5	86	90	4.5	65-135	
Bromobenzene	5.0	3.6	3.8	72	76	5.4	65-135	
n-Propylbenzene	5.0	3.3	3.9	66	78	16.7	65-135	
1,2,3-Trichloropropane	5.0	6.1	6.0	122	120	1.7	65-135	
2-Chlorotoluene	5.0	3.5	4.2	70	84	18.2	65-135	
1,3,5-Trimethylbenzene	5.0	3.6	4.3	72	86	17.7	65-135	
4-Chlorotoluene	5.0	3.7	4.4	74	88	17.3	65-135	
tert-Butylbenzene	5.0	4.1	4.7	82	94	13.6	65-135	
1,2,4-Trimethylbenzene	5.0	4.5	4.8	90	96	6.5	65-135	
sec-Butylbenzene	5.0	4.7	4.9	94	98	4.2	65-135	
Isopropyltoluene	5.0	5.0	5.2	100	104	3.9	65-135	
1,3-Dichlorobenzene	5.0	4.9	5.0	98	100	2.0	65-135	
1,4-Dichlorobenzene	5.0	5.1	5.3	102	106	3.8	65-135	
n-Butylbenzene	5.0	4.7	4.8	94	96	2.1	65-135	
1,2-Dichlorobenzene	5.0	4.8	5.5	96	110	13.6	65-135	
1,2-Dibromo-3-Chloropropane	5.0	4.5	3.5	90	70	25.0	65-135	
1,2,4-Trichlorolbenzene	5.0	5.6	5.8	112	116	3.5	65-135	
Hexachloro-1,3-butadiene	5.0	5.0	5.7	100	114	13.1	65-135	
Naphthalene	5.0	6.4	5.9	128	118	8.1	65-135	
1,2,3-Trichlorobenzene	5.0	6.4	6.6	128	132	3.1	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	92	80	65-135
1,2-Dichloroethane-d4	115	98	65-135
Toluene-d8	93	79	65-135
4-Bromofluorobenzene	128	126	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.
"S" Spike recovery outside accepted recovery limits.

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	5.0	5.3	106	80-120	
Chloromethane	5.0	4.2	84	80-120	
Vinyl chloride	5.0	6.0	119	80-120	
Bromomethane	5.0	5.0	100	80-120	
Chloroethane	5.0	4.0	80	80-120	
Trichlorofluoromethane	5.0	5.8	116	80-120	
1,1-Dichloroethene	5.0	5.1	102	80-120	
Methylene chloride	5.0	4.8	96	80-120	
Methyl *tert*- Butyl Ether (MTBE)	5.0	5.5	110	80-120	
trans -1,2-Dichloroethene	5.0	4.6	92	80-120	
1,1-Dichloroethane	5.0	5.1	102	80-120	
2,2-Dichloropropane	5.0	4.4	88	80-120	
cis -1,2-Dichloroethene	5.0	5.8	116	80-120	
Chloroform	5.0	5.1	102	80-120	
1,1,1-Trichloroethane (TCA)	5.0	5.3	106	80-120	
Carbon tetrachloride	5.0	5.5	110	80-120	
1,1-Dichloropropene	5.0	5.4	108	80-120	
Benzene	5.0	5.4	108	80-120	
1,2-Dichloroethane (EDC)	5.0	5.6	112	80-120	
Trichloroethene (TCE)	5.0	6.0	120	80-120	
1,2-Dichloropropane	5.0	5.1	102	80-120	
Dibromomethane	5.0	5.3	106	80-120	
Bromodichloromethane	5.0	4.4	88	80-120	
cis-1,3-Dichloropropene	5.0	4.3	86	80-120	
Toluene	5.0	4.6	92	80-120	
Trans-1,3-Dichloropropene	5.0	4.7	94	80-120	
1,1,2-Trichloroethane	5.0	4.4	88	80-120	
Tetrachloroethene (PCE)	5.0	5.8	116	80-120	
1,3-Dichloropropane	5.0	6.0	120	80-120	
Dibromochloromethane	5.0	4.2	84	80-120	
1,2-Dibromoethane (EDB)	5.0	5.8	116	80-120	
Chlorobenzene	5.0	5.2	104	80-120	
Ethylbenzene	5.0	5.0	100	80-120	
1,1,1,2-Tetrachloroethane	5.0	4.6	92	80-120	
Total Xylenes	15.0	10.7	71	80-120	
Styrene	5.0	5.5	110	80-120	

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	5.0	4.4	88	80-120	
Isopropylbenzene	5.0	5.2	104	80-120	
1,1,2,2-Tetrachloroethane	5.0	5.5	110	80-120	
Bromobenzene	5.0	4.0	80	80-120	
n-Propylbenzene	5.0	4.2	84	80-120	
1,2,3-Trichloropropane	5.0	5.8	116	80-120	
2-Chlorotoluene	5.0	4.4	88	80-120	
1,3,5-Trimethylbenzene	5.0	4.4	88	80-120	
4-Chlorotoluene	5.0	4.3	86	80-120	
tert-Butylbenzene	5.0	4.3	86	80-120	
1,2,4-Trimethylbenzene	5.0	4.4	88	80-120	
sec-Butylbenzene	5.0	4.7	94	80-120	
Isopropyltoluene	5.0	4.5	90	80-120	
1,3-Dichlorobenzene	5.0	4.7	94	80-120	
1,4-Dichlorobenzene	5.0	5.9	118	80-120	
n-Butylbenzene	5.0	5.9	118	80-120	
1,2-Dichlorobenzene	5.0	5.8	116	80-120	
1,2-Dibromo-3-Chloropropane	5.0	5.3	106	80-120	
1,2,4-Trichlorolbenzene	5.0	4.7	94	80-120	
Hexachloro-1,3-butadiene	5.0	4.9	98	80-120	
Naphthalene	5.0	4.4	88	80-120	
1,2,3-Trichlorobenzene	5.0	5.6	112	80-120	

Surrogate Recovery			
Dibromofluoromethane	101	65-135	
1,2-Dichloroethane-d4	111	65-135	
Toluene-d8	89	65-135	
4-Bromofluorobenzene	92	65-135	

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
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Libby Project # L200304-40

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/L)
Method Blank	3/4/2020	118	nd
MW16-20200304	3/4/2020	81	3800 *
Practical Quantitation Limit			100

"*" The gasoline range value consist of two chlorinated compounds with elevated concentrations.
"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200304-40

Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (µg/L)	Oil (µg/L)
Method Blank	3/4/2020	97	nd	nd
MW16-20200304	3/4/2020	96	nd	nd
MW16-20200304 Dup	3/4/2020	100	nd	nd
Practical Quantitation Limit			200	400

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

3322 South Bay Road NE • Olympia, WA 98506-2957

March 9, 2020

John Funderbuck
Urban Environmental Partners, LLC
2324 First Avenue, Suite 203
Seattle, WA 98121

Dear Mr. Funderbuck:

Please find enclosed the analytical data report for the Rainier Mall Project located in Seattle, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of within 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

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Libby Environmental, Inc.

Chain of Custody Record

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Client: Urban Environmental / Dixon Env.
Address: 2324 First Avenue, Suite 203
City: Seattle State: WA Zip: 98121
Phone: 206-229-6804 Fax:
Client Project #

Date: 3/5/20 Page: 1 of 1
Project Manager: Brian Dixon | John Funderburk
Project Name: Rainier Mod
Location: 4208 Rainier Ave S City, State: Seattle, WA
Collector: B. Dixon Date of Collection: 3-5-2020
Email: johnf@uepconsulting.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals			Field Notes
1	UB17-24	24	900	S		X	X			X										2nd
2	UB13W-23	23	900	W		X	X			X										1st
D	3 MW17-20200305	18	950	W		X	X			X										3rd
	4 UB13-43	43	940	S		X	X			X										
MS	5 UB14-7	7	1010	S		X	X			X										4th
	6 UB14-20	20	1015	S		X	X			X										5th
	7 UB18-24	24	1145	S		X	X			X										6th (Hot)
	8 UB18W-24	24	1200	W		X	X			X										7th (Hot)
MS	9 ~~UB~~ MW14-20200305	18	1210	W		X	X			X										8th
	10 UB15-20	20	1120	S		X	X			X										9th
	11																			
	12																			
	13																			
	14																			
	15																			
	16																			
	17																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	3-5-20 315	[signature] 3/5/20	315
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks: Field-Mobile Lab
ML

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB17-24	UB13-43	UB14-7	UB14-7 Dup	UB14-20
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd	nd	nd	nd	nd
Chloromethane	0.06	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd
Bromomethane	0.09	nd	nd	nd	nd	nd	nd
Chloroethane	0.06	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.02	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.03	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd	nd	nd	nd	nd
Chloroform	0.02	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.03	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.02	nd	nd	nd	nd	nd	nd
Dibromomethane	0.04	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.02	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	0.39	nd	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.03	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.02	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.02	nd	nd	nd	nd	nd	nd

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB17-24	UB13-43	UB14-7	UB14-7 Dup	UB14-20
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Propylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	0.03	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd	nd	nd	nd	nd
Naphthalenes	0.10	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		93	92	91	101	95	88
1,2-Dichloroethane-d4		120	117	116	127	117	121
Toluene-d8		85	83	86	87	86	85
4-Bromofluorobenzene		104	97	142	96	197	213

"E" Indicates reported result is an estimate because it exceeded the calibration range.
"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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Libby Project # L200305-40

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB18-24	UB15-20
Date Sampled	Reporting	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020
	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd
Chloromethane	0.06	nd	nd
Vinyl chloride	0.02	nd	nd
Bromomethane	0.09	nd	nd
Chloroethane	0.06	nd	nd
Trichlorofluoromethane	0.05	nd	nd
1,1-Dichloroethene	0.05	nd	nd
Methylene chloride	0.02	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd
1,1-Dichloroethane	0.03	nd	nd
2,2-Dichloropropane	0.05	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd
Chloroform	0.02	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd
Carbon tetrachloride	0.03	nd	nd
1,1-Dichloropropene	0.02	nd	nd
Benzene	0.02	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd
Trichloroethene (TCE)	0.02	nd	nd
1,2-Dichloropropane	0.02	nd	nd
Dibromomethane	0.04	nd	nd
Bromodichloromethane	0.02	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd
Toluene	0.10	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd
1,3-Dichloropropane	0.05	nd	nd
Dibromochloromethane	0.03	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd
Chlorobenzene	0.02	nd	nd
Ethylbenzene	0.03	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd
Total Xylenes	0.15	nd	nd
Styrene	0.02	nd	nd

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Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB18-24	UB15-20
Date Sampled	Reporting	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020
	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd
Isopropylbenzene	0.05	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd
Bromobenzene	0.03	nd	nd
n-Propylbenzene	0.03	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd
2-Chlorotoluene	0.03	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd
4-Chlorotoluene	0.03	nd	nd
tert-Butylbenzene	0.03	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd
sec-Butylbenzene	0.03	nd	nd
p-Isopropyltoluene	0.03	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd
n-Butylbenzene	0.03	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd
Naphthalenes	0.10	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd
Surrogate Recovery			
Dibromofluoromethane		94	91
1,2-Dichloroethane-d4		122	124
Toluene-d8		84	86
4-Bromofluorobenzene		95	90

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
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Libby Project # L200305-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB14-7

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	0.25	0.25	0.24	100	96	4.1	65-135	
Chloromethane	0.25	0.20	0.21	80	84	4.9	65-135	
Vinyl chloride	0.25	0.19	0.25	76	100	27.3	65-135	
Bromomethane	0.25	0.17	0.20	68	80	16.2	65-135	
Chloroethane	0.25	0.17	0.21	68	84	21.1	65-135	
Trichlorofluoromethane	0.25	0.32	0.27	128	108	16.9	65-135	
1,1-Dichloroethene	0.25	0.20	0.18	80	72	10.5	65-135	
Methylene chloride	0.25	0.24	0.20	96	80	18.2	65-135	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.29	0.26	116	104	10.9	65-135	
trans -1,2-Dichloroethene	0.25	0.20	0.22	80	88	9.5	65-135	
1,1-Dichloroethane	0.25	0.25	0.27	100	108	7.7	65-135	
2,2-Dichloropropane	0.25	0.23	0.23	92	92	0.0	65-135	
cis -1,2-Dichloroethene	0.25	0.26	0.15	104	60	53.7	65-135	S, R
Chloroform	0.25	0.27	0.25	108	100	7.7	65-135	
1,1,1-Trichloroethane (TCA)	0.25	0.21	0.26	84	104	21.3	65-135	
Carbon tetrachloride	0.25	0.18	0.21	72	84	15.4	65-135	
1,1-Dichloropropene	0.25	0.30	0.29	120	116	3.4	65-135	
Benzene	0.25	0.24	0.26	96	104	8.0	65-135	
1,2-Dichloroethane (EDC)	0.25	0.29	0.22	116	88	27.5	65-135	
Trichloroethene (TCE)	0.25	0.25	0.21	100	84	17.4	65-135	
1,2-Dichloropropane	0.25	0.25	0.27	100	108	7.7	65-135	
Dibromomethane	0.25	0.23	0.28	92	112	19.6	65-135	
Bromodichloromethane	0.25	0.17	0.18	68	72	5.7	65-135	
cis-1,3-Dichloropropene	0.25	0.17	0.17	68	68	0.0	65-135	
Toluene	0.25	0.18	0.21	72	84	15.4	65-135	
Trans-1,3-Dichloropropene	0.25	0.22	0.20	88	80	9.5	65-135	
1,1,2-Trichloroethane	0.25	0.28	0.29	112	116	3.5	65-135	
Tetrachloroethene (PCE)	0.25	0.26	0.29	104	116	10.9	65-135	
1,3-Dichloropropane	0.25	0.33	0.28	132	112	16.4	65-135	
Dibromochloromethane	0.25	0.21	0.19	84	76	10.0	65-135	
1,2-Dibromoethane (EDB)	0.25	0.257	0.31	103	124	18.7	65-135	
Chlorobenzene	0.25	0.27	0.23	108	92	16.0	65-135	
Ethylbenzene	0.25	0.23	0.24	92	96	4.3	65-135	
1,1,1,2-Tetrachloroethane	0.25	0.18	0.19	72	76	5.4	65-135	
Total Xylenes	0.75	0.70	0.83	93	111	17.0	65-135	
Styrene	0.25	0.24	0.25	96	100	4.1	65-135	

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Libby Project # L200305-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB14-7

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	0.25	0.18	0.18	72	72	0.0	65-135	
Isopropylbenzene	0.25	0.22	0.25	88	100	12.8	65-135	
1,1,2,2-Tetrachloroethane	0.25	0.19	0.21	76	84	10.0	65-135	
Bromobenzene	0.25	0.17	0.19	68	76	11.1	65-135	
n-Propylbenzene	0.25	0.24	0.19	96	76	23.3	65-135	
1,2,3-Trichloropropane	0.25	0.27	0.19	108	76	34.8	65-135	
2-Chlorotoluene	0.25	0.18	0.20	72	80	10.5	65-135	
1,3,5-Trimethylbenzene	0.25	0.17	0.18	68	72	5.7	65-135	
4-Chlorotoluene	0.25	0.16	0.18	64	72	11.8	65-135	
tert-Butylbenzene	0.25	0.18	0.22	72	88	20.0	65-135	
1,2,4-Trimethylbenzene	0.25	0.17	0.20	68	80	16.2	65-135	
sec-Butylbenzene	0.25	0.18	0.23	72	92	24.4	65-135	
Isopropyltoluene	0.25	0.24	0.26	96	104	8.0	65-135	
1,3-Dichlorobenzene	0.25	0.26	0.24	104	96	8.0	65-135	
1,4-Dichlorobenzene	0.25	0.28	0.28	112	112	0.0	65-135	
n-Butylbenzene	0.25	0.24	0.26	96	104	8.0	65-135	
1,2-Dichlorobenzene	0.25	0.27	0.32	108	128	16.9	65-135	
1,2-Dibromo-3-Chloropropane	0.25	0.31	0.30	124	120	3.3	65-135	
1,2,4-Trichlorolbenzene	0.25	0.31	0.30	124	120	3.3	65-135	
Hexachloro-1,3-butadiene	0.25	0.29	0.26	116	104	10.9	65-135	
Naphthalene	0.25	0.25	0.28	100	112	11.3	65-135	
1,2,3-Trichlorobenzene	0.25	0.29	0.30	116	120	3.4	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	103	92	65-135
1,2-Dichloroethane-d4	134	130	65-135
Toluene-d8	85	82	65-135
4-Bromofluorobenzene	93	91	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.
"S" Spike recovery outside accepted recovery limits.

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Libby Project # L200305-40

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	0.25	0.26	104	80-120	
Chloromethane	0.25	0.29	116	80-120	
Vinyl chloride	0.25	0.27	108	80-120	
Bromomethane	0.25	0.26	104	80-120	
Chloroethane	0.25	0.23	92	80-120	
Trichlorofluoromethane	0.25	0.25	100	80-120	
1,1-Dichloroethene	0.25	0.27	108	80-120	
Methylene chloride	0.25	0.27	108	80-120	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.24	96	80-120	
trans -1,2-Dichloroethene	0.25	0.22	88	80-120	
1,1-Dichloroethane	0.25	0.27	108	80-120	
2,2-Dichloropropane	0.25	0.26	104	80-120	
cis -1,2-Dichloroethene	0.25	0.25	100	80-120	
Chloroform	0.25	0.27	108	80-120	
1,1,1-Trichloroethane (TCA)	0.25	0.25	100	80-120	
Carbon tetrachloride	0.25	0.24	96	80-120	
1,1-Dichloropropene	0.25	0.26	104	80-120	
Benzene	0.25	0.25	100	80-120	
1,2-Dichloroethane (EDC)	0.25	0.26	104	80-120	
Trichloroethene (TCE)	0.25	0.22	88	80-120	
1,2-Dichloropropane	0.25	0.25	100	80-120	
Dibromomethane	0.25	0.25	100	80-120	
Bromodichloromethane	0.25	0.24	96	80-120	
cis-1,3-Dichloropropene	0.25	0.26	104	80-120	
Toluene	0.25	0.22	88	80-120	
Trans-1,3-Dichloropropene	0.25	0.27	108	80-120	
1,1,2-Trichloroethane	0.25	0.23	92	80-120	
Tetrachloroethene (PCE)	0.25	0.22	88	80-120	
1,3-Dichloropropane	0.25	0.26	104	80-120	
Dibromochloromethane	0.25	0.23	92	80-120	
1,2-Dibromoethane (EDB)	0.25	0.27	108	80-120	
Chlorobenzene	0.25	0.25	100	80-120	
Ethylbenzene	0.25	0.25	100	80-120	
1,1,1,2-Tetrachloroethane	0.25	0.22	88	80-120	
Total Xylenes	0.75	0.75	100	80-120	
Styrene	0.25	0.24	96	80-120	

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Libby Project # L200305-40

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	0.25	0.21	84	80-120	
Isopropylbenzene	0.25	0.22	88	80-120	
1,1,2,2-Tetrachloroethane	0.25	0.29	116	80-120	
Bromobenzene	0.25	0.25	100	80-120	
n-Propylbenzene	0.25	0.26	104	80-120	
1,2,3-Trichloropropane	0.25	0.29	116	80-120	
2-Chlorotoluene	0.25	0.24	96	80-120	
1,3,5-Trimethylbenzene	0.25	0.26	104	80-120	
4-Chlorotoluene	0.25	0.25	100	80-120	
tert-Butylbenzene	0.25	0.25	100	80-120	
1,2,4-Trimethylbenzene	0.25	0.26	104	80-120	
sec-Butylbenzene	0.25	0.26	104	80-120	
Isopropyltoluene	0.25	0.26	104	80-120	
1,3-Dichlorobenzene	0.25	0.26	104	80-120	
1,4-Dichlorobenzene	0.25	0.27	108	80-120	
n-Butylbenzene	0.25	0.23	92	80-120	
1,2-Dichlorobenzene	0.25	0.26	104	80-120	
1,2-Dibromo-3-Chloropropane	0.25	0.21	84	80-120	
1,2,4-Trichlorolbenzene	0.25	0.25	100	80-120	
Hexachloro-1,3-butadiene	0.25	0.24	96	80-120	
Naphthalene	0.25	0.28	112	80-120	
1,2,3-Trichlorobenzene	0.25	0.26	104	80-120	

Surrogate Recovery			
Dibromofluoromethane	105	65-135	
1,2-Dichloroethane-d4	119	65-135	
Toluene-d8	121	65-135	
4-Bromofluorobenzene	90	65-135	

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RAINIER MALL PROJECT
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Analyses of Gasoline (NWTPH-Gx) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (mg/kg)
Method Blank	3/5/2020	85	nd
UB17-24	3/5/2020	83	nd
UB13-43	3/5/2020	86	nd
UB14-7	3/5/2020	87	nd
UB14-7 Dup	3/5/2020	86	nd
UB14-20	3/5/2020	85	nd
UB18-24	3/5/2020	84	nd
UB15-20	3/5/2020	86	nd
Practical Quantitation Limit			10

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (mg/kg)	Oil (mg/kg)
Method Blank	3/5/2020	99	nd	nd
UB17-24	3/5/2020	107	nd	nd
UB13-43	3/5/2020	96	nd	nd
UB14-7	3/5/2020	96	nd	nd
UB14-20	3/5/2020	109	nd	nd
UB18-24	3/5/2020	87	nd	nd
UB15-20	3/5/2020	102	nd	nd
UB15-20 Dup	3/5/2020	100	nd	nd
Practical Quantitation Limit			50	250

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	UB13W-23	MW17-20200305	MW17-20200305 Dup	UB18W-24	MW14-20200305
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Dichlorodifluoromethane	2.0	nd	<20	nd	nd	nd	nd
Chloromethane	2.0	nd	<20	nd	nd	nd	nd
Vinyl chloride	0.2	nd	<2	nd	nd	nd	nd
Bromomethane	2.0	nd	<20	nd	nd	nd	nd
Chloroethane	2.0	nd	<20	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	<20	nd	nd	nd	nd
1,1-Dichloroethene	0.5	nd	<5	nd	nd	nd	nd
Methylene chloride	1.0	nd	<10	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	<50	nd	nd	nd	nd
trans -1,2-Dichloroethene	1.0	nd	<10	nd	nd	nd	nd
1,1-Dichloroethane	1.0	nd	<10	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	<20	nd	nd	nd	nd
cis -1,2-Dichloroethene	1.0	nd	1353	166	173	33	nd
Chloroform	1.0	nd	<10	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	<10	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	<10	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	<10	nd	nd	nd	nd
Benzene	1.0	nd	<10	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	<10	nd	nd	nd	nd
Trichloroethene (TCE)	0.4	nd	3180 E	nd	nd	17	nd
1,2-Dichloropropane	1.0	nd	<10	nd	nd	nd	nd
Dibromomethane	1.0	nd	<10	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	<10	nd	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd	<10	nd	nd	nd	nd
Toluene	1.0	nd	<10	nd	nd	nd	nd
Trans-1,3-Dichloropropene	1.0	nd	<10	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	<10	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	25300 E	nd	nd	11	nd
1,3-Dichloropropane	1.0	nd	<10	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	<10	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	<0.1	nd	nd	nd	nd
Chlorobenzene	1.0	nd	<10	nd	nd	nd	nd
Ethylbenzene	1.0	nd	<10	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	<10	nd	nd	nd	nd
Total Xylenes	2.0	nd	<20	nd	nd	nd	nd
Styrene	1.0	nd	<10	nd	nd	nd	nd

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	UB13W-23	MW17-20200305	MW17-20200305 Dup	UB18W-24	MW14-20200305
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Bromoform	1.0	nd	<10	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	<40	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	<10	nd	nd	nd	nd
Bromobenzene	1.0	nd	<10	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	<10	nd	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd	<10	nd	nd	nd	nd
2-Chlorotoluene	1.0	nd	<10	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	<10	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	<10	nd	nd	nd	nd
tert-Butylbenzene	1.0	nd	<10	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	<10	nd	nd	nd	nd
sec-Butylbenzene	1.0	nd	<10	nd	nd	nd	nd
p-Isopropyltoluene	1.0	nd	<10	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	<10	nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	<10	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	<10	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	<10	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	<10	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	2.0	nd	<20	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	<50	nd	nd	nd	nd
Naphthalenes	5.0	nd	<50	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	<50	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		93	92	100	97	113	90
1,2-Dichloroethane-d4		120	121	112	119	65	119
Toluene-d8		85	85	87	91	96	84
4-Bromofluorobenzene		104	106	129	121	95	105

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
"E" Reported result is an estimate because it exceeds the calibration range.
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW14-20200305

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	5.0	5.5	4.8	110	96	13.6	65-135	
Chloromethane	5.0	4.9	5.0	98	100	2.0	65-135	
Vinyl chloride	5.0	4.3	4.6	86	92	6.7	65-135	
Bromomethane	5.0	6.3	5.5	126	110	13.6	65-135	
Chloroethane	5.0	5.0	4.6	100	92	8.3	65-135	
Trichlorofluoromethane	5.0	5.3	6.6	106	132	21.8	65-135	
1,1-Dichloroethene	5.0	4.4	4.7	88	94	6.6	65-135	
Methylene chloride	5.0	4.8	5.3	96	106	9.9	65-135	
Methyl *tert*- Butyl Ether (MTBE)	5.0	6.6	5.4	132	108	20.0	65-135	
trans -1,2-Dichloroethene	5.0	3.6	4.3	72	86	17.7	65-135	
1,1-Dichloroethane	5.0	5.1	5.4	102	108	5.7	65-135	
2,2-Dichloropropane	5.0	4.9	5.4	98	108	9.7	65-135	
cis -1,2-Dichloroethene	5.0	3.9	5.2	78	104	28.6	65-135	
Chloroform	5.0	5.6	6.3	112	126	11.8	65-135	
1,1,1-Trichloroethane (TCA)	5.0	5.0	5.9	100	118	16.5	65-135	
Carbon tetrachloride	5.0	5.3	4.6	106	92	14.1	65-135	
1,1-Dichloropropene	5.0	5.4	4.9	108	98	9.7	65-135	
Benzene	5.0	5.0	5.1	100	102	2.0	65-135	
1,2-Dichloroethane (EDC)	5.0	6.5	6.6	130	132	1.5	65-135	
Trichloroethene (TCE)	5.0	5.1	5.8	102	116	12.8	65-135	
1,2-Dichloropropane	5.0	5.5	5.5	110	110	0.0	65-135	
Dibromomethane	5.0	4.8	4.3	96	86	11.0	65-135	
Bromodichloromethane	5.0	4.0	4.4	80	88	9.5	65-135	
cis-1,3-Dichloropropene	5.0	3.5	3.3	70	66	5.9	65-135	
Toluene	5.0	4.1	4.5	82	90	9.3	65-135	
Trans-1,3-Dichloropropene	5.0	3.2	3.9	64	78	19.7	65-135	
1,1,2-Trichloroethane	5.0	5.3	5.1	106	102	3.8	65-135	
Tetrachloroethene (PCE)	5.0	4.2	5.8	84	116	32.0	65-135	
1,3-Dichloropropane	5.0	5.1	5.7	102	114	11.1	65-135	
Dibromochloromethane	5.0	3.8	5.9	76	118	43.3	65-135	R
1,2-Dibromoethane (EDB)	5.0	4.9	5.3	98	106	7.8	65-135	
Chlorobenzene	5.0	4.4	4.9	88	98	10.8	65-135	
Ethylbenzene	5.0	4.3	5.0	86	100	15.1	65-135	
1,1,1,2-Tetrachloroethane	5.0	3.3	4.2	66	84	24.0	65-135	
Total Xylenes	15.0	13.2	16.7	88	111	23.4	65-135	
Styrene	5.0	4.4	5.0	88	100	12.8	65-135	

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW14-20200305

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	5.0	3.5	3.8	70	76	8.2	65-135	
Isopropylbenzene	5.0	4.2	5.2	84	104	21.3	65-135	
1,1,2,2-Tetrachloroethane	5.0	6.0	4.9	120	98	20.2	65-135	
Bromobenzene	5.0	3.8	3.8	76	76	0.0	65-135	
n-Propylbenzene	5.0	4.8	5.2	96	104	8.0	65-135	
1,2,3-Trichloropropane	5.0	3.5	3.5	70	70	0.0	65-135	
2-Chlorotoluene	5.0	3.9	3.4	78	68	13.7	65-135	
1,3,5-Trimethylbenzene	5.0	3.7	4.3	74	86	15.0	65-135	
4-Chlorotoluene	5.0	3.7	4.1	74	82	10.3	65-135	
tert-Butylbenzene	5.0	3.6	3.6	72	72	0.0	65-135	
1,2,4-Trimethylbenzene	5.0	3.9	4.1	78	82	5.0	65-135	
sec-Butylbenzene	5.0	4.4	4.6	88	92	4.4	65-135	
Isopropyltoluene	5.0	4.6	5.0	92	100	8.3	65-135	
1,3-Dichlorobenzene	5.0	4.8	4.8	96	96	0.0	65-135	
1,4-Dichlorobenzene	5.0	4.9	5.4	98	108	9.7	65-135	
n-Butylbenzene	5.0	5.0	5.4	100	108	7.7	65-135	
1,2-Dichlorobenzene	5.0	5.5	5.8	110	116	5.3	65-135	
1,2-Dibromo-3-Chloropropane	5.0	4.2	5.0	84	100	17.4	65-135	
1,2,4-Trichlorolbenzene	5.0	6.9	5.4	138	108	24.4	65-135	S
Hexachloro-1,3-butadiene	5.0	6.5	5.0	130	100	26.1	65-135	
Naphthalene	5.0	6.3	5.8	126	116	8.3	65-135	
1,2,3-Trichlorobenzene	5.0	5.1	7.5	102	150	38.1	65-135	S, R

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	99	98	65-135
1,2-Dichloroethane-d4	134	124	65-135
Toluene-d8	95	89	65-135
4-Bromofluorobenzene	89	98	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.
"S" Spike recovery outside accepted recovery limits.

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	5.0	5.3	106	80-120	
Chloromethane	5.0	5.7	114	80-120	
Vinyl chloride	5.0	5.4	108	80-120	
Bromomethane	5.0	5.1	102	80-120	
Chloroethane	5.0	4.6	92	80-120	
Trichlorofluoromethane	5.0	5.0	100	80-120	
1,1-Dichloroethene	5.0	5.3	106	80-120	
Methylene chloride	5.0	5.4	108	80-120	
Methyl *tert*- Butyl Ether (MTBE)	5.0	4.4	88	80-120	
trans -1,2-Dichloroethene	5.0	4.4	88	80-120	
1,1-Dichloroethane	5.0	5.3	106	80-120	
2,2-Dichloropropane	5.0	5.2	104	80-120	
cis -1,2-Dichloroethene	5.0	5.0	100	80-120	
Chloroform	5.0	5.4	108	80-120	
1,1,1-Trichloroethane (TCA)	5.0	5.0	100	80-120	
Carbon tetrachloride	5.0	4.8	96	80-120	
1,1-Dichloropropene	5.0	5.3	106	80-120	
Benzene	5.0	5.1	102	80-120	
1,2-Dichloroethane (EDC)	5.0	5.3	106	80-120	
Trichloroethene (TCE)	5.0	4.5	90	80-120	
1,2-Dichloropropane	5.0	4.9	98	80-120	
Dibromomethane	5.0	4.9	98	80-120	
Bromodichloromethane	5.0	4.7	94	80-120	
cis-1,3-Dichloropropene	5.0	5.3	106	80-120	
Toluene	5.0	4.5	90	80-120	
Trans-1,3-Dichloropropene	5.0	5.4	108	80-120	
1,1,2-Trichloroethane	5.0	4.6	92	80-120	
Tetrachloroethene (PCE)	5.0	4.4	88	80-120	
1,3-Dichloropropane	5.0	5.3	106	80-120	
Dibromochloromethane	5.0	4.5	90	80-120	
1,2-Dibromoethane (EDB)	5.0	5.4	108	80-120	
Chlorobenzene	5.0	5.1	102	80-120	
Ethylbenzene	5.0	5.0	100	80-120	
1,1,1,2-Tetrachloroethane	5.0	4.4	88	80-120	
Total Xylenes	15.0	15.0	100	80-120	
Styrene	5.0	4.7	94	80-120	

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	5.0	4.2	84	80-120	
Isopropylbenzene	5.0	4.5	90	80-120	
1,1,2,2-Tetrachloroethane	5.0	5.9	118	80-120	
Bromobenzene	5.0	5.0	100	80-120	
n-Propylbenzene	5.0	5.1	102	80-120	
1,2,3-Trichloropropane	5.0	5.7	114	80-120	
2-Chlorotoluene	5.0	4.7	94	80-120	
1,3,5-Trimethylbenzene	5.0	5.1	102	80-120	
4-Chlorotoluene	5.0	5.0	100	80-120	
tert-Butylbenzene	5.0	5.0	100	80-120	
1,2,4-Trimethylbenzene	5.0	5.2	104	80-120	
sec-Butylbenzene	5.0	5.2	104	80-120	
Isopropyltoluene	5.0	5.2	104	80-120	
1,3-Dichlorobenzene	5.0	5.2	104	80-120	
1,4-Dichlorobenzene	5.0	5.4	108	80-120	
n-Butylbenzene	5.0	4.6	92	80-120	
1,2-Dichlorobenzene	5.0	5.2	104	80-120	
1,2-Dibromo-3-Chloropropane	5.0	4.2	84	80-120	
1,2,4-Trichlorolbenzene	5.0	4.9	98	80-120	
Hexachloro-1,3-butadiene	5.0	4.8	96	80-120	
Naphthalene	5.0	5.6	112	80-120	
1,2,3-Trichlorobenzene	5.0	5.2	104	80-120	

Surrogate Recovery			
Dibromofluoromethane	105	65-135	
1,2-Dichloroethane-d4	119	65-135	
Toluene-d8	121	65-135	
4-Bromofluorobenzene	90	65-135	

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/L)
Method Blank	3/5/2020	85	nd
UB13W-23	3/5/2020	85	25200 E*
MW17-20200305	3/5/2020	87	nd
MW17-20200305 Dup	3/5/2020	91	nd
UB18W-24	3/5/2020	96	nd
MW14-20200305	3/5/2020	84	nd
Practical Quantitation Limit			100

"*" The gasoline range value consist of two chlorinated compounds with elevated concentrations.
“E” Reported value is above the calibration range and is an estimate.
"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-40

Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (µg/L)	Oil (µg/L)
Method Blank	3/5/2020	99	nd	nd
UB13W-23	3/5/2020	100	nd	nd
MW17-20200305	3/5/2020	101	nd	nd
MW17-20200305 Dup	3/5/2020	107	nd	nd
UB18W-24	3/5/2020	102	nd	nd
MW14-20200305	3/5/2020	101	nd	nd
Practical Quantitation Limit			200	400

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Paul Burke

Libby Environmental, Inc.

3322 South Bay Road NE • Olympia, WA 98506-2957

March 16, 2020

John Funderbuck
Urban Environmental Partners, LLC
2324 First Avenue, Suite 203
Seattle, WA 98121

Dear Mr. Funderbuck:

Please find enclosed the analytical data report for the UB20 Project located in Seattle, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of within 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

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Date: 3-13-20 Page: 1 of 1

Client: Urban Environmental Partners
Project Manager: John Funderburk
Address: 2324 First Avenue, Suite 203
Project Name: ~~UB Rainier Ave Mall~~ UB 20
City: Seattle State: WA Zip: 98121
Location: City, State: Seattle, WA
Phone: 206-229-6804 Fax:
Collector: Date of Collection: 3-13-2020
Client Project #
Email: johnfe@vepconsulting.com cc: BrianeDixon@ES.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals	PCE & Degradation	Soil Oxygen Demand	Field Notes
1	UB20-15	15	940	S													X			HOLD
2	UB20-20	20	1000	↓													X			HOLD
3	UB20-25	25	1005														X			RUSH - 24 hr
4	UB20-30	30	1015														X			RUSH - 24 hr
5	UB20-35	35	1030	↓													X			HOLD.
6	~~UB20-Comp~~		1000	↓													X	X		KD 3-13-20
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				

Relinquished by:	Date / Time	Received by:	Date / Time
	3-13-20 1327		3-13-20 1327
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks: Sample UB20-Comp returned to Client Without testing.

TAT: (24HR) 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

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UB20 PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-8

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB20-25	UB20-30	UB20-30 Dup
Date Sampled		N/A	3/12/2020	3/12/2020	3/12/2020
Date Analyzed	PQL (mg/kg)	3/15/2020 (mg/kg)	3/15/2020 (mg/kg)	3/15/2020 (mg/kg)	3/15/2020 (mg/kg)
Vinyl Chloride (VC)	0.02	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd
trans-1,2-Dichloroethene	0.02	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd	0.36	0.36
Trichloroethene (TCE)	0.02	nd	nd	0.51	0.56
Tetrachloroethene (PCE)	0.02	nd	nd	0.047	0.043
Surrogate Recovery					
Dibromofluoromethane		100	86	93	92
1,2-Dichloroethane-d4		95	73	82	81
Toluene-d8		93	98	96	96
4-Bromofluorobenzene		85	94	91	90

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
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Email: libbyenv@gmail.com

UB20 PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-8

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB20-30

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Vinyl Chloride (VC)	0.25	0.19	0.17	75	67	11.8	65-135	
1,1-Dichloroethene	0.25	0.20	0.18	79	70	11.8	65-135	
trans-1,2-Dichloroethene	0.25	0.23	0.20	90	80	11.3	65-135	
cis -1,2-Dichloroethene	0.25	0.34	0.27	135	108	22.2	65-135	
Trichloroethene (TCE)	0.25	0.33	0.22	132	88	40.0	65-135	R
Tetrachloroethene (PCE)	0.25	0.21	0.22	82	90	8.9	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	119	100	65-135
1,2-Dichloroethane-d4	104	89	65-135
Toluene-d8	121	96	65-135
4-Bromofluorobenzene	96	94	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.

ANALYSES PERFORMED BY: Sherry Chilcutt

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UB20 PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-8

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Vinyl Chloride (VC)	0.25	0.21	83	80-120	
1,1-Dichloroethene	0.25	0.24	94	80-120	
trans-1,2-Dichloroethene	0.25	0.23	93	80-120	
cis -1,2-Dichloroethene	0.25	0.29	115	80-120	
Trichloroethene (TCE)	0.25	0.26	103	80-120	
Tetrachloroethene (PCE)	0.25	0.20	80	80-120	
Surrogate Recovery					
Dibromofluoromethane			125	65-135	
1,2-Dichloroethane-d4			115	65-135	
Toluene-d8			122	65-135	
4-Bromofluorobenzene			95	65-135	

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

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UB20 PROJECT
Urban Environmental Partners, LLC
Libby Project # L200313-8
Date Received 3/13/2020
Time Received 1:27 PM

Received By KD

Sample Receipt Checklist

Chain of Custody

1. Is the Chain of Custody is complete?	☑ Yes	☐ No	
2. How was the sample delivered?	☐ Hand Delivered	☑ Picked Up	☐ Shipped

Log In

3. Cooler or Shipping Container is present.	☑ Yes	☐ No	☐ N/A
4. Cooler or Shipping Container is in good condition.	☑ Yes	☐ No	☐ N/A
5. Cooler or Shipping Container has Custody Seals present.	☐ Yes	☑ No	☐ N/A
6. Was an attempt made to cool the samples?	☑ Yes	☐ No	☐ N/A
7. Temperature of cooler (0°C to 8°C recommended)	0.3 °C		
8. Temperature of sample(s) (0°C to 8°C recommended)	6.2 °C		
9. Did all containers arrive in good condition (unbroken)?	☑ Yes	☐ No	
10. Is it clear what analyses were requested?	☑ Yes	☐ No	
11. Did container labels match Chain of Custody?	☑ Yes	☐ No	
12. Are matrices correctly identified on Chain of Custody?	☑ Yes	☐ No	
13. Are correct containers used for the analysis indicated?	☑ Yes	☐ No	
14. Is there sufficient sample volume for indicated analysis?	☑ Yes	☐ No	
15. Were all containers properly preserved per each analysis?	☑ Yes	☐ No	
16. Were VOA vials collected correctly (no headspace)?	☐ Yes	☐ No	☑ N/A
17. Were all holding times able to be met?	☑ Yes	☐ No	

Discrepancies/ Notes

18. Was client notified of all discrepancies? ☑ Yes ☐ No ☐ N/A

Person Notified: Brian Dixon — Date: 3/13/2020
By Whom: Kory Dixon — Via: In Person
Regarding: Return sample to client

19. Comments. Returned sample UB20-Comp to client. Unable to perform requested analysis.
Completed a new COC to relinquish sample.

Libby Environmental, Inc.
3322 South Bay Road NE • Olympia, WA 98506-2957

March 14, 2020

John Funderbuck
Urban Environmental Partners, LLC
2324 First Avenue, Suite 203
Seattle, WA 98121

Dear Mr. Funderbuck:

Please find enclosed the analytical data report for the Rainier Mall Project located in Seattle, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of within 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

Phone (360) 352-2110 • Fax (360) 352-4154 • libbyenv@gmail.com

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

3322 South Bay Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Urban Environmental / Dixon Environ.
Address: 2324 First Ave Suite 203
City: Seattle State: WA Zip: 98121
Phone: 206-729-6804 Fax:
Client Project #

Date: 3/5/20 Page: 1 of 1
Project Manager: Brian Dixon, John Funderburk
Project Name: Rainier Mall
Location: 4208 Rainier Ave S City, State: Seattle, WA
Collector: B. Dixon Date of Collection: 3-5-20
Email: johnf@urbanenvironmental.com

	Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	cPAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals	Field Notes
1	UB17-3	3	830	S		X	X			X								
2	UB13-4	4	910	S		X	X			X								
3	UB17-11	11	835	S		X	X			X								
4	UB13-23	23	855	S		X	X			X								
5	UB13-9	9	825	S		X	X			X								
6	UB14-5	5	1000	S		X	X			X								
7	UB18-3	3	1113	S		X	X			X								
8	UB18-12	12	1130	S		X	X			X								
9	UB18-30	30	1125	S		X	X			X								Rush
10	UB15-6	6	1105	S		X	X			X								
11	UB19-20	20	1300	S		X	X			X								HOLD
12	UB19-24	24	1310	S		PCE only X	X			not needed as per Email X								~~HOLD~~ Rush
13	UB19-30	30	1330	S		X	X			X								HOLD
14	UB19W-25	25	1410	W		PCE only X	X			X								~~HOLD~~ Rush
15																		
16																		
17																		

Relinquished by:	Date / Time	Received by:	Date / Time
	3-5-20 315		3/5/20 315
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks: standard Trn

TAT: 24HR 48HR (5-DAY)

Distribution: White - Lab, Yellow - File, Pink - Originator

Libby Environmental, Inc.

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB17-3	UB13-4	UB17-11	UB13-23	UB13-9
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/10/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd	nd	nd	nd	nd
Chloromethane	0.06	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	0.033	1.8
Bromomethane	0.09	nd	nd	nd	nd	nd	nd
Chloroethane	0.06	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.02	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd	nd	nd	nd	0.21
1,1-Dichloroethane	0.03	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd	nd	nd	0.16	33
Chloroform	0.02	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.03	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	1.8	nd
1,2-Dichloropropane	0.02	nd	nd	nd	nd	nd	nd
Dibromomethane	0.04	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.02	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	nd	143	0.25
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.03	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd	nd	nd	nd	0.010
Chlorobenzene	0.02	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.02	nd	nd	nd	nd	nd	nd

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB17-3	UB13-4	UB17-11	UB13-23	UB13-9
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/10/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Propylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	0.03	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.03	nd	0.031	nd	nd	nd	nd
n-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd	nd	nd	nd	nd
Naphthalenes	0.10	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		106	91	91	101	93	91
1,2-Dichloroethane-d4		109	91	91	97	96	92
Toluene-d8		94	90	89	101	88	95
4-Bromofluorobenzene		75	83	75	80	80	83

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Melissa Harrington

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB14-5	UB18-3	UB18-3 Dup	UB18-12	UB18-30	UB18-30 Dup
Date Sampled	Reporting	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/6/2020	3/6/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd	nd	nd	nd	nd
Chloromethane	0.06	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.02	nd	nd	nd	nd	nd	nd
Bromomethane	0.09	nd	nd	nd	nd	nd	nd
Chloroethane	0.06	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	0.05	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.05	nd	nd	nd	nd	nd	nd
Methylene chloride	0.02	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd	nd	nd	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	0.03	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	0.02	nd	0.022	nd	nd	nd	nd
Chloroform	0.02	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	0.03	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Benzene	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.02	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	0.02	nd	nd	nd	nd	nd	nd
Dibromomethane	0.04	nd	nd	nd	nd	nd	nd
Bromodichloromethane	0.02	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd	nd	nd	nd	nd
Toluene	0.10	nd	nd	nd	nd	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd	nd	0.027	nd	nd
1,3-Dichloropropane	0.05	nd	nd	nd	nd	nd	nd
Dibromochloromethane	0.03	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd	nd	nd	nd	nd
Chlorobenzene	0.02	nd	nd	nd	nd	nd	nd
Ethylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Total Xylenes	0.15	nd	nd	nd	nd	nd	nd
Styrene	0.02	nd	nd	nd	nd	nd	nd

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		UB14-5	UB18-3	UB18-3 Dup	UB18-12	UB18-30	UB18-30 Dup
Date Sampled	Reporting	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020	3/5/2020
Date Analyzed	Limits	3/10/2020	3/10/2020	3/10/2020	3/10/2020	3/6/2020	3/6/2020
	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd	nd	nd	nd	nd
Isopropylbenzene	0.05	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd	nd	nd	nd	nd
Bromobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Propylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	0.03	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	0.03	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd	nd	nd	nd	nd
n-Butylbenzene	0.03	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd	nd	nd	nd	nd
Naphthalenes	0.10	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		92	90	94	88	107	112
1,2-Dichloroethane-d4		90	87	94	81	103	124
Toluene-d8		96	87	87	89	95	93
4-Bromofluorobenzene		73	70	71	65	81	90

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Melissa Harrington

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB15-6
Date Sampled	Reporting	N/A	3/5/2020
Date Analyzed	Limits	3/6/2020	3/10/2020
	(mg/kg)	(mg/kg)	(mg/kg)
Dichlorodifluoromethane	0.06	nd	nd
Chloromethane	0.06	nd	nd
Vinyl chloride	0.02	nd	nd
Bromomethane	0.09	nd	nd
Chloroethane	0.06	nd	nd
Trichlorofluoromethane	0.05	nd	nd
1,1-Dichloroethene	0.05	nd	nd
Methylene chloride	0.02	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	0.05	nd	nd
trans -1,2-Dichloroethene	0.02	nd	nd
1,1-Dichloroethane	0.03	nd	nd
2,2-Dichloropropane	0.05	nd	nd
cis -1,2-Dichloroethene	0.02	nd	nd
Chloroform	0.02	nd	nd
1,1,1-Trichloroethane (TCA)	0.02	nd	nd
Carbon tetrachloride	0.03	nd	nd
1,1-Dichloropropene	0.02	nd	nd
Benzene	0.02	nd	nd
1,2-Dichloroethane (EDC)	0.03	nd	nd
Trichloroethene (TCE)	0.02	nd	nd
1,2-Dichloropropane	0.02	nd	nd
Dibromomethane	0.04	nd	nd
Bromodichloromethane	0.02	nd	nd
cis-1,3-Dichloropropene	0.02	nd	nd
Toluene	0.10	nd	nd
Trans-1,3-Dichloropropene	0.03	nd	nd
1,1,2-Trichloroethane	0.03	nd	nd
Tetrachloroethene (PCE)	0.02	nd	2.2
1,3-Dichloropropane	0.05	nd	nd
Dibromochloromethane	0.03	nd	nd
1,2-Dibromoethane (EDB) *	0.005	nd	nd
Chlorobenzene	0.02	nd	nd
Ethylbenzene	0.03	nd	nd
1,1,1,2-Tetrachloroethane	0.05	nd	nd
Total Xylenes	0.15	nd	nd
Styrene	0.02	nd	nd

Libby Environmental, Inc.

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB15-6
Date Sampled	Reporting	N/A	3/5/2020
Date Analyzed	Limits	3/6/2020	3/10/2020
	(mg/kg)	(mg/kg)	(mg/kg)
Bromoform	0.03	nd	nd
Isopropylbenzene	0.05	nd	nd
1,1,2,2-Tetrachloroethane	0.05	nd	nd
Bromobenzene	0.03	nd	nd
n-Propylbenzene	0.03	nd	nd
1,2,3-Trichloropropane	0.04	nd	nd
2-Chlorotoluene	0.03	nd	nd
1,3,5-Trimethylbenzene	0.03	nd	nd
4-Chlorotoluene	0.03	nd	nd
tert-Butylbenzene	0.03	nd	nd
1,2,4-Trimethylbenzene	0.03	nd	nd
sec-Butylbenzene	0.03	nd	nd
p-Isopropyltoluene	0.03	nd	nd
1,3-Dichlorobenzene	0.03	nd	nd
1,4-Dichlorobenzene	0.03	nd	nd
n-Butylbenzene	0.03	nd	nd
1,2-Dichlorobenzene	0.05	nd	nd
1,2-Dibromo-3-Chloropropane	0.05	nd	nd
1,2,4-Trichlorolbenzene	0.05	nd	nd
Hexachloro-1,3-butadiene	0.10	nd	nd
Naphthalenes	0.10	nd	nd
1,2,3-Trichlorobenzene	0.10	nd	nd
Surrogate Recovery			
Dibromofluoromethane		110	103
1,2-Dichloroethane-d4		120	109
Toluene-d8		100	97
4-Bromofluorobenzene		86	79

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
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Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Soil

Sample Description		Method Blank	UB19-24
Date Sampled	Reporting	N/A	3/5/2020
Date Analyzed	Limits	3/6/2020	3/6/2020
	(mg/kg)	(mg/kg)	(mg/kg)
Vinyl chloride	0.02	nd	nd
1,1-Dichloroethene	0.05	nd	nd
trans-1,2-Dichloroethene	0.02	nd	nd
cis-1,2-Dichloroethene	0.02	nd	nd
Trichloroethene (TCE)	0.02	nd	nd
Tetrachloroethene (PCE)	0.02	nd	nd
Surrogate Recovery			
Dibromofluoromethane		110	68
1,2-Dichloroethane-d4		120	90
Toluene-d8		100	92
4-Bromofluorobenzene		86	79

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
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Seattle, Washington
Libby Project # L200305-6

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: L200304-40

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	0.25	0.13	0.13	51	50	0.8	65-135	S
Chloromethane	0.25	0.21	0.22	84	90	6.9	65-135	
Vinyl chloride	0.25	0.22	0.24	89	96	8.2	65-135	
Bromomethane	0.25	0.17	0.18	70	72	3.4	65-135	
Chloroethane	0.25	0.10	0.10	38	40	6.1	65-135	S
Trichlorofluoromethane	0.25	0.032	0.056	13	22	54.0	65-135	R, S
1,1-Dichloroethene	0.25	0.19	0.21	77	83	7.0	65-135	
Methylene chloride	0.25	0.23	0.26	90	104	13.6	65-135	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.15	0.16	60	63	3.9	65-135	S
trans -1,2-Dichloroethene	0.25	0.21	0.22	84	89	5.6	65-135	
1,1-Dichloroethane	0.25	0.23	0.24	93	98	4.6	65-135	
2,2-Dichloropropane	0.25	0.21	0.21	82	84	1.4	65-135	
cis -1,2-Dichloroethene	0.25	0.26	0.27	102	107	4.6	65-135	
Chloroform	0.25	0.23	0.23	90	94	3.9	65-135	
1,1,1-Trichloroethane (TCA)	0.25	0.19	0.20	78	80	2.5	65-135	
Carbon tetrachloride	0.25	0.18	0.18	72	72	1.1	65-135	
1,1-Dichloropropene	0.25	0.19	0.20	76	80	4.6	65-135	
Benzene	0.25	0.24	0.24	95	98	2.9	65-135	
1,2-Dichloroethane (EDC)	0.25	0.25	0.25	100	99	0.4	65-135	
Trichloroethene (TCE)	0.25	0.21	0.22	85	88	3.7	65-135	
1,2-Dichloropropane	0.25	0.27	0.28	110	112	2.5	65-135	
Dibromomethane	0.25	0.26	0.25	103	101	2.4	65-135	
Bromodichloromethane	0.25	0.24	0.25	97	100	2.8	65-135	
cis-1,3-Dichloropropene	0.25	0.17	0.17	67	69	2.9	65-135	
Toluene	0.25	0.24	0.25	96	98	2.5	65-135	
Trans-1,3-Dichloropropene	0.25	0.20	0.22	81	89	9.4	65-135	
1,1,2-Trichloroethane	0.25	0.31	0.34	125	137	9.1	65-135	S
Tetrachloroethene (PCE)	0.25	0.22	0.23	88	91	3.6	65-135	
1,3-Dichloropropane	0.25	0.22	0.24	89	96	7.8	65-135	
Dibromochloromethane	0.25	0.22	0.24	90	95	5.6	65-135	
1,2-Dibromoethane (EDB)	0.25	0.251	0.27	100	107	6.6	65-135	
Chlorobenzene	0.25	0.25	0.27	101	107	5.4	65-135	
Ethylbenzene	0.25	0.23	0.24	90	94	4.3	65-135	
1,1,1,2-Tetrachloroethane	0.25	0.27	0.29	109	116	6.4	65-135	
Total Xylenes	0.75	0.62	0.67	83	89	7.8	65-135	
Styrene	0.25	0.25	0.28	98	112	13.3	65-135	

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Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: L200304-40

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	0.25	0.27	0.28	108	112	3.6	65-135	
Isopropylbenzene	0.25	0.19	0.20	77	81	4.6	65-135	
1,1,2,2-Tetrachloroethane	0.25	0.33	0.37	131	147	11.2	65-135	S
Bromobenzene	0.25	0.21	0.24	84	96	14.2	65-135	
n-Propylbenzene	0.25	0.23	0.24	93	95	1.7	65-135	
1,2,3-Trichloropropane	0.25	0.27	0.29	107	118	9.3	65-135	
2-Chlorotoluene	0.25	0.23	0.25	92	98	6.7	65-135	
1,3,5-Trimethylbenzene	0.25	0.22	0.23	86	91	5.9	65-135	
4-Chlorotoluene	0.25	0.22	0.23	88	92	4.0	65-135	
tert-Butylbenzene	0.25	0.18	0.18	70	73	3.9	65-135	
1,2,4-Trimethylbenzene	0.25	0.21	0.23	86	90	5.0	65-135	
sec-Butylbenzene	0.25	0.23	0.25	93	99	5.8	65-135	
Isopropyltoluene	0.25	0.21	0.21	83	82	1.0	65-135	
1,3-Dichlorobenzene	0.25	0.25	0.28	100	112	11.7	65-135	
1,4-Dichlorobenzene	0.25	0.25	0.28	99	112	12.2	65-135	
n-Butylbenzene	0.25	0.23	0.22	90	90	0.4	65-135	
1,2-Dichlorobenzene	0.25	0.22	0.26	88	103	16.4	65-135	
1,2-Dibromo-3-Chloropropane	0.25	0.27	0.32	110	128	15.5	65-135	
1,2,4-Trichlorolbenzene	0.25	0.22	0.28	88	113	25.1	65-135	
Hexachloro-1,3-butadiene	0.25	0.29	0.30	118	120	1.7	65-135	
Naphthalene	0.25	0.13	0.20	51	81	45.3	65-135	R, S
1,2,3-Trichlorobenzene	0.25	0.22	0.33	88	131	39.4	65-135	R

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	93	93	65-135
1,2-Dichloroethane-d4	94	104	65-135
Toluene-d8	101	99	65-135
4-Bromofluorobenzene	103	105	65-135

ACCEPTABLE RPD IS 35%
"S" Spike compound recovery is outside acceptance limits.
"R" High relative percent difference observed.

ANALYSES PERFORMED BY: Melissa Harrington

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Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	0.25	0.21	84	80-120	
Chloromethane	0.25	0.26	104	80-120	
Vinyl chloride	0.25	0.26	104	80-120	
Bromomethane	0.25	0.25	100	80-120	
Chloroethane	0.25	0.30	120	80-120	
Trichlorofluoromethane	0.25	0.22	88	80-120	
1,1-Dichloroethene	0.25	0.23	92	80-120	
Methylene chloride	0.25	0.30	120	80-120	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.21	84	80-120	
trans -1,2-Dichloroethene	0.25	0.24	96	80-120	
1,1-Dichloroethane	0.25	0.27	108	80-120	
2,2-Dichloropropane	0.25	0.25	100	80-120	
cis -1,2-Dichloroethene	0.25	0.27	108	80-120	
Chloroform	0.25	0.28	112	80-120	
1,1,1-Trichloroethane (TCA)	0.25	0.24	96	80-120	
Carbon tetrachloride	0.25	0.23	92	80-120	
1,1-Dichloropropene	0.25	0.23	92	80-120	
Benzene	0.25	0.28	112	80-120	
1,2-Dichloroethane (EDC)	0.25	0.27	108	80-120	
Trichloroethene (TCE)	0.25	0.25	100	80-120	
1,2-Dichloropropane	0.25	0.28	112	80-120	
Dibromomethane	0.25	0.29	116	80-120	
Bromodichloromethane	0.25	0.29	116	80-120	
cis-1,3-Dichloropropene	0.25	0.23	92	80-120	
Toluene	0.25	0.25	100	80-120	
Trans-1,3-Dichloropropene	0.25	0.23	92	80-120	
1,1,2-Trichloroethane	0.25	0.26	104	80-120	
Tetrachloroethene (PCE)	0.25	0.21	84	80-120	
1,3-Dichloropropane	0.25	0.28	112	80-120	
Dibromochloromethane	0.25	0.29	116	80-120	
1,2-Dibromoethane (EDB)	0.25	0.263	105	80-120	
Chlorobenzene	0.25	0.27	108	80-120	
Ethylbenzene	0.25	0.23	92	80-120	
1,1,1,2-Tetrachloroethane	0.25	0.29	116	80-120	
Total Xylenes	0.75	0.71	95	80-120	
Styrene	0.25	0.21	84	80-120	

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Libby Project # L200305-6

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	0.25	0.29	116	80-120	
Isopropylbenzene	0.25	0.20	80	80-120	
1,1,2,2-Tetrachloroethane	0.25	0.22	88	80-120	
Bromobenzene	0.25	0.26	104	80-120	
n-Propylbenzene	0.25	0.24	96	80-120	
1,2,3-Trichloropropane	0.25	0.30	120	80-120	
2-Chlorotoluene	0.25	0.22	88	80-120	
1,3,5-Trimethylbenzene	0.25	0.21	84	80-120	
4-Chlorotoluene	0.25	0.23	92	80-120	
tert-Butylbenzene	0.25	0.21	84	80-120	
1,2,4-Trimethylbenzene	0.25	0.21	84	80-120	
sec-Butylbenzene	0.25	0.22	88	80-120	
Isopropyltoluene	0.25	0.25	100	80-120	
1,3-Dichlorobenzene	0.25	0.30	120	80-120	
1,4-Dichlorobenzene	0.25	0.30	120	80-120	
n-Butylbenzene	0.25	0.23	92	80-120	
1,2-Dichlorobenzene	0.25	0.26	104	80-120	
1,2-Dibromo-3-Chloropropane	0.25	0.23	92	80-120	
1,2,4-Trichlorolbenzene	0.25	0.21	84	80-120	
Hexachloro-1,3-butadiene	0.25	0.24	96	80-120	
Naphthalene	0.25	0.23	92	80-120	
1,2,3-Trichlorobenzene	0.25	0.23	92	80-120	

Surrogate Recovery			
Dibromofluoromethane	112	65-135	
1,2-Dichloroethane-d4	107	65-135	
Toluene-d8	95	65-135	
4-Bromofluorobenzene	100	65-135	

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QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB18-30

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Dichlorodifluoromethane	0.25	0.17	0.18	70	72	3.4	65-135	
Chloromethane	0.25	0.26	0.28	104	110	5.6	65-135	
Vinyl chloride	0.25	0.28	0.29	111	115	3.5	65-135	
Bromomethane	0.25	0.23	0.23	91	94	3.0	65-135	
Chloroethane	0.25	0.13	0.13	50	53	4.7	65-135	
Trichlorofluoromethane	0.25	0.17	0.18	66	71	7.0	65-135	
1,1-Dichloroethene	0.25	0.24	0.24	96	96	0.0	65-135	
Methylene chloride	0.25	0.30	0.32	119	127	6.5	65-135	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.19	0.19	77	76	1.6	65-135	
trans -1,2-Dichloroethene	0.25	0.24	0.25	96	100	3.7	65-135	
1,1-Dichloroethane	0.25	0.28	0.30	113	120	6.5	65-135	
2,2-Dichloropropane	0.25	0.24	0.25	95	100	4.5	65-135	
cis -1,2-Dichloroethene	0.25	0.27	0.28	107	113	5.5	65-135	
Chloroform	0.25	0.27	0.33	106	134	22.7	65-135	
1,1,1-Trichloroethane (TCA)	0.25	0.22	0.23	89	92	3.5	65-135	
Carbon tetrachloride	0.25	0.20	0.20	78	80	2.5	65-135	
1,1-Dichloropropene	0.25	0.23	0.24	94	96	2.1	65-135	
Benzene	0.25	0.30	0.30	120	119	0.3	65-135	
1,2-Dichloroethane (EDC)	0.25	0.25	0.27	101	106	5.4	65-135	
Trichloroethene (TCE)	0.25	0.23	0.24	90	94	4.8	65-135	
1,2-Dichloropropane	0.25	0.31	0.32	123	128	4.1	65-135	
Dibromomethane	0.25	0.29	0.30	117	119	1.4	65-135	
Bromodichloromethane	0.25	0.26	0.30	104	119	13.2	65-135	
cis-1,3-Dichloropropene	0.25	0.19	0.20	76	78	3.6	65-135	
Toluene	0.25	0.28	0.28	111	113	2.1	65-135	
Trans-1,3-Dichloropropene	0.25	0.25	0.25	101	101	0.4	65-135	
1,1,2-Trichloroethane	0.25	0.31	0.32	124	128	2.9	65-135	
Tetrachloroethene (PCE)	0.25	0.23	0.24	90	94	4.3	65-135	
1,3-Dichloropropane	0.25	0.27	0.28	108	113	4.3	65-135	
Dibromochloromethane	0.25	0.26	0.28	103	112	8.6	65-135	
1,2-Dibromoethane (EDB)	0.25	0.29	0.31	116	122	5.0	65-135	
Chlorobenzene	0.25	0.27	0.28	106	112	5.5	65-135	
Ethylbenzene	0.25	0.27	0.24	108	97	11.3	65-135	
1,1,1,2-Tetrachloroethane	0.25	0.29	0.32	116	126	8.6	65-135	
Total Xylenes	0.75	0.89	0.67	118	90	27.2	65-135	
Styrene	0.25	0.23	0.20	92	80	13.9	65-135	

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QA/QC for Volatile Organic Compounds by EPA Method 8260D in Soil

Matrix Spike Sample Identification: UB18-30

	Spiked Conc. (mg/kg)	MS Response (mg/kg)	MSD Response (mg/kg)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	0.25	0.29	0.31	116	124	6.7	65-135	
Isopropylbenzene	0.25	0.18	0.17	73	69	6.2	65-135	
1,1,2,2-Tetrachloroethane	0.25	0.30	0.26	120	104	14.0	65-135	
Bromobenzene	0.25	0.23	0.26	92	104	12.2	65-135	
n-Propylbenzene	0.25	0.24	0.24	94	98	3.8	65-135	
1,2,3-Trichloropropane	0.25	0.33	0.28	130	112	14.8	65-135	
2-Chlorotoluene	0.25	0.22	0.22	89	90	0.9	65-135	
1,3,5-Trimethylbenzene	0.25	0.23	0.22	91	88	3.6	65-135	
4-Chlorotoluene	0.25	0.22	0.23	88	91	3.1	65-135	
tert-Butylbenzene	0.25	0.18	0.18	72	70	2.2	65-135	
1,2,4-Trimethylbenzene	0.25	0.30	0.21	120	86	33.1	65-135	
sec-Butylbenzene	0.25	0.28	0.22	112	90	21.9	65-135	
Isopropyltoluene	0.25	0.18	0.18	72	70	3.4	65-135	
1,3-Dichlorobenzene	0.25	0.27	0.30	107	119	10.3	65-135	
1,4-Dichlorobenzene	0.25	0.27	0.29	108	117	8.2	65-135	
n-Butylbenzene	0.25	0.21	0.19	84	75	10.6	65-135	
1,2-Dichlorobenzene	0.25	0.24	0.27	97	109	11.3	65-135	
1,2-Dibromo-3-Chloropropane	0.25	0.26	0.15	104	60	54.0	65-135	
1,2,4-Trichlorolbenzene	0.25	0.20	0.17	80	66	19.1	65-135	
Hexachloro-1,3-butadiene	0.25	0.26	0.16	104	64	47.4	65-135	R, S
Naphthalene	0.25	0.17	0.22	68	86	23.4	65-135	
1,2,3-Trichlorobenzene	0.25	0.20	0.17	81	68	17.8	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	99	102	65-135
1,2-Dichloroethane-d4	102	101	65-135
Toluene-d8	98	98	65-135
4-Bromofluorobenzene	98	98	65-135

ACCEPTABLE RPD IS 35%
"S" Spike compound recovery is outside acceptance limits.
"R" High relative percent difference observed.

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Dichlorodifluoromethane	0.25	0.26	104	80-120	
Chloromethane	0.25	0.29	116	80-120	
Vinyl chloride	0.25	0.24	95	80-120	
Bromomethane	0.25	0.23	92	80-120	
Chloroethane	0.25	0.30	119	80-120	
Trichlorofluoromethane	0.25	0.20	82	80-120	
1,1-Dichloroethene	0.25	0.24	95	80-120	
Methylene chloride	0.25	0.28	112	80-120	
Methyl *tert*- Butyl Ether (MTBE)	0.25	0.24	95	80-120	
trans -1,2-Dichloroethene	0.25	0.23	94	80-120	
1,1-Dichloroethane	0.25	0.27	106	80-120	
2,2-Dichloropropane	0.25	0.23	94	80-120	
cis -1,2-Dichloroethene	0.25	0.24	98	80-120	
Chloroform	0.25	0.25	100	80-120	
1,1,1-Trichloroethane (TCA)	0.25	0.22	86	80-120	
Carbon tetrachloride	0.25	0.21	82	80-120	
1,1-Dichloropropene	0.25	0.22	89	80-120	
Benzene	0.25	0.26	104	80-120	
1,2-Dichloroethane (EDC)	0.25	0.28	112	80-120	
Trichloroethene (TCE)	0.25	0.22	88	80-120	
1,2-Dichloropropane	0.25	0.30	119	80-120	
Dibromomethane	0.25	0.30	118	80-120	
Bromodichloromethane	0.25	0.29	115	80-120	
cis-1,3-Dichloropropene	0.25	0.21	84	80-120	
Toluene	0.25	0.24	96	80-120	
Trans-1,3-Dichloropropene	0.25	0.27	106	80-120	
1,1,2-Trichloroethane	0.25	0.29	114	80-120	
Tetrachloroethene (PCE)	0.25	0.20	82	80-120	
1,3-Dichloropropane	0.25	0.29	117	80-120	
Dibromochloromethane	0.25	0.30	119	80-120	
1,2-Dibromoethane (EDB)	0.25	0.29	115	80-120	
Chlorobenzene	0.25	0.26	105	80-120	
Ethylbenzene	0.25	0.22	87	80-120	
1,1,1,2-Tetrachloroethane	0.25	0.30	119	80-120	
Total Xylenes	0.75	0.75	99	80-120	
Styrene	0.25	0.22	88	80-120	

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Laboratory Control Sample

	Spiked Conc. (mg/kg)	LCS Response (mg/kg)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	0.25	0.27	109	80-120	
Isopropylbenzene	0.25	0.21	84	80-120	
1,1,2,2-Tetrachloroethane	0.25	0.28	112	80-120	
Bromobenzene	0.25	0.25	100	80-120	
n-Propylbenzene	0.25	0.21	86	80-120	
1,2,3-Trichloropropane	0.25	0.28	112	80-120	
2-Chlorotoluene	0.25	0.21	84	80-120	
1,3,5-Trimethylbenzene	0.25	0.22	88	80-120	
4-Chlorotoluene	0.25	0.25	98	80-120	
tert-Butylbenzene	0.25	0.22	86	80-120	
1,2,4-Trimethylbenzene	0.25	0.20	80	80-120	
sec-Butylbenzene	0.25	0.22	86	80-120	
Isopropyltoluene	0.25	0.20	80	80-120	
1,3-Dichlorobenzene	0.25	0.30	120	80-120	
1,4-Dichlorobenzene	0.25	0.28	114	80-120	
n-Butylbenzene	0.25	0.21	83	80-120	
1,2-Dichlorobenzene	0.25	0.28	112	80-120	
1,2-Dibromo-3-Chloropropane	0.25	0.24	97	80-120	
1,2,4-Trichlorolbenzene	0.25	0.28	113	80-120	
Hexachloro-1,3-butadiene	0.25	0.26	104	80-120	
Naphthalene	0.25	0.21	85	80-120	
1,2,3-Trichlorobenzene	0.25	0.29	118	80-120	

Surrogate Recovery			
Dibromofluoromethane	100	65-135	
1,2-Dichloroethane-d4	105	65-135	
Toluene-d8	95	65-135	
4-Bromofluorobenzene	100	65-135	

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Analyses of Gasoline (NWTPH-Gx) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (mg/kg)
Method Blank	3/10/2020	94	nd
UB17-3	3/10/2020	90	nd
UB13-4	3/10/2020	89	nd
UB17-11	3/10/2020	101	nd
UB13-23	3/10/2020	88	160 *
UB13-9	3/10/2020	95	nd
UB14-5	3/10/2020	96	nd
UB18-3	3/10/2020	87	nd
UB18-3 Dup	3/10/2020	87	nd
UB18-12	3/10/2020	89	nd
UB18-30	3/6/2020	95	nd
UB18-30 Dup	3/6/2020	93	nd
UB15-6	3/10/2020	97	nd
Practical Quantitation Limit			10

"*" The gasoline range value consist of a chlorinated compound with elevated concentrations.
"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

ANALYSES PERFORMED BY: Melissa Harrington & Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Soil

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (mg/kg)	Oil (mg/kg)
Method Blank	3/9/2020	92	nd	nd
UB17-3	3/9/2020	98	nd	nd
UB13-4	3/9/2020	71	nd	nd
UB17-11	3/9/2020	101	nd	nd
UB13-23	3/9/2020	72	nd	nd
UB13-9	3/9/2020	98	nd	nd
UB14-5	3/9/2020	73	nd	nd
UB18-3	3/9/2020	109	nd	nd
UB18-12	3/9/2020	99	nd	nd
UB18-30	3/6/2020	74	nd	nd
UB15-6	3/9/2020	115	nd	nd
Practical Quantitation Limit			50	250

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

ANALYSES PERFORMED BY: Jenny Anderson

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	UB19W-25	UB19W-25 Dup
Date Sampled	Reporting	N/A	3/5/2020	3/5/2020
Date Analyzed	Limits	3/6/2020	3/6/2020	3/6/2020
	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Vinyl chloride	0.2	nd	nd	nd
1,1-Dichloroethene	0.5	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd	nd
cis-1,2-Dichloroethene	1.0	nd	2.9	3.0
Trichloroethene (TCE)	0.4	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	nd	nd
Surrogate Recovery				
Dibromofluoromethane		110	93	103
1,2-Dichloroethane-d4		120	87	101
Toluene-d8		100	88	91
4-Bromofluorobenzene		86	77	75

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200305-6

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW14-20200305

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Vinyl chloride	5.0	6.1	6.0	122	120	1.7	65-135	
1,1-Dichloroethene	5.0	5.5	5.5	110	110	0.0	65-135	
trans -1,2-Dichloroethene	5.0	5.6	5.5	112	110	1.8	65-135	
cis -1,2-Dichloroethene	5.0	5.5	5.6	110	112	1.8	65-135	
Trichloroethene (TCE)	5.0	5.2	5.4	104	108	3.8	65-135	
Tetrachloroethene (PCE)	5.0	5.3	5.2	106	104	1.9	65-135	

Surrogate Recovery (%)	MS	MSD		
Dibromofluoromethane	94	95	65-135	
1,2-Dichloroethane-d4	93	86	65-135	
Toluene-d8	100	96	65-135	
4-Bromofluorobenzene	100	99	65-135	

ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Vinyl chloride	5.0	5.7	114	80-120	
1,1-Dichloroethene	5.0	4.8	96	80-120	
trans -1,2-Dichloroethene	5.0	4.7	94	80-120	
cis -1,2-Dichloroethene	5.0	4.9	98	80-120	
Trichloroethene (TCE)	5.0	4.4	88	80-120	
Tetrachloroethene (PCE)	5.0	4.1	82	80-120	

Surrogate Recovery			
Dibromofluoromethane	100	65-135	
1,2-Dichloroethane-d4	105	65-135	
Toluene-d8	95	65-135	
4-Bromofluorobenzene	100	65-135	

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

3322 South Bay Road NE • Olympia, WA 98506-2957

April 1, 2020

John Funderbuck
Urban Environmental Partners, LLC
2324 First Avenue, Suite 203
Seattle, WA 98121

Dear Mr. Funderbuck:

Please find enclosed the analytical data report for the Rainier Mall Project located in Seattle, Washington.

The results of the analyses are summarized in the attached tables. Applicable detection limits and QA/QC data are included. The sample(s) will be disposed of within 30 days unless we are contacted to arrange long term storage.

Libby Environmental, Inc. appreciates the opportunity to have provided analytical services for this project. If you have any further questions about the data report, please give me a call. It was a pleasure working with you on this project, and we are looking forward to the next opportunity to work together.

Sincerely,

Sherry L. Chilcutt
Senior Chemist
Libby Environmental, Inc.

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Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

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Date: 3/13/20 Page: 1 of 1

Client: Urban Environmental Partners
Address: 2324 First Avenue, Suite 203
City: Seattle State: WA Zip: 98121
Phone: 206-229-6004 Fax:
Client Project #

Project Manager: John Funderburk cc: Brian Dixon
Project Name: Rainier Mall
Location: 4208 Rainier Ave S. City, State: Seattle WA
Collector: BD/MG Date of Collection: 3/12-3/13
Email: johnf@uepconsulting.com cc: BrianeDixon@ES.com

Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	~~BTEX 8021~~	~~NWTPH-HCID~~ Nitrate	~~NWTPH-Dx~~ Chloride	NWTPH-Dx/Dx	~~cPAH 8270~~ Sulfate	PAH 8270	~~Semi-VOA 8270~~ Iron	~~PCB 8082~~ Calcium	~~MTCA-5 Metals~~ Magnesium	~~RCRA-8 Metals~~ Potassium	PCE & Degradation	Sodium	Alkalinity	Methane	Field Notes
1 MW1-20200313		1040	W														X				
2 MW2-20200312		1140															X				
3 MW3-20200312		1010															X				
4 MW4-20200312		1405															X				
5 MW5-20200312		1440															X				
6 MW6-20200312		1234															X				
7 MW7-20200312		1305															X				
8 MW8-20200312		1350															X				
9 MW9-20200312		1230															X				
10 MW10-20200312		915															X				
11 MW12-20200313		1045			X	X	X	X	X	X	X	X	X	X	X	X		X			
12 MW13-20200313		955			X	X	X	X	X	X	X	X	X	X	X	X		X			
13 MW15-20200312		1125			X	X	X	X	X	X	X	X	X	X	X	X		X			
14 MW16-20200312		1320			X	X	X	X	X	X	X	X	X	X	X	X		X			
15 MW17-20200312		1015			X	X	X	X	X	X	X	X	X	X	X	X		X			
16 MW18-20200312		1130			X	X	X	X	X	X	X	X	X	X	X	X		X			
17 MW20-20200312		955															X				24-hr RUSH

Relinquished by:	Date / Time	Received by:	Date / Time
	3/13 1327	3-13-20	1527
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks:

TAT: 24HR 48HR (5-DAY)

Distribution: White - Lab, Yellow - File, Pink - Originator

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW1-20200313	MW2-20200312	MW3-20200312	MW4-20200312	MW5-20200312
Date Sampled		N/A	3/13/2020	3/12/2020	3/12/2020	3/12/2020	3/12/2020
Date Analyzed	PQL (µg/L)	3/15/2020 (µg/L)	3/17/2020 (µg/L)	3/16/2020 (µg/L)	3/15/2020 (µg/L)	3/15/2020 (µg/L)	3/17/2020 (µg/L)
Vinyl Chloride (VC)	0.2	nd	499	nd	nd	nd	138
1,1-Dichloroethene	0.5	nd	2.4	nd	nd	nd	8.0
trans-1,2-Dichloroethene	1.0	nd	37	nd	nd	nd	122
cis -1,2-Dichloroethene	1.0	nd	3460	11	nd	nd	12200
Trichloroethene (TCE)	0.4	nd	3820	0.94	nd	nd	19800
Tetrachloroethene (PCE)	1.0	nd	16400	nd	nd	nd	38900
Surrogate Recovery							
Dibromofluoromethane		105	107	104	103	106	103
1,2-Dichloroethane-d4		103	97	95	91	102	107
Toluene-d8		97	91	91	96	96	68
4-Bromofluorobenzene		91	70	75	81	88	69

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		MW6-20200312	MW7-20200312	MW8-20200312	MW9-20200312	MW10-20200312	Method Blank
Date Sampled		3/12/2020	3/12/2020	3/12/2020	3/12/2020	3/12/2020	N/A
Date Analyzed	PQL (µg/L)	3/15/2020 (µg/L)	3/16/2020 (µg/L)	3/16/2020 (µg/L)	3/17/2020 (µg/L)	3/16/2020 (µg/L)	3/16/2020 (µg/L)
Vinyl Chloride (VC)	0.2	0.66	nd	13	12	nd	nd
1,1-Dichloroethene	0.5	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd	3.1	11	nd	nd
cis -1,2-Dichloroethene	1.0	13	nd	420	1030	nd	nd
Trichloroethene (TCE)	0.4	11	nd	510	740	nd	nd
Tetrachloroethene (PCE)	1.0	5.7	nd	1200	300	nd	nd
Surrogate Recovery							
Dibromofluoromethane		105	107	103	112	107	117
1,2-Dichloroethane-d4		93	94	93	105	101	118
Toluene-d8		94	96	92	88	100	94
4-Bromofluorobenzene		81	80	76	77	86	84

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: L200313-4

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Vinyl Chloride (VC)	5.0	3.9	3.6	78	72	8.0	65-135	
1,1-Dichloroethene	5.0	4.2	4.0	84	80	4.9	65-135	
trans-1,2-Dichloroethene	5.0	4.1	4.1	82	82	0.0	65-135	
cis-1,2-Dichloroethene	5.0	6.2	4.9	124	98	23.4	65-135	
Trichloroethene (TCE)	5.0	4.3	4.7	86	94	8.9	65-135	
Tetrachloroethene (PCE)	5.0	3.8	3.8	76	76	0.0	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	131	113	65-135
1,2-Dichloroethane-d4	124	107	65-135
Toluene-d8	92	98	65-135
4-Bromofluorobenzene	122	89	65-135

ACCEPTABLE RPD IS 35%

ANALYSES PERFORMED BY: Sherry Chilcutt

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Vinyl Chloride (VC)	5.0	4.4	88	80-120	
1,1-Dichloroethene	5.0	4.6	91	80-120	
trans-1,2-Dichloroethene	5.0	4.4	87	80-120	
cis-1,2-Dichloroethene	5.0	6.0	119	80-120	
Trichloroethene (TCE)	5.0	4.8	97	80-120	
Tetrachloroethene (PCE)	5.0	4.5	90	80-120	

Surrogate Recovery			
Dibromofluoromethane	110	65-135	
1,2-Dichloroethane-d4	119	65-135	
Toluene-d8	108	65-135	
4-Bromofluorobenzene	125	65-135	

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW12-20200313	MW13-20200313	MW15-20200312	MW16-20200312	MW17-20200312
Date Sampled	Reporting	N/A	3/13/2020	3/13/2020	3/12/2020	3/12/2020	3/12/2020
Date Analyzed	Limits	3/17/2020	3/17/2020	3/17/2020	3/17/2020	3/17/2020	3/17/2020
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Chloromethane	2.0	nd	nd	nd	nd	nd	nd
Vinyl chloride	0.2	nd	4.1	76	nd	nd	1.0
Bromomethane	2.0	nd	nd	nd	nd	nd	nd
Chloroethane	2.0	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	2.0	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	0.5	nd	nd	22	nd	nd	nd
Methylene chloride	1.0	nd	nd	nd	nd	nd	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd	nd	nd	nd	nd	nd
trans -1,2-Dichloroethene	1.0	nd	nd	3.3	nd	nd	nd
1,1-Dichloroethane	1.0	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	2.0	nd	nd	nd	nd	nd	nd
cis -1,2-Dichloroethene	1.0	nd	13	1160	nd	1.0	95
Chloroform	1.0	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane (TCA)	1.0	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	1.0	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Benzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane (EDC)	1.0	nd	nd	nd	nd	nd	nd
Trichloroethene (TCE)	0.4	nd	45	5580	nd	2.2	0.47
1,2-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromomethane	1.0	nd	nd	nd	nd	nd	nd
Bromodichloromethane	1.0	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
Toluene	1.0	nd	nd	nd	nd	nd	nd
Trans-1,3-Dichloropropene	1.0	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	1.0	nd	nd	nd	nd	nd	nd
Tetrachloroethene (PCE)	1.0	nd	1030	2190	nd	12	1.4
1,3-Dichloropropane	1.0	nd	nd	nd	nd	nd	nd
Dibromochloromethane	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB) *	0.01	nd	nd	nd	nd	nd	nd
Chlorobenzene	1.0	nd	nd	nd	nd	nd	nd
Ethylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Total Xylenes	2.0	nd	nd	nd	nd	nd	nd
Styrene	1.0	nd	nd	nd	nd	nd	nd

Libby Environmental, Inc.

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RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW12-20200313	MW13-20200313	MW15-20200312	MW16-20200312	MW17-20200312
Date Sampled	Reporting	N/A	3/13/2020	3/13/2020	3/12/2020	3/12/2020	3/12/2020
Date Analyzed	Limits	3/17/2020	3/17/2020	3/17/2020	3/17/2020	3/17/2020	3/17/2020
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Bromoform	1.0	nd	nd	nd	nd	nd	nd
Isopropylbenzene	4.0	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	1.0	nd	nd	nd	nd	nd	nd
Bromobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Propylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	1.0	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	1.0	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	1.0	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	1.0	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
p-Isopropyltoluene	1.0	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
n-Butylbenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	1.0	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	1.0	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorolbenzene	2.0	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	5.0	nd	nd	nd	nd	nd	nd
Naphthalenes	5.0	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	5.0	nd	nd	nd	nd	nd	nd
Surrogate Recovery							
Dibromofluoromethane		99	93	102	100	109	103
1,2-Dichloroethane-d4		95	75	88	87	93	85
Toluene-d8		90	88	96	90	92	90
4-Bromofluorobenzene		76	66	74	77	66	68

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
"E" Reported result is an estimate because it exceeds the calibration range.
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
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Libby Project # L200313-7

Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		MW18-20200312
Date Sampled	Reporting	3/12/2020
Date Analyzed	Limits	3/17/2020
	(µg/L)	(µg/L)
Chloromethane	2.0	nd
Vinyl chloride	0.2	2.8
Bromomethane	2.0	nd
Chloroethane	2.0	nd
Trichlorofluoromethane	2.0	nd
1,1-Dichloroethene	0.5	1.3
Methylene chloride	1.0	nd
Methyl *tert*- Butyl Ether (MTBE)	5.0	nd
trans -1,2-Dichloroethene	1.0	3.5
1,1-Dichloroethane	1.0	nd
2,2-Dichloropropane	2.0	nd
cis -1,2-Dichloroethene	1.0	97
Chloroform	1.0	nd
1,1,1-Trichloroethane (TCA)	1.0	nd
Carbon tetrachloride	1.0	nd
1,1-Dichloropropene	1.0	nd
Benzene	1.0	nd
1,2-Dichloroethane (EDC)	1.0	nd
Trichloroethene (TCE)	0.4	68
1,2-Dichloropropane	1.0	nd
Dibromomethane	1.0	nd
Bromodichloromethane	1.0	nd
cis-1,3-Dichloropropene	1.0	nd
Toluene	1.0	nd
Trans-1,3-Dichloropropene	1.0	nd
1,1,2-Trichloroethane	1.0	nd
Tetrachloroethene (PCE)	1.0	2.8
1,3-Dichloropropane	1.0	nd
Dibromochloromethane	1.0	nd
1,2-Dibromoethane (EDB) *	0.01	nd
Chlorobenzene	1.0	nd
Ethylbenzene	1.0	nd
1,1,1,2-Tetrachloroethane	1.0	nd
Total Xylenes	2.0	nd
Styrene	1.0	nd

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Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		MW18-20200312
Date Sampled	Reporting	3/12/2020
Date Analyzed	Limits	3/17/2020
	(µg/L)	(µg/L)
Bromoform	1.0	nd
Isopropylbenzene	4.0	nd
1,1,2,2-Tetrachloroethane	1.0	nd
Bromobenzene	1.0	nd
n-Propylbenzene	1.0	nd
1,2,3-Trichloropropane	1.0	nd
2-Chlorotoluene	1.0	nd
1,3,5-Trimethylbenzene	1.0	nd
4-Chlorotoluene	1.0	nd
tert-Butylbenzene	1.0	nd
1,2,4-Trimethylbenzene	1.0	nd
sec-Butylbenzene	1.0	nd
p-Isopropyltoluene	1.0	nd
1,3-Dichlorobenzene	1.0	nd
1,4-Dichlorobenzene	1.0	nd
n-Butylbenzene	1.0	nd
1,2-Dichlorobenzene	1.0	nd
1,2-Dibromo-3-Chloropropane	1.0	nd
1,2,4-Trichlorolbenzene	2.0	nd
Hexachloro-1,3-butadiene	5.0	nd
Naphthalenes	5.0	nd
1,2,3-Trichlorobenzene	5.0	nd

Surrogate Recovery	
Dibromofluoromethane	104
1,2-Dichloroethane-d4	93
Toluene-d8	91
4-Bromofluorobenzene	71

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

* ANALYZED BY SIM
"E" Reported result is an estimate because it exceeds the calibration range.
ACCEPTABLE RECOVERY LIMITS FOR SURROGATE 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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RAINIER MALL PROJECT
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Libby Project # L200313-7

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW17-20200312

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Chloromethane	5.0	5.0	5.3	100	106	5.8	65-135	
Vinyl chloride	5.0	5.1	5.1	102	102	0.0	65-135	
Bromomethane	5.0	6.0	5.8	120	116	3.4	65-135	
Chloroethane	5.0	6.6	6.5	132	129	2.0	65-135	
Trichlorofluoromethane	5.0	5.8	5.4	116	108	7.5	65-135	
1,1-Dichloroethene	5.0	5.5	6.3	110	126	13.7	65-135	
Methylene chloride	5.0	6.0	6.0	119	119	0.3	65-135	
Methyl *tert*- Butyl Ether (MTBE)	5.0	3.1	2.6	62	52	17.7	65-135	S
trans -1,2-Dichloroethene	5.0	6.7	6.4	134	128	4.4	65-135	
1,1-Dichloroethane	5.0	6.8	6.8	136	135	0.4	65-135	S
2,2-Dichloropropane	5.0	4.8	4.7	96	94	2.5	65-135	
cis -1,2-Dichloroethene	5.0	0.0	0.0	0	0	0.0	65-135	S
Chloroform	5.0	6.1	5.2	121	105	14.5	65-135	
1,1,1-Trichloroethane (TCA)	5.0	5.1	5.0	102	99	2.4	65-135	
Carbon tetrachloride	5.0	5.7	5.5	114	109	4.7	65-135	
1,1-Dichloropropene	5.0	4.7	4.8	94	96	1.9	65-135	
Benzene	5.0	6.3	6.0	126	121	4.2	65-135	
1,2-Dichloroethane (EDC)	5.0	4.8	3.9	96	78	20.7	65-135	
Trichloroethene (TCE)	5.0	6.0	5.4	120	108	10.5	65-135	
1,2-Dichloropropane	5.0	5.9	5.8	117	117	0.3	65-135	
Dibromomethane	5.0	5.2	4.2	103	84	20.6	65-135	
Bromodichloromethane	5.0	5.2	4.3	104	86	19.6	65-135	
cis-1,3-Dichloropropene	5.0	3.9	3.4	78	68	14.3	65-135	
Toluene	5.0	5.9	5.6	118	112	5.7	65-135	
Trans-1,3-Dichloropropene	5.0	6.7	5.9	135	118	13.1	65-135	
1,1,2-Trichloroethane	5.0	7.2	5.9	144	117	20.1	65-135	
Tetrachloroethene (PCE)	5.0	6.1	6.0	122	120	1.7	65-135	
1,3-Dichloropropane	5.0	6.2	5.2	123	104	16.7	65-135	
Dibromochloromethane	5.0	6.3	5.5	126	109	14.5	65-135	
1,2-Dibromoethane (EDB)	5.0	6.3	5.2	126	103	19.9	65-135	
Chlorobenzene	5.0	6.8	6.2	135	124	8.8	65-135	
Ethylbenzene	5.0	6.9	6.6	137	132	3.9	65-135	S
1,1,1,2-Tetrachloroethane	5.0	6.5	6.1	130	122	6.3	65-135	
Total Xylenes	15.0	19.3	17.0	129	113	12.9	65-135	
Styrene	5.0	6.0	5.5	120	109	9.4	65-135	

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Urban Environmental Partners, LLC
Seattle, Washington
Libby Project # L200313-7

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW17-20200312

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Bromoform	5.0	5.0	5.1	100	102	2.0	65-135	
Isopropylbenzene	5.0	5.6	6.0	111	120	7.1	65-135	
1,1,2,2-Tetrachloroethane	5.0	6.5	5.9	130	117	10.4	65-135	
Bromobenzene	5.0	6.0	5.9	120	118	1.9	65-135	
n-Propylbenzene	5.0	6.7	7.5	133	151	12.5	65-135	S
1,2,3-Trichloropropane	5.0	6.1	5.5	122	110	10.3	65-135	
2-Chlorotoluene	5.0	6.2	6.3	123	127	2.9	65-135	
1,3,5-Trimethylbenzene	5.0	6.5	6.6	130	133	1.7	65-135	
4-Chlorotoluene	5.0	6.0	6.2	120	123	2.8	65-135	
tert-Butylbenzene	5.0	5.7	6.5	115	130	12.6	65-135	
1,2,4-Trimethylbenzene	5.0	6.4	6.5	128	130	2.0	65-135	
sec-Butylbenzene	5.0	6.6	6.7	132	134	1.8	65-135	
Isopropyltoluene	5.0	6.0	6.7	120	135	11.5	65-135	
1,3-Dichlorobenzene	5.0	6.7	6.6	133	132	1.2	65-135	
1,4-Dichlorobenzene	5.0	6.3	6.5	127	130	2.8	65-135	
n-Butylbenzene	5.0	6.4	6.6	127	132	3.5	65-135	
1,2-Dichlorobenzene	5.0	5.4	5.6	109	112	3.4	65-135	
1,2-Dibromo-3-Chloropropane	5.0	3.3	4.1	66	82	20.8	65-135	
1,2,4-Trichlorolbenzene	5.0	3.3	4.2	66	84	23.2	65-135	
Hexachloro-1,3-butadiene	5.0	6.3	6.3	126	126	0.2	65-135	
Naphthalene	5.0	1.8	3.6	37	72	64.2	65-135	R, S
1,2,3-Trichlorobenzene	5.0	3.4	3.8	68	75	10.0	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	89	85	65-135
1,2-Dichloroethane-d4	76	70	65-135
Toluene-d8	84	90	65-135
4-Bromofluorobenzene	82	87	65-135

ACCEPTABLE RPD IS 35%
"R" High relative percent difference observed.
"S" Spike recovery outside accepted recovery limits.

ANALYSES PERFORMED BY: Sherry Chilcutt

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Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Chloromethane	5.0	4.1	82	80-120	
Vinyl chloride	5.0	4.2	83	80-120	
Bromomethane	5.0	4.5	90	80-120	
Chloroethane	5.0	4.9	98	80-120	
Trichlorofluoromethane	5.0	4.0	80	80-120	
1,1-Dichloroethene	5.0	4.6	91	80-120	
Methylene chloride	5.0	5.8	116	80-120	
Methyl *tert*- Butyl Ether (MTBE)	5.0	5.5	110	80-120	
trans -1,2-Dichloroethene	5.0	4.6	91	80-120	
1,1-Dichloroethane	5.0	5.9	118	80-120	
2,2-Dichloropropane	5.0	5.0	99	80-120	
cis -1,2-Dichloroethene	5.0	5.9	118	80-120	
Chloroform	5.0	5.6	113	80-120	
1,1,1-Trichloroethane (TCA)	5.0	5.0	99	80-120	
Carbon tetrachloride	5.0	4.7	95	80-120	
1,1-Dichloropropene	5.0	4.2	84	80-120	
Benzene	5.0	5.2	104	80-120	
1,2-Dichloroethane (EDC)	5.0	6.0	119	80-120	
Trichloroethene (TCE)	5.0	5.0	99	80-120	
1,2-Dichloropropane	5.0	4.7	93	80-120	
Dibromomethane	5.0	5.2	104	80-120	
Bromodichloromethane	5.0	6.0	120	80-120	
cis-1,3-Dichloropropene	5.0	5.4	108	80-120	
Toluene	5.0	5.3	106	80-120	
Trans-1,3-Dichloropropene	5.0	5.8	116	80-120	
1,1,2-Trichloroethane	5.0	5.7	114	80-120	
Tetrachloroethene (PCE)	5.0	4.4	87	80-120	
1,3-Dichloropropane	5.0	5.7	113	80-120	
Dibromochloromethane	5.0	5.4	108	80-120	
1,2-Dibromoethane (EDB)	5.0	5.9	118	80-120	
Chlorobenzene	5.0	5.6	112	80-120	
Ethylbenzene	5.0	4.7	93	80-120	
1,1,1,2-Tetrachloroethane	5.0	5.8	115	80-120	
Total Xylenes	15.0	14.0	93	80-120	
Styrene	5.0	5.1	102	80-120	

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Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Bromoform	5.0	5.9	117	80-120	
Isopropylbenzene	5.0	4.2	83	80-120	
1,1,2,2-Tetrachloroethane	5.0	5.1	102	80-120	
Bromobenzene	5.0	5.8	115	80-120	
n-Propylbenzene	5.0	5.1	101	80-120	
1,2,3-Trichloropropane	5.0	5.7	114	80-120	
2-Chlorotoluene	5.0	4.8	96	80-120	
1,3,5-Trimethylbenzene	5.0	4.9	97	80-120	
4-Chlorotoluene	5.0	4.7	94	80-120	
tert-Butylbenzene	5.0	4.3	86	80-120	
1,2,4-Trimethylbenzene	5.0	5.0	100	80-120	
sec-Butylbenzene	5.0	5.4	107	80-120	
Isopropyltoluene	5.0	4.6	91	80-120	
1,3-Dichlorobenzene	5.0	5.9	118	80-120	
1,4-Dichlorobenzene	5.0	5.8	116	80-120	
n-Butylbenzene	5.0	4.6	92	80-120	
1,2-Dichlorobenzene	5.0	6.0	119	80-120	
1,2-Dibromo-3-Chloropropane	5.0	4.1	81	80-120	
1,2,4-Trichlorolbenzene	5.0	5.6	112	80-120	
Hexachloro-1,3-butadiene	5.0	5.6	113	80-120	
Naphthalene	5.0	6.0	120	80-120	
1,2,3-Trichlorobenzene	5.0	4.8	97	80-120	

Surrogate Recovery			
Dibromofluoromethane	127	65-135	
1,2-Dichloroethane-d4	119	65-135	
Toluene-d8	114	65-135	
4-Bromofluorobenzene	92	65-135	

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RAINIER MALL PROJECT
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Analyses of Gasoline (NWTPH-Gx) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Gasoline (µg/L)
Method Blank	3/17/2020	90	nd
MW12-20200313	3/17/2020	88	720 *
MW13-20200313	3/17/2020	96	8200 E *
MW15-20200312	3/17/2020	90	nd
MW16-20200312	3/17/2020	92	nd
MW17-20200312	3/17/2020	90	nd
MW18-20200312	3/17/2020	91	115 *
Practical Quantitation Limit			100

" * " The gasoline range value consist of two chlorinated compounds with elevated concentrations.
“E” Reported value is above the calibration range and is an estimate.
"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (Toluene-d8): 65% TO 135%

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Analyses of Diesel & Oil (NWTPH-Dx/Dx Extended) in Water

Sample Number	Date Analyzed	Surrogate Recovery (%)	Diesel (µg/L)	Oil (µg/L)
Method Blank	3/18/2020	95	nd	nd
MW12-20200313	3/18/2020	93	nd	nd
MW13-20200313	3/18/2020	87	nd	nd
MW15-20200312	3/18/2020	79	nd	nd
MW16-20200312	3/18/2020	76	nd	nd
MW17-20200312	3/18/2020	82	nd	nd
MW18-20200312	3/18/2020	80	nd	nd
Practical Quantitation Limit			200	400

"nd" Indicates not detected at the listed detection limits.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE (2-F Biphenyl): 65% TO 135%

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Volatile Organic Compounds by EPA Method 8260D in Water

Sample Description		Method Blank	MW20-20200312
Date Sampled		N/A	3/12/2020
Date Analyzed	PQL (µg/L)	3/15/2020 (µg/L)	3/15/2020 (µg/L)
Vinyl Chloride (VC)	0.2	nd	0.20
1,1-Dichloroethene	0.5	nd	nd
trans-1,2-Dichloroethene	1.0	nd	nd
cis -1,2-Dichloroethene	1.0	nd	55
Trichloroethene (TCE)	0.4	nd	38
Tetrachloroethene (PCE)	1.0	nd	2.0
Surrogate Recovery			
Dibromofluoromethane		105	95
1,2-Dichloroethane-d4		103	79
Toluene-d8		97	94
4-Bromofluorobenzene		91	69

"nd" Indicates not detected at listed detection limit.
"int" Indicates that interference prevents determination.

ACCEPTABLE RECOVERY LIMITS FOR SURROGATE : 65% TO 135%

ANALYSES PERFORMED BY: Sherry Chilcutt

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Seattle, Washington
Libby Project # L200313-7

QA/QC for Volatile Organic Compounds by EPA Method 8260D in Water

Matrix Spike Sample Identification: MW20-02200312

	Spiked Conc. (µg/L)	MS Response (µg/L)	MSD Response (µg/L)	MS Recovery (%)	MSD Recovery (%)	RPD (%)	Limits Recovery (%)	Data Flag
Vinyl Chloride (VC)	5.0	3.2	3.2	63	64	0.6	65-135	S
1,1-Dichloroethene	5.0	4.1	3.9	82	78	5.0	65-135	
trans-1,2-Dichloroethene	5.0	5.5	5.0	110	100	9.5	65-135	
cis-1,2-Dichloroethene	5.0	24.6	21.8	492	436	12.1	65-135	S
Trichloroethene (TCE)	5.0	14.6	9.5	292	190	42.3	65-135	R,S
Tetrachloroethene (PCE)	5.0	4.2	4.0	84	80	4.9	65-135	

Surrogate Recovery (%)	MS	MSD	
Dibromofluoromethane	118	115	65-135
1,2-Dichloroethane-d4	106	108	65-135
Toluene-d8	111	110	65-135
4-Bromofluorobenzene	91	94	65-135

ACCEPTABLE RPD IS 35%
"S" Spike compound recovery is outside acceptance limits.
"R" High relative percent difference observed.

ANALYSES PERFORMED BY: Sherry Chilcutt

Laboratory Control Sample

	Spiked Conc. (µg/L)	LCS Response (µg/L)	LCS Recovery (%)	LCS Recovery Limits (%)	Data Flag
Vinyl Chloride (VC)	5.0	4.2	84	80-120	
1,1-Dichloroethene	5.0	4.1	82	80-120	
trans-1,2-Dichloroethene	5.0	4.3	86	80-120	
cis-1,2-Dichloroethene	5.0	6.0	120	80-120	
Trichloroethene (TCE)	5.0	4.9	98	80-120	
Tetrachloroethene (PCE)	5.0	4.2	84	80-120	

Surrogate Recovery			
Dibromofluoromethane	126	65-135	
1,2-Dichloroethane-d4	126	65-135	
Toluene-d8	126	65-135	
4-Bromofluorobenzene	116	65-135	

ANALYSES PERFORMED BY: Sherry Chilcutt

Libby Environmental, Inc.

3322 South Bay Road NE
Olympia, WA 98506
Phone: (360) 352-2110
FAX: (360) 352-4154
Email: libbyenv@gmail.com

RAINIER MALL PROJECT
Urban Environmental Partners, LLC
Libby Project # L200313-7
Date Received 3/13/2020
Time Received 1:27 PM

Received By KD

Sample Receipt Checklist

Chain of Custody

1. Is the Chain of Custody complete?	☑ Yes	☐ No	
2. How was the sample delivered?	☐ Hand Delivered	☑ Picked Up	☐ Shipped

Log In

3. Cooler or Shipping Container is present.	☑ Yes	☐ No	☐ N/A
4. Cooler or Shipping Container is in good condition.	☑ Yes	☐ No	☐ N/A
5. Cooler or Shipping Container has Custody Seals present.	☐ Yes	☑ No	☐ N/A
6. Was an attempt made to cool the samples?	☑ Yes	☐ No	☐ N/A
7. Temperature of cooler (0°C to 8°C recommended)	0.3 °C		
8. Temperature of sample(s) (0°C to 8°C recommended)	5.5 °C		
9. Did all containers arrive in good condition (unbroken)?	☑ Yes	☐ No	
10. Is it clear what analyses were requested?	☑ Yes	☐ No	
11. Did container labels match Chain of Custody?	☑ Yes	☐ No	
12. Are matrices correctly identified on Chain of Custody?	☑ Yes	☐ No	
13. Are correct containers used for the analysis indicated?	☑ Yes	☐ No	
14. Is there sufficient sample volume for indicated analysis?	☑ Yes	☐ No	
15. Were all containers properly preserved per each analysis?	☑ Yes	☐ No	
16. Were VOA vials collected correctly (no headspace)?	☑ Yes	☐ No	☐ N/A
17. Were all holding times able to be met?	☑ Yes	☐ No	

Discrepancies/ Notes

18. Was client notified of all discrepancies?	☐ Yes	☐ No	☑ N/A

Person Notified: _____ Date: _____

By Whom: _____ Via: _____

Regarding: _____

19. Comments. _____

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project:	Rainier Mall
Client ID:	MW-15 20200313
Date Collected:	03/13/2020
Date Received:	03/13/2020
Spectra Project:	2020030454
Spectra Number:	1

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**70500**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**6790**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**59700**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**1870**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**32200**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**0.04**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**487**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**16.9**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**33.6**	mg/L	SM 4500-$SO4^-$	0.00000	HDE	03/20/2020

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Kristin Hintz

Authorized by: Kristin Hintz

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project: Rainier Mall
Client ID: MW-12 20200313
Date Collected: 03/13/2020
Date Received: 03/13/2020
Spectra Project: 2020030454
Spectra Number: 2

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**38700**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**46**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**15700**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**15700**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**57800**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**0.34**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**252**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**35.5**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**22.0**	mg/L	SM 4500-$SO4^-$	0.00000	HDE	03/20/2020

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project:	Rainier Mall
Client ID:	MW-13 20200313
Date Collected:	03/13/2020
Date Received:	03/13/2020
Spectra Project:	2020030454
Spectra Number:	3

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**115000**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**347**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**63800**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**16800**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**78200**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**0.07**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**488**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**254**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**27.1**	mg/L	SM 4500-$SO4^-$	0.00000	HDE	03/20/2020

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project:	Rainier Mall
Client ID:	MW-16 20200313
Date Collected:	03/13/2020
Date Received:	03/13/2020
Spectra Project:	2020030454
Spectra Number:	4

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**60100**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**454**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**69000**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**1510**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**80400**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**<0.01**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**594**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**23.7**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**36.4**	mg/L	SM 4500-$SO4^=$	0.00000	HDE	03/20/2020

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project:	Rainier Mall
Client ID:	MW-17 20200313
Date Collected:	03/13/2020
Date Received:	03/13/2020
Spectra Project:	2020030454
Spectra Number:	5

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**83800**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**16400**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**79200**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**1400**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**46700**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**<0.01**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**566**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**31.0**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**41.1**	mg/L	SM 4500-$SO4^-$	0.00000	HDE	03/20/2020

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03/27/2020

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Project:	Rainier Mall
Client ID:	MW-18 20200313
Date Collected:	03/13/2020
Date Received:	03/13/2020
Spectra Project:	2020030454
Spectra Number:	6

PARAMETER	RESULTS	UNITS	METHOD	PQL	ANALYST	ANALYSIS DATE
Calcium	**71300**	ug/L	EPA 200.7	0.0076	SCJ	03/27/2020
Iron	**51**	ug/L	EPA 200.7	5.0	SCJ	03/27/2020
Magnesium	**70900**	ug/L	EPA 200.7	0.15	SCJ	03/27/2020
Potassium	**2790**	ug/L	EPA 200.7	0.5	SCJ	03/27/2020
Sodium	**53500**	ug/L	EPA 200.7	50	SCJ	03/27/2020
Nitrate	**0.06**	mg/L-N	Easy	0.00000	MMO	03/17/2020
Alkalinity	**547**	mg/L as	SM 2320 B	0.00000	HDE	03/18/2020
Chloride	**52.4**	mg/L	SM 4500-CL^-	1	DCW	03/27/2020
Sulfate	**20.5**	mg/L	SM 4500-$SO4^-$	0.00000	HDE	03/20/2020

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Authorized by: Kristin Hintz

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3/27/2020

Libby Environmental, Inc.
3322 S. Bay Rd NE
Olympia, WA 98506

Units: mg/L
Spectra Project: 2020030454
Applies to Spectra #'s 1-6
Analyst: SCJ

QUALITY CONTROL RESULTS

ICP Metals - EPA Method 200.7 - Water/Liquid

Laboratory Reagent Blank (LRB)

Date Digested: 3/27/2020 Date Analyzed: 3/27/2020

Element	Result
Calcium	< 0.025
Magnesium	< 0.015
Potassium	< 0.05
Sodium	< 0.025

Laboratory Fortified Blank (LFB)

Date Digested: 3/27/2020 Date Analyzed: 3/27/2020

Element	Spike Added	LCS Conc.	LCS %Rec
Calcium	1.0	1.141	114.1
Magnesium	1.0	1.071	107.1
Potassium	1.0	1.055	105.5
Sodium	1.0	0.874	87.4

LCS Recovery limits 85-115%

Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Date Digested: 3/27/2020 Date Analyzed: 3/27/2020
Sample Spiked: 2020030786-1

Element	Sample Conc.	Spike Conc.	MS Conc.	MS %Rec	MSD Conc	MSD %Rec	RPD
Calcium	19.550	1.0	20.436	88.6	20.229	67.9	26.5
Magnesium	1.038	1.0	2.076	103.8	2.083	104.5	0.7
Potassium	1.770	1.0	2.935	116.5	2.857	108.7	6.9
Sodium	4.241	1.0	5.281	104.0	5.219	97.8	6.1

Comment: Calcium exceeds 4 X the spiking level, therefore results are acceptable
Recovery Limits 70-130%
RPD Limit 20

Spectra Laboratories

Kristin Hintz

Authorized by: Kristin Hintz

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March 30, 2020

Libby Environmental, Inc.
3322 South Bay Rd NE
Olympia, WA 98506

Sample Matrix:	Water
Spectra Project #	2020030454
Applies to Sample #	1-6

STORMWATER
QUALITY CONTROL RESULTS
CONVENTIONALS

Analyte	Method	Date	Analyst	Method Blank Result	ICV % Rec.	Control Limits	Batch Duplicate RPD	Control Limits
Sulfate	SM 4500 SO4	3/20/20	HDE	<2	112	+0.2 pH	14.90	-
Nitrate/Nitrite	Systea Easy-1	3/17/20	MO	<0.01	95.8	77-112	0.17	≤20
Alkalinity	SM 2320B	3/18/20	HDE	-	89.7	-	5.91	-

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Authorized by: Kristin Hintz

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03/27/20

Libby Environmental, Inc.
3322 South Bay Road NE
Olympia, WA 98506

Method:	SM4500-Cl-C
Sample Matrix:	Water
Units:	mg/L
Spectra Project:	2020030454
Applies to Spectra #'s:	1-6

CHLORIDE QUALITY CONTROL RESULTS

METHOD BLANK

Date Analyzed: 03/27/2020
Units: mg/L

Chloride	< 1.0

BLANK SPIKE RESULT (LCS)

Date Analyzed: 03/27/2020
Units: mg/L

	Known Value	Measured Value	% Recovered
Chloride	1000.000	944	94.4

Authorized by: Kristin Hintz

Libby Environmental, Inc. 20200304541 Chain of Custody Record

www.LibbyEnvironmental.com

3322 South Bay Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Date: 3-13-20 Page: 1 of 1

Client: Libby Environmental
Project Manager: Sherry Chilcutt
Address: See above
Project Name: Rainier mall
City: State: Zip:
Location: City, State: WA
Phone: Fax:
Collector: BD/MG Date of Collection: 3-13-20
Client Project #
Email: Libbyenv@gmail.com

Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	cPAH 8270	PAH 8270	~~Semi-Vol 8270~~ Sulfate	RCB 8082 Chloride	~~MTCA-5 Metals~~	~~RCRA-8 Metals~~ Nitrate	Magnesium Iron	Potassium Calcium	Alkalinity Sodium	Field Notes
1 MW-15 20200313	—	1125	H2O	Poly									X	X	X	X	X	X	X	
2 MW12 20200313	—	1045											X	X	X	X	X	X	X	
3 MW13 20200313	—	955											X	X	X	X	X	X	X	
4 MW16 20200313	—	1320											X	X	X	X	X	X	X	
5 MW17 20200313	—	1015											X	X	X	X	X	X	X	
6 MW18 20200313	—	1130											X	X	X	X	X	X	X	
7 ~~MW20~~																				
8 ~~MW8~~																				
9 ~~MW9~~																				
10 ~~MW10~~																				
11 ~~MW11~~ KD 3/13/20																				
12 ~~MW13~~																				
13 ~~MW15~~																				
14 ~~MW16~~																				
15 ~~MW~~																				
16																				
17																				

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	3-13-20 1450	[signature]	03/13/20 1450
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	Y	N
Cooler Temp.		°C
Sample Temp.		°C
Total Number of Containers		

Remarks: Standard TAT

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Libby Environmental
Sherry Chilcutt
3322 South Bay Road NE
Olympia, WA 98506

RE: Rainier Mall
Work Order Number: 2003253

March 23, 2020

Attention Sherry Chilcutt:

Fremont Analytical, Inc. received 6 sample(s) on 3/15/2020 for the analyses presented in the following report.

Dissolved Gases by RSK-175

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *03/23/2020*

CLIENT: Libby Environmental
Project: Rainier Mall
Work Order: 2003253

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2003253-001	MW12-20200313	03/13/2020 10:45 AM	03/15/2020 11:14 AM
2003253-002	MW13-20200313	03/13/2020 9:55 AM	03/15/2020 11:14 AM
2003253-003	MW15-20200312	03/12/2020 11:25 AM	03/15/2020 11:14 AM
2003253-004	MW16-2020312	03/12/2020 1:20 PM	03/15/2020 11:14 AM
2003253-005	MW17-2020312	03/12/2020 10:15 AM	03/15/2020 11:14 AM
2003253-006	MW18-2020312	03/12/2020 11:30 AM	03/15/2020 11:14 AM

Case Narrative

WO#: **2003253**
Date: **3/23/2020**

CLIENT: Libby Environmental
Project: Rainier Mall

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

CLIENT: Libby Environmental
Project: Rainier Mall

Lab ID: 2003253-001 **Collection Date:** 3/13/2020 10:45:00 AM
Client Sample ID: **MW12-20200313** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	0.0116	0.00863		mg/L	1	3/20/2020 2:34:00 PM

Lab ID: 2003253-002 **Collection Date:** 3/13/2020 9:55:00 AM
Client Sample ID: **MW13-20200313** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	0.140	0.00863		mg/L	1	3/20/2020 2:37:00 PM

Lab ID: 2003253-003 **Collection Date:** 3/12/2020 11:25:00 AM
Client Sample ID: **MW15-20200312** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	0.0420	0.00863		mg/L	1	3/20/2020 2:42:00 PM

Lab ID: 2003253-004 **Collection Date:** 3/12/2020 1:20:00 PM
Client Sample ID: **MW16-2020312** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	0.103	0.00863		mg/L	1	3/20/2020 2:51:00 PM

CLIENT: Libby Environmental
Project: Rainier Mall

Lab ID: 2003253-005 **Collection Date:** 3/12/2020 10:15:00 AM
Client Sample ID: **MW17-2020312** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	2.33	0.0863	D	mg/L	10	3/20/2020 3:06:00 PM

Lab ID: 2003253-006 **Collection Date:** 3/12/2020 11:30:00 AM
Client Sample ID: **MW18-2020312** **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Gases by RSK-175				Batch ID: R58174		Analyst: WC
Methane	0.0598	0.00863		mg/L	1	3/20/2020 3:00:00 PM

Work Order: 2003253
CLIENT: Libby Environmental
Project: Rainier Mall

QC SUMMARY REPORT

Dissolved Gases by RSK-175

Sample ID: **MB-R58174**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **3/20/2020**		RunNo: **58174**	
Client ID: **MBLKW**	Batch ID: **R58174**					Analysis Date: **3/20/2020**		SeqNo: **1162119**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	ND	0.00863									

Sample ID: **LCS-R58174**	SampType: **LCS**			Units: **mg/L**		Prep Date: **3/20/2020**		RunNo: **58174**	
Client ID: **LCSW**	Batch ID: **R58174**					Analysis Date: **3/20/2020**		SeqNo: **1162118**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	933	0.00863	1,000	0	93.3	70	130				

Sample ID: **2003253-001AREP**	SampType: **REP**			Units: **mg/L**		Prep Date: **3/20/2020**		RunNo: **58174**	
Client ID: **MW12-20200313**	Batch ID: **R58174**					Analysis Date: **3/20/2020**		SeqNo: **1162108**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methane	0.0113	0.00863						0.01160	2.22	30	

Work Order: 2003253
CLIENT: Libby Environmental
Project: Rainier Mall

QC SUMMARY REPORT

Dissolved Gases by RSK-175

Sample Log-In Check List

Client Name:	**LIBBY**	Work Order Number:	**2003253**
Logged by:	**Wendy Chang**	Date Received:	**3/15/2020 11:14:00 AM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No ☐	Not Present	☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	No ☐	NA	☐
4.	Shipping container/cooler in good condition?	Yes	☑	No ☐		
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☑	No ☐	Not Required	☐
6.	Was an attempt made to cool the samples?	Yes	☑	No ☐	NA	☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☑	No ☐	NA	☐
8.	Sample(s) in proper container(s)?	Yes	☑	No ☐		
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No ☐		
10.	Are samples properly preserved?	Yes	☑	No ☐		
11.	Was preservative added to bottles?	Yes	☐	No ☑	NA	☐
12.	Is there headspace in the VOA vials?	Yes	☐	No ☐	NA	☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No ☐		
14.	Does paperwork match bottle labels?	Yes	☑	No ☐		
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No ☐		
16.	Is it clear what analyses were requested?	Yes	☑	No ☐		
17.	Were all holding times able to be met?	Yes	☑	No ☐		

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No ☐	NA	☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler	4.2
Sample	1.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

2003253

Libby Environmental, Inc.

Chain of Custody Record

www.LibbyEnvironmental.com

3322 South Bay Road NE
Olympia, WA 98506
Ph: 360-352-2110
Fax: 360-352-4154

Client: Libby Environmental, Inc
Address:
City: State: Zip:
Phone: Fax:
Client Project #

Date: 3-13-20 Page: 1 of 1
Project Manager: Sherry Chilcutt
Project Name: Rainier Mall
Location: City, State: Seattle, WA
Collector: Date of Collection: 3/12 & 3-13
Email: libbyenv@gmail.com

Sample Number	Depth	Time	Sample Type	Container Type	VOC 8260	NWTPH-Gx	BTEX 8021	NWTPH-HCID	NWTPH-Dx	NWTPH-Dx/Dx	c PAH 8270	PAH 8270	Semi Vol 8270	PCB 8082	MTCA 5 Metals	RCRA 8 Metals	Methane		Field Notes
1 MW12-20200313		1045	W	2 VOA												X			
2 MW13-20200313		955	W													X			
3 MW15-20200312		1125	W													X			
4 MW16-20200312		1320	W													X			
5 MW17-20200312		1015	W	1 VOA												X			
6 MW18-20200312		1130	W	2 VOA												X			
7																			
8																			
9																			
10																			
11																			
12																			
13																			
14																			
15																			
16																			
17																			

Relinquished by:	Date / Time	Received by:	Date / Time
[signature]	3-14-20 7:14	[signature]	3/13/20 11:14
Relinquished by:	Date / Time	Received by:	Date / Time
Relinquished by:	Date / Time	Received by:	Date / Time

Sample Receipt

Good Condition?	(Y)	N
Cooler Temp.	4.2	°C
Sample Temp.	1.1	°C
Total Number of Containers		

Remarks: STD

TAT: 24HR 48HR 5-DAY

Distribution: White - Lab, Yellow - File, Pink - Originator

Carus Remediation Technologies
Remediation Report

March 26, 2020

Customer: Dixon Environmental Services
4010 N 7th Street
Tacoma, WA 98406

CC: D. Kemmerer
D. Hartsough

Attention: Brian A. Dixon

From: T. Colgan

TECH # TECH #20-046

Subject: RemOx® S ISCO Reagent Permanganate Natural Oxidant Demand

Summary
The overall average RemOx® S ISCO reagent permanganate natural oxidant demand (PNOD) at 48 hours for the soil samples was determined to be 11.4 g/kg. The average demands ranged from 11.0 g/kg to 12.1 g/kg. These values are calculated on a weight as potassium permanganate ($KMnO_4$) per dry weight of soil.

Background
Soil sample was received from Dixon Environmental Services from the Urban Environmental Partners in Seattle, WA. The soil sample designations was UB20-Composite. The sample was analyzed for permanganate natural oxidant demand. The measurement of the permanganate natural oxidant demand is used to estimate the concentration of permanganate that will be consumed by the natural reducing agents during a given time period of 48 hours.

Experimental
The samples were analyzed for permanganate natural oxidant demand following ASTM D7262-10 Test Method A. A brief summary is as follows:

To determine the PNOD, the soil was baked at 105°C for 24 hours then allowed to cool to room temperature. The soil was then blended and passed through a U.S. 10 sieve (2 mm). Reactors were loaded with 50 grams of soil and 100 mL of 20 g/L $KMnO_4$ for an initial dose of 40 g/kg $KMnO_4$ on a dry soil weight basis at a 1:2 soil to aqueous reagent ratio. Each soil dose was performed in triplicate. The reaction vessels were inverted once to mix the reagents. Residual permanganate (MnO_4^-) was determined at 48 hours. The demands were calculated on a dry weight basis.

Results
The permanganate demand is the amount of permanganate consumed in a given amount of time. It should be noted that in a soil or groundwater sample, the oxidation of any compound by permanganate is dependent on the initial dose of permanganate and the reaction time available. As the permanganate dose is increased, the reaction rate and oxidant consumption may also increase. Some compounds that are not typically oxidized by permanganate under low doses can become

reactive with permanganate at higher concentrations. The 48-hour PNOD results can be seen in Table 1 (on a dry soil basis).

Table 1: 48-Hour PNOD *

Soil Sample Identification	Average and Standard Deviation (g/kg)	Replicate 1 (g/kg)	Replicate 2 (g/kg)	Replicate 3 (g/kg)
Composite 1 (3-4)	11.4 ± 0.62	12.1	11.0	11.1
Overall Average	11.4			

*Demands were calculated on a weight $KMnO_4$/dry soil weight basis from an initial dose of 40.0 g/kg $KMnO_4$ initial dose at a 1:2 soil to aqueous solution ratio.

Conclusions

For this application the amount of permanganate needed will be dependent on the reaction time allowed. On average, the soil sample had a 48-hour permanganate demand value of 11.4 g/kg. The average demands ranged from 11.0 g/kg to 12.1 g/kg. Generally, remediation sites with a soil demand of less than 20.0 g/kg at the time of interest are favorable for *in situ* chemical oxidation with permanganate (see Table 2 for additional information).

Table 2: Correlation of Permanganate Natural Oxidant Demand Results*

PNOD (g/kg)	**Rank**	Comment
<10	Low	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is low.
10-20	Moderate	ISCO with MnO_4^- is recommended. Soil contribution to MnO_4^- demand is moderate. Economics should be considered.
>20	High	ISCO with MnO_4^- is technically feasible. Other technologies may provide lower cost alternatives.

*Dry Weight Basis

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 14, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 8, 2020 from the Rainier Mall, F&BI 004074 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Dixon Environmental
UEP0414R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 8, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 004074 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
004074 -01	MW23-25(UB23-25)
004074 -02	MW23-30(UB23-30)
004074 -03	MW23-33(UB23-33)
004074 -04	UB22-25
004074 -05	UB21-25
004074 -06	UB21-30
004074 -07	UB21-34

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW23-25(UB23-25)	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-01
Date Analyzed:	04/09/20	Data File:	040912.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	108	62	145
Toluene-d8	105	55	145
4-Bromofluorobenzene	95	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW23-30(UB23-30)	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-02
Date Analyzed:	04/09/20	Data File:	040913.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	62	145
Toluene-d8	105	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW23-33(UB23-33)	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-03
Date Analyzed:	04/09/20	Data File:	040914.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	62	145
Toluene-d8	106	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB22-25	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-04
Date Analyzed:	04/09/20	Data File:	040916.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	62	145
Toluene-d8	106	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB21-25	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-05
Date Analyzed:	04/09/20	Data File:	040915.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	62	145
Toluene-d8	108	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB21-30	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-06
Date Analyzed:	04/09/20	Data File:	040917.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	62	145
Toluene-d8	107	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB21-34	Client:	Urban Environmental Partners
Date Received:	04/08/20	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	004074-07
Date Analyzed:	04/09/20	Data File:	040918.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	62	145
Toluene-d8	104	55	145
4-Bromofluorobenzene	93	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 004074
Date Extracted:	04/09/20	Lab ID:	00-809 mb
Date Analyzed:	04/09/20	Data File:	040909.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	62	145
Toluene-d8	106	55	145
4-Bromofluorobenzene	94	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
1,1-Dichloroethene	<0.05
trans-1,2-Dichloroethene	<0.05
cis-1,2-Dichloroethene	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 04/14/20
Date Received: 04/08/20
Project: Rainier Mall, F&BI 004074

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 004074-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	52	53	10-138	2
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	71	73	10-160	3
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	78	80	14-137	3
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	86	88	25-135	2
Trichloroethene	mg/kg (ppm)	2.5	<0.02	89	93	21-139	4
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	76	77	20-133	1

Date of Report: 04/14/20
Date Received: 04/08/20
Project: Rainier Mall, F&BI 004074

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	87	22-139
1,1-Dichloroethene	mg/kg (ppm)	2.5	101	47-128
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	101	67-129
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	106	72-127
Trichloroethene	mg/kg (ppm)	2.5	105	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	92	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

004074

SAMPLE CHAIN OF CUSTODY

ME 4/8/20 BI2/VS2

Page # 1 of 1

Report To John Funderburk cc Brian Dixon w/ Dixon ENV.

Company Urban Environmental

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email johnf@uepconsulting.com

SAMPLERS (*signature*)

PROJECT NAME: RAINIER MALL

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	PCE + degradation				Notes
MW23-25 (UB23-25)	01A-E	4.7.20	0930	SOIL	5								X				
MW23-30 (UB23-30)	02		0940										X				
MW23-33 (UB23-33)	03		0945										X				
~~MW22-25~~																	
UB22-25	04		1225										X				
UB21-25	05		1510										X				
UB21-30	06		1520										X				
UB21-34	07	↓	1605	↓	↓								X				

Samples received at 5 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	KEVIN CLINE	UEP	4.7.20	1600
Received by:	Brian Dixon	Dixon ES	"	"
Relinquished by:	Brian Dixon	Dixon ES	4-8-20	1250
Received by: HONG	HONG NGUYEN	FBI	4/8/20	1

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 24, 2019

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 22, 2019 from the LUP-RM, F&BI 904400 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP0424R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 22, 2019 by Friedman & Bruya, Inc. from the Urban Environmental Partners LUP-RM, F&BI 904400 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
904400 -01	MW10
904400 -02	MW11
904400 -03	MW9

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW10	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP-RM, F&BI 904400
Date Extracted:	04/22/19	Lab ID:	904400-01
Date Analyzed:	04/22/19	Data File:	042244.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.24
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	22
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	54
Tetrachloroethene	41

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW11	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP-RM, F&BI 904400
Date Extracted:	04/22/19	Lab ID:	904400-02
Date Analyzed:	04/22/19	Data File:	042245.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW9	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP-RM, F&BI 904400
Date Extracted:	04/22/19	Lab ID:	904400-03
Date Analyzed:	04/22/19	Data File:	042246.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	7.4
Chloroethane	<1
1,1-Dichloroethene	1.0
Methylene chloride	<5
trans-1,2-Dichloroethene	1.2
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	93
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	110
Tetrachloroethene	38

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	LUP-RM, F&BI 904400
Date Extracted:	04/22/19	Lab ID:	09-770 mb
Date Analyzed:	04/22/19	Data File:	042210.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 04/24/19
Date Received: 04/22/19
Project: LUP-RM, F&BI 904400

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 904400-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.24	89	61-139
Chloroethane	ug/L (ppb)	50	<1	85	55-149
1,1-Dichloroethene	ug/L (ppb)	50	<1	94	71-123
Methylene chloride	ug/L (ppb)	50	<5	94	61-126
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	97	72-122
1,1-Dichloroethane	ug/L (ppb)	50	<1	89	79-113
cis-1,2-Dichloroethene	ug/L (ppb)	50	22	98 b	63-126
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	83	70-119
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	92	75-121
Trichloroethene	ug/L (ppb)	50	54	95 b	73-122
Tetrachloroethene	ug/L (ppb)	50	41	94 b	72-113

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	94	92	70-128	2
Chloroethane	ug/L (ppb)	50	88	86	66-149	2
1,1-Dichloroethene	ug/L (ppb)	50	98	96	75-119	2
Methylene chloride	ug/L (ppb)	50	99	97	63-132	2
trans-1,2-Dichloroethene	ug/L (ppb)	50	100	97	76-118	3
1,1-Dichloroethane	ug/L (ppb)	50	93	91	77-119	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	99	97	76-119	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	84	85	78-114	1
1,1,1-Trichloroethane	ug/L (ppb)	50	95	93	80-116	2
Trichloroethene	ug/L (ppb)	50	93	93	72-119	0
Tetrachloroethene	ug/L (ppb)	50	92	91	78-109	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

904400

SAMPLE CHAIN OF CUSTODY

ME 04-22-19

VW2

Page # 1 of 1

Report To John Funderburk

Company Urban Environmental Partners

Address 2324 1st Ave

City, State, ZIP

Phone Email

SAMPLERS (*signature*) John R Funderburk

PROJECT NAME LUP - RM

PO #

REMARKS Chlorinated Short List
24 Hour

INVOICE TO

TURNAROUND TIME
☐ Standard Turnaround
☒ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☒ Dispose after 30 days
☐ Archive Samples
☐ Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	CVOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
						ANALYSES REQUESTED											
MW 10	01A-E	4-21-19	4:38	water	5					X							
MW 11	02	4-21-19	5:31	"	5					X							
MW 9	03	4-21-19	6:41	"	5					X							

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: John R Funderburk	John R Funderburk	Urban Envi. Partn	4-22	8:54
Received by: Michael Erdahl	Michael Erdahl	F&B	4/22/19	0854
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
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fbi@isomedia.com
www.friedmanandbruya.com

May 6, 2019

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 22, 2019 from the LUP Rainier Mall 19-037, F&BI 904401 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP0506R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 22, 2019 by Friedman & Bruya, Inc. from the Urban Environmental Partners LUP Rainier Mall 19-037, F&BI 904401 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
904401 -01	UB10 10
904401 -02	UB10 13
904401 -03	UB10 15
904401 -04	UB10 18
904401 -05	UB10 20
904401 -06	UB10-23
904401 -07	UB10-25
904401 -08	UB10-28
904401 -09	UB11-13
904401 -10	UB11-15
904401 -11	UB11-18
904401 -12	UB11-20
904401 -13	UB11-23
904401 -14	UB11-25
904401 -15	UB11-28

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10 10	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-01
Date Analyzed:	04/22/19	Data File:	042227.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10 15	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-03
Date Analyzed:	04/22/19	Data File:	042228.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10 18	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-04
Date Analyzed:	04/22/19	Data File:	042229.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10 20	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-05
Date Analyzed:	04/22/19	Data File:	042230.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10-25	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-07
Date Analyzed:	04/22/19	Data File:	042231.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.049
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB10-28	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/29/19	Lab ID:	904401-08
Date Analyzed:	04/29/19	Data File:	042925.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.083
Tetrachloroethene	0.11

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB11-13	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-09
Date Analyzed:	04/22/19	Data File:	042233.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	95	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB11-15	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-10
Date Analyzed:	04/22/19	Data File:	042234.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB11-20	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-12
Date Analyzed:	04/22/19	Data File:	042235.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB11-25	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-14
Date Analyzed:	04/22/19	Data File:	042236.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	UB11-28	Client:	Urban Environmental Partners
Date Received:	04/22/19	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	904401-15
Date Analyzed:	04/22/19	Data File:	042237.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/22/19	Lab ID:	09-769 mb
Date Analyzed:	04/22/19	Data File:	042211.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	LUP Rainier Mall 19-037
Date Extracted:	04/29/19	Lab ID:	09-922 mb
Date Analyzed:	04/29/19	Data File:	042908.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	142
Toluene-d8	98	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 05/06/19
Date Received: 04/22/19
Project: LUP Rainier Mall 19-037, F&BI 904401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 904350-35 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	46	38	10-91	19
Chloroethane	mg/kg (ppm)	2.5	<0.5	57	49	10-101	15
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	67	57	22-107	16
Methylene chloride	mg/kg (ppm)	2.5	<0.5	81	74	14-128	9
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	79	70	13-112	12
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	79	70	23-115	12
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	86	79	25-120	8
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	75	68	22-124	10
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	79	69	27-112	14
Trichloroethene	mg/kg (ppm)	2.5	<0.02	83	73	30-112	13
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	83	73	25-114	13

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	78	42-107
Chloroethane	mg/kg (ppm)	2.5	82	47-115
1,1-Dichloroethene	mg/kg (ppm)	2.5	95	65-110
Methylene chloride	mg/kg (ppm)	2.5	94	50-127
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	101	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	93	74-109
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	73-110
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	81	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	96	72-116
Trichloroethene	mg/kg (ppm)	2.5	90	72-107
Tetrachloroethene	mg/kg (ppm)	2.5	90	73-111

Date of Report: 05/06/19
Date Received: 04/22/19
Project: LUP Rainier Mall 19-037, F&BI 904401

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: 904539-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	82	72	10-138	13
Chloroethane	mg/kg (ppm)	2.5	<0.5	84	76	10-176	10
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	114	105	10-160	8
Methylene chloride	mg/kg (ppm)	2.5	<0.5	118	106	10-156	11
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	117	107	14-137	9
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	112	105	19-140	6
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	105	98	25-135	7
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	94	101	12-160	7
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	108	101	10-156	7
Trichloroethene	mg/kg (ppm)	2.5	<0.02	95	100	21-139	5
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	92	97	20-133	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	91	22-139
Chloroethane	mg/kg (ppm)	2.5	91	10-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	94	47-128
Methylene chloride	mg/kg (ppm)	2.5	100	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	99	67-127
1,1-Dichloroethane	mg/kg (ppm)	2.5	98	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	100	72-113
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	96	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	98	62-131
Trichloroethene	mg/kg (ppm)	2.5	98	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	93	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

904401

SAMPLE CHAIN OF CUSTODY

(johnf@uep consultings.com)

ME 04-22-19

V54

Page # 1 of 2

Send Report To John Funderburk

Company Urban Environmental Partners

Address 2324 1st Ave Ste 203

City, State, ZIP Seattle, Wa. 98124

Phone # (425) 922-9922 Fax #

SAMPLERS (signature) Matthew W. Grunwald

PROJECT NAME/NO. LUP Rainier Mall 19-037

PO #

REMARKS Chlorinated Solvents shot list
1 week

TURNAROUND TIME
- [X] Standard (2 Weeks) 1 week
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [X] Dispose after 30 days
- [ ] Return samples
- [ ] Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	cVOCs by 8260	SVOCs by 8270	HFS						Notes
UBD 10 ✓	01A-C	4/20/19	0950	soil	3				X								
UB10 13 ✓	02	4/20/19	0955	soil	3	Hold											
UB10 15 ✓	03	4/20/19	1000	Soil	3				X								
UB10 18 ✓	04	4/20/19	1005	Soil	3				X								
UB10 20 ✓	05A-D	4/20/19	1015	soil	4				X								
UB10-23 ✓	06	4/20/19	1020	Soil	4	Hold											
UB10-25 ✓	07	4/20/19	1025	soil	4				X								
UB10-28 ✓	08	4/20/19	1030	soil	4				X								

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	John R Funderburk	John R Funderburk	Urban Environ Partners	4-22-19	8:54
Received by:		Michael Erchl	FRBm	4/22/19	08:54
Relinquished by:					
Received by:					

Samples received at 3 °C

Freidman & Bruya 904401

~~APEX LABS~~

CHAIN OF CUSTODY

Lab # _____ COC 2 of 2

VS4

~~12232 S.W. Garden Place, Tigard, OR 97223 Ph: 503-718-2323 Fax: 503-718-0333~~

ME 04-22-19 PO#

Company: Urban Environmental Partners | Project Mgr: | Project Name: LUP Rainier Mall | Project # 19-037

Address: 2324 1st Ave Ste. 203, Seattle, WA. 98121 | Phone: 425-922-9922 | Fax: | Email: johnf@UEPconsulting.com

Sampled by: Matthew Grawald

Site Location: OR (WA) Other: _____

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 VOCs Full List	8260 RBDM VOCs	8260 HVOCs Cl	8260 BTEX VOCs	8270 SVOC	8270 SIM PAHs	8082 PCBs	600 TTO	RCRA Metals (8)	TCLP Metals (8)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS TCLP	1200- COLS	1200-Z
1 UB11-13 ✓	9 of A	4/20/19	1340	soil	4						X										
2 UB11-15 ✓	10 A	"	1345	soil	4						X										
3 UB11-18 ✓	11 A	"	1350	soil	3		Hold														
4 UB11-20 ✓	12 A	"	1355	soil	4						X										
5 UB11-23 ✓	13	"	1405	soil	4		Hold														
6 UB11-25 ✓	14	"	1410	soil	4						X										
7 UB11-28 ✓	15	"	1415	soil	4						X										
8 ~~UB11~~																					
9																					
10																					

ANALYSIS REQUEST

Normal Turn Around Time (TAT) = 10 Business Days YES NO

TAT Requested (circle): 1 Day | 2 Day | 3 Day | 4 DAY | 5 DAY | Other: _____

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
Chlorinated VOCs
Short List 1 Week

RELINQUISHED BY:		RECEIVED BY:	
Signature: John R Funderburk	Date: 4-22-19	Signature:	Date: 4/22/19
Printed Name: John R Funderburk	Time: 8:54	Printed Name: Michael Erdahl	Time: 854
Company: Urban Environ. Partners		Company: F&B	

RELINQUISHED BY:		RECEIVED BY:	
Signature:	Date:	Signature:	Date:
Printed Name:	Time:	Printed Name:	Time:
Company:		Company:	

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 29, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 10, 2020 from the Rainier Mall, F&BI 004116 project. There are 17 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0429R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 10, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 004116 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
004116 -01	UB25-25
004116 -02	UB25-27
004116 -03	UB25-35
004116 -04	UB25-45
004116 -05	UB26-25
004116 -06	UB26-30
004116 -07	UB26-35
004116 -08	UB26-40
004116 -09	UB26-45
004116 -10	UB27-6
004116 -11	UB27-12
004116 -12	UB27-17
004116 -13	UB28-6
004116 -14	UB28-11
004116 -15	UB28-15
004116 -16	UB29-6
004116 -17	UB29-11
004116 -18	UB29-15

Sample UB25-27 was sent to Fremont Analytical for TOC analysis. The report is enclosed.

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB25-27	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-02
Date Analyzed:	04/13/20	Data File:	041317.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB25-35	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-03
Date Analyzed:	04/13/20	Data File:	041318.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	102	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.26
Tetrachloroethene	1.2

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB25-45	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-04
Date Analyzed:	04/13/20	Data File:	041319.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	103	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB26-30	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-06
Date Analyzed:	04/13/20	Data File:	041320.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	103	55	145
4-Bromofluorobenzene	103	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.21
Tetrachloroethene	1.1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB26-35	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-07
Date Analyzed:	04/13/20	Data File:	041321.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	104	55	145
4-Bromofluorobenzene	102	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.14
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.43
Tetrachloroethene	0.34

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB26-40	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-08
Date Analyzed:	04/13/20	Data File:	041322a.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS/IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB26-45	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-09
Date Analyzed:	04/13/20	Data File:	041323.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS/IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	145
Toluene-d8	102	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB27-6	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-10
Date Analyzed:	04/13/20	Data File:	041324.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS/IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	145
Toluene-d8	105	55	145
4-Bromofluorobenzene	101	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB27-12	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-11
Date Analyzed:	04/13/20	Data File:	041325.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS/IJL

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	105	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB28-6	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-13
Date Analyzed:	04/17/20	Data File:	041706.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	101	50	150
4-Bromofluorobenzene	92	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB28-11	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-14
Date Analyzed:	04/17/20	Data File:	041727.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	104	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB29-6	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-16
Date Analyzed:	04/17/20	Data File:	041708.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	99	50	150
4-Bromofluorobenzene	91	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB29-11	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	004116-17
Date Analyzed:	04/17/20	Data File:	041709.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 004116
Date Extracted:	04/13/20	Lab ID:	00-816 mb
Date Analyzed:	04/13/20	Data File:	041312.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	145
Toluene-d8	103	55	145
4-Bromofluorobenzene	100	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 04/29/20
Date Received: 04/10/20
Project: Rainier Mall, F&BI 004116

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 004116-06 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	55	49	10-138	12
Chloroethane	mg/kg (ppm)	2.5	<0.5	67	59	10-176	13
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	75	66	10-160	13
Methylene chloride	mg/kg (ppm)	2.5	<0.5	91	79	10-156	14
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	82	73	14-137	12
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	87	78	19-140	11
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	89	80	25-135	11
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	84	79	12-160	6
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	89	79	10-156	12
Trichloroethene	mg/kg (ppm)	2.5	0.18	78	72	21-139	8
Tetrachloroethene	mg/kg (ppm)	2.5	0.98	57 b	38 b	20-133	40 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	74	22-139
Chloroethane	mg/kg (ppm)	2.5	85	9-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	90	47-128
Methylene chloride	mg/kg (ppm)	2.5	99	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	90	67-129
1,1-Dichloroethane	mg/kg (ppm)	2.5	93	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	93	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	90	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	96	62-131
Trichloroethene	mg/kg (ppm)	2.5	94	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	94	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Friedman & Bruya
Michael Erdahl
3012 16th Ave. W.
Seattle, WA 98119

RE: 004116
Work Order Number: 2004210

April 27, 2020

Attention Michael Erdahl:

Fremont Analytical, Inc. received 1 sample(s) on 4/17/2020 for the analyses presented in the following report.

Total Organic Carbon by EPA 9060

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *04/27/2020*

CLIENT: Friedman & Bruya
Project: 004116
Work Order: 2004210

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2004210-001	UB25-27	04/10/2020 8:30 AM	04/17/2020 3:57 PM

Case Narrative

WO#: **2004210**
Date: **4/27/2020**

CLIENT: Friedman & Bruya
Project: 004116

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **2004210**
Date Reported: **4/27/2020**

Client: Friedman & Bruya
Collection Date: 4/10/2020 8:30:00 AM
Project: 004116
Lab ID: 2004210-001
Matrix: Soil
Client Sample ID: UB25-27

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Organic Carbon by EPA 9060				Batch ID: 28169		Analyst: SS
Total Organic Carbon	0.141	0.0750		%-dry	1	4/27/2020 4:11:00 PM

Work Order: 2004210
CLIENT: Friedman & Bruya
Project: 004116

QC SUMMARY REPORT

Total Organic Carbon by EPA 9060

Sample ID: **MB-28169**	SampType: **MBLK**			Units: **%-dry**		Prep Date: **4/27/2020**			RunNo: **58813**		
Client ID: **MBLKS**	Batch ID: **28169**					Analysis Date: **4/27/2020**			SeqNo: **1174595**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	ND	0.0750									

Sample ID: **LCS-28169**	SampType: **LCS**			Units: **%-dry**		Prep Date: **4/27/2020**			RunNo: **58813**		
Client ID: **LCSS**	Batch ID: **28169**					Analysis Date: **4/27/2020**			SeqNo: **1174597**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.06	0.0750	1.000	0	106	80	120				

Sample ID: **2004210-001ADUP**	SampType: **DUP**			Units: **%-dry**		Prep Date: **4/27/2020**			RunNo: **58813**		
Client ID: **UB25-27**	Batch ID: **28169**					Analysis Date: **4/27/2020**			SeqNo: **1174599**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	0.166	0.0750						0.1410	16.3	20	

Sample ID: **2004210-001AMS**	SampType: **MS**			Units: **%-dry**		Prep Date: **4/27/2020**			RunNo: **58813**		
Client ID: **UB25-27**	Batch ID: **28169**					Analysis Date: **4/27/2020**			SeqNo: **1174600**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.25	0.0750	1.000	0.1410	111	75	125				

Sample ID: **2004210-001AMSD**	SampType: **MSD**			Units: **%-dry**		Prep Date: **4/27/2020**			RunNo: **58813**		
Client ID: **UB25-27**	Batch ID: **28169**					Analysis Date: **4/27/2020**			SeqNo: **1174601**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Organic Carbon	1.24	0.0750	1.000	0.1410	110	75	125	1.250	1.05	20	

Sample Log-In Check List

Client Name:	**FB**	Work Order Number:	**2004210**
Logged by:	**Carissa True**	Date Received:	**4/17/2020 3:57:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☑	No ☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☑	No ☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes ☑	No ☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Cooler 1	4.3
Sample 1	4.6

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SUBCONTRACT SAMPLE CHAIN OF CUSTODY

2004210

Page # 1 of 1

Send Report To Michael Erdahl

Company Friedman and Bruya, Inc.

Address 3012 16th Ave W

City, State, ZIP Seattle, WA 98119

Phone # (206) 285-8282 merdahl@friedmanandbruya.com

SUBCONTRACTER Fremont

PROJECT NAME/NO.	PO #
004116	B185

REMARKS

TURNAROUND TIME
- ☒ Standard TAT
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Page 8 of 8

Sample ID	Lab ID	Date Sampled	Time Sampled	Matrix	# of jars	ANALYSES REQUESTED: Dioxins/Furans	EPH	VPH	TOC-440°							Notes
UB25-27		4/16/20	0830	Soil	1				X							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Michael Erdahl	Friedman & Bruya	4/17/20	03:30PM
Received by: Carter Johnson	Carter Johnson	FAI	4/17/20	1557
Relinquished by:				
Received by:			-	

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

004116 [redacted]

SAMPLE CHAIN OF ~~CUSTODY~~ ME 04/10/20 [redacted]

USY / (C13)

Page # 1 of 2

Report To John Funderburk (& Brian Dixon (Dixon ES))

Company Urban Environmental

Address

City, State, ZIP Seattle WA

Phone ______ Email ______

SAMPLERS (signature)	
PROJECT NAME: Rainier Mall	PO #
REMARKS	INVOICE TO
Project specific RLs? - Yes / No	

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	PCEs & degradates	TOC			Notes
UB25-25	01A-E	4.10.20	0820	Soil	5												
UB25-27	02	↓	0830	↓	5								X	■			■ per BD 4/17/20 ME
UB25-35	03	↓	0840	↓	5								X				
UB25-45	04	↓	0925	↓	5								X				
UB26-25	05	↓	1140	↓	5												
UB26-30	06	↓	1200	↓	5								X				
UB26-35	07	↓	1210	↓	5								X				
UB26-40	08	↓	1225	↓	5								X				
UB26-45	09	↓	1320	↓	5								X				Samples received at 3 °C
UB27-6	10A-D	↓	1200	↓	4								X				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Brian Dixon	Dixon ES	4-10	[illegible]
Received by: [signature]	Matthew W. Griswold	UEP llc	4-10-20	[illegible]
Relinquished by: [signature]	Matthew W. Griswold	UEP llc	4-10-20	17:03
Received by: [signature]	BISRAT TADESSE	FBI	|	|

004116

SAMPLE CHAIN OF CUSTODY

ME 04/10/20 VS4/C73

Page # 2 of 2

Report To John Funderburk cc Brian Dixon (DixonES)

Company Urban Environmental

Address

City, State, ZIP Seattle WA

Phone Email

SAMPLERS (signature) DS

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- [ ] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID (NP)	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	PCE & Degradation				Notes (#JARS)
UB27-12	~~11~~ A-D	4-10-20	1225	S	4								X				
~~B50~~ UB27-17	~~12~~ 12		1235		4												
UB28-6	~~13~~ 13		1300		4								X				
UB28-11	14		1310		4								X				
UB28-15	15 A-C		1315		3												
UB29-6	16 A-D		1340		4								X				
UB29-11	17		1345		4								X				
UB29-15	18 A-C		1350	J	3												

Samples received at 3 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	4-10	4:15
Received by: Matthew W. Grunwald	Matthew W. Grunwald	UEP LLC	4-10-20	4:15
Relinquished by: Matthew W. Grunwald	Matthew W. Grunwald	UEP LLC	4-10-20	17:03
Received by:	BISRAT TADESSE	FBI		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 21, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on May 15, 2020 from the Rainier Mall, F&BI 005197 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Matthew Grunwald
UEP0521R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 15, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 005197 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
005197 -01	UB30-12
005197 -02	UB30-23
005197 -03	UB30-24
005197 -04	UB30-26
005197 -05	UB30-30
005197 -06	UB30-31
005197 -07	UB30-34
005197 -08	UB30-35
005197 -09	UB30-38
005197 -10	UB30-39

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-12	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-01
Date Analyzed:	05/18/20	Data File:	051812.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-23	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-02
Date Analyzed:	05/18/20	Data File:	051813.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	95	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-24	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-03
Date Analyzed:	05/18/20	Data File:	051814.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-26	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-04
Date Analyzed:	05/18/20	Data File:	051815.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-30	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-05
Date Analyzed:	05/18/20	Data File:	051816.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.20
Tetrachloroethene	1.3

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-31	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-06
Date Analyzed:	05/18/20	Data File:	051817.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.030
Tetrachloroethene	0.13

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-34	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-07
Date Analyzed:	05/18/20	Data File:	051818.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	145
Toluene-d8	101	55	145
4-Bromofluorobenzene	99	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.10
Tetrachloroethene	0.56

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-35	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-08
Date Analyzed:	05/18/20	Data File:	051819.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.17
Tetrachloroethene	0.50

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-38	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-09
Date Analyzed:	05/18/20	Data File:	051820.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	97	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.024
Tetrachloroethene	0.035

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB30-39	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	005197-10
Date Analyzed:	05/18/20	Data File:	051821.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 005197
Date Extracted:	05/18/20	Lab ID:	00-1064 mb
Date Analyzed:	05/18/20	Data File:	051811.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	62	145
Toluene-d8	99	55	145
4-Bromofluorobenzene	96	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 05/21/20
Date Received: 05/15/20
Project: Rainier Mall, F&BI 005197

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 005197-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	66	66	10-138	0
Chloroethane	mg/kg (ppm)	2.5	<0.5	79	80	10-176	1
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	90	89	10-160	1
Methylene chloride	mg/kg (ppm)	2.5	<0.5	98	99	10-156	1
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	94	95	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	100	102	19-140	2
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	101	103	25-135	2
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	92	96	12-160	4
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	103	106	10-156	3
Trichloroethene	mg/kg (ppm)	2.5	<0.02	100	106	21-139	6
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	89	90	20-133	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	99	22-139
Chloroethane	mg/kg (ppm)	2.5	106	9-163
1,1-Dichloroethene	mg/kg (ppm)	2.5	114	47-128
Methylene chloride	mg/kg (ppm)	2.5	114	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	112	67-129
1,1-Dichloroethane	mg/kg (ppm)	2.5	112	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	113	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	88	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	117	62-131
Trichloroethene	mg/kg (ppm)	2.5	92	64-117
Tetrachloroethene	mg/kg (ppm)	2.5	93	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

005197

[redacted]

CC: Brian Dixon / Dixon ES

SAMPLE CHAIN OF CUSTODY

ME 05/15/20 VS2/CT2

[redacted] Page # 1 of 1

Report To JOHN FUNDERBURKE

Company UEP

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle WA 98121

Phone 425-922-9922 Email john@uepconsulting.com / brian@DixonES.com

SAMPLERS (signature)	
PROJECT NAME: RAINIER MALL	PO #
REMARKS	INVOICE TO: UEP
Project specific RLs? - Yes / No	

TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH 3-day
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
UB30-02	01 A-E	5-15-20	1240	Soil	5					X							
UB30-23	02		1145							X							
UB30-24	03		1150							X							
UB30-26	04		1155							X							
UB30-30	05		1200							X							
UB30-31	06		1210							X							
UB30-34	07		1215							X							
UB30-35	08		1220							X							
UB30-38	09		1225							X							
UB30-39	10		1230							X							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: [signature]	Brian Dixon	Dixon ES	5-15-20	1332
Received by: [signature]	Nhan Phan	FeBI	5/15	1332
Relinquished by:				
Received by:		Samples received at 4 °C		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 21, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on May 15, 2020 from the Rainier Mall, F&BI 005196 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Matthew Grunwald
UEP0521R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on May 15, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 005196 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
005196 -01	MW09-20200515

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW09-20200515	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005196
Date Extracted:	05/15/20	Lab ID:	005196-01
Date Analyzed:	05/19/20	Data File:	051919.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	96	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.47
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	48
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	87
Tetrachloroethene	99

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 005196
Date Extracted:	05/15/20	Lab ID:	00-1058 mb
Date Analyzed:	05/15/20	Data File:	051511.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	106	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 05/21/20
Date Received: 05/15/20
Project: Rainier Mall, F&BI 005196

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	119	116	70-128	3
Chloroethane	ug/L (ppb)	50	93	89	66-149	4
1,1-Dichloroethene	ug/L (ppb)	50	110	103	72-121	7
Methylene chloride	ug/L (ppb)	50	119	117	63-132	2
trans-1,2-Dichloroethene	ug/L (ppb)	50	115	115	76-118	0
1,1-Dichloroethane	ug/L (ppb)	50	114	114	77-119	0
cis-1,2-Dichloroethene	ug/L (ppb)	50	115	114	76-119	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	103	104	75-116	1
1,1,1-Trichloroethane	ug/L (ppb)	50	115	113	80-116	2
Trichloroethene	ug/L (ppb)	50	111	113	72-119	2
Tetrachloroethene	ug/L (ppb)	50	103	102	78-109	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

005196 John Funderburk

SAMPLE CHAIN OF CUSTODY

ME 05/15/20

Page # 1 of 1 VW1

Report To

Company UEP

Address 2324 1st Ave, Suite 203

City, State, ZIP

Phone Email johnf@uepconsulting.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- ☑ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
MW09-20200515	01A-C	5-15-20	21:58	W	3					X							
																Samples received at 4 °C	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	D.Dixon ES.	5-15-20	1334
Received by:	Nhan Phan	FEBI	5/15/20	1334
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 19, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on May 15, 2020 from the Rainier Mall, F&BI 005192 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Matthew Grunwald
UEP0519R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 15, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 005192 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
005192 -01	UB31-24
005192 -02	UB31-26
005192 -03	UB31-28
005192 -04	UB31-31
005192 -05	UB31-32
005192 -06	UB31-35
005192 -07	UB31-37
005192 -08	UB31-43

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-24	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-01
Date Analyzed:	05/15/20	Data File:	051520.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.084
Tetrachloroethene	9.6

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-26	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-02
Date Analyzed:	05/15/20	Data File:	051521.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.073
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.39
Tetrachloroethene	2.4

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-28	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-03
Date Analyzed:	05/15/20	Data File:	051522A.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.040
Tetrachloroethene	0.23

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-31	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-04
Date Analyzed:	05/15/20	Data File:	051515.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	106	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-32	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-05
Date Analyzed:	05/15/20	Data File:	051516.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-35	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-06
Date Analyzed:	05/15/20	Data File:	051517.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-37	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-07
Date Analyzed:	05/15/20	Data File:	051518.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	106	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB31-43	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	005192-08
Date Analyzed:	05/15/20	Data File:	051519.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 005192
Date Extracted:	05/15/20	Lab ID:	00-1056 mb
Date Analyzed:	05/15/20	Data File:	051512.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	98	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 05/19/20
Date Received: 05/15/20
Project: Rainier Mall, F&BI 005192

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 005133-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	2.5	<0.05	52	58	10-91	11
Chloroethane	mg/kg (ppm)	2.5	<0.5	59	61	10-101	3
1,1-Dichloroethene	mg/kg (ppm)	2.5	<0.05	62	66	22-107	6
Methylene chloride	mg/kg (ppm)	2.5	<0.5	90	102	14-128	12
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	78	87	13-112	11
1,1-Dichloroethane	mg/kg (ppm)	2.5	<0.05	86	96	23-115	11
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	<0.05	88	98	25-120	11
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	<0.05	83	92	22-124	10
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	<0.05	79	88	27-112	11
Trichloroethene	mg/kg (ppm)	2.5	<0.02	81	88	30-112	8
Tetrachloroethene	mg/kg (ppm)	2.5	<0.025	58	67	25-114	14

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	2.5	92	42-107
Chloroethane	mg/kg (ppm)	2.5	99	47-115
1,1-Dichloroethene	mg/kg (ppm)	2.5	101	65-110
Methylene chloride	mg/kg (ppm)	2.5	114	50-127
trans-1,2-Dichloroethene	mg/kg (ppm)	2.5	108	71-113
1,1-Dichloroethane	mg/kg (ppm)	2.5	109	74-109
cis-1,2-Dichloroethene	mg/kg (ppm)	2.5	108	73-110
1,2-Dichloroethane (EDC)	mg/kg (ppm)	2.5	97	73-111
1,1,1-Trichloroethane	mg/kg (ppm)	2.5	107	72-116
Trichloroethene	mg/kg (ppm)	2.5	105	72-107
Tetrachloroethene	mg/kg (ppm)	2.5	96	73-111

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

005192

SAMPLE CHAIN OF CUSTODY ME 05/15/20 CD2/VS2

Page # 1 of 1

Report To JOHN FUNDERBURKE

Company VEP

Address 2324 1st, Suite 203

City, State, ZIP Seattle

Phone 425-922-9922 Email

SAMPLERS (*signature*)

PROJECT NAME: RAINIER MALL

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH 24 Hour
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
VB31-24	01 A-E	5-15-20	0840	SOIL	5					X							ASAP
VB31-26	02		0850							X							on *
VB31-28	03		0855							X							samples
* VB31-34	04		0900							X							of
* VB31-32	05		0905							X							5/15
* VB31-35	06		0910							X							
* VB31-37	07		0935							X							
* VB31-43	08	V	0950							X							
																	Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: John R Funderburke	John R Funderburke		5/15/20	1025
Received by: Nhan Phan	Nhan Phan	F&B T	5/15/20	V
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

May 19, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on May 15, 2020 from the Rainier Mall, F&BI 005198 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Matthew Grunwald
UEP0519R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 15, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 005198 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
005198 -01	Sewer South
005198 -02	Sewer North

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Sewer South	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005198
Date Collected:	05/15/20	Lab ID:	005198-01 1/7.6
Date Analyzed:	05/16/20	Data File:	051523.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat/MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	94	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	22	8.6
Chloroethane	<20	<7.6
1,1-Dichloroethene	<3	<0.76
trans-1,2-Dichloroethene	3.7	0.94
1,1-Dichloroethane	<3.1	<0.76
cis-1,2-Dichloroethene	340	87
1,2-Dichloroethane (EDC)	<0.31	<0.076
1,1,1-Trichloroethane	<4.1	<0.76
Trichloroethene	69	13
1,1,2-Trichloroethane	<0.83	<0.15
Tetrachloroethene	270	39

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Sewer North	Client:	Urban Environmental Partners
Date Received:	05/15/20	Project:	Rainier Mall, F&BI 005198
Date Collected:	05/15/20	Lab ID:	005198-02 1/8.0
Date Analyzed:	05/16/20	Data File:	051522.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat/MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	99	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<2	<0.8
Chloroethane	<21	<8
1,1-Dichloroethene	<3.2	<0.8
trans-1,2-Dichloroethene	<3.2	<0.8
1,1-Dichloroethane	<3.2	<0.8
cis-1,2-Dichloroethene	<3.2	<0.8
1,2-Dichloroethane (EDC)	<0.32	<0.08
1,1,1-Trichloroethane	<4.4	<0.8
Trichloroethene	<2.1	<0.4
1,1,2-Trichloroethane	<0.87	<0.16
Tetrachloroethene	<54	<8

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 005198
Date Collected:	Not Applicable	Lab ID:	00-1060 mb
Date Analyzed:	05/15/20	Data File:	051515.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat/MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	107	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
1,1,1-Trichloroethane	<0.55	<0.1
Trichloroethene	<0.27	<0.05
1,1,2-Trichloroethane	<0.11	<0.02
Tetrachloroethene	<6.8	<1

Date of Report: 05/19/20
Date Received: 05/15/20
Project: Rainier Mall, F&BI 005198

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 005193-01 1/8.1 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Vinyl chloride	ug/m3	<2.1	<2.1	nm
Chloroethane	ug/m3	<21	<21	nm
1,1-Dichloroethene	ug/m3	<3.2	<3.2	nm
trans-1,2-Dichloroethene	ug/m3	<3.2	<3.2	nm
1,1-Dichloroethane	ug/m3	<3.3	<3.3	nm
cis-1,2-Dichloroethene	ug/m3	<3.2	<3.2	nm
1,2-Dichloroethane (EDC)	ug/m3	<0.33	<0.33	nm
1,1,1-Trichloroethane	ug/m3	<4.4	<4.4	nm
Trichloroethene	ug/m3	<2.2	<2.2	nm
1,1,2-Trichloroethane	ug/m3	<0.88	<0.88	nm
Tetrachloroethene	ug/m3	<55	<55	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ug/m3	35	95	70-130
Chloroethane	ug/m3	36	95	70-130
1,1-Dichloroethene	ug/m3	54	104	70-130
trans-1,2-Dichloroethene	ug/m3	54	98	70-130
1,1-Dichloroethane	ug/m3	55	94	70-130
cis-1,2-Dichloroethene	ug/m3	54	99	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	100	70-130
1,1,1-Trichloroethane	ug/m3	74	98	70-130
Trichloroethene	ug/m3	73	85	70-130
1,1,2-Trichloroethane	ug/m3	74	87	70-130
Tetrachloroethene	ug/m3	92	85	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

005198

John F. @ Urban Env. cc:

SAMPLE CHAIN OF CUSTODY

ME 05/15/20

Page # 1 of 1

Report To Brian Dixon @ Dixon Env.

Company Urban Env. Partners

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle WA 98121

Phone 425-922-9922 Email johnf@urbanreporting.com BrianeDixon@ES.com

SAMPLERS (signature)	
PROJECT NAME & ADDRESS: Rainier Mall	PO #
NOTES:	INVOICE TO: UEP

TURNAROUND TIME
- ☐ Standard
- ☒ RUSH 5-day

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Default: Clean after 3 days
- ☐ Archive (Fee may apply)

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
Sewer South	01	3287	105	IA / (SG)	5-15-20	30	925	4	931			X				
Sewer North	02	2436	02	IA / (SG)	5-15-20	30	950	5	1001			X				
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												Samples received at 22°C
				IA / SG												

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	5-15-20	1332
Received by:	Nhan Phan	FCBI	5/15/20	1332
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

May 4, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 27, 2020 from the Rainier Mall, F&BI 004301 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon, Matthew Grunwald
UEP0504R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 27, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 004301 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
004301 -01	PILE1-3"
004301 -02	PILE1-6"
004301 -03	PILE1-12"
004301 -04	PILES-MIDDLE

All quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	PILE1-3”	Client:	Urban Environmental Partners
Date Received:	04/27/20	Project:	Rainier Mall, F&BI 004301
Date Extracted:	04/28/20	Lab ID:	004301-01 1/5
Date Analyzed:	04/28/20	Data File:	042815.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	85	31	163
Benzo(a)anthracene-d12	105	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	0.011
Fluoranthene	0.12
Pyrene	0.084
Benz(a)anthracene	0.20
Chrysene	0.17
Benzo(a)pyrene	0.21
Benzo(b)fluoranthene	0.23
Benzo(k)fluoranthene	0.068
Indeno(1,2,3-cd)pyrene	0.090
Dibenz(a,h)anthracene	0.025
Benzo(g,h,i)perylene	0.088

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	PILE1-6”	Client:	Urban Environmental Partners
Date Received:	04/27/20	Project:	Rainier Mall, F&BI 004301
Date Extracted:	04/28/20	Lab ID:	004301-02 1/5
Date Analyzed:	04/28/20	Data File:	042816.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	86	31	163
Benzo(a)anthracene-d12	110	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	0.012
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	PILE1-12”	Client:	Urban Environmental Partners
Date Received:	04/27/20	Project:	Rainier Mall, F&BI 004301
Date Extracted:	04/28/20	Lab ID:	004301-03 1/5
Date Analyzed:	04/28/20	Data File:	042817.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	86	31	163
Benzo(a)anthracene-d12	111	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	0.021
Benzo(a)pyrene	0.060
Benzo(b)fluoranthene	0.10
Benzo(k)fluoranthene	0.020
Indeno(1,2,3-cd)pyrene	0.026
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.021

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	PILES-MIDDLE	Client:	Urban Environmental Partners
Date Received:	04/27/20	Project:	Rainier Mall, F&BI 004301
Date Extracted:	04/28/20	Lab ID:	004301-04 1/5
Date Analyzed:	04/28/20	Data File:	042818.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	89	31	163
Benzo(a)anthracene-d12	107	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 004301
Date Extracted:	04/28/20	Lab ID:	00-965 mb 1/5
Date Analyzed:	04/28/20	Data File:	042812.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	93	31	163
Benzo(a)anthracene-d12	115	24	168

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 05/04/20
Date Received: 04/27/20
Project: Rainier Mall, F&BI 004301

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270E SIM

Laboratory Code: 004301-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Acceptance Criteria
Naphthalene	mg/kg (ppm)	0.17	<0.01	75	44-129
Acenaphthylene	mg/kg (ppm)	0.17	<0.01	74	52-121
Acenaphthene	mg/kg (ppm)	0.17	<0.01	74	51-123
Fluorene	mg/kg (ppm)	0.17	<0.01	77	37-137
Phenanthrene	mg/kg (ppm)	0.17	<0.01	83	34-141
Anthracene	mg/kg (ppm)	0.17	0.0083	82	32-124
Fluoranthene	mg/kg (ppm)	0.17	0.094	51 b	16-160
Pyrene	mg/kg (ppm)	0.17	0.064	56 b	10-180
Benz(a)anthracene	mg/kg (ppm)	0.17	0.15	23 b	23-144
Chrysene	mg/kg (ppm)	0.17	0.13	37 b	32-149
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	0.18	26 b	23-176
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	0.052	65 b	42-139
Benzo(a)pyrene	mg/kg (ppm)	0.17	0.17	24 b	21-163
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	0.069	72 b	23-170
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	0.020	81	31-146
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	0.068	68 b	37-133

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.17	81	80	58-121	1
Acenaphthylene	mg/kg (ppm)	0.17	83	81	54-121	2
Acenaphthene	mg/kg (ppm)	0.17	79	78	54-123	1
Fluorene	mg/kg (ppm)	0.17	86	84	56-127	2
Phenanthrene	mg/kg (ppm)	0.17	85	86	55-122	1
Anthracene	mg/kg (ppm)	0.17	87	87	50-120	0
Fluoranthene	mg/kg (ppm)	0.17	95	94	54-129	1
Pyrene	mg/kg (ppm)	0.17	91	91	53-127	0
Benz(a)anthracene	mg/kg (ppm)	0.17	95	96	51-115	1
Chrysene	mg/kg (ppm)	0.17	90	90	55-129	0
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	86	85	56-123	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	84	86	54-131	2
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	83	51-118	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	97	95	49-148	2
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	95	94	50-141	1
Benzo(g,h,i)perylene	mg/kg (ppm)	0.17	90	91	52-131	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

004301

SAMPLE CHAIN OF CUSTODY

ME 04/27/20

LX01

Page # 1 of 1

Report To John Funderburk cc: Brian@DixonES.com

Company Urban Env. Partners

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle

Phone 425-922-9922 Email johnf@uepconsulting.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- ☒ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
PILE1-3"	01	4-27-20	910	S	1						X						
PILE1-6"	02		915								X						
PILE1-12"	03		920								X						
PILE5-MIDDLE	04		925								X						

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Brian Dixon	Dixon ES	4-27-20	1010
Received by:		Nhan Phan	FEBT	4/27/20	1010
Relinquished by:					
Received by:			Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
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www.friedmanandbruya.com

April 27, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on April 10, 2020 from the Rainier Mall, F&BI 004118 project. There are 6 pages included in this report.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0427R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 10, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 004118 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
004118 -01	SG04
004118 -02	SG05

All quality control requirements were acceptable.

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG04	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004118
Date Collected:	04/10/20	Lab ID:	004118-01 1/16
Date Analyzed:	04/21/20	Data File:	042017.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	106	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<4.1	<1.6
Chloroethane	<42	<16
1,1-Dichloroethene	<6.3	<1.6
trans-1,2-Dichloroethene	<6.3	<1.6
1,1-Dichloroethane	<6.5	<1.6
cis-1,2-Dichloroethene	<6.3	<1.6
1,2-Dichloroethane (EDC)	<0.65	<0.16
1,1,1-Trichloroethane	<8.7	<1.6
Trichloroethene	<4.3	<0.8
1,1,2-Trichloroethane	<1.7	<0.32
Tetrachloroethene	<110	<16

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	SG05	Client:	Urban Environmental Partners
Date Received:	04/10/20	Project:	Rainier Mall, F&BI 004118
Date Collected:	04/10/20	Lab ID:	004118-02 1/16
Date Analyzed:	04/21/20	Data File:	042018.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	105	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<4.1	<1.6
Chloroethane	<42	<16
1,1-Dichloroethene	<6.3	<1.6
trans-1,2-Dichloroethene	<6.3	<1.6
1,1-Dichloroethane	<6.5	<1.6
cis-1,2-Dichloroethene	<6.3	<1.6
1,2-Dichloroethane (EDC)	<0.65	<0.16
1,1,1-Trichloroethane	<8.7	<1.6
Trichloroethene	<4.3	<0.8
1,1,2-Trichloroethane	<1.7	<0.32
Tetrachloroethene	<110	<16

Analysis For Volatile Compounds By Method TO-15

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 004118
Date Collected:	Not Applicable	Lab ID:	00-0822 mb
Date Analyzed:	04/16/20	Data File:	041611.D
Matrix:	Air	Instrument:	GCMS7
Units:	ug/m3	Operator:	bat

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
4-Bromofluorobenzene	91	70	130

Compounds:	Concentration ug/m3	ppbv
Vinyl chloride	<0.26	<0.1
Chloroethane	<2.6	<1
1,1-Dichloroethene	<0.4	<0.1
trans-1,2-Dichloroethene	<0.4	<0.1
1,1-Dichloroethane	<0.4	<0.1
cis-1,2-Dichloroethene	<0.4	<0.1
1,2-Dichloroethane (EDC)	<0.04	<0.01
1,1,1-Trichloroethane	<0.55	<0.1
Trichloroethene	<0.27	<0.05
1,1,2-Trichloroethane	<0.11	<0.02
Tetrachloroethene	<6.8	<1

Date of Report: 04/27/20
Date Received: 04/10/20
Project: Rainier Mall, F&BI 004118

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AIR SAMPLES FOR VOLATILES BY METHOD TO-15

Laboratory Code: 004108-02 1/2.8 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 30)
Vinyl chloride	ug/m3	<0.72	<0.72	nm
Chloroethane	ug/m3	<7.4	<7.4	nm
1,1-Dichloroethene	ug/m3	<1.1	<1.1	nm
trans-1,2-Dichloroethene	ug/m3	<1.1	<1.1	nm
1,1-Dichloroethane	ug/m3	<1.1	<1.1	nm
cis-1,2-Dichloroethene	ug/m3	<1.1	<1.1	nm
1,2-Dichloroethane (EDC)	ug/m3	<0.11	<0.11	nm
1,1,1-Trichloroethane	ug/m3	<1.5	<1.5	nm
Trichloroethene	ug/m3	<0.75	<0.75	nm
1,1,2-Trichloroethane	ug/m3	<0.31	<0.31	nm
Tetrachloroethene	ug/m3	<19	<19	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	ug/m3	35	86	70-130
Chloroethane	ug/m3	36	91	70-130
1,1-Dichloroethene	ug/m3	54	101	70-130
trans-1,2-Dichloroethene	ug/m3	54	95	70-130
1,1-Dichloroethane	ug/m3	55	94	70-130
cis-1,2-Dichloroethene	ug/m3	54	100	70-130
1,2-Dichloroethane (EDC)	ug/m3	55	102	70-130
1,1,1-Trichloroethane	ug/m3	74	100	70-130
Trichloroethene	ug/m3	73	85	70-130
1,1,2-Trichloroethane	ug/m3	74	85	70-130
Tetrachloroethene	ug/m3	92	87	70-130

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

004118

SAMPLE CHAIN OF CUSTODY

ME 04/10/20

Page # 1 of 1

Report To John Funderburk (" Brian Dixon w/ Dixon Env.)

Company Urban Environmental

Address

City, State, ZIP Seattle WA

Phone Email

SAMPLERS (signature)

PROJECT NAME & ADDRESS: Rainier Mall

PO #

NOTES:

INVOICE TO

TURNAROUND TIME
- ☒ Standard
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Default: Clean after 3 days
- ☐ Archive (Fee may apply)

SAMPLE INFORMATION										ANALYSIS REQUESTED						
Sample Name	Lab ID	Canister ID	Flow Cont. ID	Reporting Level: IA=Indoor Air SG=Soil Gas (Circle One)	Date Sampled	Initial Vac. ("Hg)	Field Initial Time	Final Vac. ("Hg)	Field Final Time	TO15 Full Scan	TO15 BTEXN	TO15 cVOCs	APH	Helium		Notes
SG04	01	3540	243	IA / (SG)	4-10-20	28.75	1430	3	1436			X				
SG05	02	4178	259	IA / (SG)	4-10-20	28	1506	4	1512			X				
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												
				IA / SG												

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	4-10-20	4:15
Received by: Matthew D. Grunwald	Matthew W. Grunwald	UEP LLC	4/10/20	4:15
Relinquished by: Matthew W. Grunwald	Matthew W Grunwald	UEP LLC	4/10/20	17:03
Received by:	BISRAT TADESSE	FBI	1	1

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COCTO-15.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 1, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on May 26, 2020 from the Lake Union Partners - Rainier Mall, F&BI 005319 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP0601R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on May 26, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Lake Union Partners - Rainier Mall, F&BI 005319 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
005319 -01	MW-30
005319 -02	MW-31

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-30	Client:	Urban Environmental Partners
Date Received:	05/26/20	Project:	Lake Union Partners - Rainier Mall
Date Extracted:	05/27/20	Lab ID:	005319-01
Date Analyzed:	05/27/20	Data File:	052709.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	23
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	2.4
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	230 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	420 ve
Tetrachloroethene	1,400 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-30	Client:	Urban Environmental Partners
Date Received:	05/26/20	Project:	Lake Union Partners - Rainier Mall
Date Extracted:	05/27/20	Lab ID:	005319-01 1/100
Date Analyzed:	05/28/20	Data File:	052832.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	30
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	<100
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	250
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Trichloroethene	410
Tetrachloroethene	1,500

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-31	Client:	Urban Environmental Partners
Date Received:	05/26/20	Project:	Lake Union Partners - Rainier Mall
Date Extracted:	05/27/20	Lab ID:	005319-02
Date Analyzed:	05/27/20	Data File:	052710.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	103	63	127
4-Bromofluorobenzene	93	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,500 ve
Chloroethane	<1
1,1-Dichloroethene	11
Methylene chloride	<5
trans-1,2-Dichloroethene	120
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4,900 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	6,200 ve
Tetrachloroethene	18,000 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW-31	Client:	Urban Environmental Partners
Date Received:	05/26/20	Project:	Lake Union Partners - Rainier Mall
Date Extracted:	05/27/20	Lab ID:	005319-02 1/1000
Date Analyzed:	05/28/20	Data File:	052833.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,300
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	15,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	22,000
Tetrachloroethene	120,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Lake Union Partners - Rainier Mall
Date Extracted:	05/27/20	Lab ID:	00-1156 mb2
Date Analyzed:	05/27/20	Data File:	052705.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	MS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 06/01/20
Date Received: 05/26/20
Project: Lake Union Partners - Rainier Mall, F&BI 005319

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 005264-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	<0.2	97	36-166
Chloroethane	ug/L (ppb)	50	<1	101	46-160
1,1-Dichloroethene	ug/L (ppb)	50	<1	97	60-136
Methylene chloride	ug/L (ppb)	50	<5	103	67-132
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	98	72-129
1,1-Dichloroethane	ug/L (ppb)	50	<1	102	70-128
cis-1,2-Dichloroethene	ug/L (ppb)	50	<1	99	71-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	95	48-149
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	105	60-146
Trichloroethene	ug/L (ppb)	50	<1	96	66-135
Tetrachloroethene	ug/L (ppb)	50	<1	97	10-226

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	99	99	50-154	0
Chloroethane	ug/L (ppb)	50	101	103	58-146	2
1,1-Dichloroethene	ug/L (ppb)	50	96	99	67-136	3
Methylene chloride	ug/L (ppb)	50	102	105	39-148	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	96	99	68-128	3
1,1-Dichloroethane	ug/L (ppb)	50	101	105	74-135	4
cis-1,2-Dichloroethene	ug/L (ppb)	50	97	100	74-136	3
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	97	99	66-129	2
1,1,1-Trichloroethane	ug/L (ppb)	50	105	107	74-142	2
Trichloroethene	ug/L (ppb)	50	98	100	67-133	2
Tetrachloroethene	ug/L (ppb)	50	99	99	76-121	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

005319

SAMPLE CHAIN OF CUSTODY

ME 05/26/20 VWJ

Page # 1 of 1

Report To John Funderburk

Company Urban Environmental Partners

Address

City, State, ZIP

Phone (425)922-9922 Email

SAMPLERS (*signature*)

PROJECT NAME: Lake Union Partners - Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / (No)

INVOICE TO: UEP llc

TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH 3-D
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- (Default): Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260 C	PAHs EPA 8270	PCBs EPA 8082					Notes
MW-30	01 A-C	5-23-20	11:24	W	3					X							Chl. Solvents only
MW-31	02 A-C	5-23-20	12:28	W	3					X							Chl. Solvents only
													Samples received at 5 °C				

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Benjamin Kuroiwa	UEP	5/23/20	16:20
Received by:	Ray Kuroiwa	—	5/23/20	16:20
Relinquished by:	Ray Kuroiwa	UEP	5/24	14:13
Received by:		F&B	5/26/20	1413

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

June 10, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on June 3, 2020 from the Rainier Mall, F&BI 006053 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0610R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on June 3, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 006053 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
006053 -01	UB32-2
006053 -02	UB32-7
006053 -03	UB32-13
006053 -04	UB32-18
006053 -05	UB33-2
006053 -06	UB33-5
006053 -07	UB33-12
006053 -08	UB33-17.5
006053 -09	UB34-3
006053 -10	UB34-7
006053 -11	UB34-13
006053 -12	UB35-4
006053 -13	UB35-10
006053 -14	UB35-14
006053 -15	UB34-W
006053 -16	UB35-W

All quality control requirements were acceptable.

Date of Report: 06/10/20
Date Received: 06/03/20
Project: Rainier Mall, F&BI 006053
Date Extracted: 06/04/20
Date Analyzed: 06/04/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
UB34-3 006053-09	<50	<250	98
UB34-7 006053-10	<50	<250	96
UB34-13 006053-11	<50	<250	97
UB35-4 006053-12	<50	<250	89
UB35-10 006053-13	<50	<250	99
UB35-14 006053-14	<50	<250	95
Method Blank 00-1243 MB	<50	<250	91

Date of Report: 06/10/20
Date Received: 06/03/20
Project: Rainier Mall, F&BI 006053
Date Extracted: 06/04/20
Date Analyzed: 06/04/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
UB34-W 006053-15	160 x	<250	ip
UB35-W 006053-16 1/1.3	<65	<320	ip
Method Blank 00-1220 MB2	<50	<250	77

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	UB32-13	Client:	Urban Environmental Partners
Date Received:	06/03/20	Project:	Rainier Mall, F&BI 006053
Date Extracted:	06/04/20	Lab ID:	006053-03 1/5
Date Analyzed:	06/04/20	Data File:	060417.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	65	31	163
Benzo(a)anthracene-d12	84	24	168

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	UB33-12	Client:	Urban Environmental Partners
Date Received:	06/03/20	Project:	Rainier Mall, F&BI 006053
Date Extracted:	06/04/20	Lab ID:	006053-07 1/5
Date Analyzed:	06/04/20	Data File:	060418.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	59	31	163
Benzo(a)anthracene-d12	75	24	168

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 006053
Date Extracted:	06/04/20	Lab ID:	00-1223 mb2 1/5
Date Analyzed:	06/04/20	Data File:	060416.D
Matrix:	Soil	Instrument:	GCMS6
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	76	31	163
Benzo(a)anthracene-d12	97	24	168

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Date of Report: 06/10/20
Date Received: 06/03/20
Project: Rainier Mall, F&BI 006053

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 006053-09 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	84	88	73-135	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	74-139

Date of Report: 06/10/20
Date Received: 06/03/20
Project: Rainier Mall, F&BI 006053

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	84	88	63-142	5

Date of Report: 06/10/20
Date Received: 06/03/20
Project: Rainier Mall, F&BI 006053

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR PAHS BY EPA METHOD 8270E SIM

Laboratory Code: 006039-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.17	<0.01	82	82	23-144	0
Chrysene	mg/kg (ppm)	0.17	<0.01	81	80	32-149	1
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	<0.01	78	77	23-176	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	<0.01	77	76	42-139	1
Benzo(a)pyrene	mg/kg (ppm)	0.17	<0.01	75	74	21-163	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	<0.01	81	78	23-170	4
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	<0.01	83	80	31-146	4

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.17	94	51-115
Chrysene	mg/kg (ppm)	0.17	95	55-129
Benzo(b)fluoranthene	mg/kg (ppm)	0.17	83	56-123
Benzo(k)fluoranthene	mg/kg (ppm)	0.17	86	54-131
Benzo(a)pyrene	mg/kg (ppm)	0.17	82	51-118
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.17	91	49-148
Dibenz(a,h)anthracene	mg/kg (ppm)	0.17	95	50-141

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

ME 06-03-20 Page # 1 of 2 03

Report To: John F. @ UEP 006053 cc: Brian D. @ DixonES

Company: Urban Env. Partners

Address: 2324 1st Ave Suite 203

City, State, ZIP: Seattle WA 98121

Phone: 425-922-9922 Email: johnf@uepconsulting.com Brian@DixonES.com

SAMPLERS (signature):

PROJECT NAME: Rainier Mall

PO #:

REMARKS:

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Notes
UB32-2	01	6-3-20	825	S	1								HOLD
UB32-7	02		830										HOLD
UB32-13	03		840								X		
UB32-18	04		845										HOLD
UB33-2	05		925										HOLD
UB33-[redacted]5	06		930										HOLD
UB33-12[redacted]	07		935								X		
UB39-17.5	08		945										HOLD
UB34-3	09		1000			X							
UB34-7	10	"	1005	"	"	X							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	6.3.20	1220
Received by:	Liz Webber-Bruya	F?B	6/3/20	1220
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SAMPLE CHAIN OF CUSTODY

006053

ME 06-03-20

Page # 2 of 2 63

Report To John F. & Brian D.

Company See page 1

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
UB34-13	11	6-3-20	1045	SOIL 6-3-20	1	X											
UB35-4	12		1055			X											
UB35-10	13		1100			X											
UB35-14	14		1110			X											
UB34-W	15		1045	W	1	X											TURBID
UB35-W	16	"	1130	W	1	X											TURBID

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	6-3-20	1220
Received by:	Liz Webber-Bruya	F?B	6/3/20	1220
Relinquished by:				
Received by:				

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Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

June 11, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on June 8, 2020 from the Rainier Mall, F&BI 006113 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0611R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on June 8, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 006113 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
006113 -01	MW32-20200608
006113 -02	MW33-20200608

All quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	MW32-20200608	Client:	Urban Environmental Partners
Date Received:	06/08/20	Project:	Rainier Mall, F&BI 006113
Date Extracted:	06/09/20	Lab ID:	006113-01
Date Analyzed:	06/09/20	Data File:	060908.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	80	31	160
Benzo(a)anthracene-d12	94	25	165

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	MW33-20200608	Client:	Urban Environmental Partners
Date Received:	06/08/20	Project:	Rainier Mall, F&BI 006113
Date Extracted:	06/09/20	Lab ID:	006113-02
Date Analyzed:	06/09/20	Data File:	060907.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	69	31	160
Benzo(a)anthracene-d12	82	25	165

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

Analysis For Semivolatile Compounds By EPA Method 8270E SIM

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 006113
Date Extracted:	06/09/20	Lab ID:	00-1258 mb
Date Analyzed:	06/09/20	Data File:	060905.D
Matrix:	Water	Instrument:	GCMS6
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	78	31	160
Benzo(a)anthracene-d12	101	25	165

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

Date of Report: 06/11/20
Date Received: 06/08/20
Project: Rainier Mall, F&BI 006113

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR PAHS BY EPA METHOD 8270E SIM

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	ug/L (ppb)	1	96	98	60-118	2
Chrysene	ug/L (ppb)	1	96	98	66-125	2
Benzo(b)fluoranthene	ug/L (ppb)	1	86	86	55-135	0
Benzo(k)fluoranthene	ug/L (ppb)	1	87	87	62-125	0
Benzo(a)pyrene	ug/L (ppb)	1	88	89	58-127	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	1	99	99	36-142	0
Dibenz(a,h)anthracene	ug/L (ppb)	1	100	103	37-133	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

John F. @ UEP 006113

SAMPLE CHAIN OF CUSTODY ME 06/08/20

Page # 1 of 1 COC

Report To cc: Brian D. w/ Dixon ES

Company Urban Enviro. Partners

Address

City, State, ZIP Seattle WA

Phone 425-922-9922 Email johnf@uepconsultinginc.com Brian@DixonES.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH 48 hr

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	cPAHs EPA 8270	PCBs EPA 8082					Notes
MW32-20200608	01	6-8-20	1015	W	1						X						
MW33-20200608	02	6-8-20	1050	W	1						X						
												Samples received at 9 °C					

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	6-8-20	1018
Received by:	Nhan Pham	FEBI	6/8/20	1120
Relinquished by:				
Received by:				

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Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

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Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

September 9, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on August 27, 2020 from the Rainier Mall, F&BI 008432 project. There are 49 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0909R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 27, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 008432 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
008432 -01	MW01-20200827
008432 -02	MW02-20200826
008432 -03	MW02-PDB20200826
008432 -04	MW03-20200826
008432 -05	MW03-PDB20200826
008432 -06	MW04-20200827
008432 -07	MW04-PDB20200827
008432 -08	MW09-20200826
008432 -09	MW10-20200826
008432 -10	MW10-DB-20200826
008432 -11	MW11-20200826
008432 -12	MW11-DB-20200826
008432 -13	MW12-20200827
008432 -14	MW13-20200827
008432 -15	MW14-20200826
008432 -16	MW15-20200826
008432 -17	MW16-20200827
008432 -18	MW17-20200826
008432 -19	MW18-20200826
008432 -20	MW24-20200826
008432 -21	MW25-20200827
008432 -22	MW25-PDB20200827
008432 -23	MW25-PDB2-20200827
008432 -24	MW26-20200826
008432 -25	MW30-20200827
008432 -26	MW31-20200827
008432 -27	MW32-20200826
008432 -28	MW33-20200826
008432 -29	MW30-PDB20200827
008432 -30	MW31-PDB20200827
008432 -31	MW06-20200827
008432 -32	MW07-20200827

The 8260D calibration standard failed the acceptance criteria for methylene chloride in several samples. The data were flagged accordingly.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW01-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-01
Date Analyzed:	08/28/20	Data File:	082826.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	150
Chloroethane	<1
1,1-Dichloroethene	2.0
Methylene chloride	<5
trans-1,2-Dichloroethene	28
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1,300 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	1,300 ve
Tetrachloroethene	4,600 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW01-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-01 1/1000
Date Analyzed:	09/02/20	Data File:	090217.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<200
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	1,800
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	1,900
Tetrachloroethene	14,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW02-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-02
Date Analyzed:	08/28/20	Data File:	082829.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	98	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.33
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	9.8
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW02-PDB20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-03
Date Analyzed:	09/02/20	Data File:	090236.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.47
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	8.9
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW03-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-04
Date Analyzed:	09/02/20	Data File:	090237.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW03-PDB20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-05
Date Analyzed:	09/03/20	Data File:	090238.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW04-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-06
Date Analyzed:	09/03/20	Data File:	090239.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW04-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-07
Date Analyzed:	09/03/20	Data File:	090240.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW09-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-08 1/10
Date Analyzed:	08/29/20	Data File:	082846.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	95	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	9.9
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	590
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	300
Tetrachloroethene	530

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW10-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-09
Date Analyzed:	09/03/20	Data File:	090251.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	102	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW10-DB-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-10
Date Analyzed:	09/03/20	Data File:	090241.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW11-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-11
Date Analyzed:	09/03/20	Data File:	090242.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW11-DB-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-12
Date Analyzed:	09/03/20	Data File:	090243.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW12-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-13
Date Analyzed:	09/03/20	Data File:	090244.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.4
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	26
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	1.7
Tetrachloroethene	17

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW13-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-14
Date Analyzed:	08/28/20	Data File:	082838.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	94	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,200 ve
Chloroethane	<1
1,1-Dichloroethene	12
Methylene chloride	<5
trans-1,2-Dichloroethene	140
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	3,600 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	3,600 ve
Tetrachloroethene	9,500 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW13-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-14 1/1000
Date Analyzed:	09/02/20	Data File:	090219.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,200
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	16,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	19,000
Tetrachloroethene	72,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW14-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-15
Date Analyzed:	09/03/20	Data File:	090245.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW15-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-16
Date Analyzed:	09/03/20	Data File:	090246.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	57	121
Toluene-d8	98	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW16-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-17
Date Analyzed:	09/03/20	Data File:	090247.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW17-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-18
Date Analyzed:	09/03/20	Data File:	090248.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.83
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	170 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW17-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-18 1/10
Date Analyzed:	09/03/20	Data File:	090339.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	50	150
Toluene-d8	95	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<2
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50 ca
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	190
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	<10
Tetrachloroethene	<10

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW18-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-19
Date Analyzed:	09/03/20	Data File:	090249.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.5
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	2.1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	60
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	54
Tetrachloroethene	1.8

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW24-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-20
Date Analyzed:	09/03/20	Data File:	090250.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW25-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-21
Date Analyzed:	08/28/20	Data File:	082830.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	8.7
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	3.5
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	1,100 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	1,100 ve
Tetrachloroethene	1,100 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW25-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-21 1/20
Date Analyzed:	09/02/20	Data File:	090213.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	102	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	11
Chloroethane	<20
1,1-Dichloroethene	<20
Methylene chloride	<100
trans-1,2-Dichloroethene	<20
1,1-Dichloroethane	<20
cis-1,2-Dichloroethene	980
1,2-Dichloroethane (EDC)	<20
1,1,1-Trichloroethane	<20
Trichloroethene	770
Tetrachloroethene	980

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW25-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-22
Date Analyzed:	08/28/20	Data File:	082831.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	98	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1.7
Chloroethane	<1
1,1-Dichloroethene	1.2
Methylene chloride	<5
trans-1,2-Dichloroethene	2.6
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	830 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	1,100 ve
Tetrachloroethene	960 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW25-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-22 1/20
Date Analyzed:	09/02/20	Data File:	090214.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<4
Chloroethane	<20
1,1-Dichloroethene	<20
Methylene chloride	<100
trans-1,2-Dichloroethene	<20
1,1-Dichloroethane	<20
cis-1,2-Dichloroethene	810
1,2-Dichloroethane (EDC)	<20
1,1,1-Trichloroethane	<20
Trichloroethene	750
Tetrachloroethene	830

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW25-PDB2-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-23 1/10
Date Analyzed:	09/04/20	Data File:	090413.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	50	150
Toluene-d8	100	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	2.2
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50 ca
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	1,100
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	670
Tetrachloroethene	680

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-24
Date Analyzed:	08/28/20	Data File:	082832.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	98	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	7.8
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	1.1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	130
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	600 ve
Tetrachloroethene	820 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-24 1/20
Date Analyzed:	09/02/20	Data File:	090215.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	9.1
Chloroethane	<20
1,1-Dichloroethene	<20
Methylene chloride	<100
trans-1,2-Dichloroethene	<20
1,1-Dichloroethane	<20
cis-1,2-Dichloroethene	130
1,2-Dichloroethane (EDC)	<20
1,1,1-Trichloroethane	<20
Trichloroethene	490
Tetrachloroethene	720

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-25 1/10
Date Analyzed:	08/29/20	Data File:	082845.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	92	50	150
Toluene-d8	91	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	55
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	580
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	730
Tetrachloroethene	4,700 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-25 1/100
Date Analyzed:	09/02/20	Data File:	090220.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	53
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	<100
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	540
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Trichloroethene	850
Tetrachloroethene	4,400

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW31-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-26 1/1000
Date Analyzed:	08/29/20 01:17	Data File:	082848.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	94	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,900
Chloroethane	<1,000
1,1-Dichloroethene	<1,000
Methylene chloride	<5,000
trans-1,2-Dichloroethene	<1,000
1,1-Dichloroethane	<1,000
cis-1,2-Dichloroethene	24,000
1,2-Dichloroethane (EDC)	<1,000
1,1,1-Trichloroethane	<1,000
Trichloroethene	23,000
Tetrachloroethene	120,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-29
Date Analyzed:	08/28/20	Data File:	082833.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	66
Chloroethane	<1
1,1-Dichloroethene	1.1
Methylene chloride	<5
trans-1,2-Dichloroethene	10
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	680 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	900 ve
Tetrachloroethene	3,400 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-29 1/250
Date Analyzed:	09/02/20	Data File:	090218.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	69
Chloroethane	<250
1,1-Dichloroethene	<250
Methylene chloride	<1,200
trans-1,2-Dichloroethene	<250
1,1-Dichloroethane	<250
cis-1,2-Dichloroethene	740
1,2-Dichloroethane (EDC)	<250
1,1,1-Trichloroethane	<250
Trichloroethene	1,200
Tetrachloroethene	6,400

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW31-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-30
Date Analyzed:	08/28/20	Data File:	082833.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,500 ve
Chloroethane	<1
1,1-Dichloroethene	12
Methylene chloride	<5
trans-1,2-Dichloroethene	190 ve
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	3,800 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	7,300 ve
Tetrachloroethene	21,000 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW31-PDB20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-30 1/5000
Date Analyzed:	09/02/20	Data File:	090216.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	103	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	1,900
Chloroethane	<5,000
1,1-Dichloroethene	<5,000
Methylene chloride	<25,000
trans-1,2-Dichloroethene	<5,000
1,1-Dichloroethane	<5,000
cis-1,2-Dichloroethene	20,000
1,2-Dichloroethane (EDC)	<5,000
1,1,1-Trichloroethane	<5,000
Trichloroethene	25,000
Tetrachloroethene	120,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW06-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-31
Date Analyzed:	09/03/20	Data File:	090337.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	0.34
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	8.9
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	5.7
Tetrachloroethene	3.5

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW07-20200827	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	008432-32
Date Analyzed:	09/03/20	Data File:	090338.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	95	50	150
Toluene-d8	90	50	150
4-Bromofluorobenzene	97	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5 ca
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	00-1929 mb
Date Analyzed:	08/28/20	Data File:	082825.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	50	150
Toluene-d8	96	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/28/20	Lab ID:	00-1931 mb
Date Analyzed:	08/28/20	Data File:	082812.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	97	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW32-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/31/20	Lab ID:	008432-27 1/2
Date Analyzed:	09/01/20	Data File:	083135.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	37	15	99
Phenol-d6	29	11	65
Nitrobenzene-d5	81	10	145
2-Fluorobiphenyl	87	16	138
2,4,6-Tribromophenol	85	12	132
Terphenyl-d14	89	35	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
2-Methylnaphthalene	<0.4
1-Methylnaphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW33-20200826	Client:	Urban Environmental Partners
Date Received:	08/27/20	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/31/20	Lab ID:	008432-28 1/2
Date Analyzed:	09/01/20	Data File:	083136.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	38	15	99
Phenol-d6	27	11	65
Nitrobenzene-d5	85	10	145
2-Fluorobiphenyl	87	16	138
2,4,6-Tribromophenol	85	12	132
Terphenyl-d14	89	35	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
2-Methylnaphthalene	<0.4
1-Methylnaphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 008432
Date Extracted:	08/31/20	Lab ID:	00-1970 mb
Date Analyzed:	09/01/20	Data File:	083128.D
Matrix:	Water	Instrument:	GCMS8
Units:	ug/L (ppb)	Operator:	ya

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	20	15	99
Phenol-d6	15	11	65
Nitrobenzene-d5	87	10	145
2-Fluorobiphenyl	91	16	138
2,4,6-Tribromophenol	74	12	132
Terphenyl-d14	94	35	138

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Date of Report: 09/09/20
Date Received: 08/27/20
Project: Rainier Mall, F&BI 008432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 008432-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	50	0.33	89	36-166
Chloroethane	ug/L (ppb)	50	<1	98	46-160
1,1-Dichloroethene	ug/L (ppb)	50	<1	100	60-136
Methylene chloride	ug/L (ppb)	50	<5	93	67-132
trans-1,2-Dichloroethene	ug/L (ppb)	50	<1	95	72-129
1,1-Dichloroethane	ug/L (ppb)	50	<1	96	70-128
cis-1,2-Dichloroethene	ug/L (ppb)	50	9.8	99	71-127
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	<1	100	48-149
1,1,1-Trichloroethane	ug/L (ppb)	50	<1	95	60-146
Trichloroethene	ug/L (ppb)	50	<1	97	66-135
Tetrachloroethene	ug/L (ppb)	50	<1	137	10-226

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	50	91	90	50-154	1
Chloroethane	ug/L (ppb)	50	100	100	58-146	0
1,1-Dichloroethene	ug/L (ppb)	50	99	98	67-136	1
Methylene chloride	ug/L (ppb)	50	98	97	39-148	1
trans-1,2-Dichloroethene	ug/L (ppb)	50	97	99	68-128	2
1,1-Dichloroethane	ug/L (ppb)	50	98	99	74-135	1
cis-1,2-Dichloroethene	ug/L (ppb)	50	100	101	74-136	1
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	100	102	66-129	2
1,1,1-Trichloroethane	ug/L (ppb)	50	100	100	74-142	0
Trichloroethene	ug/L (ppb)	50	91	92	67-133	1
Tetrachloroethene	ug/L (ppb)	50	97	98	76-121	1

Date of Report: 09/09/20
Date Received: 08/27/20
Project: Rainier Mall, F&BI 008432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 008432-29 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	66	5 b	50-150
Chloroethane	ug/L (ppb)	10	<1	108	50-150
1,1-Dichloroethene	ug/L (ppb)	10	1.1	96	50-150
Methylene chloride	ug/L (ppb)	10	<5	75	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	10	81 b	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	91	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	680	0 b	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	92	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	97	50-150
Trichloroethene	ug/L (ppb)	10	900	0 b	50-150
Tetrachloroethene	ug/L (ppb)	10	3,400	0 b	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	131 vo	144 vo	70-130	9
Chloroethane	ug/L (ppb)	10	108	113	70-130	5
1,1-Dichloroethene	ug/L (ppb)	10	107	107	70-130	0
Methylene chloride	ug/L (ppb)	10	120	114	29-192	5
trans-1,2-Dichloroethene	ug/L (ppb)	10	97	108	70-130	11
1,1-Dichloroethane	ug/L (ppb)	10	101	104	70-130	3
cis-1,2-Dichloroethene	ug/L (ppb)	10	100	102	70-130	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	108	112	70-130	4
1,1,1-Trichloroethane	ug/L (ppb)	10	103	105	70-130	2
Trichloroethene	ug/L (ppb)	10	96	93	70-130	3
Tetrachloroethene	ug/L (ppb)	10	126	123	70-130	2

Date of Report: 09/09/20
Date Received: 08/27/20
Project: Rainier Mall, F&BI 008432

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	82	84	56-100	2
2-Methylnaphthalene	ug/L (ppb)	5	82	85	60-104	4
1-Methylnaphthalene	ug/L (ppb)	5	83	86	60-104	4
Acenaphthylene	ug/L (ppb)	5	93	93	70-130	0
Acenaphthene	ug/L (ppb)	5	87	87	65-122	0
Fluorene	ug/L (ppb)	5	91	93	70-130	2
Phenanthrene	ug/L (ppb)	5	89	90	70-130	1
Anthracene	ug/L (ppb)	5	93	93	70-130	0
Fluoranthene	ug/L (ppb)	5	96	98	70-130	2
Pyrene	ug/L (ppb)	5	97	95	70-130	2
Benz(a)anthracene	ug/L (ppb)	5	92	94	70-130	2
Chrysene	ug/L (ppb)	5	94	94	70-130	0
Benzo(a)pyrene	ug/L (ppb)	5	103	104	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	5	101	102	70-130	1
Benzo(k)fluoranthene	ug/L (ppb)	5	100	101	70-130	1
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	107	108	57-141	1
Dibenz(a,h)anthracene	ug/L (ppb)	5	113	111	57-137	2
Benzo(g,h,i)perylene	ug/L (ppb)	5	107	105	50-143	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

009432

SAMPLE CHAIN OF CUSTODY ME 08/27/20

VW4 / 3D04

Page # 1 of 1

Report To John Funderburk cc: Brian Dixon w/ Dixon ES

Company Urban Env. Partners

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email johnfe@uepconsulting.com Briane.Dixon@ES.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
MW01-20200827	01 A-C	8-27	1450	W	3					X							
MW02-20200826	02	8-26	1123														
MW02-PDB20200826	03	8-26	945														
MW03-20200826	04	8-26	1442														
MW03-PDB20200826	05	8-26	1415														
MW04-20200827	06	8-27	1042														
MW04-PDB20200827	07	8-27	940														
MW09-20200826	08	8-26	1315														
MW10-20200826	09	8-26	1430														Times on lab 1 dont match COC
MW10-DB20200826	10	8-26	1436														

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	8-27-20	1598
Received by:	Eric Clowe	F+B	8/27/20	1658
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

008432

SAMPLE CHAIN OF CUSTODY

ME 08/27/20

DOH/UWH

Page # 2 of 3

Report To John F. & Brian D.

Company Urban Env.

Address See P.1

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
MW11-20200826	11 A,C	8-26	1555	W	3					X							
MW11-DB-20200826	12	8-26	1545														3 different ID same time
MW12-20200827	13	8-27	1415														
MW13-20200827	14	8-27	1317														
MW14-20200826	15	8-26	1352														
MW15-20200826	16	8-26	1322														
MW16-20200827	17	8-27	1012														
MW17-20200826	18	8-26	1535														
MW18-20200826	19	8-26	1605														
MW24-20200826	20	8-26	1205														

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	8/27/20	1558
Received by:		F&B	8/27/20	1558
Relinquished by:				
Received by:		Samples received at 4 °C		

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008432

SAMPLE CHAIN OF CUSTODY

ME 08/27/20

VW4/D04

Page # 3 of 3

Report To John F. & Brian D.

Company Urban Env.

Address see P. 1

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
MW25-20200827	21 A-C	8-27	1245	W	3					X							
MW25-PDB20200827	22	8-27	1210														
MW25-PDB2-20200827	23	8-27	1215														
MW26-20200826	24	8-26	1430														
MW30-20200827	25	8-27	0935														
MW31-20200827	26	8-27	1347														
MW32-20200826	27	8-26	1200	W	1						X						
MW33-20200826	28	8-26	1240	W	1						X						

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	8/27/20	1558
Received by:	Eric Young	FB	8/27/20	1558
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
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Seattle, WA 98119-2029
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008432

SAMPLE CHAIN OF CUSTODY

ME 08/27/20 D04 / VW#

Page # 1 of 1

Report To [redacted]

Company Urban

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*) [redacted]

PROJECT NAME	PO #

REMARKS
coc generated at lab (MP)
Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
☐ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260 Chlorinated	PAHs EPA 8270	PCBs EPA 8082					Notes
MW30-PDB20200827	29 A-C	8/27	905	water	3					X							Added
MW31-PDB20200827	30	8/27	1327		3					X							
MW06-20200827	31	8/27	1145		3					X							PB 8/28
MW07-20200827	32	8/27	1115		3					X							
																	X - cVOCs per
																	BD 8/28/20 ME

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:				
Received by: [signature]	James Bruya	F&B	8/28	0700
Relinquished by:				
Received by:				

Samples received at 4 °C

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FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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fbi@isomedia.com
www.friedmanandbruya.com

September 9, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on August 28, 2020 from the Rainier Mall, F&BI 008452 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP0909R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on August 28, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 008452 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
008452 -01	MW21-20200828
008452 -02	MW20-20200828
008452 -03	MW20-DB-20200828
008452 -04	MW22-20200828
008452 -05	MW23-20200828
008452 -06	MW05-20200828
008452 -07	MW08-20200828

Chloroethane in the 8260D laboratory control sample and laboratory control sample duplicate failed the acceptance criteria. The analyte was not detected, therefore the data were acceptable.

All other quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW21-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-01
Date Analyzed:	09/02/20	Data File:	090231.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW20-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-02
Date Analyzed:	09/02/20	Data File:	090232.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	36
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	2.7
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW20-DB-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-03
Date Analyzed:	09/02/20	Data File:	090233.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	102	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW22-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-04
Date Analyzed:	09/02/20	Data File:	090234.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	97	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW23-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-05
Date Analyzed:	09/02/20	Data File:	090235.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW05-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-06 1/100
Date Analyzed:	09/01/20	Data File:	090124.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	250
Chloroethane	<100
1,1-Dichloroethene	<100
Methylene chloride	<500
trans-1,2-Dichloroethene	140
1,1-Dichloroethane	<100
cis-1,2-Dichloroethene	6,100
1,2-Dichloroethane (EDC)	<100
1,1,1-Trichloroethane	<100
Trichloroethene	11,000
Tetrachloroethene	16,000 ve

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW05-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-06 1/200
Date Analyzed:	09/02/20	Data File:	090223.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	100	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	220
Chloroethane	<200
1,1-Dichloroethene	<200
Methylene chloride	<1,000
trans-1,2-Dichloroethene	<200
1,1-Dichloroethane	<200
cis-1,2-Dichloroethene	5,800
1,2-Dichloroethane (EDC)	<200
1,1,1-Trichloroethane	<200
Trichloroethene	10,000
Tetrachloroethene	15,000

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW08-20200828	Client:	Urban Environmental Partners
Date Received:	08/28/20	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	008452-07 1/5
Date Analyzed:	09/02/20	Data File:	090224.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	99	63	127
4-Bromofluorobenzene	102	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	9.3
Chloroethane	<5
1,1-Dichloroethene	<5
Methylene chloride	<25
trans-1,2-Dichloroethene	<5
1,1-Dichloroethane	<5
cis-1,2-Dichloroethene	200
1,2-Dichloroethane (EDC)	<5
1,1,1-Trichloroethane	<5
Trichloroethene	220
Tetrachloroethene	400

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 008452
Date Extracted:	08/31/20	Lab ID:	00-1939 mb
Date Analyzed:	08/31/20	Data File:	083121.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	AEN

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	100	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 09/09/20
Date Received: 08/28/20
Project: Rainier Mall, F&BI 008452

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 008479-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.2	113	50-150
Chloroethane	ug/L (ppb)	10	<1	128	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	110	50-150
Methylene chloride	ug/L (ppb)	10	<5	75	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	107	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	104	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	104	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	99	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	104	50-150
Trichloroethene	ug/L (ppb)	10	<1	80	50-150
Tetrachloroethene	ug/L (ppb)	10	1.0	100	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	118	113	70-130	4
Chloroethane	ug/L (ppb)	10	139 vo	133 vo	70-130	4
1,1-Dichloroethene	ug/L (ppb)	10	120	114	70-130	5
Methylene chloride	ug/L (ppb)	10	126	118	29-192	7
trans-1,2-Dichloroethene	ug/L (ppb)	10	112	103	70-130	8
1,1-Dichloroethane	ug/L (ppb)	10	107	101	70-130	6
cis-1,2-Dichloroethene	ug/L (ppb)	10	107	102	70-130	5
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	96	96	70-130	0
1,1,1-Trichloroethane	ug/L (ppb)	10	113	109	70-130	4
Trichloroethene	ug/L (ppb)	10	79	84	70-130	6
Tetrachloroethene	ug/L (ppb)	10	101	98	70-130	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

008452 ME 08/28/20 VW3

008452 (NP) uepconsulting.com

Report To johnf@uepconsulting.com

Company

Address 2324 First Ave

City, State, ZIP Seattle Wa 98121

Phone (425) 922-9924 Email

SAMPLERS (signature) Matthew W. Granvold

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

Page # 1 of 1

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260 (chlorinated only)	PAHs EPA 8270	PCBs EPA 8082				Notes
						ANALYSES REQUESTED										sample label
MW21-20200828	01 A-C	8/28/20	0835	H_2O	3					X						MW 10-20200828
MW20-20200828	02		0910							X						
MW20-DB-20200828	03		0915							X						
MW22-20200828	04		0945							X						(A) 1-VOA label MW20-20200828
MW23-20200828	05		1025							X						(B) 1-VOA, label MW22 (C) 1-VOA label MW23
MW05-20200828	06		1100							X						NP 8/25/20
MW08-20200828	07		11:25						*	X						

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: Matthew W. Granvold	Matthew W. Granvold	UEP LLC	8/28/20	1205
Received by:	Khoi Hoang	FBI	8/28/20	1205
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 5, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on October 28, 2020 from the Rainier Mall, F&BI 010505 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP1105R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 28, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 010505 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
010505 -01	UB39-33
010505 -02	UB40-30
010505 -03	UB40-33.5

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB39-33	Client:	Urban Environmental Partners
Date Received:	10/28/20	Project:	Rainier Mall, F&BI 010505
Date Extracted:	10/30/20	Lab ID:	010505-01
Date Analyzed:	11/02/20	Data File:	110211.D
Matrix:	Soil	Instrument:	GCMS11
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	94	50	150
Toluene-d8	106	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.076
Tetrachloroethene	0.14

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB40-30	Client:	Urban Environmental Partners
Date Received:	10/28/20	Project:	Rainier Mall, F&BI 010505
Date Extracted:	10/30/20	Lab ID:	010505-02
Date Analyzed:	11/02/20	Data File:	110212.D
Matrix:	Soil	Instrument:	GCMS11
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	50	150
Toluene-d8	98	50	150
4-Bromofluorobenzene	99	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.11
Tetrachloroethene	0.67

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB40-33.5	Client:	Urban Environmental Partners
Date Received:	10/28/20	Project:	Rainier Mall, F&BI 010505
Date Extracted:	10/30/20	Lab ID:	010505-03
Date Analyzed:	11/02/20	Data File:	110213.D
Matrix:	Soil	Instrument:	GCMS11
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	50	150
Toluene-d8	95	50	150
4-Bromofluorobenzene	101	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 010505
Date Extracted:	10/30/20	Lab ID:	00-2644 mb
Date Analyzed:	10/30/20	Data File:	103009.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 11/05/20
Date Received: 10/28/20
Project: Rainier Mall, F&BI 010505

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 010579-11 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	1	<0.05	85	80	10-138	6
Chloroethane	mg/kg (ppm)	1	<0.5	92	87	10-176	6
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	104	104	10-160	0
Methylene chloride	mg/kg (ppm)	1	<0.5	117	112	10-156	4
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	106	105	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	105	105	19-140	0
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	109	109	25-135	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	102	102	12-160	0
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	100	106	10-156	6
Trichloroethene	mg/kg (ppm)	1	<0.02	108	107	21-139	1
Tetrachloroethene	mg/kg (ppm)	1	<0.025	109	109	20-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	1	83	22-139
Chloroethane	mg/kg (ppm)	1	86	9-163
1,1-Dichloroethene	mg/kg (ppm)	1	103	47-128
Methylene chloride	mg/kg (ppm)	1	111	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	1	97	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	98	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	1	100	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	95	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	94	62-131
Trichloroethene	mg/kg (ppm)	1	99	64-117
Tetrachloroethene	mg/kg (ppm)	1	92	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

010505

SAMPLE CHAIN OF CUSTODY

ME 10/28/20

Page # 1 of 1 VSI

Report To John Funderburk cc: Brian Dixon (DixonES)

Company Urban Environmental Partners

Address

City, State, ZIP

Phone 425-922-9922 Email johnfe@uepconsulting.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
UB39-33	01 A-D	10-28	935	S	4					X							
UB40-30	02	10-28	1015	S	4					X							
UB40-33.5	03	10-28	1030	S	4					X							
													*				

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	10-28	1307
Received by:	Nhan Phan	FEBI	10/28/20	1307
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 6, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on October 29, 2020 from the Rainier Mall, F&BI 010543 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP1106R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 29, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 010543 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
010543 -01	UB41-33
010543 -02	UB42-33

All quality control requirements were acceptable.

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB41-33	Client:	Urban Environmental Partners
Date Received:	10/29/20	Project:	Rainier Mall, F&BI 010543
Date Extracted:	10/30/20	Lab ID:	010543-01
Date Analyzed:	11/02/20	Data File:	110214.D
Matrix:	Soil	Instrument:	GCMS11
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	114	50	150
Toluene-d8	107	50	150
4-Bromofluorobenzene	96	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	0.085
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.28
Tetrachloroethene	0.32

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	UB42-33	Client:	Urban Environmental Partners
Date Received:	10/29/20	Project:	Rainier Mall, F&BI 010543
Date Extracted:	10/30/20	Lab ID:	010543-02
Date Analyzed:	11/02/20	Data File:	110215.D
Matrix:	Soil	Instrument:	GCMS11
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	50	150
Toluene-d8	105	50	150
4-Bromofluorobenzene	94	50	150

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	0.17
Tetrachloroethene	0.43

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 010543
Date Extracted:	10/30/20	Lab ID:	00-2644 mb
Date Analyzed:	10/30/20	Data File:	103009.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	62	145
Toluene-d8	100	55	145
4-Bromofluorobenzene	98	65	139

Compounds:	Concentration mg/kg (ppm)
Vinyl chloride	<0.05
Chloroethane	<0.5
1,1-Dichloroethene	<0.05
Methylene chloride	<0.5
trans-1,2-Dichloroethene	<0.05
1,1-Dichloroethane	<0.05
cis-1,2-Dichloroethene	<0.05
1,2-Dichloroethane (EDC)	<0.05
1,1,1-Trichloroethane	<0.05
Trichloroethene	<0.02
Tetrachloroethene	<0.025

Date of Report: 11/06/20
Date Received: 10/29/20
Project: Rainier Mall, F&BI 010543

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 010579-11 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	mg/kg (ppm)	1	<0.05	85	80	10-138	6
Chloroethane	mg/kg (ppm)	1	<0.5	92	87	10-176	6
1,1-Dichloroethene	mg/kg (ppm)	1	<0.05	104	104	10-160	0
Methylene chloride	mg/kg (ppm)	1	<0.5	117	112	10-156	4
trans-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	106	105	14-137	1
1,1-Dichloroethane	mg/kg (ppm)	1	<0.05	105	105	19-140	0
cis-1,2-Dichloroethene	mg/kg (ppm)	1	<0.05	109	109	25-135	0
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	<0.05	102	102	12-160	0
1,1,1-Trichloroethane	mg/kg (ppm)	1	<0.05	100	106	10-156	6
Trichloroethene	mg/kg (ppm)	1	<0.02	108	107	21-139	1
Tetrachloroethene	mg/kg (ppm)	1	<0.025	109	109	20-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Vinyl chloride	mg/kg (ppm)	1	83	22-139
Chloroethane	mg/kg (ppm)	1	86	9-163
1,1-Dichloroethene	mg/kg (ppm)	1	103	47-128
Methylene chloride	mg/kg (ppm)	1	111	42-132
trans-1,2-Dichloroethene	mg/kg (ppm)	1	97	67-129
1,1-Dichloroethane	mg/kg (ppm)	1	98	68-115
cis-1,2-Dichloroethene	mg/kg (ppm)	1	100	72-127
1,2-Dichloroethane (EDC)	mg/kg (ppm)	1	95	56-135
1,1,1-Trichloroethane	mg/kg (ppm)	1	94	62-131
Trichloroethene	mg/kg (ppm)	1	99	64-117
Tetrachloroethene	mg/kg (ppm)	1	92	72-114

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

010543

SAMPLE CHAIN OF CUSTODY

cc. Brian Dixon w/ Dixon ES

ME 10-29-20

Page # 1 of 1 VSI

Report To John Funderburk

Company Urban Environmental Partners llc

Address 2324 1st Ave, Suite 203

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email: johnf@uepconsulting.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project Specific RLs - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- X Standard Turnaround
- RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- Dispose after 30 days
- Archive Samples
- Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	cVOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082						Notes
UB41-33	01 A-D	10-29-20	920	S	4				X								
UB42-33	02	10-29-20	1325	S	4				X								

ANALYSES REQUESTED

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		John R Funderburk	UEP LLC	10/29	1447
Received by:					
Relinquished by:					
Received by:		Ann Webster Bruya	F&B	10/29	1447

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

Samples received at W °C

DRAFT

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/08/20	Lab ID:	012109-03
Date Analyzed:	12/08/20	Data File:	120813.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.6
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4.8
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	1.1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/08/20	Lab ID:	012109-04
Date Analyzed:	12/08/20	Data File:	120814.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	104	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.7
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	180 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	5.1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-04 1/20
Date Analyzed:	12/07/20	Data File:	120719.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	105	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<4
Chloroethane	<20
1,1-Dichloroethene	<20
Methylene chloride	<100
trans-1,2-Dichloroethene	<20
1,1-Dichloroethane	<20
cis-1,2-Dichloroethene	170
1,2-Dichloroethane (EDC)	<20
1,1,1-Trichloroethane	<20
Trichloroethene	<20
Tetrachloroethene	<20

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW09-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-05 1/10
Date Analyzed:	12/07/20	Data File:	120720.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	39
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	990
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	140
Tetrachloroethene	110

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	00-2762 mb
Date Analyzed:	12/07/20	Data File:	120707.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	106	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

SAMPLE CHAIN OF CUSTODY

ME 12/7/20 VW3/E03

Page # 1 of 1

052109

Report To John F. & Brian D.

Company Urban Env. Partners

Address 2324 1st Ave, # 203

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email johnf@urbanepconsulting.com Brian@DixonES.com

SAMPLERS (signature)

PROJECT NAME: Rainier MoM

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH see notes

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
MW32-20201207	01	12-7-20	1105	W	1						X						
MW33-20201207	02	12-7-20	1115	W	1						X						
MW30-20201207	03 A-C	12-7-20	1140	W	3					X							Rush 24hr
MW26-20201207	04	12-7-20	1200	W	3					X							Del Dx 12/7
MW09-20201207	05	12-7-20	1245	W	3					X							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	12-7	1315
Received by:	James Bruya	F&B	12/7	1315
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
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fbi@isomedia.com
www.friedmanandbruya.com

December 14, 2020

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on December 7, 2020 from the Rainier Mall, F&BI 012109 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP1214R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 7, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 012109 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
012109 -01	MW32-20201207
012109 -02	MW33-20201207
012109 -03	MW30-20201207
012109 -04	MW26-20201207
012109 -05	MW09-20201207

All quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW32-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-01
Date Analyzed:	12/08/20	Data File:	120808.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	22	15	61
Phenol-d6	13	10	46
Nitrobenzene-d5	71	17	143
2-Fluorobiphenyl	73	50	150
2,4,6-Tribromophenol	88	50	150
Terphenyl-d14	82	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW33-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-02
Date Analyzed:	12/08/20	Data File:	120809.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	19	15	61
Phenol-d6	14	10	46
Nitrobenzene-d5	69	17	143
2-Fluorobiphenyl	74	50	150
2,4,6-Tribromophenol	91	50	150
Terphenyl-d14	85	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	00-2793 mb
Date Analyzed:	12/07/20	Data File:	120727.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	20	15	61
Phenol-d6	16	10	46
Nitrobenzene-d5	82	17	143
2-Fluorobiphenyl	84	50	150
2,4,6-Tribromophenol	59	50	150
Terphenyl-d14	90	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW30-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/08/20	Lab ID:	012109-03
Date Analyzed:	12/08/20	Data File:	120813.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	96	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.6
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	4.8
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	1.1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/08/20	Lab ID:	012109-04
Date Analyzed:	12/08/20	Data File:	120814.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JCM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	99	57	121
Toluene-d8	104	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	3.7
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	180 ve
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	5.1
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW26-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-04 1/20
Date Analyzed:	12/07/20	Data File:	120719.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	50	150
Toluene-d8	97	50	150
4-Bromofluorobenzene	105	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<4
Chloroethane	<20
1,1-Dichloroethene	<20
Methylene chloride	<100
trans-1,2-Dichloroethene	<20
1,1-Dichloroethane	<20
cis-1,2-Dichloroethene	170
1,2-Dichloroethane (EDC)	<20
1,1,1-Trichloroethane	<20
Trichloroethene	<20
Tetrachloroethene	<20

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	MW09-20201207	Client:	Urban Environmental Partners
Date Received:	12/07/20	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	012109-05 1/10
Date Analyzed:	12/07/20	Data File:	120720.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	106	50	150
Toluene-d8	103	50	150
4-Bromofluorobenzene	102	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	39
Chloroethane	<10
1,1-Dichloroethene	<10
Methylene chloride	<50
trans-1,2-Dichloroethene	<10
1,1-Dichloroethane	<10
cis-1,2-Dichloroethene	990
1,2-Dichloroethane (EDC)	<10
1,1,1-Trichloroethane	<10
Trichloroethene	140
Tetrachloroethene	110

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 012109
Date Extracted:	12/07/20	Lab ID:	00-2762 mb
Date Analyzed:	12/07/20	Data File:	120707.D
Matrix:	Water	Instrument:	GCMS13
Units:	ug/L (ppb)	Operator:	jcm

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	107	50	150
Toluene-d8	104	50	150
4-Bromofluorobenzene	106	50	150

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.2
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<1
1,1,1-Trichloroethane	<1
Trichloroethene	<1
Tetrachloroethene	<1

Date of Report: 12/14/20
Date Received: 12/07/20
Project: Rainier Mall, F&BI 012109

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	84	72	70-130	15
2-Methylnaphthalene	ug/L (ppb)	5	88	74	70-130	17
1-Methylnaphthalene	ug/L (ppb)	5	83	70	70-130	17
Acenaphthylene	ug/L (ppb)	5	97	88	70-130	10
Acenaphthene	ug/L (ppb)	5	93	84	70-130	10
Fluorene	ug/L (ppb)	5	95	87	70-130	9
Phenanthrene	ug/L (ppb)	5	97	92	70-130	5
Anthracene	ug/L (ppb)	5	102	92	70-130	10
Fluoranthene	ug/L (ppb)	5	102	97	70-130	5
Pyrene	ug/L (ppb)	5	99	94	70-130	5
Benz(a)anthracene	ug/L (ppb)	5	98	97	70-130	1
Chrysene	ug/L (ppb)	5	96	94	70-130	2
Benzo(a)pyrene	ug/L (ppb)	5	101	102	70-130	1
Benzo(b)fluoranthene	ug/L (ppb)	5	107	107	62-130	0
Benzo(k)fluoranthene	ug/L (ppb)	5	98	98	70-130	0
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	105	111	70-130	6
Dibenz(a,h)anthracene	ug/L (ppb)	5	102	109	70-130	7
Benzo(g,h,i)perylene	ug/L (ppb)	5	100	107	70-130	7

Date of Report: 12/14/20
Date Received: 12/07/20
Project: Rainier Mall, F&BI 012109

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 012111-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.2	114	50-150
Chloroethane	ug/L (ppb)	10	<1	124	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	109	50-150
Methylene chloride	ug/L (ppb)	10	<5	116	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	110	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	110	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	111	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<1	112	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	109	50-150
Trichloroethene	ug/L (ppb)	10	<1	105	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	100	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	99	109	70-130	10
Chloroethane	ug/L (ppb)	10	118	119	70-130	1
1,1-Dichloroethene	ug/L (ppb)	10	95	103	70-130	8
Methylene chloride	ug/L (ppb)	10	109	111	29-192	2
trans-1,2-Dichloroethene	ug/L (ppb)	10	95	106	70-130	11
1,1-Dichloroethane	ug/L (ppb)	10	95	106	70-130	11
cis-1,2-Dichloroethene	ug/L (ppb)	10	95	105	70-130	10
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	98	110	70-130	12
1,1,1-Trichloroethane	ug/L (ppb)	10	96	106	70-130	10
Trichloroethene	ug/L (ppb)	10	92	102	70-130	10
Tetrachloroethene	ug/L (ppb)	10	100	100	70-130	0

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

ME 12/7/20 VW3/E03

Page # 1 of 1

052109

Report To John F. & Brian D.

Company Urban Env. Partners

Address 2324 1st Ave, # 203

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email johnf@urbanepconsulting.com Brian@DixonES.com

SAMPLERS (signature)

PROJECT NAME: Rainier MoM

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH see notes

Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
MW32-20201207	01	12-7-20	1105	W	1						X						
MW33-20201207	02	12-7-20	1115	W	1						X						
MW30-20201207	03 A-C	12-7-20	1140	W	3					X							Rush 24hr
MW26-20201207	04	12-7-20	1200	W	3					X							Del Dx 12/7
MW09-20201207	05	12-7-20	1245	W	3					X							

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	12-7	1315
Received by:	James Bruya	F&B	12/7	1315
Relinquished by:				
Received by:		Samples received at 4 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

January 8, 2021

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on December 31, 2020 from the LUP-Rainier Mall-PAHs, F&BI 012472 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
UEP0108R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on December 31, 2020 by Friedman & Bruya, Inc. from the Urban Environmental Partners LUP-Rainier Mall-PAHs, F&BI 012472 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
012472 -01	Pile109-2"
012472 -02	Pile109-4"
012472 -03	Pile109-6"
012472 -04	Pile2-2"
012472 -05	Pile2-4"
012472 -06	Pile2-6"

All quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile109-2”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-01 1/25
Date Analyzed:	01/05/21	Data File:	010513.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	71 d	36	114
Phenol-d6	90 d	47	116
Nitrobenzene-d5	84 d	38	117
2-Fluorobiphenyl	88 d	50	150
2,4,6-Tribromophenol	95 d	25	187
Terphenyl-d14	94 d	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	<0.05
Fluorene	<0.05
Phenanthrene	<0.05
Anthracene	<0.05
Fluoranthene	<0.05
Pyrene	<0.05
Benz(a)anthracene	<0.05
Chrysene	<0.05
Benzo(a)pyrene	0.065
Benzo(b)fluoranthene	0.11
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	<0.05
Dibenz(a,h)anthracene	<0.05
Benzo(g,h,i)perylene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile109-4”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-02 1/25
Date Analyzed:	01/05/21	Data File:	010512.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	83 d	36	114
Phenol-d6	95 d	47	116
Nitrobenzene-d5	96 d	38	117
2-Fluorobiphenyl	93 d	50	150
2,4,6-Tribromophenol	91 d	25	187
Terphenyl-d14	97 d	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.05
2-Methylnaphthalene	<0.05
1-Methylnaphthalene	<0.05
Acenaphthylene	<0.05
Acenaphthene	0.055
Fluorene	0.053
Phenanthrene	0.18
Anthracene	<0.05
Fluoranthene	0.21
Pyrene	0.22
Benz(a)anthracene	0.22
Chrysene	0.39
Benzo(a)pyrene	0.68
Benzo(b)fluoranthene	1.3
Benzo(k)fluoranthene	0.32
Indeno(1,2,3-cd)pyrene	0.36
Dibenz(a,h)anthracene	0.12
Benzo(g,h,i)perylene	0.32

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile109-6”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-03 1/5
Date Analyzed:	01/05/21	Data File:	010511.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	80	36	114
Phenol-d6	90	47	116
Nitrobenzene-d5	84	38	117
2-Fluorobiphenyl	83	50	150
2,4,6-Tribromophenol	89	25	187
Terphenyl-d14	89	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	0.014
Pyrene	0.015
Benz(a)anthracene	0.010
Chrysene	0.02
Benzo(a)pyrene	0.028
Benzo(b)fluoranthene	0.048
Benzo(k)fluoranthene	0.012
Indeno(1,2,3-cd)pyrene	0.017
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.018

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile2-2”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-04 1/5
Date Analyzed:	01/05/21	Data File:	010510.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	81	36	114
Phenol-d6	90	47	116
Nitrobenzene-d5	86	38	117
2-Fluorobiphenyl	90	50	150
2,4,6-Tribromophenol	85	25	187
Terphenyl-d14	92	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	0.024
Anthracene	<0.01
Fluoranthene	0.025
Pyrene	0.019
Benz(a)anthracene	0.016
Chrysene	0.027
Benzo(a)pyrene	0.036
Benzo(b)fluoranthene	0.063
Benzo(k)fluoranthene	0.016
Indeno(1,2,3-cd)pyrene	0.017
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.014

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile2-4”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-05 1/5
Date Analyzed:	01/05/21	Data File:	010509.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	77	36	114
Phenol-d6	86	47	116
Nitrobenzene-d5	83	38	117
2-Fluorobiphenyl	86	50	150
2,4,6-Tribromophenol	79	25	187
Terphenyl-d14	92	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	0.011
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	0.022
Fluorene	0.036
Phenanthrene	0.15
Anthracene	0.025
Fluoranthene	0.11
Pyrene	0.072
Benz(a)anthracene	0.035
Chrysene	0.044
Benzo(a)pyrene	0.035
Benzo(b)fluoranthene	0.062
Benzo(k)fluoranthene	0.018
Indeno(1,2,3-cd)pyrene	0.012
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	0.010

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Pile2-6”	Client:	Urban Environmental Partners
Date Received:	12/31/20	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	012472-06 1/5
Date Analyzed:	01/05/21	Data File:	010508.D
Matrix:	Soil	Instrument:	GCMS8
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	81	36	114
Phenol-d6	90	47	116
Nitrobenzene-d5	88	38	117
2-Fluorobiphenyl	90	50	150
2,4,6-Tribromophenol	82	25	187
Terphenyl-d14	101	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	LUP-Rainier Mall-PAHs, F&BI 012472
Date Extracted:	01/05/21	Lab ID:	01-62 mb 1/5
Date Analyzed:	01/05/21	Data File:	010513.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	93	32	100
Phenol-d6	97	46	107
Nitrobenzene-d5	110	24	127
2-Fluorobiphenyl	107	46	108
2,4,6-Tribromophenol	102	25	127
Terphenyl-d14	102	50	150

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<0.01
2-Methylnaphthalene	<0.01
1-Methylnaphthalene	<0.01
Acenaphthylene	<0.01
Acenaphthene	<0.01
Fluorene	<0.01
Phenanthrene	<0.01
Anthracene	<0.01
Fluoranthene	<0.01
Pyrene	<0.01
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01
Benzo(g,h,i)perylene	<0.01

Date of Report: 01/08/21
Date Received: 12/31/20
Project: LUP-Rainier Mall-PAHs, F&BI 012472

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	0.83	89	91	58-108	2
2-Methylnaphthalene	mg/kg (ppm)	0.83	93	94	70-130	1
1-Methylnaphthalene	mg/kg (ppm)	0.83	93	94	70-130	1
Acenaphthylene	mg/kg (ppm)	0.83	97	99	70-130	2
Acenaphthene	mg/kg (ppm)	0.83	92	94	70-130	2
Fluorene	mg/kg (ppm)	0.83	96	99	70-130	3
Phenanthrene	mg/kg (ppm)	0.83	97	101	70-130	4
Anthracene	mg/kg (ppm)	0.83	96	99	70-130	3
Fluoranthene	mg/kg (ppm)	0.83	103	106	70-130	3
Pyrene	mg/kg (ppm)	0.83	89	91	70-130	2
Benz(a)anthracene	mg/kg (ppm)	0.83	99	101	70-130	2
Chrysene	mg/kg (ppm)	0.83	100	103	70-130	3
Benzo(a)pyrene	mg/kg (ppm)	0.83	99	103	70-130	4
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	93	96	70-130	3
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	95	102	70-130	7
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	115	119	70-130	3
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	112	122	70-130	9
Benzo(g,h,i)perylene	mg/kg (ppm)	0.83	109	121	70-130	10

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

012472

SAMPLE CHAIN OF CUSTODY ME 12/31/20

D02

Page # 1 of 1

Report To John Funderburk

Company Urban Environ. Partners llc

Address 2324 1st Ave

City, State, ZIP Seattle, WA 98121

Phone 425-922-9922 Email

SAMPLERS (signature) John R Funderburk

PROJECT NAME LUP-Rainier mall – PAHs

PO #

REMARKS

Project specific RLs? - Yes (No)

INVOICE TO

TURNAROUND TIME
- ☒ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
Pile 109-2"	01	12/31	8:35	Soil	1						X						
Pile 109-4"	02	12/31	8:38	"	1						X						
Pile 109-6"	03	12/31	8:38	"	1						X						
Pile 2-2"	04	12/31	9:10	Soil	1						X						
Pile 2-4"	05	12/31	9:10	"	1						X						
Pile 2-6"	06	12/31	9:0	"	1						X						

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: John R Funderburk	John R Funderburk	UEP LLC	12/31	9:49
Received by: Nhan Phan	Nhan Phan	FEBI	12/31/20	0949
Relinquished by:				
Received by:		Samples received at 14 °C		

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

March 16, 2021

John Funderburk, Project Manager
Urban Environmental Partners
2324 1st Ave, Suite 203
Seattle, WA 98121

Dear Mr Funderburk:

Included are the results from the testing of material submitted on March 11, 2021 from the Rainier Mall, F&BI 103207 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Brian Dixon
UEP0316R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on March 11, 2021 by Friedman & Bruya, Inc. from the Urban Environmental Partners Rainier Mall, F&BI 103207 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Urban Environmental Partners
103207 -01	MW32-20210311
103207 -02	MW33-20210311

All quality control requirements were acceptable.

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW32-20210311	Client:	Urban Environmental Partners
Date Received:	03/11/21	Project:	Rainier Mall, F&BI 103207
Date Extracted:	03/11/21	Lab ID:	103207-01 1/2
Date Analyzed:	03/11/21	Data File:	031105.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	44	15	61
Phenol-d6	25	10	46
Nitrobenzene-d5	84	17	143
2-Fluorobiphenyl	85	50	150
2,4,6-Tribromophenol	90	50	150
Terphenyl-d14	91	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
2-Methylnaphthalene	<0.4
1-Methylnaphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	MW33-20210311	Client:	Urban Environmental Partners
Date Received:	03/11/21	Project:	Rainier Mall, F&BI 103207
Date Extracted:	03/11/21	Lab ID:	103207-02 1/2
Date Analyzed:	03/11/21	Data File:	031106.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	27	15	61
Phenol-d6	21	10	46
Nitrobenzene-d5	54	17	143
2-Fluorobiphenyl	65	50	150
2,4,6-Tribromophenol	81	50	150
Terphenyl-d14	79	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.4
2-Methylnaphthalene	<0.4
1-Methylnaphthalene	<0.4
Acenaphthylene	<0.04
Acenaphthene	<0.04
Fluorene	<0.04
Phenanthrene	<0.04
Anthracene	<0.04
Fluoranthene	<0.04
Pyrene	<0.04
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04
Benzo(g,h,i)perylene	<0.08

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Urban Environmental Partners
Date Received:	Not Applicable	Project:	Rainier Mall, F&BI 103207
Date Extracted:	03/11/21	Lab ID:	01-549 mb2
Date Analyzed:	03/11/21	Data File:	031104.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	19	15	61
Phenol-d6	13	10	46
Nitrobenzene-d5	88	17	143
2-Fluorobiphenyl	89	50	150
2,4,6-Tribromophenol	65	50	150
Terphenyl-d14	93	50	150

Compounds:	Concentration ug/L (ppb)
Naphthalene	<0.2
2-Methylnaphthalene	<0.2
1-Methylnaphthalene	<0.2
Acenaphthylene	<0.02
Acenaphthene	<0.02
Fluorene	<0.02
Phenanthrene	<0.02
Anthracene	<0.02
Fluoranthene	<0.02
Pyrene	<0.02
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02
Benzo(g,h,i)perylene	<0.04

Date of Report: 03/16/21
Date Received: 03/11/21
Project: Rainier Mall, F&BI 103207

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	ug/L (ppb)	5	86	83	70-130	4
2-Methylnaphthalene	ug/L (ppb)	5	88	84	70-130	5
1-Methylnaphthalene	ug/L (ppb)	5	88	85	70-130	3
Acenaphthylene	ug/L (ppb)	5	100	100	70-130	0
Acenaphthene	ug/L (ppb)	5	95	95	70-130	0
Fluorene	ug/L (ppb)	5	96	93	70-130	3
Phenanthrene	ug/L (ppb)	5	94	93	70-130	1
Anthracene	ug/L (ppb)	5	94	93	70-130	1
Fluoranthene	ug/L (ppb)	5	98	96	70-130	2
Pyrene	ug/L (ppb)	5	92	94	70-130	2
Benz(a)anthracene	ug/L (ppb)	5	98	95	70-130	3
Chrysene	ug/L (ppb)	5	97	95	70-130	2
Benzo(a)pyrene	ug/L (ppb)	5	91	89	70-130	2
Benzo(b)fluoranthene	ug/L (ppb)	5	100	94	62-130	6
Benzo(k)fluoranthene	ug/L (ppb)	5	95	95	70-130	0
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	104	103	70-130	1
Dibenz(a,h)anthracene	ug/L (ppb)	5	104	101	70-130	3
Benzo(g,h,i)perylene	ug/L (ppb)	5	105	104	70-130	1

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

103207

ME 03-11-21

Page # 1 of 1 E03

Report To John Funderburk cc: Brian Dixon w/ Dixon ES

Company Urban Env. Partners

Address

City, State, ZIP

Phone 425-922-9922 Email johnf@uepconsulting.com Brian@DixonES.com

SAMPLERS (signature)

PROJECT NAME: Rainier Mall

PO #

REMARKS

Project specific RLs? - Yes / No

INVOICE TO: UEP

TURNAROUND TIME
- [x] Standard turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [ ] Archive samples
- [ ] Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
MW32-20210311	01	3-11	915	W	1						X						
MW33-20210311	02		940	W	1						X						
																	Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Brian Dixon	Dixon ES	3-11	1058
Received by:	Nhan Pham	FEBI	3/11/21	1058
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

Appendix B: Boring Logs

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 2/9/17
Surface Conditions: Asphalt
Well Location N/S: See FN
Well Location E/W:
Reviewed by:
Date Completed: 2/9/17

BORING LOG | B01 @ MW-01

Site Address: 4208 Rainier Avenue S, Seattle, WA

Water Depth At Time of Drilling: ~28 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0		8 10 15	50	0.0	B01-02.5 @0930	SM		moist, gray, silty SAND some gravel, no odor 30-50-20)	
5		3 5 10	70	0.0	B01-05 @0935			Damp, gray, silty SAND some gravel, no odor (30-55-15) Some brick fragments	
		3 2 10	80	0.0	B01-07.5 @0940			Same as previous, some brick fragments, trace organics	
10		5 5/6	60	0.0	B01-10 @0945			moist gray silty SAND, some gravel, no odor, some organics + brick (30-55-15)	
		13 5 6	10	0.0	B01-12.5 @0950			Poor recovery, Damp gray gravelly SAND, some silt no odor (20-45-35)	
15									

Drilling Co./Driller: Holocene / RJ
Drilling Equipment: Truck HSA
Sampler Type: SPT
Hammer Type/Weight: Auto / 140 lbs
Total Boring Depth: 41.5 feet bgs
Total Well Depth: 33 feet bgs
State Well ID No.: BJU 248

Well/Auger Diameter: 2 / 8OD inches
Well Screened Interval: 18-33 feet bgs
Screen Slot Size: 0.10 inches
Filter Pack Used: Colorado Silica Sand
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flush mount

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 2/9/17
Surface Conditions: Asphalt
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B01/MW-01

Site Address: 4208 Rainier Avenue S, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	X	6 4 6	0	–	~~B01-15 @0900~~			No recovery	
	X	0	100	40.8	B01-17.5 @0905			moist, light gray, SILT, some fines SAND, no odor (75-25-0)	
20	X	0 0 2	100	82.3	B01-20 @0910			Same as previous	
	X	2 2 5	100	15.4	B01-22.5 @0920			moist, darker gray, sandy SILT, no odor (60-40-0)	
25	X	5 6 15	90	1.9	B01-25 @0925			moist, dark gray, silty SAND, no odor (45-55-0)	
	X	13 17 23	70	0.3	B01-27.5 @0935			wet, dark speckled gray, SAND, some silt, trace gravel, no odor (20-80-0)	
30								Driller starts adding H_2O to inside of hollow	

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: LOS
Date Started: 2/9/17
Surface Conditions: See page 1
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B01/MW-01

Site Address: 4208 Rainier Avenue S
Seattle, Washington

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		6 10 15	70	0.9	B01-30 @0940			wet, dark gry sandy SILT to silty SAND, no odor (50-50-0).	
		7 6 3	80	5.6	B01-32.5 @0955			wet ~~saturated~~, dark gry ~~SILT~~ sandy SILT, no odor (65-35-0).	
35		17 34 50/6"	90	0.0	B01-35 @1010			~~wet to moist~~ ~~saturated~~, dark gry, sandy SILT, no odor (65-35-0).	
		10 16 32	95	0.0	B01-37.5 @1020			wet - ~~saturated~~ to moist, dark gry, sandy ~~SILT~~ SILT, no odor (70-30-0).	
40		18 36 50/6"	80	0.0	B01-40 @1035			wet to moist, dark gry ~~silty SAND~~ sandy SILT, no odor (75-25-0)	
45								EOB @41.5' bgs, backfilled to 33' w/ sand + hydrated well MW01 w/ 15' screen.	

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

15' up from 33

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 2/9/17
Surface Conditions: Asphalt
Well Location N/S: See FN
Well Location E/W:
Reviewed by:
Date Completed: 2/9/17

BORING LOG | B02/MW02

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
		11 7 12	70	0.3	B02-02.5 @1346	SM		moist, gray silty SAND w/ gravel, no odor (30-60-10) trace organics	
5		7 5 6	80	0.1	B02-05 @1345			moist, gray, silty SAND some gravel, no odor, trace organics (30-55-15).	
		18 24 14	30	0.0	B02-07.5 @1350			moist, gray silty SAND, some gravel, no odor, glass fragments (30-50-20)	
10		7 14 8	40	3.3	B02-10 @1355			moist, gray silty SAND, some gravel, no odor (40-45-15)	
		7 6 7	60	12.5	B02-12.5 @1400			moist, gray brown, SILT some SAND, no odor (80-20-0)	
15									

Drilling Co./Driller: Holocene / RJ
Drilling Equipment: track HSA
Sampler Type: SPT
Hammer Type/Weight: Auto / 140 lbs
Total Boring Depth: 31.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: 2 / 8OD inches
Well Screened Interval: — feet bgs
Screen Slot Size: ~~0.10~~ inches
Filter Pack Used: —
Surface Seal:
Annular Seal: Bentonite
Monument Type: Flush mount

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 2/9/17
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B02

Site Address: 4208 Rainier Avenue S
Seattle, WA

See page 1

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		5 4 6	80	72.4	B02-15 @1410			Same as previous	
		8 3 3	90	13.3	B02-17.5 @1415			moist, light gry brn SILT, some sand, no odor (85-15-0)	
20		2 1 2	80	0.0	B02-20 @1420			~~Moist~~ Damp, dark gry SILT some sand, no odor (85-15-0)	
		8 14 23	70	0.0	B02-22.5 @1425			~~Damp moist~~ to wet, dark gry SILT some to w/ some, no odor ~~85-15-0~~ (90-10-0)	
25		8 8 8	100	0.0	B02-25 @1430			Damp to moist, gry SILT, some sand, no odor (80-20-0)	
		19 ~~30/4"~~ 24 32	100	0.0	B02-27.5 @1440			moist, gry silt, wi sand, no odor (85-15-0)	
30									

Drilling Co./Driller:
Drilling Equipment: See page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: LDS
Date Started: 2/9/17
Surface Conditions:
Well Location N/S: See Page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | BH2/MW2

Site Address: 4208 Rainier Avenue S
Seattle, Washington

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		18 24 28	100		BH2-30 @1455			Brn, gry SILT, some SAND, no ore (85-15-0).	
								Boring terminated @ 31.5' bgs. Soil conditions indicate a well would not produce GW.	
35									
40									
45									

Drilling Co./Driller:
Drilling Equipment: See Page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: CMS
Date Started: 2/9/17
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 2/10/17

BORING LOG | B03

Site Address: 4208 Rainier Avenue S Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
		10 11 23	30	0.0	B03-02.5 020215	SM		Moist, medium dense, sandy SILT w/ gravel, mixed brown/gray, no HC odor (60, 30, 10).	
5		3 4 11	50	0.0	B03 05 020215			Moist, loose, sandy CLAY/SILT, w/ scattering of glass, dark brown to black (70, 30, 10). (FILL)	
		3 1 2	60	0.0	B03-07.5 020215			Moist, loose, sandy CLAY/SILT w/ glass fragments, mottled gray+black (80, 20, 0). (FILL)	
10		0 0 3	75	0.0	B03-10 020215			Saturated, loose, sandy CLAY, dark greenish gray, no HC odor (95, 5, 0)	
		0 3 5	100	0.0	B03-12.5 020215			Saturated, loose, sandy CLAY, dark greenish-gray, no HC odor (95, 5, 0) 10-12" Saturated, loose sandy CLAY, mottled green/gray, no HC odor (85, 15, 0)	
15									

Drilling Co./Driller: Holocene/RJ
Drilling Equipment: Limited HSA
Sampler Type: SPT
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B03

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 3 6	100	0.0	B03-15 C0840			Saturated, loose, Sandy CLAY, mottled brown/gray orange (90,10,0)	
		0 6 7	100	6.0	B03-17.5 C0845			Saturated, loose, Sandy CLAY w/ very small lenses of SAND, mottled gray w/ orange (90,10,0) lenses = (25,75,0)	
20		0 0 0	100	0.0	B03-20 C0850			Saturated, soft, Sandy CLAY, dark greenish gray w/ some orange mottling (85,15,0)	
		2 1 1	100	0.0	B03-22.5 C0855			Saturated, soft, sandy CLAY w/ loose lenses of SAND, dk gray, no hc odor (80,20,0)	
25		0 0 10	100	0.0	B03-25 C0900			Wet, soft, Sandy CLAY, dark gray, no HC odor (90,10,0)	
		0 0 0	100	0.0	B03-27.5 C0905			Wet, soft, Sandy CLAY, dk gray, no HC odor (90,10,0) 6" wet, loose, Sandy SILT w/ clay, gray, no HC odor (60,40,0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001
Logged by:
Date Started: see pg 1
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | BC3

Site Address: 4208 Rainier Avenue S
Seattle, Washington

DRAFT

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		1 6 22	100	0.0	BC3-30 @0922			Mo.St, Sandy SILT/CLAY; gray. no HC odor (90,10,0) 3" Moist, Sandy SILT, gray no HC odor (60,40,0)	
		7 12 28	100	0.0	BC3-32.5 @0925			Most, medium dense, silty MEDIUM SAND, gray, no HC odor (10,90,0)	
35		7 16 24	100	0.0	BC3-35 @0930			Mo.St, Medium dense, silty medium SAND, gray. no HC odor (10,90,0) 6" Mo.St, dense, Sandy SILTw/ gravel, gray. no HC odor Boring terminated @ 36.5 bgs. Backfill w/ bentonite	
40									
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type: see pg 1
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: CMS
Date Started: 2/10/17
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 2/10/17

BORING LOG | B04

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
		9 10 11	50	0.0	B04-02.5 0945			Moist, med dense, sandy SILT w/ gravel, brown and dark grey (60, 30, 10)	
5		5 13 9	75	0.0	B04-05 1050			Moist, med dense, silty SAND w/ gravel, mottled grey and orange, no HC odor (40, 55, 5)	
		4 20 15	40		B04-07.5 1055			Moist, dense, sandy silt w/ gravel, dark grey, no HC odor (60, 35, 5)	
10		3 3 5	50	0.0	B04-10 1106			Moist, loose, sandy SILT/CLAY, mottled grey and orange, no HC odor (80, 20, 0)	
		2 3 6	100	0.0	B04-12.5 1105			Moist, loose, sandy SILT/CLAY, mottled grey, and orange, no HC odor (90, 10, 0)	
15									

Drilling Co./Driller: Holocene/RJ
Drilling Equipment: Truck HSA
Sampler Type: SPT
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B04

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 3 5	100		B04-15 @1110			Moist, soft CLAY w/ sand, mottled, orange/gray. no HC odor (95,5,0)	
		6 0 3	100		B04-17.5 @1115			Moist, soft SILT w/ sand, brown w/ some gray & orange. no HC odor (95, 5, 0)	
20		0 2 1	100		B04-20 @1120			Moist, soft, CLAY w/ sand, dark gray, no HC odor (95, 5, 0)	
		0 0 6	100		B04-22.5 @1125			Moist, soft, sandy SILT/CLAY, gray w/ brown & orange mottling. no HC odor (80, 20, 0)	
25		15 20 20	100		B04-25 @1130			Wet, dense, silty medium SAND, gray. no HC odor (10, 90, 0).	
		7 15 22			B04-27.5 @1135			1" wet, SA.A Moist, dense, sandy SILT, dark gray. no HC odor (80, 20, 0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

See pg. 1

BORING LOG B04

Site Address: 4208 Rainier Avenue S, Seattle, Washington

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30	X	18 24 27	100		B04-30 @ 1145			Moist, very dense, SILT w/ sand, dark gray, no HC odor (85, 15, 0) Boring terminated @ 31.5' bgs Backfill w/ bentonite	
35									
40									
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

See pg. 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276.001
Logged by: CJT
Date Started: 1/4/17
Surface Conditions: asphalt
Well Location N/S: 19'S
Well Location E/W: 22'E of S lamp post
Reviewed by:
Date Completed: 1/18/17

BORING LOG | SB01

Site Address: 4208 Rainier Ave S
Seattle, Washington

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		80	0.0/0.1	SB01-2.5 (0830)	SP/GP		0-2" → asphalt 2"-2.5' → M. dense, dry, SAND, some gravel, some silt, lt brown, no odor (30,40,30) 2.5-4' → M. dense, dry, silty SAND, trace gravel, gray, no odor, (40,55,5)	
5				0.0/0.2	SB01-5.0 (0835)	SM			
	5-10		50	0.0/0.4	SB01-7.5 (0836)	SM		0-1' → M. dense, moist, silty SAND with gravel, gray/lt brown, no odor (35,50,15) 1-2.5' → M. dense, moist, SILT with fine sand, trace gravel, gray, no odor (60,35,5)	
10				0.0/0.2	SB01-10.0 (0840)	ML			
	10-15		75	0.0/0.2	SB01-12.5 (0850)	ML/CL		0-1.5' → Moist, dense, SILT, little sand, with organics, dk brown, mod. organic odor, (70,30,0) 1.5-4' → Moist, V. stiff SILT, little clay, trace sand, gray/brown, no odor (80,20,0)	
15				0.0/0.3	SB01-15.0 (0855)	ML/CL			

Drilling Co./Driller: Holocene/MAC
Drilling Equipment: Geoprobe
Sampler Type: Sleeve
Hammer Type/Weight: — lbs
Total Boring Depth: 24.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: 2 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: asphalt
Annular Seal: —
Monument Type: —

Notes/Comments:

Page: 1

SoundEarth Strategies

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W: see FS1
Reviewed by:
Date Completed:

BORING LOG | SB01

Site Address:

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	15-20		100	0.0/0.2	SB01-17.5 (0900)	CL/ML		0-5'→ V. Stiff, CLAY + SILT, H brown, no odor (10,0,0)	
20				0.0/0.2	SB01-20.0 (0905)	CL/ML			
	15-24.5		10	1.9/1.5	SB01-22.5 (0915)	CL/ML		0-1'→ S.A.A, gray 1-4'→ moist, V. stiff, SILT, little clay, trace fine sand, gray, no odor (90,10,0)	
				0.0/0.1	SB01-24.5 (0920)	ML SP		4-5'→ moist, dense, F-C SAND, little gravel, trace silt, gray, no odor (10,80,20)	
25									
30								Refusal at 24.5. GW not encountered.	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: see FS1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal: see FS1
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: Asphalt
Well Location N/S: 2' S of S lamp post
Well Location E/W: 14' E
Reviewed by:
Date Completed: 1/18/17

BORING LOG SB02

Site Address: 4208 Rainier Ave S
Seattle, Washington

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		50	0.0/0.0	SB02-2.5 (0940)	SP		0-1' → Loose, dry, SAND, little silt, little gravel, H brown, no odor (20, 60, 20), trace metal 1-2.5' → M. stiff, dry, fine SAND, little-some silt, gray, no odor (35, 60, 5)	
				0.0/0.0	SB02-5.0 (0945)	SM			
5	5-10		100	0.0/0.0	SB02-7.5 (0950)	SM		0-2.5' → S.A.A. 2.5-5.0' → Moist, stiff, fine SAND with silt, trace gravel, gray, no odor (45, 55, 0)	
				0.0/0.0	SB02-10.0 (0955)	SM/ML			
10	10-15		100	35.1/32.0	SB02-12.5 (1004)	ML		0-1' → Moist, m. dense, silt + fine sand, dk brown, some organics, no odor, (50, 50, 0) 1-5' → Moist, v. stiff SILT, little clay, gray/H brown, no odor (90, 10, 0) 5-11' → S.A.A.; H brown.	
						ML/CL			
15	15-16		100	17.9/13.9	SB02-16.0 (1005)	ML/CL		Boring terminated at 16' bgs	

Drilling Co./Driller: Holocene/Match
Drilling Equipment: Geoprobe
Sampler Type: Liner
Hammer Type/Weight: — lbs
Total Boring Depth: 16 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — 12 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: asphalt
Well Location N/S: 17' S
Well Location E/W: 45.5' E of S lamp post
Reviewed by:
Date Completed: 1/18/17

BORING LOG SB03

Site Address: 4208 Rainier Ave S Seattle, Washington

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		75	0.0/0.0 0.0/0.0	SB03-2.5 (1025) SB03-5.0 (1030)	SP		0-2" - asphalt 2"-2.5' → loose, dry, SAND, some silt & gravel, lt brown/gray, trace wood, no odor (25, 50, 25) 2.5-4' → m. dense, dry, SAND little silt, trace gravel, brown gray, no odor (	
5	5-10		75	0.0/0.0 0.0/0.0	SB03-7.5 (1040) SB03-10.0 (1045)	SP SM		0-1.5' → S.A.A., small layers of organic-rich material 1.5-4' → m. ~~stiff~~ dense SAND with silt, trace gravel, gray brown, no odor (40, 50, 10)	
10	10-15		75	0.0/0.3	SB03-12.5 (1050)	ML		0-1' → S.A.A. 1-4' → v. stiff, dry SILT, little clay, lt brown, no odor (95, 5, 0)	
15	15-16		100	0.0/0.4	SB03-16.0 (1055)	ML		0-1' → S.A.A. Terminated at 16' bgs	

Drilling Co./Driller: Holocene/Anton	Well/Auger Diameter: ~2 inches
Drilling Equipment: geoprobe	Well Screened Interval: — feet bgs
Sampler Type: liner	Screen Slot Size: — inches
Hammer Type/Weight: — lbs	Filter Pack Used: —
Total Boring Depth: 16 feet bgs	Surface Seal: —
Total Well Depth: — feet bgs	Annular Seal: —
State Well ID No.: —	Monument Type: —

Notes/Comments:

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SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: Asphalt
Well Location N/S: 26' S of SE lamppost
Well Location E/W: 34' E
Reviewed by:
Date Completed: 1/18/17

BORING LOG SB04

Site Address: 4208 Rainier Ave S
Seattle, Washington

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		75	0.0/0.0	SB04-2.5 (1100)	SP		0-2" – asphalt 2"-1.5' – loose, dry, SAND, little silt, some gravel, gray & brown, no odor (20, 50, 30) 1.5-4' – M. dense, silty SAND, little gravel, gray & lt brown, no odor (35, 50, 15)	
				0.0/0.0	SB04-5.0 (1105)	SM			
5	5-10		10	0.0/0.0	SB04-7.5 (1115)	SM		0-2' – M. dense, dry, fine SAND, some silt, trace gravel, lt brown, no odor (35, 60, 5) 2-5' – M. stiff, dry, SILT w/ fine sand, lt brown, no odor (60, 40, 0)	
				0.0/0.0	SB04-10.0 (1120)	SM/ML			
10	10-15		10		SB04-12.5 (1122)	ML		0-1' – S.A.A. 1-5' – V. stiff, dry, SILT, trace clay, lt brown & gray, no odor (100, 0, 0)	
	15-16		100		SB04-16.0 (1125)	ML		0-1' – S.A.A.	
15								Terminated at 16' bgs	

Drilling Co./Driller: Holocene / Matt
Drilling Equipment: Geoprobe
Sampler Type: Liner
Hammer Type/Weight: — lbs
Total Boring Depth: 16 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: – 12 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

Page: 1

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: Asphalt
Well Location N/S: 50' S of S/approx
Well Location E/W: 22'E
Reviewed by:
Date Completed: 1/18/17

BORING LOG SB05

Site Address: 4208 Rainier Ave S
Seattle, Washington

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		75	0.0/10.0	SB05-2.5 (1140)	SP		0-2"- asphalt 2"-1.5'→ loose, dry, SAND, little silt, little gravel, dk brown, no odor (20, 65, 15) 1.5-4'→ m dense, silty SAND, little gravel, gray, no odor (40, 50, 10)	
5				0.0/10.0	SB05-5.0 (1145)	SM			
	5-10		75		SB05-7.5 (1150)	SM/PT		0-0.5'→ S.A.A. 0.5-1.5'→ loose, moist, SILTY SAND with organics, dk brown, organic odor, (40, 55, 5) 1.5-4'→ m. dense, silty SAND, little gravel, H brown/gray, no odor (40, 50, 10)	
10					SB05-10.0 (1152)	SM			
	10-15		100		SB05-12.5 (1155)	SM/ML		0-1→ S.A.A. 1-5→ V. stiff, dry SILT, little fine sand, H brown/gray, no odor (90, 10, 0)	
	15-16		100		SB05-16.0 (1200)	ML		0-1'→ V. stiff SILT, gray, no odor (100, 0, 0)	
15									

Drilling Co./Driller: Holocene/Mitch
Drilling Equipment: Geoprobe
Sampler Type: Liner
Hammer Type/Weight: — lbs
Total Boring Depth: 16 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: ~12 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

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SoundEarth Strategies

DRAFT

Project: 1276.00
Project Number: Rainier Mall Property
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: Asphalt
Well Location N/S: 24' N of 2nd N lamppost
Well Location E/W: 32.5' W
Reviewed by:
Date Completed: 1/18/17

BORING LOG | SB06

Site Address: 4203 Rainier Ave S Seattle, WA

Water Depth At Time of Drilling: ⟶ feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0				0.0 / 0.0	SB06-2.5 (1215)	SP		0-2" → asphalt 2"-2.5' → loose, dry, SAND, some silt & gravel, lt brown, no odor (30, 40, 30)	
	0-5'		50						
				0.0 / 0.0	SB06-5.0 (1220)	SP			
5									
	5-10		100	0 / 0	SB06-7.5 (1405)	SM		0-1' → S.A.A. 1-5' → loose, dry, SAND w/ silt, little gravel, brown, gray, & orange, no odor (40, 50, 10)	
				0 / 0	SB06-10.0 (1410)	SM			
10									
	10-15		100		SB06-12.5 (1415)	ML		0-5' → V. stiff SILT, dry, little fine sand, lt brown/ gray mottled, no odor (85, 15, 0)	
					SB06-15.0 (1417)	ML			
15									

Drilling Co./Driller: Holdiere / Mitch
Drilling Equipment: Geoprobe
Sampler Type: liner
Hammer Type/Weight: — lbs
Total Boring Depth: 24 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: ~12 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

Page: 1

SoundEarth Strategies

BORING LOG | SB06

Project:
Project Number:
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

see ps1

Site Address:

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	K-20		100	0/0	SB06-17.5 CT (1420)	ML		0-4' → S.A.A, thin lenses of F-C sand	
				0/0	SB06-20.0 (1425)	ML/CL		4-5' → ~~Dk~~ CT Stiff, moist CLAY & SILT, gray, no odor (10,0,0)	
20	20-24		100	0/0	SB06-22.5 (1430)	ML/CL		0-3' → S.A.A	
				0/0	SB06-24.0 (1435)	ML		3-4' → CT ~~Dense~~ Stiff, moist SILT, little clay, trace sand, Hbrown, no odor (95,5,0)	
25								refusal at 24' bgs. No GW encountered	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: see ps1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: see ps1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

/

SoundEarth Strategies

Project: Rainier Ave Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: Asphalt
Well Location N/S: 32.5' N of 2nd N post
Well Location E/W: 15.5' W
Reviewed by:
Date Completed: 1/18/17

DRAFT

BORING LOG SB07

Site Address: 4208 Rainier Ave S, Seattle, WA

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5'		50	0/0	SB07-2.5 (1450)	SP/GP		0-2.5' → loose, dry SAND + GRAVEL, little silt, brown/gray, no odor (15, 45, 40)	
				0/0	SB07-5.0 (1453)				
5	5-10'		50	0/0	SB07-7.5 (1455)	SP/GP SM		0-1' → S.A.A. 1-2.5' → M. dense silty SAND, little gravel, dk brown/gray, no odor (40, 50, 10)	
				0/0	SB07-10.0 (1500)				
10	10-15'		100		SB07-12.5 (505)	ML		0-5' → V. stiff SILT, little fine sand, dry, brown, no odor (90, 10, 0)	
	15-16'		100		SB07-16.0 (1510)	ML		0-1' → S.A.A. Boring terminated at 16' bgs.	
15									
16									

Drilling Co./Driller: Holocene/Matt
Drilling Equipment: Geoprobe
Sampler Type: Liner
Hammer Type/Weight: — lbs
Total Boring Depth: 16 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: 1/2 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001
Logged by: CJT
Date Started: 1/18/17
Surface Conditions: asphalt
Well Location N/S: 14' N of S lamppost
Well Location E/W: 14' E
Reviewed by:
Date Completed: 1/18/17

BORING LOG | SB08

Site Address: 4208 Rainier Ave S, Seattle, WA

Water Depth At Time of Drilling: — feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0	0-5		100	0/0	SB08-2.5 (1520)	SP		0-2.5' → loose, dry SAND, some silt & gravel, lt brown, no odor (30,40,3)	
						SM		2.5-5' → M. dense, dry, silty SAND, gray/dk brown, no odor (40,55,5)	
				0/0	SB08-5.0 (1525)				
5	5-10		100	0/0	SB08-7.5 (1527)	SM		0-1' → S.A.A. 1-3' → Dense, dry silty SAND, trace gravel, gray, no odor (40,55,5)	
				0/0	SB08-10.0 (1530)	SM/ML		3-5' → v. stiff, SILT + fine SAND, gray, no odor (50,50,0)	
10	10-15		100	0/0	SB08-12.5 (1535)	ML		0-3' → V. Stiff SILT, little fine sand, dry, no odor, gray (55,15,0)	
						ML		3-5' → v. stiff SILT, dry, lt brown, no odor (100,0,0)	
15	15-16			4.9/4.6	SB08-16.0 (1540)			Boring terminated at 16' bgs.	

Drilling Co./Driller: Holocene / Match
Drilling Equipment: Geoprobe
Sampler Type: liner
Hammer Type/Weight: — lbs
Total Boring Depth: 16 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — / 2 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: —
Annular Seal: —
Monument Type: —

Notes/Comments:

(No well installed)

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: CGC
Date Started: 03/22/17
Surface Conditions: Asphalt
Well Location N/S: ~18 ft S (~18'S)
Well Location E/W: ~29 ft E (~29'E)
Reviewed by:
Date Completed:

MW02 (~4' ... of MW01)

BORING LOG MW02

Site Address: 4208 Rainier Avenue S, Seattle, WA

~70' of SW-most light pole in parking lot

Water Depth At Time of Drilling: (perched) 17.5', 23', 26.5' feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail (N/A)
0–5			100	0.0; 0.0	—; —	Fill (SM)		Damp & moist, med dense, silty fine SAND w/ gravel, gray & brown, faint organic odor (30-55-15). Contains wood pieces & yellow ceramic chips in upper ~2' bgs (Fill)	None
5–10			100	0.0; 0.0	—; —	Fill (SM); Fill (ML)	8'	Localized at ~7.5 to 8' bgs. 8': Damp, dense, Sandy SILT with subr. gravel, contains bits of red brick, wood pieces, & mottled broken glass, Brown & gray, No HC/solvent odor (45-35-20) Fill	
10–15			100	0.0; 0.0	—; —	Fill (ML); ML	ML; ~12.5'	becomes siltier with clay & less gravel @ ~11' + (75-15-10) Fill. ~12.5': moist, hard, Clayey SILT with fine sand. Mottled, orange-brown gray, No HC/solvent odor ~~(70-25-5)~~ ~~(65-30-5)~~ (90-10-0).	

Drilling Co./Driller: Cascade / Zane
Drilling Equipment: Track-Mounted Sonic
Sampler Type: Core barrel
Hammer Type/Weight: — lbs
Total Boring Depth: 90.0 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:
(None)

Notes/Comments: 8" conductor casing used to 35' bgs. Bentonite seal placed @ ~30-35' bgs. Seal set for ... min before drilling deeper.

Page: 1 of 6

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

see pg 1

BORING LOG MW02

Site Address: 4208 Rainier Avenue S Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15				0.0	–	ML		Same as above	
			100	0.0	–	ML	17.5 / 18	17.5 wet, dense sandy SILT, mottled brown & gray; No HC/solvent odor (60-40-0).	▽ 17.5'
				0.0	–	ML		Moist, hard, clayey SILT with v. fine sand, faint solvent odor @~19 bgs, mottled brown/gray (85-15-0).	
				5.6	~~MW02~~				
20				@21 ~~11.6~~ 11.6	–	ML		moist, soft, silty CLAY, faint solvent odor, brown & gray (100-0-0)	
			100%	@23 36.7		SM	23'	wet, dense, silty SAND, gray, faint solvent odor (30-70-0)	▽ 23'
				@24 82.8	MW02-24 @1100 x4	CL	24'	Moist, hard, silty CLAY, gray, No HC/solvent odor (100-0-0)	
25				@24.5 40.6					
				0.4				contains 2-3" thick lenses of silty sand (30-70-0)	
			100%			SM-SP	26.5	wet to moist, dense fine to med SAND w/ silt & gravel, gray, faint solvent odor (10-80-10)	▽ ~26.5'
				@28 35.0	MW02-28 @1125 x4	ML	28.5	Moist, hard, sandy SILT trace clay, gray, no solvent odor (30-70-0)	
30				@28.5 26.5 / 0.3					

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

See pg 1

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG MW02

Site Address: 4208 Rainier Avenue S Seattle, Washington

See p3 !

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			100	0.0	~~MW02-3~~ MW02-31 @1140 x4	ML		Damp to dry, hard, Sandy SILT with clay & gravel, gray, no solvent or HC odor. ~~(80-20-0)~~ (80-15-5)	
35				0.0	MW02-35 @1145 x4	ML			
			100	0.0	—	ML		Same as above except Moist except less gravel & less sand @~37 to 38' bgs (80-10-10)	
				0.0	—				
38'							~38'	Moist, dense/hard, ~~Sandy~~ SILT with sand, clay & fine sub. gravel, gray, no HC/Solvent odor (85-10-5) (~~5~~ 5	
40				0.0	MW02-40 @ 1340 x4	ML			
			100	—					
				0.0					
43'							~43'	Damp to moist dense, SILT locally with trace very fine sand, gray, NO HC/solvent odor (95-5-0)	
45	45'		100	0.0	~~0.0~~	ML			

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal: See p3 /
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

See pg 1

BORING LOG MW02

Site Address: 4208 Rainier Avenue S, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45		from 43	100		—	ML		Same as above (95-5-0)	
				0.0					
48			100	0.0	—	ML		Becomes SILT with clay trace (fine to fine sand), dry, gray, moist (95-5-0)	
				0.0	—				
50			100	0.0	—	ML			
				0.0	—	ML		Same as above	
55			100	0.0	—	ML			
				0.0	—	ML		Same as above	
60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

See pg 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

see pg 1

BORING LOG MW02

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
60			100	0.0	—	ML		Same as above locally [illegible] @ 61 to 63 bgs Moist	
				0.0	—	ML			
65			100	0.0	—	ML		Same as above Damp to dry SILT with [illegible] fine sand (95-5-0)	
				0.0	—	ML		@ 69' Damp to moist, dense, sandy SILT, [illegible], no HC/solvent odor (75-25-0)	
70			100	0.0	—	ML		↓	
				0.0	—	ML			
75									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

see pg 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

seeps 1

BORING LOG ~~MW02~~ MW02

Site Address: 4208 Rainier Avenue S, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
~~0~~ 75			100	0.0	—	ML		Same as above (Damp to moist, dense, Sandy SILT, gray, no HC/solvent odor (75-25-0)	
				0.0	—	ML			
~~5~~ 80				0.0	—	ML			
				0.0	—	ML		Same as above (75-25-0)	
~~10~~ 85				0.0	—	ML	86'	Becomes siltier on ~~85~~ 86' bgs (80-20-0)	
							~~87~~	Becomes ~~Damp to~~ Damp to dry, @87'	
~~15~~ 90				0.0	MW02-90 @1555	ML		Boring terminated @ 90' bgs	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: seeps 1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:
EOB: 90' bgs
Backfilled w/ bentonite chips to grade & capped with ~~asphalt~~ concrete.

Page: 6 of 6

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 1/24/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/24/18

BORING LOG | TB01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~13 feet bgs
Water Depth After Completion: — feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								3" of asphalt	
5		8 12 12	40	0.3	TB01-05 @0938	GM		med. dense 5'-6.5': Moist, silty GRAVEL w/ some sand, dark brown, occasional brick fragments, no HC odor. (25-10-65)	
10		3 4 6	80	0.0	TB01-10 @0945	ML		medium stiff 10'-11.5': Moist clayey SILT w/ fine sandy layers, gray to brown, no HC odor. (90-10-0)	
15									

Drilling Co./Driller: Holocene / Rowdy
Drilling Equipment: HSA truck rig
Sampler Type: SPT
Hammer Type/Weight: AUTO / 140 lbs
Total Boring Depth: 31.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — / 8" inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type: —

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

BORING LOG | TB01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~13 feet bgs
Water Depth After Completion: — feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		1 1 2	100	23.3	TB01-15 @0950	ML		soft Wet, clayey SILT w/ some sand, faint solvent? odor, gray to brown, (90-10-0)	
20		1 1 1	100	2.0	TB01-20 @0955	CL		soft Wet, silty CLAY, gray, no HC or solvent odor, (100-0-0)	
25		3 5 16	100	0.2		CL		Wet, ~~soft very~~ stiff silty CLAY, gray, no HC/solvent odor, (100-0-0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:
see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:
see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

see page 1

BORING LOG | TB01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~13 feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		3 4 6	100	0.7		CL		Wet, stiff, silty CLAY, gray, no HC/solvent odor, (100-0-0)	
								EOB @ 31.5' bgs. Boring abandoned, backfilled w/ bentonite and sealed w/ concrete flush with surface.	
35									
40									
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 1/24/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/24/18

BORING LOG | TB02

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15, 40 feet bgs
Water Depth After Completion: ____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								3" of asphalt	
5	X	4 6 5	20	0.0	TB02-05 @1035 (4 VOAs)	SM		med. dense Moist, silty SAND, trace of gravel, brown, occasional organics, no HC/solvent odor. (FILL?) (30-65-5)	
10	X	3 3 6	60	0.0	TB02-10 @1045	CL		stiff Moist, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
15									

Drilling Co./Driller: HOLOCENE / Rowdy
Drilling Equipment: HSA truck rig
Sampler Type: SPT
Hammer Type/Weight: AUTO / 140 lbs
Total Boring Depth: 41.5 feet bgs
Total Well Depth: ____ feet bgs
State Well ID No.: ____

Well/Auger Diameter: ~ / 8" inches
Well Screened Interval: ____ feet bgs
Screen Slot Size: ____ inches
Filter Pack Used: ____
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type: ____

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

BORING LOG | TB02

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15, 40 feet bgs
Water Depth After Completion: _____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 5 7	80	2.4	TB02-15 @1055	CL		Wet, stiff silty CLAY, gray, no HC/ solvent odor. (100-0-0)	
20		1 1 1	100	0.1	TB02-20 @1105	CL		Wet, soft silty CLAY, gray to brown, no HC/solvent odor. (100-0-0)	
25		1 1 1	100	0.0		CL		~~Wet~~, Moist, soft, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:
see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:
see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

BORING LOG | TB02

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15, 40 feet bgs
Water Depth After Completion: ——— feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
35		3 3 4	100	0.1		CL		~~Moist~~, med. stiff, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
50		33 36 49	100	0.1		SM		Moist, very dense silty SAND w/ some gravel, gray, no HC/solvent odor. (25-60-15). (med. to coarse)	
55		7 15 20	100	0.0		SP		Wet, dense, medium to coarse SAND, trace of silt, gray, no HC/solvent odor. (5-90-0)	
60								EOB @ 41.5' bgs Boring abandoned and backfilled w/ bentonite and sealed with concrete to flush with surface.	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:
see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:
see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 1/24/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/24/18

BORING LOG | TB03

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~18 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								3" of asphalt	
5		2 2 4	20	0.4	TB03-05 @1300	GM		5'-5.5': Moist, loose silty GRAVEL, with some sand, dark brown, occasional organics, faint HC?/solvent-like? odor. (25-10-65) (FILL?)	
10		3 3 2	90	0.0	TB03-10 @1305	ML		10'-11.5': Moist, medium stiff fine sandy SILT, dark brown to gray	
15									

Drilling Co./Driller: Holocene / Rowdy
Drilling Equipment: HSA truck rig
Sampler Type: SPT
Hammer Type/Weight: AUTO / 140 lbs
Total Boring Depth: 46.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — / 8 inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions: see page 1
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB03

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~18 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 3 4	100	0.0		CL		medium stiff Moist, silty CLAY, light brown, no HC/solvent odor. (100-0-0)	
20		1 1 2	100	0.0		CL		soft Wet, ~~medium stiff~~, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
25		2 2 3	100	0.0		CL		Wet, medium stiff, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.: see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type: see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

see page 1

BORING LOG | TB03

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~18 feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		1 2 2	100	0.0		CL		Wet, soft, silty CLAY, gray, no HC/solvent odor. (100-0-0)	
35		2 3 4	100	0.0		CL		Wet, medium stiff silty CLAY, gray, no HC/solvent odor. (100-0-0)	
40		4				CL		40'-40.5': Wet, soft silty CLAY, gray, no HC/solvent odor, (100-0-0)	
41		15 31	100	0.0		SM		40.5-41.5': Wet, dense SAND w/ some silt, gray, no HC/solvent odor. (15-85-0)	
42 43 44 45									
46		11 38 46	80	0.1		SP		45'-46.5': Wet, very dense SAND, trace of silt, gray, no HC/solvent odor. (5-95-0)	
47 45								EOB at 46.5' bgs.	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

see page 1

Notes/Comments: Boring abandoned at 46.5' bgs, backfilled w/ bentonite, and sealed with concrete to surface.

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/25/18

BORING LOG TB04

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		5 10 13	55	0.3	TB04-05 @0905	SM		Moist, gry-brn, SILTY SAND w/ grvl, no odor (35-55-10)	
10		2 3 5	100	0.1	TB04-10 @0910	ML		Moist, light-brn w/ trace to some, SILT w/ SAND no odor (30-70-0)	
15									

Drilling Co./Driller: Holocene
Drilling Equipment: truck HSA
Sampler Type: SPT
Hammer Type/Weight: Auto / 140 lbs
Total Boring Depth: 46.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — / 6OD inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: Asphalt
Annular Seal: Bentonite
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LMS
Date Started: 1/25/13
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB04

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		7 4 5	100	0.1	TB04-15 @ 0815	ML		moist, light brn, silt w/ SAND, no odor (95-15-0)	
20		1 1 1	100	0.1	—	ML/CL		moist to wet, light gry SILT w/ SAND, no odor (40-10-0)	clear
25		1 2 7	100	0.1	—	ML/CL		wet, light gry, SILT/clay w/ to fine SAND, no odor (95-5-0)	
30									

Drilling Co./Driller: —
Drilling Equipment: See page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LBS
Date Started: 1/25/10
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG +B04

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30	X	9 20 21	100	0.2	–	ML / SM		wet-sat, gray, silty SAND, no odor (30-70-0) w/ 8" [illegible]	
35	X	2 4 5	100	0.2	–	ML/CL		wet-sat, gray, silt/clay, no odor (100-0-0)	
40	X	11 20 29	100	0.3	–	SM		Sat, gray, silty SAND w/ gravel, no odor (35-55-10) [Glacial till?]	
45									

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/12
Surface Conditions: See Page 1
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45		12 32 50/3"	100	0.3	—	SM		Wet-Sat, gry, SAND w/ SILT + gravel, no odor (20-65-15)	
								EOB @ 46.4' bgs.	
50									
55									
60									

Drilling Co./Driller:
Drilling Equipment: See Page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/25/18

DRAFT

BORING LOG | TB05

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~25 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		7 6 8	90	5.6	TB05-03 @0945	SP-SM		8" ASPH. brn, moist SAND w/ silt + gravel, Faint HC odor (15-85-20) over 4" light brn, coarse SAND w/ silt + gravel, no odor (20-80-10)	
10		3 3 4	100	0.6	TB05-10 @0950	ML/CL		4" Pavers (sleight) over moist, gry-brn, SANDY clay w/ silt, no odor (90-10-0)	
15									

Drilling Co./Driller: Holocene
Drilling Equipment: Truck HSA
Sampler Type: SPT
Hammer Type/Weight: Auto / 140 lbs
Total Boring Depth: 40' 1" feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: — / 6OD inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: Asphalt
Annular Seal: Cement
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions: See page 1
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB05

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		2 3 5	100	0.5	TB05-15 @0955	ML/CL		Moist, light brn SILT/clay w/ sand, no odor (90-10-0)	
20		6 8 11	100	0.4	–	CL/ML		Mott-wthy, gry, clay-SILT, no odor (100-0-0)	
25		4 4 3	100	0.4	–	CL/ML		mott-brn / gry, SILT/clay w/ SAND, no odor (90-10-0)	
30								Drilled planned grnd @ 25' bgs	

Drilling Co./Driller:
Drilling Equipment: See page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB05

Site Address: 4208 Rainier Ave South, Seattle, WA

See Page 1

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		14 10 15	100	0.5	—	CL		wet, dark gray, SILT/clay, no odor (100-0-0)	
35		50/2"	0	—	—	—		No recovery	
40		50/1"	5	0.0	—	CL		auger down for recovery. ~50 blows wet-Sat, gray, silt/clay, no odor (100-0-0) EOB @ 40' 1" bgs GW observed at ~25' ATD.	
45									

Drilling Co./Driller:
Drilling Equipment: See Page 1
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/25/18

BORING LOG TB06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		4 4 5	10	3.6	TB06-05 @1110	SM		4" gry silt mat, dry, moist, brn, silty SAND w/ gravel, faint petrol odor (25-60-15)	
	CAL		50	3.5	—			redrive to improve recovery for Geotech sample	
10		2 2 2	40	0.2	TB06-10 @1115	SM		Moist to wet, gry-brn, silty SAND w/ gravel, no HC/Sulfur odors (30-60-10) 2" overlying silt.	
15									

Drilling Co./Driller: Holocene
Drilling Equipment: Truck HSA
Sampler Type: Split
Hammer Type/Weight: Auto/140 lbs
Total Boring Depth: 51.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.:

Well/Auger Diameter: —/6 OD inches
Well Screened Interval: — feet bgs
Screen Slot Size: — inches
Filter Pack Used: —
Surface Seal: Asphalt
Annular Seal: Bentonite
Monument Type: —

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/25/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

See page 1

BORING LOG TB06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	X	3 5 6	100	0.4	TB06-15 @1120	ML/CL		Moist, tan, clay/silt, w/ sand. No odor (90-10-0)	
20	X	1 1 2	100	0.2	—	CL/ML		moist to wet, tan clay/silt, No HC/solv odor (100-0-0)	▽
25	X	2 3 5	100	0.3	—	CL/ML		wet, gray, clay/silt, no HC/solv odor (100-0-0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

See page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

Page: 2 of 4

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LBS
Date Started: 1/25/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

See page 1

BORING LOG TB06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30	X	31 16 29	100	0.2	—	SP-SM		wet-sat, gray silty SAND w/ gravel, no HC/solv odor (20-70-10)	
								Driller adds H_2O to prevent heave.	
35	X	20 50/2"	85	0.0	—	SP-SM		sat, gray, silty SAND ~~w/~~ no fine gravel, no HC/solv odor (15-80-5)	
								Driller adds more water	
40	X	10 50/2"	70	0.1	—	SP-SM		same as previous, no HC/solv odor	
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

See page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/23/18
Surface Conditions: See page 1
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG TB06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45	X	30 50/4"	80	0.0	—	SM	S	Wet, gray silty SAND, no HC/sheen odor (35-65-0)	
50	X	10 36 50/5"	80	0.0	—	ML-SM		Moist, gray, sandy silt, no HC/sheen odor (70-30-0)	
								EOB @ 51.4' bgs	
55									
60									

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/26/13
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/26/13

BORING LOG | TB07/MW01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~27 feet bgs
Water Depth After Completion: ~13.7 feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		3 5 6	70	0.2	TB07-05 @0810	SM		Moist, gray, silty SAND, trace gravel, no odor (25-70-5)	
10		1 2 50/2"	55	0.5	TB07-10 @0815	SM		Moist to wet, gray, silty SAND w/ gravel, no HC/sheen odor (30-60-10)	
		8 3 2	40	0.3	TB07-12.5 @0820	ML/CL		Moist, dark gray Silt/clay, no HC/sheen odor (100-0-0)	
15									

Drilling Co./Driller: Holocene
Drilling Equipment: truck HSA
Sampler Type: SPT
Hammer Type/Weight: Auto/140 lbs
Total Boring Depth: 41.5 feet bgs
Total Well Depth: 35 feet bgs
State Well ID No.: BLC 019

Well/Auger Diameter: 2 / 6 OD inches
Well Screened Interval: 15-35 feet bgs
Screen Slot Size: 0.10 inches
Filter Pack Used: Colorado Silica Sand
Surface Seal: cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments:
Sand Pack 13-36

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/20/12
Surface Conditions:
Well Location N/S: See fig 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB07

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		2 3 4	75	0.5	TB07-15 @0825	ML		moist, tan silt/clay, trace to w/ sand, no odor (90-10-0)	
		2 4 7	100	0.7	TB07-17.5 @0830	ML/CL		moist, medium brown, silt/clay no HC/Sdy odor (100-0-0)	
20		2 1 1	100	0.5	TB07-20 @0835	ML/CL		wet, light tan silt/clay no HC/Sdy odor (100-0-0)	
25		3 1 3	100	0.5	TB07-25 @0840	ML/CL		wet, gray, silt/clay w/ sand, no HC/Sdy odor (90-10-0) Sand stringers. Drill refusal @ 29' bgs	
30									

Drilling Co./Driller: —
Drilling Equipment: Geoprobe
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: 15-35 feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:
Sand -36

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/26/12
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG TB07

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30	X	14 / 13 / 16	70	0.6	TB07-30 @0845	ML		Sand, gray silt w/ sand, no HC/sol odr (85-15-0)	
35	X	17 / 34 / 50/6"	30	0.5	TB07-35 @0850	ML		Sand, gray, silt w/ sand, no HC/sol odr (90-10-0)	
40	X	11 / 20 / 24	100	0.3	TB07-40 @0900	ML		Mud, gray, v-dns silt, no HC/sol odr (100-0-0)	
								EOB @ 41.5, backfilled + set well screen 15-35	
45									

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/26/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 1/26/18

BORING LOG | TB08/MW05

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ? NO GW ATD feet bgs
Water Depth After Completion: ~27 (+11.5M?) feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		6 9 6	80	0.2	TB08-05 @1100	SM		moist, brn, silty SAND w/ gravel, trace ± to strong, no HC/SH odor (30-60-10)	
10		2 2 3	100	0.4	TB08-10 @1105	ML/SM		12" moist, gray-tn silt w/ SAND no HC odor (05-15-0) over 6" moist, dark brn, organic rich silty SAND (40-60-0) no odor	
		3 5 8	90	12.9	TB08-12.5 @1110	ML/SM		Moist, tn-gry silt/clay, trace to strong, no odor. (100-0-0)	
15									

Drilling Co./Driller: Holocene
Drilling Equipment: track HSA
Sampler Type: SPT
Hammer Type/Weight: Auto / 140 lbs
Total Boring Depth: 41.5 feet bgs
Total Well Depth: 35 feet bgs
State Well ID No.: BICC 620

Well/Auger Diameter: 2 / 6OD inches
Well Screened Interval: 15-35 feet bgs
Screen Slot Size: 0.10 inches
Filter Pack Used: Colorado silica sand
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments: Sand Point B-36

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LDS
Date Started: 1/26/18
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG TB08

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	X	2 4 5	100	48.2	TB08-15 @1115	ML		Sm as prev, No HC/Sdw odor (100-0-0)	
	X	2 2 3	100	72	TB08-17.5 @1120	ML		Sm as prev	
20	X	2 3 4	100	4.3	TB08-20 @1125	ML		moist, 12" prev, 6" moist, gry silt w/ 10 strong possible decomposed root fragments, no HC/Sdw odor	
25	X	7 12 17	100	0.3	TB08-25 @1130	ML/CL		moist, gry, silt/clay no HC/Sdw odor (100-0-0)	
30									

Drilling Co./Driller: See page 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: LOG
Date Started: 1/26/12
Surface Conditions:
Well Location N/S: See pg 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | TB08

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		10 17 25	100	0.6	TB08-30 @1135	SM/ML		Same as prev, no HC/SW odors (100-0-0)	
35		17 20 25	100	0.3	TB08-35 @1145	SM/ML		Same as prev, no HC/SW odors (100-0-0)	
40		12 22 29	100	0.2	TB08-40 @1155	SM/ML		Same as prev no HC/SW odors (100-0-0)	
								EOB @ 41.5 set well. Screen 15-35' bgs. NO GW observed at time of drilling.	
45									

Drilling Co./Driller: See pg 1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GLE
Date Started: 1/28/13
Surface Conditions: asphalt
Well Location N/S: SEE Fig.
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B08

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20 feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		7 6 6	100	0.2	P08-05 @ 1335	ML/CL		Mott/stiff, silt w/clay, Gray, no HC/solvent odor. (100-0-0)	
10		4 7 8	100	0.2	P08-10 @ 1345	ML/CL		Mott/stiff, silt w/clay, Gray/tan, no HC/solvent odor. (100-0-0)	
		5 5 6	100	0.2	P08-12.5 @ 1355	ML/CL		Mott/stiff, silt w/clay and trace fine sand, Gray/tan, no HC/solvent odor. Retained sample. (95-5-0)	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: Dandm
Hammer Type/Weight: Downhole / 300 lbs
Total Boring Depth: 50.5' feet bgs
Total Well Depth: / feet bgs
State Well ID No.: /

Well/Auger Diameter: / inches
Well Screened Interval: / feet bgs
Screen Slot Size: / inches
Filter Pack Used: /
Surface Seal: /
Annular Seal: /
Monument Type: /

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GKF
Date Started: 1/25/18
Surface Conditions: asphalt
Well Location N/S:
Well Location E/W:
Reviewed by: SEE pg 1.
Date Completed:

BORING LOG | BOB

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 4 4	100	0.4	BOB-15 @ 1400	ML		Moist, stiff, silt w/ clay and fine sand, brown, no HC/solvent odor. (70-30-0)	
		4 4 4	100	0.3	BOB-17.5 @ 1405	ML/CL		Mo-d, stiff, silt w/ clay, brown to gray, no HC/solvent odor. (100-0-0)	
20		4 3 4	100	0.2	BOB-20 @ 1410	ML/CL		Moist, medium stiff, silt w/ clay, Gray and Brown, no HC/solvent odor. (100-0-0)	
25		6 4 4	100	0.2	BOB-25 @ 1420	ML/CL		Moist, stiff, silt w/ clay, Gray (tourist) Gray, no HC/solvent odor. (100-0-0)	
30									

Drilling Co./Driller: SEE pg 1.
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B08

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30	X	5 4 4	100	0.2	B08-30 @ 1425	ML/CL		Moist to wet, Silt w/ clay, Gray, thin layer of fine sand at 30'. No HC/solvent odor. (100-0-0)	
35	X	13 21 23	100	0.2	B08-35 @ 1430	SM		dense; Moist, Silty SAND w/ gravel, Gray, medium sand. No HC/solvent odor. (15-70-15)	
40	X	50/6"			~~B08-40 @~~			~~Driller~~ Driller notes hard/heaving condition. Sample full of slough @ 40'. No sample collected.	
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: SEE PG 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE PG 1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG. 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B08

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45		50/6"	70	0.2	B08-45 @ 1505	ML/CL		Moist to dry, very stiff, silt w/ clay, no HC/solvent odor. (100-00)	
50		50/6"	30	0.2	~~B08~~ B08-50 @ 1530	ML/CL		Same as above.	
								EOB @ 52 bgs, backfill boring with bentonite and patch surface.	
55									
60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: SEE PG 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE PG 1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

Sound Earth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: CJCF
Date Started: 1/25/18
Surface Conditions: asphalt
Well Location N/S: –
Well Location E/W: 7' W of D6
Reviewed by:
Date Completed: 1/25/18

BORING LOG | B09/MW02

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20' feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		2 2 3	100	0.3	B09-05 @ 0820	SM		Loose Moist, Silty SAND w/ trace gravel & organics, Gray, no HC or Solvent odor. (45-50-5) (Fill)	
10		3 3 3	100	0.2	B09-10 @ 0825	SM / ML		10-11.5' Same as above 11-11.5': Moist, Soft, Silt w/ clay, Gray, no HC or Solvent odor. (100-0-0)	
15		4 5 5	100	0.2	B09-12.5 @ 0835	ML/CL		Moist, Stiff, Silt w/ clay, light gray, no HC or Solvent odor, trace organics, (0-0-0)	

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: D and M
Hammer Type/Weight: downhole / 300 lbs
Total Boring Depth: 31.5' feet bgs
Total Well Depth: 30' feet bgs
State Well ID No.: ~~MW02~~ BKF103 (CJCF)

Well/Auger Diameter: 2 / 8.25 OD inches
Well Screened Interval: 15-30 feet bgs
Screen Slot Size: 0.010 inches
Filter Pack Used: 2/12 Silica SAND
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments:
EOB at 31.5' BGS.
Set well MW02 screened from 15-30'
Sand pack 13-31.5'
Bentonite 2-13'

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE Pg. 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B09

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		4 4 4	100	0.2	B09-15 @ 0840	CL/ML		Moist, stiff, Silty clay, light gray mottled tan, no HC/Solvent odor, fine OSCARS (100-0-0)	
		4 3 4	100	0.2	B09-17.5 @ 0845	CL/ML		Moist, medium stiff, silty w/clay, tan, thin (~1cm) fine sandy silt varves at ~ 13.5'; no HC/Solvent odor. (100-0-0)	
20		4 3 3	100	0.3	B09-20 @ 0850	CL/ML		Wet, medium stiff, Silty clay and fine to medium Sand, Gray, becomes more soft and wet at 20.5' BGS. No HC/Solvent odor. (100-20-0)	
25		2 2 2	100	0.2	B09-25 @ 0855			25-25.5; wet to moist, Silty medium SAND, gray, no HC/Solvent odor. (40-60-0) soft 25.5-26.5: wet to moist, Silt with clay and fine Sand, No HC, Solvent odor. (95-5-0) medium 30-30.5: wet to moist Silty SAND, Gray, fine to HC or Solvent odor. (15-85-0) 30.5-31.5, wet to moist, Silt with clay and fine sand, gray soft. No HC/Solvent odor. (95-5-0)	
30		2 2 2	100	6.2	B09-30 @ 0900				

31.5

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: SEE Pg 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE Pg 1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GLP
Date Started: 11/25/18
Surface Conditions: asphalt
Well Location N/S: — GLP
Well Location E/W: ~~3' of DG~~ 12' E of G3
Reviewed by:
Date Completed: 11/25/18

BORING LOG | MW03 / B07

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20 feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								6" asphalt.	
5		5 4 3	100	0.1	B07-05 @ 1025	SM		Lower Moist, Silty SAND w/ gravel, medium grey, no HC/solvent odor. (25-Sat 0)	
10		5 9 6	100	0.2	B07-10 @ 1030	ML/CL		Moist, stiff, Silty w/ clay, Gray and tan Veins, no HC or solvent odor. medium plasticity	
		2 9 6	100	0.2	B07-12.5 @ ~~1030~~ 1035 KLF	ML/CL		Moist, stiff, Silt w/ clay, Mostly tan w/ Gray Veins, several angular (<1cm) fine to medium sized lithics. No HC/solvent odor. (100-0-0)	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: D and M
Hammer Type/Weight: downhole / 300 lbs
Total Boring Depth: ~~31.5~~ feet bgs
Total Well Depth: 30' feet bgs
State Well ID No.: BKF 104

Well/Auger Diameter: 2" / 8.25 inches
Well Screened Interval: 15-30' feet bgs
Screen Slot Size: 0.010 inches
Filter Pack Used: #2/12 Sand
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type: Flushmount.

Notes/Comments: EOB at 31.5'
Set well MW03
Screen 15-30'
Sand 13-31.5'
Bentonite -13

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GLF
Date Started: 1/25/18
Surface Conditions: asphalt
Well Location N/S:
Well Location E/W:
Reviewed by: SEE PG 1.
Date Completed:

BORING LOG B07

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: / feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		3 4 4	100	0.1	B07-15 @ 1100	ML/CL		Moist, stiff, silt w/ clay, tan with mottled gray, no HC or solvent odor. (100-0-0)	
		3 2 2	100	0.2	B07-17.5 @ 1105	ML/CL		Moist to wet, medium stiff, silt w/ clay and fine sand, no HC or solvent odor. (95-5-0)	
20		3 3 3	100	0.2	B07-20 @ 1110	ML/CL (SM)?		20-21: Moist to wet, silt w/ clay and fine to medium sand, no HC/solvent odor. (90-10-0) 21-21.5: Moist to wet, silt w/ clay and fine to medium sand, no HC/solvent odor. (80-20-0)	
25		3 4 5	100	0.2	B07-25 @ 1115	ML/CL		wet to moist, medium stiff, silt w/ clay and trace fine sand, gray, no HC/solvent odor. (95-5-0)	
30		3 4 4	100	0.2	B07-30 @ 1120	ML/CL		wet to moist, medium stiff, silt w/ clay and trace medium sand, gray, no HC/solvent odor. (95-5-0	

31.5

Drilling Co./Driller: CES
Drilling Equipment:
Sampler Type: SEE PG 1
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal: SEE PG 1
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started: 1/26/18
Surface Conditions: asphalt
Well Location N/S: SEE Fig.
Well Location E/W:
Reviewed by:
Date Completed: 1/26/18

BORING LOG B06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: / feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5	X	11, 12, 12	100	0.5	B06-05 @ 0945	SM		Moist, ~~loose~~ medium dense Silty SAND w/ gravel, organic debris, no HC / solvent odor. (25-60-15)	
10	X	6, 6, 7	100	0.1	B06-10 @ 0950	SM	Fill	Moist, loose, silty SAND w/ gravel, Brown and organic debris. No HC / solvent odor. (05-95-0)	
						ML	Native	Moist, soft, SILT w/ sand, Brown with mottled gray. No HC / solvent odor. (80-20-0)	
	X	7, 6, 6		3.1, 0.1, 5.2	B06-12.5 @ 0955	ML		Moist, medium stiff, SILT, mottled brown and gray. No HC / solvent odor. (100-0-0) Thin (<1cm) sand lenses at 13.5 and 14' BGS.	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: D and M
Hammer Type/Weight: downhole 300 lbs
Total Boring Depth: 51 feet bgs
Total Well Depth: feet bgs
State Well ID No.: /

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments: No GW encountered in boring.

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started: 1/26/18
Surface Conditions: asphalt
Well Location N/S: SEE Fig.
Well Location E/W:
Reviewed by:
Date Completed: 1/26/18

DRAFT

BORING LOG B06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: / feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								very dark gray SILTy SAND w/ gravel, Organic debris,	
5		11 12 12	100	0.5	B06-05 @ 0945	SM		Moist, [illegible] no HC/ solvent odor. (25-6-15)	
10		6 6 7	100	0.1	B06-10 @ 0950	SM ML	FILL native	Moist, loose, silty SAND w/ gravel, Brown and Organic debris. No HC/ solvent odor. (25-8-20) Moist, firm, SILT w/ Sand, Brown with mottled gray. No HC/ solvent odor. (80-20-0)	
		7 6 6		3.1 0.1 5.2	B06-12.5 @ 0955	ML		Moist, medium stiff, SILT, mottled Brown and gray. No HC/ solvent odor. (100-0-0) Thin (<1cm) sand lenses at 13.5 and 14' BGS.	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: D and M
Hammer Type/Weight: down hole 300 lbs
Total Boring Depth: 51 feet bgs
Total Well Depth: / feet bgs
State Well ID No.: /

Well/Auger Diameter: / inches
Well Screened Interval: / feet bgs
Screen Slot Size: / inches
Filter Pack Used: /
Surface Seal: /
Annular Seal: /
Monument Type: /

Notes/Comments: No GW encountered in boring.

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG.1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

DRAFT

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		7 6 8	100	11.2 8.4	B06-15 @ 1005	ML		Moist, stiff, SILT w/ sand, gray and brown, medium, no HC/solvent odor. (90-10-0)	
		4 4 7	100	1.1 1.0 0.1	B06-17.5 @ 1010	ML		Moist, stiff, SILT w/ fine sand, brown to gray, no HC/solvent odor. (90-10-0)	
20		8 7 5	100	0.4 0.2	B06-20 @ 1015	ML / SP / ML		20-20.5 Moist, stiff, SILT w/ trace fine sand, gray, no HC/solvent odor (95-5-0) 20.5-21: Moist, loose, SAND w/ trace silt, medium, gray, no odor (HC/solvent) (5-95-0) 21-21.5: Back into SILT. (45-5-0)	
25		20 20 20	100	0.3	B06-25 @ 1030	ML		tidy Moist, Hard, SILT, gray, no odor (100-0-0)	
30									

Drilling Co./Driller: SEE PG.1
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE PG.1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG. 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ✓ feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30		16 18 18	100	0.3	B06-30 @ 1040	ML/CL		Dry to moist, Hard, SILT w/ little clay, gray, no HC/Solvent odor. (100-0-0)	
35		23 25 27	100	0.5	B06-35 @ 1040	ML/CL		Dry to moist, Hard, SILT w/ clay, gray, no HC/Solvent odor. (100-0-0)	
40		25 26 24	100	0.3	B06-40 @ 1105	ML/CL		Dry to moist, hard, SILT w/ clay, gray, no HC/Solvent odor. (100-0-0)	
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type: SEE PG. 1
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE PG. 1
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG. 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B06

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: / feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45		37 50/6"	100 150 (est)	0.3	B06-45 @ N/S	ML/CL		Dry brown, Mud, SILT w/clay, gray with veins, No HC/solvent odor. (100-0-0) Same as above.	
50		33 50/6"	150 (est)	0.4	B06-50 @ 1120	ML/CL		Same as above, no HC/solvent odor. (100-0-0) EOB @ 51' BGS.	
55									
60									

Drilling Co./Driller: /
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: SEE PG. 1 lbs
Total Boring Depth: / feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: / inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used: SEE PG. 1
Surface Seal:
Annular Seal:
Monument Type: /

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GCF
Date Started: 1/26/18
Surface Conditions: Asphalt
Well Location N/S: SEE Fig.
Well Location E/W:
Reviewed by:
Date Completed: 1/26/18

BORING LOG B10

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~20 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0		4 4 3	80	0.0	B10-02.5 @ 0825	SM		Moist, brown silty SAND with fine gravel, brick and organic debris. No HC/solvent odor. (30-65-5)	
5		5 6 7	100	0.0	B10-05 @ 0830	SM		Moist, brown, silty Sand w/gravel, some roots. No HC/solvent odor (25-65-10)	
10		6 8 7	100	0.0	B10-10 @ 0835	SM ML		10-11: Moist, silty SAND, brown with gray SNB layers (fine). No HC/solvent odor. (30-70-0) 11-11.5: Moist, sandy SILT, brown with mottled gray, no HC/solvent odor. (65-35-0)	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: HSA
Sampler Type: D and M
Hammer Type/Weight: Downhole / 300 lbs
Total Boring Depth: 20.5 feet bgs
Total Well Depth: — feet bgs
State Well ID No.: —

Well/Auger Diameter: 8.25" inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: GCF
Date Started: 1/26/18
Surface Conditions: Asphalt
Well Location N/S: SEE Fig. 1
Well Location E/W:
Reviewed by:
Date Completed: 1/26/18

BORING LOG B11

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: / feet bgs
Water Depth After Completion: / feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								Fill debris/cobbles observed in spoils. Drilled straight to 10 bgs	
5									
10	S 6 7		50	0.0	B11-10 @ 1250	SM/ML		Fill, glass debris, large cobbles, silty sand, no HC/solvent odor.	
	14 15 15		100	0.1	B11-15 @ 1255			Moist, stiff, SILT w/ clay and fine sand, brown with some gray mottling. (90-10-0) Thin medium sand lens (2" thick) at 16 and 16.5'	
15									

Drilling Co./Driller: Cascade / James
Drilling Equipment: 175A
Sampler Type: D and M
Hammer Type/Weight: downhole / 300 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S: SEE PG1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B01

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: 7 feet bgs
Water Depth After Completion: 7 feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15				SEE PG1					
20		6 5 11	90	0.2	B01-20 @ 0305	ML/CL		Moist, stiff, SILT w/clay, Gray, Low plasticity, no HC/Solvent odor. (100-0-0)	
25		36 50/6"	100	0.2	B11-25 @ 1310	~~SM~~ SP		Moist, very dense, ~~silty~~ medium SAND with subrounded Gravel and SILT, gray, no HC/Solvent odor. (5-65-30)	
30								EOB @ 26' BGS. Backfill boring with bentonite and Patch surface with concrete. No GW encountered in boring.	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type: SEE PG1
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal: SEE PG2
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

BORING LOG | **B12**

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 2/7/18
Surface Conditions: ASPHALT
Well Location N/S: 13'S of passive sample location D1
Well Location E/W: 13'W OR 3'N of MW05 1'E
Reviewed by:
Date Completed: 2/7/18

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15 feet bgs
Water Depth After Completion: ____ feet bgs

DRAFT

10 | 7
15 | 10.9
20 | 14
24 | 17
25 | 20
35 | 25

linear feet of auger

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								4" of ASPHALT	
								Driller measures auger angle w/ cell phone inclinometer: 48°	
5									
		3 3 3	50	1.1	B12-07 @1020			~~7' 8.5': Moist, loose, gravelly, silty SAND, brown, no HC/solvent odor (25-30-45)~~	
10		3 3 3	50	1.1	B12-07 @1020	SM		10'-11.5' (7'-8.5' bgs): Moist, loose, gravelly, silty SAND, brown, no HC/solvent odor (25-45-30)	
15									

Drilling Co./Driller: CASCADE/Curtis
Drilling Equipment: HSA truck rig
Sampler Type: ~~DAMES & MOORE~~ SPT split spoon
Hammer Type/Weight: AUTO/140 lbs
Total Boring Depth: 36.5 (26.5') feet bgs
Total Well Depth: ____ feet bgs
State Well ID No.: ____

Well/Auger Diameter: ____ / 8 inches
Well Screened Interval: ____ feet bgs
Screen Slot Size: ____ inches
Filter Pack Used: ____
Surface Seal: ASPHALT
Annular Seal: Bentonite
Monument Type: ____

Notes/Comments:
45° ANGLED BORING
Depth = linear feet of auger.
Sample depths = feet bgs
(i.e. B12-07 = sample depth 7' bgs)

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

DRAFT

BORING LOG B12

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15' feet bgs ✓
Water Depth After Completion: ____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description (10.5'-12' bgs)	Well Construction Detail
15		15 20 22	90	24.1	B12-10.5 @1035	ML		15'-16.5': Moist, dense, fine sandy SILT, brown to gray, no HC/solvent (80-20-0)	
20		13 14 15	100	18.7	B12-14 @1050	ML		20'-21.5' (14'-15.5' bgs) Moist to wet, fine sandy SILT with 2" wet layer of silty SAND, brown to tan, dense, no HC/solvent odor (80-20-0)	
25		NR	90	1.6	B12-17 @1100	ML		24'-25.0' (17'-18.0' bgs) Moist, SILT, trace of fine sand, brown, no HC/solvent odor. (95-5-0)	
						ML		25'-25.5' (18'-18.5' bgs): Moist, clayey SILT, blue to gray, no HC/solvent odor. (100-0-0)	
30		NR	90	1.1	B12-20 @1115	ML		28'-29.5' (20'-21.5' bgs) Moist, SILT with some clay, blue to gray, no HC/solvent odor. (100-0-0)	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: see page 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: see page 1 feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type: see page 1

Notes/Comments:
NR = Not reported by driller. Blow counts

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

DRAFT

BORING LOG | B12

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~15 feet bgs
Water Depth After Completion: ____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30									
35		NR	100	1.5	B12-25 @1130	ML		35'-36.5' (25'-26.5' bgs): Moist, clayey SILT, blue to gray, no HC/solvent odor. (100-0-0)	
								EOB @ 36.5' bgs. Borehole abandoned, backfilled with bentonite and sealed w/ ~~asphalt~~ black-dyed concrete grout flush to surface.	
40									
45									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.: see page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal: see page 1
Monument Type:

Notes/Comments:
NR = Blow counts not reported by driller.

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 2/7/18
Surface Conditions: ASPHALT
Well Location N/S: 3' S of passive sample location B0
Well Location E/W: 3' E
Reviewed by:
Date Completed: 2/7/18

DRAFT

BORING LOG | B13

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~11 feet bgs
Water Depth After Completion: ____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		5 5 5	40	0.9	B13-05 @1335	SM		5'-6.5': Moist, med. dense silty SAND with some gravel, gray to brown, no HC/solvent odor. (30-60-10) occasional organics	
10		5 8 8	50	1.7	B13-10 @1345	SM		10'-11': Moist to wet, med. dense silty SAND with some gravel, brown, large 4" piece of wood, no HC/solvent odor.	
						ML		very stiff (30-60-10)	
15								11'-11.5': wet, clayey SILT, trace of fine gravel, blue to gray, no HC/solvent odor (95-0-5)	

Drilling Co./Driller: CASCADE / CURTIS
Drilling Equipment: HSA
Sampler Type: ~~Dames and Moore~~ SPT split spoon
Hammer Type/Weight: AUTO / 140 lbs
Total Boring Depth: 21.5 feet bgs
Total Well Depth: ____ feet bgs
State Well ID No.: ____

Well/Auger Diameter: ~ 18" inches
Well Screened Interval: ____ feet bgs
Screen Slot Size: ____ inches
Filter Pack Used: ____
Surface Seal: ASPHALT
Annular Seal: BENTONITE
Monument Type: ____

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 2/7/18
Surface Conditions: ASPHALT
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 2/7/18

BORING LOG | B13

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~11 feet bgs
Water Depth After Completion: — feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		5 6 7	100	1.7	B13-15 @1355	ML		15'-16.5': Moist, stiff, clayey SILT, tan to gray, no HC/solvent odor. (100-0-0)	
20		5 6 8	80	2.3	B13-20 @1405	SM ML		20'-20.7': Moist, med. dense, silty SAND w/ some gravel, brown, no HC/solvent odor. (20-70-10) 20.7'-21.5': Moist, stiff, clayey SILT, gray, no HC/solvent odor. (100-0-0) EOB at 21.5' bgs. Borehole abandoned, backfilled with bentonite, sealed with concrete (black-dyed) flush to surface.	
25									
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: see page 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: see page 1 feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall
Project Number: 0611-017
Logged by: JSL
Date Started: 2/7/18
Surface Conditions: ASPHALT
Well Location N/S: 0.5' N
Well Location E/W: 2' E of passive sample location F1
Reviewed by:
Date Completed: 2/7/18

DRAFT

BORING LOG B14

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5		3 8 9	100	0.6	B14-05 @1425	SM		5'-6.5': Moist, silty SAND, trace of gravel, brown to gray, no HC/solvent odor. (20-75-5)	
10		3 3 4	100	1.7	B14-10 @1430	ML		10'-11.5': Moist, med. stiff clayey SILT, gray to tan, no HC/solvent odor. (100-0-0)	
15									

Drilling Co./Driller: CASCADE / CURTIS
Drilling Equipment: HSA truck rig
Sampler Type: ~~ACES~~ SPT split spoon
Hammer Type/Weight: AUTO / 140 lbs
Total Boring Depth: 21.5 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: — / 8 inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 0611-017
Logged by:
Date Started:
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by: see page 1
Date Completed:

BORING LOG | B14

Site Address: 4208 Rainier Ave South, Seattle, WA

Water Depth At Time of Drilling: ~16 feet bgs
Water Depth After Completion: ____ feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		5 7 8	100	4.9	B14-15 @1440	ML		15'-16.5': Moist to wet, very stiff clayey SILT, tan, no HC/solvent odor. (100-0-0)	
20		2 2 3	100	0.9	B14-20 @1450	CL		20'-21.5': wet to moist, med. stiff clay, gray, no HC/solvent odor (100-0-0)	
								EOB at 21.5' bgs. Borehole abandoned, backfilled with bentonite, sealed with concrete flush to surface.	
25									
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: see page 1 lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: see page 1 feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type: see page 1

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/1/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 10/1/18

BORING LOG B15

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: 20 feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								~4" Asphalt at Surface 0-~10' Inner. Moist brn silty SAND sports, appt fill. Driller here	
5									
10	X	19 19 23 (42)	100	0.0	B15-07 @1335	SM		10-11.5' (7-8.5' bgs) Moist, v-dense, brn w/ gry, silty SAND, trc gravel, no HC/odor. Occ (40-55-5)	
15									

Drilling Co./Driller: Cascade / Sams
Drilling Equipment: HSA
Sampler Type: CAL
Hammer Type/Weight: Autohole/300 lbs
Total Boring Depth: 40' Inner / 29 feet bgs
Total Well Depth: 40' Inner / 29 feet bgs
State Well ID No.: BKF 728

Well/Auger Diameter: 2 / 4.5 inches
Well Screened Interval: 25-40 feet bgs Inner
Screen Slot Size: 0.10 inches
Filter Pack Used: Pioneer silica sand
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments: 46° wood borg

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/1/18
Surface Conditions:
Well Location N/S:
Well Location E/W: See pg 1
Reviewed by:
Date Completed:

BORING LOG B15

Site Address: 4208 Rainier Avenue S Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	X	16 22 19 (41)	100	0.0	B15-11 @1340	ML/CL		15-16.5' (10.5-12' bgs) Moist to wet, gray-brn, Silt/Clay w/ sand lenses/grains, no HC/solv odor (90-10-0) trace peat lenses.	
20	X	16 22 20 (42)	95	0.0	B15-14 @1400	ML		20-21.5' (14-15' bgs) Moist to wet, brown w/ gray stains SILT w/ v-fine sand, no HC/solv odor (95-10-0)	
25	X	14 17 22 (39)	70	0.0	B15-17 @1410	SM / ML		24-25.5' (17-18' bgs) ~6" wet to sat, brn, silty SAND w/ gravel (40-50-10) over 6" moist to moist, blue-gray fine SANDY SILT, no HC/solv odor (80-20-0)	
30	X	20 20 20 (40)	100	0.0	B15-20 @1420	ML/CL		28-29.5' (20-21' bgs) Moist, gray-blue SILT, no HC odor (100-0-0)	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:
See page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by: LDS
Date Started: 10/1/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B15

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30 45									
35 50		18 22 22	80	0.0	B15-25 @1435	ML		35-36.5' (25-25' bgs) Moist, light gray-blue, SILT, no HC/solv. odor (100-0-0)	
40 55		50/6"	110	0.0	B15-28 @1445	ML		40-40.5 (28-28.5' bgs) Same as previous.	
45 60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: See page 1 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/1/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 10/1/18

BORING LOG B16

Site Address: 4208 Rainier Avenue S, Seattle, WA

Water Depth At Time of Drilling: ~15 feet bgs
Water Depth After Completion: 18 feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								4" Asphalt	
								Driller reduces auger angle w/ inclinometer 46.5°.	
5								drilling spoils 5-10' Moist silty SAND w/ Brick fragments [FILL]	
10	X	15, 21, 20, (41)	100	0.0	B16-07 @0905	SM		10-11.5' (7-8.5' bgs) Moist, Medium v-dense, silty SAND, w/ gravel, no HC odor or sheen (35-55-10)	
15									

Drilling Co./Driller: Cascade / Sanecca web
Drilling Equipment: HSA
Sampler Type: CAL
Hammer Type/Weight: In-hole / 300 lbs
Total Boring Depth: 40' lineal / 29 feet bgs
Total Well Depth: 40' lineal / 29 feet bgs
State Well ID No.: BKF 727

Well/Auger Diameter: 2 / 4.5 inches
Well Screened Interval: 25-40 feet ~~bgs~~ (lineal
Screen Slot Size: 0.010 inches
Filter Pack Used: Prosecco Silica SAND
Surface Seal: Concrete
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments: 46° Angled Boring

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/1/18
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B16

Site Address: 4208 Rainier Avenue S Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		13 19 17 (36)	100	4.9	B16-10.5-11 @0915		SM	15-16.5 (10.5-12' bgs) Moist, dense, fine Sandy SILT, brn to gry, trace peat lens @11' no HC/solv odor (80-20-0)	
20		15 22 17 (39)	20	0.0	B16-14 @0930	ML		20-21.5' (14-15.5' bgs) Moist to wet, fine Sandy SILT w/ some silty lense and seam, brn to tn, no HC/solv odor (80-20-0)	
25		28 21 36 (57)	100	0.1	B16-17 @0940	ML		24-25.5' (17-18' bgs) Moist V-dense, SILT, ~~trace of fine Sand~~, blue to gry, no HC/solv odor (100-0-0)	
30		50/6"	120	0.0	B16-20 @0950	ML		28-29' (20-21' bgs) Moist, V-dense SILT, blue to gry, trace Sand lenses no HC/solv odor (95-5-0)	

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: See pg 1 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by: LDS
Date Started: 10/1/13
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

DRAFT

BORING LOG | B16

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
35 45									
50		42 50/6"	110	0.0	B16-25 @1010	ML		BS-38' bgs (25-26' bgs) Moist, v-dense gry-blue SILT no HC/sOU color (100-0-0)	
48 55		21 37 36	100	0.0	B16-28 @1025	ML		40-41.5 (28-29' bgs) Same as previous.	
								EOB @ 41.5 bgs Set well screen 25-40' bgs.	
45 60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

See page 1

SoundEarth Strategies

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/2/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 10/2/18

DRAFT

BORING LOG | B17

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								~4" Asphalt at surface	
5		3 3 2 (5)	100	0.0	B17-05 @1030	SM		Moist, brn-gry, silty SAND w/ gravel, no HC/SOW. odor Probable SM (35-55-10)	
10		3 6 4 (10)	100	0.0	B17-10 @1033	SM		Moist to damp, brn-gry, silty SAND w/ gravel, no HC/SOW odor (35-50-10)	
		3 4 7 (11)	100	0.0	B17-12.5 @1037	ML/CL		Moist, blue gry w/ 5mm mottling, silt/clay w/ fine SAND, no HC odor, fine peat lenses (90-10-0)	
15									

Drilling Co./Driller: Cascade/Jones
Drilling Equipment: HSA
Sampler Type: CAL
Hammer Type/Weight: M-hole/300 lbs
Total Boring Depth: 35 feet bgs
Total Well Depth: 35 feet bgs
State Well ID No.: BKF 730

Well/Auger Diameter: 2/4.5 inches
Well Screened Interval: 25-35 feet bgs
Screen Slot Size: 0.10 inches
Filter Pack Used: Premier 8/20 SAND
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/2/18
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG B17

Site Address: 4208 Rainier Avenue S Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15	X	6, 8, 6, (14)	100	0.0	B17-15 @ 1042	ML/CL		Moist, gray-blue w/ brn mottling, silt/clay w/ small sm [illegible], no HC/solv odr (95-5-0)	
	X	7, 7, 7, (14)	100	0.0	B17-17.5 @ 1048	ML/CL		Moist to wet, light brn SILT/clay w/ fine SAND, no HC/solv odor (80-20-0)	
20	X	6, 6, 5, (11)	100	0.0	B17-20 @ 1053	ML/CL		Moist to dry, light brn-gray, SILT/clay, trace organic peaty fragments. no HC/solv odor (100-0-0)	
25	X	20, 50/6"	100	1.7	B17-25 @ 1058	SM-SP		Saturated, gray, fine to med. SAND w/ silt, no HC/solv odor (15-85-0)	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: See page 1 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by: LDS
Date Started: 10/2/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B17

Site Address: 4208 Rainier Avenue S
Seattle, WA

DRAFT

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30 45	X	50/6"	200	0.3	B17-30 @1107	SP		Loose, SAND as prev no HC/sdw ors (15-85-0)	
35 50	X	50/6"	200	0.0	B17-35 @1135	SP SM		8" Prevs ors wet to SAT, GM, STRY SAND, no HC/sdw ors (25-85-0)	
40 55									
45 60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: See page 1 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/2/18
Surface Conditions: Asphalt
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed: 10/2/18

BORING LOG | B18

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: 7 feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								4" Asphalt at surface	
5		8 8 6 (14)	100	0.2	B18-05 @0840	SM		Moist, light gry-brn, silty fine SAND w/ gravel, no odor (35-55-10)	
10		6 8 9 (17)	100	12.4	B18-10 @0845	ML/CL		Moist light blue-gry, Silt/Clay w/ trace fine Sand + organics/peat (45-5-0) no HC/Solv odor.	
		7 5 5	100	14.5	B18-12.5 @0850	ML/CL		Same as previous	
15									

Drilling Co./Driller: Cascade / Sonic
Drilling Equipment: HSA
Sampler Type: CAL
Hammer Type/Weight: In-hole / 300 lbs
Total Boring Depth: 31 feet bgs
Total Well Depth: 30 feet bgs
State Well ID No.: BLCF 729

Well/Auger Diameter: 2 / 4.5 inches
Well Screened Interval: 15-30 feet bgs
Screen Slot Size: 0.10 inches
Filter Pack Used: Proper Silica Sand
Surface Seal: Cement
Annular Seal: Bentonite
Monument Type: Flushmount

Notes/Comments:

SoundEarth Strategies

DRAFT

Project: Rainier Mall
Project Number: 1276-001
Logged by: LDS
Date Started: 10/2/18
Surface Conditions:
Well Location N/S: See page 1
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B18

Site Address: 4208 Rainier Avenue S
Seattle, WA

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15		9 4 8 (17)	100	40	B18-15 @0900	ML/CL		Moist to damp, light brn, SILT/clay w/ V-fine sand, no HC/sdw odor (90-10-0)	
		19 29 20 (49)	100	0.3	B18-17.5 @0902	ML/CL		Moist, blue-gry - V-fine clay/SILT, no HC odor (100-0-0)	
20		19 21 17 (38)	100	0.1	B18-20 @0905	ML/CL		Same as prev	
25		23 27 29	100	0.0	B18-25 @0912	ML/CL		Same as prev	
30									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: See page 1 feet bgs
Total Well Depth: feet bgs
State Well ID No.:

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

SoundEarth Strategies

Project: Rainier Mall Property
Project Number: 1276-001-01
Logged by: LDS
Date Started: 10/2/18
Surface Conditions:
Well Location N/S:
Well Location E/W:
Reviewed by:
Date Completed:

BORING LOG | B18

Site Address: 4208 Rainier Avenue S
Seattle, WA

DRAFT

Water Depth At Time of Drilling: feet bgs
Water Depth After Completion: feet bgs

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30 45		33 50/6"	100	0.0	B18-30 @0920	ML/CL		Same as previous	
								EOB @ 31' bgs, set GW well screen 15-30.	
35 50									
40 55									
45 60									

Drilling Co./Driller:
Drilling Equipment:
Sampler Type:
Hammer Type/Weight: lbs
Total Boring Depth: feet bgs
Total Well Depth: feet bgs
State Well ID No.:

See page 1

Well/Auger Diameter: inches
Well Screened Interval: feet bgs
Screen Slot Size: inches
Filter Pack Used:
Surface Seal:
Annular Seal:
Monument Type:

Notes/Comments:

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 20, 2019
Date Completed:	April 20, 2019
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	20 feet bgs
Water Depth After Completion:	14.05 feet bgs

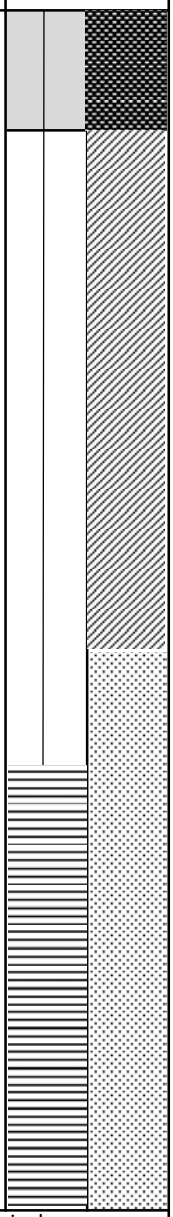
Boring No.

UB10/MW10

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description
								Air knifed to 3 feet
5								No soil samples collected between 0 and 10 feet
10			85	0.7	UB10-10	SM		Brown SILTY SAND trace GRAVEL and CLAY, moist 11.0 - gray and wet
			100	0.6	UB10-13	CL		Gray CLAY, moist
15								

Well Construction Detail



Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	9.5 - 29.5	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	31.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	29.5	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 147		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 20, 2019
Date Completed:	April 20, 2019
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	20 feet bgs
Water Depth After Completion:	14.05 feet bgs

Boring No.
UB10/MW10

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.5	UB10-15	CL		Gray CLAY, moist	
			100	0.5	UB10-18			Gray/brown mottled CLAY, moist <1" lenses of SILTY SAND every 3-4"	
20				0.6	UB10-20				
			100						
			100	0.6	UB10-23			Gray, moist to wet	
25				0.5	UB10-25				
			100			SP		Gray, medium SAND trace GRAVEL, wet	
			100	0.9	UB10-28			some SILT	
30									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	9.5 - 29.5	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	31.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	29.5	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 147		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB10/MW10**	
Date Started:	April 20, 2019		
Date Completed:	April 20, 2019	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:	20 feet bgs		
Water Depth After Completion:	14.05 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			100					Gray SAND trace GRAVEL, increasing fines	
								31.5 - Bottom of Boring	
35									
40									
45									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	9.5 - 29.5	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	31.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	29.5	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 147		**Monument Type:**	Flush	

Notes/Comments

Page: **3/3**

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB11/MW11**	
Date Started:	April 20, 2019		
Date Completed:	April 20, 2019	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:	32 feet bgs		
Water Depth After Completion:			

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
								Air knifed to 3 feet	
5								No soil samples collected between 0 and 10 feet	
10			0.0					no recovery	
			100	0.0	UB11-13	CL		Gray CLAY, moist 13.0 - with brown mottling	
15									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15 - 35	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	36.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	35	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 148		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 20, 2019
Date Completed:	April 20, 2019
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	32 feet bgs
Water Depth After Completion:	

Boring No.

UB11/MW11

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.8	UB11-15	CL		Gray/brown mottled CLAY, moist <1" lenses of SILTY SAND every 3-4"	
			100	0.2	UB11-18			0.4-foot lens of brown/gray mottled SILTY fine SAND	
20			100	0.4	UB11-20				
			100	0.6	UB11-23			wet	
25			80	0.5	UB11-25				
			75	0.9	UB11-28	SP		Gray, SILTY SAND with GRAVEL, moist	
30									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15 - 35	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	36.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	35	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 148		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 20, 2019
Date Completed:	April 20, 2019
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	13.25 feet bgs

Boring No.

UB11/MW11

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			80	1.6		SM		Gray SAND with SILT, trace GRAVEL, wet	
35			100	2.1		CL		Gray CLAY, moist	
								36.5 - Bottom of Boring	
40									
45									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15 - 35	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	36.5	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	35	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLI 148		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 4, 2020
Date Completed:	March 4, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	13.25 feet bgs

Boring No.

UB12/MW12

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
5			45	0.0 NS	UB12-5	SW-SM		Gray SILTY fine SAND trace GRAVEL, moist FILL	
10									
15			100	5.6 NS	UB12-14	CL		Gray/brown mottled CLAY, moist	

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	31-46	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	48	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	46	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 351		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 4, 2020
Date Completed:	March 4, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	13.25 feet bgs

Boring No.

UB12/MW12

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100			CL		Gray/brown mottled CLAY, moist	
				7.5	UB12-22	SM			
			70	NS		CL		22.0 to 22.3 - lens of gray fine silty SAND, moist Gray CLAY, moist with intermixed gray fine sand	
20									
25									
30									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	31-46	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	48	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	46	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 351		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

No free water at 22 feet bgs

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC		**UB12/MW12**
Date Started:	March 4, 2020		
Date Completed:	March 4, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:			
Water Depth After Completion:	13.25 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30									
35			0					36' - No Soil Recovery	
			40	1.8 NS	UB12-37	CL		Gray CLAY (CL), moist, without fine sand	
40									
45									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	31-46	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	48	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	46	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 351		**Monument Type:**	Flush	

Notes/Comments

No free water at 37'

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 4, 2020
Date Completed:	March 4, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	13.25 feet bgs

Boring No.

UB12/MW12

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45									
			90		UB12-46	CL		Gray CLAY, moist	
								48 - Bottom of Boring	
50									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	31-46	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	48	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	46	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 351		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	12.76 feet bgs

Boring No.

UB13/MW13

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5			35	0.4	UB13-4	SP		Brown fine to medium SAND trace GRAVEL, moist FILL 4.2 - Gray, no GRAVEL	
10			50		UB13-9	SM		9.0 to 9.3 - Brown with gray silty SAND with GRAVEL, moist 9.3 to 9.6 - wood debris 9.6 - as above with 0.2' lens of concrete	
15									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	28-42	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	42	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 353		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	12.76 feet bgs

Boring No.

UB13/MW13

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						SM			
20			100	0.5 NS	UB13-23 UB13-23(GW)	CL		Gray CLAY, wet	
						SM		Gray silty fine SAND, wet, with organics	
25									
30									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	28-42	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	42	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 353		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB13/MW13**	
Date Started:	March 5, 2020		
Date Completed:	March 5, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:			
Water Depth After Completion:	12.76 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30									
35									
40									
			65	2.3 NS	UB13-43	CL		Gray CLAY, wet 42.0 to 42.4 - some fine sand 44.0 - Bottom of Boring	
45									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	28-42	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	44	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	42	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 353		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	17 feet bgs
Water Depth After Completion:	8.70 feet bgs

Boring No.

UB14/MW14

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0			50			SP		Light brown medium SAND some GRAVEL, moist FILL	
5				0.0 NS	UB14-5			5.5 - gray mottling 5.8 to 6.1 - concrete	
						SP		6.8 - Gray, medium SAND, wet FILL	
			50	0.0 NS	UB14-7	CL		7.3 - Gray/brown mottled CLAY, moist	
10			100						
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	10-20	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 039		**Monument Type:**	Flush	

Notes/Comments

Groundwater monitoring well sample MW14-20200305 collected

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	17 feet bgs
Water Depth After Completion:	8.70 feet bgs

Boring No.

UB14/MW14

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100			CL			
						CH		Gray CLAY, wet	
20					UB14-20			20.0 - Bottom of Boring	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	10-20	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 039		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	16 feet bgs
Water Depth After Completion:	9.03 feet bgs

Boring No.

UB15/MW15

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0			36			SP		Light brown medium SAND, some gravel, moist FILL	
5			64	0.0	UB15-6	CL		Brown/gray mottled CLAY, moist FILL	
				NS		ML		Brown SILT with organics, moist FILL	
						SP		Gray medium SAND, wet FILL	
						SM		Gray/green mottled, silty fine SAND, wet FILL	
10			100			CL		Brown/gray mottled CLAY, moist	
				0.2					
15				NS					

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	10-20	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 040		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	16 feet bgs
Water Depth After Completion:	9.03 feet bgs

Boring No.

UB15/MW15

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100			CL		18.0 to 18.7 - wet	
20				0.0	UB15-20	CH		Gray CLAY, wet	
								20.0 - Bottom of Boring	
25									
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	10-20	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 040		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 4, 2020
Date Completed:	March 4, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Soil
Water Depth at Time of Drilling:	20 feet bgs
Water Depth After Completion:	13.41 feet bgs

Boring No.

UB16/MW16

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
5			35			GW		Gray, well graded GRAVEL with SAND, moist FILL	
			35	3.9 NS	UB16-6				
10									
15			100	0.2 NS	UB16-14	CL		Gray/light brown mottled CLAY, moist	

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	18-28	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	30	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	28	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 352		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB16/MW16**	
Date Started:	March 4, 2020		
Date Completed:	March 4, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:	20 feet bgs		
Water Depth After Completion:	13.41 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						CL		Gray/light brown mottled CLAY (CL), moist	
20									
25								28.0 - Gray CLAY, moist to wet	
			100			CL		29.0 to 29.6 - Gray well graded fine GRAVEL with SAND, moist to wet	
				0.0	UB16-29	GW		29.6 - Gray CLAY, moist to wet	
30				0.0	UB16-29.5	CL		30.0 - Bottom of Boring	

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	18-28	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	30	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	28	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 352		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	21 feet bgs
Water Depth After Completion:	6.69 feet bgs

Boring No.

UB17/MW17

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						SM		Gray silty SAND, trace gravel, moist FILL	
								1.2 - Brown/gray, with gravel	
			66					1.6 - Gray, with trace gravel	
				0.0	UB17-3				
				NS					
5									
						GW		5.4 - Dark brown/black sandy GRAVEL, sub-rounded, moist FILL	
						SM		5.9 - Dark gray silty SAND, moist FILL	
			80			CL		6.4 - Gray CLAY, moist	
						ML		7.0 - Gray fine sandy SILT, moist	
						CL		7.2 - Gray CLAY, moist	
								7.7 - 8.0 dark brown/gray	
10									
								Gray/brown mottled, CLAY, moist	
				0.0	UB17-11				
			100	NS					
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15-25	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	25	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	25	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 038		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB17/MW17**	
Date Started:	March 5, 2020		
Date Completed:	March 5, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:	21 feet bgs		
Water Depth After Completion:	6.69 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100			CL		Gray/brown mottled, CLAY, moist to wet 16.0 to 16.3 - Gray SILT, wet	
20			100	0.1	UB17-24	CH		Gray CLAY, wet	
25								25.0 - Bottom of Boring	
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15-25	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	25	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	25	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 038		**Monument Type:**	Flush	

Notes/Comments

Groundwater monitoring well sample MW17-20200305 collected

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	24 feet bgs
Water Depth After Completion:	11.12 feet bgs

Boring No.

UB18/MW18

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0									
			45	0.0	UB18-3	SW		Gray, fine to medium SAND with GRAVEL, moist	
5									
10								▼	
			30	0.2 NS	UB18-12	CL		Gray/ brown mottled CLAY, moist some interbedded lenses (<0.1 foot) of fine sand	
15									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15-30	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	32	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 354		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB18/MW18**	
Date Started:	March 5, 2020		
Date Completed:	March 5, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Soil	Seattle, Washington	
Water Depth at Time of Drilling:	24 feet bgs		
Water Depth After Completion:	11.12 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						CL			
20									
				0.3	UB18-24	CH		Gray CLAY, wet	
25			100	NS	UB18W-24				
30									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15-30	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	32	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 354		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB18/MW18**	
Date Started:	March 5, 2020		
Date Completed:	March 5, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Soil	Seattle, Washington	
Water Depth at Time of Drilling:	24 feet bgs		
Water Depth After Completion:	11.12 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			90	0.3	UB18-30	CH		Gray CLAY, wet	
								32.0 - Bottom of Boring	
35									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	15-30	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	32	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 354		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB19/MW19

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						SP		Gray fine SAND and GRAVEL, moist FILL	
			70	0.4		SC		2.3 - Green/gray CLAYEY SAND, trace GRAVEL, moist FILL	
				NS					
5			50			ML		7.2 Dark brown SILT, moist FILL	
10			100			CL		Gray/brown mottled CLAY, moist some lenses (<0.1') of fine SAND, approximately 1 per foot	
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	30	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 5, 2020
Date Completed:	March 5, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB19/MW19

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						CL		Gray/brown mottled CLAY, moist some lenses (<0.1') of fine SAND, approximately 1 per foot	
			100			ML		17.2 - Brown SILT, moist	
						CL		Gray/brown mottled CLAY, moist some lenses (<0.1') of fine SAND, approximately 1 per foot	
20				0.6	UB19-20				
				NS					
			100					21.5 - gray, wet	
						ML		Gray SILT, wet	
					UB19-24				
25						CH		Gray CLAY, moist to wet	
			100						
								29.0 - Gray fine SAND, moist to wet	
				0.1		SP		29.5 - Gray CLAY, moist to wet	
30				NS	UB19-30	CH		30.0 - Botttom of Boring	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Direct Push CAB Liner		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

Page:

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	March 12, 2020
Date Completed:	March 12, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Soil
Water Depth at Time of Drilling:	15-20 feet bgs
Water Depth After Completion:	14.70 feet bgs

Boring No.

UB20/MW20

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						SP-SM		Light brown medium SAND and GRAVEL, trace silt, moist	
5								No samples collected. Cuttings appear as fine SAND and SILT, trace gravel.	
10									
15									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	22-37	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	37	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	37	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 350		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB20/MW20**	
Date Started:	March 12, 2020		
Date Completed:	March 12, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Soil	Seattle, Washington	
Water Depth at Time of Drilling:	15-20 feet bgs		
Water Depth After Completion:	14.70 feet bgs		

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.0 NS	UB20-15	CH		Brown/gray mottled CLAY, moist	
20			100	0.0 NS	UB20-20			moist to wet; lens (<0.1') of gray medium SAND 21.6 - lens (<0.1') of gray medium SAND 21.8 - gray	
25			100	0.0 NS	UB20-25			25.3 - lens (<0.1') of gray medium SAND 25.7 - lens (<0.1') of gray medium SAND 26.5 - lens (<0.1') of gray medium SAND 26.7 - lens (<0.1') of gray medium SAND	
30									

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	22-37	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	37	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	37	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 350		**Monument Type:**	Flush	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project: Rainier Mall
Logged by: KMC
Date Started: March 12, 2020
Date Completed: March 12, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Soil
Water Depth at Time of Drilling: 15-20 feet bgs
Water Depth After Completion: 14.70 feet bgs

Boring No.
UB20/MW20

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			90	0.3 NS	UB20-30	SP		Gray medium SAND, wet 30.2 - 0.15' lens of gray CLAY, wet	
35			90	0.0 NS	UB20-35				
40								37.0 - Bottom of Boring	

Driller:	Boretech		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Hollow-Stem Auger		**Well Screened Interval:**	22-37	feet bgs
Sampler Type:	Split Spoon		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Industrial Sand	
Total Boring Depth:	37	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	37	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BKH 350		**Monument Type:**	Flush	

Notes/Comments

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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB21/MW21

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						ML		Light brown SILT, moist	
5			30						
10				0.2				Dark brown SILT with organics, moist to wet	
			50			CL		Gray/light brown mottled CLAY, moist	
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 048		**Monument Type:**	Flush	

Notes/Comments

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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB21/MW21

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.2		CL		Gray/light brown mottled CLAY , moist	
						ML		Gray/light brown mottled SILT, moist to wet	
						CL		Gray/light brown mottled CLAY, moist	
20			100	0.2		CH		Gray/light brown mottled CLAY, moist to wet	
								Gray	
25			100	0.2	UB21-25				
			100						
30				0.2	UB21-30	SP		Gray medium SAND, wet	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 048		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB21/MW21

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			100	0.2	UB21-34	SP		Gray medium SAND, wet	
								34.0 - Boring Completed	
35									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 048		**Monument Type:**	Flush	

Notes/Comments

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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB22/MW22

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								Asphalt/GRAVEL FILL	
						SM		Light brown SILTY fine SAND some GRAVEL, moist FILL	
5			15						
10				0.4				Dark brown SILT with organics, moist to wet	
			20			CL		Gray/light brown mottled CLAY, moist	
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 047		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB22/MW22

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						CL		Gray/light brown mottled CLAY, moist	
						ML		Gray/light brown mottled SILT, moist to wet	
			100	0.2		CL		Gray/light brown mottled CLAY, moist	
20						CH		Gray/light brown mottled CLAY, moist to wet	
			100	0.2					
						SP		Gray medium SAND, some GRAVEL, moist to wet	
25			100	0.2	UB22-25				
								No soil recovered below 27 feet. Expendable point used to drive well screen to depth.	
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 048		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 7, 2020
Date Completed:	April 7, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Concrete
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB23/MW23

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								Concrete/GRAVEL FILL	
						SM		Brown SILTY fine SAND trace GRAVEL, moist FILL	
5			10						
10						CL		Gray/light brown mottled CLAY, moist	
			40	0.5					
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	33	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 046		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB23/MW23

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.4		CL		Gray/light brown mottled CLAY, moist	
						ML		Gray/light brown mottled SILT, moist to wet	
						CL		Gray/light brown mottled CLAY, moist	
20			100	0.4		CH		Brown CLAY, moist to wet Gray	
25			100	0.2	UB23-25	SP		Gray medium SAND, moist to wet	
			100			CH			
30					UB23-30				

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	33	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 047		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB23/MW23

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30			100	0.2	UB23-33	CH		Gray CLAY, moist to wet	
						SP		Gray medium SAND, wet	
								34.0 - Boring Completed	
35									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	33	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 047		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	20.8 feet

Boring No.

UB24/MW24

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						SM		Light brown SILTY fine SAND some GRAVEL, moist	
5			30						
10						CL		Gray/light brown mottled CLAY, moist	
			50						
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	14 - 29	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	29	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	29	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 049		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB24/MW24

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			95			CL		Gray/light brown mottled CLAY, moist	
						SM			
20			100			CH		Light brown/some grey mottles CLAY, moist	
			100			CH		Gray SILTY CLAY, moist to wet	
25						CH		Gray CLAY, moist to wet	
			100			CH		Gray CLAY with interbedded lenses of SILTY fine SAND, moist to wet	
30								29.0 - Boring Completed	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	34	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 048		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB25/MW25

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								Asphalt/GRAVEL FILL	
								Gray SILT with GRAVEL, moist	
						ML			
			90	1.5					
5								No recovery 5 - 10	
10								Gray SILT with SAND and GRAVEL, moist	
			100	2.8					
						CL		Gray/light brown mottled CLAY, moist	
15									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	50	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB25/MW25

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	1.5		CH		Gray/light brown mottled CLAY, moist to wet	
20			100					Gray, wet	
25			100	1.3	UB25-25				
				1.2	UB25-27	SM		Gray, SILTY fine SAND, wet	
30						CH			

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	50	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB25/MW25

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						CH		Gray/light brown mottled CLAY, moist to wet	
						SP		Gray medium SAND with GRAVEL, moist	
			100						
				1.2	UB25-35				
35						CL		Gray CLAY, moist	
			100						
				1.1					
40									
			100						
				1.2					
45				1.0	UB25-45				

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	50	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 7, 2020
Date Completed: April 7, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB25/MW25

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
45			100	0.9		CL		Gray CLAY, moist	
50								50.0 - Bottom of Boring	

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	50	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB26/MW26

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
			0						
5			0					No recovery 0 - 10	
10			100	2.8		SP		Brown, SILTY fine SAND with GRAVEL, moist FILL	
15									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 339		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 10, 2020
Date Completed: April 10, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB26/MW26

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						SP		Brown, SILTY fine SAND with GRAVEL, moist FILL	
						CL		Gray/light brown mottled CLAY, moist	
			100						
20				0.7				moist to wet	
			100						
				1.2	UB26-25				
25						SP		Gray, medium SAND with gravel, wet	
			100						
30				1.0	UB26-30				

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB26/MW26

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						SP		Gray medium SAND, moist	
								Gray medium SAND with GRAVEL, moist	
			100						
				1.2	UB26-35				
35								Transitions from medium SAND to SILTY fine SAND	
			100						
						SM		Gray SILTY fine SAND, moist	
				1.1					
					UB26-40				
40						CL		Gray CLAY, moist	
			100						
				1.2					
45				1.0	UB26-45			45.0 - Boring Completed	

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLU 338		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: April 10, 2020
Date Completed: April 10, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB27

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
			50			SP		Brown medium SAND with GRAVEL, moist	
5									
			40	0.0	UB27-6				
10						CL		Gray/light brown mottled CLAY, moist	
			60	0.0	UB27-12				
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	17	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	N/A
Water Depth After Completion:	N/A

Boring No.

UB27

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100		UB27-17	CL		Gray/light brown mottled CLAY, moist	
								17.0 - Boring Completed	
5									
10									
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	17	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB28

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0								Asphalt/GRAVEL FILL	
			60			SP		Brown medium SAND with GRAVEL, moist	
5						CL		Light brown CLAY, moist	
			80			SM		Gray/light brown mottled SILTY fine SAND, moist to wet	
10				0.0	UB28-11	CL		Gray/light brown mottled CLAY, moist	
			100						
15				0.0	UB28-15			15.0 - Boring Completed	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	15	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	April 10, 2020
Date Completed:	April 10, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	N/A
Water Depth After Completion:	N/A

Boring No.

UB29

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
			75			SP		Brown medium SAND with GRAVEL, moist	
5				0.0	UB29-6				
			80			CL		Gray/light brown mottled CLAY, moist	
						SM		Dark brown SILTY fine SAND, wet	
10				0.0	UB29-11	CL		Gray/light brown mottled CLAY, moist	
			100						
15				0.0	UB29-15			15.0 - Boring Completed	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	15	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	May 15, 2020
Date Completed:	May 15, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB30/MW30

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
			25			GW		Dark gray/Black GRAVEL and SAND, moist FILL	
5			25						
10			80	0.7	UB30-12	ML		Gray/Brown, SANDY SILT with GRAVEL, moist FILL	
15									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	40	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 416		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: KMC
Date Started: May 15, 2020
Date Completed: May 15, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB30/MW30

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						ML		Brown, SILTY fine SAND with GRAVEL, moist FILL	
								16.0 - Abundant Organics	
			100	0.4		CL		Gray/Brown mottled CLAY, moist	
20						CH		Gray CLAY, moist to wet	
			100	0.3	UB30-23			23.0 - some intermixed fine SAND	
				0.4	UB30-24				
25						SP		Gray, fine SAND with gravel, wet	
					UB30-26				
						CL		Gray CLAY, moist	
			100						
30				0.7	UB30-30				

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	40	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 416		**Monument Type:**	Flush	

Notes/Comments
Gray/brown mottling indicates the presence of iron precipitates.

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project:	Rainier Mall
Logged by:	KMC
Date Started:	May 15, 2020
Date Completed:	May 15, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB30/MW30

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30									
				0.7	UB30-31	SP		Gray coarse medium SAND with GRAVEL, moist	
			90						
				0.7	UB30-34				
35				0.3	UB30-35				
			100			CL		Gray CLAY, moist	
				0.6	UB30-38				
				0.6	UB30-39				
40								40.0 - Boring Completed	
45									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	25 - 40	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	40	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	40	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 416		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: May 15, 2020
Date Completed: May 15, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB31/MW31

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						SW		Dark gray/Black GRAVEL and SAND, moist FILL	
			50	0.9		ML		Gray/Brown, SANDY SILT with GRAVEL, moist FILL	
5								Traces of debris (brick and tile)	
			90	1.1				10 to 12 - wet	
10								11.5 to 12.0 - Abundant Organics	
			65			CL		Gray CLAY, moist	
15									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 415		**Monument Type:**	Flush	

Notes/Comments
Drillers addded approximately 50 gallons of water to drive casing
Gray/brown mottling indicates the presence of iron precipitates.

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Project: Rainier Mall
Logged by: KMC
Date Started: May 15, 2020
Date Completed: May 15, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB31/MW31

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			95	1.0		CL		Gray CLAY, moist	
20			100					Gray CLAY, moist to wet	
								23.0 - some intermixed fine SAND	
				1.0	UB31-24	SP		Gray, medium SAND, moist to wet	
25						CL			
						ML		Gray SANDY SILT, moist to wet	
				1.2	UB31-26				
			100			SP		Gray medium SAND with GRAVEL, wet	
				1.2	UB31-28	ML		Gray SANDY SILT, moist to wet	
30									

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 415		**Monument Type:**	Flush	

Notes/Comments
Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall	**Boring No.**	
Logged by:	KMC	**UB31/MW31**	
Date Started:	May 15, 2020		
Date Completed:	May 15, 2020	**Site Address:**	
Checked by:	Richard Martin, LHG	4208 Rainier Avenue	
Surface Conditions:	Asphalt	Seattle, Washington	
Water Depth at Time of Drilling:			
Water Depth After Completion:			

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30								Gray CLAY, moist	
				1.2	UB31-31	CL			
				1.0	UB31-32				
			90						
35				0.3	UB31-35				
			100						
				0.5	UB31-37				
40									
			80						
				0.8	UB31-43				
45								45.0 - Boring Completed	

Driller:	Holocene		**Well/Auger Diameter:**	2/8	inches
Drilling Equipment:	Sonic		**Well Screened Interval:**	15 - 30	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	Sand	
Total Boring Depth:	45	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	30	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLH 415		**Monument Type:**	Flush	

Notes/Comments

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Project: Rainier Mall
Logged by: KMC
Date Started: June 3, 2020
Date Completed: June 3, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling: 17 feet
Water Depth After Completion:

Boring No.
UB32/MW32

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						SP		Light brown, medium SAND, some GRAVEL, moist	
			65	0.3	UB32-2				
5									
			75	0.0	UB32-7	ML		Gray SILT with SAND and GRAVEL, moist	
10									
			100			CL		Dark brown/gray CLAY, moist	
				0.0	UB32-13			Gray with brown mottling	
15									

Driller: Standard Geoprobe
Drilling Equipment: Direct Push
Sampler Type: Lined Core
Hammer Type/Weight:
Total Boring Depth: 20 feet bgs
Total Well Depth: 20 feet bgs
State Well ID No.: BLS 127

Well/Auger Diameter: 1/2.25 inches
Well Screened Interval: 5 - 20 feet bgs
Screen Slot Size: 0.010 inches
Filter Pack Used: Sand
Annular Seal: Bentonite
Surface Seal: Concrete
Monument Type: Flush

Notes/Comments
Gray/brown mottling indicates the presence of iron precipitates.

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: June 3, 2020
Date Completed: June 3, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB32/MW32

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15			100	0.0	UB32-18	CL		Moist to wet 0.2' lens of brown/gray mottled fine SANDY SILT, moist	
20								Bottom of Boring	
25									
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	5 - 20	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 127		**Monument Type:**	Flush	

Notes/Comments

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Project: Rainier Mall
Logged by: KMC
Date Started: June 3, 2020
Date Completed: June 3, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB33/MW33

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
			55	0.2	UB33-2	SP		Light brown, medium SAND, some GRAVEL, moist	
5				0.4	UB33-5	ML		Gray brown SILT with SAND and GRAVEL, some wood and brick, moist	
			25						
10						CL		Brown gray mottled CLAY, moist	
			100	0.4	UB32-12				
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	5 - 20	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 128		**Monument Type:**	Flush	

Notes/Comments
Gray/brown mottling indicates the presence of iron precipitates.

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: KMC
Date Started: June 3, 2020
Date Completed: June 3, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB32/MW32

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15						CL		15.0 to 15.5 wet	
			100	0.0	UB33-17.5			0.5' lens of brown fine SANDY SILT, moist to wet	
20								Bottom of Boring	
25									
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	1/2.25	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	5 - 20	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	0.010	inches
Hammer Type/Weight:			**Filter Pack Used:**	Sand	
Total Boring Depth:	20	feet bgs	**Annular Seal:**	Bentonite	
Total Well Depth:	20	feet bgs	**Surface Seal:**	Concrete	
State Well ID No.:	BLS 128		**Monument Type:**	Flush	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	KMC
Date Started:	June 3, 2020
Date Completed:	June 3, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB34

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						SP		Brown medium SAND with GRAVEL, moist	
			65	0.4	UB34-3				
5								Wet	
			60	0.6	UB34-7	CL		Gray CLAY, moist	
						ML		Gray/dark brown SILT with organics, moist	
10						CL		Gray/brown mottled CLAY, moist	
			100		UB34-13			0.2' lens of brown medium SAND, moist	
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	15	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

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Project:	Rainier Mall
Logged by:	KMC
Date Started:	June 3, 2020
Date Completed:	June 3, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	
Water Depth After Completion:	

Boring No.

UB35

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
						SP		Brown medium SAND , moist	
			50						
				1.2	UB35-4				
5								Wet	
								Gray CLAY, moist	
			50						
						ML		Gray/dark brown SILT with organics, moist	
				0.4	UB35-10	CL		Gray/brown mottled CLAY, moist	
10									
			95						
				0.3	UB35-14			0.2' lens of brown medium SAND, moist	
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	15	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Gray/brown mottling indicates the presence of iron precipitates.

Page:

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Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 28, 2020
Date Completed: October 28, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling: Not Measured
Water Depth After Completion: Not Measured

Boring No.
UB39

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
5								Soil not logged/sampled between 0 and 25 feet BGS	
10									
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

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Project:	Rainier Mall
Logged by:	Richard Martin, LHG
Date Started:	October 28, 2020
Date Completed:	October 28, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	Not Measured
Water Depth After Completion:	Not Measured

Boring No.

UB39

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15								Soil not logged/sampled between 0 and 25 feet BGS	
20									
25						ML		Gray, clayey SILT, trace sand, scattered silty sand layers (<0.25-inch), moist	
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
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Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 28, 2020
Date Completed: October 28, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB39

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						ML		Gray, clayey SILT, trace sand, scattered silty sand layers (<0.25-inch)	
						SP		Gray, slighty silty to silty, gravelly, fine to medium SAND	
35								35.0 - Boring Completed	
40									
45									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

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Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 28, 2020
Date Completed: October 28, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling: Not Measured
Water Depth After Completion: Not Measured

Boring No.
UB40

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
5								Soil not logged/sampled between 0 and 25 feet BGS	
10									
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
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Project:	Rainier Mall
Logged by:	Richard Martin, LHG
Date Started:	October 28, 2020
Date Completed:	October 28, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	Not Measured
Water Depth After Completion:	Not Measured

Boring No.

UB40

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15								Soil not logged/sampled between 0 and 25 feet BGS	
20									
25						ML		Gray, slightly clayey to clayey silty SAND to sandy SILT, trace organics	
30						SP		Gray, trace to slighty silty, gravelly, fine to medium SAND; layers of fine gravel and gravelly medium sand	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 28, 2020
Date Completed: October 28, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB40

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						SP		Gray, trace to slighty silty, gravelly, fine to medium SAND; layers of fine gravel and gravelly medium sand	
						SM		Gray, slightly clayey to clayey, fine sandy SILT to silty fine SAND; till-like	
35								35.0 - Boring Completed	
40									
45									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Page:
3/3

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 29, 2020
Date Completed: October 29, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling: Not Measured
Water Depth After Completion: Not Measured

Boring No.
UB41

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
5								Soil not logged/sampled between 0 and 25 feet BGS	
10									
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project:	Rainier Mall
Logged by:	Richard Martin, LHG
Date Started:	October 29, 2020
Date Completed:	October 29, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	Not Measured
Water Depth After Completion:	Not Measured

Boring No.

UB41

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15								Soil not logged/sampled between 0 and 25 feet BGS	
20									
25						ML		Gray, silty CLAY to clayey SILT; trace sand; scattered laminations of fine sand	
30						SP		Gray, trace to slighty silty, fine to medium SAND; trace gravel	

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 29, 2020
Date Completed: October 29, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB41

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						SP		Gray, trace to slighty silty, fine to medium SAND; scattered gravel	
						SP		Gray, trace to slighty silty, fine to coarse SAND; trace gravel	
						SP		Gray, trace to slightly silty, fine to medium SAND; grades to fine sand	
35								35.0 - Boring Completed	
40									
45									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 29, 2020
Date Completed: October 29, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling: Not Measured
Water Depth After Completion: Not Measured

Boring No.
UB42

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
0						AC		Asphalt/GRAVEL FILL	
5								Soil not logged/sampled between 0 and 25 feet BGS	
10									
15									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project:	Rainier Mall
Logged by:	Richard Martin, LHG
Date Started:	October 29, 2020
Date Completed:	October 29, 2020
Checked by:	Richard Martin, LHG
Surface Conditions:	Asphalt
Water Depth at Time of Drilling:	Not Measured
Water Depth After Completion:	Not Measured

Boring No.

UB42

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
15								Soil not logged/sampled between 0 and 25 feet BGS	
20									
25						ML		Gray, slightly clayey to clayey, silty fine SAND to fine sandy SILT	
						SP		Gray, trace to slightly silty, slightly gravelly, fine to medium SAND	
30									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:			**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Urban Environmental Partners llc
Diligent, responsive, and practical consulting!

Project: Rainier Mall
Logged by: Richard Martin, LHG
Date Started: October 29, 2020
Date Completed: October 29, 2020
Checked by: Richard Martin, LHG
Surface Conditions: Asphalt
Water Depth at Time of Drilling:
Water Depth After Completion:

Boring No.
UB42

Site Address:
4208 Rainier Avenue
Seattle, Washington

Depth (feet bgs)	Interval	Blow Count	% Recovery	PID (ppm)	Sample ID	USCS Class	Graphic	Lithologic Description	Well Construction Detail
30						SP		Gray, trace to slightly silty, slightly gravelly, fine to medium SAND	
						SP		Gray, fine to medium SAND; trace silt	
						SP		Gray, fine to coarse SAND; trace silt	
						SP		Gray, trace to slightly silty, fine to medium SAND; silt decreases with depth	
35								35.0 - Boring Completed	
40									
45									

Driller:	Standard Geoprobe		**Well/Auger Diameter:**	N/A	inches
Drilling Equipment:	Direct Push		**Well Screened Interval:**	N/A	feet bgs
Sampler Type:	Lined Core		**Screen Slot Size:**	N/A	inches
Hammer Type/Weight:	N/A		**Filter Pack Used:**	N/A	
Total Boring Depth:	35	feet bgs	**Annular Seal:**	N/A	
Total Well Depth:	N/A	feet bgs	**Surface Seal:**	N/A	
State Well ID No.:	N/A		**Monument Type:**	N/A	

Notes/Comments

Appendix C: TRS Design Plans for ERH

ELECTRICAL RESISTANCE HEATING DESIGN PACKAGE

PRELIMINARY

Not Approved for Construction

RAINER MALL PROPERTY
4208 RANIER AVE. SOUTH
SEATTLE, WASHINGTON 98118

Prepared by:

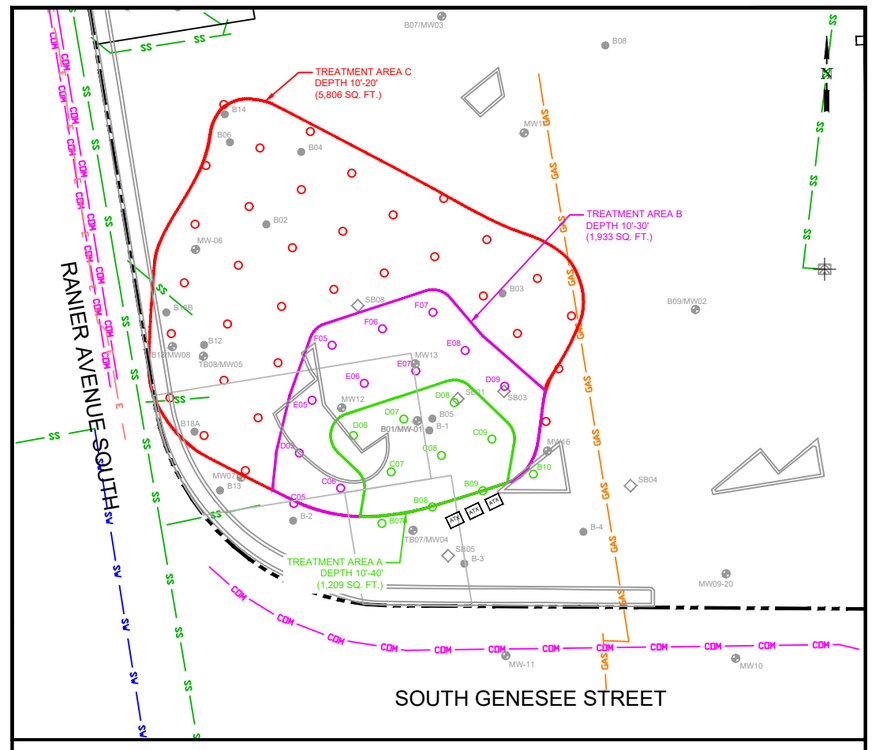
TRS Accelerating Value

MAY 2020

WASHINGTON

SITE LOCATION MAP

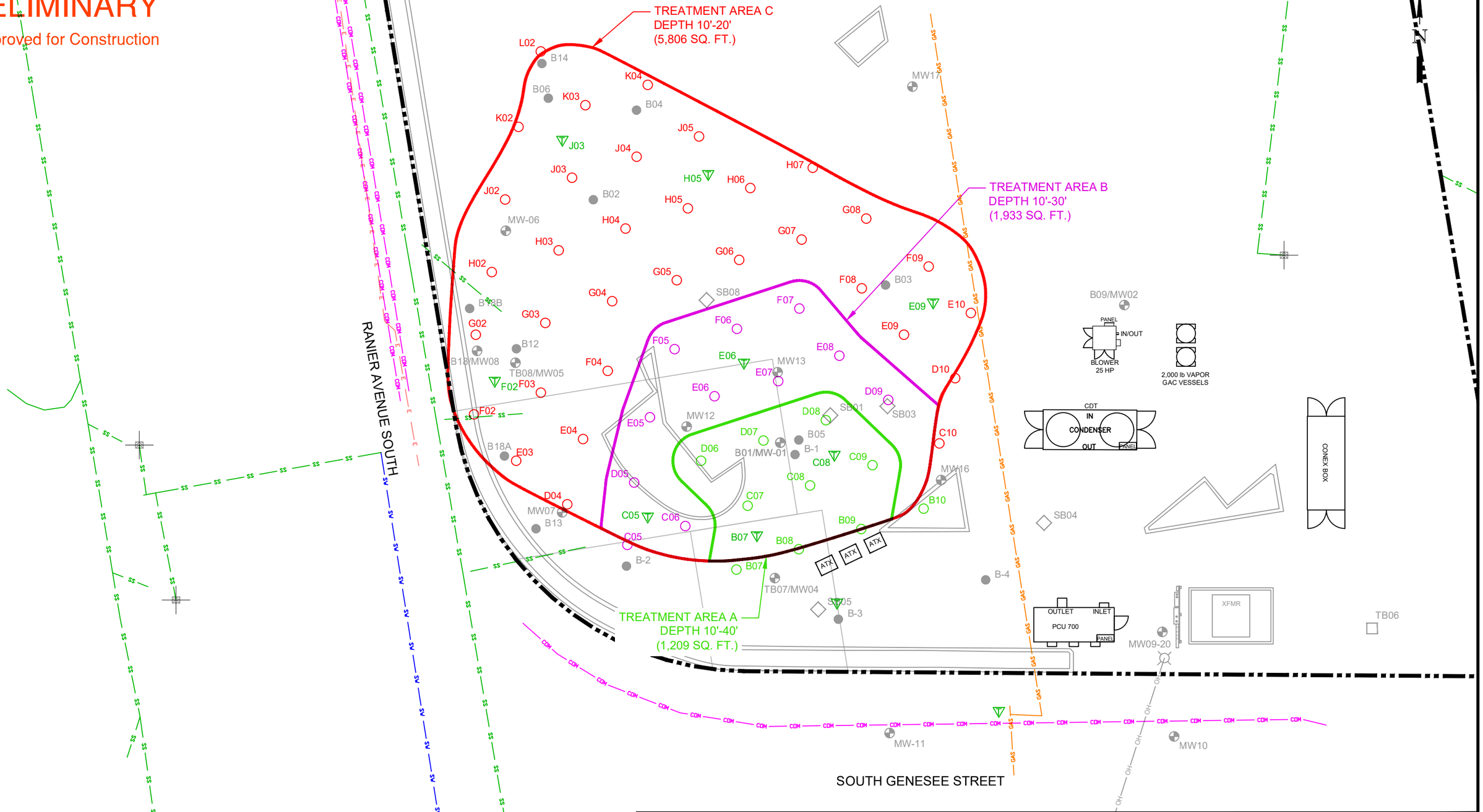
SHEET INDEX	
DRAWING NUMBER	**TITLE AND DESCRIPTION**
Y-1	SITE PLAN
Y-2	PROPOSED ELECTRICAL SERVICE LOCATION
M-1	ELECTRODE DETAIL TYPE A
M-2	ELECTRODE DETAIL TYPE B
M-3	ELECTRODE DETAIL TYPE C
M-4	TEMPERATURE MONITORING POINT DETAIL TYPE A
M-5	TEMPERATURE MONITORING POINT DETAIL TYPE B
M-6	AREA 1 TEMPERATURE MONITORING POINT DETAIL TYPE C
E-1	ELECTRICAL ONE-LINE DIAGRAM LEGEND
E-2	ELECTRICAL ONE-LINE DIAGRAM REQUIREMENTS
E-3	ELECTRICAL ONE-LINE DIAGRAM
E-4	ELECTRICAL ONE-LINE DIAGRAM



SITE PLAN

PRELIMINARY

Not Approved for Construction



LEGEND

- ELECTRODE (QTY. 54)
- TEMPERATURE MONITORING POINT (QTY. 8)
- EXISTING MONITORING WELL
- EXISTING BORING LOCATION

0 10 20 40

SCALE IN FEET

TRS Accelerating Value

TRS GROUP, INC. 338 COMMERCE AVE., SUITE 304, LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

SITE PLAN

APPROVED FOR CONSTRUCTION

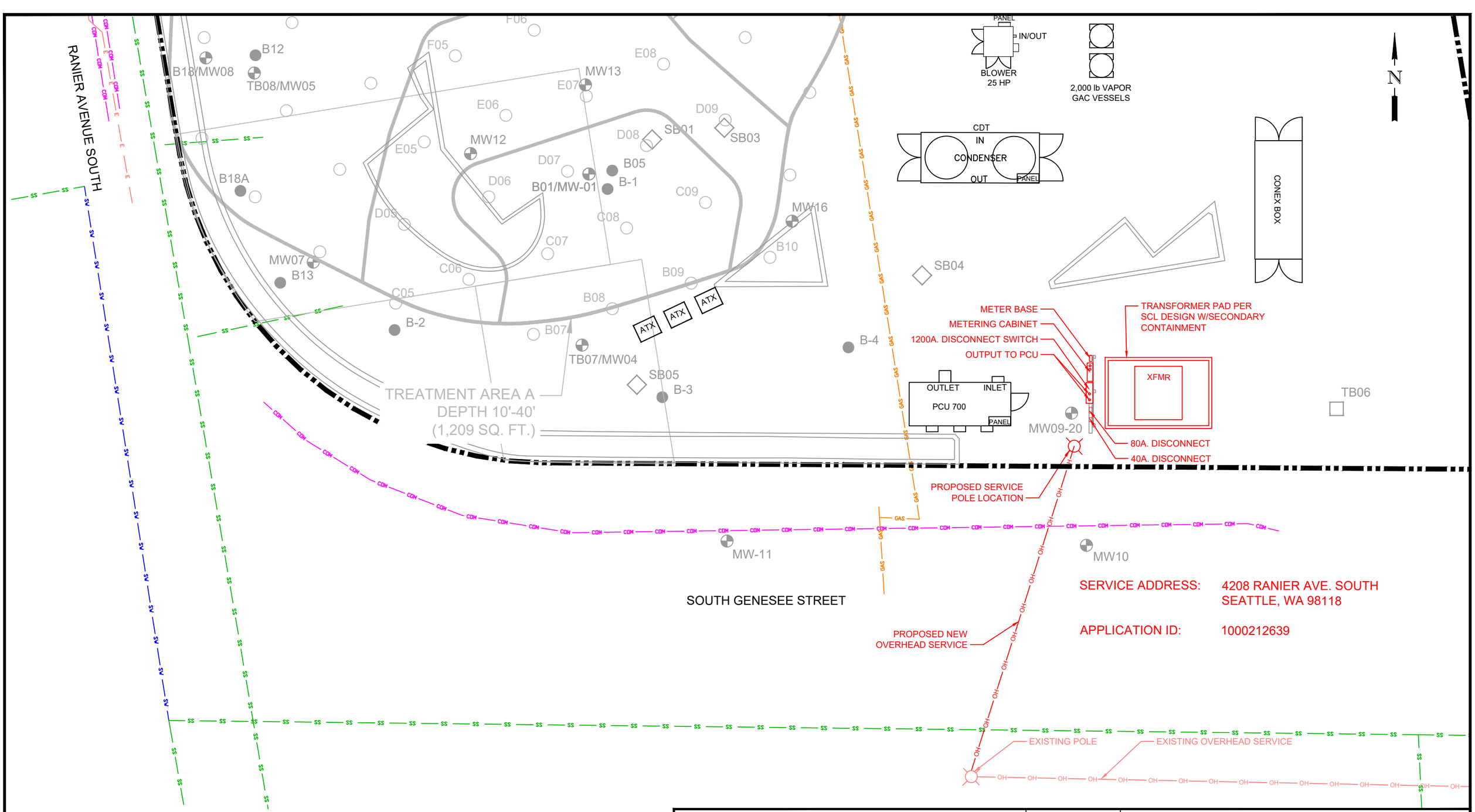
BY _____

DATE _____

DATE 2020.MAY.15

PROJECT WA.RAI.2136

SHEET Y-1



LEGEND

- EXISTING MONITORING WELL
- EXISTING BORING LOCATION
- ELECTRODES

PRELIMINARY

Not Approved for Construction

0 7.5 15 30

SCALE IN FEET

TRS Accelerating Value

TRS GROUP, INC. 338 COMMERCE AVE., SUITE 304, LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

PROPOSED ELECTRICAL SERVICE LOCATION

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

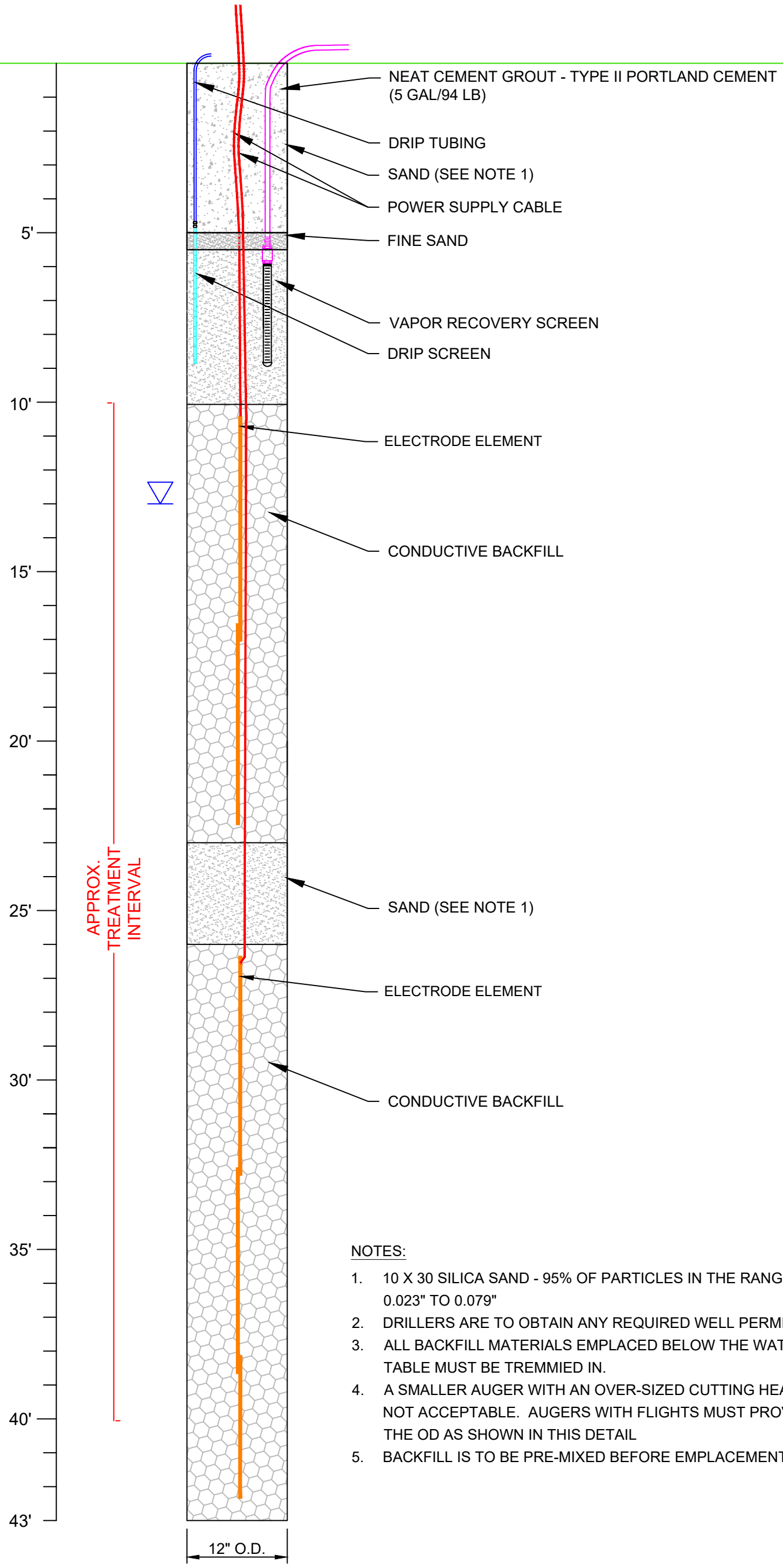
PROJECT WA.RAI.2136

SHEET Y-2

PRELIMINARY

Not Approved for Construction

ABOVE GRADE BORED ELECTRODE
TYPE A
(TYPICAL OF 9)



NOTES:

1. 10 X 30 SILICA SAND - 95% OF PARTICLES IN THE RANGE OF 0.023" TO 0.079"
2. DRILLERS ARE TO OBTAIN ANY REQUIRED WELL PERMITS.
3. ALL BACKFILL MATERIALS EMPLACED BELOW THE WATER TABLE MUST BE TREMMIED IN.
4. A SMALLER AUGER WITH AN OVER-SIZED CUTTING HEAD IS NOT ACCEPTABLE. AUGERS WITH FLIGHTS MUST PROVIDE THE OD AS SHOWN IN THIS DETAIL
5. BACKFILL IS TO BE PRE-MIXED BEFORE EMPLACEMENT.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRODE DETAIL
TYPE A

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

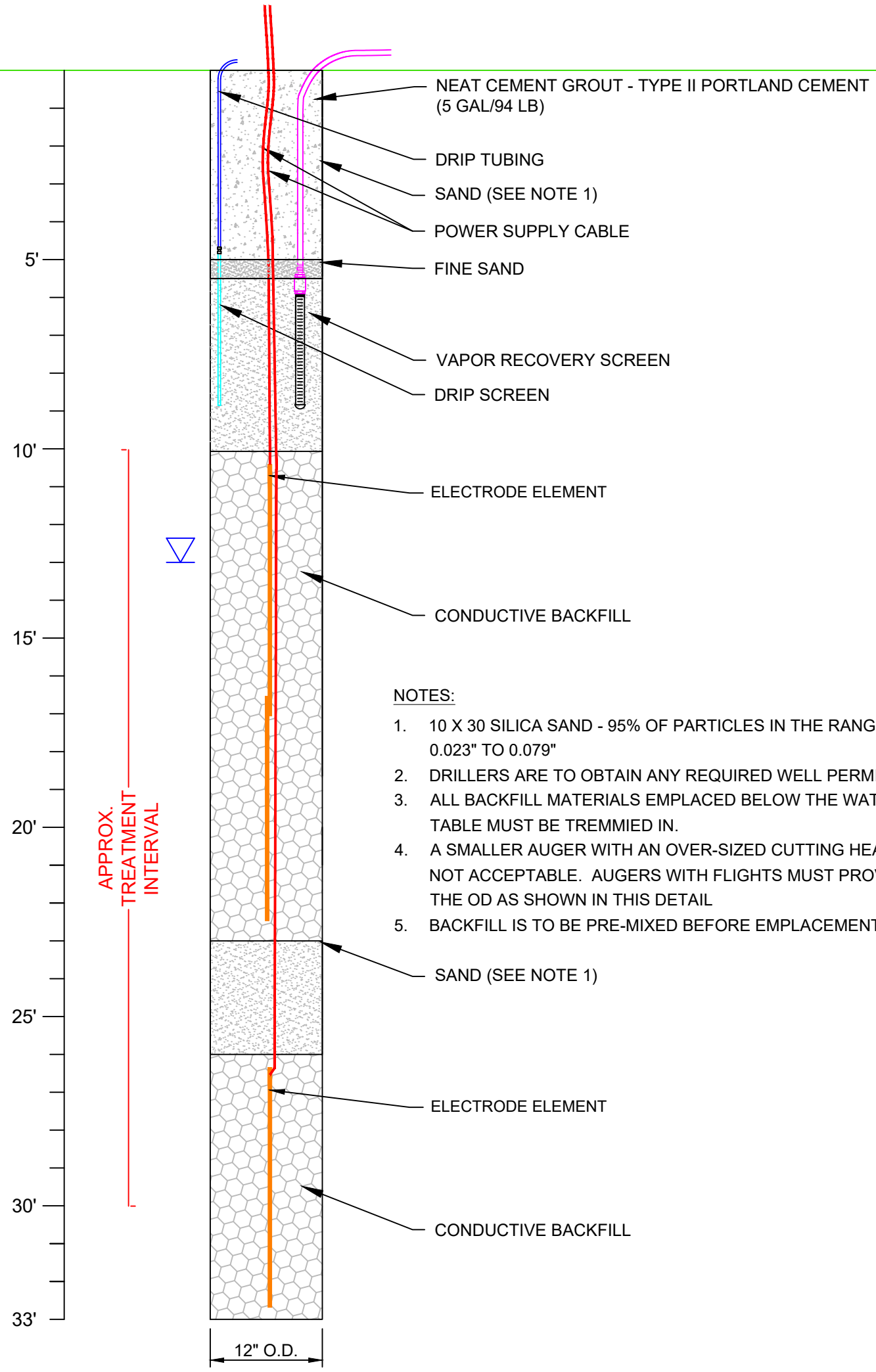
PROJECT WA.RAI.2136

SHEET M-1

PRELIMINARY

Not Approved for Construction

ABOVE GRADE BORED ELECTRODE
TYPE B
(TYPICAL OF 13)



NOTES:

1. 10 X 30 SILICA SAND - 95% OF PARTICLES IN THE RANGE OF 0.023" TO 0.079"
2. DRILLERS ARE TO OBTAIN ANY REQUIRED WELL PERMITS.
3. ALL BACKFILL MATERIALS EMPLACED BELOW THE WATER TABLE MUST BE TREMMIED IN.
4. A SMALLER AUGER WITH AN OVER-SIZED CUTTING HEAD IS NOT ACCEPTABLE. AUGERS WITH FLIGHTS MUST PROVIDE THE OD AS SHOWN IN THIS DETAIL
5. BACKFILL IS TO BE PRE-MIXED BEFORE EMPLACEMENT.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRODE DETAIL
TYPE B

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

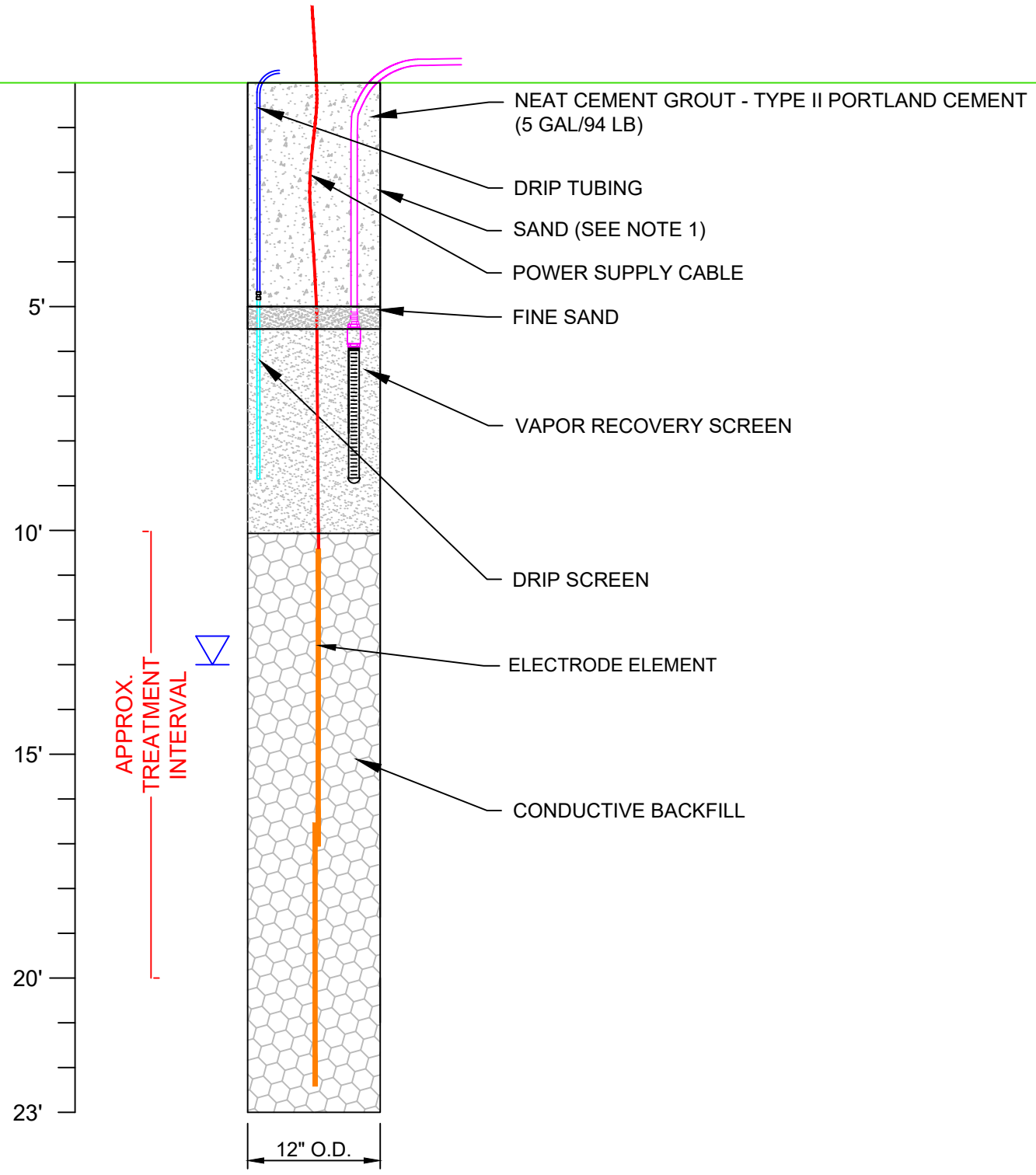
PROJECT WA.RAI.2136

SHEET M-2

PRELIMINARY

Not Approved for Construction

ABOVE GRADE BORED ELECTRODE
TYPE C
(TYPCAL OF 32)



NOTES:

1. 10 X 30 SILICA SAND - 95% OF PARTICLES IN THE RANGE OF 0.023" TO 0.079"
2. DRILLERS ARE TO OBTAIN ANY REQUIRED WELL PERMITS.
3. ALL BACKFILL MATERIALS EMPLACED BELOW THE WATER TABLE MUST BE TREMMIED IN.
4. A SMALLER AUGER WITH AN OVER-SIZED CUTTING HEAD IS NOT ACCEPTABLE. AUGERS WITH FLIGHTS MUST PROVIDE THE OD AS SHOWN IN THIS DETAIL
5. BACKFILL IS TO BE PRE-MIXED BEFORE EMPLACEMENT.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRODE DETAIL
TYPE C

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

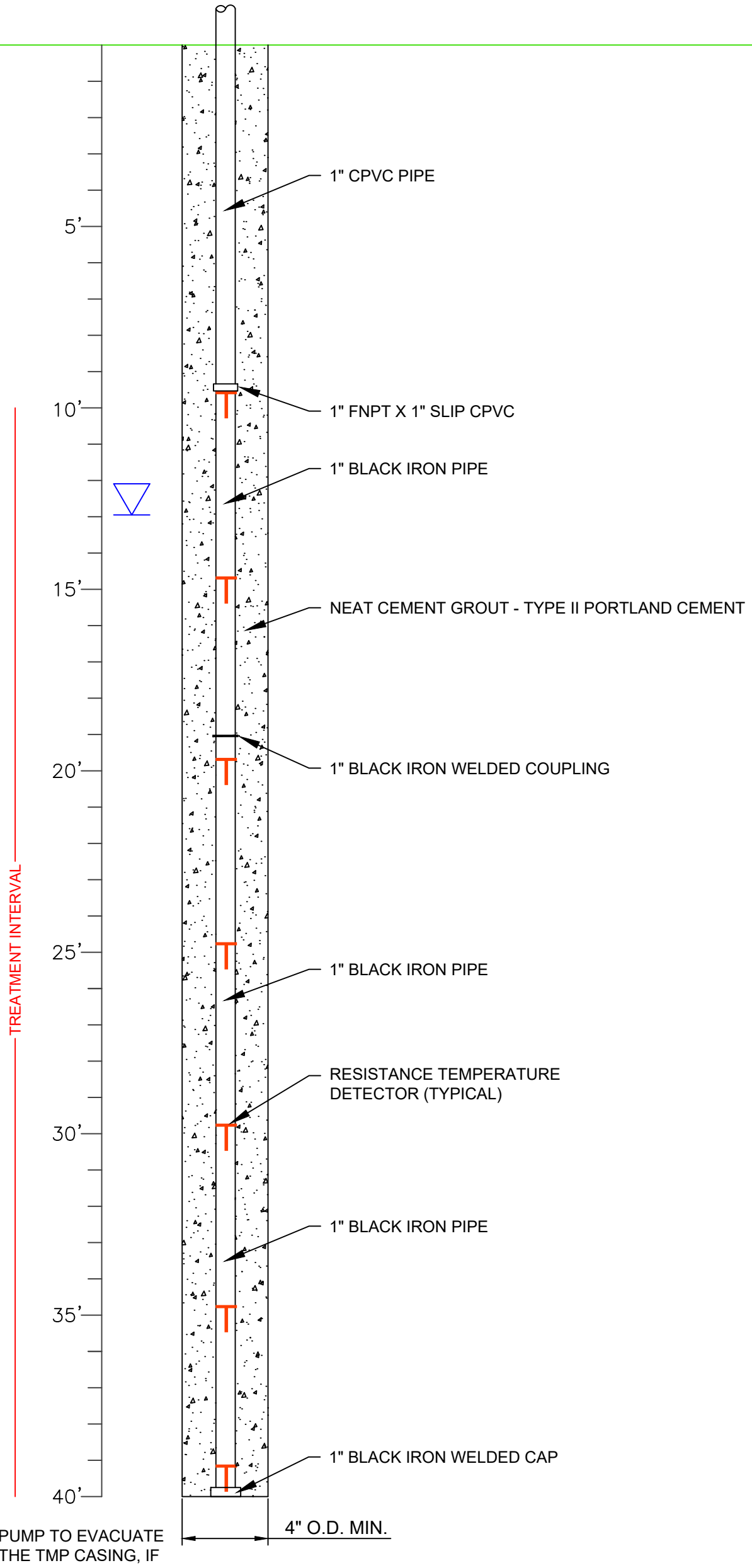
PROJECT WA.RAI.2136

SHEET M-3

PRELIMINARY

Not Approved for Construction

ABOVE GRADE TEMPERATURE MONITORING POINT TYPE A (TYPICAL OF 2)



NOTE:
USE A WATER PUMP TO EVACUATE WATER FROM THE TMP CASING, IF WATER IS OBSERVED.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

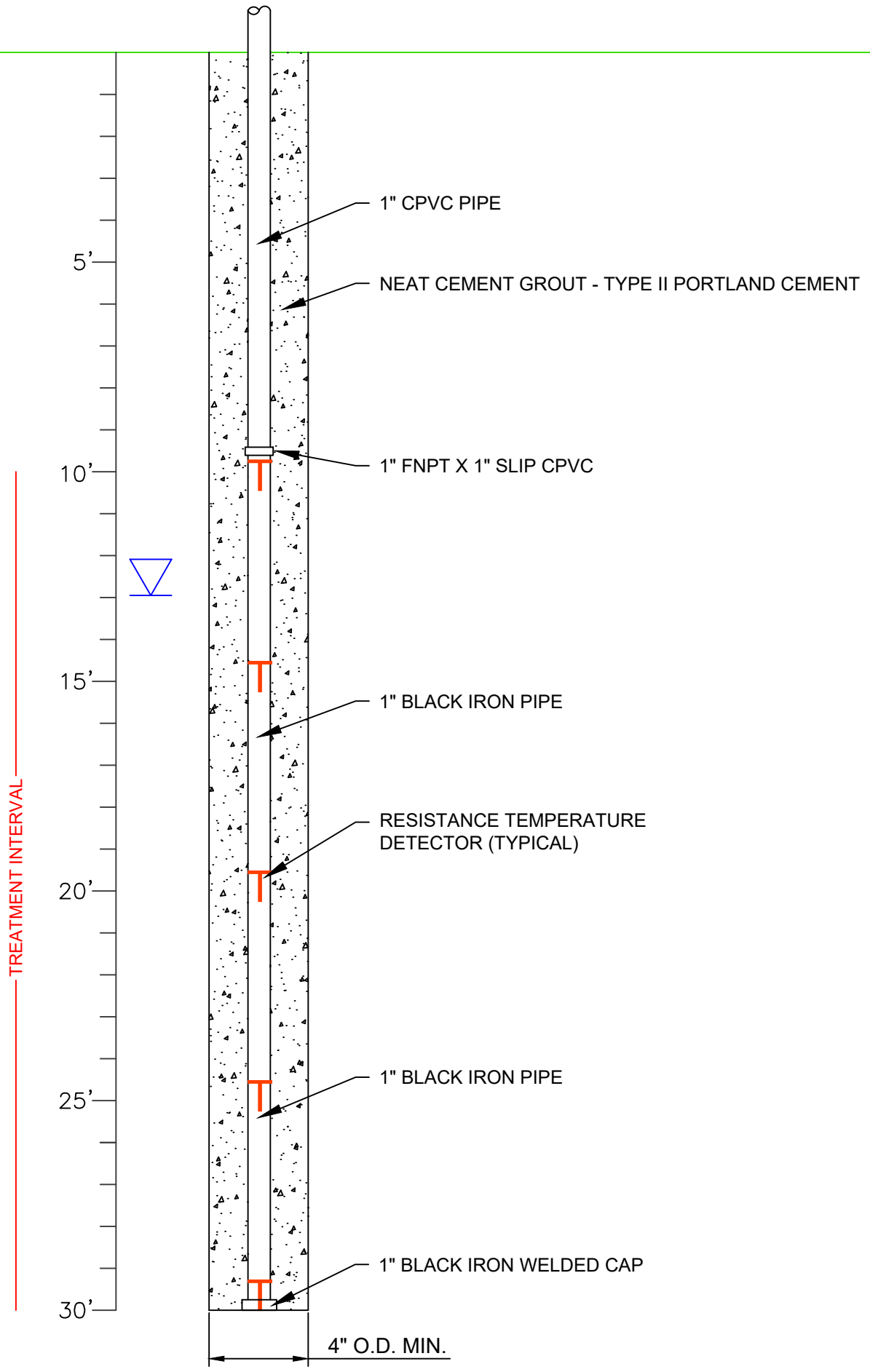
TEMPERATURE MONITORING POINT DETAIL TYPE A

APPROVED FOR CONSTRUCTION BY _____ DATE _____	DATE 2020.MAY.15	PROJECT WA.RAI.2136
	SHEET M-4	

PRELIMINARY

Not Approved for Construction

ABOVE GRADE TEMPERATURE MONITORING POINT TYPE B (TYPICAL OF 2)



NOTE:
USE A WATER PUMP TO EVACUATE WATER FROM THE TMP CASING, IF WATER IS OBSERVED.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

TEMPERATURE MONITORING POINT DETAIL TYPE B

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

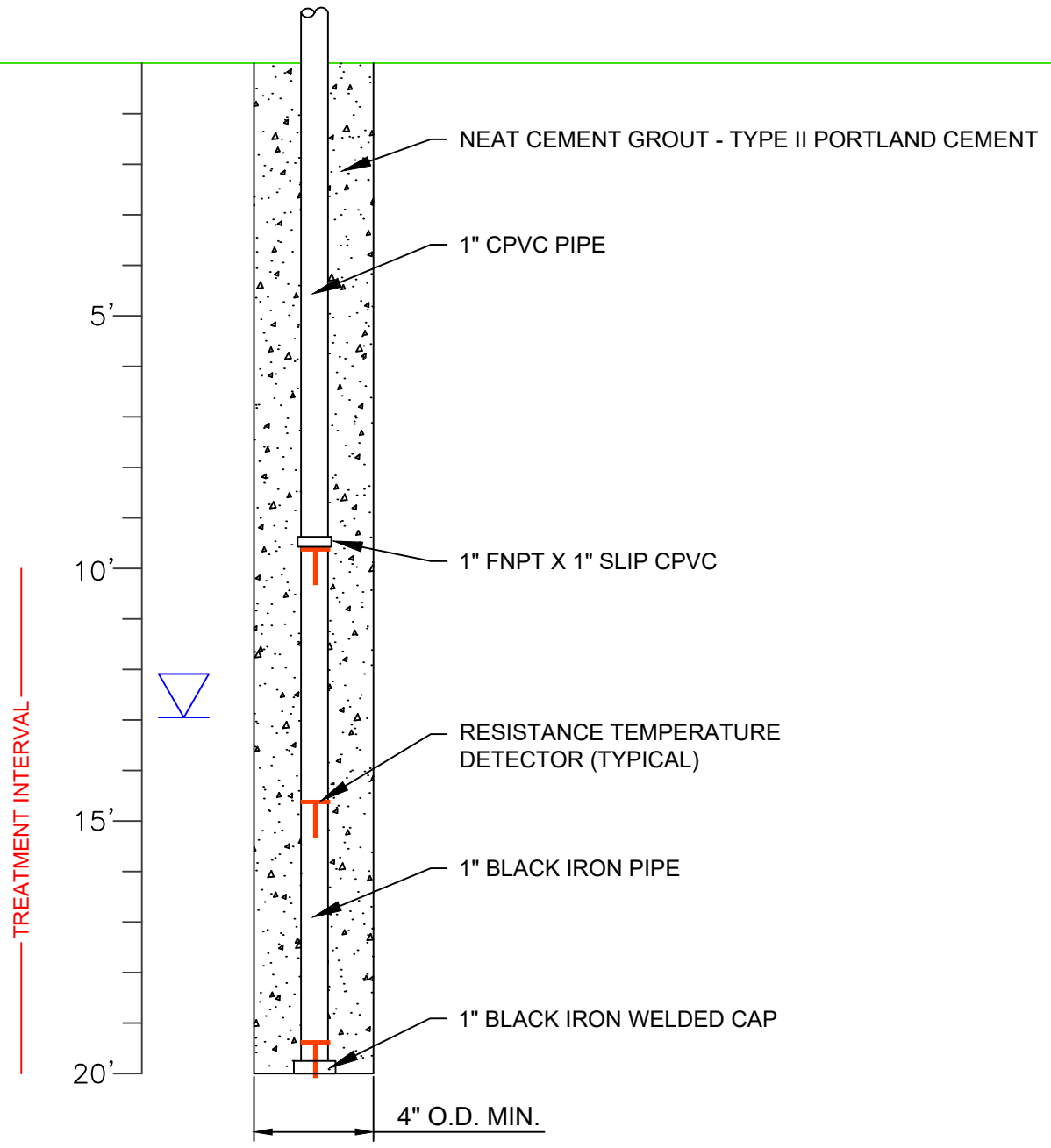
PROJECT WA.RAI.2136

SHEET M-5

PRELIMINARY

Not Approved for Construction

ABOVE GRADE
TEMPERATURE MONITORING POINT
TYPE C
(TYPICAL OF 4)



NOTE:
USE A WATER PUMP TO EVACUATE WATER FROM THE TMP CASING, IF WATER IS OBSERVED.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

TEMPERATURE MONITORING POINT DETAIL
TYPE C

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

PROJECT WA.RAI.2136

SHEET M-6

PRELIMINARY

Not Approved for Construction

SYMBOLS

UTILITY METERING

MEDIUM VOLTAGE
DRAW OUT CIRCUIT
BREAKER

FUSE

DISCONNECT SWITCH

FUSED DISCONNECT
SWITCH

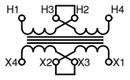
CIRCUIT BREAKER

N.O. CONTACT
A NORMALLY OPEN (N.O.) CONTACT IS OPEN WHEN IT, OR THE DEVICE OPERATING IT, IS IN A DE-ENERGIZED

N.C. CONTACT
A NORMALLY CLOSED (N.C.) CONTACT IS CLOSED WHEN IT, OR THE DEVICE OPERATING IT, IS IN A DE-ENERGIZED STATE OR RELAXED STATE.

THERMAL OVERLOAD

PUMP/MOTOR



TRANSFORMER

VARIABLE OUTPUT
3 PHASE
TRANSFORMER

GENERATOR

AUTOMATIC
TRANSFER SWITCH

ABBREVIATIONS

A	AMPERES
ATS	AUTOMATIC TRANSFER SWITCH
FLA	FULL LOAD AMPS
HP	HORSEPOWER
KW	KILOWATT
KVA	KILOVOLT-AMPERES
KV	KILO-VOLTS
N.O.	NORMALLY OPEN
OL	OVERLOAD
P	POLE
PH, Ø	PHASE
SRGAC	STEAM REGENERATED GAS ACTIVATED CARBON
VAC	VOLTAGE ALTERNATING CURRENT
VFD	VARIABLE FREQUENCY DRIVE
V	VOLT
W	WATTS, WIRE

NOTE: THIS IS AN ALL INCLUSIVE LEGEND SHEET. NOT ALL SYMBOLS/ABBREVIATIONS WILL APPEAR ON EACH SHEET.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRICAL ONE-LINE DIAGRAM LEGEND

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

PROJECT WA.RAI.2136

SHEET E-1

PRELIMINARY

Not Approved for Construction

GENERAL NOTES

1. PERFORM INSTALLATION IN ACCORDANCE WITH THE CURRENT EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA). EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL).
2. PROVIDE AND MAINTAIN A CLEAR WORKING SPACE ABOUT ELECTRIC EQUIPMENT IN ACCORDANCE WITH NEC ARTICLES 110.26 AND 110.34.
3. PROVIDE CIRCUIT BREAKERS WITH UL LISTED INTERRUPTING RATING (RMS SYMMETRICAL AMPERES) GREATER THAN THE AVAILABLE FAULT CURRENT SHOWN IN THE SHORT CIRCUIT REPORT.
4. PROVIDE PADLOCKING PROVISIONS FOR EACH TWO AND THREE POLE CIRCUIT BREAKERS.
5. USE #12AWG OR LARGER CONDUCTORS FOR POWER WIRING.
6. USE #14AWG OR LARGER CONDUCTORS FOR CONTROL WIRING UNLESS OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS.
7. LIMIT USE OF ELECTRICAL METALLIC TUBING (EMT) AND SCHEDULE 40 PVC CONDUIT TO AREAS WHERE IT WILL NOT BE SUBJECT TO PHYSICAL DAMAGE.
8. USE LIQUID TIGHT FLEXIBLE METAL CONDUIT FOR FLEXIBLE CONNECTIONS TO EQUIPMENT OUTDOORS.
9. USE INTERMEDIATE METALLIC CONDUIT (IMT) OR RIGID GALVANIZED STEEL CONDUIT (RGS) OR SCHEDULE 80 PVC CONDUIT FOR WORK EMBEDDED IN CONCRETE OR EXPOSED TO PHYSICAL DAMAGE. THESE CONDUIT TYPES MAY BE USED IN ALL APPLICATIONS WHERE SCHEDULE 40 PVC OR EMT WOULD BE APPROPRIATE, AT THE DISCRETION OF THE DESIGN ENGINEER.
10. USE THE FOLLOWING CONDUCTOR COLOR CODES.

	240/120V	208Y/120V	480Y/277V	MED VOLTAGE	ELECTRODE CABLES
PHASE A	BLACK	BLACK	BROWN	RED	RED W/ELECTRODE MARKER
PHASE B	RED	RED	ORANGE	YELLOW	YELLOW W/ELECTRODE MARKER
PHASE C		BLUE	YELLOW	BLUE	BLUE W/ELECTRODE MARKER
NEUTRAL	WHITE	WHITE	GRAY		
EQUIP, GND	GREEN/BARE	GREEN/BARE	GREEN/BARE	GREEN/BARE	

ISOLATED GROUND SHALL BE GREEN WITH YELLOW TRACER.

11. USE ONLY COPPER CONDUCTORS.
12. POWER CONDUCTORS 10AWG AND SMALLER SHALL BE SOLID. POWER CONDUCTORS 8AWG AND LARGER SHALL BE STRANDED
13. FOR NON-ELECTRODE CIRCUITS, PROVIDE TYPE THHN/THWN WIRE INSULATION. XHHW INSULATION MAY BE USED FOR 1AWG AND LARGER. TYPE W AND DLO CABLE MAY BE USED FOR CIRCUITS WHICH REQUIRE FLEXIBILITY. CONDUCTORS THAT REQUIRE FLEXIBILITY ARE PERMITTED TO BE STRANDED REGARDLESS OF CONDUCTOR SIZE. USE OF WIRE FERRULES ON UN-LUGGED FLEXIBLE CABLE IS REQUIRED. SOW CABLE IS PERMITTED FOR SKID POWER FEEDERS.
14 . ARRANGE CONNECTIONS FOR SINGLE PHASE CIRCUITS TO ACHIEVE THREE PHASE LOAD BALANCE WITHIN 10% OF THE AVERAGE PHASE LOAD CURRENT FOR SCR POWERED LOADS.
15. ARRANGE CONNECTIONS FOR SINGLE PHASE CIRCUITS TO ACHIEVE THREE PHASE LOAD BALANCE WITHIN 20% OF THE AVERAGE PHASE LOAD CURRENT FOR NON-SCR POWERED LOADS.
16. INSTALL OUTDOOR EQUIPMENT TO BE WEATHERPROOF AND TO EXCLUDE BIRDS AND RODENTS WITH A MAXIMUM ½" DIAMETER UNPROTECTED OPENINGS IN ENCLOSURES.
17. TEST CONDUCTORS FOR CONTINUITY AND FREEDOM FROM SHORTS AND UNINTENTIONAL GROUNDS.
18. ELECTRICAL MATERIALS AND CONSTRUCTION SHALL CONFORM TO TRS GROUP INC STANDARD CONSTRUCTION SPECIFICATIONS WHERE APPLICABLE.
19. IF A CONFLICT ARISES BETWEEN THE FIELD CONDITIONS AND THESE GENERAL ELECTRICAL REQUIREMENTS, STOP WORK AND CONTACT THE PROJECT ENGINEER.
20. TIE-INS TO EXISTING POWER SYSTEMS WILL BE PERFORMED BY OTHERS, WORKING UNDER THE DIRECTION OF A LOCALLY LICENSED ENGINEER OR UTILITY AUTHORITY. SEE TRS ELECTRICAL CONTRACTING SPECIFICATION FOR ADDITIONAL REQUIREMENTS IF PERFORMED BY TRS SUBCONTRACTOR.

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRICAL ONE-LINE REQUIREMENTS

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

PROJECT WA.RAI.2136

SHEET E-2

PRELIMINARY

Not Approved for Construction

DESIGN AND INSTALLATION BY UTILITY AND/OR OTHERS

EXISTING TBD KV CIRCUIT
ISC 3P TBD A - TBD X/R
ISC SLG TBD A - TBD X/R

SUBCONTRACTOR OR UTILITY TO PROVIDE ISC AND X/R

SUBCONTRACTOR OR UTILITY TO PROVIDE FUSE RATING AND MODEL NUMBER

xxx

TBD kV

TBD kVA

480V
3P,3W

METER CABINET
CT=1000AMP

1200A DISC. SWITCH
NEMA 3R STAINLESS STEEL ENCLOSURE
FUSED @ 1000A

PRIMARY CONNECTION BY OTHERS
4(500MCM/PHASE) MAX

2000AF
1400AT ADJ. TRIP

BUS

1200:5
3

TEST JACK

MAIN CONTACTOR

800A(PH)

480V

855KVA

X X, X

4000:1
3

TEST JACK

1000V 300A

2/0 TYPE W AWG (VARIABLE)

ENGINEERING HOLD NO. 2

TYPICAL ELECTRODE BRANCH

TRS CTRL
50P 52a
RIO HST

3-1/C-#8

504CB
4A

.75 kVA
480/120V XFMR
INTERNAL
CONTROL PWR.

112CB
80A

110CB
40A

106CB
25A

504CB
4A

0.75 kVA
480/120V XFMR
INTERNAL
CONTROL PWR.

552CB
20A

7.5 kVA
480/120V XFMR
INTERNAL
LIGHTS/HTRS

PCU 700-2
SUPPLIED BY TRS
SERVICE REQUIREMENTS:
480 VAC
3 PHASE, 1028 FULL LOAD AMPS
CONNECT UTIL NEUTRAL TO PCU GROUND BUS
BLOWER AND CONDENSER BONDED TO PCU GROUNDING BUSS, PCU CONNECTED TO GROUNDING ROD PER NEC SPECS

ELECTRICAL LOAD SUMMARY

LOAD	NUMBER		CONNECTED LOAD		LOAD FACTOR		DESIGN LOAD
ERH ELECTRODES (HIGH TRIAD)	3	X	16.5 KVA	X	1.25	=	61.9 KVA
ERH ELECTRODES (REMAINDER)	51	X	16.5 KVA	X	1.00	=	841.5 KVA
CONDENSER	1	X	60 KVA	X	1.00	=	60 KVA
BLOWER	1	X	30.8 KVA	X	1.00	=	30.8 KVA
			TOTAL PEAK ELECTRODE LOAD			=	**903.4 KVA**
			TOTAL DESIGN LOAD			=	**994.2 KVA**

NOTES

1. GROUND CABLE SIZES ARE MINIMUMS
2. LIMIT AVERAGE ELECTRODE POWER TO 40.4 KVA PER ELECTRODE

DRAWING HOLDS

1. ENGINEERING HOLD PENDING OPTION SELECTION AND TRANSFORMER SELECTION.
2. ENGINEERING HOLD PENDING OPTION SELECTION.
3. ENGINEERING HOLD PENDING SETTINGS.

100A DISC. SWITCH
NEMA 3R STAINLESS STEEL ENCLOSURE
FUSED @ 80A

3/C #2 SOW + #8 GND (TBD)

CDT-XX
CONDENSER

71 FLA/80 MCA

SEE DWG. E-4

60A DISC. SWITCH
NEMA 3R STAINLESS STEEL EN
FUSED @ 45A

3/C #6 SOW + #8 GND (TBD)

B25-X
BLOWER

37 FLA/XX MCA

SEE DWG. E-4

TRS Accelerating Value

TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	C. CROWNOVER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE RANIER MALL PROPERTY
LOCATION SEATTLE, WASHINGTON
CLIENT CLIENT NAME

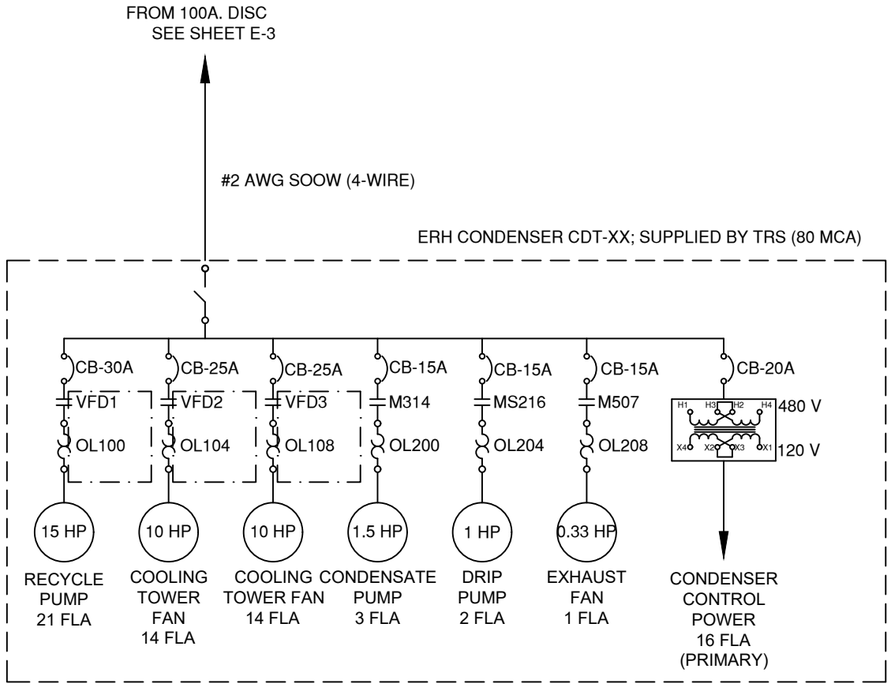
ELECTRICAL ONE-LINE DIAGRAM

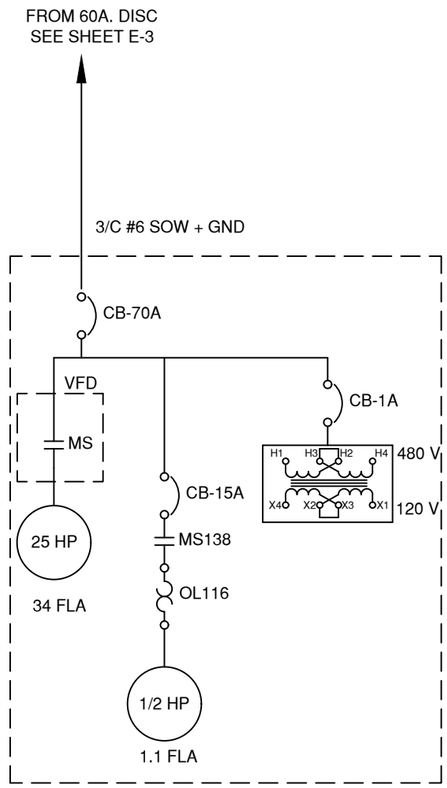
APPROVED FOR CONSTRUCTION
BY _____
DATE _____

DATE 2020.MAY.15
PROJECT WA.RAI.2136
SHEET E-3

PRELIMINARY

Not Approved for Construction





TRS GROUP, INC. PO BOX 737 LONGVIEW, WA 98632

DESIGNED BY	D. SEILER
DRAWN BY	A. PEABODY
CHECKED BY	PENDING APPROVAL
PROJECT MANAGER	TRS PERSONNEL
QSAT REVIEW	xx/xx/xx

SITE	RANIER MALL PROPERTY
LOCATION	SEATTLE, WASHINGTON
CLIENT	CLIENT NAME

ELECTRICAL ONE-LINE DIAGRAM

APPROVED FOR CONSTRUCTION

BY _____

DATE _____

DATE 2020.MAY.15

PROJECT WA.RAI.2136

SHEET E-4

Appendix D: TRS Soil and Groundwater Sampling Protocols

TRS Accelerating Value	STANDARD OPERATING PROCEDURE	PROCEDURE No: 3.1

Procedure Title: # Hot Groundwater Sampling

Author:	TRS Team	**Issue Date:**	4/22/08

Revisions:

Date	Initials	Revision Description	Revision #
12/15/14	TP	Annual Review, MW access caution	6
12/4/17	GK	Annual review; procedure updates	7
12/02/19	GK	Annual Review, revised sample rate to 0.2 L/m, added steam reference	8

Reviewed and Approved by (initial and date):

SOP/ Revision #	Safety & Quality		Engineering	
Original	4/22/08		4/22/08	
REV 5	7/27/12		7/27/12	
REV 6	1/21/16		1/21/16	
REV 7	12/4/17		12/4/17	
REV 8		12/2/2019		12/2/2019

1.0 PURPOSE

This standard operating procedure (SOP) provides uniform procedures for the safe collection of representative groundwater samples during or after the application of electrical resistance heating (ERH), Thermal Conduction Heating (TCH), or other *in situ* thermal remediation (ISTR) applications. This procedure specifically addresses sampling of groundwater that has been heated during the thermal remediation process.

2.0 SCOPE

This SOP provides the relevant information and steps for the collection of groundwater samples during or after the application of ISTR using modified low-flow sampling procedures. This SOP draws information primarily from the United States Environmental Protection Agency's (USEPA's) groundwater issue paper, Low-Flow (minimal drawdown) Ground-Water Sampling Procedure (Puls and Barcelona, 1996). Modifications to the EPA methodology have been made to accommodate groundwater temperatures that have been elevated from the application of ISTR. Only personnel trained to the minimum requirements outlined in **Section 7.0** of this SOP are authorized to collect hot groundwater samples at TRS ISTR project sites.

The USEPA guidance document recommends continual monitoring of water levels during the purge and sample process to ensure that minimal drawdown is occurring (Puls and Barcelona, 1996). Due to the safety hazards associated with opening groundwater monitoring wells where heated groundwater is present at ISTR project sites, groundwater level measurements (depth to groundwater) will not be collected as part of hot groundwater sampling activities. If the TRS project site has been constructed with pressure transducers to monitor groundwater gradients, readings from the transducers will be monitored as feasible to minimize groundwater drawdown. If previous sampling records or hydrogeologic data is available, this information shall be used to develop target flow rates for the groundwater sampling effort.

These procedures assume that dedicated sample tubing and pumping systems for each monitoring well have been established prior to application of electrical energy to the subsurface.

Caution - Access to groundwater monitoring wells during a TRS ISTR application is prohibited without TRS management approval. If intrusive work is required to complete the sampling efforts, or minimally accessing (removing) a well cap, an additional activity hazard analysis (AHA) must be created specific to the site and activity and reviewed and approved by the TRS project manager (PM), TRS Safety & Quality Manager (SQM), and, the TRS authorized employee approving the Start-Up Checklist (SUCL).

Samples collected using this SOP are generally used for optimizing system performance. Samples collected using this procedure may also be used for regulatory compliance and/or site closure.

TRS Group, Inc. (TRS) personnel shall use this procedure in conjunction with site-specific Health and Safety Plans (HASP), sample analysis plans, and permit requirements. These are standard (i.e., typically applicable) operating procedures that may be varied or changed as required, dependent on-site conditions, equipment limitations, permit requirements, or limitations imposed by the procedure. The ultimate procedures, including any deviations from this SOP, shall be documented on the groundwater sampling form.

3.0 DEFINITIONS

Authorized employee

Any designated employee who locks out or tags out equipment in order to perform servicing or maintenance. This person must have completed the mandatory Lockout/Tagout (LOTO) training described in SOP 1.1 LOTO to be qualified as an authorized worker. Only an authorized worker installs and removes his or her own lock and tag as required by this program.

Competent Person

Any designated employee who has been trained in proper procedures for hot groundwater sampling at thermal remediation sites. This person must have completed the mandatory training outlined in **Section 7.0** to be qualified as a competent person.

ERH – Electrical Resistance Heating

ERH is a process whereby soils and groundwater are heated by passing an electrical current through the subsurface volume to be remediated.

TCH – Thermal Conduction Heating

TCH is a process whereby soils and groundwater are heated with electric heaters placed as an array into the subsurface volume to be remediated.

Bladder Pump

Submersible pump with external control unit used for pumping fluids at greater depths. The bladder pump consists of an internal flexible bladder that is positioned within a rigid pump body constructed of stainless steel. The inner bladder is equipped with one-way inlet and outlet valves and passively fills with water when the pump is at depth by virtue of hydrostatic pressure. Following the fill cycle, compressed air from a cylinder or compressor at the wellhead is delivered to the pump through tubing and is used to compress the bladder. The applied pressure then causes the flexible bladder to compress and closes the bottom check valve, forcing water from the bladder into the discharge tubing. During a vent cycle, the pressure is released from the drive tubing. The bladder returns to its initial state as water re-enters the pump, while the top check valve prevents water already in the discharge tubing from falling back into the bladder. The pumping sequence consists of repeated fill/compress cycles, using a pneumatic controller positioned at the wellhead.

LOTO

Lockout/Tagout. The practice of using a tag for visibility and awareness in conjunction with placement of a keyed device ("lock") on an energy isolating device, in accordance with TRS SOP 1.1, Lockout/Tagout to prevent the unwanted activation of mechanical or electrical equipment. Lockout ensures the equipment being controlled cannot be operated until the lock is removed.

Low-Flow Purging

A USEPA approved purge-and-sample method used to minimize stress on the formation (minimal drawdown) which results in less mixing of stagnant casing water with formation water. Additional advantages of using low-flow purging methods include the following:

- Samples are more representative of actual contaminant loading
- Disturbance at the sampling point is minimal which minimizes sampling artifacts
- Less operator variability occurs between sampling events
- Decreased amount of investigation-derived waste (IDW) is produced
- Need for filtration is reduced
- Sample consistency is increased
- Only small volumes are removed from the well, making flashing in the well less likely

Flow-rates during low-flow purging/sampling are site-specific, based on hydrology, but are generally in the order of 0.1 to 0.2 liters per minute (L/min). Proper screen location, screen length, well construction and well development techniques may impact the effectiveness of low-flow purging. (Puls and Barcelona, 1996). The total volume of water removed from the well should be minimized to the extent practicable to avoid flashing of groundwater in the well which will produce erroneous data. These factors must be considered when developing a consistent, site-specific groundwater sampling procedure.

Multi-probe and Flow-Through Cell

The flow through cell allows for in-line sampling of water quality parameters with the Multi-probe to determine stabilization for water sampling. At a minimum, groundwater quality parameters include pH, conductivity, temperature, dissolved oxygen (DO), and turbidity. Examples of multi-probes used for collecting water quality parameters include the Horiba U-22 and YSI 556 (shown below).

Peristaltic Pump

A positive displacement pump used for pumping fluids. Generally, flexible tubing is fitted inside a circular pump casing. A rotor with a number of "rollers", "shoes", or "wipers" attached to the external circumference compresses the flexible tube. As the rotor turns, the part of tube under compression closes thus forcing the fluid to move through the tube.



SHSO

Site Health and Safety Officer

Trip Blank

The purpose of trip blanks it to identify any potential contamination of samples during sample handling and shipment. These blanks are prepared in the laboratory by filling a volatile organic analysis (VOA) bottle with distilled/deionized water. Trip blanks shall accompany shipment of empty vials to the site and shipment of samples back to the laboratory.

VOA Vials

EPA recommended glass sample containers used to collect liquid samples for laboratory analysis. Volatile organic analysis (VOA) vials have a nominal volume of 40 milliliters (mL) and are manufactured of clear or amber borosilicate glass. Depending on type of analysis being conducted, the VOA vials may contain small amounts of preservative when shipped from the laboratory. When collecting samples in VOA vials, fill the vial completely full (ensure that a meniscus has formed at the top of the vial before securing the cap) and check that there are no air bubbles in the closed sample. If there is a preservative present, use caution to not overfill the vial.

4.0 EQUIPMENT LIST

The required equipment for groundwater sampling may differ from this SOP based on the requirements set by the local regulatory oversight agency. Typically, the required equipment will be as follows:

1) Groundwater Sampling Field Form and indelible pen.
2) Safety Glasses with side shields. Additional option: full face-shield (wear over safety glasses).
3) Cotton Gloves with nitrile over-gloves. Cotton gloves should be worn to protect against water having high temperatures (wear under outer nitrile gloves).
4) Site-specific personal protective equipment (PPE) requirements. Refer to site-specific HASP.
5) Pump and operating components:
    a) Peristaltic pump utilized when the depth to water is 20 feet below ground surface (ft bgs) or less. Dedicated tubing shall be installed prior to ISTR application.
    b) Dedicated bladder pump with compressed air for depth to groundwater greater than 20 feet. Dedicated pumps shall be installed prior to ISTR application.
6) Tubing (installed prior to ISTR application):
    a) Stainless steel and Silicone tubing (Masterflex®) for use with the peristaltic pump. Silicone tubing should be used only above the ground surface at the pump head in order to minimize potential for degradation by contaminants. The silicone tubing is then connected to the previously installed stainless steel tubing.
    b) Dedicated bladder pumps and tubing if using a bladder pump. Reminder: bladder pumps should have been installed prior to the start of ISTR operations.
    c) Caution – Once ISTR heating begins; wellhead access is prohibited without prior TRS management approval. See **Section 2.0** for details regarding the administrative process for monitoring well wellhead removal.
7) Cooler with ice, (one to two 10-pound bags of ice).
8) 10-ft length of ¼-inch (outside diameter) stainless steel tubing.
9) One-ft length of four-inch diameter pipe.
10) Tray or container for ice bath.
11) Field water quality measuring equipment w/flow-through cell or similar device for monitoring groundwater parameters (pH, conductivity, ORP, temperature, DO, etc.) and calibration standards.
12) Turbidity meter.
13) Buckets for purge water.
14) Sample containers (with preservative as required by the laboratory analytical method), labels, and chain-of-custody forms (as required by the laboratory for the analysis). Pre-printed labels are generally available from the laboratory if requested in advance.
15) Scissors or tubing cutter (for cutting tubing lengths).
16) Packaging material and shipping labels.
17) LOTO equipment as described in TRS SOP 1.1.

5.0 HOT GROUNDWATER SAMPLING PROCEDURES

Groundwater purging is generally accepted as a required component of groundwater sampling in order to remove non-representative water from the well casing (Puls and Barcelona, 1996). Low-flow purging (or micro-purging) and sampling techniques will be used to minimize the impact on groundwater chemistry and collect representative samples. This technique also reduces the amount of investigation-derived waste (IDW) produced from a well.

Generally, low-flow purging is considered to have been accomplished once the water quality parameters monitored have stabilized to within a 10 percent margin of error. Water quality parameters should be recorded at a frequency of intervals between 3 and 5 minutes until parameter stabilization occurs. The key to successful micro-purging is to minimize draw-down in the monitoring well (less than 0.33 feet). Due to the need for sealed monitoring wells during the thermal remediation process, special care should be administered to purge flow rates. **Purge flow rates are preferred to be between 0.1 and 0.2 L/min whenever possible**.

5.1 Safety Considerations

There are certain hazards associated with ISTR during the remediation of soil and groundwater. These hazards include possible contact with hazardous voltage, steam, hot water, or hazardous chemicals. Exposure to these hazards can be mitigated through engineering controls and strict adherence to documented procedures and safety protocols, such as the following restrictions:

- For sample integrity, ground water sampling is performed while the ISTR power control unit (PCU) is off-line. The ISTR PCU output must be off and LOTO applied.
- Extreme temperatures, hot water, and steam may be encountered when collecting groundwater samples; the use of the proper personal protective equipment (PPE) is mandatory and caution is advised.
- Dedicated tubing and pumping systems shall be established prior to application of electrical energy to the subsurface.
- Refer to the site-specific Sampling and Analysis Plan (SAP) and HASP for site-specific requirements and restrictions.
- Personnel shall be trained on hazards and engineering controls associated with hot groundwater and potentially pressurized wells prior to sampling. Potential hazards include steam, hot groundwater, hot mud/soil, heated sampling equipment. Personnel should also be familiar with general site hazards identified in the site-specific HASP.

Refer to the site-specific Sampling and Analysis Plans (SAPs) and HASP for site-specific requirements and restrictions.

Caution: Exposure to hot groundwater and steam possible

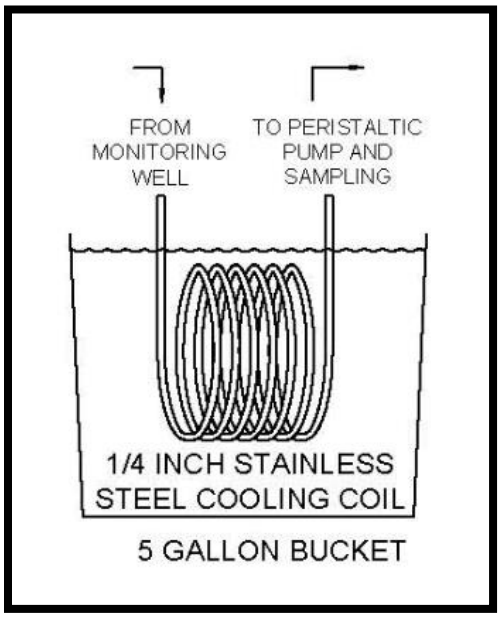
The removal of water and from a groundwater monitoring well can change the temperature/pressure conditions existing in the well by reducing the hydrostatic head in the well allowing hot water and steam to flash within the monitoring well casing. Improper sealing of the monitoring well wellhead may produce steam or hot groundwater leaks at the connection point.

5.2 Ice Bath Construction

Groundwater heated through the thermal remediation process presents both a potential safety hazard and a potential concern for collecting representative samples. If a boiling or near-boiling liquid is collected in a volatile organic analysis (VOA) vial, the formation of air bubbles as the sample cools within the VOA vial renders the sample non-representative. Additionally, hot liquids collected in the VOA vial may result in failure of the VOA septum.

The ice bath is designed to cool the groundwater prior to sample collection while limiting the impact on groundwater chemistry and contaminant concentrations. Cooling the groundwater prior to sample collection allows for both the safe handling of highly elevated water temperatures and prevents the formation of volatile organic compound (VOC) bubbles in the VOA vial after sample collection.

Prior to initial sampling, a cooling coil shall be constructed by wrapping a 10-ft length of ¼-inch outside diameter stainless steel tubing 6 full turns around a 4-inch diameter pipe. The ends of the tubing shall be fashioned such that both ends of the tubing extend upward, as shown in the figure below.



5.3 Pumps

Peristaltic pumps are used for purging and sampling wells that have a depth to water of 20-ft bgs or less. During the construction of the ISTR system, a dedicated ¼-inch sample tube will be set within the well and a ¼-inch stainless steel sample valve will be installed in the surface well cap for sampling with a peristaltic pump. Prior to commencing any ISTR operations, the well caps will be inspected for proper construction and installation and the well cap should not be removed during ISTR operations and/or sampling. Installation of the sample valve is mandatory in order to prevent steam from escaping from the well during ISTR application.

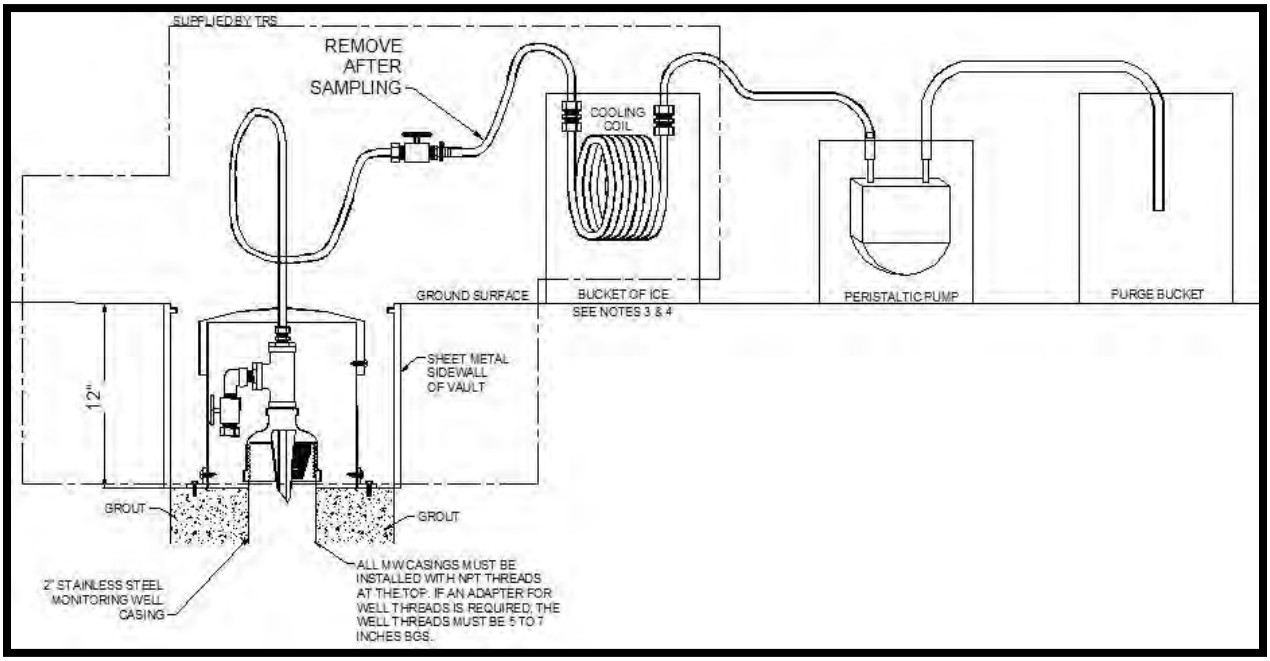
Pneumatically operated bladder pumps will be used for purging and sampling wells that with depth to water greater than 20 feet. The well head completion will be modified to allow for two tubes to pass independently through the sealed well head assembly. One tube will be used to deliver compressed air to the pump and the other tube will be used for sample recovery.

Either dedicated bladder pumps with Teflon® tubing or dedicated stainless steel tubing for use with a peristaltic pump will be installed prior to initiating heating of the ISTR treatment volume. The use of pre-installed, dedicated sample equipment will reduce the risk of exposure to steam, hot water, or contaminants, since the well head will not have to be opened.

Refer to the site-specific work plan or client directives on specific placement/depth of the sample tubing intake or dedicated pump in monitoring wells.

5.4 Well Head Construction

The TRS wellhead construction contains mandatory features that support the safe and representative collection of groundwater samples on a heated ISTR site. The detailed features of the Groundwater Monitoring Well are shown below.



This monitoring well head design provides the ability to collect groundwater samples from a screened monitoring well without needing to open the well head increasing exposure to steam and hot water. Once heating has commenced, entry to the wellhead is **prohibited** without TRS senior management approval (see **Section 2.0**).

Please note the relief valve at the well head is for venting purposes and used ***ONLY*** when accessing the interior of the monitoring well becomes necessary. This valve should ***NOT*** be opened prior to sampling as this may change the hydrostatic head pressure within the monitoring well and cause flashing within the monitoring well, resulting in unrepresentative groundwater samples. Should the valve be opened prior to sampling, additional time may be required for the well to stabilize before the collection of groundwater samples. Dependent on groundwater recharge rates, this stabilization period could range from hours to days.

5.5 Sample Collection Approach

For GW sampling, TRS typically extend stainless steel or Teflon™ tubing into the water table connected to a stainless steel, specialty wellhead and collect the groundwater samples by peristaltic pump. The groundwater partially flashes within the sample tube during recovery but the cooling coil re-condenses it so there is no VOC loss since heated GW contains almost zero dissolved gases.

Do not sample steam and air

Sampling personnel must be careful to make sure the tube extends fully into the water table to avoid collecting steam and air from inside the well casing. If steam and air are recovered from above the water table, rather than collecting groundwater, it causes the contaminant concentrations in the samples to be much higher than what is actually in the groundwater (opposite of what you would instinctively think). This occurs because there is mostly steam and very little air in the well casing and VOCs volatilize at a higher proportion in the steam. When the steam is condensed, it shows much higher concentrations than are typically in the groundwater. For example, 1 part per million (ppm) trichloroethene (TCE) in groundwater will boil to create steam that contains about 0.6 milligrams (mg) of TCE per liter of steam, but that one liter of steam condenses to only 0.6 mL of water so when that steam is condensed it can make it appear like the groundwater contains 1,000 mg/L of TCE rather than 1 mg/L. When the stainless steel or Tefon™ tube is submersed in the groundwater, the data are very comparable to that of water collected by submersible pump. However, flashing can occur throughout the entire depth of a monitoring well, so unusually high VOC concentrations can still be obtained by sampling a well by pumping too quickly or reducing the head in the well too dramatically when the sample collection point is well below the groundwater elevation. Sampling at a slow rate with as small of a volume removal as practicable from the wells will help produce quality samples.

5.6 Groundwater Sampling

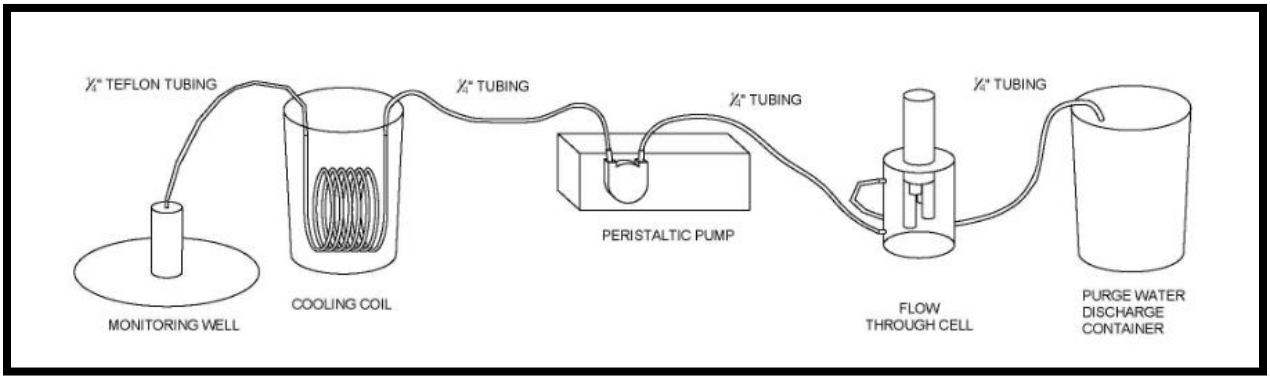
The TRS project team must coordinate, in advance, with all applicable parties to schedule an interruption to the ISTR application. The PM and SHSO shall determine a site-specific interruption period. Sampling shall be completed in order from the wells having the lowest anticipated concentrations of contaminants of concern (COC) to wells having the highest anticipated COC concentrations (usually from exterior wells to boundary control wells to wells located within the source area).

The groundwater sampling procedure is as follows:

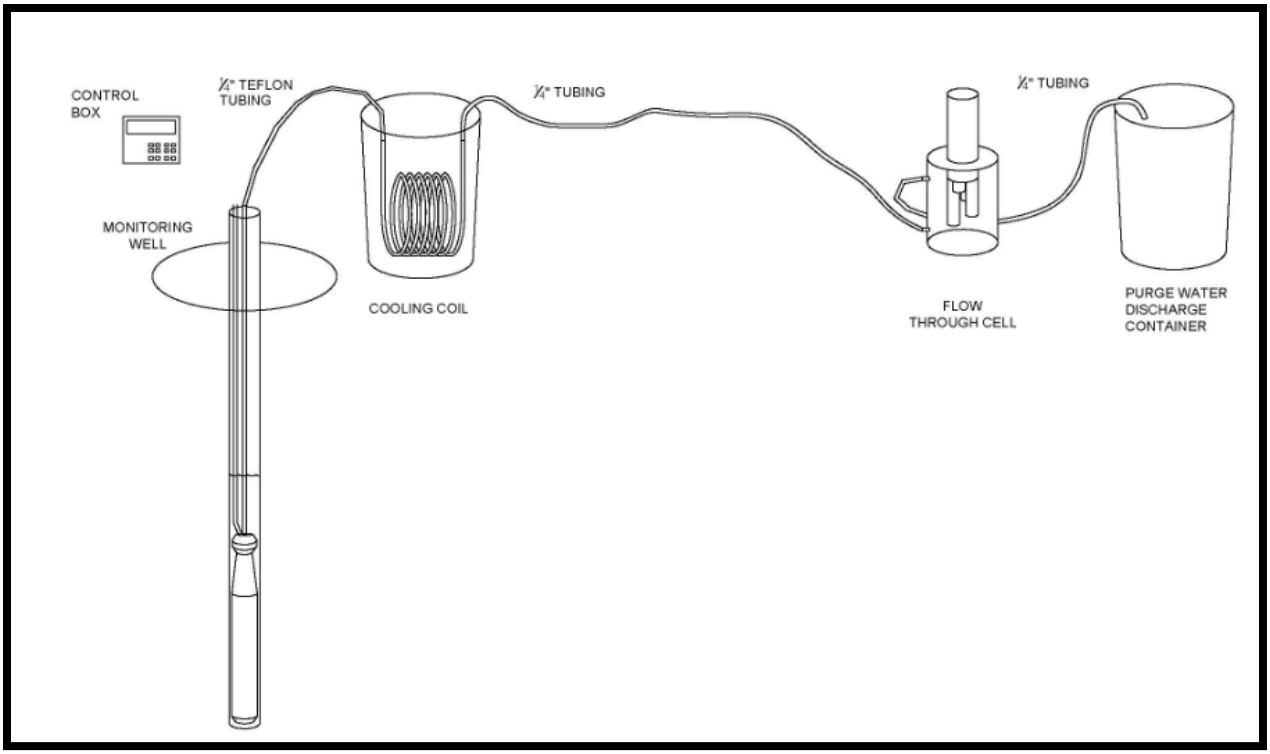
1) Calibrate probes used to monitor water quality parameters according to the manufacturer's instructions (as necessary). Calibration frequencies should adhere to the manufacturer's recommendations. Document all calibrations done to the probes used. Documentation should include: date, time, calibration solutions used, solution expiration dates, solution lot numbers, calibration results, outliers, and any illuminating comments.
2) Cease ISTR application to the treatment volume and perform LOTO procedures on the ISTR PCU as required by site-specific protocols. Note: LOTO application shall only be completed by personnel who have been trained and certified by TRS in accordance with SOP 1.1.
3) Connect ¼-inch sample tubing from the valve on the well to the cooling coil and place the coil in a bucket or cooler with ice to form the ice bath as described in **Section 5.2**.

4) Connect the pump to the cooling coil. For wells with a depth to water less than 25 feet, connect the cooling coil and peristaltic pump to the monitoring wellhead. For wells having a depth to water greater than 25 ft bgs, connect pump controls to the previously deployed bladder pump and connect the cooling coil and compressed air source. An in-line filter is only required for specific analyses (typically for dissolved metals analyses). Please confirm with laboratory for specific sample requirements.
5) Connect the cooling coil discharge tubing to a flow-through cell with the calibrated meter probes/sensors securely held in the flow-through cell.
6) Connect tubing from the discharge of the flow-through cell to the purge water collection bucket. For monitoring wells with low recharge rates, discharge purge water into a graduated cylinder (500 – 1,000 mL) for more accurate recording of purge rate and volume.

PUMPING SET-UP WITH PERISTALTIC PUMP



PUMPING SET-UP WITH SUBMERSIBLE PUMP



7) Begin purging the well at a low flow rate. Target pumping rates should generally be in the order of **0.1 to 0.2 L/min** to ensure stabilization of parameters and reduce mixing of formation water with stagnant well casing water. (Puls and Barcelona, 1996). If the pump must be temporarily operated at a higher flow to prime the system or maintain flow, the adjustment to the pumping rate is best made within the first 15 minutes of purging. The flow rate should remain constant during parameter stabilization monitoring.
8) The pumping rate is recorded on purge data sheets every 3 to 5 minutes during purging. Any adjustments to the pumping rate are recorded. At the initiation of well purging and after recording pumping rates, water quality parameters are measured and recorded with a multi-parameter water quality meter equipped with a flow-through cell. The measured water quality parameters are temperature, turbidity, specific conductance, pH, DO, and oxygen reduction potential (ORP or Redox). Pumping shall continue until the water quality parameters have stabilized (refer to **Section 5.6.1**). Hot water should generally contain a very low DO value and a negative ORP. If high DO or high ORP are observed, it could be an indicator that air is being introduced into the sample line.
9) After all water quality parameters have stabilized (refer to **Section 5.6.1**) sampling may begin. If all parameters have stabilized, but turbidity remains above 10 Nephelometric Turbidity Units (NTUs), decrease the pump rate and continue monitoring. If the pump rate cannot be reduced and turbidity remains above 10 NTUs, the information will be recorded and sampling initiated. For low yield wells, contact TRS Engineering group for evaluation and instructions for sampling.
10) Disconnect the tubing from the inlet side of the flow-through cell. The tubing from the pump outlet will be used to fill the groundwater sample vials. Samples for VOCs shall be collected first followed by semi-volatile organic compounds (SVOCs). All other parameters should be collected in order from most volatile to least.

11) Groundwater samples including quality control (QC) samples are labeled and preserved per the site-specific Sampling and Analysis Plan (SAP).
12) All pertinent information will be documented in the sample log book and on the chain-of-custody forms including: date, time of sample, sample identification, analysis being completed, and any other information deemed relevant to the sample results. The following additional information shall be documented in the sample logbook: time at beginning and end of monitoring well purging, flow rate and any changes during the monitoring well purge, equipment used for monitoring well purge, and water quality parameter readings used to determine sample time.
13) Package and ship samples with a laboratory supplied trip blank to the off-site laboratory for analysis.
14) Flow-through cells used for groundwater sampling effort shall be decontaminated according to manufacturer recommendations. Dispose of decontamination liquids and purge water in accordance with site-specific documents.
15) Following each sampling event, cooling coils should also be decontaminated using Alconox or a similar detergent with the peristaltic pump.

5.6.1 Water Quality Parameters

Readings are recorded on the purge data sheets every 3 to 5 minutes or at volume measurement intervals for monitoring wells with low recharge rates. Field parameters are monitored until stabilization occurs. Unless local regulatory requirements differ, readings are generally considered stable when three consecutive readings are within the following criteria:

- Specific conductance readings within 3 percent
- Redox potential within 10 millivolts (mV)
- pH within +/-0.1 standards units
- Turbidity and DO readings within 10 percent

5.6.2 Pump Assisted Grab Sample

To collect representative groundwater data, it is **critical that steam is not collected** during sampling. If steam is inadvertently sampled, the analytical results will be biased high. Geochemical parameter monitoring will provide indicators of whether steam is sampled. As the treatment volume reaches steaming conditions, DO concentrations in groundwater should be essentially zero. DO readings are therefore expected to reflect this but may be slightly higher as there can be sensor limitations. As the flow cell is nearly full, it should be tilted to remove any potential air bubbles. If elevated DO readings are observed, this is an indication that steam may have been sampled and the data may **not** be representative of groundwater. Significant swings in conductivity or a sudden drop in conductivity can also be an indication of steam influences that may impact the data quality.

If during the ISTR process, depth to groundwater levels have dropped and conditions do not allow for a representative sample to be collected (i.e., pumping activities draw down groundwater level below the sampling tube inlet), the following procedures will be used to sample the well and allow for recharge. Please note that this procedure cannot be followed if subsurface temperatures are indicative of steam generation occurring within the ISTR treatment volume. This method will recover steam if steam is present in the formation surrounding the monitoring well.

Pump Assisted Grab Sample Procedure:

1) A column of water is drawn in the cooling coil tubing with the pump.
2) The well sample valve and the peristaltic pump inlet valve are closed and the pump shut off.
3) The cooling coil is disconnected from the well sample valve.
4) The cooling coil is carefully removed from the ice bath.
5) The pump inlet valve is opened.
6) The sample is decanted into the sample vials from the pump end of the tubing via gravity flow.

The process is repeated until the sample volume is collected. Any other sample fractions (cations, anions) are sampled from the well end of the cooling coil tubing. It is important to note sampling with this procedure may not provide sample results representative of the formation. In addition, field notes/datasheets should explicitly detail all activities and actions when using this procedure.

6.0 RESPONSIBIITIES

TRS Safety & Quality Manager	• Develop and implement SOPs • Provide training and maintain training documentation. • Assist SHSO with modifying SOP to meet site-specific HASP and SAP requirements. • Work with PM to develop AHA for any intrusive work required to complete groundwater sampling efforts. • Periodically review and update procedures based on project feedback.
Project Manager	• Review procedures in conjunction with site-specific SAP requirements and scope of work (SOW). Coordinate changes to procedures as necessary. • Schedule and coordinate sampling effort. Ensure adequate supplies are available. • Work with HSO to develop AHA for any intrusive work required to complete groundwater sampling efforts.
Site Health & Safety officer	• Conduct orientations for subcontractors and employees. • Coordinate training needs with TRS SQM. • Review procedures in conjunction with site-specific HASP. Coordinate changes to procedures as necessary to maintain safe working procedures.
Sampling Personnel	• Complete training to the level of competent person prior to initiating sampling activities. • Follow procedures and document information related to groundwater sampling effort as identified in this SOP, including and deviations from the SOP.

7.0 TRAINING

Training in SOPs is provided upon initial assignment and annually thereafter. Practical training is provided on a project-specific basis. Additional retraining is provided if there is a change in procedures or if inadequacies are observed in the individual's application of procedures.

Competent persons in hot groundwater sampling are determined by the project PM and SHSO and must, at a minimum, complete the following requirements:

- Read this SOP (SOP 3.1) and understand the general process and the specific requirements of this SOP.
- Sign the training acknowledgement form.
- Obtain on-site instruction by a knowledgeable person on the task-specific hazards associated with hot groundwater sampling and the methods used to control these hazards.
- Obtain on-site instruction by a knowledgeable person on important technical components of the hot groundwater sampling program to ensure the collection of representative samples.

8.0 RECORD KEEPING

These are standard (i.e., typically applicable) procedures which may be varied or changed as required, dependent on-site conditions, equipment limitations, permit requirements or limitations imposed by the procedure. The ultimate procedures used during any sampling event, including any deviations from these procedures, shall be documented in the sample logbook. AHA's developed for any intrusive work conducted in conjunction with this SOP shall be maintained with the groundwater sample logbook.

Calibrations of water quality meters used to measure water quality readings shall be completed according to the manufacturer's recommendations. Calibration results shall be maintained in a written log kept at the site throughout the operational phase of the project.

At a minimum, the following information shall be maintained in the sample logbook related to well purging and groundwater sample collection:

1) Date
2) Sample/purge location identification
3) Type of pump used for well purge
4) Duration of well purge
5) Sample time
6) Flow rate (including changes throughout purge)
7) Meter(s) used for collection of water quality parameters and calibration documentation
8) Water quality parameter readings
9) Volume of purge water collected prior to sampling
10) Sample identifications and analysis to be performed
11) Chain-of-custody number
12) Shipping information
13) Procedures used for equipment decontamination
14) Deviations from this SOP

15) Any other information deemed relevant to the sample results

Copies of chain-of-custody forms and shipping documentation shall be maintained and kept with the sample log book.

9.0 REFERENCES

Puls, R.W. and M.J. Barcelona, 1996, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedure, EPA/540/S-95/504.

Yeskis, Douglas and Zavala, Bernard, 2002, Ground Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA/542-S-02-001.

Vail, Jonathon, France, Danny, and Lewis, Bobby, 2013, SESD Operating Procedure Groundwater Sampling, EPA Region 4/SESDPROC-301-R3.

Environmental Protection Agency – Region 1, 2017, Low Stress (low flow) Purging and Sampling Procedure For The Collection Of Groundwater Samples From Monitoring Wells, EQASOP-GW4, Revision Number: 4.

Revision Record

SOP 3.1 Hot Groundwater Sampling

Training Acknowledgment

All personnel that receive training on this procedure will review and sign the acknowledgement form contained in this section.

I have been trained by TRS Group, Inc. (TRS) to perform non-intrusive hot groundwater sampling at ISTR project sites. By signing this document, trainee acknowledges that SOP 3.1 Hot Groundwater Sampling has been read and the contents of the document are understood. Trainee has received hands-on training from a competent person who is authorized to use and instruct others on sampling procedures at TRS project sites.

Date	Trainee (print)	Trainee (Sign)	Trainer

Revision Record

Date	Initials	Revision Description	Revision #
04/14/09		Update format, include pictures	2
06/27/09	LS	Add Scope, responsibilities, training, definitions, Recordkeeping, and new procedures	3
06/25/10	LS	Update Drawings	4
07/27/12	LS	Review and update SOP; changes to pump usage	5
12/15/14	TP	Annual Review, MW access caution	6
12/4/17	GK	Annual review; procedure updates	7
12/02/19		Annual Review, changed sample rate to 0.2 L/m, added steam reference	8

SOP/ Revision #	Safety & Quality	Engineering
Original	4/22/08	4/22/08
REV 2	4/14/09	4/14/09
REV 3	6/27/09	6/27/09
REV 4	6/25/10	6/25/10
REV 5	7/27/12	7/27/12
REV 6	1/21/16	1/21/16
REV 7	12/4/17	12/4/17
REV 8	12/2/19	12/2/19

TRS Accelerating Value	STANDARD OPERATING PROCEDURE	PROCEDURE No: 3.2

Procedure Title:

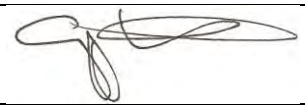
HOT SOIL SAMPLING

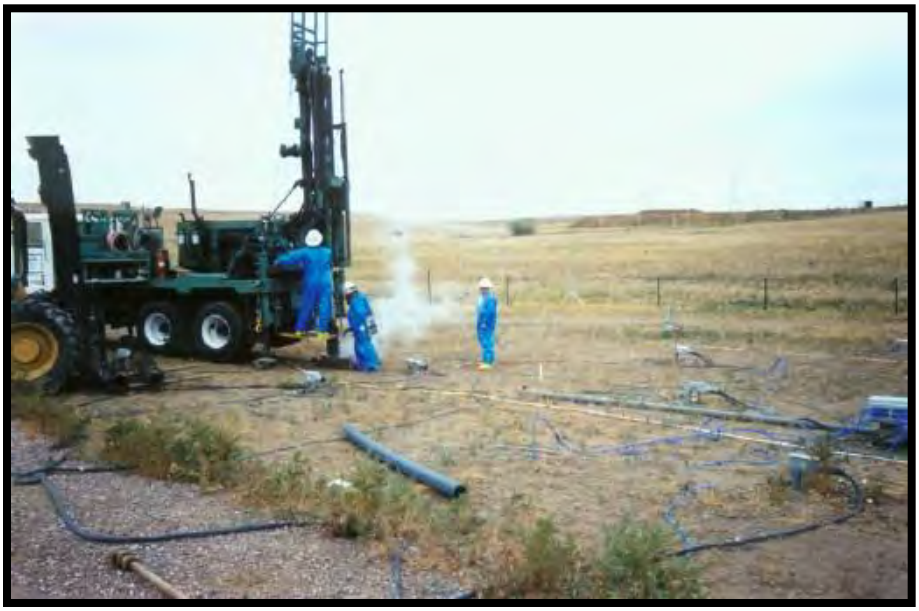
Author:	TRS Team	Issue Date:	4/22/08

Revisions:

Date	Initials	Revision Description	Revision #
01-04-10	LS	Add Scope, responsibilities, training, definitions, recordkeeping	1
5-6-14	TP	Added caution concerning hot water, steam expulsion	2
2-22-16	TP	Review, revised power off requirement	3
12-4-17	GK	Removed Geoprobe® Dual-Tube Sampler reference and revised determination for use of Teflon liners.	4
12-02-19	GK	Added section on hot sampling with sonic drill rig	5

Reviewed and Approved by (initial and date):

SOP/ Revision #	Safety & Quality		Engineering	
Original	4/22/08		4/22/08	
REV 1	1/4/10		1/4/10	
REV 2	5/6/14		5/6/14	
REV 3	2/24/16		2/22/16	
REV 4	12/4/17		12/6/17	
REV 5		12/2/2019		12/2/2019



1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide a procedure for the safe collection of representative soil samples during, or after, the application of *in situ* thermal remediation (ISTR) technologies.

2.0 SCOPE

This SOP serves as a guideline for the collection of soil samples during, or after, the application of ISTR. To minimize the risk due to electrical hazards, lockout/tagout (LOTO) procedures must be applied to the ISTR power control unit (PCU) throughout the duration of the soil sampling effort. Only authorized persons trained in procedures and requirements described in SOP 1.1 are permitted to conduct LOTO on TRS equipment. Samples collected using this SOP are generally used for evaluating treatment effectiveness, and/or confirming treatment goals have been met.

TRS Group, Inc. (TRS) personnel shall use this procedure in conjunction with site-specific sample analysis plans and permit requirements. These are standard (i.e., typically applicable) operating procedures, which may be varied or changed as required, dependent on site conditions, equipment limitations, permit requirements, or limitations imposed by the procedure. The ultimate procedures, including any deviations from this SOP, shall be documented in the soil sampling form.

3.0 DEFINITIONS

Authorized Employee

Any designated employee who locks out or tags out equipment to perform servicing or maintenance. This person must have completed the mandatory LOTO training described in SOP 1.1 LOTO to be qualified as an authorized worker. Only an authorized worker installs and removes his or her own lock and tag as required by this program.

Competent Person

Any designated employee who has been trained in proper procedures for the application of ISTR to the subsurface at remediation sites.

ISTR – In Situ Thermal Remediation

A process whereby soil and groundwater are heated to the desired temperature to volatilize the target contaminants. Some ISTR technologies are electrical resistance heating (ERH), thermal conduction heating (TCH), and steam enhanced extraction (SEE).

LOTO – Lockout/Tagout

The practice of using a tag for visibility and awareness in conjunction with placement of a keyed device ("lock") on an energy isolating device, in accordance with SOP 1.1, to prevent the unwanted activation of mechanical or electrical equipment. Lockout ensures the equipment being controlled cannot be operated until the lock is removed.

4.0 EQUIPMENT LIST

1) Soil Sampling Field Form and pen (recommend indelible).
2) Drill rig and related equipment. Soil sampling is best achieved using a direct push drill rig such as a Geoprobe®. Alternative types of drilling methods are hollow stem auger (HSA) or rotosonic (sonic).

3) Ice bath for soil samples. An example is a cooler filled with ice. The cooler (or container) must be equipped with an opening at the bottom to allow water from melting ice to drain.

4) Standard cooking thermometer. Calibrated to both zero (0) degrees Celsius (°C) and 100°C (an infrared thermometer can be substituted when sampling denser soils or bedrock. Keep in mind the sample tube will likely be a few degrees cooler than the internal temperature of the sample).
5) LOTO equipment as described in TRS SOP 1.1.
6) Sample containers, labels, and chain-of-custody forms (as required by the laboratory for the analysis).
7) Safety Glasses with side shields. Additional option: full face-shield (wear over safety glasses).
8) Hearing protection adequate for sampling equipment decibel level. Refer to site-specific Health and Safety Plan (HASP).
9) Latex or nitrile gloves. Additional option: cotton or leather outer gloves (wear over inner latex gloves).
10) Site-specific personal protective equipment (PPE) requirements. Refer to site-specific HASP.
11) Packaging material, chain-of-custody seals, and shipping labels.

5.0 HOT SOIL SAMPLING PROCEDURES

A soil-sampling event begins with the shutdown and application of LOTO to the PCU. This is done to prevent any electrical hazards between the steel drill string and sampling personnel. The vapor recovery system should continue to operate to maintain capture of steam in the subsurface, rather than allowing it to exit through the sample borehole. Interim and final soil sampling is best achieved using a direct push drill rig such as a Geoprobe®. As the probe casing is extracted from the subsurface, it should be considered to be very hot, and handled with proper precaution and personal protective equipment.

Choose a sample sleeve compatible with the conditions being encountered. For example, if the sample location temperature is elevated above 100°C, then a stainless steel sleeve will be a better choice than a Teflon sleeve as the Teflon sleeve will become soft and deform at elevated temperatures. Consult engineering for the appropriate sleeve. Teflon sleeves are only recommended for sampling when expected subsurface temperatures will be at or below 70°C.

Note: sample sleeves can be custom fabricated if supplier inventories are inadequate. Please contact equipment@thermalrs.com if additional resources are needed to procure sampling sleeves.

5.1 Safety Considerations

There are certain hazards associated with the application of ISTR to contaminated soil and groundwater. These hazards include possible contact with hazardous voltages, steam, hot water, hot soil, other hot surfaces, and/or hazardous chemicals. Exposure to these hazards can be mitigated through engineering controls and strict adherence to documented procedures and safety protocols such as the following restrictions:

- The ISTR PCU system must be turned off and LOTO applied during soil sampling activities. Only trained and authorized TRS personnel can perform LOTO of ISTR equipment.
- High temperatures, hot water, and steam may be encountered when collecting subsurface soil samples; the use of the proper PPE is mandatory and caution is advised.
- Contaminant vapors may be present at the borehole during sampling.
- Personnel shall be trained on hazards and engineering controls associated with drilling before beginning sampling operations. Potential hazards include rotating equipment, overhead loads, and slips trips and falls.

Refer to the site-specific Sampling and Analysis Plan (SAP) and HASP for site-specific requirements and restrictions.

Caution: Exposure to hot groundwater and steam possible

The removal of water and soil from the sample borehole can change the temperature/pressure equilibrium conditions existing within the borehole prior to drilling and sampling by reducing the hydrostatic head in the borehole, allowing hot water and steam to eject from the borehole. Review the site conditions prior to commencing drilling or boring. If sampling soil beneath the groundwater surface level elevation, always remove the boring equipment and samples slowly from the boring to allow the borehole conditions to safely re-equilibrate.

Stop and complete the attached Site Sampling Evaluation Checklist before proceeding with this procedure.

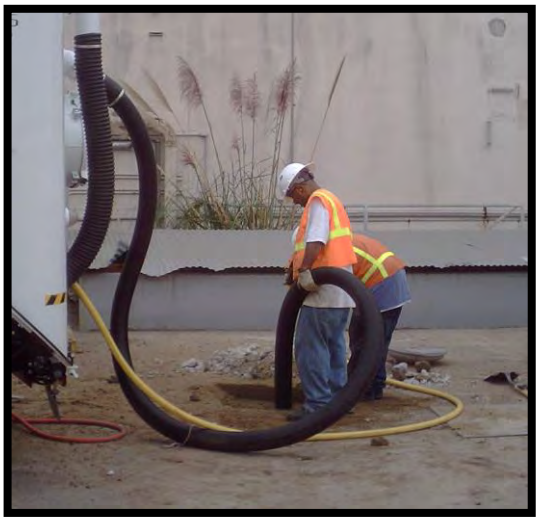
5.2 Hot Soil Sampling Procedures

Whenever possible, sampling shall be completed in order from sample locations having the lowest anticipated concentrations of contaminants of concern (COCs) to locations having the highest anticipated COC concentrations (i.e.; outside treatment area, treatment area boundary, locations within the source area). The steps outlined below must be followed for iterative, interim, and/or final hot soil sampling.

Contact the TRS Project Manager (PM) the day prior to sampling to coordinate a shutdown. A shutdown period of 4 hours is preferred prior to soil sampling.

1) An authorized person shall apply LOTO to the ISTR PCU by site-specific instructions. Note: Only personnel who have been trained and certified by TRS in LOTO procedures can complete this procedure.
2) Position drill rig in the area to be sampled and perform a visual check for any safety concerns. Potential concerns include: high voltage lines, uneven terrain, underground utilities, and egress limitations with rig placement.


3) Hand auger or air knife the first five (5) feet of the boring to clear the location for potential buried utilities.

4) Advance the push sampler to the depth required and collect samples. If subsurface temperatures are expected to be greater than 70°C, the sample sleeves used must be made of brass or stainless steel. Sample sleeves made of acrylic or other materials can melt and bias sample results.

5) The sample sleeves must be capped immediately and placed into the ice bath to begin the cool-down process. Water from melting ice must be allowed to drain, as the sample sleeves should not be submerged at any time.

6) The sample sleeves should be cooled until the soil nears ambient temperature (approximately 20°C or 70 degrees Fahrenheit [°F]). A standard cooking thermometer can be inserted through the end cap for temperature monitoring. The sample sleeve may be opened and sampled once near-ambient temperatures have been reached. Soil samples, including quality control (QC) samples, are collected, labeled, preserved, and shipped per the site-specific SAP.
7) Plugging/sealing of the soil borehole will be in accordance with Federal, State, and/or Local regulatory and client requirements.
8) Soil cuttings not consumed in the sampling process will be disposed of according to Federal, State, and/or Local regulatory and client requirements.

6.0 Hot Soil Sampling Using Rotosonic Method

The procedures for hot soil sampling with a Sonic rig are similar to the steps outlined in **Section 5.2**, except for the following deviations:

- Sonic drilling methods produce large soil cores, 4 to 6 inches in diameter. Cool the cores in a large trough of ice, with drainage of melt water. Ice consumption may range from 500-1,000 pounds per day depending on soil temperature, ambient temperature, and soil core production rate.
- In ambient temperature soil conditions, Sonic drilling methods use a low-density polyethylene (LDPE) sleeve to recover soil cores from the Sonic rig sample apparatus. The LDPE bags used for

this method of sample retrieval are typically only rated for temperatures below 90°C, therefore liners must be used with additional precautions:

  - Cool the exterior of the sonic barrel with a garden hose prior to contact with the LDPE liner and extraction of the soil core. It is recommended to double-bag hot soil cores in the LDPE liners. Have an ice bath ready for immediate cooling of the soil cores.
  - Direct contact with ice below and above the bagged soil core cools the soil cores in approximately 1 hour. Additional plastic may be preferred to further eliminate risk of cross contamination but does slow the cooling rate.

- For sampling at ISTR sites where soil temperatures are greater than 90°C, lexan polycarbonate liners (or equivalent) are an alternative. Lexan polycarbonate is rated to approximately 130°C.
- Some subsurface conditions may make the lexan polycarbonate liners prohibitive.
- Verify with the drilling subcontractor that a second sample core barrel is available to maintain production while the first sample core barrel is cooling and during core extraction.
- Extreme caution will be exercised in cutting the lexan polycarbonate liners when the soil core is ready to be sampled.

7.0 RESPONSIBILITIES

Role	Responsibility
VP Operations	• Develop and implement SOPs • Periodically review and update procedures based on project feedback • Provide training and maintain training documentation
TRS Safety & Quality Manager	• Assist VP Operations with providing training and maintaining training documentation. • Assist Site Health and Safety Officer (SHSO) with modifying SOP to meet site-specific HASP requirements.
PM	• Review procedures in conjunction with site-specific sample requirements and scope of work (SOW). Coordinate changes to procedures as necessary. • Schedule and coordinate sampling effort. Ensure adequate supplies are available.
SHSO	• Conduct orientations for subcontractors and employees • Coordinate training needs with TRS SQM • Review procedures in conjunction with site-specific HASP. Coordinate changes to procedures as necessary to maintain safe working procedures.
Sampling Personnel	• Complete training to the level of competent person prior to initiating sampling activities. • Follow procedures and document information related to soil sampling effort as identified in this SOP, including and deviations from the SOP.

8.0 TRAINING

Training in SOPs is provided upon initial assignment and annually thereafter. Additional retraining is provided if there is a change in procedures or if inadequacies are observed in the individual's application of procedures. Subcontractors must train their own employees. LOTO training requirements for personnel are outlined in SOP 1.1.

9.0 RECORD KEEPING

These are standard (i.e., typically applicable) procedures, which may be varied or changed as required dependent on site conditions, equipment limitations, permit requirements, or limitations imposed by the procedure. The ultimate procedures used during any sampling event, including any deviations from these procedures, shall be documented in the sample logbook.

At a minimum, the following information shall be maintained in the sample logbook related to hot soil sampling at ISTR sites:

- Date
- Sample identification and corresponding location
- Sample time
- Sample identifications and analysis to be performed
- Chain-of-custody number
- Shipping information
- Deviations from this SOP
- Any other information deemed relevant to the sample results

Copies of chain-of-custody forms and shipping documentation shall be maintained and kept with the sample logbook.

10.0 REFERENCES

TRS Group, Inc., 2013. SOP 1.1, Lockout/Tagout (LOTO), Most Recent Version.

US EPA Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW-846,

Most Recent Version (Method 5035)

SOP 3.2 Hot Soil Sampling

Training Acknowledgment

All personnel that receive training on this procedure will review and sign the acknowledgement form contained in this section.

I have been trained by TRS Group, Inc. (TRS) to perform hot soil sampling at TRS ISTR project sites. By signing this document, trainee acknowledges that SOP 3.2 Hot Soil Sampling has been read and the contents of the document are understood. Trainee has received hands-on training from a competent person who is authorized to use and instruct others on sampling procedures at TRS project sites.

Date	Trainee (print)	Trainee (Sign)	Trainer

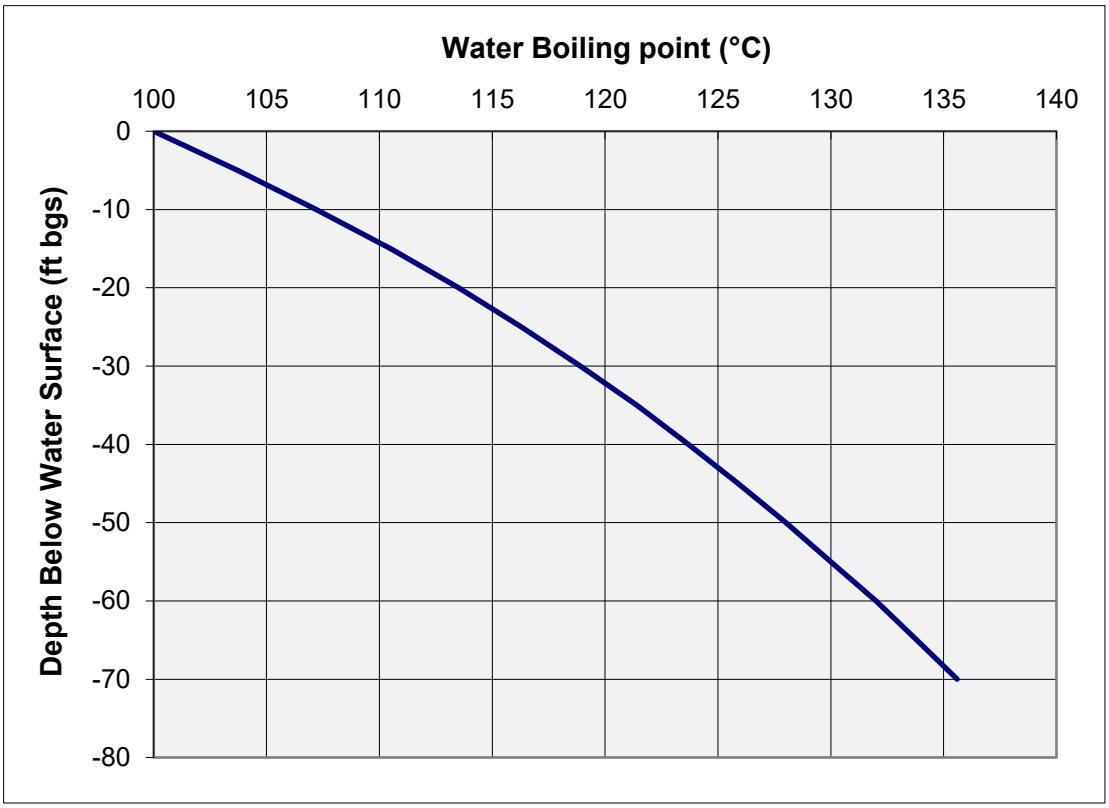
Site Sampling Evaluation Checklist

Project #: _____

Date: _____

Subsurface Conditions

1) Are soil samples being recovered from beneath the groundwater surface?
2) What is the depth to groundwater at the time of sampling?
3) How deep below the groundwater surface elevation are we sampling?
4) What are the current temperatures at or near each boring location?
5) Are there confining layers on site? Clay or silt over saturated zone sand for example.
6) Use the figure below to determine where the sites actual temperatures fit on the boiling point curve.



7) Actual temperature for each depth elevation that is higher in value than the temperatures represented by this curve suggest a temperature value greater than the hydrostatic boiling point of water.

TRS Accelerating Value	**STANDARD OPERATING PROCEDURE**	**PROCEDURE No: 3.11**

Procedure Title:

Hot Groundwater Sampling-DPT

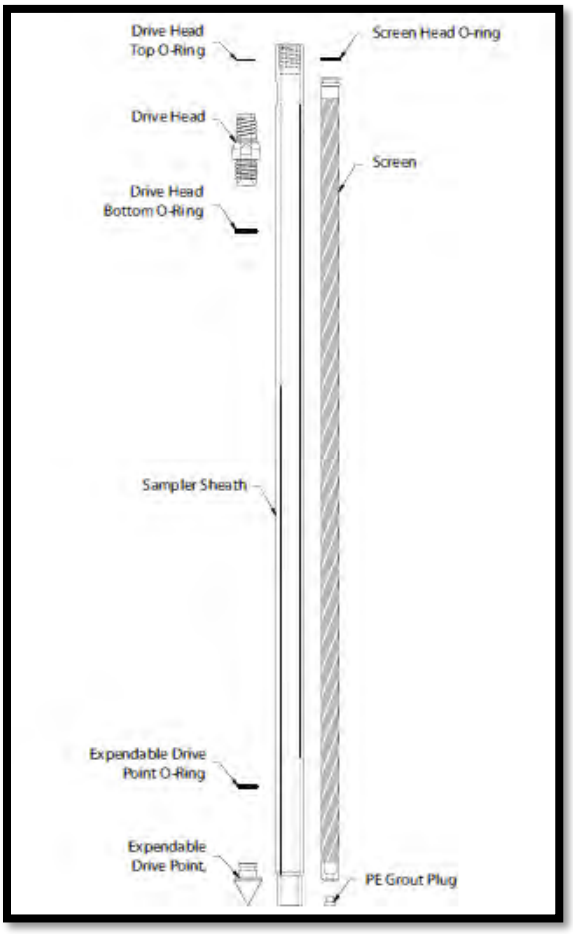
Author:	TRS Team	**Issue Date:**	8/4/16

Revisions:

Date	Initials	Revision Description	Revision #

Reviewed and Approved by (initial and date):

SOP/ Revision #	Health & Safety		Operations	
Original		8/4/2016		8/4/2016



1.0 PURPOSE

This standard operating procedure (SOP) provides uniform procedures for the safe collection of representative groundwater samples during or after the application of Electrical Resistance Heating (ERH) using direct push technology (DPT) to advance the sample screen to the desired depth. This procedure specifically addresses sampling of groundwater that has been heated during the ERH process.

2.0 SCOPE

This SOP provides guidance for the collection of groundwater samples during the application of ERH using modified low-flow sampling procedures in conjunction with the DPT screen advancement method. This SOP draws information primarily from the United States Environmental Protection Agency's (USEPA's) groundwater issue paper, Low-Flow (minimal drawdown) Ground-Water Sampling Procedure (Puls and Barcelona, 1996). Modifications to the EPA methodology have been made to accommodate groundwater temperatures that have been elevated as a result of ERH application. Only personnel trained to the minimum requirements outlined in Section 7.0 of this SOP are authorized to collect hot groundwater samples using this SOP.

The USEPA guidance document recommends continual monitoring of water levels during the purge and sample process to ensure that minimal drawdown is occurring (Puls and Barcelona, 1996). Due to the safety hazards associated with driving DPT sampling apparatus into the subsurface where heated groundwater is present, groundwater level measurements (depth to groundwater) will not be collected as part of hot groundwater sampling activities.

These procedures assume that new tubing will be used for each sample location. Samples collected using this SOP are generally used for optimizing system performance or may also be used for regulatory compliance and/or Site closure.

TRS Group, Inc. (TRS) personnel shall use this procedure in conjunction with site-specific Health and Safety Plans and any applicable sample analysis plans and/or permit requirements. These are standard (i.e., typically applicable) operating procedures that may be varied or changed as required, dependent on site conditions, equipment limitations, permit requirements, or limitations imposed by the procedure. The ultimate procedures, including any deviations from this SOP, shall be documented on the groundwater sampling form.

Since the procedure to drive a DPT sampling screen into the subsurface is similar to soil sampling procedures, under no circumstances will intrusive activities occur while ERH electrical power is being applied to the treatment volume. Refer to TRS SOP 1.1 Lockout/Tagout (TRS 2009), TRS SOP 3.2 Hot Soil Sampling (TRS 2008), the site-specific HASP, and consult with the Project Manager (PM) and Site Health and Safety Officer (SHSO) for additional site-specific requirements, restrictions, and/or additional information.

3.0 DEFINITIONS

Authorized employee – Any designated employee who locks out or tags out equipment in order to perform servicing or maintenance. This person must have completed the mandatory LOTO training described in SOP 1.1 LOTO to be qualified as an authorized worker. Only an authorized worker installs and removes his or her own lock and tag as required by this program.

Competent Person – Any designated employee who has been trained in proper procedures for the application of energy to the subsurface at ERH sites. This person must have completed the mandatory training outlined in **Section 7.0** to be qualified as a competent person.

ERH – Electrical Resistance Heating. ERH is a process whereby soils and groundwater are heated by passing an electrical current through the subsurface volume to be remediated.

DPT – a stainless steel and Teflon® *in situ* sampling tool that allows for the collection of representative groundwater samples without the installation of a groundwater monitoring well. The sampling screen is driven to the desired depth using DPT. Once at the desired sampling depth, the sampling screen is exposed and water is extracted from the temporary sampling location via tubing and above grade pump.

LOTO – Lockout/Tagout. The practice of using a tag for visibility and awareness in conjunction with placement of a keyed device ("lock") on an energy isolating device, in accordance with TRS SOP 1.1, Lockout/Tagout to prevent the unwanted activation of mechanical or electrical equipment. Lockout ensures the equipment being controlled cannot be operated until the lock is removed.

Low-Flow Purging – A USEPA approved purge-and-sample method used to minimize stress on the formation (minimal drawdown) which results in less mixing of stagnant casing water with formation water. Additional advantages of using low-flow purging methods include the following:

- Samples are more representative of actual contaminant loading.
- Disturbance at the sampling point is minimal which minimizes sampling artifacts.
- Less operator variability occurs between sampling events.
- Decreased amount of investigation-derived waste (IDW) is produced.
- Need for filtration is reduced.
- Sample consistency is increased.

Flow-rates during low-flow purging/sampling are site-specific, based on hydrology, but are generally in the order of 0.1 to 0.5 liters per minute (L/min). Proper screen location and screen length may impact the effectiveness of low-flow purging. (Puls and Barcelona, 1996)

Multi-probe and Flow-Through Cell – The flow through cell allows for in-line sampling of water quality parameters with a multi-probe to determine stabilization for water sampling. At a minimum, groundwater quality parameters include pH, conductivity, temperature, dissolved oxygen (DO), and turbidity. Examples of multi-probes used for collecting water quality parameters include the Horiba U-22 and YSI 556 (shown below).

Peristaltic Pump – A positive displacement pump used for pumping fluids. Generally, flexible tubing is fitted inside a circular pump casing. A rotor with a number of "rollers", "shoes" or "wipers" attached to the external circumference compresses the flexible tube. As the rotor turns, the part of tube under compression closes thus forcing the fluid to move through the tube.

SHSO – Site Health and Safety Officer

Trip Blank – The purpose of trip blanks it to identify any potential contamination of samples during sample handling and shipment. These blanks are prepared in the laboratory by filling a volatile organic analysis (VOA) bottle with distilled/deionized water. Trip blanks shall accompany shipment of empty bottles to the site and shipment of samples back to the laboratory.

VOA Vials – EPA recommended glass sample containers used to collect liquid samples for laboratory analysis. VOA vials have a nominal volume of 40 milliliters (mL) and are manufactured of clear or amber borosilicate glass. Depending on type of analysis being conducted, the VOA vials may contain small amounts of preservative when shipped from the laboratory. When collecting samples in VOA vials, fill the vial completely full (ensure that a meniscus has formed at the top of the vial before securing the cap) and check that there are no air bubbles in the closed sample. If there is a preservative present, use caution to not overfill the vial.

4.0 EQUIPMENT LIST

The required equipment for groundwater sampling may differ from this SOP based on the requirements set by the local regulatory oversight agency. Typically, the required equipment will be as follows:

1) Groundwater Sampling Field Form and indelible pen.
2) Safety Glasses with side shields and full face-shield (wear over safety glasses).
3) Hot water/Steam protective outer clothing (PVC rain gear is recommended).
4) Cotton Gloves with Latex (or equivalent) over-gloves. Cotton gloves should be worn to protect against water having high temperatures (wear under outer latex gloves). Leather gloves should be worn over sampling gloves when handling hot sampling equipment (i.e., DPT tubes).
5) Site-specific personal protective equipment (PPE) requirements. Refer to site specific HASP.
6) Peristaltic Pump.
7) Direct Push Technology (DPT) drill rig and associated equipment.
8) Geoprobe® SP-16 Groundwater Sampler assembly (or similar) and associated tools and supplies (stainless steel screens for this procedure are mandatory. Polyvinyl chloride (PVC)-type screens are not temperature rated for this application and are not acceptable). Associated equipment includes, but is not limited to:
    a) 1.5-inch probe rods,
    b) Drive and pull caps,
    c) Rod grip pull system,
    d) Drive head,
    e) Expendable drive points,
    f) Extension rods, quick links or couplers, and extension rod handle, and
    g) O-ring service kit.
9) Disposable Teflon™ and silicone tubing (Masterflex™) for use with the peristaltic pump. Silicone tubing should be used only above the ground surface at the pump head in order to minimize potential for degradation by contaminants. The silicone tubing is then connected to the Teflon™ tubing, which is lowered to depth within the DPT drive casing to the sampling screen. Tubing shall be replaced at each sampling location.
10) Power supply (12-volt automotive battery or similar, or portable generator).
11) Cooler with ample supply of ice.
12) 10-ft length of ¼-inch stainless steel or copper tubing.
13) One-ft length of four-inch diameter pipe.
14) Tray, bucket, or cooler for ice bath.
15) Field water quality measuring equipment w/flow-through cell or similar device for monitoring groundwater parameters (pH, conductivity, ORP, temperature, DO, etc.) and calibration standards.
16) Turbidity meter.
17) Empty buckets for purge water.

18) Sample containers (with preservative as required by the laboratory analytical method), labels, and chain-of-custody forms (as required by the laboratory for the analysis). Pre-printed labels are generally available from the laboratory if requested in advance.
19) Scissors or tubing cutter (for cutting tubing lengths).
20) Decontamination water and a non-phosphate detergent for decontamination of DPT sampling apparatus and components after each sample.
21) Packaging material, shipping containers (coolers), chain of custody forms, and shipping labels.
22) LOTO equipment as described in TRS SOP 1-1.

5.0 HOT GROUNDWATER SAMPLING PROCEDURES

A groundwater sampling event with DPT begins with the shutdown and application of LOTO of the ERH PCU in accordance with TRS SOP 1.1. This is required to prevent any electrical hazards between the steel drill string and sampling personnel. DPT sampling is best achieved using a DPT rig such as a Geoprobe® or similar. As the probe casing makes contact with the heated subsurface or is extracted from the subsurface, it should be considered to be very hot, and handled with proper precaution and use of the prescribed personal protective equipment (PPE). In addition, there is the potential for hazardous steam and/or hot water to be expulsed from the borehole due to changes in hydrostatic head of the soil bore during the extraction of advancement casings. To minimize the risk of expulsion of steam/soil/groundwater from the borehole during casing extraction, casing should be extracted at a significantly slower rate than at a non-heated site.

Groundwater purging is generally accepted as a required component of groundwater sampling in order to remove non-representative water from the well casing (Puls and Barcelona, 1996). Low-flow purging and sampling techniques will be used to minimize the impact on groundwater chemistry and collect representative samples. This technique also reduces the amount of investigation-derived waste (IDW) produced from a well.

5.1 Safety Considerations

There are certain hazards associated with ERH during the remediation of soil and groundwater. These hazardous include possible contact with hazardous voltage, steam, hot water, or hazardous chemicals. Exposure to these hazards can be mitigated through engineering controls and strict adherence to documented procedures and safety protocols, such as the following restrictions:

- The ERH PCU system must be turned off and LOTO applied during soil and/or groundwater sampling activities. Only trained and authorized TRS personnel are allowed to perform LOTO of ERH equipment.
- Extreme temperatures and steam may be encountered when collecting groundwater samples; the use of the proper personal protective equipment (PPE) is mandatory and caution is advised.
- Personnel shall be trained on hazards and engineering controls associated with drilling before beginning sampling operations. Potential hazards include rotating equipment, overhead loads, and slips, trips, and falls. Drilling equipment is to be operated only by trained drilling personnel.

- Personnel shall be trained on hazards and engineering controls associated with hot groundwater sampling. Potential hazards include steam, hot groundwater, hot mud/soil, and heated sampling equipment. Personnel should also be familiar with general site hazards identified in TRS SOP 3.1 Hot Groundwater Sampling, and TRS SOP 3.2 Hot Soil Sampling.

Refer to the site-specific Sampling and Analysis Plans (SAPs) and site-specific HASP for site-specific requirements and restrictions.

Caution: Exposure to hot groundwater and steam possible

The removal of water and steam from a DPT sampling screen can change the temperature/pressure equilibrium conditions existing in the subsurface prior to sampling by reducing the hydrostatic head in the borehole, allowing hot water and steam to flash within and along the outside of the sampling apparatus casing.

The stratigraphy of the Site can contribute to this issue. Sites with a semi-confined aquifer condition may present additional hazards because of the influence on hydrostatic head. Extreme caution should be used when driving the DPT sampling assembly into the water table and especially upon removal. The DPT assembly and drive casing should be removed at an extremely slow rate to minimize disturbance to the hydrostatic pressure within the borehole.

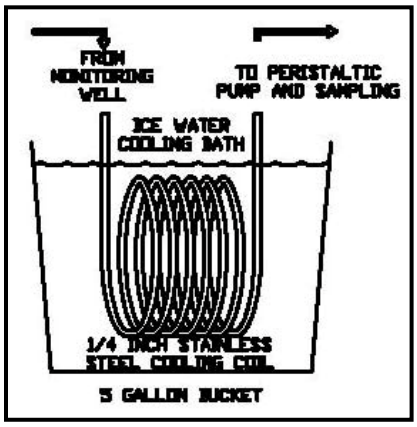
Stop and complete the attached Site Sampling Evaluation Checklist (attached) before proceeding with this procedure.

5.2 Ice Bath Construction

Groundwater heated through the ERH process presents both a potential safety hazard and a potential concern for collecting representative samples. If a boiling or near-boiling liquid is collected in a volatile organic analysis (VOA) vial, the formation of air bubbles as the sample cools within the VOA vial renders the sample non-representative. Additionally, hot liquids collected in the VOA vial may result in failure of the VOA septum.

The ice bath is designed to cool the groundwater prior to sample collection while limiting the impact on groundwater chemistry and contaminant concentrations. Cooling the groundwater prior to sample collection allows for both the safe handling of highly elevated water temperatures and prevents the formation of volatile organic compound (VOC) bubbles in the VOA vial after sample collection.

Prior to initial sampling, a cooling coil shall be constructed by wrapping a 10-ft length of ¼-inch stainless steel or copper tubing 6 full turns around a 4-inch diameter pipe. The ends of the tubing shall be fashioned such that both ends of the tubing extend upward, as shown in the figure below.



5.3 Peristaltic Pumps

Peristaltic pumps are used for purging and sampling wells that have a depth to water of approximately 20-ft bgs or less.

Each sample location will use a section of dedicated Teflon™ tubing for downhole use and a dedicated section of silicone tubing at the peristaltic pump.

The downhole end of the tubing shall be located in the middle or slightly above the middle of the screened interval. Placing the intake in the middle or near the middle of the screened interval, the amount of mixing between the overlaying stagnant casing water with the water within the screened interval is minimized. If the pump-intake is too close to the bottom of the well, increased entrainment of solids may occur. Pump-intake placement should only be used at the top of the water column in unconfined aquifers screened across the water table, where this is the required sampling point.

5.4 DPT Advancement

The TRS project team should coordinate, in advance, with all applicable parties to schedule an ERH system shutdown. The PM and SHSO shall determine a site-specific shutdown period. When possible, sampling shall be completed in order from the sampling locations anticipated to have the lowest concentrations of contaminants of concern (COC) to wells having the highest anticipated COC concentrations (usually from exterior wells to boundary control wells to wells located within the source area).

The TRS project team shall also determine the optimum pathways of approach for situating the DPT rig at the designated sample locations. ERH cabling and vapor recovery piping may need to be disconnected and removed to navigate the DPT rig to the sample locations. Interruption to the vapor recovery system may be required if removal of a section(s) of vapor recovery piping is required.

The DPT advancement procedure is as follows:

1) Cease power application to the treatment volume and perform LOTO procedures on the ERH PCU as required by site-specific protocols. Note: LOTO application shall only be completed by personnel who have been trained and certified by TRS according to SOP 1-1.
2) The drilling subcontractor will navigate and situate the DPT rig into position via the predetermined pathway to the desired sample location.

3) Proper PPE should be donned (i.e., face shield, leather gloves, hot water/steam protective clothing) at this time.

4) The drilling subcontractor will advance the DPT sample assembly into the subsurface. Additional casings are added incrementally and advanced until the desired sampling depth is reached. Advance the sampler with caution upon reaching the estimated water table depth.

5) Using extension rods to keep the sample screen in place, the DPT assembly is retracted the distance of the screen length. Once the screen is exposed, remove the extension rods.

6) Proceed to **Section 5.5**, Groundwater sampling.

5.5 Groundwater Sampling

The groundwater sampling procedure is as follows:

1) At the start of the work day, calibrate probes used to monitor water quality parameters according to the manufacturer's instructions (as necessary). Calibration frequencies should adhere to the manufacturer's recommendations. Document all calibrations done to the probes used. Documentation should include: date, time, calibration solutions used, solution expiration dates, solution lot numbers, calibration results, outliers, and any illuminating comments.

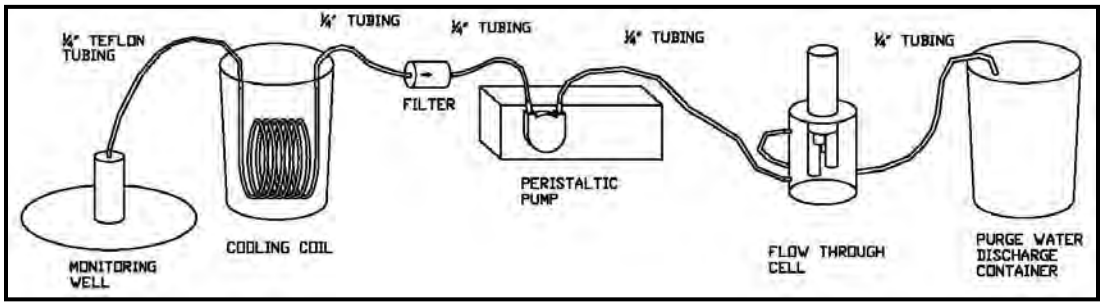
2) The dedicated Teflon™ sample tubing will be inserted into the DPT drive casing until the approximate mid-point of the DPT sampling assembly screen is reached. Ensure tubing has entered the screen interval, tubing can catch at the top of the screen head simulating the feeling that the bottom of the screen has been reached.

3) Connect the sample tubing from the DPT sample screen to the inlet of the cooling coil and place the coil in a bucket or cooler with ice to form the ice bath as described in **Section 4.2**.

4) Connect the peristaltic pump tubing to a section of tubing connected to the outlet of the cooling coil. A filter can be placed between the cooling coil and the peristaltic pump if sample methods dictate filtering of sample.

5) Connect the peristaltic pump discharge tubing to a flow-through cell with the calibrated meter probes/sensors securely held in the flow-through cell.

6) Connect tubing from the discharge of the flow-through cell to the purge water collection bucket.



7) Begin purging the well at a low-flow rate. Target pumping rates should generally be in the order of 0.1 to 0.5 L/min to ensure stabilization of parameters and reduce mixing of formation water with stagnant borehole groundwater. (Puls and Barcelona, 1996). Depending on site parameters and pumping method used, maintaining a steady low-flow rate may require pumping up to a rate of 1 L/min. Adjustments to the pumping rate are best made within the first 15 minutes of purging to minimize purging time.

8) The pumping rate is recorded on purge data sheets every 3 to 5 minutes during purging. Any adjustments to the pumping rate are recorded. At the initiation of well purging and after recording pumping rates, water quality parameters are measured and recorded with a multi-parameter water quality meter equipped with a flow-through cell. The measured water quality parameters are temperature, turbidity, specific conductance, pH, DO, and oxygen reduction potential (ORP or Redox). Pumping shall continue until the water quality parameters have stabilized (refer to **Section 5.5.1**) or the minimum purge volume has been removed (refer to Section 5.4.2).

   After all water quality parameters have stabilized (refer to **Section 5.5.1**) and/or the minimum purge volume is purged (refer to **Section 5.5.2**), sampling may begin. If all parameters have stabilized, but turbidity remains above 10 nephelometric turbidity units (NTUs), decrease the pump rate and continue monitoring. If the pump rate cannot be reduced and turbidity remains above 10 NTUs, the information will be recorded and sampling initiated. For low yield wells, sampling commences as soon as the well has recovered sufficiently to collect the appropriate volume for the anticipated samples. If well purging has caused the well to become dry, refer to **Section 5.5.3** for sampling procedures.
9) Disconnect the tubing from the inlet side of the flow-through cell. The tubing from the pump outlet will be used to fill the groundwater sample bottles. Samples for VOCs shall be collected first followed by semi-volatile organic compounds (SVOCs). All other parameters should be collected in order from most volatile to least.
10) Groundwater samples including quality control (QC) samples are labeled and preserved per the site-specific Sampling and Analysis Plan (SAP).
11) All pertinent information will be documented in the sample log book and on the chain of custody forms including: date, time of sample, sample identification, analysis being completed, and any other information deemed relevant to the sample results. The following additional information shall be documented in the sample logbook: time at beginning and end of well purging, flow rate and any changes during the well purge, equipment used for well purge, and water quality parameter readings used to determine sample time.
12) Package and ship samples with a laboratory supplied trip blank to the offsite laboratory for analysis.
13) Meters, DPT sample apparatus, and drilling components used for groundwater sampling effort shall be decontaminated according to manufacturer recommendations. Dispose of decontamination liquids and purge water in accordance with site-specific documents.

5.5.1 Water Quality Parameters

Readings are recorded on the purge data sheets every 3 to 5 minutes. Field parameters are monitored until stabilization occurs. Unless local regulatory requirements differ, readings are generally considered stable when three consecutive readings are within the following criteria:

- Specific conductance readings within 3 percent;
- Redox potential within 10mV;
- pH within +/-0.1 standards units;
- Turbidity and DO readings within 10 percent.

5.5.2 Minimum Purge Volume

The purpose of low-flow purgin (or low stress approach) is to reduce the amount of water generated during this procedure. Generally, low-flow purging is considered to have been accomplished once the water quality parameters monitored have stabilized to within a 10 percent margin of error. The key to successful low-flow purging is minimize draw-down in the monitoring well (less than 0.33 feet). Purge flow rates are preferred to be between 0.1 and 0.5 L/min whenever possible, but rates up to 1.0 L/min are acceptable if hydrogeological conditions dictate. However, if the water quality parameters will not stabilize, a TRS established minimum purge volume will be used.

The minimum purge volume for the standard monitoring well purge approach is three times the static saturated well volume. To reduce investigative derived waste (IDW), the TRS minimum purge volume required when water quality parameters do not stabilize will be one well volume. The equation to calculate the minimum purge volume is:

$$V = 7.48*\pi r^2(td-dtw)$$

Where V = one purge volume in gallons; r= radius of well casing in feet; td = total depth of well in feet; dtw = typical depth to groundwater in feet.

5.5.3 Dry Borehole Sampling

If purging activities has caused the sampling borehole to become dry, the following procedures will be used to sample the well and allow for recharge:

1) A column of water is drawn in the cooling coil tubing with the pump.
2) The sample valve and the peristaltic pump inlet valve are closed and the pump shut off.
3) The cooling coil is disconnected from the sample valve.
4) The cooling coil is carefully removed from the ice bath.
5) The pump inlet valve is opened.
6) The sample is decanted into the sample vials from the pump end of the tubing via gravity flow.

The process is repeated until the sample volume is collected. Any other sample fractions (cations, anions) are sampled from the well end of the cooling coil tubing.

5.6 DPT Assembly Extraction and Grouting

The DPT sampling assembly can also be used to abandon the borehole during the casing extraction process. A removable plug allows for the deployment of grout through the drive casing into the subsurface, slowly filling the borehole with grout as the casing is removed from the borehole.

The DPT assembly extraction and grouting procedure is as follows:

1) Prepare grout to meet quantity and quality requirements specified by the borehole size, and local, state, federal, and/or other regulatory requirements**. Extreme caution should be exercised to minimize disturbance to the hydrostatic head within the borehole during the sealing process.**
2) Extract sample tubing from casing. Dispose of tubing as per site-specific requirements.
3) All extraction rates should be significantly slower than extraction rates used at non-heated sites. Carefully and slowly, raise the casing string to allow for the release the grout plug.

4) Advance the plug push adapter and extension rods down the casing string until the plug is reached. Apply pressure to extension rods until plug is released. Remove extension rods and plug push adapter form the casing string.
5) Attach grout nozzle to grout tubing and lower tubing into casing string until the bottom of the screen is reached. Connect grout tubing to grout pump.
6) As grout is pumped into the borehole, the casing string is slowly extracted from the subsurface. Each section of drive casing is removed as it clears the ground surface and allows for access to the threaded connections. Grouting ceases while the exposed casing section is removed. Coordinate grout pumping rates so grout fills the void at the speed the casing string is being extracted. Slower than average pumping rates are anticipated.
7) The drilling subcontractor will continue repeating the previous step until the DPT sample apparatus is extracted from the borehole. Extreme caution should be exercised to minimize disturbance to the hydrostatic head within the borehole during extraction. Extracted casings and DPT sample apparatus will be hot to the touch upon removal from the borehole.
8) Promptly clean all casings and DPT assembly to remove grout before it sets.
9) DPT assembly, casing, and components used in the sampling effort shall be decontaminated according to manufacturer recommendations after each sample location. Dispose of decontamination liquids and purge water in accordance with site-specific requirements.

6.0 RESPONSIBILITIES

Role	Responsibility
TRS Technical Group Lead	• Develop and implement SOPs • Periodically review and update procedures based on project feedback
TRS HSO	• Provide training and maintain training documentation. • Assist SHSO with modifying SOP to meet site-specific HASP and SAP requirements. • Work with PM to develop AHA for any intrusive work required to complete groundwater sampling efforts.
PM	• Review procedures in conjunction with site-specific SAP requirements and scope of work (SOW). Coordinate changes to procedures as necessary. • Schedule and coordinate sampling effort. Ensure adequate supplies are available. • Work with HSO to develop AHA for any intrusive work required to complete groundwater sampling efforts.
SHSO	• Conduct orientations for subcontractors and employees • Coordinate training needs with TRS HSO • Review procedures in conjunction with site-specific HASP. Coordinate changes to procedures as necessary to maintain safe working procedures.
Sampling Personnel	• Complete training to the level of competent person prior to initiating sampling activities. • Follow procedures and document information related to groundwater sampling effort as identified in this SOP, including and deviations from the SOP.

7.0 TRAINING

Training in SOPs is provided upon initial assignment and annually thereafter. Practical training is provided on a site-specific basis. Additional retraining is provided if there is a change in procedures or if inadequacies are observed in the individual's application of procedures.

Competent persons in hot groundwater sampling are determined by the ERH PM and SHSO and must, at a minimum, complete the following requirements:

- Read this SOP (SOP 3.11) and understand the general process and the specific requirements of this SOP.
- Sign the training acknowledgement form.
- Obtain onsite instruction by a knowledgeable person on the task-specific hazards associated with hot groundwater sampling and the methods used to control these hazards.
- Obtain onsite instruction by a knowledgeable person on important technical components of the hot groundwater sampling program to ensure the collection of representative samples.

8.0 RECORD KEEPING

These are standard (i.e., typically applicable) procedures which may be varied or changed as required, dependent on Site conditions, equipment limitations, permit requirements, or limitations imposed by the procedure. The ultimate procedures used during any sampling event, including any deviations from these procedures, shall be documented in the sample logbook. AHA's developed for any intrusive work conducted in conjunction with this SOP shall be maintained with the groundwater sample logbook.

Calibrations of water quality meters used to measure water quality readings shall be completed according to the manufacturer's recommendations. Calibration results shall be maintained in a written log kept at the site throughout the operational phase of the project.

At a minimum, the following information shall be maintained in the sample logbook related to well purging and groundwater sample collection:

- Date;
- Sample/purge location identification;
- Depth of DPT sample apparatus and screened interval;
- Type of pump used for well purge;
- Duration of well purge;
- Sample time;
- Flow rate (including changes throughout purge);
- Meter(s) used for collection of water quality parameters and calibration documentation;
- Water quality parameter readings;
- Volume of purge water collected prior to sampling;
- Sample identifications and analysis to be performed;
- Chain of custody number;
- Shipping information;
- Procedure and material used for borehole plugging/sealing;
- Procedures used for equipment decontamination;
- Deviations from this SOP, and;
- Any other information deemed relevant to the sample results.

Copies of chains of custody forms and shipping documentation shall be maintained and kept with the sample log book.

9.0 REFERENCES

Puls, R.W. and M.J. Barcelona, 1996, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedure, EPA/540/S-95/504.

Yeskis, Douglas and Zavala, Bernard, 2002, Ground Water Sampling Guidelines for Superfund and RCRA Project Managers, EPA/542-S-02-001.

Vail, Jonathon, France, Danny, and Lewis, Bobby, 2013, SESD Operating Procedure Groundwater Sampling, EPA Region 4/SESDPROC-301-R3.

Geoprobe®, 2006, Geoprobe® Screen Point 16 Groundwater Sampler, Standard Operating Procedure, Technical Bulletin No. MK3142.

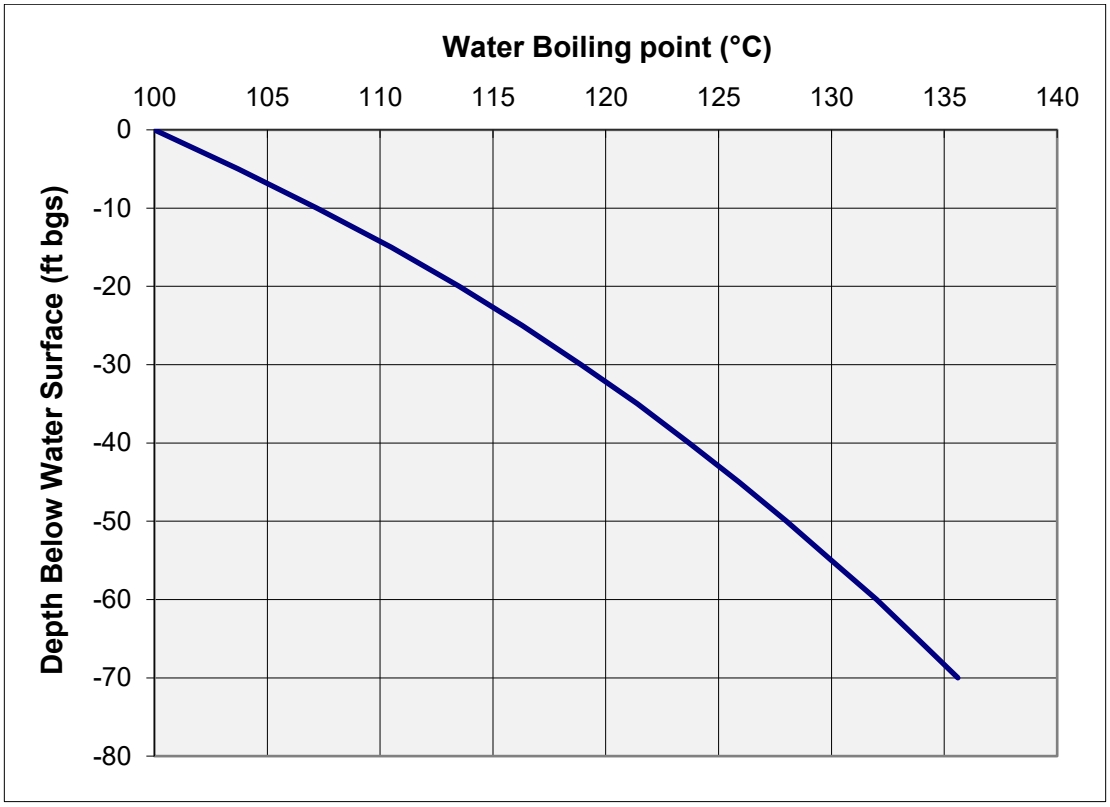
Edge, Russel W., and Cordry, Ken, 1989, The DPT: An *In Situ* Sampling Tool for Collecting Groundwater from Unconsolidated Sediments.

Site Sampling Evaluation Checklist

Project #: _____
Date: _____

Subsurface Conditions

1) What is the anticipated depth to groundwater at the time of sampling?
2) How deep below the groundwater surface elevation are the screens?
3) What are the current temperatures at or near each boring location?
4) Are there confining layers on site? Clay or silt over saturated zone sand for example.
5) Use the figure below to determine where the site's actual temperatures fit on the boiling point curve.



6) Actual temperature for each depth elevation that is higher in value than the temperatures represented by this curve suggest a temperature value greater than the hydrostatic boiling point of water.

SOP 3.11 Hot Groundwater Sampling-DPT
Training Acknowledgment

All personnel that receive training on this procedure will review and sign the acknowledgement form contained in this section.

I have been trained by TRS Group, Inc. (TRS) to perform non-intrusive hot groundwater sampling at the SITE-SPECIFIC project site. By signing this document, trainee acknowledges that SOP 3.11 Hot Groundwater Sampling-DPT has been read and the contents of the document are understood. Trainee has received hands-on training from a competent person who is authorized to use and instruct others on sampling procedures at TRS project sites.

Date	Trainee (print)	Trainee (Sign)	Trainer

Appendix E: Pilot Test Results for ISCR and Regenesis Information on ISCR/ERD Injection Products

Global Headquarters
1011 Calle Sombra
San Clemente, CA 92673
Ph: (949) 366-8000
Fax: (949) 366-8090

12/30/20

REGENESIS Project No. APUNS7186

John Funderburk
Urban Environmental Partners LLC
2324 1st Ave Suite 203
Seattle, WA 98121

SUBJECT: Design Verification Test for the Rainier Avenue Dry Cleaners Site

Dear Mr. John Funderburk,

REGENESIS Remediation Services (RRS) has recently completed a design verification test (DVT) for an in-situ injection application of 3-D Microemulsion® (3DME), S-MicroZVI® (SMZVI), and Bio-Dechlor Inoculum® Plus (BDI) at the Rainier Avenue Dry Cleaners Site located at 4208 Rainier Avenue S, Seattle, WA 98118. The goal of the application was to remediate chlorinated solvents in the groundwater of the site and to collect data for a full-scale event. RRS employed in-situ enhanced anaerobic biodegredation, chemical reduction, and bioaugmentation technologies to meet remediation goals.

RRS mobilized a support pickup truck, injection trailer, and personnel to the site to begin work over two (2) days from October 28, 2020 – October 29, 2020. RRS staffed this project with experienced personnel who ensured a safe, successful injection application. On-site activities included mixing 3DME, SMZVI, and BDI; injecting product into three (3) injection points, collecting four (4) soil borings, and radius of influence (ROI) testing to verify distribution for a full-scale application.

Please review the attached application summary page, injection log, and photo log for more detail on the application.

RRS appreciates the opportunity to work at this site with UEP. RRS will be available to interpret the field data as it is collected or answer any questions. If you need additional information regarding the application process or attached field notes, please contact Andrea Maben at 949.429.3868, or Will Mohan at 224.754.2660.

Sincerely,

William Mohan
Project Supervisor
REGENESIS Remediation Services

Andrea Maben
West Region Project Manager
REGENESIS Remediation Services

cc: dforlini@regenesis.com; clee@regenesis.com; apunsoni@regenesis.com

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1011 Calle Sombra
San Clemente, CA 92673
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Application Summary Page

OVERVIEW

Client: Urban Environmental Partners LLC
Project Name: Rainier Ave Dry Cleaners Site

Client PM: John Funderburk
RRS Project Manager: Andrea Maben
RRS Project Supervisors: Will Mohan

Site Address: 4208 Rainier Ave S. Seattle, WA 98121
Project Dates: 10/28/2020-10/29/2020

TREATMENT TECHNOLOGY

S-MicroZVI is used in soil and groundwater remediation as an in situ chemical reduction (ISCR) reagent. The ZVI acts as a reducing agent to provide electrons directly to the contaminant for degradation or to support processes that require electrons to degrade contaminants. Bio-Dechlor INOCULUM Plus (BDI Plus) is designed for use at sites where chlorinated contaminants are present and unable to be completely biodegraded via the existing microbial communities. BDI Plus is an enriched, natural microbial consortium containing species of *Dehalococcoides sp.* (DHC) which are capable of completely dechlorinating contaminants during *in situ* anaerobic bioremediation processes. This microbial consortium accelerates the extant rate of chlorinated contaminant degradation from parent compounds to intermediates (like dichloroethene (DCE) and vinyl chloride (VC)) and completely through to harmless end products such as ethene and ethane.

3-D Microemulsion is an injectable liquid material specifically designed for in situ remediation projects where the anaerobic biodegradation of chlorinated compounds through the enhanced reductive dechlorination (ERD) process is possible. ERD is the primary anaerobic biological process by which problematic chlorinated solvents such as tetrachloroethylene (PCE) and trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) in groundwater are biologically transformed into less harmful end products such as ethene and ethane.

BDI Plus is designed for use at sites where chlorinated contaminants are present and unable to be completely biodegraded via the existing microbial communities. BDI Plus is an enriched, natural microbial consortium containing species of Dehalococcoides sp. (DHC) which are capable of completely dechlorinating contaminants during in situ anaerobic bioremediation processes. BDI Plus has been shown to stimulate the rapid dechlorination of chlorinated compounds such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE), and vinyl chloride (VC). It also contains microbes capable of

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dehalogenating halomethanes (e.g. carbon tetrachloride and chloroform) and haloethanes (e.g. 1,1,1 TCA and 1,1, DCA) as well as mixtures of these halogenated contaminants.

RRS employed remediation design specifications as outlined in designs dated 9/16/2020.

DESIGN VERIFICATION TESTING

Four (4) soil borings were collected for grain size analysis across the site (UB39; UB40; UB41; UB42). Three (3) DVT injection locations were completed while observing nearby groundwater parameters (DVT-1; DVT-2; DVT-3).

UB39 was collected 12 ft. NE of MW30. UB40 was collected 12 ft. NW of MW30. UB41 was collected 12 ft. NW of MW09. UB42 was collected 5 ft. NW of MW26 and was a post DVT-1 injection ROI sample.

DVT-1 injection was placed 10 ft. NW of MW26. DVT-2 injection was placed 10 ft. NW of MW09. DVT-3 injection was placed 10 ft. S of MW30.

To test product ROI influence, water was continuously pumped to the surfacing and into a bucket utilizing a peristaltic pump provided by UEP. During the entire time of injection, groundwater level and parameters were collected (i.e. DO, pH, conductivity, ORP). These monitoring wells were utilized to determine the radius of influence (ROI) in the subsurface. The injection volume was recorded when the monitoring wells were impacted while pumping on adjacent points. There was visual color confirmation of product infiltration at MW26 and MW30, after completing ROI test injections.

APPLICATION

RRS applied the REGENESIS product 3DME and SMZVI by mixing them in the RRS injection trailer. The mixed solution was then injected through direct push borings drilled with 2-foot retractable screen. Product was distributed in two-foot increments to cover the entire treatment zone. Mixing water was provided by a nearby fire hydrant. Utilizing 1.5-inch fire hose, water was transferred into the trailer where RRS used a dual batch mixing system with two (2) 350-gallon tanks to mix the 3DME and SMZVI, injecting from one tank while mixing the other to ensure efficiency. Once mixed, these reagents were delivered into the subsurface using a positive displacement, electrically powered pump. BDI was injected via a slip-stream method using pressurized nitrogen gas.

Injection pressures were observed between 30 and 125 PSI. Injection flow rates were observed between 0 to 5 GPM.

Injections were completed by pumping on one (1) to two (2) injection points at a time using the RRS injection trailer manifold system. Although pressures were generally under 125 PSI, the RRS trailer is equipped with a pressure bypass valve that will re-route fluids back into the mix tanks if downhole

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pressures reach 125 PSI in order to keep pressures at safe levels for field personnel. For more information, please see attached Table 1.

TREATMENT AREA

A total of 1,410 gallons of 3DME and SMZVI was mixed and applied as a 4% solution. 400 pounds of 3DME and 400 pounds of SMZVI was applied during the DVT.

Application Method: Bottom-up direct push drilling with 2-foot retractable screens
Injection Depth: 35 to 25 feet below ground surface
Number of Injection Points: 3
Average Injection Flowrate: 4 GPM
Average Injection Pressure: 70 PSI
General Observations: Injection pressures were high even though injecting into sandy zones.
Deviations from Proposal: None.

Please see attached Table 1 for details on injection flow rates and pressures observed.

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Photo Log: Rainier Avenue Dry Cleaners Site

Photo 1: Water source storage tote and well extraction setup.

Photo 2: RRS trailer setup. Past product storage totes.

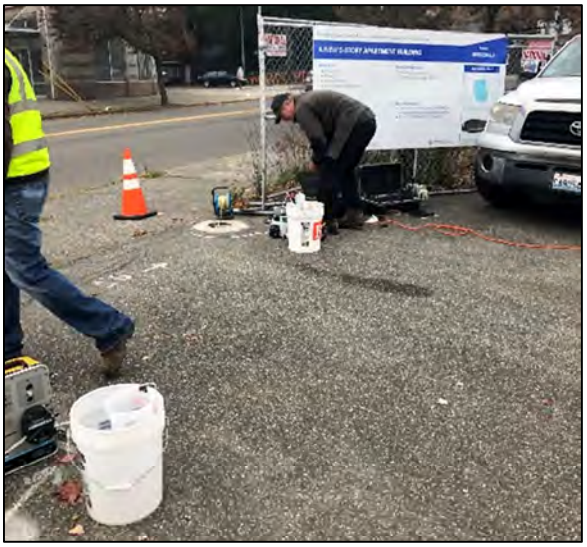


Photo 3: YSI data collection on downgradient monitoring wells.

Photo 4: ROI data collection setup on downgradient wells.

Urban Environmental Partners LLC - Rainer Mall Site
Injection Field Log
DVT / Pilot Test; October 2020
Table 1

Injection Point	Date	Time	Injection Depth (ft. bgs)	Injection Pressure (psi)	Flow Rate (gpm)	Volume of 3DME/S-MicroZVI Injected			Gallons Per Location	3DME Per Location (lb.)	S-MicroZVI Per Location (lb.)	BDI Per Location (L.)	Comments	Injection Tooling
						Beginning Flow Meter (gal.)	Ending Flow Meter (gal.)	Gallons Per Interval						
DVT-1	10/28/2020	12:20	35-33	40	3.0	0.0	10.0	10.0	470	133	133	6		2-Foot Screen
	10/28/2020	12:30	35-33	45	3.5	10.0	50.0	40.0						
	10/28/2020	12:40	35-33	55	3.8	50.0	75.0	25.0						
	10/28/2020	12:45	35-33	55	4.0	75.0	94.0	19.0						
	10/28/2020	12:50	33-31	55	4.0	94.0	115.0	21.0						
	10/28/2020	13:00	33-31	60	4.2	115.0	165.0	50.0						
	10/28/2020	13:10	33-31	60	4.2	165.0	190.0	25.0						
	10/28/2020	13:20	31-29	70	4.2	190.0	215.0	25.0						
	10/28/2020	13:30	31-29	70	4.3	215.0	260.0	45.0						
	10/28/2020	13:45	29-27	55	4.4	260.0	315.0	55.0						
	10/28/2020	13:50	29-27	55	4.5	315.0	330.0	15.0					Light Grey visual in MW-26	
	10/28/2020	13:55	29-27	55	4.5	330.0	360.0	30.0						
	10/28/2020	14:00	27-25	40	4.4	360.0	385.0	25.0						
	10/28/2020	14:10	27-25	40	4.5	385.0	400.0	15.0						
	10/28/2020	14:15	27-25	45	5.0	400.0	430.0	30.0						
	10/28/2020	14:20	27-25	45	5.1	430.0	460.0	30.0						
	10/28/2020	14:25	27-25	30	3.4	460.0	470.0	10.0						
DVT-2	10/29/2020	9:30	35-33	100	1.1	0.0	15.0	15.0	470	133	133	6	High PSI low flow - next interval.	2-Foot Screen
	10/29/2020	9:40	33-31	80	2.2	15.0	30.0	15.0						
	10/29/2020	9:45	33-31	100	2.7	30.0	40.0	10.0						
	10/29/2020	9:50	33-31	125	3.3	40.0	80.0	40.0						
	10/29/2020	10:05	33-31	125	3.9	80.0	170.0	90.0						
	10/29/2020	10:25	33-31	120	4.1	170.0	190.0	20.0						
	10/29/2020	10:30	31-29	110	4.1	190.0	210.0	20.0						
	10/29/2020	10:40	31-29	110	4.2	210.0	250.0	40.0						
	10/29/2020	10:55	31-29	110	4.1	250.0	280.0	30.0						
	10/29/2020	11:05	29-27	115	4.2	280.0	330.0	50.0						
	10/29/2020	11:25	29-27	115	4.2	330.0	375.0	45.0						
	10/29/2020	11:35	27-25	40	4.1	375.0	470.0	95.0						
DVT-3	10/29/2020	11:50	35-33	150	0.0	0.0	0.0	0.0	470	133	133	6	High PSI no flow - next interval.	2-Foot Screen
	10/29/2020	12:10	33-31	150	0.0	0.0	0.0	0.0					High PSI no flow - next interval.	
	10/29/2020	12:30	31-29	40	3.3	0.0	100.0	100.0						
	10/29/2020	13:00	31-29	40	3.5	100.0	280.0	180.0						
	10/29/2020	13:30	29-27	30	2.3	280.0	375.0	95.0						
	10/29/2020	14:30	27-25	35	2.3	375.0	470.0	95.0						

Total Gallons	Total 3DME (lb.)	Total S-MicroZVI (lb.)	Total BDI (L.)
1410	400	400	18.00

S-Micro ZVI
Sulfidated Zero-Valent Iron

REGENESIS
REMEDIATION SERVICES

UEP - Rainer Mall Site
Groundwater Parameter Log
MW-09
Table 2

2.0"				DTW		DO	ORP	pH	Conductivity	Temperature		
Well	Screen	Date	Time	(ft.)	Gallons	mg/L	mV	su	ms	Celcius	Color	Interval
Injection Water:						9.9	2.0					
SMZVI Mix w/ Water:						0.7	-248.0					
MW-09	25-35	10/29/2020	9:15		0.0	1.70		6.74	0.89	16.0	Clear	
MW-09	25-35	10/29/2020	9:20		0.0	1.70		6.67	0.91	16.0	Clear	
MW-09	25-35	10/29/2020	9:30		0.0	1.70	69.4	6.63	0.93	15.9	Clear	
MW-09	25-35	10/29/2020	9:50	14.63	80.0	1.51	58.9	6.66	0.97	15.8	Clear	33-31
MW-09	25-35	10/29/2020	10:05	14.22	170.0	1.57	52.0	6.71	1.00	15.8	Clear	33-31
MW-09	25-35	10/29/2020	10:20	13.95	190.0	1.64	48.4	6.73	1.01	15.9	Clear	33-31
MW-09	25-35	10/29/2020	10:35	14.13	225.0	0.65	42.8	6.71	1.02	15.9	Clear	31-29
MW-09	25-35	10/29/2020	10:50	13.94	275.0	0.44	36.3	6.71	1.03	15.9	Clear	31-29
MW-09	25-35	10/29/2020	11:05	13.99	330.0	0.41	34.2	6.70	1.03	15.9	Clear	29-27
MW-09	25-35	10/29/2020	11:20	14.01	360.0	0.41	32.4	6.70	1.03	15.9	Clear	29-27
MW-09	25-35	10/29/2020	11:35	12.67	470.0	0.43	32.3	6.70	1.04	15.9	Clear	27-25
MW-09	25-35	10/29/2020	11:50	13.89	470.0	0.46	28.8	6.70	1.03	16.1	Clear	27-25

UEP - Rainer Mall Site
Groundwater Parameter Log
MW-26
Table 3

2.0"				DTW		DO	ORP	pH	Conductivity	Temperature		
Well	Screen	Date	Time	(ft.)	Gallons	mg/L	mV	su	ms	Celcius	Color	Interval
Injection Water:						9.9	2.0					
SMZVI Mix w/ Water:						0.7	-248.0					
MW-26	25-40	10/28/2020	10:20		0.0	3.80	80.1	8.29	0.96	14.9	Clear	
MW-26	25-40	10/28/2020	10:30		0.0	2.29	81.6	7.10	1.00	15.4	Clear	
MW-26	25-40	10/28/2020	10:50		0.0	1.70	71.7	7.06	1.03	15.6	Clear	
MW-26	25-40	10/28/2020	11:15		0.0	1.39	68.0	7.03	1.05	15.5	Clear	
MW-26	25-40	10/28/2020	11:45		0.0	0.65	67.6	7.00	1.06	15.7	Clear	
MW-26	25-40	10/28/2020	12:00		0.0	1.20	26.0				Clear	35-33
MW-26	25-40	10/28/2020	12:20		10.0	1.10	38.0				Clear	35-33
MW-26	25-40	10/28/2020	12:30		50.0	1.04	40.0				Clear	35-33
MW-26	25-40	10/28/2020	12:40		75.0	1.00	43.0				Clear	35-33
MW-26	25-40	10/28/2020	12:45		95.0	1.02	46.0				Clear	35-33
MW-26	25-40	10/28/2020	12:50		115.0	0.98	45.8				Clear	33-31
MW-26	25-40	10/28/2020	13:00		165.0	0.81	44.8				Clear	33-31
MW-26	25-40	10/28/2020	13:10		190.0	0.68	44.0				Clear	33-31
MW-26	25-40	10/28/2020	13:20		215.0	0.61	46.0				Clear	31-29
MW-26	25-40	10/28/2020	13:30		260.0	0.54	48.8				Clear	31-29
MW-26	25-40	10/28/2020	13:35		280.0	0.47	30.4				Clear	31-29
MW-26	25-40	10/28/2020	13:45		315.0	0.47	12.0				Clear	29-27
MW-26	25-40	10/28/2020	13:50		330.0	0.36	-16.0				Light Grey	29-27
MW-26	25-40	10/28/2020	13:55		360.0	0.16	-15.0				Light Grey	29-27
MW-26	25-40	10/28/2020	14:00		385.0	0.18	-24.0				Light Grey	27-25
MW-26	25-40	10/28/2020	14:10		400.0	0.16	-91.0				Grey	27-25
MW-26	25-40	10/28/2020	14:15		430.0	0.05	-116.0				Grey	27-25
MW-26	25-40	10/28/2020	14:25		470.0	0.04	-141.0				Grey	27-25

UEP - Rainer Mall Site
Groundwater Parameter Log
MW-30
Table 4

2.0"				DTW		DO	ORP	pH	Conductivity	Temperature		
Well	Screen	Date	Time	(ft.)	Gallons	mg/L	mV	su	ms	Celcius	Color	Interval
Injection Water:						9.9	2.0					
SMZVI Mix w/ Water:						0.7	-248.0					
MW-30	25-40	10/29/2020	12:20		50.0	0.88	37.9	6.77	0.97	15.8	Clear	35-33
MW-30	25-40	10/29/2020	12:30	6.50	100.0	0.05	18.6	6.80	0.97	15.9	Clear	33-31
MW-30	25-40	10/29/2020	12:40	6.95	240.0	0.04	-149.1	6.98	1.29	16.1	Grey	31-29
MW-30	25-40	10/29/2020	12:50	6.65	260.0	0.01	-225.6	7.54	1.47	16.1	Grey	31-29
MW-30	25-40	10/29/2020	13:10	4.20	310.0	0.00	-227.0	7.68	1.46	16.2	Grey	29-27
MW-30	25-40	10/29/2020	13:30	1.62	375.0	0.00	-183.7	7.76	1.15	16.4	Grey	29-27
MW-30	25-40	10/29/2020	13:45	1.22	410.0	0.00	-259.4	7.81	1.33	16.5	Grey	27-25

Appendix F: Terrestrial Ecological Evaluation

Voluntary Cleanup Program

Washington State Department of Ecology
Toxics Cleanup Program

TERRESTRIAL ECOLOGICAL EVALUATION FORM

Under the Model Toxics Control Act (MTCA), a terrestrial ecological evaluation is necessary if hazardous substances are released into the soils at a Site. In the event of such a release, you must take one of the following three actions as part of your investigation and cleanup of the Site:

1. Document an exclusion from further evaluation using the criteria in WAC 173-340-7491.
2. Conduct a simplified evaluation as set forth in WAC 173-340-7492.
3. Conduct a site-specific evaluation as set forth in WAC 173-340-7493.

When requesting a written opinion under the Voluntary Cleanup Program (VCP), you must complete this form and submit it to the Department of Ecology (Ecology). The form documents the type and results of your evaluation.

Completion of this form is not sufficient to document your evaluation. You still need to document your analysis and the basis for your conclusion in your cleanup plan or report.

If you have questions about how to conduct a terrestrial ecological evaluation, please contact the Ecology site manager assigned to your Site. For additional guidance, please refer to https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Terrestrial-ecological-evaluation.

Step 1: IDENTIFY HAZARDOUS WASTE SITE	
Please identify below the hazardous waste site for which you are documenting an evaluation.	
Facility/Site Name: Rainier Mall	
Facility/Site Address: 4208 Rainier Avenue South, Seattle, WA 98118	
Facility/Site No: 88987973	VCP Project No.: NW3261

Step 2: IDENTIFY EVALUATOR			
Please identify below the person who conducted the evaluation and their contact information.			
Name: Brian Dixon		Title: President	
Organization: Dixon Environmental Services			
Mailing address: 4010 N 7th Street			
City: Tacoma	State: WA	Zip code: 98406	
Phone: 253-380-4303	Fax:	E-mail: Brian@DixonES.com	

Step 3: DOCUMENT EVALUATION TYPE AND RESULTS

A. Exclusion from further evaluation.

1. Does the Site qualify for an exclusion from further evaluation?

☒ Yes *If you answered **"YES,"** then answer **Question 2**.*

☐ No or Unknown *If you answered **"NO" or "UNKNOWN,"** then skip to **Step 3B** of this form.*

2. What is the basis for the exclusion? *Check all that apply. Then skip to **Step 4** of this form.*

Point of Compliance: WAC 173-340-7491(1)(a)

☐ All soil contamination is, or will be,* at least 15 feet below the surface.

☐ All soil contamination is, or will be,* at least 6 feet below the surface (or alternative depth if approved by Ecology), and institutional controls are used to manage remaining contamination.

Barriers to Exposure: WAC 173-340-7491(1)(b)

☐ All contaminated soil, is or will be,* covered by physical barriers (such as buildings or paved roads) that prevent exposure to plants and wildlife, and institutional controls are used to manage remaining contamination.

Undeveloped Land: WAC 173-340-7491(1)(c)

☐ There is less than 0.25 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site and any of the following chemicals is present: chlorinated dioxins or furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, heptachlor epoxide, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, or pentachlorobenzene.

☒ For sites not containing any of the chemicals mentioned above, there is less than 1.5 acres of contiguous[#] undeveloped[±] land on or within 500 feet of any area of the Site.

Background Concentrations: WAC 173-340-7491(1)(d)

☐ Concentrations of hazardous substances in soil do not exceed natural background levels as described in WAC 173-340-200 and 173-340-709.

* An exclusion based on future land use must have a completion date for future development that is acceptable to Ecology.

[±] "Undeveloped land" is land that is not covered by building, roads, paved areas, or other barriers that would prevent wildlife from feeding on plants, earthworms, insects, or other food in or on the soil.

[#] "Contiguous" undeveloped land is an area of undeveloped land that is not divided into smaller areas of highways, extensive paving, or similar structures that are likely to reduce the potential use of the overall area by wildlife.

B. Simplified evaluation.

1. Does the Site qualify for a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No or Unknown *If you answered **"NO"** or **"UNKNOWN,"** then skip to **Step 3C** of this form.*

2. Did you conduct a simplified evaluation?

☐ Yes *If you answered **"YES,"** then answer **Question 3** below.*

☐ No *If you answered **"NO,"** then skip to **Step 3C** of this form.*

3. Was further evaluation necessary?

☐ Yes *If you answered **"YES,"** then answer **Question 4** below.*

☐ No *If you answered **"NO,"** then answer **Question 5** below.*

4. If further evaluation was necessary, what did you do?

☐ Used the concentrations listed in Table 749-2 as cleanup levels. *If so, then skip to **Step 4** of this form.*

☐ Conducted a site-specific evaluation. *If so, then skip to **Step 3C** of this form.*

5. If no further evaluation was necessary, what was the reason? *Check all that apply. Then skip to **Step 4** of this form.*

Exposure Analysis: WAC 173-340-7492(2)(a)

☐ Area of soil contamination at the Site is not more than 350 square feet.

☐ Current or planned land use makes wildlife exposure unlikely. Used Table 749-1.

Pathway Analysis: WAC 173-340-7492(2)(b)

☐ No potential exposure pathways from soil contamination to ecological receptors.

Contaminant Analysis: WAC 173-340-7492(2)(c)

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations that exceed the values listed in Table 749-2.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations that exceed the values listed in Table 749-2, and institutional controls are used to manage remaining contamination.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 15 feet at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays.

☐ No contaminant listed in Table 749-2 is, or will be, present in the upper 6 feet (or alternative depth if approved by Ecology) at concentrations likely to be toxic or have the potential to bioaccumulate as determined using Ecology-approved bioassays, and institutional controls are used to manage remaining contamination.

C. Site-specific evaluation. A site-specific evaluation process consists of two parts: (1) formulating the problem, and (2) selecting the methods for addressing the identified problem. Both steps require consultation with and approval by Ecology. *See* WAC 173-340-7493(1)(c).

1. Was there a problem? *See* WAC 173-340-7493(2).

☐ Yes *If you answered **"YES,"** then answer **Question 2** below.*

☐ No *If you answered **"NO,"** then identify the reason here and then skip to **Question 5** below:*

- ☐ No issues were identified during the problem formulation step.
- ☐ While issues were identified, those issues were addressed by the cleanup actions for protecting human health.

2. What did you do to resolve the problem? *See* WAC 173-340-7493(3).

- ☐ Used the concentrations listed in Table 749-3 as cleanup levels. *If so, then skip to **Question 5** below.*
- ☐ Used one or more of the methods listed in WAC 173-340-7493(3) to evaluate and address the identified problem. *If so, then answer **Questions 3 and 4** below.*

3. If you conducted further site-specific evaluations, what methods did you use? *Check all that apply. See* WAC 173-340-7493(3).

- ☐ Literature surveys.
- ☐ Soil bioassays.
- ☐ Wildlife exposure model.
- ☐ Biomarkers.
- ☐ Site-specific field studies.
- ☐ Weight of evidence.
- ☐ Other methods approved by Ecology. If so, please specify:

4. What was the result of those evaluations?

- ☐ Confirmed there was no problem.
- ☐ Confirmed there was a problem and established site-specific cleanup levels.

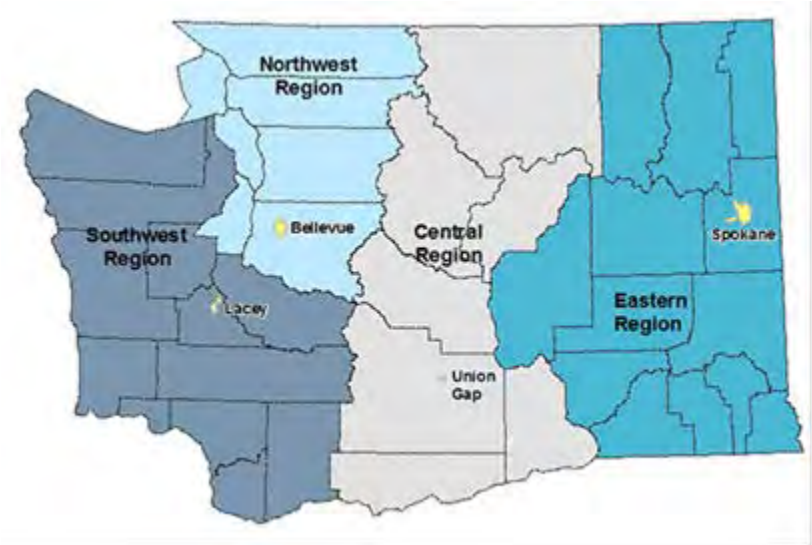
5. Have you already obtained Ecology's approval of both your problem formulation and problem resolution steps?

☐ Yes If so, please identify the Ecology staff who approved those steps:

☐ No

Step 4: SUBMITTAL

Please mail your completed form to the Ecology site manager assigned to your Site. If a site manager has not yet been assigned, please mail your completed form to the Ecology regional office for the County in which your Site is located.



Northwest Region: Attn: VCP Coordinator 3190 160th Ave. SE Bellevue, WA 98008-5452	**Central Region:** Attn: VCP Coordinator 1250 West Alder St. Union Gap, WA 98903-0009
Southwest Region: Attn: VCP Coordinator P.O. Box 47775 Olympia, WA 98504-7775	**Eastern Region:** Attn: VCP Coordinator N. 4601 Monroe Spokane WA 99205-1295

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Appendix G: PanGeo: Existing Timber Pile Evaluation, January 13, 2020

PanGEO INCORPORATED
Geotechnical & Earthquake Engineering Consultants

January 13, 2021
PanGEO Project No. 20-162

Ms. Norah Potter
Rainier & Genesee, LLC
401 North 36th Street, Suite 104
Seattle, Washington 98103

Subject: **Existing Timber Pile Evaluation**
Proposed Mixed-Use Development
4208 Rainier Avenue South, Seattle, Washington

Dear Ms. Potter:

This report summarizes our observations of the existing timber piles supporting the existing building at 4208 Rainier Avenue South in Seattle. We understand that the project team is considering using the existing piles to support the floor of the proposed building, which will occupy the approximately the same footprint as the existing building. This report includes our observations of the piles partially exhumed for this evaluation, and from a previous exploration completed by others. In summary, the timber piles observed were in adequate condition, and in our opinion suitable for supporting the new concrete slab.

SITE AND PROJECT DESCRIPTION

The subject site is located at 4208 Rainier Avenue South in the Columbia City neighborhood of Seattle, Washington. It is bordered to the north by a two-story mixed use complex, to the south by South Genesee Street, to the east by 36th Avenue South, and to the west by Rainier Avenue South. The approximate north half of the site is occupied by a one-story at-grade retail/warehouse building (former Safeway grocery store), and the south half of the site is an asphalt-paved parking lot. The site is relatively flat, with less than five feet of elevation change across the site.

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As currently planned, the existing building, which is supported on timber piles, will be demolished to construct an at-grade mid-rise mixed-use buildings. The proposed building will have a similar footprint as the existing building.

OBSERVATIONS EXISTING FOUNDATION

Based on our review of the foundation plans for the existing building, the existing building is supported on timber piles. We understand that the project team is considering re-using the existing timber piles to support the concrete floor in the proposed building, provided that the existing timber piles are in good structural conditions (i.e., no dry rot). To verify the conditions on the piles, select piles were partially exhumed to provide a direct visual inspection. Our field observations are summarized below.

EXISTING TIMBER PILE OBSERVATIONS

PanGEO was on site on 12/31/2020 to observe the timber piles. Three test pits (TP-1 to TP-3) were excavated prior to our arrival to expose the existing piles. The test pit locations are shown on the attached Figure 1. The test pits were excavated to between 2 to 4½ feet below the existing 7-inch thick concrete floor slab.

The soils observed in the test pits generally consisted of loose, brown to gray, silty sand with gravel, which we interpreted as fill. No voids were observed beneath the existing concrete slab at these test pit locations. Groundwater was not observed in the test pits at the time of our site visit.

PanGEO was able to observe the conditions of two existing timber piles (Pile 2 and Pile 109) during our site visit, and reviewed the photos of two additional timber piles from a previous exploration completed by Urban Environmental Planners along the north side of the building. The locations of the piles observed are indicated on the attached Figure 1.

We attempted to expose Pile 101, but the excavation became unsafe and the effort was aborted.

The top of the exposed existing timber piles observed were between 8 to 18 inches in diameter. The timber piles were probed with a screw driver for indication of decay. In summary, we did not observe any signs of decay, indicating the timber piles are in adequate condition.

Plates 1 and 2, below, shows the conditions exposed at Piles 2 and 109 during the current exploration. Plate 3 shows the conditions of the piles previously exposed by Urban Environmental Planners.

Plate 1. Excavation and pile condition at Pile 109. The existing concrete slab was poured directly on the existing timber pile. Top of timber pile is approximately 17 inches in diameter. Did not observe signs of decay on the existing timber pile. (12/31/2020)

Plate 2. Observed Pile 2 condition. Timber pile is approximately 8 inches in diameter. Did not observe signs of decay on the existing timber pile. (12/31/2020)

Plate 3. Piles observed in northwest corner of north loading dock by Urban Environmental Partners (UEP). Timber piles are approximately 18 inches in diameter. Photo provided by UEP. Do not observe signs of decay on the existing timber piles.

EXISTING GRADE BEAM

An existing concrete grade beam was observed at Test Pit TP-2 (Pile 101), below the existing 7-inch concrete slab. The grade beam extended approximately 2 feet below the existing concrete slab to the existing pile cap (see Plate 4, below).

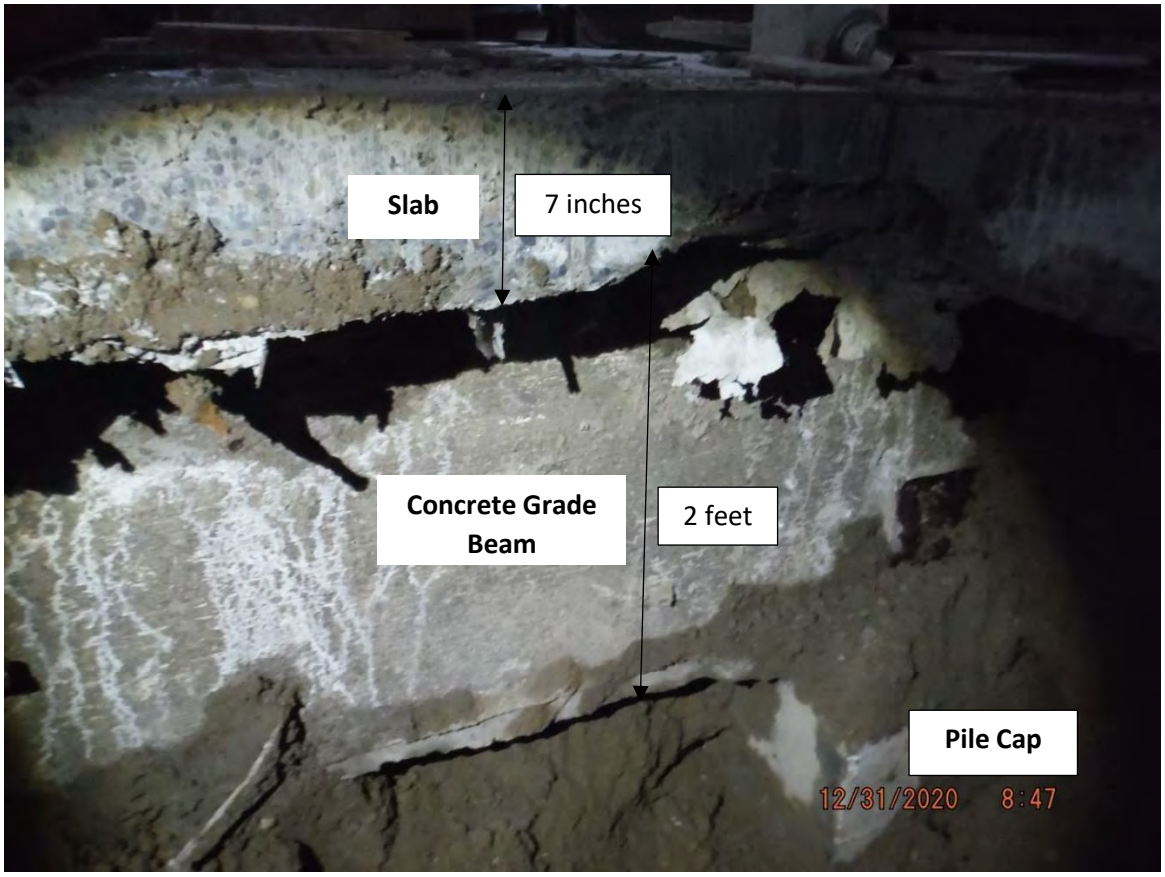

Plate 4. Slab and grade beam observed at Test Pit TP-2 (Pile 101)

CONCLUSIONS AND RECOMMENDATIONS

In summary, the existing piles were observed to be in satisfactory conditions, and in our opinion it is appropriate to re-purpose the existing piles to support the new floor slab in the proposed building. The top of the existing piles may be cast directly into the new concrete slab, similar to the construction of the existing slab (see Plate 1, page 3). If the floor in the proposed building will

be lower than the existing floor slab, the top of the existing timber piles should be cutoff accordingly such that the top of the piles will be embedded entirely within the new slab.

Based on the subsurface conditions at the site and the performance of the existing building foundation, it is our opinion that these piles were driven to the weathered Blakeley Formation underlying the site. As such, it is our opinion that the existing timber piles are capable of supporting an allowable axial load of 20 tons or more.

Form the geotechnical perspective, the existing fill adjacent to the piles may remain. If, during construction, the existing fill appears loose, the existing fill should be re-compacted with a jumping jack or equivalent prior to placing reinforcing steel for the floor slab.

In the event that the existing piles are not properly-spaced for the new building slab, driven small diameter (3 to 6 inches in diameter) steel pipe piles (pin piles) can be installed to supplement the existing timber piles. For design purposes, an allowable axial compression load of 6 tons maybe assumed for 3-inch piles, 10 tons for 4-inch piles, and 20 tons for 6-inch piles.

CLOSURE

We have prepared this report for Rainier & Genesee, LLC and the project design team. Recommendations contained in this report are based on reviewing existing onsite subsurface information and our understanding of the project. The study was performed using a mutually agreed-upon scope of services.

Variations in soil conditions may exist between the locations of the explorations and the actual conditions underlying the site. The nature and extent of soil variations may not be evident until construction occurs. If any soil conditions are encountered at the site that are different from those described in this report, we should be notified immediately to review the applicability of our recommendations. Additionally, we should also be notified to review the applicability of our recommendations if there are any changes in the project scope.

The scope of our work does not include services related to construction safety precautions. Our recommendations are not intended to direct the contractors' methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design. Additionally, the scope of our services specifically excludes the assessment of environmental characteristics, particularly those involving hazardous substances. We are not mold consultants nor are our recommendations to be interpreted as being preventative of mold development. A mold specialist should be consulted for all mold-related issues.

This report has been prepared for planning and design purposes for specific application to the proposed project in accordance with the generally accepted standards of local practice at the time this report was written. No warranty, express or implied, is made.

This report may be used only by the client and for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both off and on-site), or other factors including advances in our understanding of applied science, may change over time and could materially affect our findings. Therefore, this report should not be relied upon after 24 months from its issuance. PanGEO should be notified if the project is delayed by more than 24 months from the date of this report so that we may review the applicability of our conclusions considering the time lapse.

It is the client's responsibility to see that all parties to this project, including the designer, contractor, subcontractors, etc., are made aware of this report in its entirety. The use of information contained in this report for bidding purposes should be done at the contractor's option and risk. Any party other than the client who wishes to use this report shall notify PanGEO of such intended use and for permission to copy this report. Based on the intended use of the report, PanGEO may require that additional work be performed and that an updated report be reissued. Noncompliance with any of these requirements will release PanGEO from any liability resulting from the use this report.

We appreciate the opportunity to be of service.

Sincerely,

Siew L. Tan, P.E.
Principal Geotechnical Engineer

Enclosure:
Figure 1. Pile Foundation Layout Plans

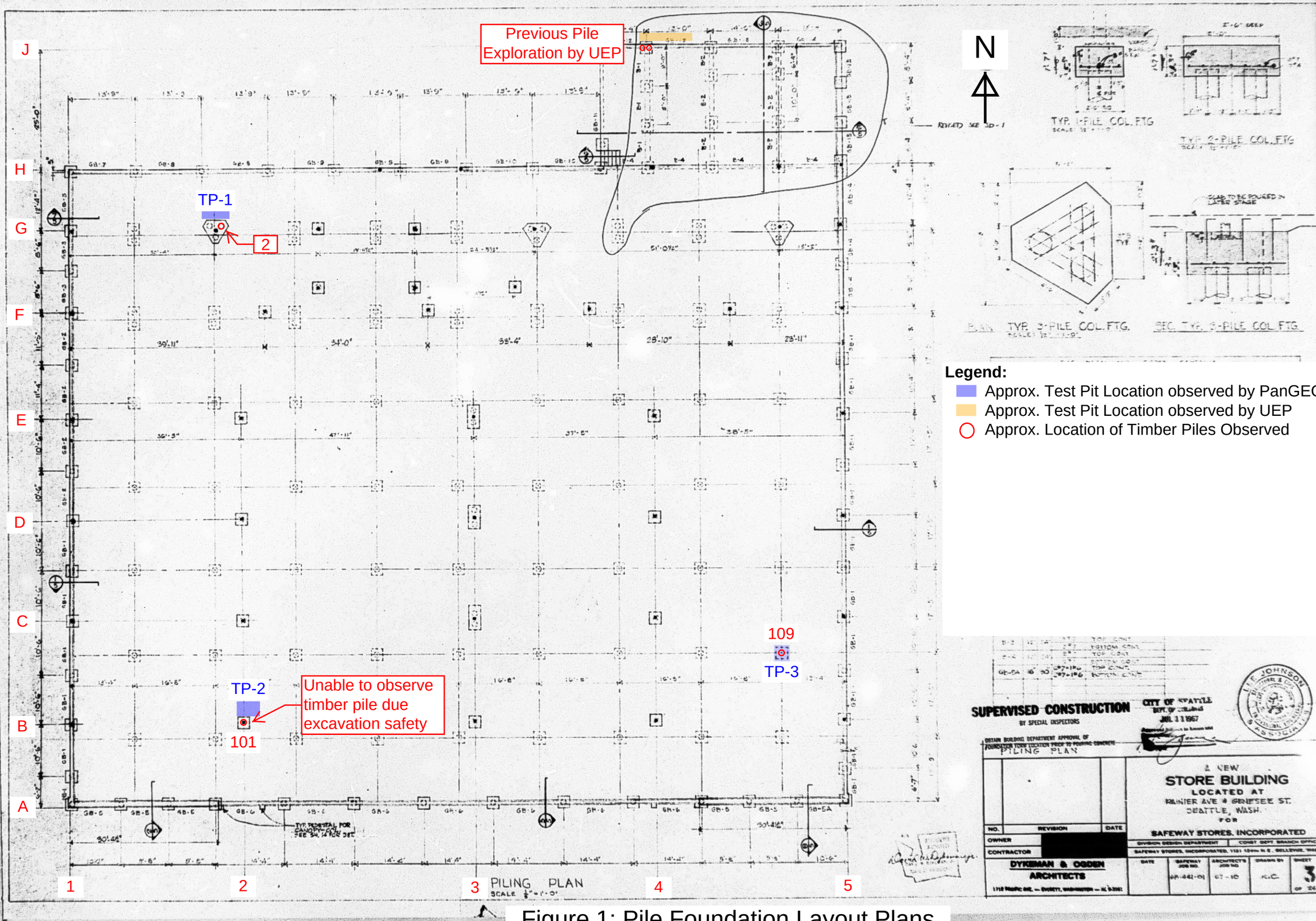

Figure 1: Pile Foundation Layout Plans