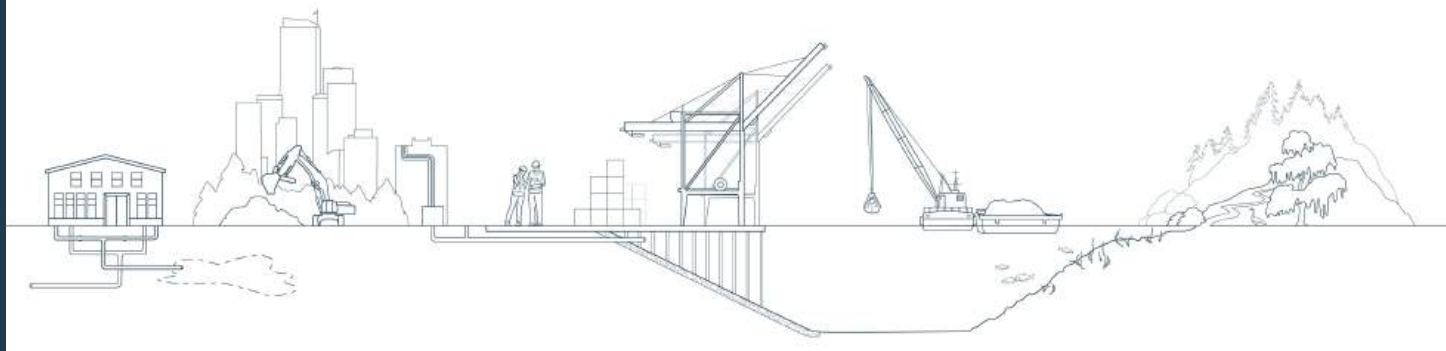
Cleanup Action Plan Addendum

Riverside HVOC Site

Prepared for
City of Bothell

February 2025 DRAFT



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The interpretations and conclusions contained in this report are based in part on site characterization data collected by others and provided by the City of Bothell. Floyd|Snider cannot assure the accuracy of this information.

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List of Abbreviations

Abbreviation	Definition
ARAR	Applicable or relevant and appropriate requirement
bgs	Below ground surface
CAP	Cleanup Action Plan
CUL	Cleanup level
Ecology	Washington State Department of Ecology
HVOC	Halogenated volatile organic compound
µg/L	Micrograms per liter
MTCA	Model Toxics Control Act
PCE	Tetrachloroethene
PDI	Pre-engineering design investigation
RAO	Remedial action objective
RI/FS	Remediation Investigation and Feasibility Study
Site	Riverside Halogenated Volatile Organic Compound Site
SVE	Soil vapor extraction
TCE	Trichloroethene
WAC	Washington Administrative Code
ZVI	Zero-valent iron

1.0 Introduction

This document is an addendum to the Washington State Department of Ecology's (Ecology's) Cleanup Action Plan (CAP) for the Riverside Halogenated Volatile Organic Compound (HVOC) Site (Site) issued by Ecology in March 2023 as Exhibit B of Agreed Order No. DE 21531 (Ecology 2023). This addendum provides details for a revised cleanup action to address Site conditions observed during the pre-engineering design investigation, which was conducted in 2024 as documented in the Pre-Engineering Design Investigation (PDI) Data Report (Appendix A). The cleanup action described in the CAP is superseded by this document.

1.1 DECLARATION

Ecology has revised the selected cleanup action based on current Site conditions to be protective of human health and the environment and to minimize cost, treatment time, and impact to the environment during cleanup action implementation. Furthermore, the selected cleanup action is consistent with the State of Washington's preference for permanent solutions, as stated in RCW 70A.305.040(1)(b). Ecology will consider all public input received during the public comment period for this CAP Addendum to the extent possible.

1.2 CLEANUP STANDARDS

Site-specific cleanup standards were developed in the CAP as a part of an overall remediation process under Ecology oversight for this Site using the authority of the Model Toxics Control Act (MTCA). The two primary components of cleanup standards are cleanup levels (CULs) and points of compliance.

There are no changes to the cleanup standards presented in the CAP. However, because soil contamination exceedances of tetrachloroethene (PCE) and trichloroethene (TCE) CULs are all in the saturated zone and soil cleanup standards for these COCs were developed for protection of groundwater, compliance with soil cleanup standards can be empirically demonstrated by meeting groundwater cleanup standards for the Site. Table 1.1 presents a summary of the cleanup standards for Site soil and groundwater.

Table 1.1
Cleanup Standards from the 2023 Cleanup Action Plan

Analyte	Unit	Cleanup Level
Soil		
PCE	mg/kg	0.05
TCE	mg/kg	0.03
cis-1,2-DCE	mg/kg	160
Vinyl chloride	mg/kg	0.67
Groundwater		
PCE	µg/L	4.9
TCE	µg/L	0.38
cis-1,2-DCE	µg/L	16
Vinyl chloride	µg/L	0.02

Notes:
cis-1,2-DCE *cis*-1,2-Dichloroethene
µg/L Micrograms per kilogram
mg/kg Milligrams per kilogram

1.3 UPDATES TO THE ADMINISTRATIVE RECORD

The documents used to make the decisions discussed in the CAP and this CAP Addendum are on file in the administrative record for the Site. Major documents supporting this CAP Addendum are listed in the References section or attached as Appendix A. The entire administrative record for the Site is available for public review by appointment at Ecology's Northwest Regional Office, located at 15700 Dayton Avenue N, Shoreline, Washington 98133. Results from applicable studies and reports are summarized to provide background information related to the CAP Addendum. These studies and reports include the following:

- Pre-Engineering Design Investigation Data Report, Riverside HVOC Site, December 2024
- Supplemental Remedial Investigation & Feasibility Study, Riverside HVOC Site, Bothell, Washington, February 2022

2.0 Supplemental Data Collection

In 2024, additional soil and groundwater data were collected to inform design of the cleanup action for the Site:

- Hydrogeologic data were collected to inform the suitability of the conceptual bio-recirculation system design (or other variations of groundwater pump and treat systems) and to inform any necessary adjustments to support engineering design and injection parameters such as rates and quantities of treatment materials.
- Data on HVOC distribution and geochemistry in groundwater were collected to confirm the current horizontal extents of the HVOC plume, to assess the vertical distribution and flux of HVOCs in groundwater, and to assess geochemical parameters such as redox conditions to inform efficient formulation and delivery of treatment materials.
- Data on HVOC distribution in soil were collected to inform the likely mass of HVOCs in the vadose zone that would need to be targeted by soil vapor extraction (SVE) and to more precisely delineate the extent of HVOCs in the presumed source area to inform design of soil treatment in the saturated zone.

All results discussed in this section, as well as laboratory analytical reports for 2024 sampling, are presented in the PDI Data Report (Appendix A).

2.1 GROUNDWATER

Prior to 2024, the most recent groundwater sampling occurred in 2020. In 2024, groundwater samples were collected to document current HVOC concentrations after continued groundwater extraction since 2020[1] and to further refine the lateral extent of HVOCs in groundwater exceeding CULs. In general, the most recent 2024 results collected from monitoring wells Site-wide show HVOC concentrations have reduced since 2020 and prior results that were used to inform the selected cleanup action in the CAP:

- **PCE** concentrations ranged from not detected to 9.8 micrograms per liter (µg/L), compared with the 2020 maximum concentration of 26 µg/L (CUL: 4.9 µg/L).
- **TCE** concentrations ranged from not detected to 3.4 µg/L, compared with the 2020 maximum concentration of 23 µg/L (CUL: 0.38 µg/L).
- **Vinyl chloride** concentrations ranged from not detected to 6.2 µg/L, compared with the 2020 maximum concentration of 28 µg/L (CUL: 0.020 µg/L). Although the most elevated concentration of vinyl chloride remains at the farthest downgradient monitoring point (RMW-7), a declining trend has been observed in this area.

[1] Groundwater extraction continues to be performed as part of an interaction required by Agreed Order No. DE 6295 and its Amendment No. 2.

The 2024 geochemical results confirm that site conditions are favorable for anaerobic biodegradation of HVOCs by reductive dechlorination (Appendix A). Anaerobic biodegradation remains the preferred primary treatment technology for HVOCs in Site groundwater.

Because of the groundwater extraction pumping between 2020 and 2024, groundwater source contamination mass has been reduced as described above. These reductions are such that remaining source contamination can be addressed by a single treatment event using direct-push drilling, instead of the continuous injection, extraction, and recirculation treatment presented in the CAP.

The PDI additionally documented that downgradient migration of vinyl chloride appeared to be exacerbated by groundwater extraction pumping. Addition of an in situ treatment barrier is recommended to fully treat vinyl chloride at the point of discharge to the Sammamish River.

2.2 SOIL

Soil samples were collected to inform design of SVE in the vadose zone and soil treatment in the saturated zone.

HVOCs that exceed CULs in soil include PCE and TCE. Based on PDI sample results and historical sample results, the shallowest occurrences of HVOC CUL exceedances in soil occurred at the water table (approximately 12 to 13 feet below ground surface [bgs] at sample location SB-06), and concentrations in shallower (vadose zone) samples were less than CULs. Data indicate that vadose soil does not require SVE treatment; SVE would not remove the soil contaminant mass located in the saturated zone.

The PDI determined that vertical and horizontal extents of PCE and TCE exceeding CULs are sufficiently defined in the vicinity of the former machine shop, and the concentrations that occur in saturated soil are sufficiently low to be treated concurrently with in situ groundwater treatment.

2.3 RISKS TO HUMAN HEALTH AND ENVIRONMENT

PDI samples from 2024 indicated no CUL exceedances of HVOCs in vadose zone soil above 12 feet bgs; therefore, the soil direct contact pathway for terrestrial biota no longer applies, because soil to the point of compliance for terrestrial biota (6 feet bgs) meets Site CULs. The soil direct contact pathway should be considered complete only for human exposures with a point of compliance to 15 feet bgs. However, Site soil PCE and TCE CULs are based on protection of groundwater quality and the groundwater to surface water pathway, and this finding does not impact the application of the Site CULs. HVOC concentrations in Site soil do not exceed the MTCA Method B CULs for direct contact in any samples (Ecology 2025).

3.0 Cleanup Action Selection

The following sections describe the proposed changes to the 2023 CAP cleanup action based on the findings of the PDI.

3.1 SUMMARY OF 2023 CAP CLEANUP ACTION

The 2023 CAP cleanup action includes SVE and Site-wide recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate™) to enhance biodegradation of HVOCs (Ecology 2023). The elements of the 2023 CAP cleanup action are shown on Figure 3.1, which is reproduced from the CAP.

The 2023 CAP cleanup action included proposed installation of the following components:

- 12 soil vapor extraction wells
- Vapor collection piping and blowers and a vapor treatment system to remove HVOCs prior to discharge
- Six injection wells and two extraction wells (plus conversion of two existing extraction/monitoring wells for injection)
- Injection delivery and recovery piping, groundwater treatment system to remove remaining HVOCs prior to reinjection, and injection delivery control system

Implementation of the cleanup action would include regular operation and maintenance including weekly application of CarBstrate and periodic changeout of carbon vessels for both the SVE and bio-recirculation systems. It was estimated that the SVE system would run for 3 years and that the bio-recirculation system would run for 2 years. The estimated restoration time frame for this cleanup action is 5 years. The estimated cost for this cleanup action, adjusted to present value costs estimated in December 2024, is $2,732,602 (Appendix A).

3.2 EVALUATION OF 2023 CAP CLEANUP ACTION

In response to the finding of the PDI, which concluded that HVOC concentrations in groundwater have decreased due to ongoing groundwater extraction, a re-evaluation of remedial alternatives was performed as described in the PDI Report. This evaluation included the 2023 CAP cleanup action as well as two new alternatives that were developed based on current HVOC conditions at the Site.

3.2.1 Achievement of Remedial Action Objectives

Remedial action objectives (RAOs) describe the actions necessary to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through each exposure pathway and migration route. They identify goals that should be accomplished to meet the requirements of the MTCA Cleanup Regulations (Washington Administrative Code [WAC] 173-340).

RAOs may be informed by current or future property use. RAOs were not previously defined for the Site; therefore, the following RAOs are defined for the Site:

- Protect humans and the environment (ecological receptors) from exposure to Site contamination that exceeds applicable CULs.
    - Achieve CULs in groundwater to protect surface water quality of the adjacent Sammamish River, prioritizing rapid achievement of CULs at the point of discharge to surface water.
    - Address residual contaminated soil to reduce exposure to hazardous substances via leaching to groundwater.
- Comply with local, state, and federal laws and other applicable or relevant and appropriate requirement (ARARs; WAC 173-340-710) and Site-specific cleanup standards. ARARs are limited to applicable federal and state laws and those that Ecology determines are relevant and appropriate.
- Remediate contaminants in a manner that minimizes impacts to public use of park space at the Site.
- Provide compliance monitoring to evaluate (1) the effectiveness of the preferred cleanup action and (2) when the cleanup standards are met.

Some elements of the 2023 CAP cleanup action may not support progress toward achieving these RAOs.

- The available soil data suggest that SVE will not reduce exposures to contaminated soil because it will not reach the contaminated soil mass that lies fully below the groundwater table.
- The available groundwater data suggest that Site-wide groundwater recirculation, which includes downgradient groundwater extraction, may not achieve CULs at the point of discharge to the Sammamish River because extraction could exacerbate migration of vinyl chloride toward the river.
- Aerobic conditions that may be created by the remediation technologies and compete with the desired anaerobic biodegradation process in groundwater are also of concern, primarily for SVE but also potentially for the mechanical process of extraction and injection.

Site soil data demonstrate that excavation and SVE with air sparging, technologies considered in the Remedial Investigation and Feasibility Study (RI/FS; Kane 2022), remain impractical at the Site; excavation to depths of almost 20 feet below the water table is cost prohibitive and unsafe adjacent to State Route 522, and air sparging would create adverse geochemical conditions for anaerobic biodegradation of HVOCs in groundwater.

Another treatment technology for groundwater considered in the RI/FS included injection of organic carbon (edible oil) without recirculation. The Site groundwater data suggest that

treatment of groundwater cleanup via passive migration is a viable alternative technology because it would not exacerbate downgradient vinyl chloride migration.

3.3 OVERVIEW OF REVISED CLEANUP ACTION

The 2024 PDI data indicate that vadose soil does not require treatment and that the remaining source contamination in saturated soil and groundwater is reduced from 2020 concentrations and is able to be treated with a single treatment event using direct-push drilling, instead of continuous injection, extraction, and recirculation treatment. The revised cleanup action makes the following adjustments to adapt the remedial action to current Site conditions based on the findings of the PDI:

- SVE is eliminated.
- Soluble organic carbon and *Dehalococcoides* treatment in the source area is achieved by direct-push injection, which is supplemented with zero-valent iron (ZVI). A lesser amount of supplemental ZVI is also added in the western plume.
- Downgradient soluble organic carbon and *Dehalococcoides* treatment are supplemented with ZVI and colloidal activated carbon (such as PlumeStop) to form in situ treatment barriers.
- A controlled-release source of organic carbon is used.

The elements of the revised cleanup action are shown on Figure 3.2. This alternative supplements source area treatment with ZVI to achieve prompt abiotic degradation of PCE and TCE and ensure ongoing reducing conditions to promote anaerobic biodegradation. The addition of ZVI, combined with a controlled-release form of organic carbon, allows for a single direct-push application of the treatment materials in lieu of recirculation to degrade the remaining HVOC mass. The addition of colloidal activated carbon downgradient is designed to adsorb HVOCs and allow longer contact time with the treatment materials, which will allow for more rapid cleanup of downgradient groundwater. A double row of injections is assumed in order to form a highly effective barrier. The estimated restoration time frame for this cleanup action is 3 years. The estimated cost for this cleanup action is $1,655,362.

ARARs were established in the CAP for the 2023 CAP cleanup action. The same ARARs generally apply to the revised cleanup action; however, SVE was eliminated for the revised cleanup action and ARARs presented in the CAP related to air quality and air permitting are no longer applicable.

Institutional controls are not anticipated to be required at the Site.

Additional details about the revised cleanup action including remedial design, monitoring, and reporting as required by MTCA; remedy costs; and disproportionate cost analysis for the revised cleanup action will be implemented as described in the PDI Data Report (Appendix A).

3.4 DECISION

Based on the analysis described in the previous sections, Ecology has eliminated SVE treatment of vadose soil and revised the in situ groundwater treatment as shown on Figure 3.2 to address contamination in saturated soil and groundwater at the Site. This revised cleanup action will remediate contaminants in saturated soil and groundwater, treat contaminated groundwater flowing through downgradient in situ treatment barriers before reaching the Sammamish River, and protect human health and the environment at reduced cost and faster restoration time frame than the 2023 CAP cleanup action.

Consistent with the CAP and MTCA, the revised cleanup action will include compliance monitoring, including protection, performance, and confirmation monitoring, as further detailed in the PDI Data Report (Appendix A). Compliance monitoring will be further described in a Construction Compliance Monitoring Plan as part of the Engineering Design Report and a post-remedy Long-Term Compliance Monitoring Plan, which will include a Groundwater Monitoring Plan.

4.0 References

Kane Environmental, Inc. (Kane). 2022. *Supplemental Remedial Investigation & Feasibility Study, Riverside HVOC Site, Bothell, Washington.* Prepared for City of Bothell. 22 February.

Washington State Department of Ecology (Ecology). 2023. *Agreed Order No. DE 21531.* 22 March.

____. 2025. Cleanup Levels and Risk Calculation (CLARC) Workbook. January. Available: https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Contamination-clean-up-tools/CLARC/Data-tables

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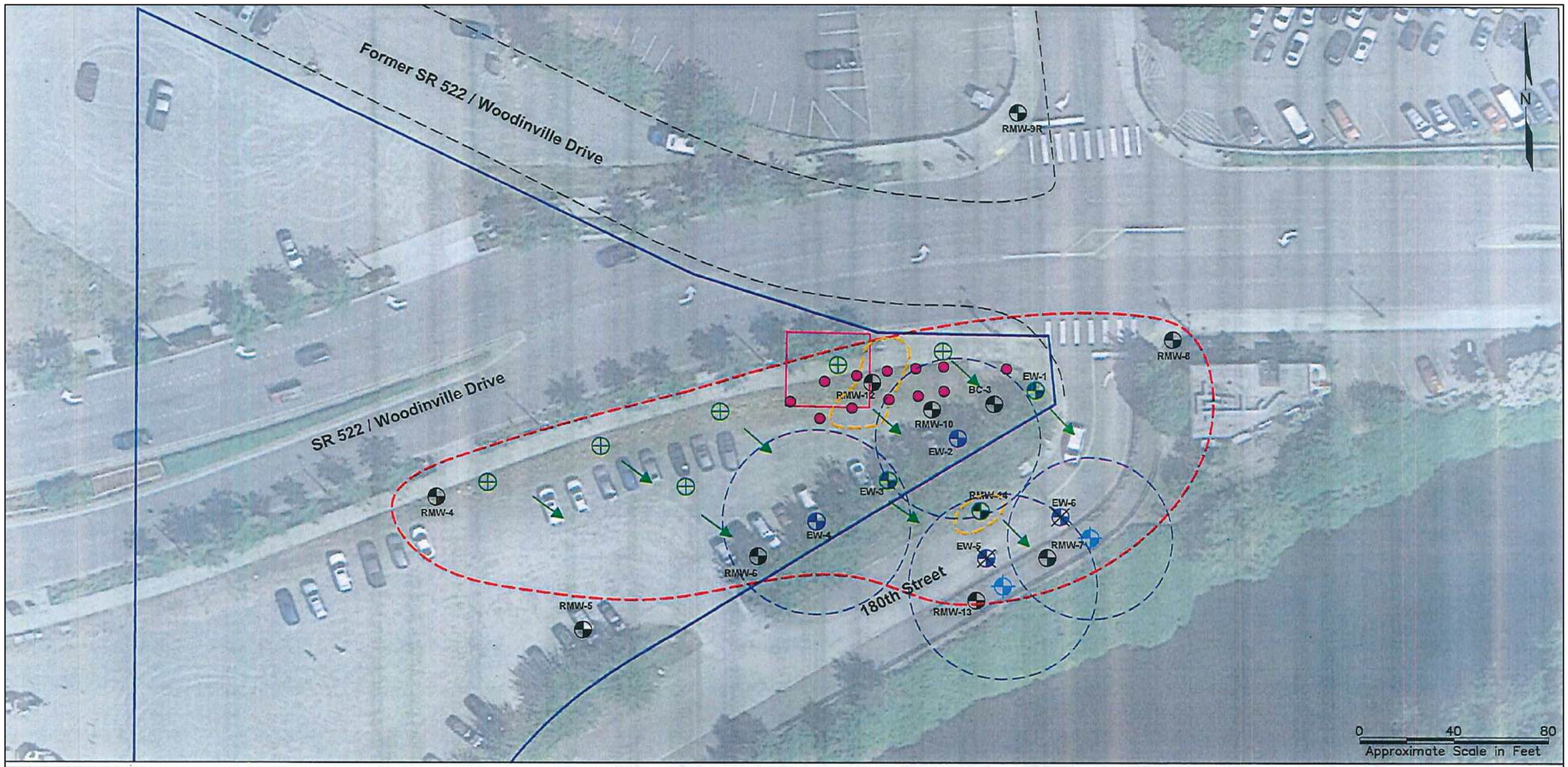
Riverside HVOC Site

Figures



LEGEND

- Approximate location of monitoring well
- Approximate location of extraction well
- Approximate location of historical machine shop
- Approximate location of historical Riverside property
- Approximate location of Riverside HVOC Site Boundary and approximate extent of groundwater containing HVOCs contaminants above Site-specific cleanup levels
- Approximate extent of soil containing HVOC contaminants at concentrations exceeding MTCA Method A/B Cleanup Levels
- Approximate location of new bioremediation injection well
- Approximate location of existing monitoring/extraction well to be converted to bioremediation injection well
- Approximate location of existing extraction well to be used as monitoring well
- Approximate location of new extraction well (1)
- Approximate location of soil vapor extraction well
- Simulated groundwater injection product path
- Simulated groundwater extraction radius of influence

Note:
1 An equal number of injection and extraction wells are assumed for alternatives evaluation.

Source: Cleanup Action Plan Figure 6 (Ecology 2023)

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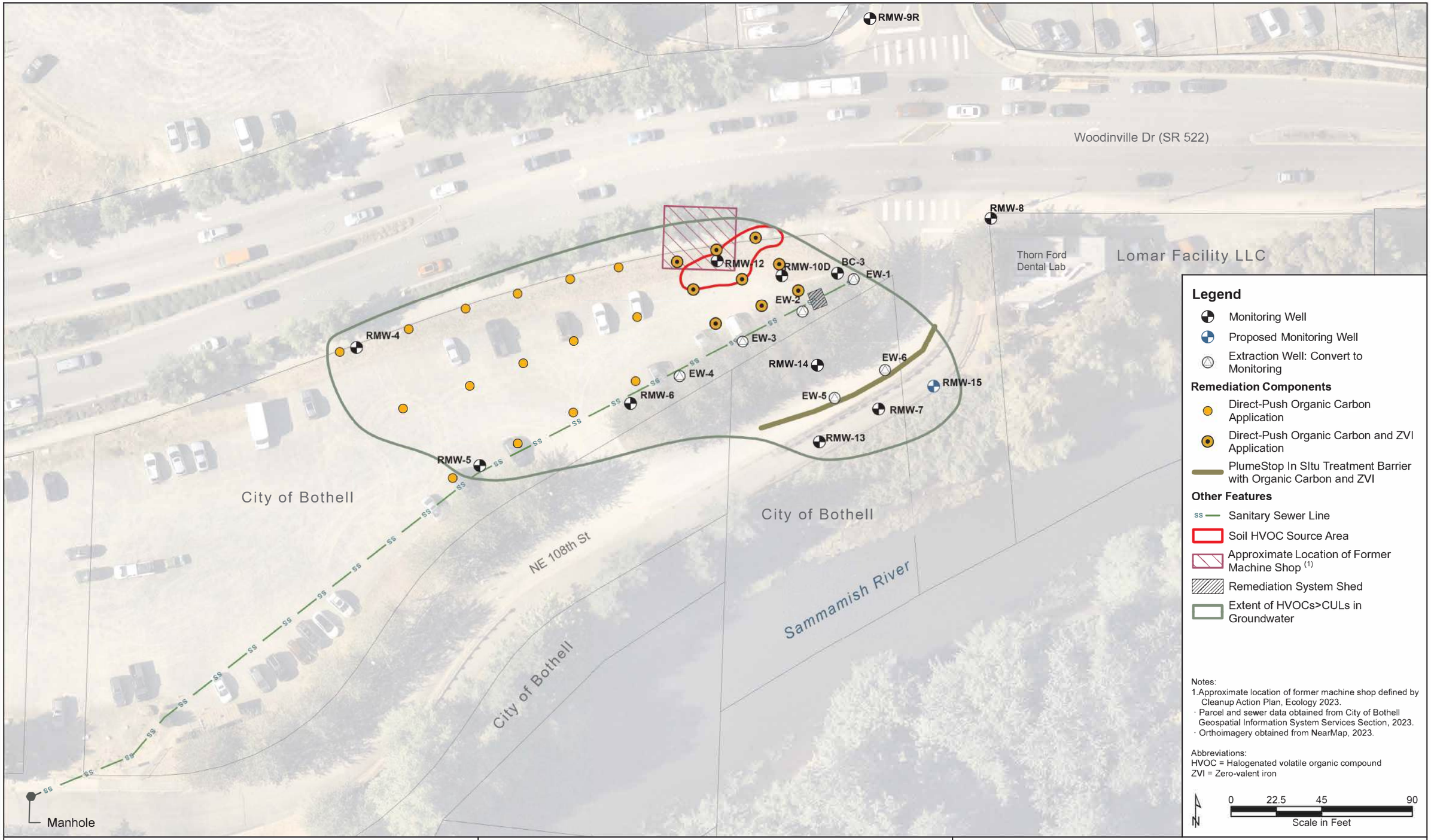
Riverside HVOC Site
Bothell, Washington

Figure 3.1
2023 CAP Cleanup Action

1/15/2025



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Riverside HVOC Site
Bothell, Washington

Figure 3.2
Revised Cleanup Action

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12/16/2024

Cleanup Action Plan Addendum

Riverside HVOC Site

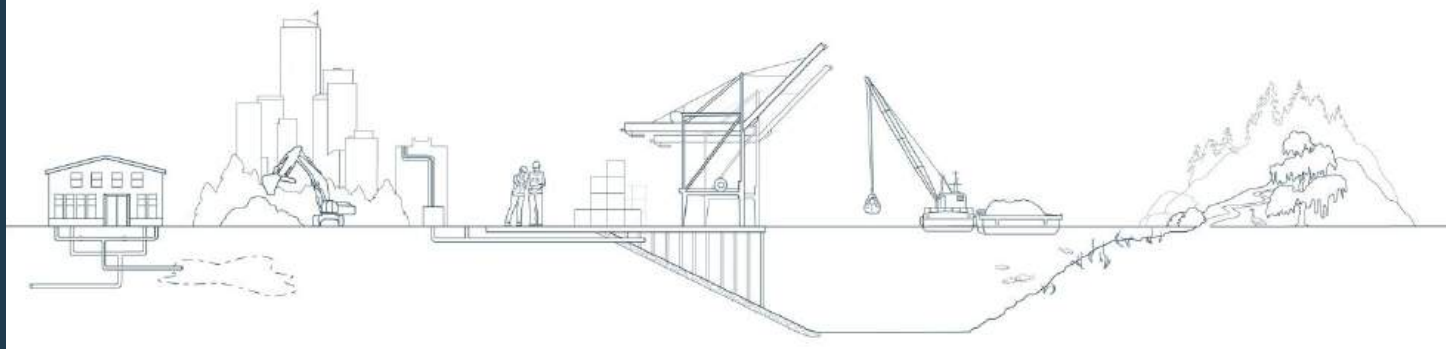
Appendix A
Pre-Engineering Design Investigation Data Report

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Prepared for
City of Bothell

December 2024 DRAFT



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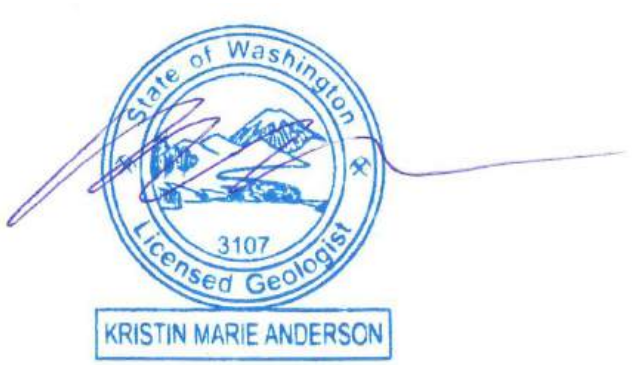
Pre-Engineering Design Investigation Data Report

This document was prepared for
The City of Bothell
under the supervision of:



Name: Kristin Anderson
Date: 12/17/2024

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List of Abbreviations

Abbreviation	Definition
AO	Agreed Order
ARAR	Applicable or relevant and appropriate requirement
bgs	Below ground surface
CAP	Cleanup Action Plan
CCMP	Construction Compliance Monitoring Plan
City	City of Bothell
cm/day	Centimeters per day
COC	Contaminant of concern
CUL	Cleanup level

Abbreviation	Definition
DCE	Dichloroethene
DO	Dissolved oxygen
Ecology	Washington State Department of Ecology
ft/ft	Feet per foot
g/mol	Grams per mole
GMP	Groundwater monitoring plan
HASP	Health and Safety Plan
HVOC	Halogenated volatile organic compound
HWA	HWA Geosciences
IC	Institutional control
µg/L	Micrograms per liter
mg/kg	Milligrams per kilogram
mg/L	Milligrams per liter
MNA	Monitored natural attenuation
MTCA	Model Toxics Control Act
mV	Millivolts
NAVD 88	North American Vertical Datum of 1988
O&M	Operation and maintenance
ORP	Oxidation–reduction potential
PCE	Tetrachloroethene
PDI	Pre-Engineering Design Investigation
PDI Data Report	Pre-Engineering Design Investigation Data Report
PDI Work Plan	Pre-Design Investigation Work Plan
PFM	Passive flux meter
RAO	Remedial action objective
RI/FS	Remediation Investigation and Feasibility Study
ROW	Right-of-way
Site	Riverside Halogenated Volatile Organic Compound Site
SR	State Route
SVE	Soil vapor extraction

Abbreviation	Definition
TCE	Trichloroethene
TOC	Total organic carbon
ZVI	Zero-valent iron

1.0 Introduction

1.1 BACKGROUND

This Pre-Engineering Design Investigation (PDI) Data Report (PDI Data Report) has been prepared on behalf of the City of Bothell (City) for the Riverside Halogenated Volatile Organic Compound (HVOC) Site (Site) located at NE 108th Street and Woodinville Drive (State Route [SR] 522) in Bothell, Washington (refer to Figure 1.1). This PDI Data Report presents the results of the sampling conducted as presented in the Pre-Design Investigation Work Plan (PDI Work Plan; Floyd|Snider 2024) to inform the design and modification of the cleanup action for the Site.

1.1.1 Site Regulatory History

The Site is located on the eastern portion of King County Assessor's parcel 082605-9120 (the Site property), which is currently owned by the City. The Site is located in the easternmost portion of the City's Park at Bothell Landing administered by the Parks and Recreation Department and is currently used as a public, unpaved parking lot. The Site is bounded to the north by SR 522 and to the south by the Sammamish River (refer to Figure 1.1).

The Site is defined by the extents of soil and groundwater contamination likely resulting from releases of tetrachloroethene (PCE) to the ground at a former machine shop (Figure 1.1) that operated in the northeast portion of the current parking area from 1944 until 1973.

An interim action for the Site was approved by the Washington State Department of Ecology (Ecology) to temporarily address HVOC groundwater discharge to the Sammamish River using groundwater extraction. In 2013, the groundwater extraction system was installed by HWA Geosciences (HWA), consisting of four extraction wells (EW-1 through EW-4) that discharge to the sanitary sewer under a King County Industrial Waste discharge permit. In 2016, HWA installed two more extraction wells (EW-5 and EW-6) in closer proximity to the river (refer to Figure 1.1). This system is still in operation in a limited capacity.

A Supplemental Remedial Investigation/Feasibility Study was completed for the Site in 2022 (Kane 2022) and a Cleanup Action Plan (CAP) was issued by Ecology in March 2023 as Exhibit B of Agreed Order (AO) No. DE 21531 (Ecology 2023). The CAP defines the extent of HVOC contamination, contaminants of concern (COCs), and cleanup levels (CULs) for the Site. The COCs in soil and groundwater are PCE, trichloroethene (TCE), *cis*-1,2-dichloroethene (DCE), and vinyl chloride. Due to the proximity of the HVOC-contaminated groundwater to the Sammamish River, CULs were selected to be protective of surface water. The selected cleanup alternative summarized in the CAP is a combination of soil vapor extraction (SVE) in the presumed PCE source area near the former machine shop and Site-wide groundwater treatment by bio-recirculation with an organic carbon amendment to promote anaerobic biodegradation of HVOCs.

As required by the AO, Floyd|Snider prepared a PDI Work Plan for the Site, which was approved by Ecology in June 2024.

1.1.2 Purpose of the Pre-Engineering Design Investigation

The PDI Work Plan presented a revised scope for investigation to support design and implementation of cleanup at the Site. It provided details for additional proposed soil and groundwater data collection that will inform the design of the cleanup action. The following additional data collection objectives were identified, and the data obtained are summarized in this PDI Data Report:

Hydrogeologic study: More hydrogeologic data were needed to inform the suitability of the conceptual bio-recirculation system design (or other variations of groundwater pump and treat systems) and any necessary adjustments to support engineering design, as well as to inform injection parameters such as rates and quantities of treatment materials.

HVOC distribution and geochemistry in groundwater: More recent data were needed to confirm the current horizontal extents of the HVOC plume, and additional data were needed to assess the vertical distribution and flux of HVOCs in groundwater and geochemical parameters such as redox conditions that will inform the efficient formulation and delivery of treatment materials.

HVOC distribution in soil: Additional data were needed to inform the likely mass of HVOCs in the vadose zone that would be targeted by SVE and to more precisely delineate the extent of HVOCs in the presumed source area to inform the design of soil treatment in the saturated zone.

1.2 REPORT OUTLINE

The remaining sections of this report are organized as follows:

- **Section 2.0 Pre-Engineering Design Investigation Summary.** Discusses the scope and results of pre-engineering design data collection. Includes supporting Appendices A (Hydrogeologic Study Results), B (Laboratory Reports), and C (Field Boring Logs)
- **Section 3.0 Updated Conceptual Site Model**. Incorporates the findings of the PDI into a more thorough understanding of the nature, extent, and behavior of HVOC contamination at the Site.
- **Section 4.0. Identification of Supplemental Cleanup Action Alternatives.** Presents potential amendments to the 2023 CAP Cleanup Action responsive to the findings of the PDI and evaluates the cost-benefit of potential alternatives to the cleanup action to identify a Preferred Revised Cleanup Action. Includes supporting Appendix D (Detailed Costs).
- **Section 5.0 Preferred Revised Cleanup Action**. Describes the elements of a revised preferred cleanup action, including compliance with the Model Toxics Control Act, applicable or relevant and appropriate requirements (ARARs), and remedial action objectives (RAOs).
- **Section 6.0 References.** Provides reference information for documents cited in this report.

2.0 Pre-Engineering Design Investigation Summary

2.1 HYDROGEOLOGIC STUDY

Hydrogeologic study activities included groundwater extraction system maintenance, synoptic water level measurement, and water level measurement during pumping and non-pumping conditions. The scope and results of hydrogeologic study are discussed in the following sections.

2.1.1 Groundwater Extraction System Maintenance

Prior to the implementation of the PDI Work Plan, several maintenance and repair tasks were addressed so that the groundwater extraction system was operating as intended for the hydrogeologic study. In 2023, decreases in sewer discharge rates combined with increased electrical power usage indicated that pump failure was likely occurring at upgradient extraction wells. Additionally, the downgradient extraction wells had both become stuck in the well screens at EW-5 and EW-6 and ceased to properly function sometime before 2023. To address this issue, a secondary pump was placed on top of the stuck pump in EW-6 in late 2023 and pumps in EW-1, EW-3, and EW-4 were replaced in early 2024; however, pump performance did not improve acceptably after replacement.

In coordination with the City and Ecology, it was determined that EW-2, EW-3, and EW-6 in the most contaminated portion of the HVOC plume would be prioritized for maintenance.

The original extraction well pumps were inspected and found to be severely damaged by siltation, which is expected when pumps are set at the base of the well. The manufacturer specifications require a minimum distance of 10 feet between the base of the well and pump inlet. The pump rotors were replaced, and the motors were serviced to improve pump functionality.

After completing repairs, the rigid polyvinyl chloride piping was replaced with more flexible hose and the pumps were set at a shallower depth in the well to operate within the manufacturer's recommended installation guidelines. An exception to this is EW-6, which could only be set just below the water level due to the former extraction pump and inactive discharge line stuck in the well.

In addition to these in-well changes, flow control globe valves were also added inside the remediation shed. The globe valves are intended to appropriately slow flow from the extraction pumps and work with the existing check valves to create uniform flow through the extraction system.. The flow controls were added because surplus pump capacity was found to cause excess drawdown and cycling of the pumps in the generally fine-grained saturated zone at the Site. The drawdown may also be partially addressed by periodic redevelopment of the extraction wells.

2.1.2 Hydrogeologic Study Field Investigation

2.1.2.1 Synoptic Water Levels

Four rounds of synoptic water levels were collected at the Site in accordance with the PDI Work Plan between July 25 and August 22, 2024:

- As a baseline with the system operating under normal pumping conditions (completed July 25)
- After downgradient extraction well EW-6 had been shut off for at least 48 hours (completed July 29)
- After upgradient extraction wells EW-2 and EW-3 had been shut off for at least 48 hours (completed July 31)
- Under baseline non-pumping conditions prior to Site-wide groundwater monitoring (completed August 22)

A survey of horizontal position, top of casing elevation, and ground surface elevation was additionally completed by a licensed surveyor for all monitoring and extraction wells during the hydrogeologic study.

2.1.2.2 Transducer Study

A transducer study was conducted at monitoring wells adjacent to groundwater extraction wells to monitor water level responses during baseline pumping conditions, the phased downgradient and upgradient shut-off, and post-shut-off conditions as described in Section 2.1.2.1.

Transducers were set in RMW-10D and BC-3 (nearest to EW-2), RMW-7 and RMW-14 (nearest to EW-6) and RMW-13 (downgradient west of EW-5) and set to record at 0.5-second intervals during each pump shut-off event. The transducers were set to begin recording, then the pumps were turned off in series while monitoring the water level manually within the well casing. A representative pumping to shut-off period could not be obtained for EW-6, however, because the water level was close to the pump intake and triggered an automatic dry-run condition circuit fault of the pump controller.

During the equilibration periods between shut-off events, the transducers were reset to record at 5-minute intervals.

2.1.3 Hydrogeologic Study Findings

2.1.3.1 Groundwater Occurrence and Flow Directions

Depth to groundwater varied at the Site between approximately 10 and 20.5 feet below ground surface (bgs) during the four synoptic water level events. These measurements were generally consistent with previous depth to water measurements collected at the Site. A summary of

monitoring well construction details and available depth-to-water measurements is provided in Table 2.1.

The direction of groundwater flow was to the southeast toward the Sammamish River, consistent with Site topography, as shown in Figure 2.1. Groundwater elevations ranged from approximately 26 to 19 feet North American Vertical Datum of 1988 (NAVD 88) within the Site boundary, resulting in measured horizontal gradients of 0.06 to 0.07 feet per foot (ft/ft).

2.1.3.2 Groundwater Extraction System Evaluation

Water level responses measured during phased shut-off of the extraction well system showed limited influence at adjacent well locations, as shown on the hydrogeologic study plots presented in Appendix A. During the first downgradient shut-off at EW-6, water level trends were not discernable at RMW-7 or RMW-13; however, the groundwater level increased slightly at RMW-14 after shut-off. During the upgradient shut-off at EW-2 and EW-3, water levels appeared to decrease slightly at BC-3 and RMW-10D. However, because the changes are on the order of hundredths of a foot, these observations may reflect normal variability rather than responses to the pumping system.

During the first downgradient equilibration period, uniform fluctuations in water levels were observed at all shallow well locations for approximately the first day of the period. The cause of this fluctuation is unknown and not correlated with rainfall or related water level impacts to the Sammamish River and were not replicated during the second upgradient equilibration period.

The inconclusive results of the hydrogeologic study are likely due to the limitations of the current extraction pumping system, which uses high-capacity pumps that cause rapid drawdown in the relatively fine-grained saturated zone despite the flow control measures that were added during 2024 maintenance. This rapid drawdown causes frequent on/off cycles at the extraction well pumps and limits the radius of influence of pumping.

2.2 GROUNDWATER MONITORING

Groundwater monitoring activities included sample collection from reconnaissance borings and permanent wells for HVOCs and geochemical parameters and measurement of HVOC flux at targeted locations. The scope and results of groundwater monitoring are discussed in the following sections.

2.2.1 Groundwater Monitoring Field Investigation

The most recent comprehensive groundwater sampling event before the implementation of the PDI Work Plan was completed in 2020.

Therefore, groundwater samples were collected to document current HVOC concentrations after continued groundwater extraction between 2020 and 2024 and to further refine the lateral extent of HVOCs in groundwater exceeding CULs. These samples were collected from existing monitoring wells, passive flux meters (PFMs), and temporary borings.

2.2.1.1 Low-Flow Groundwater Sampling

As described in the PDI Work Plan, groundwater samples were collected from the Site wells during three separate events. Sampling events were conducted at targeted wells concurrently with the hydrogeologic study and during a Site-wide sampling event.

During the first targeted sampling event, HVOC samples and field water quality parameters were collected from extraction wells EW-5 and EW-6 at the wellhead, downgradient well RMW-7 and upgradient well RMW-12 via low-flow sampling while the extraction system was running. Field water quality parameters were additionally collected from extraction wells EW-2 and EW-3 at the wellhead via low-flow sampling after a 48-hour equilibration period with EW-6 shut off but with the upgradient extraction system running.

Finally, after another 48-hour equilibration period with the extraction system fully shut off, EW-5, EW-6, RMW-7, and RMW-12 were sampled again for HVOCs, as described above.

The PDI was then paused to allow HVOC conditions to equilibrate without pumping prior to collecting groundwater data to define the current baseline conditions. The equilibration period is the estimated time for groundwater to migrate from the upgradient extraction wells to the farthest downgradient monitoring well (RMW-7), a distance of approximately 60 feet. The seepage velocity of groundwater was estimated from previous slug testing data collected at the Site, where an average groundwater flow of 2.5 feet per day was established (HWA 2013). The resulting calculated equilibration period was 3 weeks. After this equilibration time, a Site-wide groundwater sampling event was conducted via low-flow sampling at all monitoring and extraction wells to establish current baseline groundwater HVOC and geochemical condition data.

2.2.1.2 Groundwater Reconnaissance Sampling

Groundwater samples were collected from temporary soil borings using retractable direct-push screens. Angled borings were implemented to collect samples in locations with limited access, specifically beneath the sidewalk that is located closest to the Sammamish River. A total of six direct-push borings were advanced for collection of groundwater reconnaissance samples to delineate the current extent of the HVOC plume exceeding CULs, as shown on Figure 2.2 and summarized in Table 2.2, including the following:

- Four borings at the presumed downgradient edge of the plume to inform the extent of potential groundwater treatment (GWB-03 through GWB-06), with samples for HVOC analysis collected from the 15- to 20-, 20- to 25-, and 25- to 30-foot intervals except where groundwater was not present in the 15- to 20-foot interval at GWB-05 and GWB-06.
- One boring to vertically delineate HVOCs within the plume downgradient of the source area (GWB-07), with samples collected from the 35- to 40- and 40- to 45-foot intervals.

- One contingency boring was drilled to delineate cross-gradient HVOCs to the west (GWB-08) after a review of the updated baseline groundwater sample results. A groundwater sample was collected from the 15- to 20-foot interval.
- Originally, two borings were also planned to determine current groundwater HVOC conditions in the upgradient direction to the north (GWB-01, GWB-02), but due to the close proximity to Puget Sound Energy power lines running under the north-adjacent sidewalk where the borings were planned and the observed declining PCE results from RMW-12, these locations were removed from the sampling plan. Contingency borings GWB-10 and GWB-11 on the eastern side of the Site were also determined not to be necessary based on results at EW-1 and RWM-8.

2.2.1.3 Passive Flux Meter Sampling

As described in the PDI Work Plan, PFMs were deployed on August 26 and retrieved on September 16, 2024, for a sampling period of 3 weeks. Two 5-foot PFM samplers were installed in each well screen; however, the upper 2 feet of the well screen at RWM-7 (from 15 to 17 feet bgs) was likely not saturated for most of the sampling based on depth to water measurements collected during the synoptic water level events. The extraction system remained off during PFM deployment to capture baseline groundwater and HVOC flux conditions. After retrieval, samples of the PFM media were collected from 2-foot intervals and analyzed for HVOC flux and Darcy velocity. PFM samplers were provided and analyzed by EnviroFlux, Inc., and the resulting data are presented in Appendix B.

2.2.2 Groundwater Monitoring Results

Groundwater monitoring results for monitoring well and reconnaissance water samples and passive flux meter media samples are summarized in the following sections. Laboratory analytical reports are provided in Appendix B.

2.2.2.1 HVOC Results

Groundwater samples were analyzed for PCE, TCE, *cis*- and *trans*-1,2-DCE, and vinyl chloride. Groundwater monitoring results for the PDI and all available historical sampling events are shown in Table 2.2. Key groundwater results for PCE and vinyl chloride (the final toxic degradation product of PCE) are also shown in Figure 2.2.

PCE: PCE concentrations at monitoring wells ranged from not detected to a maximum detection of 9.8 micrograms per liter (µg/L) at downgradient well RMW-14, compared to a Site-wide maximum concentration in 2020 of 26 µg/L at EW-3. PCE exceedances of the CUL of 4.9 µg/L were detected at RMW-12 in the presumed upgradient source area, upgradient extraction well EW-2 and downgradient extraction well EW-6. PCE was also detected at reconnaissance borings GWB-05 and GWB-06 to the southeast of the current permanent well network. The extents of PCE concentrations exceeding the CUL are well-defined to the west, east, south, and southwest; however, the southeastern extent of PCE in the vicinity of GWB-06 is a potential data gap for

installation of a permanent monitoring well to assess compliance with CULs and complete engineering design in this area.

TCE: TCE concentrations at monitoring wells ranged from not detected to a maximum detection of 3.4 µg/L at EW-3, compared to a Site-wide maximum concentration in 2020 of 23 µg/L at EW-3. TCE exceedances of the CUL of 0.38 µg/L were also detected at upgradient source area well RMW-12 and downgradient wells RMW-14 and RMW-7, as well as at RMW-4 and RMW-5 cross-gradient to the west of the presumed source area. Similar to PCE, TCE was also detected at GWB-05 and GWB-06 as well as at GWB-04. The extents of TCE concentrations exceeding the CUL are delineated to the east and southwest, and are sufficiently defined for engineering design by low-level exceedances to the west and south. The southeastern extent of TCE is not fully delineated and is a potential data gap for engineering design.

***cis*-1,2-DCE:** *cis*-1,2-DCE concentrations exceeded the CUL of 16 µg/L only at downgradient monitoring well RMW-7 and was additionally detected at GWB-06. *cis*-1,2-DCE concentrations exceeding the CUL are sufficiently defined for engineering design with low-level exceedances to the east/southeast.

Vinyl chloride: Vinyl chloride concentrations at monitoring and extraction wells ranged from not detected to a maximum detection of 6.2 µg/L at RMW-7, compared to a Site-wide maximum concentration in 2020 of 28 µg/L at RMW-7. Vinyl chloride exceedances of the CUL of 0.020 µg/L were also detected at upgradient source area well RMW-12, upgradient extraction wells EW-3 and EW-4, downgradient wells RMW-13 and RMW-16, and cross-gradient wells RMW-5 and RMW-6 to the west-southwest. Vinyl chloride was additionally detected at reconnaissance borings GWB-04 and GWB-06 downgradient and GWB-08 to the west. Vinyl chloride concentrations are generally well-defined for the purposes of engineering design; the most elevated concentrations of vinyl chloride remain at the farthest available downgradient monitoring point (RMW-7); however, a trend of declining vinyl chloride has been observed in this area since 2020.

The vertical extent of all HVOCs exceeding CULs is well-defined above 35 feet bgs by samples collected at RMW-10D (screened 32 to 42 feet bgs) and at GWB-07 (collected from 35 to 40 feet bgs and 40 to 45 feet bgs), which had non-detect results for all HVOCs.

2.2.2.2 HVOC Flux

Flux refers to the mass of water and contaminants flowing per unit area at a measured point in a well screen, averaged over the time during which the samples were collected. Groundwater flux is measured by tracers in the PFM media, whose rate of consumption can be used to determine the rate of groundwater flow through the sample interval.

The average ambient groundwater flux, or Darcy velocity, ranged from 3.0 to 5.4 centimeters per day (cm/day) at RMW-12 and 0.7 to 4.0 cm/day at RMW-7. Darcy velocity was generally uniform across the screened intervals and between the wells except in the water table interval at RMW-7, where the minimum value of 0.7 cm/day was observed.

Contaminant flux values for HVOC, which are defined as contaminant mass/unit area/time, were calculated for the HVOCs vinyl chloride, *cis*-1,2-DCE, TCE, and PCE. The HVOC flux values are calculated using the HVOC mass sorbed to the PFM media combined with the groundwater flux described above; the HVOC flux values are additionally averaged over the width of the aquifer to obtain an average flux in micrograms per liter.

At upgradient well RMW-12, HVOC flux values were uniformly low, ranging from 0.9 to 3.4 µg/L for PCE, TCE, and *cis*-1,2-DCE at all intervals. There was only measurable vinyl chloride flux in the 19- to 21-foot interval, which was also the most transmissive interval (i.e., maximum observed Darcy velocity).

At downgradient well RMW-7, HVOC flux values were greater overall compared to upgradient flux values, which also increased with the relative mobility of the HVOCs. The greatest fluxes at RMW-7 were vinyl chloride, which ranged from 16 to 186 µg/L.

2.2.2.3 Geochemistry

Key geochemical data suggest that current conditions at the Site are favorable for anaerobic biodegradation of HVOCs by reductive dechlorination. Key geochemical parameters include the following, which are summarized in Table 2.3:

Dissolved oxygen (DO): DO measures the amount of oxygen, an electron acceptor, available in groundwater. DO was generally low within the plume, with values of 0.5 milligrams per liter (mg/L) or less. Typical target DO concentrations for anaerobic biodegradation are less than 1.0 mg/L (Arcadis 2002). DO concentrations greater than 1 mg/L were measured in the upgradient and deep wells that are not impacted by HVOCs (RMW-9R and RMW-10D). Greater DO was also measured at EW-6, which is attributed to localized perturbations caused by frequent on/off cycles with the pump inlet set near the groundwater table during the sampling period, because DO was significantly lower at adjacent non-pumping well EW-5.

Oxidation–reduction potential (ORP): ORP measures the capacity for electron transfer in groundwater in millivolts (mV); positive ORP indicates that conditions are oxidizing (i.e., groundwater has a tendency to lose electrons), whereas negative ORP indicates that conditions are reducing (i.e., groundwater has a tendency to accept electrons). At the Site, ORP values were generally near zero or negative within the HVOC plume, indicating that baseline conditions are reducing and conducive to anaerobic biodegradation. More strongly positive ORP values were measured at MR-9R, MW-10D, and EW-6, consistent with greater DO at these locations. More strongly positive ORP was also measured at RMW-12, indicating that this well is likely near the upgradient edge of the HVOC plume.

pH: pH across the Site ranged from 5.95 to 7.10. Most biological activity in groundwater, including biodegradation, is most effective in near-neutral pH conditions consistent with those observed at the Site.

Nitrate and sulfate: Nitrate and sulfate ions are electron acceptors that, along with DO, may compete with HVOCs for electrons and inhibit reducing processes that degrade HVOCs. Nitrate concentrations in Site groundwater ranged from 0.052 to 2.6 mg/L, and sulfate concentrations in Site groundwater ranged from not detected to 34 mg/L. These values are generally low; USEPA drinking water standards are 10 mg/L for nitrate 250 mg/L for sulfate. This result indicates limited potential for background electron acceptors to inhibit reduction.

Total organic carbon (TOC): Organic carbon acts as an electron donor that can facilitate anaerobic biodegradation by the process of reductive dechlorination. TOC concentrations in Site groundwater were relatively low, ranging from not detected to 11 µg/L. TOC concentrations of approximately 50 mg/L are required to sustain biodegradation and initial TOC concentrations up to 500 mg/L are generally targeted when soluble organic carbon is added as a treatment material to facilitate biodegradation (Arcadis 2002).

Dissolved gases (ethene, ethane, and methane): Dissolved gases are the end products of anaerobic biodegradation. Of the dissolved gases, ethene and ethane are shorter-lived in the environment and detection of these gases indicates that more rapid biodegradation is occurring, whereas methane is longer-lived and indicates slower rates of biodegradation. At the Site, ethene and ethane were not detected but methane ranged between 2,200 µg/L and 8,200 µg/L at downgradient wells including EW-5, EW-6, RMW-7, and RMW-14. These methane detections indicate that anaerobic biodegradation, likely at slow rates, is occurring in the downgradient portion of the HVOC plume. Target dissolved gas concentrations for anaerobic biodegradation are generally greater than 1,000 µg/L (USEPA 2023).

Calcium, iron, and magnesium: The presence of metals including calcium, iron, and magnesium is an indicator of hardness in groundwater. Hardness inhibits the migration of some treatment materials such as activated carbon and zero-valent iron, and therefore, calcium is often added to in situ treatment barriers to ensure their accurate placement. Total calcium concentrations in Site groundwater ranged from 38,000 to 64,000 µg/L (38 to 64 mg/L), total iron concentrations ranged from not detected to 31,000 µg/L (31 mg/L), and total magnesium concentrations ranged from 11,000 to 19,000 µg/L (11 to 19 mg/L). Similar values were observed for dissolved metals. Combined, the detected metals in Site water classify it as moderately hard (USGS 2018). These results indicate that other treatment materials, if needed, could be injected with accuracy at the Site.

Other parameters such as alkalinity, chloride, nitrite, and sulfide provide useful baseline measurements for comparison during future groundwater treatment. Increases in concentrations of these parameters are indicators of the occurrence of biodegradation by reductive dechlorination (ITRC and RTDF 1999).

2.3 SOIL SAMPLING

Soil samples were collected from direct-push soil borings for HVOC and grain size analysis. The scope and results of soil sampling are discussed in the following sections.

2.3.1 Soil Sampling Field Investigation

The conceptual design of the SVE system presented in the CAP includes treatment of vadose zone soil in the presumed source area to the depth of the water table, which is encountered at approximately 8 feet bgs on the northern portion of the Site and deepens to approximately 16 feet bgs on the southern portion of the Site. The depth to water table varies by approximately 2 to 5 feet seasonally at individual well locations. There were limited existing soil data in the target SVE treatment zone, and additional data were needed to determine the mass of HVOCs that may be mobilized and recovered by SVE. Additionally, more precise horizontal and vertical delineation of HVOCs in the saturated zone within the source area was needed to determine the extent of soil to be targeted by treatment. Soil grain size data were also needed to inform injection rates and quantities of groundwater treatment materials.

Collection of additional HVOC data in soil was proposed to update current conditions and refine current understanding of the lateral and vertical extent of soil with HVOC concentrations exceeding CULs. The implemented soil quality assessment included nine direct-push borings for collection of soil samples to delineate HVOCs. Two of the originally planned direct-push borings were removed from the soil quality assessment due to their proximity to Puget Sound Energy electrical feeder lines that run underneath the north-adjacent sidewalk at the Site.

2.3.2 Soil Sampling Results

Field geological observations for soil and results for soil laboratory analysis are summarized in the following sections. Soil analytical data are presented in Table 2.4 and Figure 2.3, and a cross-section of Site soil types and the occurrence of HVOC contamination is presented in Figure 2.4. Laboratory analytical reports are provided in Appendix B and observations for individual borings are described in detail in the soil boring logs provided in Appendix C.

2.3.2.1 Geology

Soils encountered at the Site consisted of an uppermost fill unit underlain by alluvium deposits. The fill was composed of varying amounts of well-graded sand, silty sand, and gravel and contained occasional anthropogenic debris. The contact between the fill and native alluvium was characterized by a peaty silt consistent with marsh deposits approximately 2 feet thick. Below the peaty deposit, soils consisted of interbedded fine sand and silty sand. Alluvium was observed to the deepest depth of 40 feet bgs explored during the PDI. Historical boring logs noted deeper occurrences of a stiff silt (for example, beginning at 40 feet bgs at RMW-10), which was interpreted to be a glacially deposited unit in prior reports.

The results of qualitative grain size analysis showed that saturated soils consisted primarily of fine to very fine sand with at least 20% silt and an average of approximately 30% silt. These results were confirmed with laboratory grain size analyses that showed similar grain size distribution.

2.3.2.2 Vertical and Horizontal Extents of HVOCs

Soil samples were analyzed for PCE, TCE, *cis*- and *trans*-1,2-DCE, and vinyl chloride, as shown in Table 2.4. Key soil results are also shown in Figures 2.3 and 2.4.

PCE exceeding the CUL of 0.05 milligrams per kilogram (mg/kg) was detected only in the 12- to 14-foot-bgs and 24- to 26-foot-bgs samples at SB-06 in the presumed source area of the former machine shop. Samples above 12 feet bgs, between 14 and 24 feet bgs, and between 28 and 40 feet bgs at SB-06 had HVOC concentrations that were not detected or were less than CULs.

HVOCs did not exceed CULs in any samples collected at SB-03, SB-04, SB-05, and SB-08, which were collected to verify the lateral extents of the upgradient PCE source area. HVOCs also did not exceed CULs at SB-07, SB-09, SB-10, or SB-11, which were sampled to investigate a potential secondary HVOC source area in the downgradient direction that was suggested by the historical soil dataset.

The vertical and horizontal extents of HVOCs exceeding CULs in soil are well-defined in the vicinity of the former machine shop. As shown in Figure 2.3, a limited area of contamination appears to extend into the City right-of-way (ROW) in the vicinity of RB-25, where PCE exceeding the CUL was detected at 13 feet bgs.

3.0 Updated Conceptual Site Model

The results of the PDI sampling provide key updates to the understanding of the nature and extent of HVOC contamination in groundwater and soil at the Site, as well as the mechanisms of migration and potential degradation of HVOCs.

3.1 NATURE AND EXTENT OF HVOCS IN GROUNDWATER

The most recent data show that the overall magnitude of HVOC source mass in groundwater has decreased significantly within the footprint of the groundwater extraction interim action since the extraction system began running in 2013. This is demonstrated by declining PCE and other HVOC concentrations at most Site wells, as shown in Table 2.2.

For consideration of nature and extent of HVOCs, as well as migration and degradation mechanisms, the Site HVOC plume can be subdivided into four subareas (refer to HVOC results presented in Figure 2.2):

- HVOC source area and upgradient plume
  - Within the former machine shop source area and the assumed pumping footprint of the upgradient extraction well row: RMW-12, BC-3, EW-1 through EW-4, and deep well RMW-10D
  - Immediately adjacent to the assumed extraction pumping footprint: RMW-6, RMW-8
- Downgradient HVOC plume
  - Within the assumed pumping footprint of downgradient extraction well row: RMW-14, EW-5, EW-6, RMW-7, and PDI reconnaissance samples from GWB-07
  - Immediately adjacent to the extraction pumping radius: RMW-13
- Western HVOC plume
  - Cross-gradient and farther outside the footprint of groundwater extraction: RMW-4, RMW-5, and PDI reconnaissance sample from GWB-08
- Riverbank area of the Sammamish River
  - Reconnaissance samples from GWB-03 through GWB-06

The current HVOC conditions and trends in each subarea are described in the following sections.

For the permanent monitoring and extraction wells, the progress of mass removal and contaminant degradation within each subarea of the HVOC plume discussed above are further illustrated by analyzing changes in total HVOC molar concentrations and molar fractions of individual HVOCs over time. A molar concentration is a measure of the number of molecules of a given contaminant in a sample, which is obtained by normalizing the bulk concentration reported by the laboratory (in micrograms per liter) with the molecular weight of the compound

(in grams per mole [g/mol]). Molar weights are useful for compounds such as HVOCs that undergo a degradation process (dechlorination) that produces toxic daughter products with lesser molecular weights than the source contaminant. Molar concentrations of HVOCs in a sample, therefore, provide more precise information versus bulk concentrations to determine whether dechlorination is occurring, as well as the relative contributions of dechlorination versus physical extraction to the removal of HVOC molecules from Site groundwater.

3.1.1 HVOC Source Area and Upgradient Plume

Within the source area and upgradient portions of the plume, the total molar concentration of HVOCs has declined since the start of groundwater extraction pumping. Prior to the start of active groundwater treatment, a maximum PCE concentration during low-flow sampling of 170 µg/L was detected at BC-3 in 2009. As shown on the total HVOC mass trend plots in Figure 3.1, most wells have experienced an approximately 10-fold decrease in HVOC concentrations since their first year of monitoring data. In PDI sample results, the maximum detected PCE concentration in this area is 9.6 µg/L at RMW-12, 2 times the Site CUL. The vertical extent of HVOCs in groundwater is presumed to extend from the water table to approximately 35 feet bgs or less in this area, based on non-detect results at RMW-10D, which is screened 32 to 42 feet.

The HVOC contamination within the source area (i.e., at RMW-12, BC-2, and EW-1 through EW-4) prior to groundwater extraction was composed primarily of PCE, with lesser fractions of TCE and *cis*-1,2-DCE and small amounts of vinyl chloride, as shown on the HVOC distribution trend plots in Figure 3.1. At the nearby wells on the plume edges (i.e., RMW-6 and RMW-8), the more mobile degradation products TCE, *cis*-1,2-DCE, and vinyl chloride made up most of the HVOC mixture. The distribution of HVOCs in the source plume has remained largely consistent over the duration of groundwater extraction while the overall concentrations have decreased, indicating that removal by pumping has caused most of the reduction of HVOC mass. There is also some evidence of dechlorination, for example at RMW-3 where the HVOC molar mass is now primarily *cis*-1,2-DCE; however, this appears to be a lesser contribution to overall mass reduction. There is some observed fluctuation of total HVOC molar mass between wet and dry seasons at RMW-8 during more recent sampling events; however, these potential fluctuations are within the context of overall low and relatively stable HVOC mass.

3.1.2 Downgradient HVOC Plume

Within the downgradient portion of the plume, the total molar concentrations of HVOCs have declined at a rate similar to the upgradient areas as shown on the mass trend plots in Figure 3.2. Prior to the start of active downgradient groundwater treatment, the maximum PCE concentration during low-flow sampling of 50 µg/L was detected at RMW-7 in 2009. In PDI sample results, the maximum detected PCE concentration in this area is 9.8 µg/L at RMW-14, 2 times the Site CUL. The vertical extent of HVOCs in groundwater is presumed to extend from the water table to approximately 35 feet bgs based on non-detect results from 35 to 40 feet bgs and 40 to 45 feet bgs at GWB-07.

The initial distribution of HVOCs in the downgradient plume was more variable prior to pumping, with fractions of more highly mobile degradation products (i.e., *cis*-1,2-DCE and vinyl chloride) increasing with distance downgradient from the source area as shown on the distribution trend plots on Figure 3.2.

Similar to the source area and upgradient portions of the plume, the distribution of HVOCs has remained relatively consistent while overall concentrations have decreased, indicating that pumping has caused most of the mass reductions. However, farthest downgradient at RMW-7, remaining HVOCs are primarily *cis*-1,2-DCE and vinyl chloride, suggesting that dechlorination has also occurred.

An additional trend that is demonstrated on Table 2.2 is a positive correlation between mobile HVOC concentrations at the farthest downgradient well RMW-7 and groundwater extraction at EW-5 and EW-6. During upgradient-only groundwater extraction between 2013 and 2017, vinyl chloride was highly variable at RMW-7, but evidence of a decreasing trend began to emerge in late 2016/early 2017. After downgradient extraction began in 2017, vinyl chloride was consistently elevated at concentrations between 25 and 27 µg/L. Declining pump performance at EW-5 and EW-6 ultimately resulted in pump failure in both wells between approximately 2020 and 2023; during the same period, vinyl chloride decreased to less than 10 µg/L. This trend suggests that steeper horizontal gradients created by groundwater extraction downgradient facilitated downgradient migration of mobile HVOCs. There is some fluctuation observed in overall HVOC mass observed at RMW-7 during more recent sampling events; however, these fluctuations do not appear to have any seasonality and likely reflect the overall analytical variability and heterogeneity of HVOCs in Site groundwater.

3.1.3 Western HVOC Plume

An additional western lobe of the groundwater HVOC plume is represented by RMW-4, RMW-5, and GWB-08, which are farther outside the potential influence of extraction pumping. HVOC concentrations in this area are less elevated relative to the main plume, with PCE concentrations less than the Site CUL and exceedances of CULs only for TCE and vinyl chloride.

Overall HVOC mass has been stable to slightly increasing at the permanent wells in this area as shown on the mass trend plots in Figure 3.3. The HVOC distribution trend suggests that dechlorination has occurred, as illustrated by increases in *cis*-1,2-DCE fractions at both wells and vinyl chloride fraction at EW-5; however, degradation appears to be slow and incomplete based on the relatively flat trends in HVOC concentrations during recent sampling events.

The source of PCE in the western plume is uncertain; however, there is no evidence of upgradient PCE contamination in groundwater or contamination in soil in this area (refer to Section 3.2). Because the footprint of former machine shop operations is not well defined, it is assumed that incidental historical releases to soil may have occurred to the west of the machine shop that have now fully leached into groundwater. It is likely that some PCE mass remains sorbed to fine-grained soil in the saturated zone and will continue to diffuse to groundwater over time until it is depleted.

3.1.4 Riverbank Area of the Sammamish River

Reconnaissance groundwater samples in the riverbank area are intended as a screening tool to demonstrate the presence or absence of the HVOC plume. Because reconnaissance samples are generally biased high due to inherent turbidity associated with grab sample collection, they do not define the extents of HVOC CUL exceedances in groundwater.

The western extent of the HVOC plume at the riverbank is well-defined by non-detect results at GWB-03. HVOC concentrations were found to be increasing from west to east in the riverbank area with the most elevated results at GWB-06, indicating that the most concentrated area of the downgradient plume may lie to the east of the existing permanent well network. As discussed in Section 2.2.2.1, this is a minor data gap for engineering design to treat the horizontal extent of groundwater exceeding CULs.

3.2 NATURE AND EXTENT OF HVOCS IN SOIL

Soil sampling conducted during the PDI provides a more detailed understanding of the vertical and horizontal extents of historical PCE releases to soil, which acted as a source of HVOC contamination to groundwater.

Based on samples collected continuously from above the water table to 40 feet bgs at SB-06 within the source area, there appears to be a stratified PCE soil source remaining at the Site. The shallowest occurrence of PCE concentrations exceeding the Site CULs coincided with the approximate seasonal low water table of 12 to 14 feet bgs, and the overlying vadose zone and underlying saturated zone samples did not have PCE exceedances. This is consistent with the historical soil dataset, which did not have any vadose zone soil exceedances and had one isolated exceedance at 13 feet bgs. This shallower saturated source is correlated with the observed the contact between fill and marsh deposits, which may preferentially sorb PCE due to the presence of organic carbon.

A deeper and more concentrated source zone of PCE occurs in the saturated zone from approximately 20 to 30 feet bgs. This zone is vertically delineated by multiple samples without detectable PCE or other HVOCs to 40 feet bgs at SB-06. The vertical extent of the soil source zone is generally consistent with the vertical extent of groundwater contamination in this area, which is presumed to be 35 feet bgs or less (refer to Section 3.1.2).

The lateral extents of the PCE soil source area were confirmed by PDI borings and are largely consistent with the source area presented in the Supplemental Remediation Investigation & Feasibility Study (RI/FS; Kane 2022) and CAP. The PDI borings downgradient of the soil source area did not have HVOC exceedances in soil, in contrast to the previous low-level exceedances of PCE and TCE at RMW-14 (just over 2 times the CUL for PCE) in the historical dataset. Because historical groundwater concentrations of HVOCs during soil sample collection were several orders of magnitude greater than current conditions, the exceedances in soil at RMW-14 near the centerline of the plume were likely caused by back-diffusion from highly contaminated groundwater. There is not a suspected secondary soil source area in the vicinity of RMW-14.

3.3 EXPOSURE PATHWAYS AND CLEANUP STANDARDS

The exposure pathways identified in the 2023 CAP as complete or potentially complete under future scenarios include the following:

- Direct contact with contaminated soils by humans and terrestrial biota
- Direct contact/ingestion of surface water and ingestion of organisms in impacted surface water by humans and aquatic biota
- Inhalation of soil vapors by humans

The findings of the PDI and the historical dataset generally support these conclusions, with the exception of the soil direct contact pathway. The point of compliance for direct contact with soil is 15 feet bgs for human receptors and 6 feet bgs for terrestrial biota; therefore, the soil direct contact pathway is only complete for human exposures. However, the Site CULs are based on protection of surface water quality, which are more stringent than criteria for direct contact exposures, and this finding does not impact the application of the Site CULs. Site soils do not exceed the Model Toxics Control Act (MTCA) Method B CULs for direct contact in any samples (Ecology 2024).

3.4 IMPLICATIONS FOR CLEANUP ACTION

The updated conceptual site model regarding the nature and extent of HVOC contamination has implications for both cleanup action technologies proposed by the 2023 CAP cleanup action as described in the following sections.

3.4.1 Soil Vapor Extraction

The proposed SVE system would be installed only in the vadose zone of the PCE source area, which extends to approximately 12 to 13 feet bgs based on recent depth to water measurements at RMW-12. During the PDI and in historical samples, the shallowest occurrences of HVOC CUL exceedances in soil occurred at the water table (approximately 12 to 13 feet bgs) and concentrations in shallower samples were less than CULs. Therefore, SVE in the vadose zone would not accomplish the goal of soil source mass removal.

3.4.2 Groundwater Bio-Recirculation

The proposed groundwater bio-recirculation with soluble organic carbon treatment is designed to enhance biodegradation via introduction of an electron donor and to increase horizontal groundwater gradients to ensure rapid distribution of the treatment materials.

The results of recent groundwater sampling for HVOCs and geochemical parameters indicate that soluble organic carbon is likely to be an effective treatment technology for stimulating anaerobic biodegradation; the conditions in groundwater naturally trend toward reducing conditions and there are few naturally occurring electron acceptors that would compete with HVOCs for soluble electron donors. The efficacy of soluble organic carbon would likely be enhanced by a minor

adjustment of additionally injecting cultures of *Dehalococcoides* bacteria, which degrade HVOCs. Given the relatively low concentrations of HVOCs in saturated soil, this treatment technology is also expected to result in elimination of the remaining soil source over time as HVOCs are depleted from groundwater, facilitating further diffusion of any sorbed soil mass.

The current nature and extent of HVOCs in groundwater, HVOC flux, and observed historical distribution and trends of HVOCs indicate that a groundwater recirculation system would have mixed results for groundwater treatment.

In the upgradient source plume, HVOC fluxes are generally low, and recirculation is likely to accelerate anaerobic biodegradation by steepening horizontal gradients and resultant groundwater flow velocities, moving the treatment materials more quickly through the saturated zone. Given the small amount of PCE source mass remaining, CULs would likely be achieved rapidly where treatment materials are distributed throughout the saturated zone. However, the fine-grained nature of the saturated zone and limited observed radius of influence of the existing extraction wells indicate that it may not be the most practical and efficient approach to deliver treatment materials evenly into the formation with a limited number of larger diameter extraction wells. The mechanical processes of groundwater extraction and recirculation may additionally increase dissolved oxygen in the recirculation, which would require management to ensure that in situ conditions remain favorable for anaerobic biodegradation.

In downgradient areas of the plume, recirculation may make achieving CULs more difficult. The flux of the most mobile HVOCs is already greater downgradient than in other areas of the Site under baseline conditions, and the historical groundwater data trends additionally indicate that increased downgradient pumping is correlated with downgradient increases in vinyl chloride concentrations. The migration of mobile HVOCs induced by injection and pumping would likely make it more difficult to achieve groundwater CULs at the point of discharge to the Sammamish River by decreasing the time that vinyl chloride is in contact with the treatment materials.

Lastly, the estimated pumping and injection radius of the current extraction system potentially would not reach the eastern portion of the riverbank area in the vicinity of GWB-06, and therefore, an expansion of the system would be needed to treat the area.

4.0 Identification of Supplemental Cleanup Action Alternatives

The data collected during the PDI support reevaluation of the cleanup action to ensure that remediation efficiently and thoroughly addresses the remaining Site HVOC contamination. The following sections present and evaluate potential adjustments to the 2023 CAP cleanup action to most efficiently achieve the RAOs for the Site.

4.1 SUMMARY OF 2023 CAP CLEANUP ACTION

The 2023 CAP cleanup action includes soil vapor extraction and Site-wide recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate) to enhance biodegradation of HVOCs (Ecology 2023). The elements of the 2023 CAP cleanup action are shown on Figure 4.1, which is reproduced from the CAP.

The 2023 CAP cleanup action would include installation of the following components:

- 12 soil vapor extraction wells
- Vapor collection piping and blowers and a vapor treatment system to remove HVOCs prior to discharge
- Six injection wells and two extraction wells (plus conversion of two existing extraction/monitoring wells for injection)
- Injection delivery and recovery piping, groundwater treatment system to remove remaining HVOCs prior to reinjection, and injection delivery control system

For this analysis, a revised assumption of an equal number of injection and extraction wells was used to evaluate cost-benefit.

Implementation of the cleanup action would include regular operation and maintenance (O&M) including weekly application of CarBstrate and periodic changeout of carbon vessels for both the SVE and bio-recirculation systems. The SVE system is designed to run for 3 years, and the bio-recirculation system is designed to run for 2 years. Progress of the groundwater cleanup would be evaluated through regular groundwater monitoring at existing wells. After completion of bio-recirculation and SVE, compliance with soil CULs would be demonstrated by collecting soil samples in the source area via direct-push drilling. The estimated restoration time frame for this cleanup action is 5 years.

4.2 REMEDIAL ACTION OBJECTIVES AND TECHNOLOGIES

RAOs identify goals that should be accomplished to meet the minimum requirements of the MTCA Cleanup Regulations (WAC 173-340). RAOs may also be informed by current or future

property use. RAOs were not previously defined for the Site. To help guide the evaluation of remedial actions, the following RAOs are defined for the Site:

- Protect humans and the environment (ecological receptors) from exposure to Site contamination that exceeds applicable CULs.
    - Achieve CULs in groundwater to protect surface water quality of the adjacent Sammamish River, prioritizing rapid achievement of CULs at the point of discharge to surface water.
    - Address residual contaminated soil to reduce exposure to hazardous substances via leaching to groundwater.
- Comply with local, state, and federal laws and other ARARs (WAC 173-340-710) and Site-specific cleanup standards. ARARs are limited to applicable federal and state laws and those that Ecology determines are relevant and appropriate.
- Remediate contaminants in a manner that minimizes impacts to public use of park space at the Site.
- Provide compliance monitoring to evaluate the effectiveness of the preferred cleanup action and to evaluate when the cleanup standards are met.

As discussed in Section 3.4, some elements of the 2023 CAP cleanup action may not support progress toward achieving the RAOs. The available soil data suggest that SVE will not reduce exposures to contaminated soil because it will not reach the contaminated soil mass that lies fully below the groundwater table. The available groundwater data suggest that Site-wide groundwater recirculation, which includes downgradient groundwater extraction, may not achieve CULs at the point of discharge to the Sammamish River because extraction could exacerbate migration of vinyl chloride toward the river. Aerobic conditions that may be created by the remediation technologies and compete with the desired anaerobic biodegradation process in groundwater are also of concern, primarily for SVE but also potentially for the mechanical process of extraction and injection.

The other treatment technologies for saturated soil considered in the RI/FS included excavation and SVE with the addition of air sparge. The Site soil data demonstrate that these technologies remain impractical at the Site; excavation to depths of almost 20 feet below the water table is cost prohibitive and unsafe adjacent to SR 522, and air sparging would create adverse geochemical conditions for anaerobic biodegradation of HVOCs in groundwater. The other treatment technology for groundwater considered in the RI/FS included injection of organic carbon (edible oil) without recirculation. The Site groundwater data suggest that treatment of groundwater cleanup via passive migration is a viable alternative technology because it would not exacerbate downgradient vinyl chloride migration. Treatment via passive migration is incorporated into the revised alternatives discussed in the following sections, and additional treatment components to further stimulate biodegradation are also considered in these alternatives.

4.3 REVISED CLEANUP ALTERNATIVE 1: TARGETED BIO-RECIRCULATION WITH IN SITU TREATMENT INJECTION

The first revised alternative to the 2023 CAP cleanup action makes the following adjustments to adapt the remediation to current Site conditions based on the findings of the PDI:

- SVE is eliminated.
- Groundwater bio-recirculation with soluble organic carbon (such as CarBstrate) is retained in the upgradient HVOC source area only. The bio-recirculation is enhanced with an initial introduction of *Dehalococcoides* bacterial culture.
- Groundwater treatment with soluble organic carbon and supplemental *Dehalococcoides* in the downgradient plume is achieved via passive treatment using rows of direct-push injection points. It is assumed that two injection events would be completed approximately 1 to 1.5 years apart to treat the remaining downgradient plume. The western plume, where the overall HVOC source mass is low, is treated with a single direct-push application of the treatment materials.

The elements of Alternative 1 are shown on Figure 4.2. This alternative retains groundwater treatment with a soluble organic carbon electron donor, which is expected to be effective in achieving anaerobic biodegradation of HVOCs at the Site, and supplements this alternative with beneficial cultures of bacteria that degrade HVOCs. It additionally addresses potential downgradient vinyl chloride migration by using the alternate technology of passive treatment in the direction of groundwater flow.

Implementation of the cleanup action would include regular O&M including weekly application of soluble organic carbon and periodic changeout of activated carbon vessels used to remove HVOCs from extracted groundwater prior to recirculation. The bio-recirculation system is designed to run for 2 years. The estimated restoration time frame for this cleanup action is 5 years, because the organic carbon added during active recirculation is expected to form biomass that will continue to provide donor electrons to complete the process of anaerobic degradation.

4.4 REVISED CLEANUP ALTERNATIVE 2: IN SITU TREATMENT INJECTION

The second revised alternative to the 2023 CAP cleanup action makes additional adjustments to Alternative 1 to further adapt the remedial action to current Site conditions based on the findings of the PDI. Additional adjustments include the following:

- Soluble organic carbon and *Dehalococcoides* treatment in the source area is achieved by direct-push injection, which is supplemented with zero-valent iron (ZVI). A lesser amount of supplemental ZVI is also added in the western plume.
- Downgradient soluble organic carbon and *Dehalococcoides* treatment are supplemented with ZVI and colloidal activated carbon (such as PlumeStop) to form in situ treatment barriers.
- A controlled-release source of organic carbon is used.

The elements of Alternative 2 are shown on Figure 4.3. This alternative supplements source area treatment with ZVI to achieve prompt abiotic degradation of PCE and TCE and ensure ongoing reducing conditions to promote anaerobic biodegradation. The addition of ZVI, combined with a controlled-release form of organic carbon, allows for a single direct-push application of the treatment materials in lieu of recirculation to degrade the remaining HVOC mass. The addition of colloidal activated carbon downgradient is designed to adsorb HVOCs and allow longer contact time with the treatment materials, which will allow for more rapid cleanup of downgradient groundwater. A double row of injections is assumed in order to form a highly effective barrier. The estimated restoration time frame for this cleanup action is 3 years.

4.5 SUPPLEMENTAL ALTERNATIVES ANALYSIS

This section provides a supplemental analysis of each cleanup action alternative in accordance with MTCA per WAC 173-340-360(3). Each of the proposed alternatives fulfills the mandatory MTCA general requirements for cleanup action:

- Protect human health and the environment
- Comply with cleanup standards
- Comply with applicable state and federal laws
- Prevent or minimize present and future releases of hazardous substances in the environment
- Provide resilience to climate change impacts
- Provide for compliance monitoring
- Not rely primarily on institutional controls (ICs) or dilution and dispersion
- Use permanent solutions to the maximum extent practicable
- Provide for a reasonable restoration time frame
    - The predicted restoration time frame for groundwater to meet proposed cleanup standards for HVOCs for each Alternative is as follows:
        - 2023 CAP Cleanup Action: 5 years
        - Alternative 1: 5 years
        - Alternative 2: 3 years

4.5.1 Supplemental Disproportionate Cost Analysis

The MTCA disproportionate cost analysis (DCA) procedure is used to evaluate whether a cleanup action uses permanent solutions to the maximum extent practicable as determined by the level of attainment of specific criteria defined in WAC 173-340-360(5)(d) and also factoring public concerns (WAC 173-340-360(5)(c)(i)(C). For the DCA, each alternative is assigned a numerical score for each DCA criterion on a scale of 1 to 10 and then multiplied by a weighting value, and

the scores are summed to determine the total alternative benefit score. Finally, the ratio of the cost of each alternative to its total benefit score is calculated.

An evaluation of each of the alternatives relative to the MTCA criteria and the weighting of each of the criteria is summarized as follows:

- **Protectiveness (30%).** Overall protectiveness of human health and the environment, including the degree to which existing risks are reduced, the time required to reduce these risks, and the overall improvement in environmental quality. All the alternatives are protective of human health and the environment. All the alternatives are expected to be equally protective in the HVOC source area, where rapid degradation of HVOCs can be achieved either by bio-recirculation or by addition of ZVI to supplement treatment with abiotic degradation. Alternative 2 has the highest degree of protectiveness for discharges to surface water because it uses an in situ treatment barrier to trap and fully degrade HVOCs. Overall, Alternative 2 is considered the most protective. The 2023 CAP cleanup action is considered the least protective of surface water receptors due to concerns with downgradient vinyl chloride migration during groundwater extraction.
- **Permanence (20%).** The degree to which the alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. All of the alternatives are designed to achieve CULs Site-wide through degradation of HVOCs and are, therefore, considered permanent. However, because the current alternative would install the greatest number of permanent injection and extraction wells that could be operated indefinitely if needed, this alternative is considered the most permanent. Alternative 2, which uses only direct-push injection, is the least permanent and may require more than one injection event to achieve CULs.
- **Effectiveness over the long term (20%).** Long-term effectiveness consists of the degree of certainty that the alternative will be successful, the reliability of the alternative during the time during that hazardous substances are expected to remain at the Site at concentrations greater than CULs, the magnitude of the residual risk with the alternatives in place, and the effectiveness of controls in place to control risk while contaminants remain at the Site. All the alternatives are designed to fully degrade HVOCs; however, Alternative 2 is expected to be most effective because it includes the most aggressive downgradient treatment.
- **Management of short-term risks (10%).** Short-term risks comprise the risk to human health and the environment associated with the alternative during construction and implementation and the effectiveness of measures taken to control those risks. The 2023 CAP cleanup alternative poses the most short-term risk because it involves the most ground-disturbing construction, production of waste soils and waters, and installation of permanent infrastructure such as conveyance piping and underground power in close proximity to the Sammamish River. Alternative 2 poses the least short-term risk because it involves the least ground disturbance and includes limited permanent infrastructure.

- **Technical and administrative implementability (10%).** The ability of the alternative to be implemented is based on whether the alternative is technically possible and meets administrative and regulatory requirements, and if all necessary services, supplies, and facilities are readily available. The 2023 CAP cleanup action is the most technically difficult to implement because it involves multiple types of equipment and construction methodologies. Alternative 2 is the least technically difficult to implement because it involves the fewest types of equipment and methodologies. The necessary materials and facilities for all alternatives are readily available.
- **Consideration of public concerns and tribal rights and interests (10%).** These considerations take into account whether the community has concerns regarding the alternative and if so, to what extent the alternative addresses those concerns. The alternatives all address public concerns regarding contamination with equal effectiveness. The 2023 CAP cleanup action is expected to raise more public concerns due to more permanent cleanup infrastructure that would be constructed in a public park space that may limit Site use and potential short-term surface water impacts from vinyl chloride. Alternative 2 has the least permanent infrastructure and poses the fewest limitations on Site use and additionally prioritizes cleanup at the point of groundwater discharge to surface water.

- **Cost.** The cost to implement the alternative consists of construction, net present value of any long-term costs, and agency oversight costs that are recoverable. Detailed costs for the alternatives are presented in Appendix D and summarized as follows:
  - 2023 CAP Cleanup Action: $2,732,602
  - Alternative 1: $1,648,059
  - Alternative 2: $1,655,362

A summary of the scoring for each criterion, including the estimated costs for each alternative, is presented in Table 4.1. A full description of all aspects evaluated under each criterion for the alternatives is included in Table 4.2.

The cost-benefit score is calculated by dividing the total weighted benefit score by the estimated alternative cost (standardized by dividing by $1.5 million[1]) for that alternative. Total benefits per unit cost scores are presented in Table 4.2. Based on the alternatives evaluation presented in the previous sections and in Tables 4.1 and 4.2, the total benefit per unit cost achieved are as follows:

- 2023 CAP Cleanup Action: 3.40
- Alternative 1: 6.19
- Alternative 2: 7.70

[1] The method for calculation of cost benefit is not specified in MTCA. A divisor of $1.5 million for estimated alternative cost was selected to obtain cost-benefit scores between 0 and 10 for the alternatives.

4.5.2 Preferred Cleanup Action Alternative

Based on the results of the supplemental DCA, selection of a revised cleanup action is warranted for the Site. To determine a revised preferred alternative, the step-wise DCA procedures was followed per MTCA to select a baseline for comparison. First, a baseline was selected from the most permanent alternatives. Both the 2023 CAP cleanup action and Alternative 2 are considered permanent (WAC 173-340-200) because construction of further remedial action components is not anticipated to be needed after they are installed. Alternative 2 was selected as the baseline because it has the greatest cost-benefit score of the permanent alternatives (WAC 173-340-360(5)(c)(iii)(B).

Alternative 2 was then weighed against the next-most permanent alternative (Alternative 1) to determine whether the incremental costs of the baseline alternative are disproportionate to the incremental benefits (WAC 173-340-360(5)(c)(iv).

The costs of Alternative 1 and Alternative 2 are approximately the same. Alternative 2 scored most highly for protectiveness because it prioritizes improvement of groundwater quality to reach CULs downgradient at the point of discharge to the Sammamish River and additionally is expected to have the shortest restoration time frame. It also causes the least disruption to use of public space at the Site. Protection of surface water in the river and preservation of public use of the Site are key RAOs for the City. Because Alternative 2 achieves these key RAOs most effectively, it has a cost benefit of 7.70 versus a cost benefit of 6.19 for Alternative 1.

Given these considerations, Alternative 2 is the Preferred Revised Cleanup Action. Section 5.0 describes the Preferred Revised Cleanup Action in greater detail.

5.0 Preferred Revised Cleanup Action

The Preferred Revised Cleanup Action for the remediation of soil and groundwater at the Site, which is proposed by the City to Ecology for selection and implementation at the Site, is described in Section 5.1. Sections 5.4, 5.5, and 5.6 describe how the Preferred Revised Cleanup Action complies with MTCA, ARARs, and Site RAOs, respectively.

5.1 DESCRIPTION OF PREFERRED REVISED CLEANUP ACTION

Alternative 2, which is permanent to the maximum extent practicable out of all the alternatives discussed in Section 4.0, is selected as the Preferred Revised Cleanup Action for the Site, and is shown on Figure 4.3. This remedy includes the following components:

- In situ groundwater treatment using soluble organic carbon, ZVI, and colloidal activated carbon treatment barriers
- Monitored natural attenuation (MNA) for groundwater recovery and groundwater monitoring to determine compliance with Site cleanup standards

Together, the individual technologies remove contaminant mass in saturated zone soil and groundwater through a combination of anaerobic biodegradation and abiotic degradation of source mass. The Preferred Revised Cleanup Action is a comprehensive final remedy for the Site that is compliant with all the applicable remedy selection requirements under MTCA.

5.1.1 In Situ Groundwater Treatment

In situ groundwater treatment will be conducted throughout the groundwater plume to address HVOCs at concentrations that are greater than their respective CULs. Remediation will be achieved using a combination of soluble organic carbon electron donors and *Dehalococcoides* culture Site-wide, with ZVI to promote reducing conditions and achieve abiotic degradation, and a proprietary mixture of liquid colloidal activated carbon, such as PlumeStop, to provide sorption of contamination and more rapid and complete treatment in the downgradient portion of the HVOC plume. Treatment materials will be injected under low pressure into the subsurface using a direct-push drill rig to provide even distribution within the target groundwater treatment zones. The target treatment zone is expected to range from approximately 12 to 32 feet bgs within the source area to approximately 15 to 35 feet bgs in the downgradient portion of the HVOC plume. Upgradient injection points using soluble treatment materials will be installed at approximately 15-foot spacing. The downgradient treatment with additional colloidal activated carbon will be implemented as a double row of closely spaced injection points to ensure creation of a full barrier.

5.1.2 Groundwater Monitoring

MNA for groundwater is a component of the Preferred Revised Cleanup Action after the completion of active treatment to degrade source contamination. As part of MNA, post-remedy groundwater monitoring throughout the plume in accordance with a groundwater monitoring plan (GMP) will be required after cleanup action implementation. The GMP will describe long-

term post-construction groundwater monitoring, including specific monitoring locations and frequency, and adaptive management to ensure the long-term protectiveness of the Preferred Revised Cleanup Action. Groundwater compliance will be determined based on a comparison of groundwater data to Site CULs.

5.1.3 Institutional Controls

ICs are not anticipated to be required at the Site. In situ treatment would address remaining soil that is a source of groundwater contamination, and HVOC concentrations do not exceed screening levels for worker protection in any Site soil.

Additionally, the City has implemented a ROW contamination protocol that is incorporated into the City parcel mapping system and triggered by applications for ROW work permits adjacent to contaminated sites. The ROW contamination protocol identifies requirements for design review and City consultation prior to construction, material handling, material disposal, record-keeping, and worker safety.

5.2 COMPLIANCE MONITORING REQUIREMENTS

Compliance monitoring to ensure the protectiveness of the Preferred Revised Cleanup Action will be implemented in accordance with WAC 173-340-410, Compliance Monitoring Requirements. Detailed monitoring elements for construction will be described in a Construction Compliance Monitoring Plan (CCMP), which will be prepared as part of remedial design. The CCMP will include a Health and Safety Plan (HASP), Sampling and Analysis Plan, and Quality Assurance Project Plan for monitoring and sample collection during cleanup action implementation. The CCMP will be included as an appendix to the Engineering Design Report, which will describe the approach and criteria for the engineering design of soil and groundwater cleanup actions at the Site. A post-remedy Long-Term Compliance Monitoring Plan will describe required long-term operations, maintenance, and monitoring after remedy implementation to ensure the long-term protectiveness of the remedy and will include a GMP and an updated HASP.

The purpose of the three types of compliance monitoring identified in WAC 173-340-410, with respect to how they will be implemented as part of the proposed alternative, is described as follows.

- **Protection monitoring** is used to confirm that human health and the environment are adequately protected during construction of the cleanup action and post-construction monitoring. Protection monitoring requirements will be described in Site-specific HASPs that address worker activities during remedy construction and post-construction monitoring.
- **Performance monitoring** is used to confirm that the cleanup action has attained cleanup standards and other performance standards. Performance monitoring will be conducted to document that remedial goals are being achieved, including HVOC reduction in groundwater after treatment injections. The combined soluble organic carbon, *Dehalococcoides* culture, and ZVI throughout the plume are designed to

address groundwater contamination through abiotic degradation and biodegradation of PCE and its breakdown products. Additional of colloidal activated carbon will additionally provide adsorption in the downgradient portion of the plume to increase contact time with the treatment materials. Remediation of HVOC contamination in the saturated zone soil, where CULs are designed to be protective of groundwater quality, will also be assessed by groundwater performance monitoring because the soil CULs are based on groundwater protection.

- **Confirmation monitoring** is used to confirm the long-term effectiveness of the cleanup action after completion of the preferred cleanup action. Confirmation groundwater monitoring would be conducted after results from performance monitoring that verify that groundwater concentrations of HVOCs are less than CULs. Long-term monitoring of groundwater may be required to verify that the remedy remains effective. This is likely to be conducted through periodic reviews of the Site overseen by Ecology.

5.3 CONTINGENCY ACTIONS

Contingency actions may be considered if groundwater does not achieve CULs within the restoration time frame. Because all HVOC contamination is currently situated in the saturated zone and soil CULs are based on groundwater protection, groundwater quality will dictate the potential implementation of contingencies.

5.4 COMPLIANCE WITH THE MODEL TOXIC CONTROL ACT

The Preferred Revised Cleanup Action meets the MTCA requirements for selection of a cleanup action as described in Section 4.5.

- Protect human health and the environment: Risk to human health during construction would be minimized by use of in situ treatment methodologies and long-term risk due to contamination to surface water would be mitigated by achieving Site CULs in groundwater.
- Comply with cleanup standards: Cleanup standards for the Site, which are designed to be protective of surface water, would be achieved Site-wide.
- Comply with applicable state and federal laws: The action will meet the ARARs discussed further in Section 5.5.
- Prevent or minimize present and future releases of hazardous substances in the environment: Future releases of hazardous substances, particularly to surface water, would be prevented by complete degradation of HVOCs.
- Provide resilience to climate change impacts: The action would not change the natural Site topography and would install no permanent structures that would be vulnerable to climate change.

- Provide for compliance monitoring: Compliance monitoring would be achieved through sampling of existing and proposed wells under a GMP.
- Not rely primarily on ICs or dilution and dispersion: No ICs are proposed and remediation relies on destruction of contaminants.
- Use permanent solutions to the maximum extent practicable: The Preferred Revised Cleanup Action was identified as a permanent alternative and also achieved the highest cost benefit of the alternatives considered.
- Provide for a reasonable restoration time frame: The estimated restoration time frame is 3 years.

Exposure pathways will be addressed through in situ groundwater treatment and MNA.

5.5 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

Compliance with ARARs is a requirement for cleanup actions. ARARs are often categorized as location-specific, action-specific, or chemical-specific.

- **Location-specific ARARs** are requirements that are applicable to the specific area where the site is located and can restrict the performance of activities, including cleanup actions, solely because they occur in specific locations.
- **Action-specific ARARs** are requirements that are applicable to certain types of activities or technologies that are used during the implementation of cleanup actions. Waste disposal regulations are an example of an action-specific ARAR.
- **Chemical-specific ARARs** are applicable to the types of contaminants present at the site. The cleanup of contaminated media at the Site must meet the proposed CULs developed under MTCA; these CULs are considered chemical-specific ARARs.

ARARs were established in the CAP for the 2023 CAP cleanup action. The same ARARs generally apply to the Preferred Revised Cleanup Action; however, SVE was eliminated for the Preferred Revised Cleanup Action and ARARs presented in the CAP related to air quality and air permitting are no longer applicable.

Location-specific ARARs will be met through compliance with all applicable local, state, and federal regulations based on the physical location of the Site. Action-specific ARARs will be met through implementation of construction activities in compliance with all applicable construction-related requirements such as disposal for excavated soil and compliance with all applicable drilling-related requirements. Chemical-specific ARARs will be met through compliance with proposed CULs.

Implementation of the Preferred Revised Cleanup Action would typically trigger a suite of environmental permits; however, cleanup actions conducted under an AO with Ecology are exempt from the state and local ARAR procedural requirements, such as permitting and approval requirements (WAC 173-340-710(9)(b)). Cleanup actions must, however, demonstrate

compliance with the substantive requirements of those ARARs (WAC 173-340-710(9)(c)). This exemption applies to procedural permitting requirements under the Washington State Water Pollution Control Act, the Solid Waste Management Act, the Shoreline Management Act, and local laws requiring permitting such as City municipal codes and regulations. Cleanup actions are not exempt from procedural requirements of federal ARARs.

5.6 COMPLIANCE WITH REMEDIAL ACTION OBJECTIVES

The Preferred Revised Cleanup Action achieves the RAOs through the following actions:

- Protection of human health and the environment from Site contamination that exceeds applicable CULs protective of surface water quality by attenuation of HVOCs throughout the saturated zone
- Prevention of migration of contaminants from the Site via groundwater transport by installation of in situ downgradient treatment barriers
- Proper management of contaminated soil or groundwater generated during Site cleanup by implementing construction protection monitoring
- Compliance with ARARs as described in Section 5.5
- Provision for compliance monitoring to evaluate the effectiveness of the Preferred Revised Cleanup Action and to determine that the cleanup standards are met by implementation of a GMP

5.7 TYPES AND AMOUNTS OF HAZARDOUS SUBSTANCES TO REMAIN IN PLACE

No hazardous substances exceeding CULs are anticipated to remain in place after implementation of the Preferred Revised Cleanup Action.

The Preferred Revised Cleanup Action addresses all groundwater HVOC contamination and associated HVOC contamination in saturated soil. HVOC contamination in groundwater will be addressed with in situ treatment and is expected to achieve CULs. Groundwater will achieve CULs throughout the standard point of compliance, which is Site-wide, and soil concentrations will be demonstrated to be protective of groundwater quality through monitoring. Therefore, no groundwater contamination that exceeds CULs will remain in place after implementation of the Preferred Revised Cleanup Action.

5.8 RESTORATION TIME FRAME

The restoration time frame for HVOCs to achieve groundwater CULs Site-wide is approximately 3 years after injections are complete. The restoration time frame reflects the time expected for complete degradation of HVOCs in the source area and treatment of all groundwater flowing through the downgradient in situ treatment barriers.

5.9 SUMMARY OF THE ESTIMATED REMEDY COSTS

Estimated remedial costs for the Preferred Revised Cleanup Action are presented in Appendix D. The costs associated with remedy implementation consist of capital construction costs, groundwater confirmation monitoring and reporting following remedy completion, and agency oversight that would include periodic reviews of the constructed remedy. The estimated costs for remedy construction are as follows:

- Construction costs include construction materials and services; engineering design, oversight, and reporting; agency oversight; and permitting costs associated with remedy implementation are estimated to be approximately $1,437,152.
- Long-term groundwater monitoring costs were estimated based on quarterly monitoring for 2 years after remedy implementation, then semiannual monitoring for a period of 1 year. The groundwater monitoring costs, including well installation and decommissioning, were estimated to be $218,210.

The total project cost for the Preferred Revised Cleanup Action, which includes a 20% construction contingency cost and sales tax for construction materials and services, is estimated to be $1,655,362.

6.0 References

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Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Tables

Table 2.1
Well Construction and Water Level Data

Well ID	X Coordinate (feet NAD 83 WA State Plane N)	Y Coordinate (feet NAD 83 WA State Plane N)	Top of Casing Elevation (feet NAVD 88)	Ground Surface Elevaiton (feet NAVD 88)	Casing Type	Screened Interval (feet bgs)	Date	Depth to Water (feet below top of casing)	Measured By
BC-3	300020	1302930.5	279935.8	37.34	2-inch PVC	15 to 25	5/24/2013	12.95	HWA
							6/24/2014	14.41	HWA
							12/19/2014	15.61	HWA
							6/23/2015	18.30	HWA
							12/8/2015	15.30	HWA
							6/29/2016	16.95	HWA
							12/21/2016	14.25	HWA
							6/28/2017	16.43	HWA
							9/27/2019	16.08	Kane
							2/4/2020	15.05	Kane
							5/6/2020	13.81	Kane
							7/25/2024	14.73	Floyd|Snider
							7/29/2024	13.92	Floyd|Snider
							7/31/2024	13.95	Floyd|Snider
							8/22/2024	14.22	Floyd|Snider
RMW-4	300001	1302692.0	279898.8	38.48	2-inch PVC	15 to 25	12/19/2014	12.20	HWA
							6/23/2015	13.09	HWA
							12/8/2015	11.95	HWA
							6/29/2016	12.22	HWA
							12/21/2016	11.48	HWA
							6/28/2017	11.48	HWA
							9/26/2019	12.24	Kane
							1/31/2020	10.72	Kane
							5/4/2020	11.09	Kane
							7/25/2024	11.16	Floyd|Snider
							7/29/2024	11.16	Floyd|Snider
							7/31/2024	11.20	Floyd|Snider
							8/22/2024	11.22	Floyd|Snider
RMW-5	300003	1302753.1	279840.3	35.58	2-inch PVC	12 to 22	5/24/2013	11.51	HWA
							6/24/2014	14.51	HWA
							12/19/2014	13.61	HWA
							6/23/2015	14.26	HWA
							12/8/2015	13.29	HWA
							6/29/2016	13.41	HWA
							12/22/2016	13.01	HWA
							6/29/2017	13.26	HWA
							9/26/2019	13.53	Kane
							1/31/2020	9.82	Kane
							5/4/2020	12.34	Kane
							7/25/2024	12.36	Floyd|Snider
							7/29/2024	12.40	Floyd|Snider
							7/31/2024	12.43	Floyd|Snider
							8/22/2024	12.55	Floyd|Snider
RMW-6	300007	1302827.904	279871.0979	34.520827	2-inch PVC	15 to 25	5/24/2013	10.42	HWA
							6/24/2014	14.79	HWA
							12/19/2014	13.31	HWA
							6/23/2015	13.65	HWA
							12/8/2015	12.46	HWA
							6/29/2016	13.14	HWA
							12/21/2016	12.21	HWA
							6/29/2017	12.68	HWA
							9/26/2019	12.67	Kane
							1/31/2020	10.85	Kane
							5/4/2020	11.11	Kane
							7/25/2024	11.33	Floyd|Snider
							7/29/2024	11.35	Floyd|Snider
							7/31/2024	11.39	Floyd|Snider
							8/22/2024	11.49	Floyd|Snider

Table 2.1
Well Construction and Water Level Data

Well ID	X Coordinate (feet NAD 83 WA State Plane N)	Y Coordinate (feet NAD 83 WA State Plane N)	Top of Casing Elevation (feet NAVD 88)	Ground Surface Elevaiton (feet NAVD 88)	Casing Type	Screened Interval (feet bgs)	Date	Depth to Water (feet below top of casing)	Measured By
RMW-7	300042	1302951.009	279868.3275	35.512833	2-inch PVC	15 to 25	5/24/2013	16.31	HWA
							4/4/2014	16.65	HWA
							6/25/2014	16.55	HWA
							9/22/2014	17.54	HWA
							12/19/2014	17.49	HWA
							3/18/2015	16.66	HWA
							6/23/2015	17.41	HWA
							9/11/2015	18.5	HWA
							12/8/2015	15.97	HWA
							3/31/2016	16.94	HWA
							6/29/2016	17.11	HWA
							9/30/2016	18.28	HWA
							12/22/2016	15.89	HWA
							4/5/2017	16.43	HWA
							6/28/2017	16.65	HWA
							10/10/2017	18.26	HWA
							9/27/2019	17.6	Kane
							2/3/2020	16.27	Kane
							5/5/2020	16.49	Kane
							7/25/2024	17.19	Floyd|Snider
							7/29/2024	17.26	Floyd|Snider
							7/31/2024	17.30	Floyd|Snider
							8/22/2024	17.44	Floyd|Snider
RMW-8	300013	1303006.8	279962.8225	40.61165	2-inch PVC	20 to 30	5/24/2013	18.81	HWA
							6/24/2014	19.62	HWA
							12/19/2014	20.63	HWA
							6/23/2015	20.87	HWA
							12/8/2015	19.42	HWA
							6/29/2016	20.5	HWA
							12/22/2016	20.58	HWA
							6/28/2017	19.73	HWA
							9/27/2019	21.10	Kane
							2/3/2020	19.56	Kane
							5/6/2020	19.52	Kane
							7/25/2024	20.14	Floyd|Snider
							7/29/2024	20.21	Floyd|Snider
							7/31/2024	20.28	Floyd|Snider
							8/22/2024	20.51	Floyd|Snider
RMW-9R	300040	1302946.715	280061.9349	43.912907	2-inch PVC	20 to 30	12/19/2014	15.31	HWA
							6/23/2015	4.00	HWA
							12/8/2015	15.92	HWA
							6/29/2016	15.31	HWA
							12/22/2016	14.78	HWA
							6/29/2017	13.55	HWA
							9/27/2019	16.61	Kane
							2/4/2020	15.10	Kane
							5/7/2020	14.48	Kane
							7/25/2024	15.09	Floyd|Snider
							7/29/2024	15.14	Floyd|Snider
							7/31/2024	15.19	Floyd|Snider
							8/22/2024	15.41	Floyd|Snider

Table 2.1
Well Construction and Water Level Data

Well ID	X Coordinate (feet NAD 83 WA State Plane N)	Y Coordinate (feet NAD 83 WA State Plane N)	Top of Casing Elevation (feet NAVD 88)	Ground Surface Elevaiton (feet NAVD 88)	Casing Type	Screened Interval (feet bgs)	Date	Depth to Water (feet below top of casing)	Measured By
RMW-10D	300021	1302902.913	279934.4964	36.775746	2-inch PVC	32 to 42	5/24/2013	11.85	HWA
							6/24/2014	15.00	HWA
							12/19/2014	14.80	HWA
							6/23/2015	20.40	HWA
							12/8/2015	19.69	HWA
							6/29/2016	13.60	HWA
							12/21/2016	13.63	HWA
							6/28/2017	14.05	HWA
							9/27/2019	15.99	Kane
							2/4/2020	15.56	Kane
							5/5/2020	12.48	Kane
							7/25/2024	12.92	Floyd|Snider
							7/29/2024	12.97	Floyd|Snider
							7/31/2024	13.00	Floyd|Snider
							8/22/2024	13.14	Floyd|Snider
RMW-12	300025	1302870.828	279941.8863	38.872699	2-inch PVC	15 to 25	7/25/2016	16.25	HWA
							12/21/2016	13.1	HWA
							6/28/2017	13.1	HWA
							9/27/2019	14.52	Kane
							2/4/2020	12.47	Kane
							5/6/2020	12.24	Kane
							7/25/2024	12.64	Floyd|Snider
							7/29/2024	12.68	Floyd|Snider
							7/31/2024	12.71	Floyd|Snider
							8/22/2024	12.81	Floyd|Snider
RMW-13	300009	1302921.615	279852.0768	34.144621	2-inch PVC	15 to 25	7/25/2016	14.95	HWA
							12/22/2016	16.61	HWA
							6/28/2017	15.23	HWA
							9/27/2019	16.2	Kane
							2/3/2020	14.94	Kane
							5/5/2020	15.22	Kane
							7/25/2024	15.95	Floyd|Snider
							7/29/2024	16.05	Floyd|Snider
							7/31/2024	16.09	Floyd|Snider
							8/22/2024	16.22	Floyd|Snider
RMW-14	300027	1302920.611	279889.9609	34.225634	4-inch PVC	15 to 25	5/5/2020	12.36	Kane
							7/25/2024	12.94	Floyd|Snider
							7/29/2024	12.98	Floyd|Snider
							7/31/2024	13.04	Floyd|Snider
							8/22/2024	13.27	Floyd|Snider
EW-1	300016	1302938.645	279932.8205	36.252622	4-inch PVC	12.5 to 32.5	7/25/2024	13.84	Floyd|Snider
							7/29/2024	13.87	Floyd|Snider
							7/31/2024	13.92	Floyd|Snider
							8/22/2024	14.02	Floyd|Snider
EW-2	300038	1302913.3	279916.7	35.45	4-inch PVC	15 to 35	7/29/2024	12.75	Floyd|Snider
EW-3	300030	1302883.6	279901.9	33.78	4-inch PVC	14 to 34	7/29/2024	10.98	Floyd|Snider
EW-4	300034	1302852.3	279884.7	34.55	4-inch PVC	11 to 31	---	--	--
EW-5	300046	1302929.192	279873.8944	34.099437	4-inch PVC	15 to 35	7/25/2024	13.82	Floyd|Snider
							7/29/2024	13.69	Floyd|Snider
							7/31/2024	13.75	Floyd|Snider
							8/22/2024	13.90	Floyd|Snider
EW-6	300049	1302954.181	279887.7261	35.601836	4-inch PVC	15 to 35	7/29/2024	15.73	Floyd|Snider
							7/31/2024	15.82	Floyd|Snider
							8/22/2024	15.96	Floyd|Snider

Note:

-- Not measured

Abbreviations:

bgs Below ground surface
HWA HWA GeoSciences, Inc.
Kane Kane Environmental, Inc.
NAD 83 North American Datum of 1983
NAVD 88 North American Vertical Datum of 1988
PVC Polyvinyl chloride

Table 2.2
Groundwater HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [1]			4.9	0.38	16	--	0.020
Unit			µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Depth/ Screen Interval (feet bgs)					
BC-3							
BC-3D-092008	9/5/2008	15–25	**110**	**120**	**46**	1.0 U	*1.0 U*
BC-3D-092009	9/15/2009		**130**	**120**	**49**	1.0 U	*1.0 U*
BC-3D-122009	12/16/2009		**170**	**130**	**48**	1.0 U	*1.0 U*
BC-3-052013	5/24/2013		**25**	**11**	4.0		*0.20 U*
BC-3-062014	6/24/2014		**11**	**4.0**	0.75		*0.20 U*
BC-3D-122014	12/19/2014		**7.7**	**2.1**	0.44	0.20 U	*0.20 U*
BC-3D-062015	6/23/2015		3.8	**0.90**	0.20 U	0.20 U	*0.20 U*
BC-3D-122015	12/8/2015		**5.3**	**1.3**	0.29	0.20 U	*0.20 U*
BC-3D-062016	6/29/2016		3.7	**0.93**	0.20 U	0.20 U	*0.20 U*
BC-3D-122016	12/21/2016		**5.9**	**1.5**	0.57	0.20 U	*0.20 U*
BC-3-062017	6/28/2017		**6.8**	**1.9**	0.80		*0.20 U*
BC-3-092019	9/27/2019		4.3	**1.0**	0.34	0.20 U	*0.20 U*
BC-3-022020	2/4/2020		**5.2**	**1.3**	0.43	0.20 U	0.020 U
BC-3-052020	5/6/2020		**6.7**	**1.7**	0.52	0.20 U	0.020 U
EW-1							
EW-1-042014	4/4/2014	12.5–32.5	**17**	**3.0**	1.2		*0.20 U*
EW-1-062014	6/25/2014		**27**	**8.1**	6.5		*0.20 U*
EW-1-122014	12/19/2014		**21**	**2.6**	0.82	0.20 U	*0.20 U*
EW-1-032015	3/18/2015		2.8	0.27	0.20 U	0.20 U	*0.20 U*
EW-1-062015	6/23/2015		**22**	**2.0**	0.95	0.20 U	*0.20 U*
EW-1-092015	9/11/2015		**41**	**2.2**	0.79	0.20 U	*0.20 U*
EW-1-032016	3/31/2016		**22**	**2.8**	2.5	0.20 U	*0.20 U*
EW-1-062016	6/29/2016		**24**	**4.2**	4.5	0.20 U	*0.20 U*
EW-1-092016	9/30/2016		**20**	**2.0**	2.3	0.20 U	*0.20 U*
EW-1-012017	1/5/2017		1.1	0.20 U	0.20 U	0.20 U	*0.20 U*
EW-1-042017	4/5/2017		**13**	**1.2**	0.85		*0.20 U*
EW-1-062017	6/29/2017		**8.9**	**0.77**	0.70		*0.20 U*
EW-1-102017	10/10/2017		**15**	**0.81**	0.50		*0.20 U*
EW-1-082324	8/23/2024		3.2	0.20 U	0.20 U	0.20 U	0.020 U
EW-2							
EW-2-042014	4/4/2014	15–35	**13**	**2.8**	1.5		
EW-2-062014	6/25/2014		**28**	**3.8**	1.5		*0.20 U*
EW-2-092014	9/22/2014		**66**	**16**	12		*0.40 U*
EW-2-122014	12/19/2014		**44**	**12**	12	0.40 U	*0.40 U*
EW-2-032015	3/18/2015		**22**	**6.5**	4.3	0.20 U	*0.20 U*
EW-2-062015	6/23/2015		**8.6**	**2.4**	1.8	0.20 U	*0.20 U*
EW-2-092015	9/11/2015		**6.5**	**0.62**	0.40	0.20 U	*0.20 U*
EW-2-122015	12/8/2015		**16**	**2.6**	2.4	0.20 U	*0.20 U*
EW-2-032016	3/31/2016		**16**	**4.0**	3.7	0.20 U	*0.20 U*
EW-2-062016	6/29/2016		**17**	**4.1**	3.2	0.20 U	*0.20 U*
EW-2-092016	9/30/2016		**21**	**6.2**	5.6	0.20 U	*0.20 U*
EW-2-012017	1/5/2017		**24**	**3.6**	1.7	0.20 U	*0.20 U*
EW-2-042017	4/5/2017		**11**	**3.2**	2.2		*0.20 U*
EW-2-062017	6/29/2017		**16**	**4.8**	3.6		*0.20 U*
EW-2-102017	10/10/2017		3.0	**0.45**	0.23		*0.20 U*
EW-2-092019	9/27/2019		**16**	**4.7**	3.2	0.20 U	*0.20 U*
EW-2-022020	2/5/2020		**26**	**7.9**	6.2	0.20 U	**0.39**
EW-2-082324	8/23/2024		**7.8**	0.27	0.20 U	0.20 U	0.020 U
EW-3							
EW-3-042014	4/4/2014	14–34	**49**	**14**	7.2		**0.61**
EW-3-062014	6/25/2014		**41**	**14**	12		*0.40 U*
EW-3-092014	9/22/2014		**190**	**59**	**33**		**1.1**
EW-3-122014	12/19/2014		**21**	**6.4**	6.0	0.20 U	*0.20 U*
EW-3-032015	3/18/2015		**140**	**46**	**29**	1.0 U	*1.0 U*
EW-3-062015	6/23/2015		**87**	**24**	9.0	0.40 U	*0.40 U*
EW-3-092015	9/11/2015		**81**	**28**	14	0.40 U	*0.40 U*
EW-3-122015	12/8/2015		**33**	**11**	7.8	0.20 U	**0.38**
EW-3-032016	3/31/2016		**72**	**21**	16	0.40 U	**0.64**
EW-3-062016	6/29/2016		**79**	**24**	14	0.40 U	**0.43**
EW-3-092016	9/30/2016		**50**	**18**	10	0.20 U	**0.63**
EW-3-012017	1/5/2017		**95**	**30**	**20**	0.40 U	**0.46**
EW-3-042017	4/5/2017		**150**	**57**	**30**		**1.3**
EW-3-062017	6/29/2017		**270**	**79**	**59**		**1.4**
EW-3-102017	10/10/2017		**69**	**25**	16		**0.41**
EW-3-052020	5/7/2020		**25**	**23**	11	0.20 U	**0.023**
EW-3-082224	8/22/2024		3.7	**3.4**	12	0.21	**0.42**

Table 2.2
Groundwater HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [1]			4.9	0.38	16	--	0.020
Unit			µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Depth/ Screen Interval (feet bgs)					
EW-4							
EW-4-062014	6/25/2014	11–31	1.7	**1.8**	1.1		**0.38**
EW-4-092014	9/22/2014		**45**	**10**	7.4		**0.87**
EW-4-122014	12/19/2014		1.2	**1.6**	1.1	0.20 U	**0.27**
EW-4-032015	3/18/2015		**15**	**4.8**	3.2	0.20 U	*0.20 U*
EW-4-062015	6/23/2015		0.85	**2.8**	1.7	0.20 U	**0.37**
EW-4-092015	9/11/2015		1.8	**2.1**	0.92	0.20 U	**0.28**
EW-4-122015	12/8/2015		0.20 U	**1.6**	2.9	0.20 U	**0.85**
EW-4-032016	3/31/2016		0.20 U	**2.5**	2.0	0.20 U	**0.31**
EW-4-062016	6/29/2016		0.20 U	**1.2**	3.5	0.20 U	**0.61**
EW-4-092016	9/30/2016		0.20 U	**0.88**	4.0	0.20 U	**0.75**
EW-4-012017	1/5/2017		0.33	**3.2**	1.8	0.20 U	**0.29**
EW-4-042017	4/5/2017		0.20	**3.0**	1.7		**0.25**
EW-4-062017	6/29/2017		0.20	**0.90**	2.6		**0.24**
EW-4-082324	8/23/2024		0.20 U	0.20 U	1.3	0.20 U	**0.34**
EW-5							
EW-5D-012017	1/5/2017	15–35	**5.0**	**4.0**	9.4	0.20 U	**2.5**
EW-5D-042017	4/5/2017		**6.9**	**5.2**	15		**3.8**
EW-5D-062017	6/29/2017		**8.6**	**3.8**	10		**0.49**
EW-5D-102017	10/10/2017		0.36	**0.94**	8.6		**1.8**
EW-5-072524	7/25/2024		0.26	0.20 U	0.20 U	0.20 U	*0.20 U*
EW-5-073124	7/31/2024		0.25	0.20 U	0.20 U	0.20 U	*0.20 U*
EW-5-082324	8/23/2024		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
EW-6							
EW-6D-012017	1/5/2017	15–35	2.4	**0.54**	0.20 U	0.20 U	*0.20 U*
EW-6D-042017	4/5/2017		2.1	**0.94**	1.2		*0.20 U*
EW-6D-062017	6/29/2017		0.56	**0.63**	2.0		**0.31**
EW-6D-102017	10/10/2017		**20**	**7.2**	**18**		**0.46**
EW-6D-092019	9/27/2019		4.7	**1.4**	4.2	0.20 U	*0.20 U*
EW-6D-022020	2/5/2020		3.1	**1.0**	4.0	0.20 U	**0.16**
EW-6D-052020	5/7/2020		**12**	**5.3**	7.6	0.20 U	**0.36**
EW-6-072524	7/25/2024		0.27	0.20 U	0.20 U	0.20 U	*0.20 U*
EW-6-073124	7/31/2024		1.5	0.20 U	0.20 U	0.20 U	*0.20 U*
EW-6-082324	8/23/2024		**8.8**	0.23	0.20 U	0.20 U	0.020 U
RMW-4							
RMW-4D-122014	12/19/2014	15–25	0.79	0.33	0.20 U	0.20 U	*0.20 U*
RMW-4D-062015	6/23/2015		0.52	**0.72**	0.20 U	0.20 U	*0.20 U*
RMW-4D-122015	12/8/2015		2.2	**0.56**	0.20 U	0.20 U	*0.20 U*
RMW-4D-062016	6/29/2016		3.6	**0.46**	0.20 U	0.20 U	*0.20 U*
RMW-4D-122016	12/21/2016		4.3	**0.51**	0.20 U	0.20 U	*0.20 U*
RMW-4-062017	6/28/2017		3.9	**0.49**	0.20 U		*0.20 U*
RMW-4-092019	9/26/2019		2.5	**0.45**	0.20 U	0.20 U	*0.20 U*
RMW-4-012020	1/31/2020		3.7	**0.54**	0.20 U	0.20 U	0.020 U
RMW-4-052020	5/4/2020		3.2	**0.82**	0.20 U	0.20 U	0.020 U
RMW-4-082324	8/23/2024		3.3	**0.96**	0.33	0.20 U	0.020 U
RMW-5							
RMW-5-052013	5/24/2013	12–22	1.7	0.20 U	0.20 U		*0.20 U*
RMW-5-062014	6/24/2014		1.4	**0.40**	0.20 U		*0.20 U*
RMW-5D-122014	12/19/2014		1.3	0.32	0.22	0.20 U	*0.20 U*
RMW-5D-062015	6/23/2015		0.66	0.36	0.20 U	0.20 U	*0.20 U*
RMW-5D-122015	12/8/2015		1.6	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-5D-062016	6/29/2016		1.1	0.31	0.20 U	0.20 U	*0.20 U*
RMW-5D-122016	12/22/2016		1.0	0.20 U	0.23	0.20 U	*0.20 U*
RMW-5-062017	6/29/2017		2.0	0.20 U	0.20 U		*0.20 U*
RMW-5-092019	9/26/2019		2.1	**0.39**	0.22	0.20 U	*0.20 U*
RMW-5-012020	1/31/2020		2.5	0.21	0.20 U	0.20 U	**0.024**
RMW-5-052020	5/4/2020		2.3	0.20 U	0.20 U	0.20 U	0.020 U
RMW-5-082224	8/22/2024		3.5	**0.55**	0.43	0.20 U	**0.036**
RMW-6							
RMW-6D-092009	9/14/2009	15–25	0.20 U	0.27	3.6	0.20 U	**5.3**
RMW-6-052013	5/24/2013		0.20 U	0.20 U	2.7		**3.4**
RMW-6-062014	6/24/2014		0.34	**0.60**	0.42		*0.20 U*
RMW-6D-122014	12/19/2014		0.47	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-6D-062015	6/23/2015		0.20 U	**1.4**	0.88	0.20 U	*0.20 U*
RMW-6D-122015	12/8/2015		0.20 U	**2.7**	1.0	0.20 U	*0.20 U*
RMW-6D-062016	6/29/2016		0.20 U	**2.5**	1.3	0.20 U	*0.20 U*
RMW-6D-122016	12/21/2016		0.20 U	**0.39**	0.50	0.20 U	*0.20 U*
RMW-6-062017	6/29/2017		0.20 U	**0.41**	0.30		*0.20 U*
RMW-6-092019	9/26/2019		0.20 U	**1.7**	3.8	0.20 U	**0.57**
RMW-6-012020	1/31/2020		0.20 U	**0.52**	2.5	0.20 U	**0.70**
RMW-6-052020	5/4/2020		0.20 U	**0.45**	1.5	0.20 U	**0.21**
RMW-6-082224	8/22/2024		0.20 U	0.20 U	0.77	0.20 U	**0.79**

Table 2.2
Groundwater HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [1]			4.9	0.38	16	--	0.020
Unit			µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Depth/ Screen Interval (feet bgs)					
RMW-7							
RMW-7D-092009	9/15/2009	15–25	**50**	**120**	**190**	2.0	**22**
RMW-7-052013	5/24/2013		**9.0**	**33**	**65**		**9.3**
RMW-7-042014	4/4/2014		0.75	**3.8**	**35**		**8.3**
RMW-7-062014	6/25/2014		**5.2**	**24**	**80**		**9.9**
RMW-7-092014	9/22/2014		1.0 U	**3.2**	**170**		**47**
RMW-7D-122014	12/19/2014		2.9	**8.9**	**150**	1.4	**34**
RMW-7D-032015	3/18/2015		0.40 U	**1.5**	**57**	0.64	**20**
RMW-7D-062015	6/23/2015		0.40 U	**3.1**	**95**	1.2	**9.6**
RMW-7D-092015	9/11/2015		4.2	**23**	**110**	1.4	**14**
RMW-7D-122015	12/8/2015		3.5	**8.7**	**85**	0.87	**9.0**
RMW-7D-032016	3/31/2016		1.5	**6.8**	**84**	0.91	**35**
RMW-7D-062016	6/29/2016		2.3	**14**	**65**	0.68	**12**
RMW-7D-092016	9/30/2016		2.4	**7.8**	**89**	1.0 U	**13**
RMW-7D-122016	12/22/2016		1.1	**4.1**	**88**	0.93	**24**
RMW-7-042017	4/5/2017		1.2	**2.4**	12		**0.86**
RMW-7-062017	6/28/2017		1.3	**1.9**	**33**		**1.9**
RMW-7-102017	10/10/2017		1.0	**2.3**	**47**		**25**
RMW-7-092019	9/27/2019		0.51	**4.1**	**33**	0.39	**27**
RMW-7-022020	2/3/2020		0.20 U	0.22	16	0.28	**26**
RMW-7-052020	5/5/2020		0.32	**0.88**	**20**	0.31	**28**
RMW-7-072524	7/25/2024		0.45	**0.46**	**26**	0.22	**6.4**
RMW-7-073124	7/31/2024		0.38	**0.41**	**31**	0.29	**9.4**
RMW-7-082224	8/22/2024		0.48	**0.64**	**27**	0.28	**6.2**
RMW-8							
RMW-8D-092009	9/15/2009	20–30	0.46	**2.6**	1.3	0.36	*0.20 U*
RMW-8D-Dup-092009	9/15/2009		0.48	**2.6**	1.3	0.36	*0.20 U*
RMW-8D-122009	12/16/2009		0.91	**3.0**	1.4	0.40	*0.20 U*
RMW-8D-052013	5/24/2013		0.50	**0.85**	0.44		*0.20 U*
RMW-8D-062014	6/24/2014		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-8D-122014	12/19/2014		0.70	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-8D-062015	6/23/2015		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-8D-122015	12/8/2015		0.20 U	**0.39**	0.47	0.20 U	*0.20 U*
RMW-8D-062016	6/29/2016		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-8D-122016	12/22/2016		0.31	**0.66**	0.37	0.20 U	*0.20 U*
RMW-8D-062017	6/28/2017		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-8D-092019	9/27/2019		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-8D-022020	2/3/2020		0.20 U	**0.40**	0.28	0.20 U	0.020 U
RMW-8D-052020	5/6/2020		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-8-082324	8/23/2024		0.20 U	0.20 U	0.81	0.20 U	0.020 U
RMW-9							
RMW-9D-092009	9/15/2009	20–30	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-122009	12/16/2009		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-052013	5/24/2013		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-9R							
RMW-9RD-122014	12/19/2014	20–30	0.79	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-062015	6/23/2015		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-122015	12/8/2015		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-062016	6/29/2016		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9D-122016	12/22/2016		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9RD-062017	6/29/2017		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-9RD-092019	9/27/2019		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-9RD-022020	2/4/2020		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-9RD-052020	5/7/2020		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-9R-082224	8/22/2024		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-10D							
RMW-10D-092009	9/15/2009	32–42	0.24	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-122009	12/16/2009		0.35	0.27	0.20 U	0.20 U	*0.20 U*
RMW-10D-Dup-122009	12/16/2009		0.28	0.23	0.20 U	0.20 U	*0.20 U*
RMW-10D-052013	5/24/2013		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-10D-062014	6/24/2014		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-10D-122014	12/19/2014		0.69	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-062015	6/23/2015		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-122015	12/8/2015		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-062016	6/29/2016		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-122016	12/21/2016		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-062017	6/28/2017		0.20 U	0.20 U	0.20 U		*0.20 U*
RMW-10D-092019	9/27/2019		0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
RMW-10D-022020	2/4/2020		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-10D-052020	5/5/2020		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U
RMW-10D-082324	8/23/2024		0.20 U	0.20 U	0.20 U	0.20 U	0.020 U

Table 2.2
Groundwater HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [1]			4.9	0.38	16	--	0.020
Unit			µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Depth/ Screen Interval (feet bgs)					
RMW-12							
RMW-12D-072016	7/25/2016	15–25	**120**	**19**	14	1.0 U	*1.0 U*
RMW-12D-122016	12/21/2016		**61**	**14**	**21**	0.34	**1.6**
RMW-12D-062017	6/28/2017		**130**	**27**	**29**		*1.0 U*
RMW-12D-092019	9/27/2019		**15**	**3.1**	6.5	0.20 U	**0.87**
RMW-12D-022020	2/4/2020		**13**	**3.7**	6.1	0.20 U	**2.8**
RMW-12D-052020	5/6/2020		**19**	**4.6**	5.4	0.20 U	**0.50**
RMW-12-072524	7/25/2024		**9.6**	**1.7**	1.2	0.20 U	*0.20 U*
RMW-12-073124	7/31/2024		**8.2**	**1.7**	1.5	0.20 U	**0.22**
RMW-12-082224	8/22/2024		**8.8**	**1.8**	1.4	0.20 U	**0.19**
RMW-112-082224	8/22/2024		**9.2**	**1.9**	1.4	0.20 U	**0.21**
RMW-13							
RMW-13D-072016	7/25/2016	15–25	0.20 U	0.20 U	1.8	0.20 U	**0.24**
RMW-13D-122016	12/22/2016		0.20 U	0.20 U	1.2	0.20 U	*0.20 U*
RMW-13D-062017	6/28/2017		0.20 U	0.20 U	0.50		*0.20 U*
RMW-13D-092019	9/27/2019		0.20 U	0.20 U	0.97	0.20 U	*0.20 U*
RMW-13D-022020	2/3/2020		0.20 U	0.20 U	0.31	0.20 U	**0.095**
RMW-13D-052020	5/5/2020		0.20 U	0.20 U	0.30	0.20 U	**0.060**
RMW-13-082224	8/22/2024		0.20 U	0.20 U	0.48	0.20 U	**0.16**
RMW-14							
RMW-14D-052020	5/5/2020	15–25	**15**	**5.6**	4.0	0.20 U	**0.15**
RMW-14-082224	8/22/2024		**9.8**	**2.7**	0.58	0.20 U	**0.032**
CDM-B14							
CDM-B14-W	4/3/2009	9–9	**5.9**	**0.54**	0.33	0.20 U	*0.20 U*
CDM-B15							
CDM-B15-W	4/3/2009	10–10	3.9	**1.8**	1.4	0.20 U	*0.20 U*
CDM-B16							
CDM-B16-W	4/3/2009	13–13	0.21	0.20 U	0.20 U	0.20 U	*0.20 U*
CDM-B17							
CDM-B17-W	4/2/2009	11–11	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
GWB-03							
GWB-03-15-20	9/4/2024	15–20	0.20 U	0.20 U	0.68	0.20 U	*0.20 U*
GWB-03-20-25	9/4/2024	20–25	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
GWB-03-25-30	9/4/2024	25–30	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
GWB-04							
GWB-04-15-20	9/4/2024	15–20	0.20 U	**0.50**	3.6	0.20 U	**1.4**
GWB-04-20-25	9/4/2024	20–25	0.63	**0.61**	7.1	0.20 U	*0.20 U*
GWB-04-25-30	9/5/2024	25–30	0.20 U	0.20 U	0.32	0.20 U	*0.20 U*
GWB-05							
GWB-05-20-25	9/5/2024	20–25	1.2	**1.5**	12	0.20 U	*0.20 U*
GWB-05-25-30	9/5/2024	25–30	**8.6**	**21**	2.6	0.20 U	*0.20 U*
GWB-06							
GWB-06-20-25	9/5/2024	20–25	**11**	**18**	**21**	0.47	**0.43**
GWB-06-25-30	9/5/2024	25–30	**18**	**18**	11	0.29	*0.20 U*
GWB-07							
GWB-07-35-40	9/6/2024	35–40	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
GWB-07-40-45	9/6/2024	40–45	0.26	0.20 U	0.20 U	0.20 U	*0.20 U*
GWB-08-15-25							
GWB-08-15-25	9/5/2024	15–25	0.20 U	0.20 U	0.20 U	0.20 U	**0.29**
RB-25							
RB-25-102018	10/24/2018	15–25	**200**	**88**	**92**		**1.0**
RB-26							
RB-26-102018	10/24/2018	15–25	2.4	**1.6**	3.5		0.020 U
RB-27							
RB-27-102018	10/24/2018	15–25	**29**	**19**	7.1		**1.0**
RB-28							
RB-28-102018	10/24/2018	10–20	**15**	**6.4**	4.7		**0.34**
RB-29							
RB-29-102018	10/24/2018	15–25	2.6	**1.0**	1.4		0.020 U
RB-30							
RB-30-102018	10/24/2018	15–25	0.56	**1.3**	8.1		**0.28**
RB-31							
RB-31-102018	10/25/2018	15–25	**63**	**11**	**43**		**13**
RB-32							
RB-32-102018	10/25/2018	15–25	**110**	**44**	**76**		0.020 U
UCCB-5							
UCCB5-15-GW	3/22/2017	10–20	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB5-32-GW	3/22/2017	29–34	4.2	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB5-43-GW	3/22/2017	40–45	1.5	0.20 U	0.20 U	0.20 U	*0.20 U*

Table 2.2
Groundwater HVOC Results

		Analyte	Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
		CAS No.	127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
		CUL [1]	4.9	0.38	16	--	0.020
		Unit	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Name	Sample Date	Sample Depth/ Screen Interval (feet bgs)					
UCCB-6							
UCCB6-9-GW	3/23/2017	7–12	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB6-22-GW	3/23/2017	20–25	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB6-36-GW	3/23/2017	33–38	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB-7							
UCCB7-17-GW	3/23/2017	14–19	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB7-28-GW	3/23/2017	25–30	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB7-38-GW	3/23/2017	35–40	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB-9							
UCCB9-18-GW	3/22/2017	15–20	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB9-31-GW	3/22/2017	28–33	0.61	0.20 U	0.20 U	0.20 U	*0.20 U*
UCCB9-41-GW	3/23/2017	39–44	0.20 U	0.20 U	0.20 U	0.20 U	*0.20 U*

Notes:

All results are rounded to two significant figures.
Blank cells are intentional.
-- Not established.
Italic Analyte was not detected at a reporting limit greater than the CUL.
RED/BOLD Analyte was detected at a concentration greater than the CUL.
1 CULs are established in the Cleanup Action Plan (Exhibit B of Ecology 2023).

Abbreviations:

bgs Below ground surface
CAS Chemical Abstracts Service
CUL Cleanup level
HVOC Halogenated volatile organic compound
µg/L Micrograms per liter

Qualifier:

U Analyte was not detected at the associate reporting limit.

Table 2.3
Groundwater Geochemical Parameter Results

	Analyte	Dissolved Oxygen	ORP	pH	Specific Conductance	Temperature	Turbidity	Alkalinity, Total	Chloride	Nitrate	Nitrite	Sulfate	Sulfide
	CAS No.	--	--	pH	--	--	--	--	16887-00-6	14797-55-8	14797-65-0	14808-79-8	18496-25-8
	Unit	mg/L	mV	pH	µS/cm	°C	NTU	mg-$CaCO_3$/L	mg/L	mg-N/L	mg-N/L	mg/L	mg/L
Sample Location	**Sample Date**												
Extraction Wells													
EW-1	8/23/2024	0.36	168.3	6.43	240.0	14.9	1.10						
EW-2	8/23/2024	0.68	23.1	6.47	246.5	14.4	7.45						
EW-3	8/22/2024	0.22	-6.8	6.36	437.8	14.7	2.90	220 J	31 J	0.16	0.020 U	12	0.080
EW-4	8/23/2024	0.25	-31.6	6.57	377.7	14.7	16.10						
EW-5	7/25/2024	0.24	81.5	6.92	262.3	16.1	1.99						
	7/31/2024	0.26	114.3	7.10	260.1	16.8	0.87						
	8/23/2024	0.41	-47.5	6.89	252.5	16.1	0.81						
EW-6	7/25/2024	2.12	88.1	6.43	212.0	15.8	2.64						
	7/31/2024	2.15	88.6	6.52	207.2	16.3	2.37						
	8/23/2024	1.18	126.8	6.35	224.0	16.7	1.40						
Monitoring Wells													
RMW-4	8/23/2024	0.37	-78.1	6.27	394.2	14.8	0.97						
RMW-5	8/22/2024	0.22	-80.8	6.50	540.0	15.6	1.24	210 J	14 J	0.21	0.020 U	18	0.050 U
RMW-6	8/22/2024	0.56	-98.7	6.68	510.0	14.8	3.43	280 J	28 J	0.13	0.020 U	5.0 U	0.050 U
RMW-7	7/25/2024	0.24	-3.6	6.66	418.7	16.7	1.86						
	7/31/2024	0.27	4.6	6.69	440.9	17.6	1.25						
	8/22/2024	0.22	13.7	6.38	400.8	17.7	0.97	190 J	15 J	0.19	0.020 U	14	0.050 U
RMW-8	8/23/2024	0.40	-83.1	6.22	659.0	15.1	2.12						
RMW-9R	8/22/2024	5.00	166.4	5.95	506.0	16.6	0.60	40 J	140 J	2.6	0.020 U	23	0.050 U
RMW-10D	8/23/2024	2.39	161.8	6.24	217.9	15.2	1.13						
RMW-12	7/25/2024	0.48	113.0	6.16	380.0	15.1	1.77						
	7/31/2024	0.36	140.4	6.11	385.0	16.2	7.64						
	8/22/2024	0.36	125.0	6.00	420.8	16.3	1.26	190 J	34 J	0.052	0.020 U	16	0.050 U
RMW-13	8/22/2024	0.31	-7.6	6.32	399.7	17.9	1.35	200 J	14 J	0.21	0.020 U	34	0.050 U
RMW-14	8/22/2024	0.34	-6.9	6.34	339.1	15.8	1.50	160 J	12 J	0.97	0.020 U	20	0.050 U
Reconnaissance Samples													
GWB-03-15-20	9/4/2024	3.95	-41.7	6.70	294.3	19.7	80.30						
GWB-03-20-25	9/4/2024	4.58	-72.8	7.10	314.2	20.1	454.00						
GWB-03-25-30	9/4/2024	0.46	-207.4	7.99	301.9	19.1	368.00						
GWB-04-15-20	9/4/2024	3.12	-34.6	6.55	545.0	24.6	7.15						
GWB-04-20-25	9/4/2024	5.04	-49.9	7.25	322.8	23.8	47.30						
GWB-04-25-30	9/5/2024	2.54	-54.0	6.99	303.3	24.8	49.30						
GWB-05-20-25	9/5/2024	3.53	-27.4	6.69	280.6	21.9	40.00						
GWB-05-25-30	9/5/2024	2.74	-48.1	6.87	284.5	23.1	41.80						
GWB-06-20-25	9/5/2024	3.74	4.1	6.70	303.4	24.2	47.40						
GWB-06-25-30	9/5/2024	3.96	-35.3	6.83	302.4	23.7	61.70						
GWB-07-35-40	9/6/2024	2.64	-99.4	8.24	256.1	24.7	181.00						
GWB-08-15-25	9/5/2024	2.70	-67.4	6.84	497.2	24.1	48.00						

Notes:

All chemistry results are rounded to two significant figures. Field parameters are reported as displayed by the instrument.

Blank cells are intentional.

-- Not established.

Abbreviations:

°C Degrees Celsius
CAS Chemical Abstracts Service
µg/L Micrograms per liter
µS/cm Microsiemens per centimeter
mg-$CaCO_3$/L Milligrams of calcium carbonate per liter
mg-N/L Milligrams of nitrogen per liter
mg/L Milligrams per liter
mV Millivolts
NTU Nephelometric turbidity units
ORP Oxidation–reduction potential

Qualifier:

J Analyte was detected; concentration is an estimate.
U Analyte was not detected at the associate reporting limit.
UJ Analyte was not detected at the associate reporting limit, which is an estimate.

Table 2.3
Groundwater Geochemical Parameter Results

Analyte		Total Organic Carbon	Ethane	Ethene	Methane	Calcium	Iron	Magnesium	Calcium	Iron	Magnesium
CAS No.		TOC	74-84-0	74-85-1	74-82-8	7440-70-2	7439-89-6	7439-95-4	7440-70-2	7439-89-6	7439-95-4
Unit		mg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Sample Location	**Sample Date**										
Extraction Wells											
EW-1	8/23/2024										
EW-2	8/23/2024										
EW-3	8/22/2024	5.8	0.56 UJ	0.58 UJ	410	50,000	13,000	20,000	45,000	14,000	19,000
EW-4	8/23/2024										
EW-5	7/25/2024										
	7/31/2024										
	8/23/2024										
EW-6	7/25/2024										
	7/31/2024										
	8/23/2024										
Monitoring Wells											
RMW-4	8/23/2024										
RMW-5	8/22/2024	11	0.56 UJ	0.58 UJ	1,300	37,000	18,000	15,000	39,000	24,000	14,000
RMW-6	8/22/2024	11	0.56 UJ	0.58 UJ	2,200	54,000	31,000	19,000	53,000	31,000	19,000
RMW-7	7/25/2024										
	7/31/2024										
	8/22/2024	3.9	0.56 UJ	0.58 UJ	580	49,000	3,900	11,000	49,000	4,100	11,000
RMW-8	8/23/2024										
RMW-9R	8/22/2024	1.0 U	0.56 UJ	0.58 UJ	0.55 U	40,000	56 U	17,000	38,000	50 U	17,000
RMW-10D	8/23/2024										
RMW-12	7/25/2024										
	7/31/2024										
	8/22/2024	4.4	0.56 UJ	0.58 UJ	76	52,000	94	15,000	51,000	220	13,000
RMW-13	8/22/2024	4.9	0.56 UJ	0.58 UJ	26	65,000	1,900	14,000	64,000	1,900	14,000
RMW-14	8/22/2024	2.4	0.56 UJ	0.58 UJ	820	44,000	2,200	14,000	38,000	2,400	13,000
Reconnaissance Samples											
GWB-03-15-20	9/4/2024										
GWB-03-20-25	9/4/2024										
GWB-03-25-30	9/4/2024										
GWB-04-15-20	9/4/2024										
GWB-04-20-25	9/4/2024										
GWB-04-25-30	9/5/2024										
GWB-05-20-25	9/5/2024										
GWB-05-25-30	9/5/2024										
GWB-06-20-25	9/5/2024										
GWB-06-25-30	9/5/2024										
GWB-07-35-40	9/6/2024										
GWB-08-15-25	9/5/2024										

Notes:

All chemistry results are rounded to two significant figures. Field parameters are reported as displayed by the instrument.
Blank cells are intentional.
-- Not established.

Abbreviations:

°C Degrees Celsius
CAS Chemical Abstracts Service
µg/L Micrograms per liter
µS/cm Microsiemens per centimeter
mg-$CaCO_3$/L Milligrams of calcium carbonate per liter

Qualifier:

J Analyte was detected; concentration is an estimate.
U Analyte was not detected at the associate reporting limit.
UJ Analyte was not detected at the associate reporting limit, which is an estimate.

Table 2.4
Soil HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [(1)]			0.05	0.03	160	--	0.67
Unit			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Sample Depth (feet bgs)					
EW-5D-18	10/11/2016	18–18	0.00092 U	0.00092 U	0.0015	0.00092 U	0.00092 U
EW-5D-21	10/11/2016	21–21	0.00081 U	0.00081 U	0.0023	0.00081 U	0.0020
EW-6D-19	10/12/2016	19–19	0.00070 U	0.00070 U	0.00070 U	0.00070 U	0.00070 U
EW-6D-21	10/12/2016	21–21	0.0038	0.0052	0.050	0.0014 U	0.0028
RMW-12D-5'	9/22/2016	5–5	0.00088 U	0.00088 U	0.00088 U	0.00088 U	0.00088 U
RMW-12D-12.5'	9/22/2016	12.5–12.5	0.012	0.0061	0.0029	0.00091 U	0.00091 U
RMW-12D-17.5'	9/22/2016	17.5–17.5	0.024	0.0025	0.0011	0.00099 U	0.00099 U
RMW-12D-22.5'	9/22/2016	22.5–22.5	**0.59**	0.0058	0.0010 U	0.0010 U	0.0010 U
RMW-13D-5'	9/22/2016	5–5	0.00092 U	0.00092 U	0.00092 U	0.00092 U	0.00092 U
RMW-13D-12.5'	9/22/2016	12.5–12.5	0.0015 U	0.0015 U	0.0015 U	0.0015 U	0.0015 U
RMW-13D-17.5'	9/22/2016	17.5–17.5	0.00096 U	0.00096 U	0.0014	0.00096 U	0.00096 U
RMW-13D-22.5'	9/22/2016	22.5–22.5	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
RMW-14:6ft	4/27/2020	6–6	0.00077 U	0.00077 U	0.00077 U	0.00077 U	0.00077 U
RMW-14:11.5ft	4/27/2020	11.5–11.5	0.0073	0.00080 U	0.00080 U	0.00080 U	0.00080 U
RMW-14:15ft	4/27/2020	15–15	0.00093	0.00075 U	0.00075 U	0.00075 U	0.00075 U
RMW-14:20ft	4/27/2020	20–20	0.0012	0.00074 U	0.00074 U	0.00074 U	0.00074 U
RMW-14:21.5ft	4/27/2020	21.5–21.5	**0.13**	**0.27**	0.029	0.0012	0.0017
RMW-14:26ft	4/27/2020	26–26	0.0014	0.00087	0.00086 U	0.00086 U	0.00086 U
CDM-B15-10	4/3/2009	10–10	0.027	0.0017 U	0.0017 U	0.0017 U	0.0017 U
CDM-B16-13	4/3/2009	13–13	0.0041	0.0010 U	0.0010 U	0.0010 U	0.0010 U
R-3-8	2/12/2008	8–8	0.0057 U				
R-4-8	2/12/2008	8–8	0.0090				
RB-25-13	10/24/2018	13–13	**0.46**	**0.052**	0.0016 U		0.0016 U
RB-26-8.5	10/24/2018	8.5–8.5	0.00094 U	0.00094 U	0.00094 U		0.00094 U
RB-27-10	10/24/2018	10–10	0.0011 U	0.0011 U	0.0011 U		0.0011 U
RB-28-10	10/24/2018	10–10	0.0017	0.00078 U	0.00078 U		0.00078 U
RB-29-8	10/24/2018	8–8	0.00082 U	0.00082 U	0.00082 U		0.00082 U
RB-30-9	10/24/2018	9–9	0.00077 U	0.00077 U	0.00077 U		0.00077 U
RB-31-7.75	10/24/2018	7.75–7.75	0.0010 U	0.0010 U	0.0010 U		0.0010 U
RB-32-15	10/24/2018	15–15	0.00080 U	0.00080 U	0.00080 U		0.00080 U
KSB-1:12ft	2/24/2020	12–12	0.00099 U	0.00099 U	0.00099 U	0.00099 U	0.0014 U
KSB-1:15ft	2/24/2020	15–15	0.0013 U	0.0013 U	0.0014	0.0013 U	0.0018 U
KSB-1:23ft	2/24/2020	23–23	0.0052	0.00094 U	0.00094 U	0.00094 U	0.0013 U
KSB-2:12ft	2/24/2020	12–12	0.0017	0.00096 U	0.00096 U	0.00096 U	0.0013 U
KSB-2:18.75ft	2/24/2020	18.75–18.75	0.0051	0.0012	0.00093 U	0.00093 U	0.00093 U
KSB-2:25ft	2/24/2020	25–25	**0.055**	0.0020	0.00088 U	0.00088 U	0.0012 U
KSB-3:11.5ft	2/24/2020	11.5–11.5	0.0074	0.00095 U	0.00095 U	0.00095 U	0.0013 U
KSB-3:19ft	2/24/2020	19–19	**0.058**	0.029	0.033	0.0010 U	0.0048
KSB-3:25.5ft	2/24/2020	25.5–25.5	**1.0**	0.0061	0.00090 U	0.00090 U	0.0013 U
KSB-4:12ft	2/24/2020	12–12	0.021	0.00089 U	0.00089 U	0.00089 U	0.0013 U
KSB-4:23.5ft	2/24/2020	23.5–23.5	0.0028	0.00085 U	0.00085 U	0.00085 U	0.0012 U
KSB-4:30ft	2/24/2020	30–30	**0.13**	0.0018	0.00096 U	0.00096 U	0.0013 U
KSB-5:8ft	2/24/2020	8–8	0.0011	0.00085 U	0.00085 U	0.00085 U	0.0012 U
KSB-5:11.5ft	2/24/2020	11.5–11.5	0.0025 U	0.0025 U	0.0025 U	0.0025 U	0.0046
KSB-5:13ft	2/24/2020	13–13	0.00097 U	0.00097 U	0.0012	0.00097 U	0.00097 U
KSB-6:15.5ft	2/24/2020	15.5–15.5	**1.5**	**0.30**	0.020	0.0014 U	0.0014 U
KSB-6:24ft	2/24/2020	24–24	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
KSB-7:11ft	2/24/2020	11–11	0.0045 U	0.0045 U	0.0045 U	0.0045 U	0.0045 U
KSB-7:17ft	2/24/2020	17–17	**0.17**	0.011	0.00095 U	0.00095 U	0.00095 U
KSB-7:22ft	2/24/2020	22–22	0.00081 U	0.00081 U	0.00081 U	0.00081 U	0.00081 U
UCCB5-36.0	3/22/2017	36–36	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
UCCB6-25.5	3/23/2017	25.5–25.5	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
UCCB7-20.0	3/23/2017	20–20	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
UCCB9-35.5	3/22/2017	35.5–35.5	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SB-03-16-19	9/3/2024	16–19	0.0022 U	0.0022 U	0.0022 U	0.0022 U	0.0022 U
SB-03-19-22	9/3/2024	19–22	0.0063	0.0011 U	0.0011 U	0.0023	0.0011 U
SB-03-25-28	9/4/2024	25–28	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0019 U
SB-04-16-19	9/4/2024	16–19	0.0012 U	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SB-04-19-22	9/4/2024	19–22	0.0015 U	0.0015 U	0.0015 U	0.0027	0.0015 U
SB-04-25-28	9/4/2024	25–28	0.0011 UJ	0.0011 UJ	0.0011 UJ	0.0011 UJ	0.0017 UJ
SB-05-16-19	9/3/2024	16–19	0.0027	0.0010 U	0.0010 U	0.0012	0.0010 U
SB-05-19-22	9/3/2024	19–22	0.0021	0.0010 U	0.0010 U	0.0010 U	0.0010 U
SB-05-25-28	9/3/2024	25–28	0.0068	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SB-06R-8-10	9/6/2024	8–10	0.0025	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SB-06R-12-14	9/3/2024	12–14	**0.073**	0.0016 U	0.0016 U	0.0095	0.0016 U

Table 2.4
Soil HVOC Results

Analyte			Tetrachloroethene	Trichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	Vinyl chloride
CAS No.			127-18-4	79-01-6	156-59-2	156-60-5	75-01-4
CUL [1]			0.05	0.03	160	--	0.67
Unit			mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Sample Name	Sample Date	Sample Depth (feet bgs)					
SB-06-14.5-16	9/3/2024	14.5–16	0.0031	0.00089 U	0.00089 U	0.0015	0.00089 U
SB-06-16-18	9/3/2024	16–18	0.0032	0.0010 U	0.0010 U	0.0010 U	0.0010 U
SB-06-18-20	9/3/2024	18–20	0.0060	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SB-06-20-22	9/3/2024	20–22	0.012	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SB-06-22-24	9/3/2024	22–24	0.041	0.0012 U	0.0012 U	0.0012 U	0.0012 U
SB-06-24-26	9/3/2024	24–26	**0.14**	0.0011 U	0.0011 U	0.0026	0.0011 U
SB-06-28-30	9/3/2024	28–30	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SB-06-30-32	9/3/2024	30–32	0.00084 U	0.00084 U	0.00084 U	0.00084 U	0.00084 U
SB-06-30-32-D	9/3/2024	30–32	0.00072 U	0.00072 U	0.00072 U	0.00072 U	0.00072 U
SB-06-32-34	9/3/2024	32–34	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
SB-06-34-36	9/3/2024	34–36	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0010 U
SB-06-36-38	9/3/2024	36–38	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0011 U
SB-06-38-40	9/3/2024	38–40	0.0014 U	0.0014 U	0.0014 U	0.0014 U	0.0014 U
SB-07-16-19	9/6/2024	16–19	0.0016 U	0.0016 U	0.014	0.0056	0.0016 U
SB-07-16-19-D	9/6/2024	16–19	0.0011 U	0.0011 U	0.0053	0.0018	0.0011 U
SB-07-25-28	9/6/2024	25–28	0.0010 U	0.0010 U	0.0010 U	0.0010 U	0.0017 U
SB-08-19-22	9/3/2024	19–22	0.025	0.00098 U	0.00098 U	0.0016	0.00098 U
SB-08-25-28	9/3/2024	25–28	0.0098 J	0.0012 UJ	0.0012 UJ	0.0012 UJ	0.0019 UJ
SB-09-16-19	9/6/2024	16–19	0.0032 U	0.0032 U	0.0089	0.0032 U	0.0032 U
SB-09-25-28	9/6/2024	25–28	0.0011 U	0.0011 U	0.0011 U	0.0011 U	0.0017 U
SB-10-16-19	9/6/2024	16–19	0.0014 U	0.0018	0.11	0.039	0.0075
SB-10-25-28	9/6/2024	25–28	0.0085	0.00094 U	0.00094 U	0.00094 U	0.0015 UJ
SB-11-21-23	9/4/2024	21–23	0.0068	0.0011 U	0.0050	0.0017	0.0011 U

Notes:

All results are rounded to two significant figures.

Blank cells are intentional.

-- Not established.

RED/BOLD Analyte was detected at a concentration greater than the CUL.

1 CULs are established in the Cleanup Action Plan (Exhibit B of Ecology 2023).

Abbreviations:

bgs Below ground surface

CAS Chemical Abstracts Service

CUL Cleanup level

HVOC Halogenated volatile organic compound

mg/kg Milligrams per kilogram

Qualifiers:

J Analyte was detected; concentration is an estimate.

U Analyte was not detected at the associate reporting limit.

UJ Analyte was not detected at the associate reporting limit, which is an estimate.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Alternative Description	The 2023 CAP Cleanup Action consists of the following: • Soil source treatment by SVE with ex situ soil vapor treatment using activated carbon • Groundwater treatment by recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate) to enhance biotic dechlorination of the HVOCs The 2023 CAP Cleanup Action would support site-wide groundwater recovery through the treatment of the HVOC source area and recirculation of CarBstrate to treat HVOCs across the entire groundwater plume extent. Groundwater monitoring would be implemented to evaluate groundwater compliance with CULs site-wide. Soil confirmation monitoring would additionally be implemented following SVE to evaluate soil compliance with CULs. The anticipated restoration time frame is 5 years. ICs would not be required, because soil and groundwater would achieve CULs site-wide.	Alternative 1 consists of the following: • Limited groundwater treatment by recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate) to enhance biotic dechlorination of HVOCs in the upgradient portion of the Site • Injection of soluble organic carbon in situ treatment in four focused areas along the length of the HVOC groundwater plume to enhance biotic dechlorination of HVOCs Alternative 1 would support soil and groundwater recovery through treatment of the source area and recirculation and injection of CarBstrate to treat HVOCs throughout the groundwater plume. Groundwater monitoring would be implemented to evaluate groundwater compliance with CULs site-wide. The anticipated restoration time frame is 5 years. ICs would not be required, because soil and groundwater would achieve CULs site-wide.	Alternative 2 consists of the following: • Injection of in situ groundwater treatment in four treatment zones: o HVOC Source Area Plume: Soluble organic carbon to enhance biotic dechlorination with S-mZVI to achieve abiotic degradation and continued reducing conditions o Downgradient HVOC Plume and Riverbank: Soluble organic carbon to enhance biotic dechlorination with S-mZVI to achieve abiotic degradation and continued reducing conditions and PlumeStop colloidal active carbon to increase contact time with treatment materials o Western Plume: Soluble organic carbon with ZVI to promote reducing conditions Alternative 2 would support site-wide groundwater recovery through treatment of the HVOC source zone and downgradient treatment by enhanced biodegradation with supplemental adsorption by PlumeStop colloidal activated carbon. Groundwater monitoring would be implemented to evaluate groundwater compliance with CULs site-wide. The anticipated restoration time frame is 3 years. ICs would not be required, because soil and groundwater would achieve CULs site-wide.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

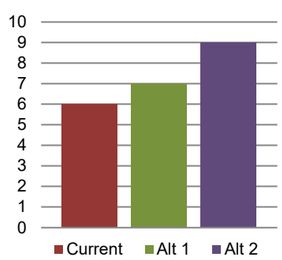
Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Overall Protectiveness • Degree to which existing risks to human health and the environment are reduced • Time required to reduce risks and attain cleanup standards • On-site and off-site risks resulting from alternative implementation • Improvement in overall environmental quality **Protectiveness Benefit Scoring by Alternative**  	• Risks associated with groundwater would be eliminated by plume-wide treatment. However, downgradient risks to the adjacent Sammamish River would be higher in the short term due to downgradient groundwater extraction pumping. This alternative also relies on ambient geochemical conditions being conducive to anaerobic degradation. • The time frame for achievement of CULs site-wide is anticipated to be 5 years. • On-site risks during construction, trenching, and well installation would be managed by proper H&S protocols and site security. Additionally, with the operation of the SVE system, an air discharge permit would be obtained for the discharge of treated soil vapor. • The off-site risks associated with contaminated material transport and disposal are negligible and would be managed using licensed operators and permitted disposal facilities. • The alternative relies on a mechanical system which could experience breakdowns resulting in temporary gaps in groundwater treatment. • The 2023 CAP Cleanup Action achieves desired protectiveness to human health and the environment by degradation of HVOCs utilizing bio-recirculation. This alternative addresses contamination exceeding CULs by promoting microbial activity in the breakdown of the HVOC mass.	• Risks associated with contaminated groundwater would be eliminated by plume-wide treatment. However, the treatment relies on ambient geochemical conditions being conducive to anaerobic degradation. • The time frame for achievement of groundwater CULs site-wide is anticipated to be 5 years. • On-site risks during construction, trenching, well installation, direct push injection and system operation would be managed by proper H&S protocols and site security. There are no other added on-site risks. • The off-site risks associated with contaminated material transport and disposal are negligible and would be managed using licensed operators and permitted disposal facilities. • The alternative relies partially on a mechanical system which could experience breakdowns resulting in temporary gaps in groundwater treatment. • Alternative 1 achieves improvement in overall environmental quality because it is expected to fully achieve CULs in groundwater. This alternative has a similar anticipated restoration time frame for groundwater compared to the 2023 CAP cleanup action, which includes SVE operation.	• Risks associated with contaminated groundwater would be eliminated by plume-wide treatment. The treatment would include optimization of geochemical conditions and addition of materials to adsorb and then both biotically and abiotically degrade the extent of the current HVOC plume. • The time frame for achievement of groundwater CULs site-wide is anticipated to be 3 years. • No ground-disturbing construction would be necessary for this alternative because all treatment will be applied via direct push drilling. On-site H&S protocols and site security would still need to be managed for the duration of the injections. There are no other added on-site risks. The off-site risks associated with contaminated material transport would be limited to incidental investigation-derived waste because no soil excavation is proposed. • Alternative 2 achieves the highest improvement in overall environmental quality because it is has the highest degree of protectiveness for discharges to surface water, utilizing an in situ treatment barrier to trap and fully degrade HVOCs and controlled-release sources of organic carbon to address sorbed HVOC mass in soil.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

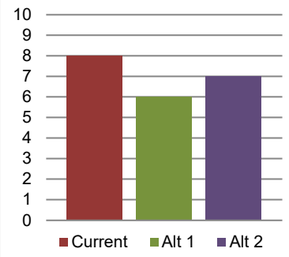
Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Permanence • Degree of reduction of contaminant toxicity, mobility, and volume • Adequacy of destruction of hazardous substances • Reduction or elimination of substance release, and source of release • Degree of irreversibility of waste treatment processes • Volume and characteristics of generated treatment residuals **Permanence Benefit Scoring by Alternative**  	• The 2023 CAP Cleanup Action has a high degree of permanence because bio- recirculation of groundwater is designed to reduce contaminated groundwater concentrations of HVOCs via degradation to less than CULs over the restoration time frame. It is scored most highly of the alternatives for permanence because it would install the greatest number of permanent injection and extraction wells, which could be operated indefinitely if needed, without requiring further action at the Site. • The primary sources of contamination would be reduced and extracted by the treatment technologies and in situ biodegradation. • Bioremediation is irreversible but does involve the production of breakdown products, such as vinyl chloride, as part of the dechlorination process. • Treatment residuals associated with implementation of this technology include spent activated carbon, which can be disposed a licensed facilities. Treatment residuals would be generated ex situ and do not pose a risk of Site recontamination.	• Alternative 1 is likely to be permanent at the end of the restoration time frame because bio-recirculation and in situ treatment of groundwater are designed to reduce contaminated groundwater concentrations of HVOCs via degradation to less than CULs over the restoration time frame. However, it is assumed that carbon injection may need to be repeated to reach CULs site-wide and address rebound of contamination; this alternative is, therefore, not fully permanent. • The remaining plumes of contamination would be reduced under anerobic conditions created by the injected organic carbon treatment material. Remaining soil contamination continuing to diffuse to groundwater would be controlled by continued recirculation and by biomass produced by carbon injection that decays and provides donor electrons over time. • Bioremediation is irreversible but does involve the production of breakdown products, such as vinyl chloride, as part of the dechlorination process. • Treatment residuals associated with implementation of this technology include spent activated carbon, which can be disposed of at licensed facilities. Treatment residuals would be generated ex situ and do not pose a risk of Site recontamination.	• Alternative 2 has a high degree of permanence because in situ treatment of groundwater is designed to reduce contaminated groundwater concentrations of HVOCs via degradation to less than CULs over the restoration time. The technologies used for in situ treatment in Alternative 2 have a long lifespan and further action is unlikely to be needed after installation. • The primary sources of contamination would be removed from the site by in situ biotic and abiotic degradation. Remaining soil contamination would be controlled by controlled-release organic carbon sources and a downgradient barrier wall of colloidal active carbon to enhance contact time with treatment materials before groundwater discharges to surface waters. • Bioremediation is irreversible but does involve the production of breakdown products, such as vinyl chloride, as part of the dechlorination process. • There are no treatment residuals associated with implementation of this technology.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

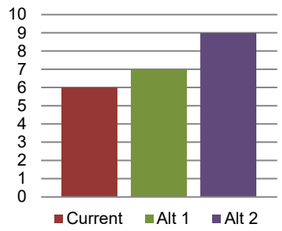
Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Effectiveness over the Long-Term • Degree of certainty of alternative success • Reliability while contaminants on-site remain greater than CULs • Magnitude of residual risk • Effectiveness of controls implemented to manage residual risk **Effectiveness over the Long-Term Benefit Scoring by Alternative**  	• The 2023 CAP Cleanup Action is designed to fully degrade HVOCs and provides a reasonable certainty of success to achieve groundwater CULs within a restoration time frame of 5 years site-wide. • Bio-recirculation treatment is also an effective and reasonably common technology to implement and would remove contamination in groundwater. • Degree of certainty for success to remediate groundwater site-wide is moderately high because of SVE and aggressive groundwater treatment; however, success is less certain downgradient compared to the other alternatives. • No residual risk would remain in soil. • The risk from groundwater contamination remaining during the restoration time frame would be monitored by routine groundwater monitoring events until compliance with CULs was achieved. • Residual risk to groundwater would remain due to the potential rebound of contamination due to diffusion of soil mass. This risk is managed over the long term by formation of biomass to continue to provide donor electrons after completion of active treatment. • Aerobic conditions caused by SVE may compete with the goal of anaerobic biodegradation in the bio-recirculation system. • Additional construction of a surface seal would be necessary to ensure the effectiveness of the SVE system, which may be complicated by site topography.	• Alternative 1 is designed to fully degrade HVOCs and provides some certainty of success to achieve groundwater CULs within a restoration time frame of 5 years site-wide. • Bio-recirculation and in situ treatment are also effective and reasonably common technologies to implement and would remove contamination in groundwater. • Degree of certainty for success to remediate groundwater site-wide is moderately high because of targeted groundwater treatment and generally favorable Site conditions. • No residual risk would remain in soil. • The risk from groundwater contamination remaining during the restoration time frame would be monitored by routine groundwater monitoring events until compliance with CULs was achieved. • Residual risk to groundwater would remain due to the potential rebound of contamination due to diffusion of soil mass. This risk is managed over the long term by formation of biomass to continue to provide donor electrons after completion of active treatment. • Localized aerobic conditions may be created by groundwater extraction and redox conditions may require additional management in the bio-recirculation system.	• Alternative 2 is designed to rapidly and fully degrade HVOCs and provides high certainty of success to achieve CULs within a restoration time frame of 3 years site-wide. • In situ treatment is an effective and reasonably common technology to implement and would remove contamination in groundwater. • Degree of certainty for success to remediate groundwater site-wide is the highest because this alternative includes the most aggressive in situ treatment and prioritizes immediate cleanup of the downgradient portions of the HVOC plume. • No residual risk would remain in soil. • The risk from groundwater contamination during the restoration time frame would be monitored by routine groundwater monitoring events until compliance with CULs was achieved. • Residual risk to groundwater would remain due to the potential rebound of contamination due to diffusion of soil mass. This risk is managed over the long term by use of long-acting treatment materials including colloidal activated carbon which will continue to release into the subsurface over approximately 10 years.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

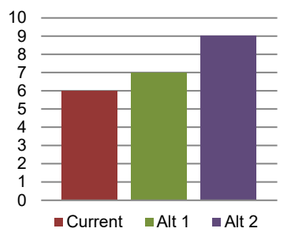
Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Short-Term Risk Management • Risk to human health and the environment associated with alternative construction • The effectiveness of controls in place to manage short-term risks **Short-Term Risk Management Benefit Scoring by Alternative**  	• The 2023 CAP Cleanup Action has a moderate short-term risk to human health and the environment during implementation. There are residual risks to human health posed by drilling, trenching, and electrical installation. These risks would be managed by proper BMPs, worker H&S protocols, and site security. • This alternative would require the largest amount of construction and trenching, increasing risks due to equipment, traffic, and exposure to contaminated groundwater. Pollution control measures would also need to be implemented during construction of this alternative to prevent water quality impacts to the Sammamish River. • There is some risk for public exposure with this alternative due to construction and trenching for the installation of pressurized treatment systems, injection wells, and extraction wells that will take place in a public parking lot. • There is a low risk to site workers during handling of CarBstrate for injection. • Site activities would require appropriate PPE, BMPs, site controls to restrict site access, traffic control, and appropriate training requirements for management of risk. These controls are highly effective and anticipated to adequately manage short-term risk.	• Alternative 1 has a low to moderate short-term risk to human health and the environment during implementation. There are residual risks to human health posed by drilling, trenching, and electrical installation. These risks would be managed by proper BMPs, worker H&S protocols, and site security. • This alternative would include construction and trenching for the groundwater recirculation system piping. Fewer trenches and wells are required for this alternative than for the 2023 CAP cleanup action. • There is some risk for public exposure with this alternative due to construction and trenching for treatment system installation that will take place in a public parking lot. • There is a low risk to site workers during handling of CarBstrate for injection. • Site activities would require appropriate PPE, BMPs, site controls to restrict site access, traffic control, and appropriate training requirements for management of risk. These controls are highly effective and anticipated to adequately manage short-term risk.	• Alternative 2 has low short-term risk to human health and the environment during implementation primarily due to the fact that no trenching or treatment system installation will be required. Risks associated with direct-push drilling would be managed by proper H&S procedures and site security. • This alternative would not involve earthwork. • There is de minimis risk for public exposure with this alternative due to drilling. • There is a low risk to site workers during handling of organic carbon, ZVI, and PlumeStop for injection. • Site activities would require appropriate PPE, BMPs, site controls to restrict site access, traffic control, and appropriate training requirements for management of risk. These controls are highly effective and anticipated to adequately manage short-term risk.

Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

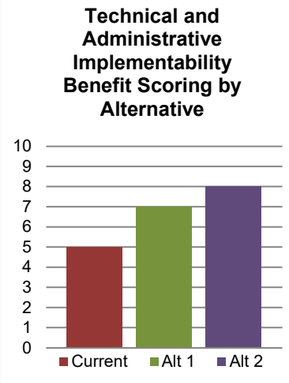
Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Technical and Administrative Implementability *Ability of alternative to be implemented considering the following:* • Technical possibility • Availability of off-site facilities, services, and materials • Administrative and regulatory requirements • Schedule, size, and complexity of construction • Monitoring requirements • Site access for construction, operations, and monitoring • Integration with existing site operations or other current and potential future remedial action 	• The 2023 CAP Cleanup Action is the most difficult to implement because it involves multiple types of equipment and construction methodologies. SVE and bio-recirculation are somewhat specialized construction elements; however, many licensed contractors in the region are qualified to safely perform this work. This alternative can be implemented in a single construction season. • Additional technical and administrative controls would be required in this alternative to prevent water quality impacts due to invasive construction activities to nearby Sammamish River. • All necessary off-site facilities, materials, and services are available within the region. • Site access during most of the work should include only the closure of a City-owned gravel parking lot that can be closed for the duration of construction work. Sidewalks may be closed for part of the work. • Monitoring requirements include protection monitoring for workers during construction, performance monitoring during SVE, and groundwater monitoring during and after bio-recirculation. • This alternative would moderately impede current or future property use due to the construction of additional structures in public park space. It would not preclude potential future remedial action.	• Alternative 1 is the second largest in scale and includes some technical construction elements. Bio-recirculation and in situ injection are somewhat specialized construction elements; however, many licensed drillers in the region are qualified to safely perform this work. This alternative can be implemented easily in a single construction season; however, additional site access and permitting work would be needed if a second round of downgradient injection is completed. • All necessary off-site facilities, materials, and services are available within the region. • Site access during most of the work should include only the closure of a City-owned gravel parking lot that can be closed for the duration of construction work. Sidewalks may be closed for part of the work. • Monitoring requirements include protection monitoring for workers during construction and groundwater monitoring after bio-recirculation and direct push injection. • This alternative would moderately impede current or future property use due to the construction of additional structures in public park space; however, it includes fewer permanent structures than the 2023 CAP cleanup action. It would not preclude potential future remedial action.	• Alternative 2 is the smallest in scale. In situ injection is a somewhat specialized construction element; however, many licensed drillers in the region are qualified to safely perform this work. This alternative can be implemented in a single construction season. • All necessary off-site facilities, materials, and services are available within the region. • Site access during most of the work should include only the closure of a City-owned gravel parking lot that can be closed for the duration of construction work. Sidewalks may be closed for part of the work. • Monitoring requirements include performance monitoring during injection and groundwater monitoring after injection. • This alternative would not impede current property use and would cause minimal impediment to future property use. This alternative would not preclude potential future remedial action.

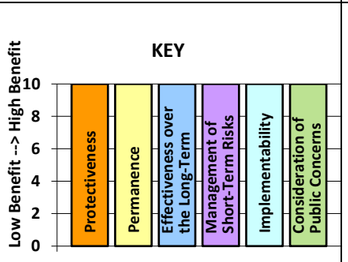
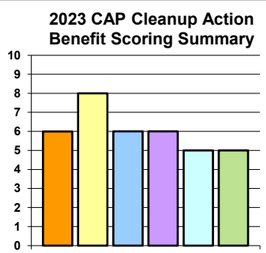
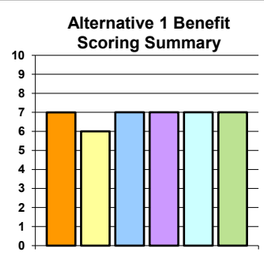
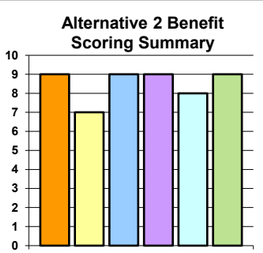
Table 4.1
Disproportionate Cost Analysis Alternative Evaluation

Criteria	2023 CAP Cleanup Action	Alternative 1	Alternative 2
Consideration of Public Concerns and Tribal Rights and Interests • Whether the community has concerns • Degree to which the alternative addresses those concerns **Consideration of Public Concerns and Tribal Rights and Interests Benefit Scoring by Alternative** 	• The 2023 CAP Cleanup Action addresses public concerns regarding contaminated groundwater impacts with groundwater and soil vapor treatment. • The installation of an SVE system may raise concerns with members of the public who walk through the area surrounding the site because the equipment associated with an SVE can cause noise pollution. • Disturbance to parking and sidewalks is also expected to be of concern to the City and the public. The current cleanup action involves a high degree of temporary disturbance to the Site and surrounding sidewalks during remedy implementation and some permanent loss of parking space due to added structures. • The treatment systems will be pressurized and will routinely have contaminated soil vapor or groundwater flowing through mechanical components. The public could perceive this as a potential risk if the systems were to fail or leak. • Public concerns will be reviewed after the public comment period and will be addressed as part of the final remedial alternative selection and design.	• Alternative 1 addresses public concerns regarding contaminated groundwater impacts with targeted groundwater treatment. • Disturbance to parking and sidewalks is also expected to be of concern to the City and the public. Alternative 1 involves less disturbance than the 2023 CAP cleanup action, but more than Alternative 2 during remedy implementation. • The treatment systems will be pressurized and will routinely have contaminated soil vapor or groundwater flowing through mechanical components. The public could perceive this as a potential risk if the systems were to fail or leak. • Public concerns will be reviewed after the public comment period and will be addressed as part of the final remedial alternative selection and design.	• Alternative 2 addresses public concerns regarding contaminated groundwater impacts with aggressive groundwater treatment. Tribal concerns are addressed by prioritizing rapid cleanup of groundwater discharging to surface water to protect all uses of the Sammamish River. • Disturbance to parking and sidewalks is also expected to be of concern to the City and the public. Alternative 2 involves a minimal amount of temporary disturbance compared to the other alternatives during remedy implementation. • Public concerns will be reviewed after the public comment period and will be addressed as part of the final remedial alternative selection and design.
Cost • Cost of construction • Long-term monitoring, operations, and maintenance costs • Agency oversight costs	**2023 CAP Cleanup Action**	**Alternative 1**	**Alternative 2**
	Total cost: $2,732,602 • Includes construction, long-term monitoring, and agency oversight costs • Includes tax • Includes 20% contingency	Total cost: $1,669,059 • Includes construction, long-term monitoring, and agency oversight costs • Includes tax • Includes 20% contingency	Total cost: $1,673,963 • Includes construction, long-term monitoring, and agency oversight costs • Includes tax • Includes 20% contingency

Abbreviations:

BMP	Best management practice
CAP	Cleanup Action Plan
City	City of Bothell
CUL	Cleanup level
H&S	Health and safety
HVOC	Halogenated volatile organic compound
IC	Institutional control
PPE	Personal protective equipment
S-mZVI	Sulfidated micro zero-valent iron
Site	Riverside Halogenated Volatile Organic Compound Site
SVE	Soil vapor extraction
ZVI	Zero-valent iron

Table 4.2
Disproportionate Cost Analysis Summary

Alternative	2023 CAP Cleanup Action SVE, Groundwater Recirculation with CarBstrate	Alternative 1 Groundwater Recirculation with CarBstrate, Direct-Push Injections of CarBstrate	Alternative 2 In Situ Bioremediation using CarBstrate, PlumeStop, and S-mZVI
Alternative Description	The 2023 CAP cleanup action includes: • Soil source treatment by SVE with ex situ soil vapor treatment using activated carbon • Groundwater treatment by recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate) to enhance biotic dechlorination of HVOCs	Alternative 1 includes: • Limited groundwater treatment by recirculation of groundwater amended with a soluble organic carbon substrate electron donor (CarBstrate) to enhance biotic dechlorination of HVOCs in the upgradient portion of the Site • Injection of CarBstrate in situ treatment in four focused areas along the length of the HVOC groundwater plume to enhance biotic dechlorination of HVOCs	Alternative 2 includes: • Injection of in-situ groundwater treatment in three treatment zones: ○ HVOC Source Area Plume: Soluble organic carbon to enhance biotic dechlorination with S-mZVI to achieve abiotic degradation and continued reducing conditions ○ Downgradient HVOC Plume and Riverbank: Soluble organic carbon to enhance biotic dechlorination with S-mZVI to achieve abiotic degradation and continued reducing conditions and PlumeStop colloidal active carbon to increase contact time with treatment materials ○ Western Plume: Soluble organic carbon with ZVI to promote reducing conditions
				
Complies with MTCA Requirements	Yes	Yes	Yes
Restoration Time Frame	5 Years	5 Years	3 Years
Protectiveness (30%)	6	7	9
Permanence (20%)	8	6	7
Effectiveness over the Long Term (20%)	6	7	9
Management of Short-Term Risks (10%)	6	7	9
Technical and Administrative Implementability (10%)	5	7	8
Consideration of Public Concerns and Tribal Rights and Interests (10%)	5	7	9
Total Weighted Benefit Score (Relative Benefit Ranking)	**6.2**	**6.8**	**8.5**
Estimated Total Alternative Cost [(1)]	$2.7 million	$1.7 million	$1.7 million
Benefit per Unit Cost Ratio [(2)]	**3.40**	**6.19**	**7.70**

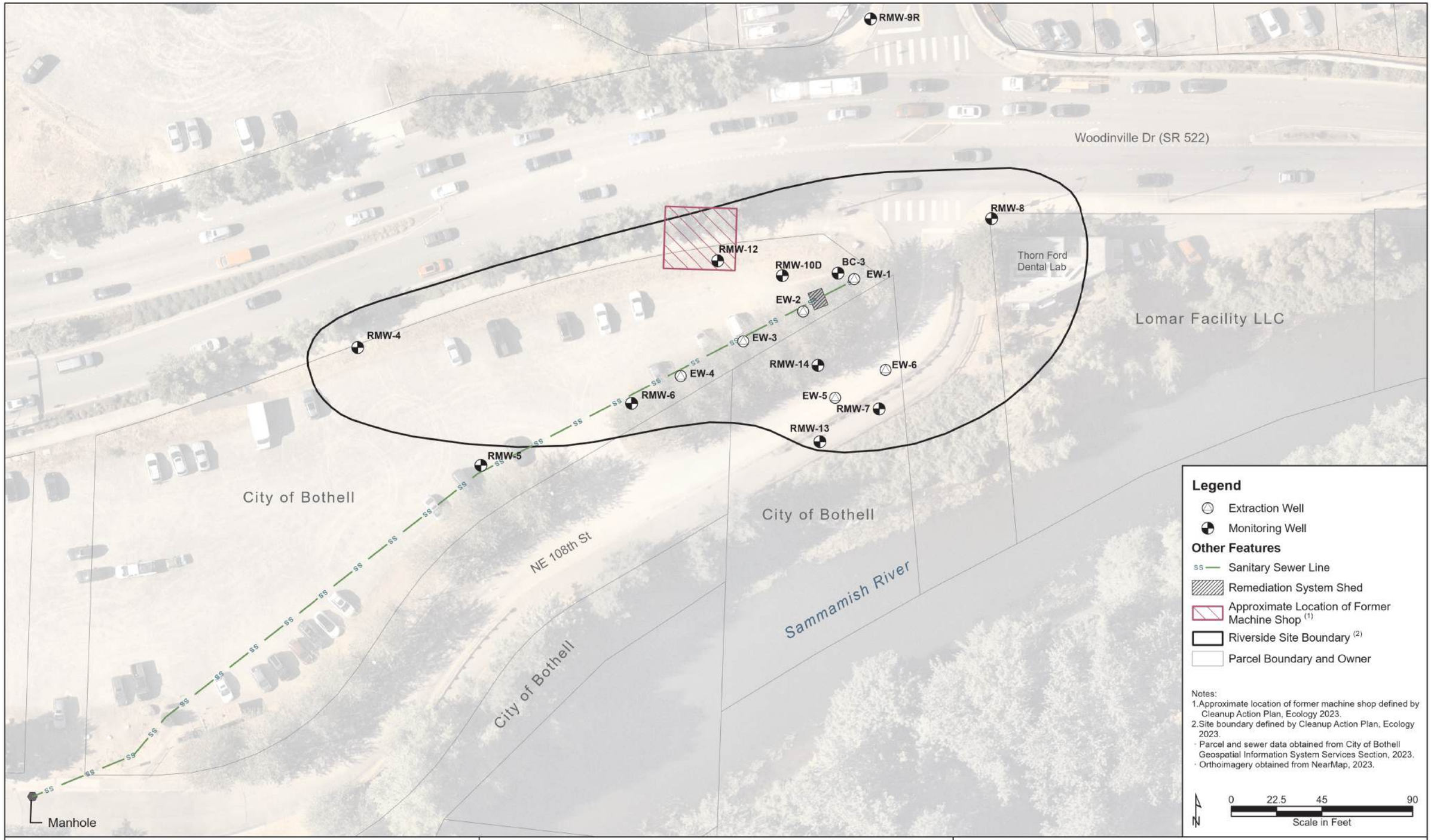
Notes:
1 Specific cost estimate information is provided in Appendix D.
2 Benefit per Unit Cost Ratio calculated by dividing the Total Weighted Benefit Score by the Estimated Total Alternative Cost (standardized by dividing by $1.5 million). Higher value indicates the most benefit per unit cost.

Abbreviations:
CUL Cleanup level
HVOC Halogenated volatile organic compound
MTCA Model Toxics Control Act
S-mZVI Sulfidated micro zero-valent iron
SVE Soil vapor extraction
Site Riverside Halogenated Volatile Organic Compound Site

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Figures



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Pre-Engineering Design Investigation Data Report
Riverside HVOC Site
Bothell, Washington

Figure 1.1
Site Map

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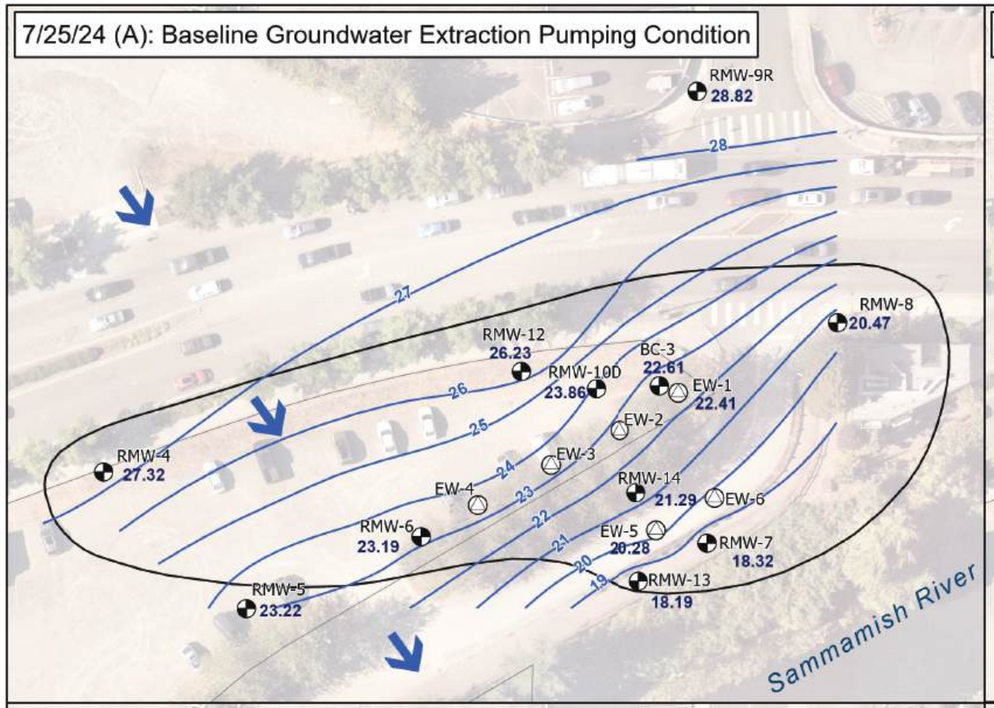
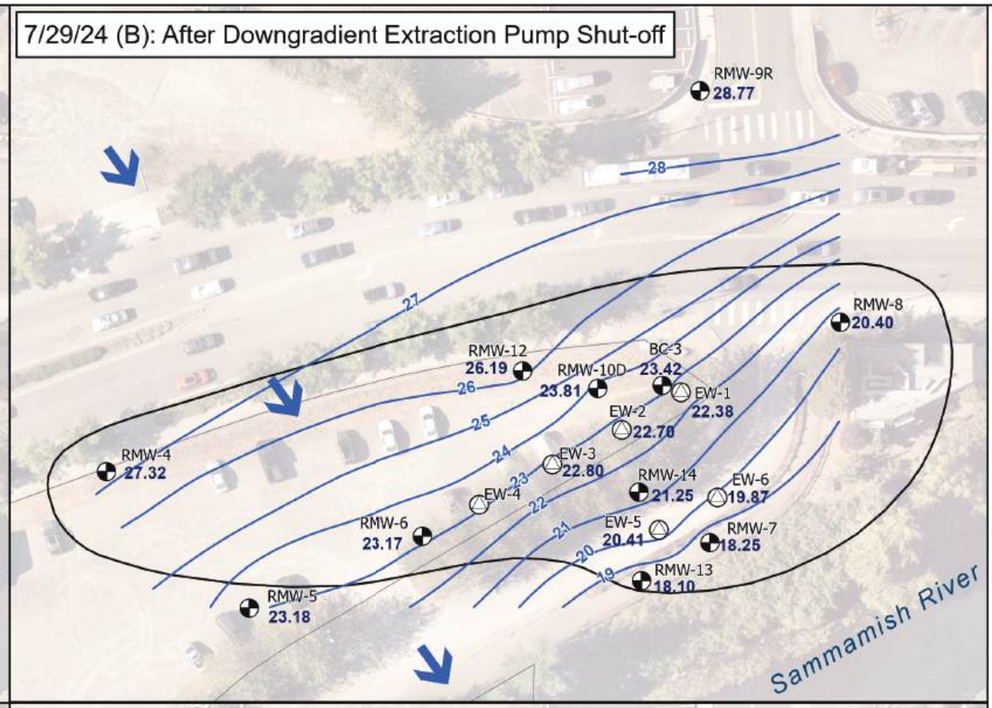
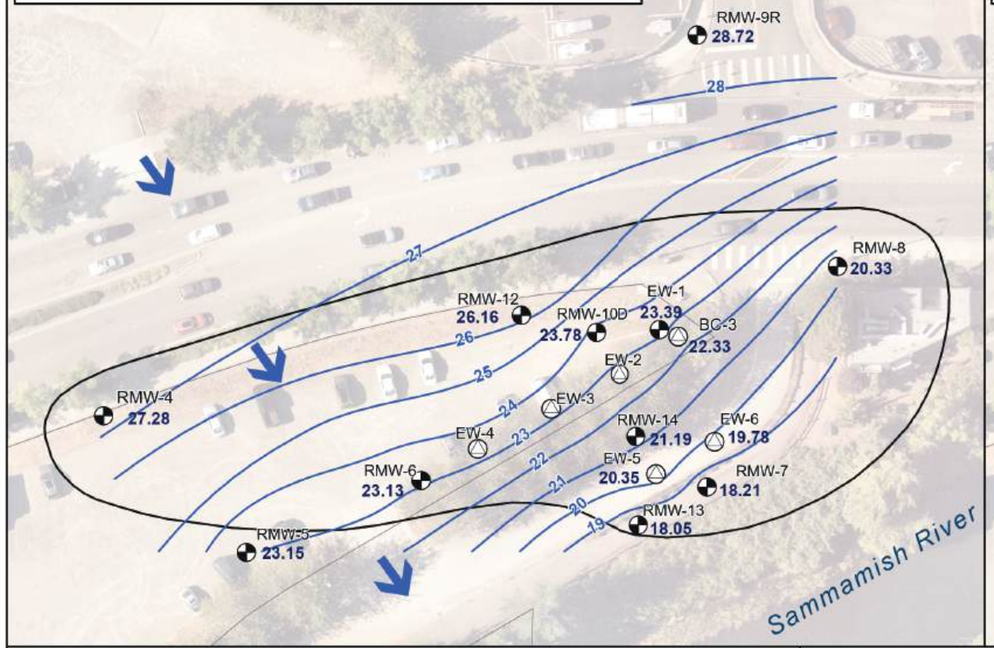
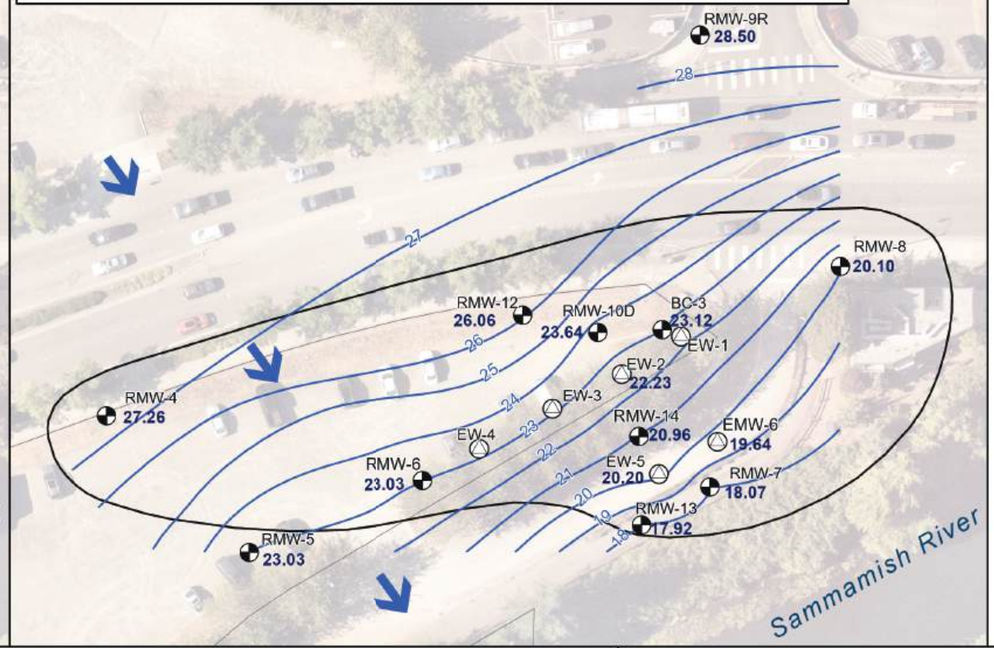
12/16/2024









Legend

Existing Well Locations

- Monitoring Well
- Extraction Well

Other Features

- Groundwater Elevation Contour (Feet NAVD 88)
- Groundwater Flow Direction
- Riverside Site Boundary (1)

Notes:
1. Site boundary defined by Cleanup Action Plan, Ecology 2023.
   - Parcel data obtained from City of Bothell Geospatial Information System Services Section, 2023.
   - Orthoimagery obtained from NearMap, 2023.

Abbreviation:
NAVD 88 = North American Vertical Datum of 1988

N

0 32.5 65 130

Scale in Feet

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Pre-Engineering Design Investigation Data Report
Riverside HVOC Site
Bothell, Washington

Figure 2.1
Groundwater Elevations

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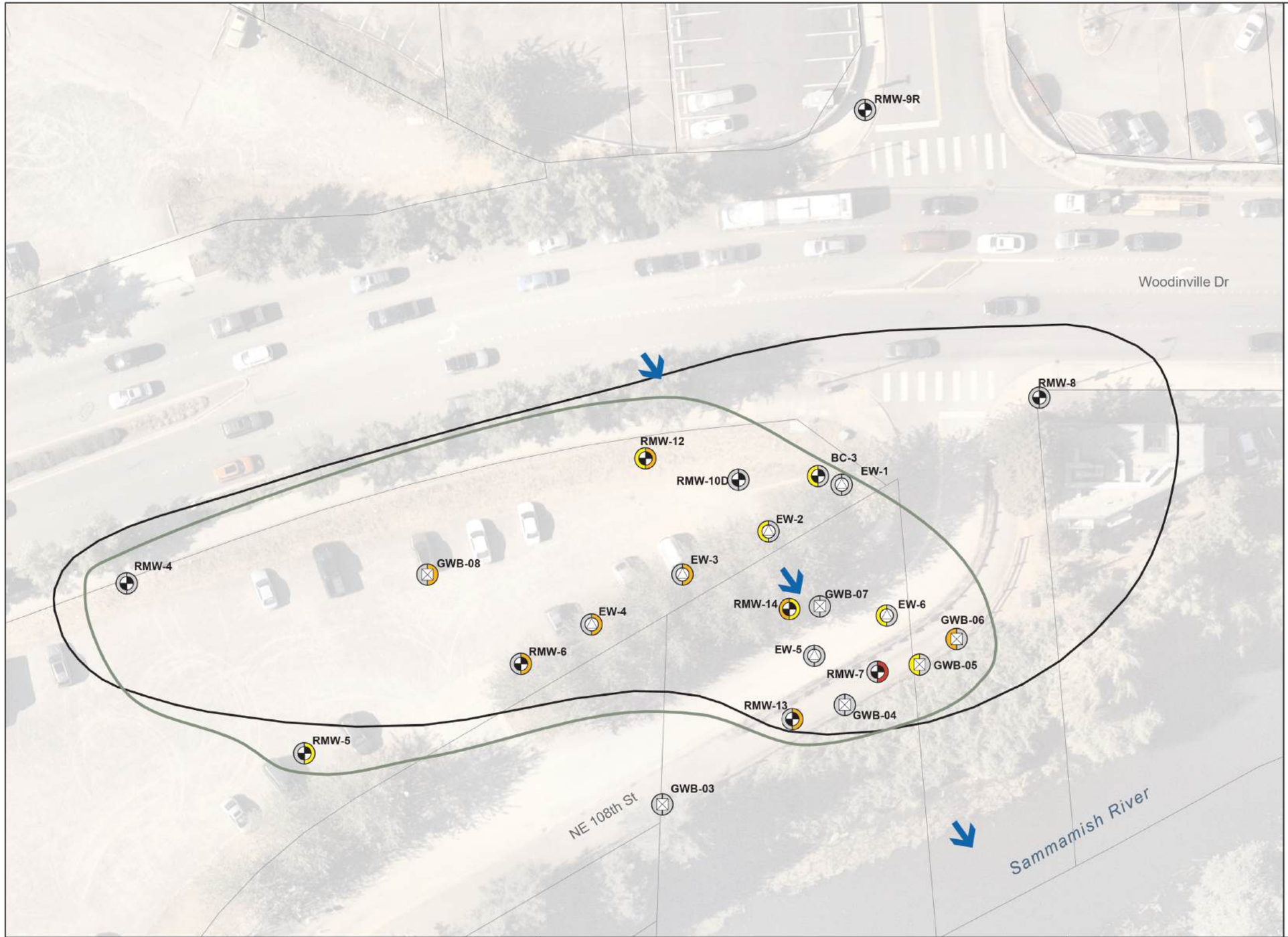
12/12/2024



Legend

Groundwater Sample Result [1]

PCE Result	Vinyl Chloride Result
ND or ≤ CUL	ND or ≤ CUL
> CUL – < 2x CUL	> CUL – < 5x CUL
≥ 2xCUL – < 10x CUL	≥ 5xCUL – < 50x CUL
≥ 10x CUL	≥ 50x CUL

Sample Location

- Monitoring Well
- Reconnaissance Boring
- Extraction Well

Other Features

- Groundwater Flow Direction
- Riverside Site Boundary [2]
- Extent of HVOCs>CULs in Groundwater
- Parcel Boundary

Cleanup Levels
PCE = 4.9 µg/L
Vinyl chloride = 0.02 µg/L

Notes:
1. For reconnaissance boring samples with multiple sample depths, the maximum result is shown. HVOC results shown are the maximum detection in samples collected from July-September 2024, except at BC-3 where the most recent result collected in May 2020 is shown.
2. Site boundary defined by Cleanup Action Plan, Ecology 2023.
   · Parcel data obtained from City of Bothell Geospatial Information System Services Section, 2023.
   · Orthoimagery obtained from NearMap, 2023.

Abbervations:
CUL = Cleanup level
HVOC = Halogenated volatile organic compound
µg/L = Micrograms per liter
ND = Non-detect
PCE = Tetrachloroethene

N

0 17.5 35 70
Scale in Feet

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Bothell, Washington

Figure 2.2
Groundwater HVOC Conditions

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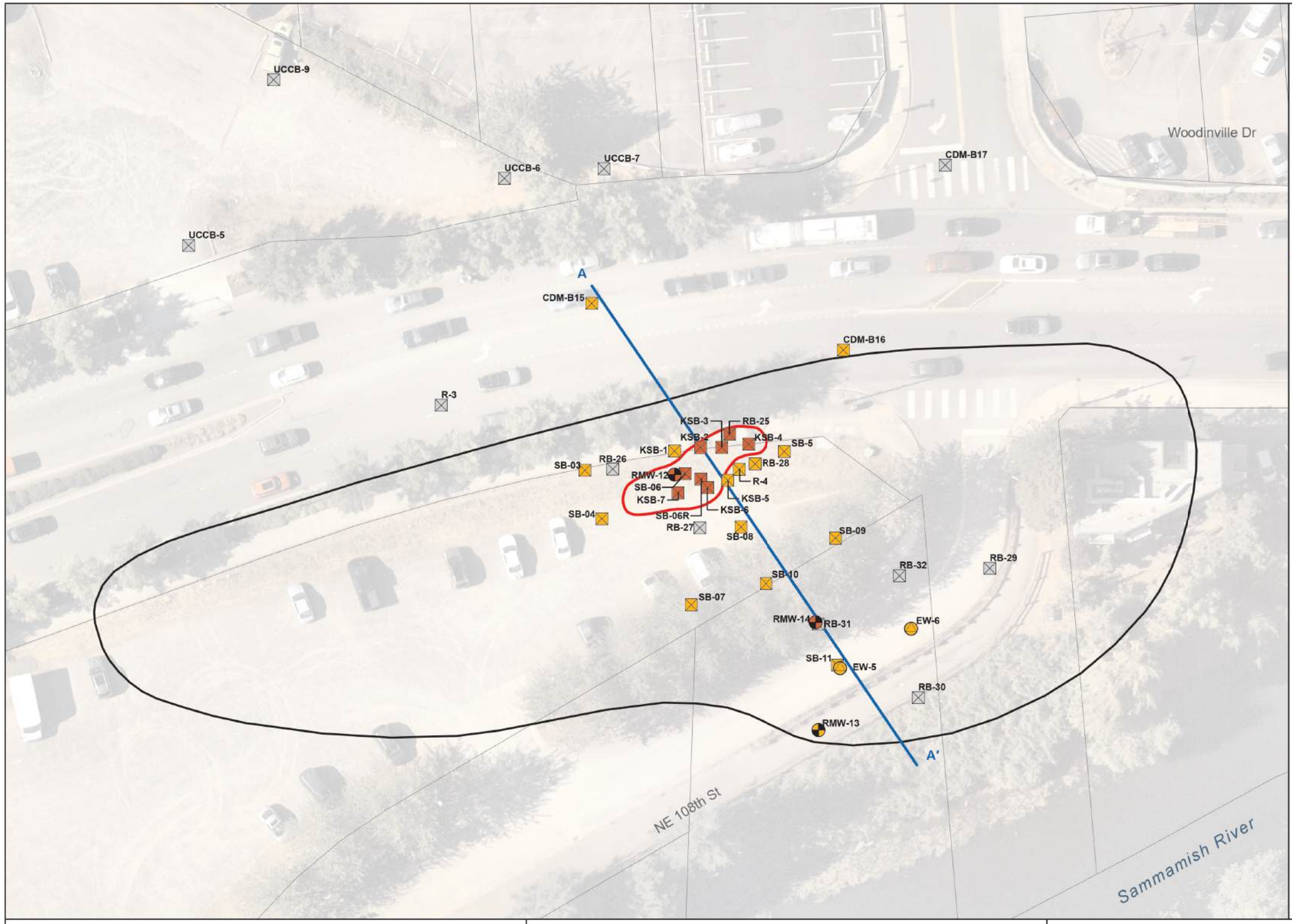
12/16/2024



Legend

Existing Sample Location Type (1)

- Soil Boring
- Extraction Well Boring
- Monitoring Well Boring

HVOC Results

- Non-detect
- One or More HVOCs Detected, All Results Less Than CULs
- One or More Results Exceed CUL

Other Features

- Cross-Section Transect
- Approximate Extent of Soil HVOCs Exceeding CULs
- Riverside Site Boundary (2)
- Parcel Boundary

Cleanup Levels
Tetrachloroethene = 0.05 mg/kg
Trichloroethene = 0.03 mg/kg
cis-1,2-Dichloroethene = 160 mg/kg
Vinyl chloride = 0.67 mg/kg

Notes:
1. Site soil samples were colelcted between 2008 and 2024, with most samples collected between 2017 and 2024. Refer to Table 2.4 for a full summary of soil sample collection dates and HVOC results.
2. Site boundary defined by Cleanup Action Plan, Ecology 2023.

- Parcel data obtained from City of Bothell Geospatial Information System Services Section, 2023.
- Orthoimagery obtained from NearMap, 2023.

Abbervations:
CUL = Cleanup level
HVOC = Halogenated volatile organic compound
mg/kg = Milligrams per kilogram

N

0 17.5 35 70
Scale in Feet

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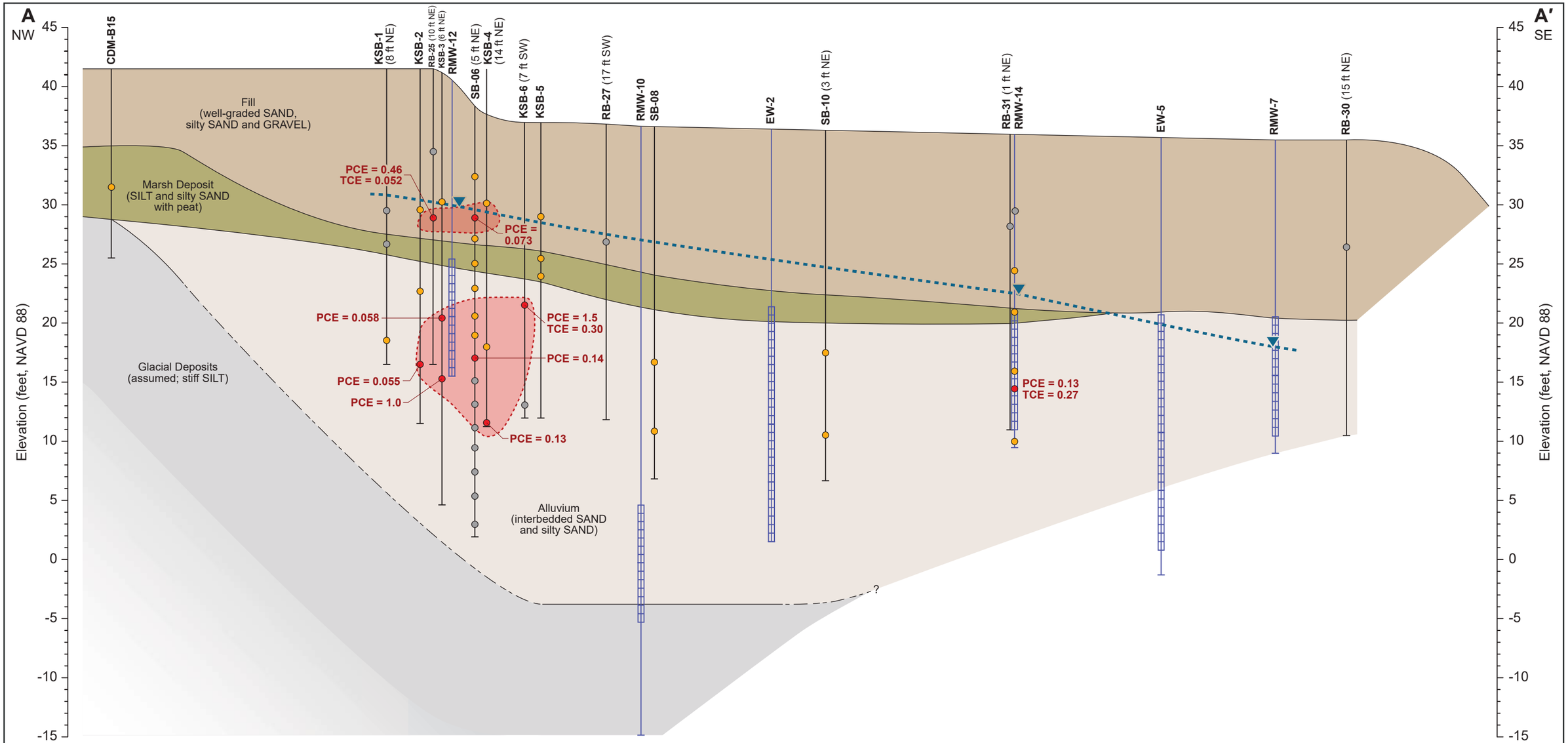
Riverside HVOC Site
Bothell, Washington

Figure 2.3
Soil HVOC Conditions

I:\GIS\Projects\COBothell-Riverside\02-Map Documents\03-Pre-Engineering Design Data Summary Report\01 - HVOC\HVOC.aprx
12/12/2024



Legend

KSB-1 (8 ft NE) Identifier (bolded) and Offset (in parentheses if applicable)

Boring

Soil Sample

Well Screen Interval on Well Casing

Groundwater Elevation, Aug/Sep 2024

Groundwater Table, Aug/Sep 2024

Contact Boundary Between Lithologies (dashed where inferred)

Soil Analytical Results

- HVOC contaminant detected greater than Site cleanup levels (refer to table to right) in soil sample.
- HVOC contaminant detected less than Site cleanup levels (refer to table to right) in soil sample.
- HVOC contaminants not detected in soil sample.

Approximate Extent of Soil PCE Source Area

Cleanup Levels
PCE = 0.05 mg/kg
TCE = 0.03 mg/kg
DCE = 160 mg/kg
VC = 0.67 mg/kg

Note: Soil analytical results listed in mg/kg. Site soil samples were collected between 2008 and 2024, with most samples collected between 2017 and 2024. Refer to Table 2.4 for a full summary of soil sample collection dates and HVOC results.

0 13 26

Approximate Horizontal Scale in Feet
Vertical Exaggeration = 1.5x

Abbreviations: DCE = cis-1,2-Dichloroethene, ft = Feet, HVOC = Halogenated volatile organic compound, mg/kg = Milligrams per kilogram, NAVD 88 = North American Vertical Datum of 1988, PCE = Tetrachloroethene, Site = Riverside HVOC Site, TCE = Trichloroethene, VC = Vinyl chloride

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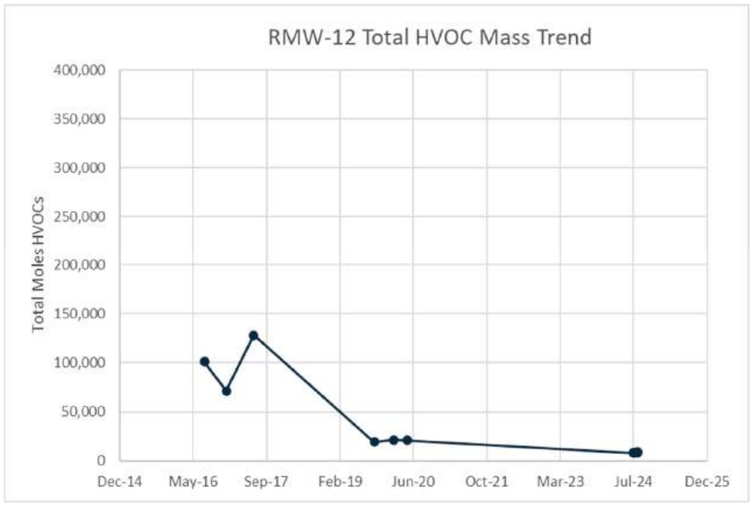
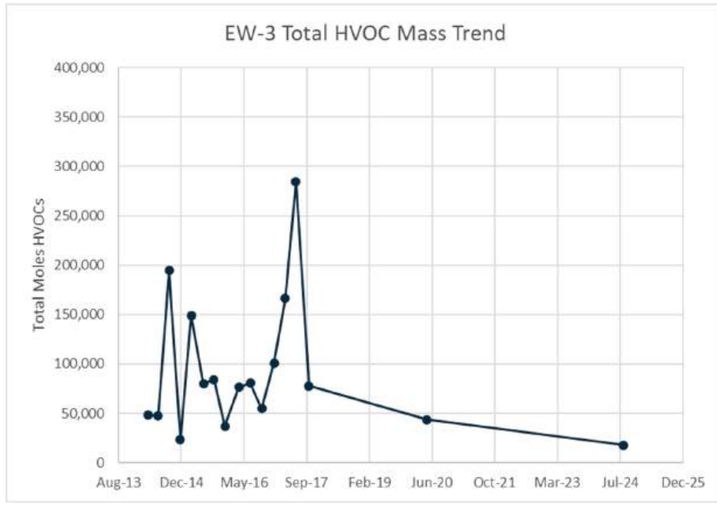
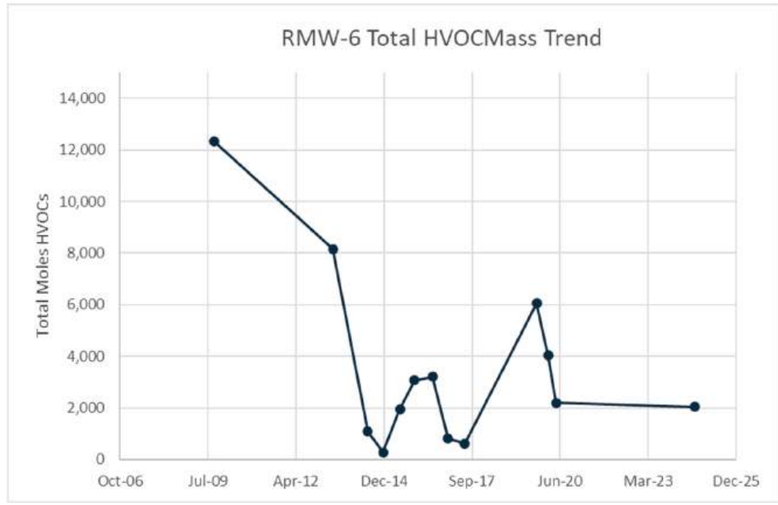
Riverside HVOC Site
Bothell, Washington

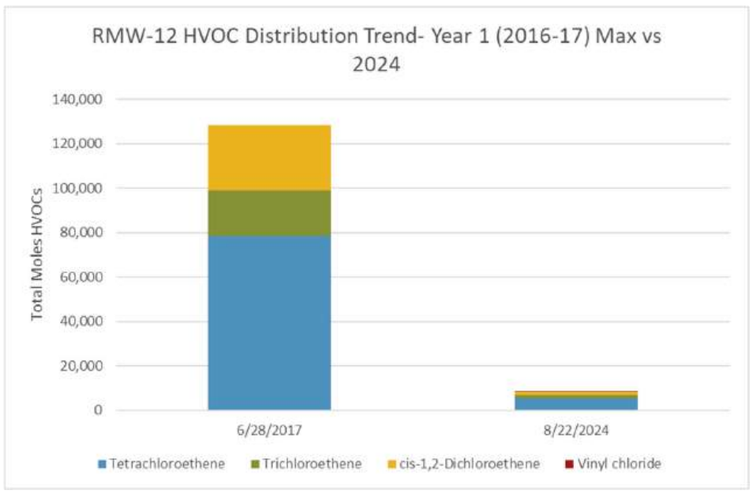
Figure 2.4
Cross Section A-A′

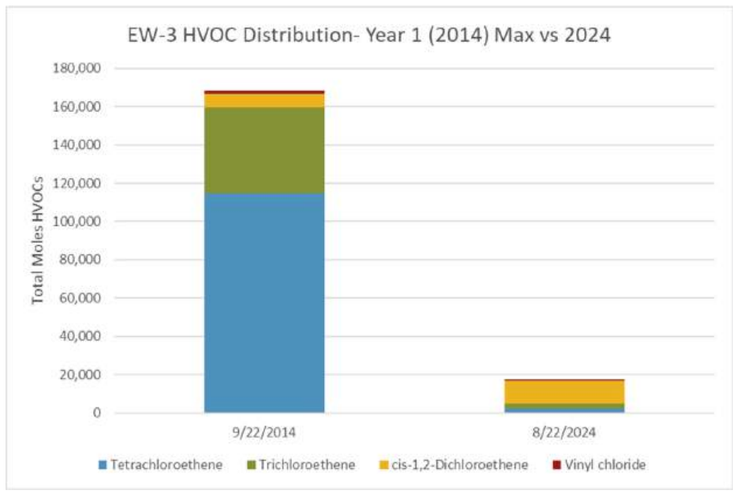
I:\GIS\Projects\COBothell-Riverside\00-AI\PDI Data Report\Figure 2.4 Cross Section A-A'.ai
12/12/2024

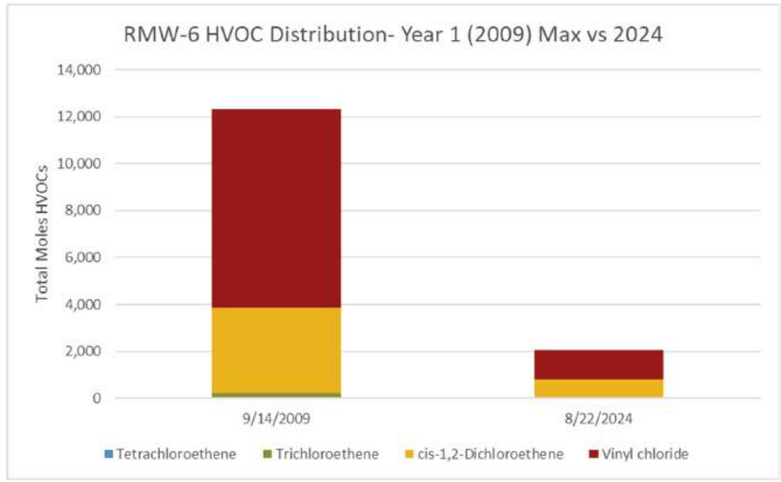












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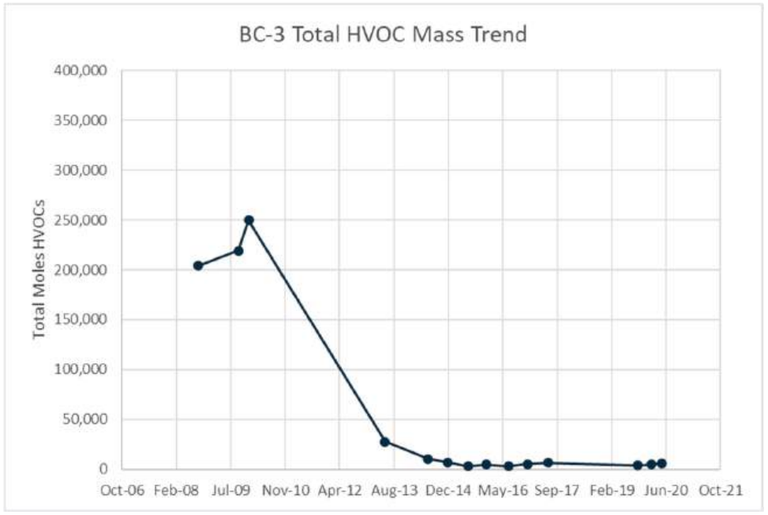
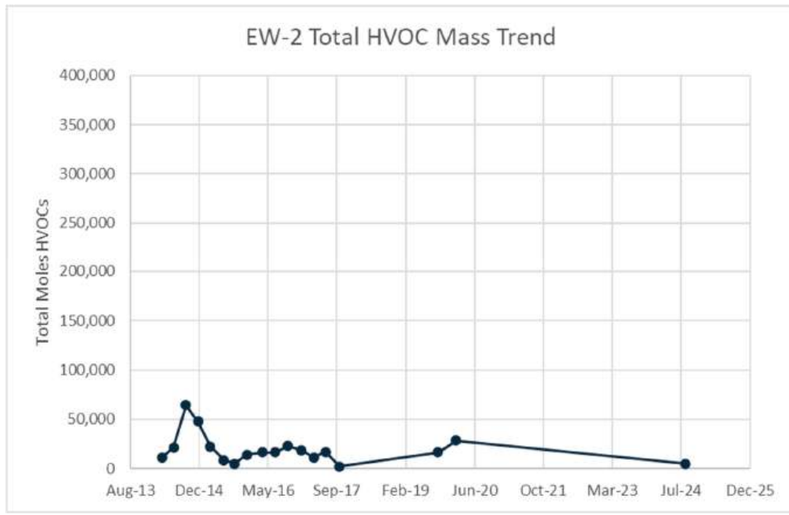
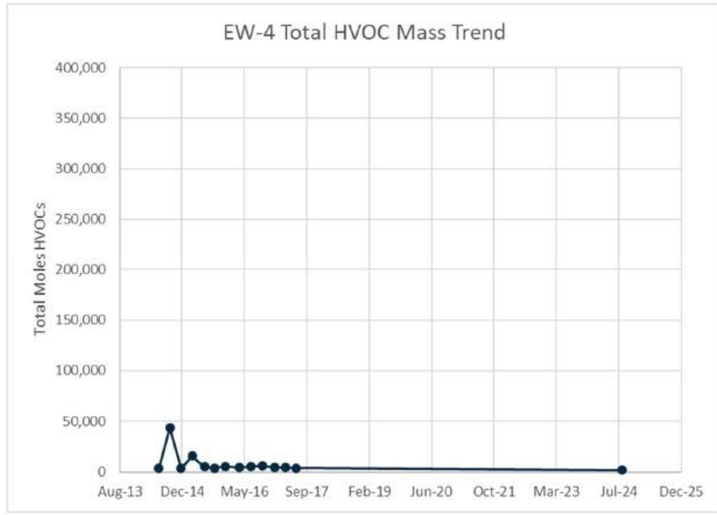
Riverside HVOC Site
Bothell, Washington

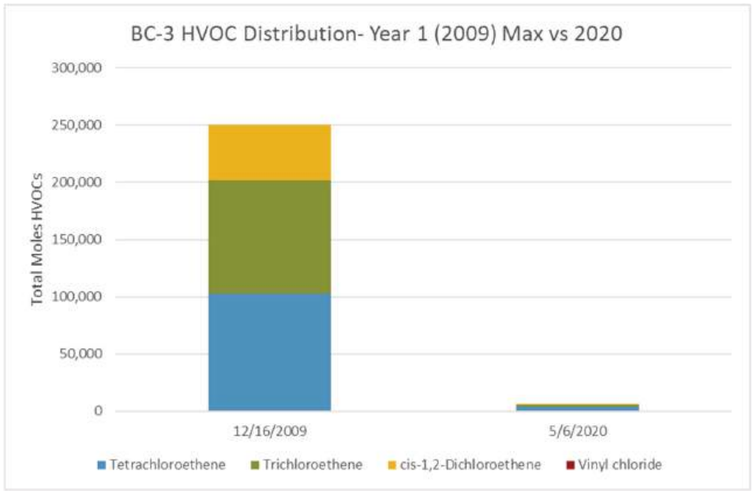
Figure 3.1
HVOC Molar Concentrations: Source Area and Upgradient Plume (Sheet 1 of 3)

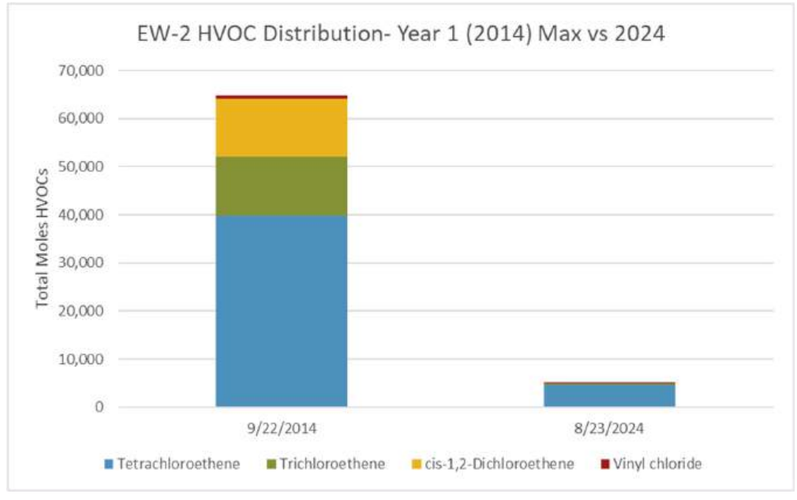
12/4/2024

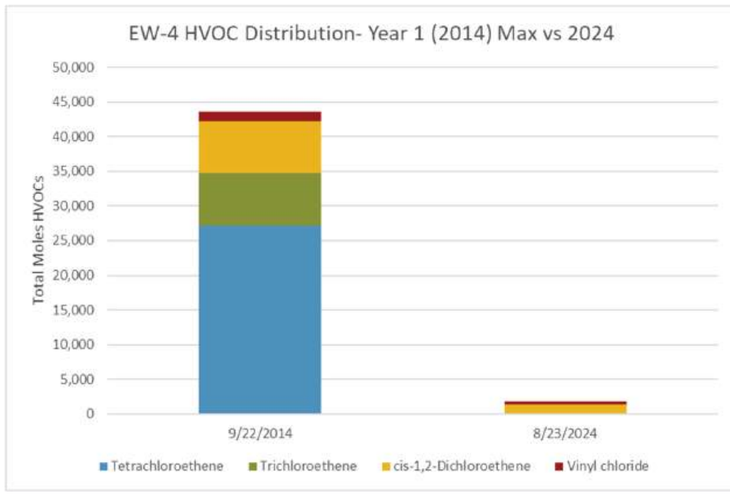












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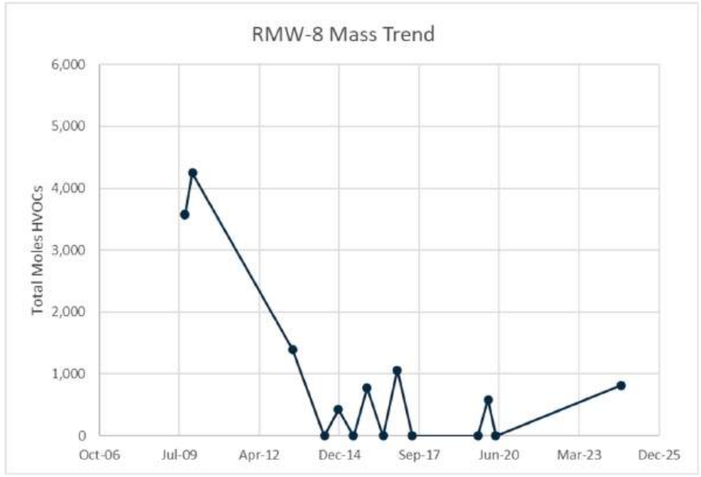
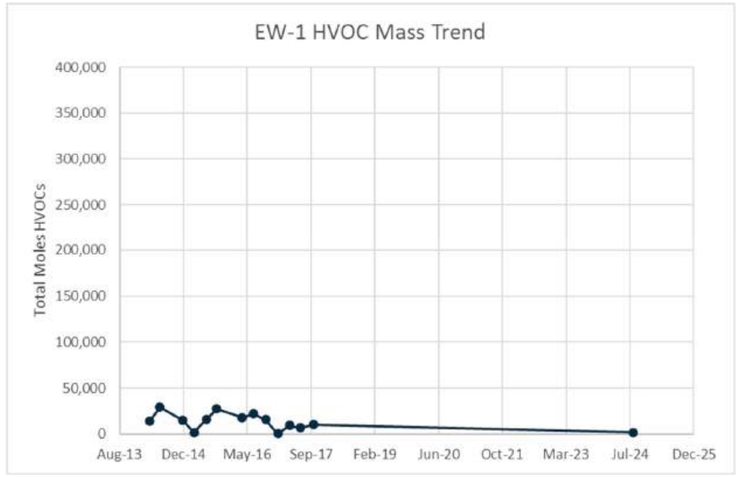
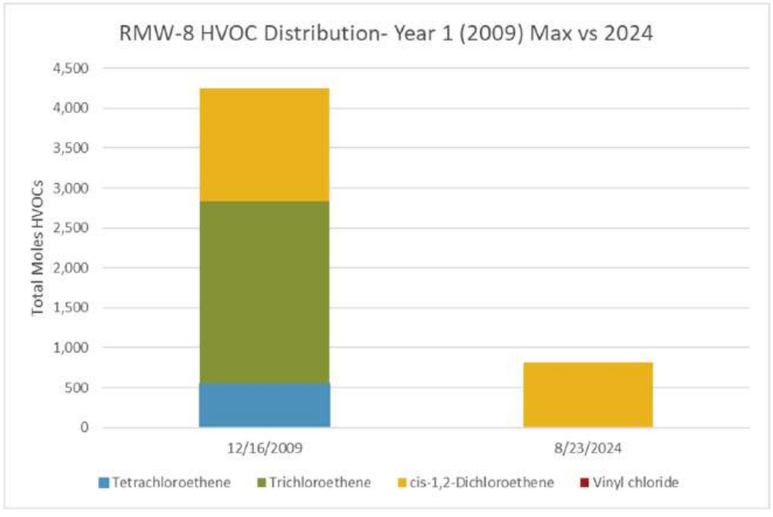
Riverside HVOC Site
Bothell, Washington

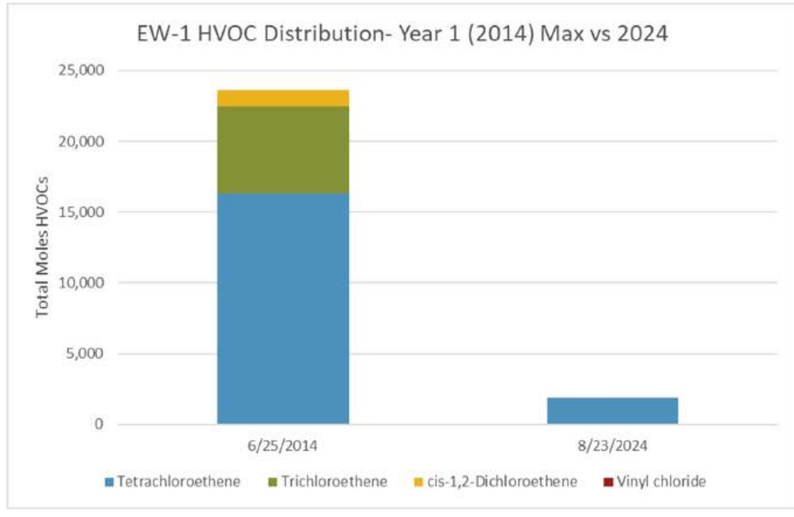
Figure 3.1
HVOC Molar Concentrations: Source Area and Upgradient Plume (Sheet 2 of 3)

12/4/2024









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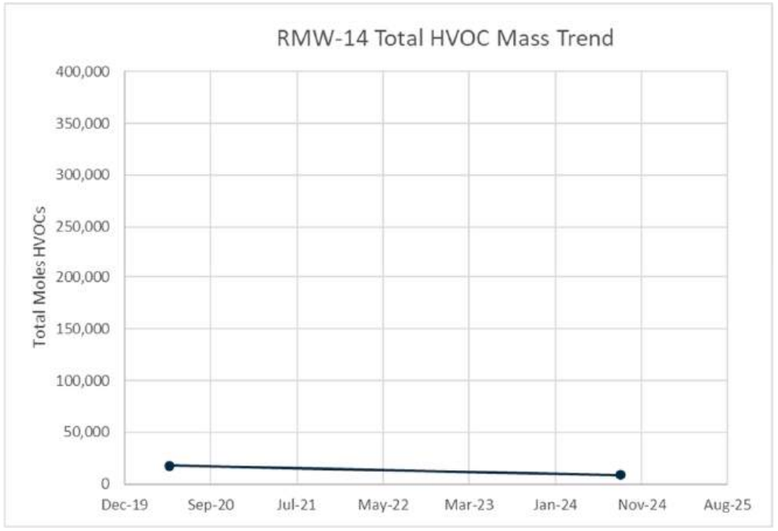
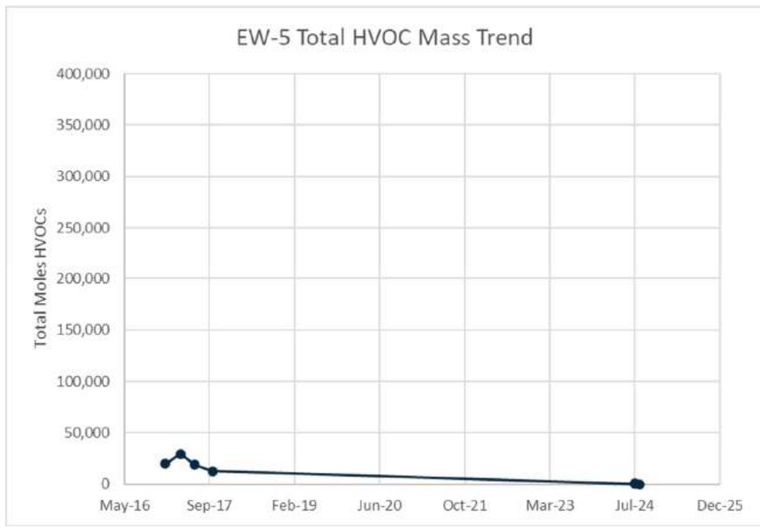
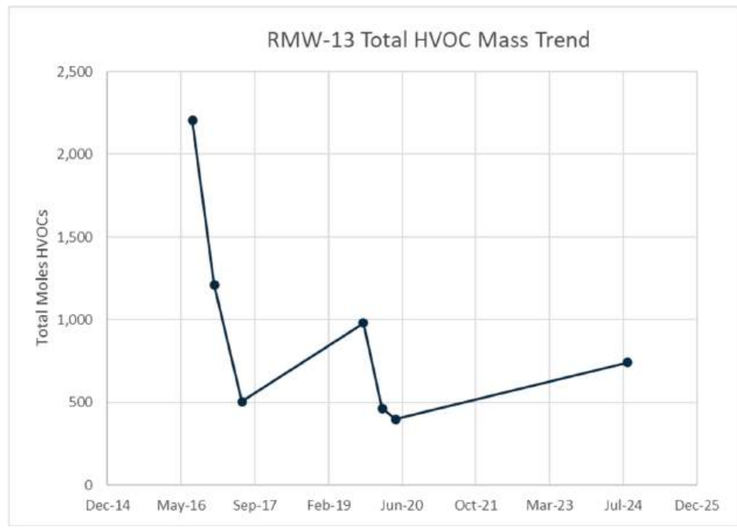
Riverside HVOC Site
Bothell, Washington

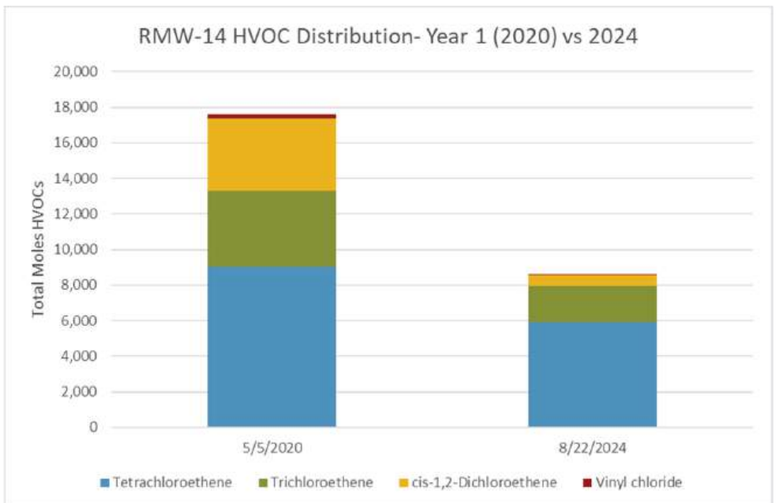
Figure 3.1
HVOC Molar Concentrations: Source Area and Upgradient Plume (Sheet 3 of 3)

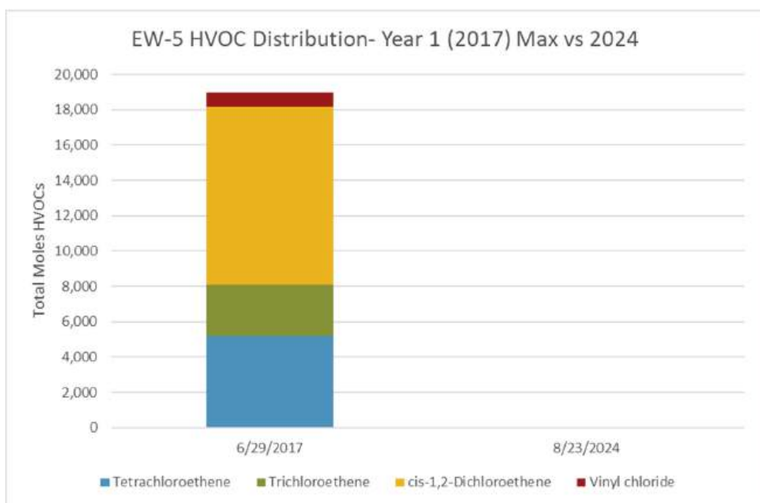
12/4/2024

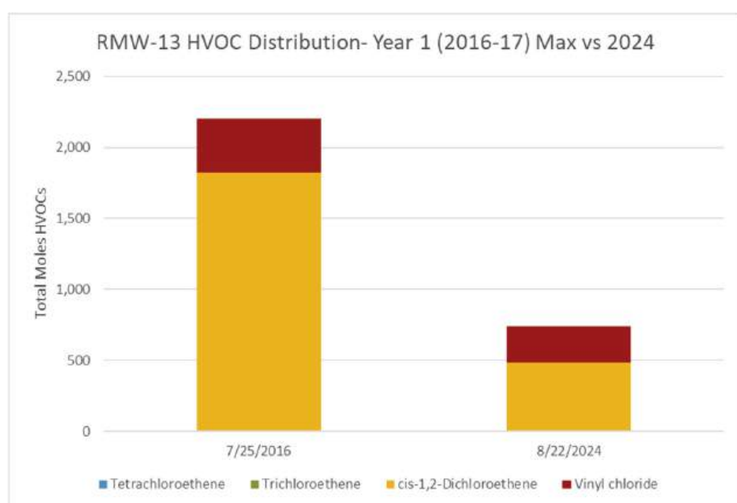












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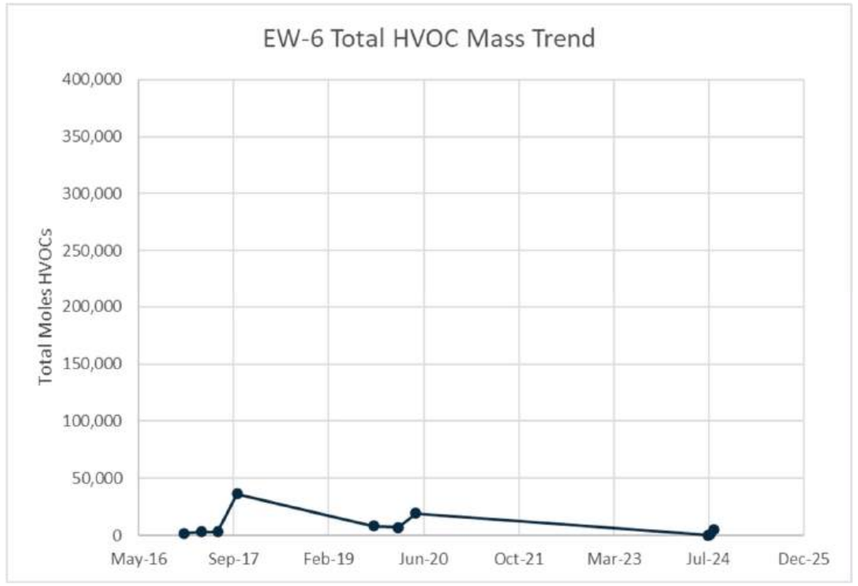
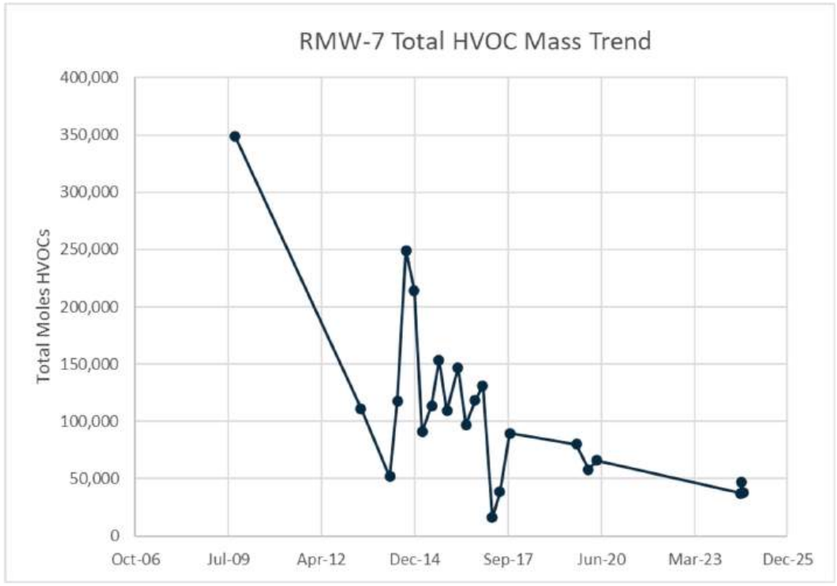
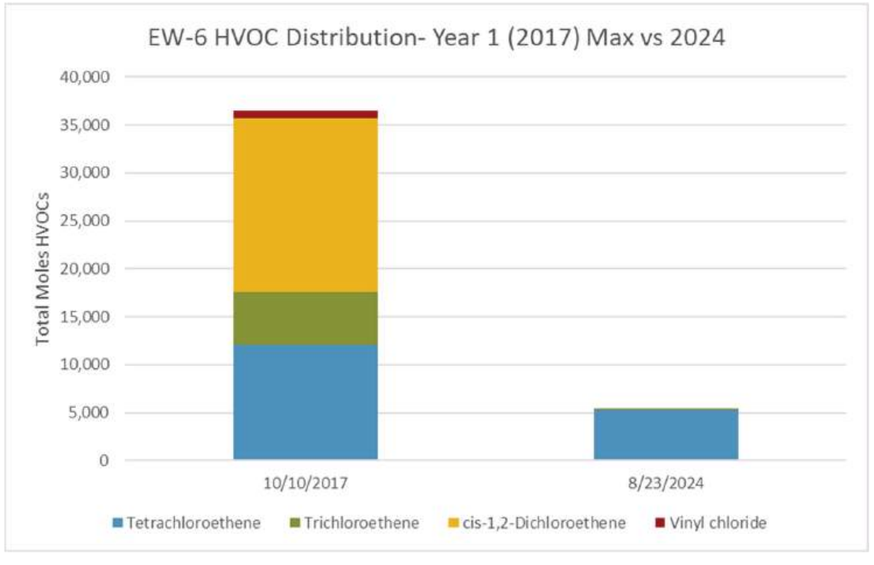
Riverside HVOC Site
Bothell, Washington

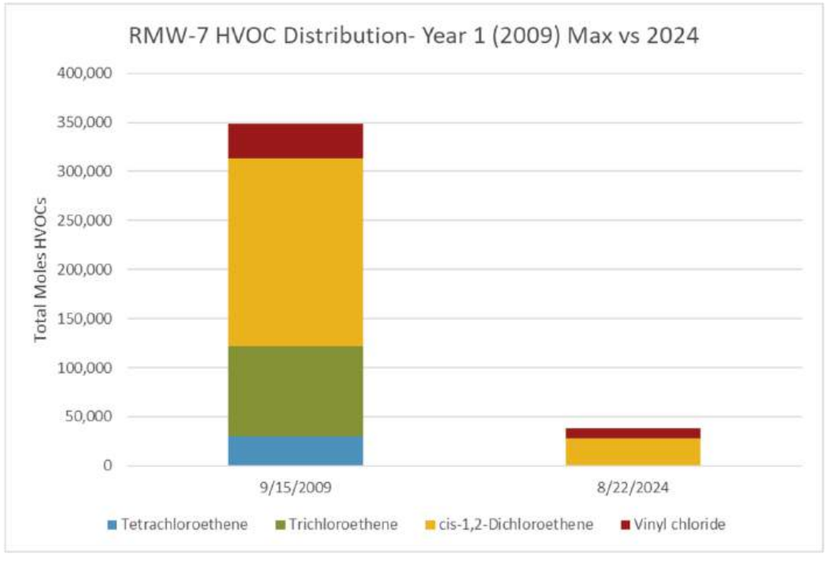
Figure 3.2
HVOC Molar Concentrations: Downgradient Plume
(Sheet 1 of 2)

12/4/2024









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Riverside HVOC Site
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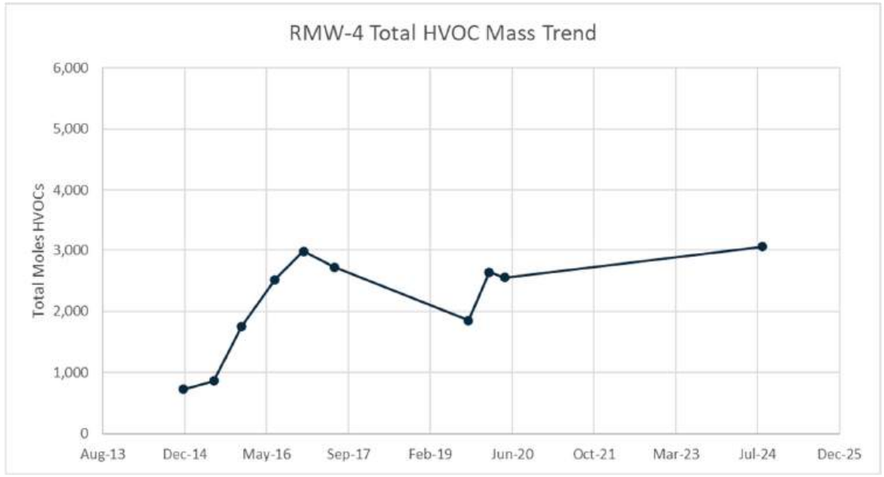
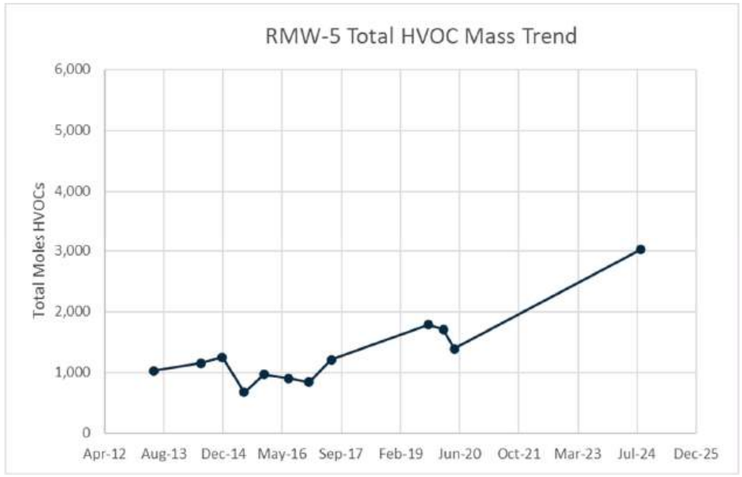
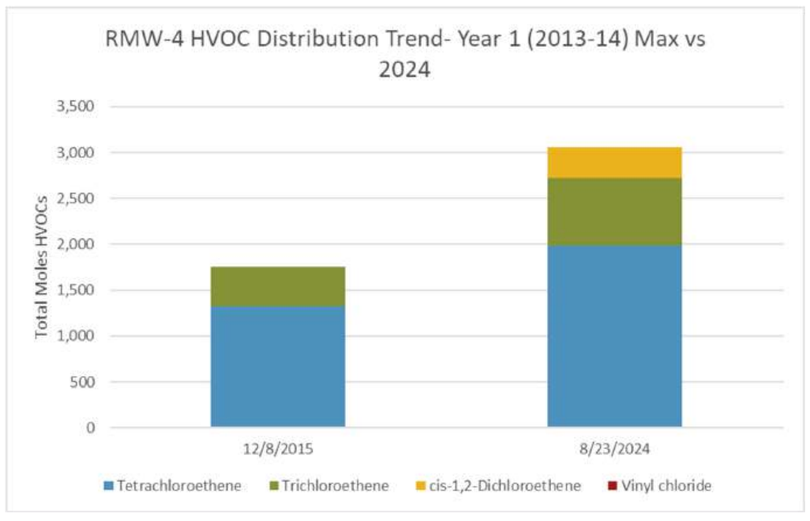
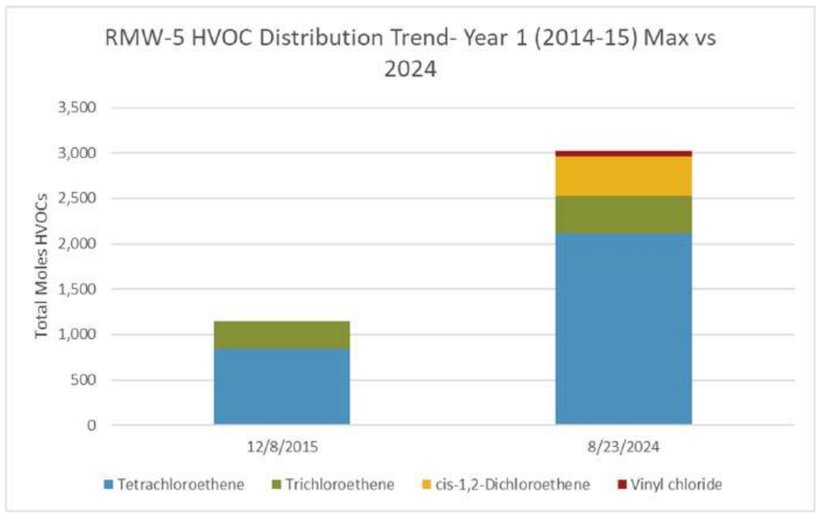
Figure 3.2
HVOC Molar Concentrations: Downgradient Plume
(Sheet 2 of 2)

12/4/2024









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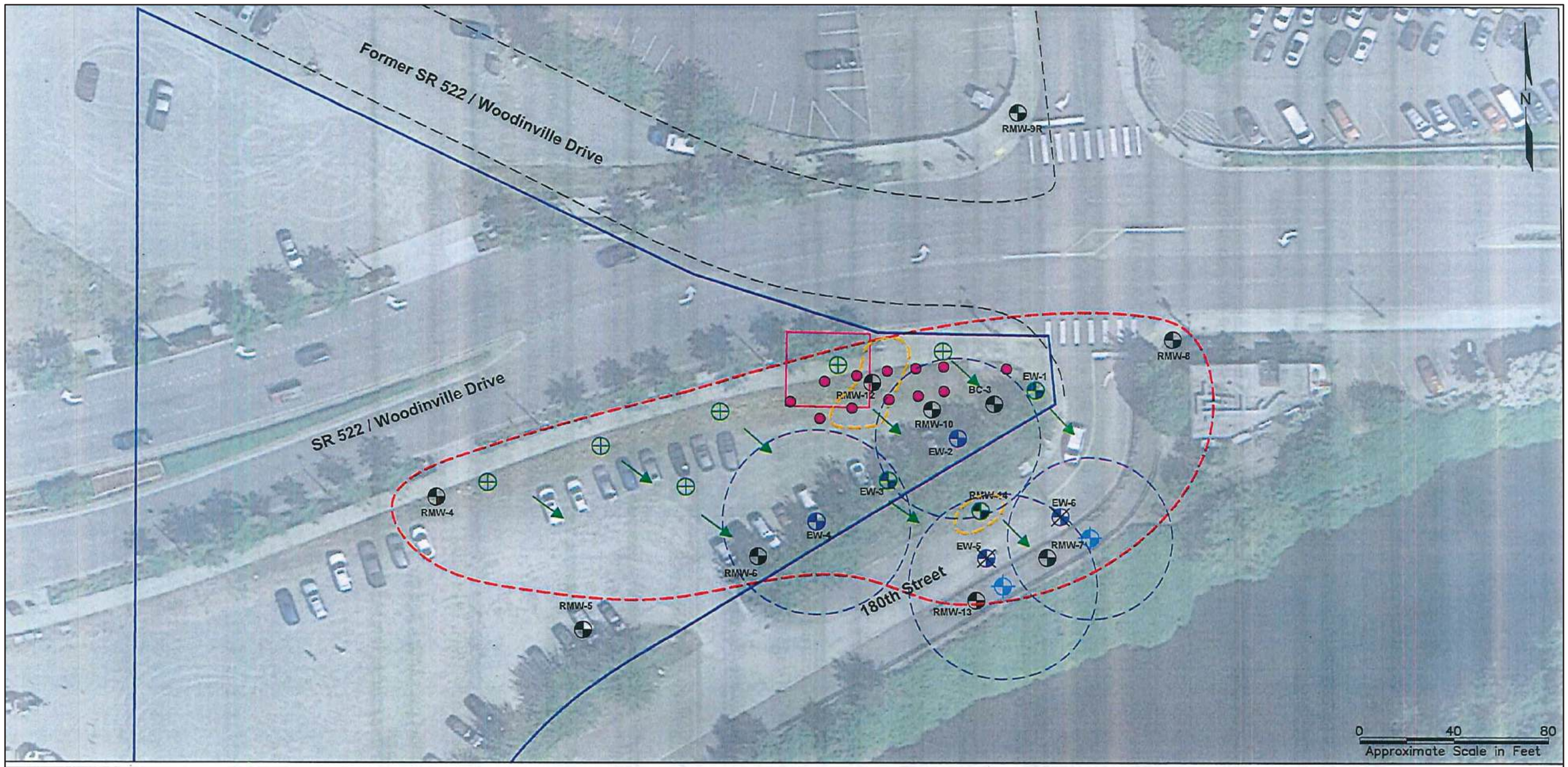
Riverside HVOC Site
Bothell, Washington

Figure 3.3
HVOC Molar Concentrations: Western Plume

12/4/2024



Note:
1 An equal number of injection and extraction wells are assumed for alternatives evaluation.

Source: Cleanup Action Plan Figure 6 (Ecology 2023)

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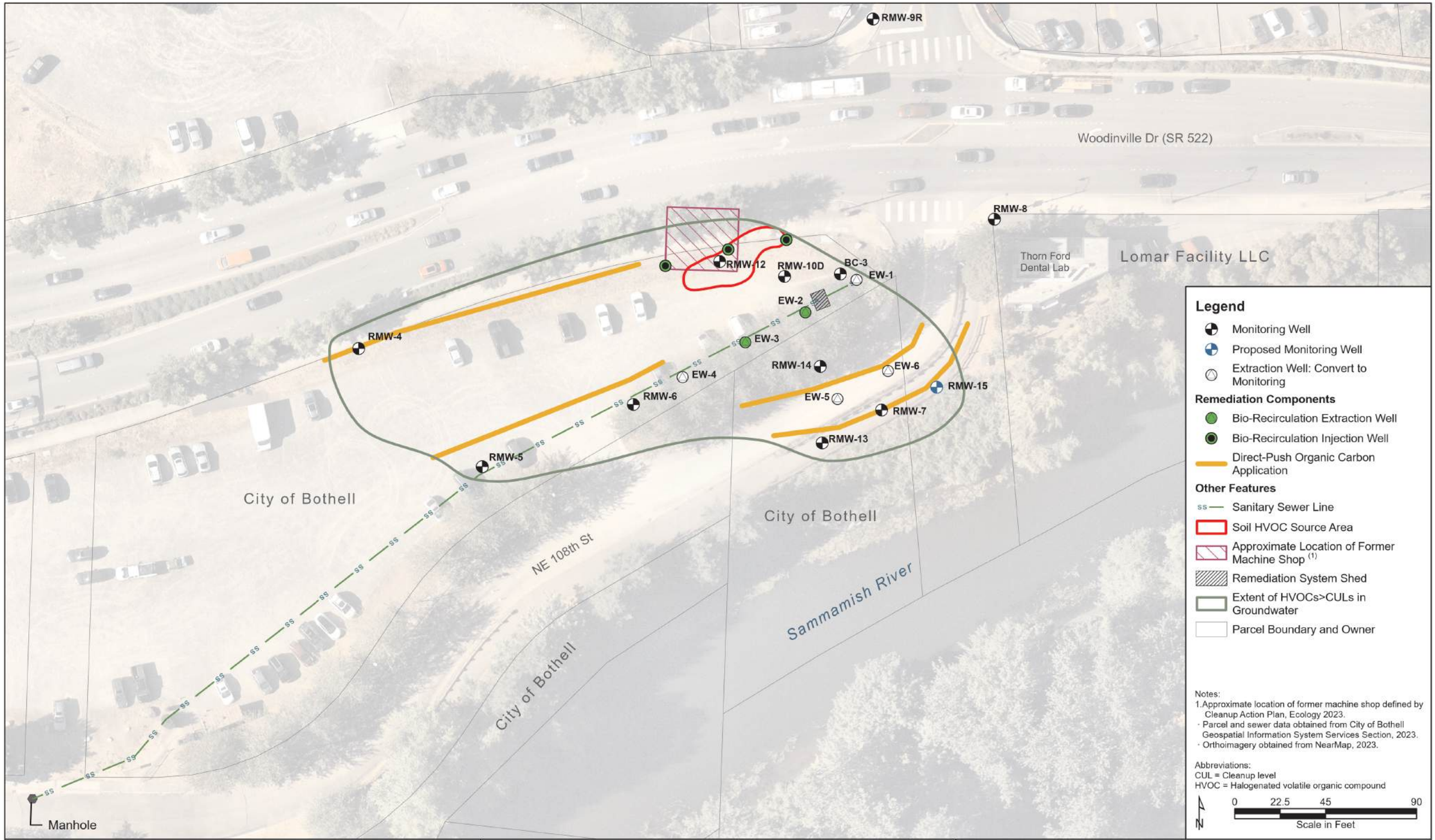
Riverside HVOC Site
Bothell, Washington

Figure 4.1
2023 CAP Cleanup Action

12/16/2024



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Riverside HVOC Site
Bothell, Washington

Figure 4.2
Revised Alternative 1

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12/16/2024

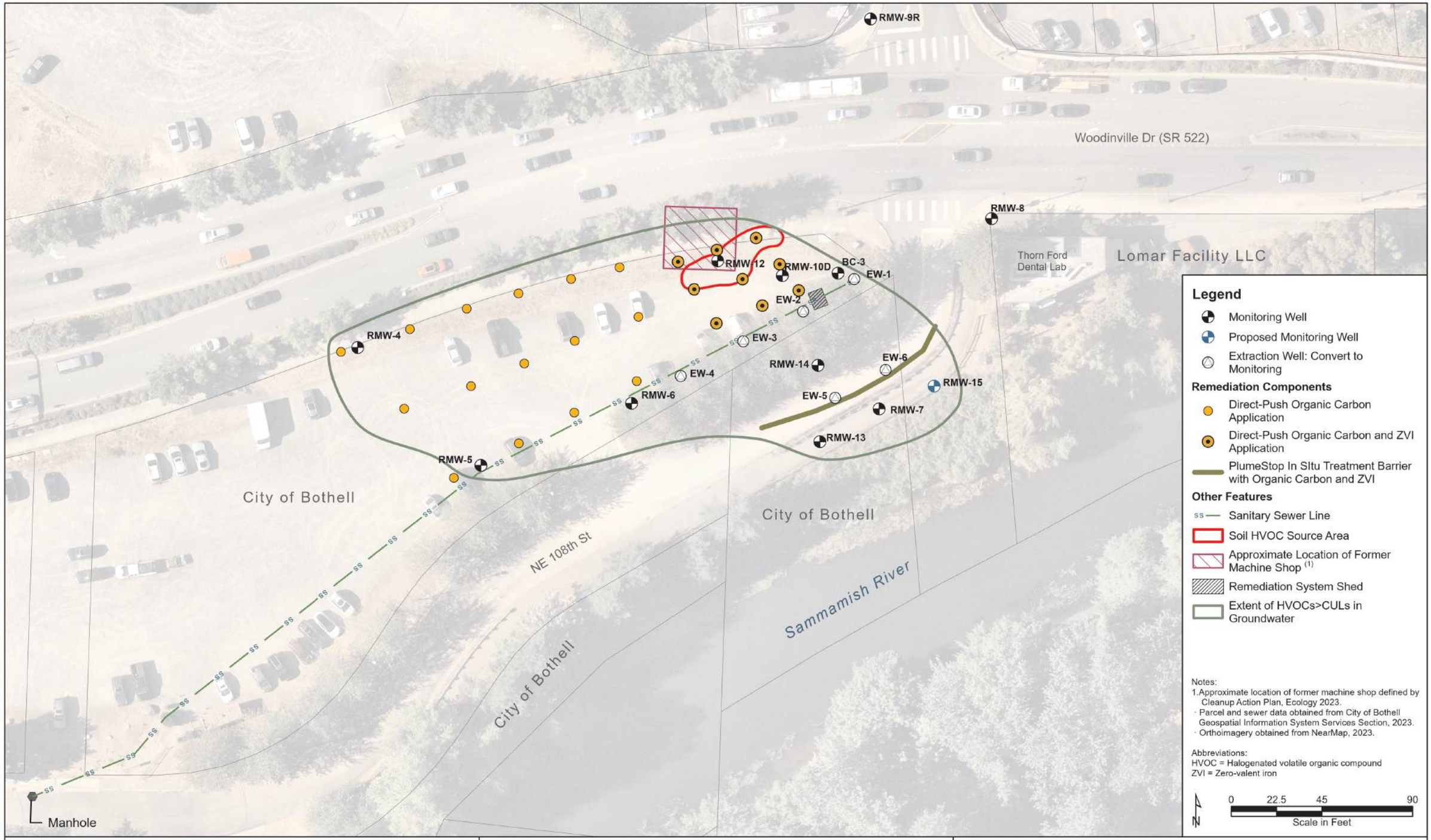

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Figure 4.3
Revised Alternative 2

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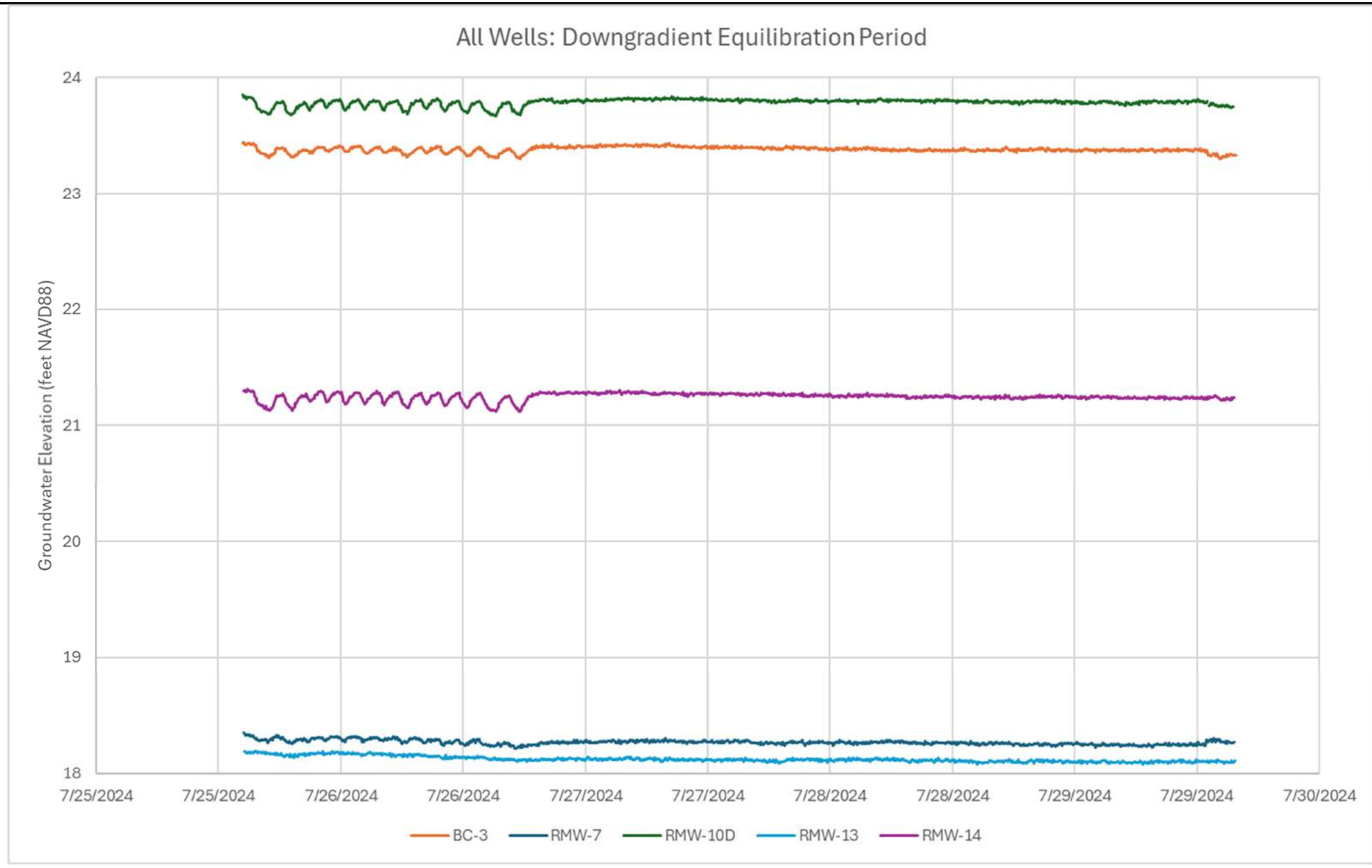
12/16/2024

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Appendix A
Hydrogeologic Study Results


All Wells: Downgradient Equilibration Period
Groundwater Elevation (feet NAVD88)
24
23
22
21
20
19
18
7/25/2024
7/25/2024
7/26/2024
7/26/2024
7/27/2024
7/27/2024
7/28/2024
7/28/2024
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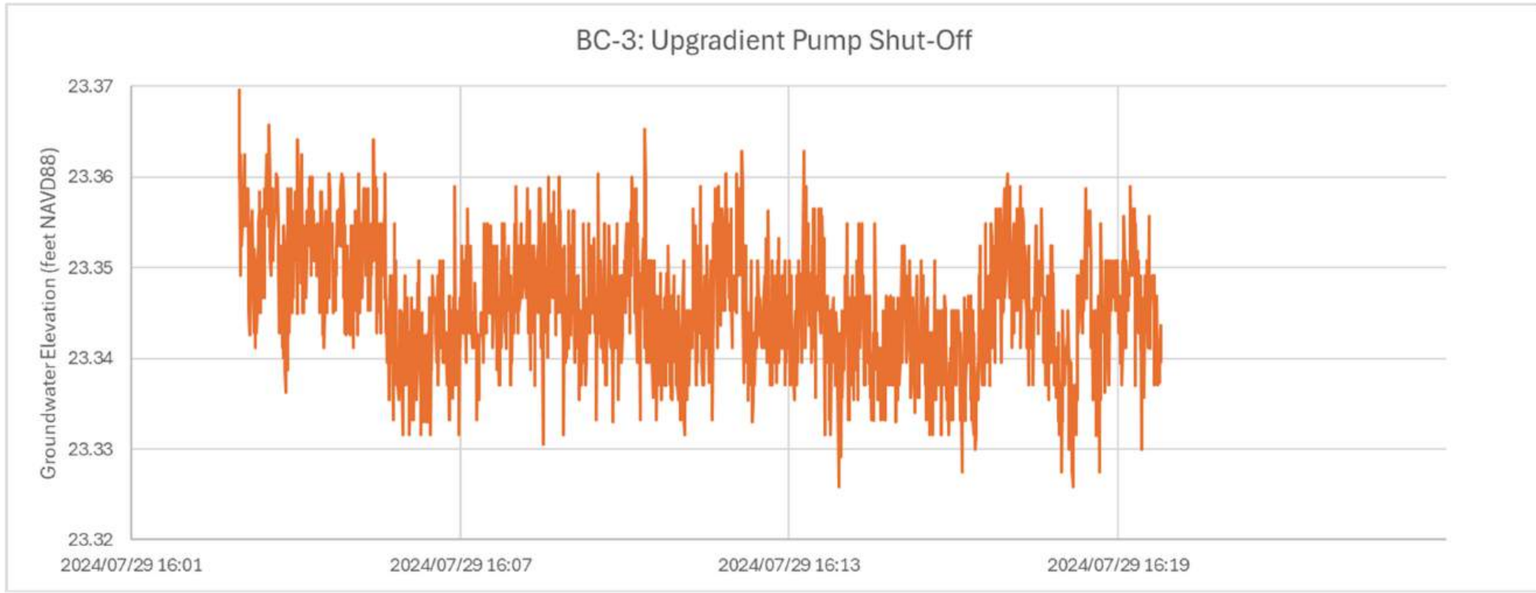
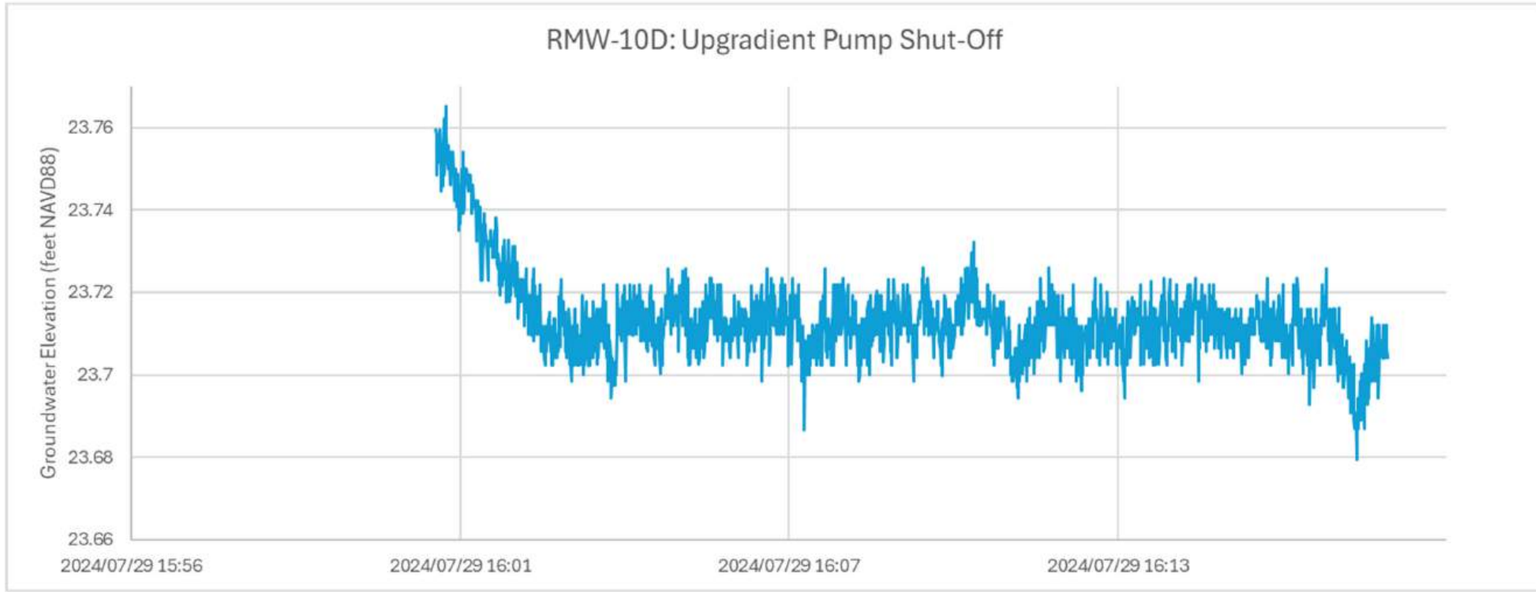
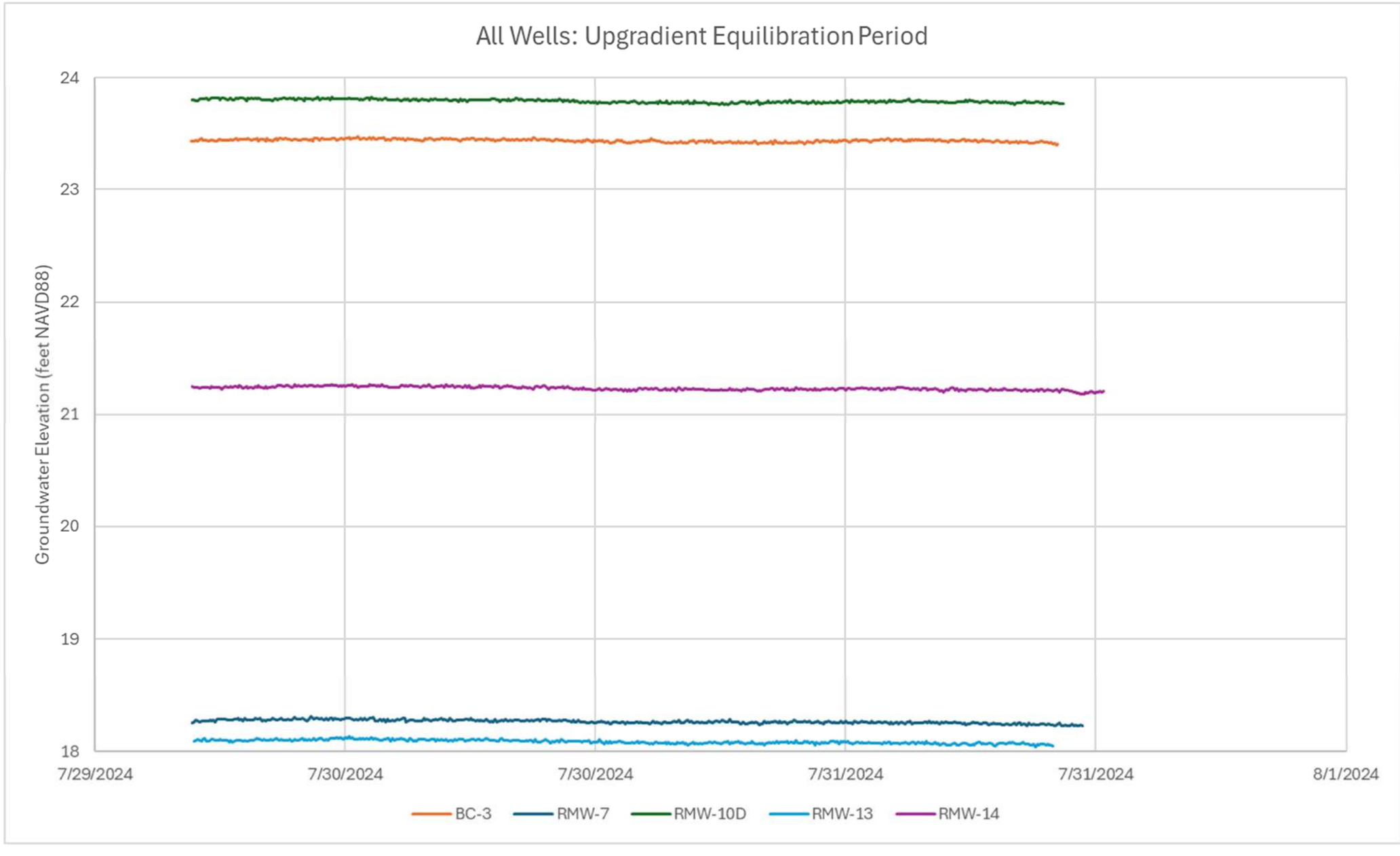
7/29/2024
7/30/2024
BC-3
RMW-7
RMW-10D
RMW-13
RMW-14


BC-3: Upgradient Pump Shut-Off
Groundwater Elevation (feet NAVD88)
23.37
23.36
23.35
23.34
23.33
23.32
2024/07/29 16:01
2024/07/29 16:07
2024/07/29 16:13
2024/07/29 16:19


RMW-10D: Upgradient Pump Shut-Off
Groundwater Elevation (feet NAVD88)
23.76
23.74
23.72
23.7
23.68
23.66
2024/07/29 15:56
2024/07/29 16:01
2024/07/29 16:07
2024/07/29 16:13


All Wells: Upgradient Equilibration Period
Groundwater Elevation (feet NAVD88)
24
23
22
21
20
19
18
7/29/2024
7/30/2024
7/30/2024
7/31/2024
7/31/2024
8/1/2024
BC-3
RMW-7
RMW-10D
RMW-13
RMW-14

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Appendix B
Laboratory Reports

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

July 29, 2024

Kristin Anderson
Floyd & Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: Analytical Data for Project Task 5; COB-Riverside
Laboratory Reference No. 2407-281

Dear Kristin:

Enclosed are the analytical results and associated quality control data for samples submitted on July 25, 2024.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: July 29, 2024
Samples Submitted: July 25, 2024
Laboratory Reference: 2407-281
Project: Task 5; COB-Riverside

Case Narrative

Samples were collected on July 25, 2024 and received by the laboratory on July 25, 2024. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: July 29, 2024
Samples Submitted: July 25, 2024
Laboratory Reference: 2407-281
Project: Task 5; COB-Riverside

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**EW-05-072524**					
Laboratory ID:	07-281-01					
Vinyl Chloride	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	0.26	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				
Client ID:	**EW-06-072524**					
Laboratory ID:	07-281-02					
Vinyl Chloride	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	0.27	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*98*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**RMW-07-072524**					
Laboratory ID:	07-281-03					
Vinyl Chloride	6.4	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	0.22	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	26	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	0.46	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	0.45	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*97*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				

Date of Report: July 29, 2024
Samples Submitted: July 25, 2024
Laboratory Reference: 2407-281
Project: Task 5; COB-Riverside

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-12-072524**					
Laboratory ID:	07-281-04					
Vinyl Chloride	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	1.2	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	1.7	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	9.6	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*100*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**Trip Blanks**					
Laboratory ID:	07-281-05					
Vinyl Chloride	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				

Date of Report: July 29, 2024
Samples Submitted: July 25, 2024
Laboratory Reference: 2407-281
Project: Task 5; COB-Riverside

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0726W1					
Vinyl Chloride	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Trichloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	7-26-24	7-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*100*	*68-133*				
Toluene-d8	*103*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0726W1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**9.58**	**9.44**	10.0	10.0	96	94	67-130	1	15	
(trans) 1,2-Dichloroethene	**9.90**	**10.0**	10.0	10.0	99	100	77-125	1	15	
(cis) 1,2-Dichloroethene	**10.2**	**10.2**	10.0	10.0	102	102	78-130	0	15	
Trichloroethene	**9.93**	**9.92**	10.0	10.0	99	99	80-126	0	15	
Tetrachloroethene	**9.79**	**9.81**	10.0	10.0	98	98	80-125	0	15	
Surrogate:										
Dibromofluoromethane					*98*	*98*	*68-133*			
Toluene-d8					*99*	*101*	*79-123*			
4-Bromofluorobenzene					*102*	*101*	*78-117*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd | Snider
Project Number: Task 5
Project Name: COB-Riverside HVOC Site
Project Manager: Kristin Anderson
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-281

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260 ★	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	EW-05-072524	7/25/24	10:30	GW	3					X																	
2	EW-06-072524	"	10:28	GW	3					X																	
3	RMW-07-072524	"	11:25	GW	3					X																	
4	RMW-12-072524	"	11:30	GW	3					X																	
5	Trip Blanks	"	"	W	3					X																	

	Signature	Company	Date	Time
Relinquished	[signature]	Floyd | Snider	7/25/24	15:20
Received	[signature]	OSE	7/25/24	15 20
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
★ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & Vinyl Chloride
Send results to: labdata@floydsnider.com

Data Package: Standard ☐ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 6, 2024

Kristin Anderson
Floyd & Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: Analytical Data for Project Task 5; COB-Riverside HVOC Site
Laboratory Reference No. 2407-356

Dear Kristin:

Enclosed are the analytical results and associated quality control data for samples submitted on July 31, 2024.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 6, 2024
Samples Submitted: July 31, 2024
Laboratory Reference: 2407-356
Project: Task 5; COB-Riverside HVOC Site

Case Narrative

Samples were collected on July 31, 2024 and received by the laboratory on July 31, 2024. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 6, 2024
Samples Submitted: July 31, 2024
Laboratory Reference: 2407-356
Project: Task 5; COB-Riverside HVOC Site

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**EW-05-073124**					
Laboratory ID:	07-356-01					
Vinyl Chloride	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Trichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Tetrachloroethene	0.25	0.20	EPA 8260D	8-1-24	8-1-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*102*	*78-117*				
Client ID:	**EW-06-073124**					
Laboratory ID:	07-356-02					
Vinyl Chloride	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Trichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Tetrachloroethene	1.5	0.20	EPA 8260D	8-1-24	8-1-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*102*	*78-117*				
Client ID:	**RMW-07-073124**					
Laboratory ID:	07-356-03					
Vinyl Chloride	9.4	0.20	EPA 8260D	8-1-24	8-1-24	
(trans) 1,2-Dichloroethene	0.29	0.20	EPA 8260D	8-1-24	8-1-24	
(cis) 1,2-Dichloroethene	31	0.20	EPA 8260D	8-1-24	8-1-24	
Trichloroethene	0.41	0.20	EPA 8260D	8-1-24	8-1-24	
Tetrachloroethene	0.38	0.20	EPA 8260D	8-1-24	8-1-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				

Date of Report: August 6, 2024
Samples Submitted: July 31, 2024
Laboratory Reference: 2407-356
Project: Task 5; COB-Riverside HVOC Site

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-12-073124**					
Laboratory ID:	07-356-04					
Vinyl Chloride	0.22	0.20	EPA 8260D	8-1-24	8-1-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(cis) 1,2-Dichloroethene	1.5	0.20	EPA 8260D	8-1-24	8-1-24	
Trichloroethene	1.7	0.20	EPA 8260D	8-1-24	8-1-24	
Tetrachloroethene	8.2	0.20	EPA 8260D	8-1-24	8-1-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*102*	*78-117*				

Date of Report: August 6, 2024
Samples Submitted: July 31, 2024
Laboratory Reference: 2407-356
Project: Task 5; COB-Riverside HVOC Site

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0801W1					
Vinyl Chloride	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Trichloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-1-24	8-1-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*95*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	07-358-01										
	MS	MSD	MS	MSD		MS	MSD				
Vinyl Chloride	**10.5**	**10.8**	10.0	10.0	ND	105	108	62-121	3	15	
(trans) 1,2-Dichloroethene	**10.3**	**10.4**	10.0	10.0	ND	103	104	79-120	1	16	
(cis) 1,2-Dichloroethene	**10.5**	**10.7**	10.0	10.0	ND	105	107	81-128	2	16	
Trichloroethene	**10.6**	**10.4**	10.0	10.0	ND	106	104	80-130	2	12	
Tetrachloroethene	**10.1**	**10.1**	10.0	10.0	ND	101	101	84-126	0	19	
Surrogate:											
Dibromofluoromethane						*96*	*96*	*68-133*			
Toluene-d8						*99*	*99*	*79-123*			
4-Bromofluorobenzene						*103*	*104*	*78-117*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd Snider
Project Number: Task 5
Project Name: COB - Riverside HVOC Site
Project Manager: Kristin Anderson
Sampled by: Danielle Grossheber

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 07-356

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	EW-05-073124	7/31/24	11:15	GW	3					X																	
2	EW-06-073124	↓	11:20	↓	3					X																	
3	RMW-07-073124		12:00		3					X																	
4	RMW-12-073124		12:05		3					X																	

	Signature	Company	Date	Time
Relinquished		Floyd | Snider	7/31/24	13:47
Received		OSE	7/31/24	1347
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
★ Only PCE, TCE, 1,2-cis-DCE, trans-1,2-DCE & Vinyl Chloride
Send results to: labdata@floydsnider.com

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

September 4, 2024

Kristin Anderson
Floyd & Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: Analytical Data for Project COB-Riverside; Task 5
Laboratory Reference No. 2408-289

Dear Kristin:

Enclosed are the analytical results and associated quality control data for samples submitted on August 22, 2024.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

Case Narrative

Samples were collected on August 22, 2024 and received by the laboratory on August 22, 2024. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Alkalinity SM 2320B Analysis

Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects of sample RMW-05-082224.

Dissolved Gases RSK 175 Analysis

Due to the high concentration of Methane in the native sample used for the MS/MSD, meaningful recovery data for this compound could not be obtained. Ethane and Ethene were also recovered outside of control limits. The samples were re-analyzed with similar results, indicating probable matrix interference. The SB/SBD extracted with these samples had all parameters within control limits.

Please note that any other QA/QC issues associated with these extractions and analyses will be indicated with a footnote reference and discussed in detail on the Data Qualifier page.

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Vinyl Chloride (SIM)	0.032	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.58	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	2.7	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	9.8	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Vinyl Chloride (SIM)	0.16	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.48	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Vinyl Chloride	6.2	0.20	EPA 8260D	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	0.28	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	27	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	0.64	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	0.48	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Vinyl Chloride (SIM)	0.19	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	1.4	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	1.8	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	8.8	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Vinyl Chloride	0.42	0.20	EPA 8260D	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	0.21	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	12	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	3.4	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	3.7	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				

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Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Vinyl Chloride (SIM)	0.036	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.43	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	0.55	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	3.5	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Vinyl Chloride	0.79	0.20	EPA 8260D	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.77	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Vinyl Chloride	0.21	0.20	EPA 8260D	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	1.4	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	1.9	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	9.2	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Vinyl Chloride	**9.99**	**10.2**	10.0	10.0	ND	100	102	62-121	2	15	
(trans) 1,2-Dichloroethene	**9.72**	**9.87**	10.0	10.0	ND	97	99	79-120	2	16	
(cis) 1,2-Dichloroethene	**10.6**	**10.3**	10.0	10.0	0.428	102	99	81-128	3	16	
Trichloroethene	**12.2**	**11.7**	10.0	10.0	0.548	117	112	80-130	4	12	
Tetrachloroethene	**14.9**	**14.3**	10.0	10.0	3.47	114	108	84-126	4	19	
Surrogate:											
Dibromofluoromethane						*87*	*88*	*68-133*			
Toluene-d8						*99*	*98*	*79-123*			
4-Bromofluorobenzene						*101*	*100*	*78-117*			

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL METALS
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Calcium	**38000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**ND**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**17000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Calcium	**38000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**2400**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**13000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Calcium	**64000**	5000	EPA 6010D	8-28-24	9-3-24	
Iron	**1900**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**14000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Calcium	**49000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**4100**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**11000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Calcium	**51000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**220**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**13000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Calcium	**45000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**14000**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**19000**	1000	EPA 6010D	8-28-24	9-3-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL METALS
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Calcium	**39000**	1000	EPA 6010D	8-28-24	8-28-24	
Iron	**24000**	50	EPA 6010D	8-28-24	8-28-24	
Magnesium	**14000**	1000	EPA 6010D	8-28-24	8-28-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Calcium	**53000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**31000**	250	EPA 6010D	8-28-24	9-3-24	
Magnesium	**19000**	1000	EPA 6010D	8-28-24	9-3-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Calcium	**52000**	1000	EPA 6010D	8-28-24	9-3-24	
Iron	**210**	50	EPA 6010D	8-28-24	9-3-24	
Magnesium	**14000**	1000	EPA 6010D	8-28-24	9-3-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL METALS
EPA 6010D
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0828WH1					
Calcium	**ND**	1000	EPA 6010D	8-28-24	8-28-24	
Iron	**ND**	50	EPA 6010D	8-28-24	8-28-24	
Magnesium	**ND**	1000	EPA 6010D	8-28-24	8-28-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery	Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE										
Laboratory ID:	08-289-07									
	ORIG	DUP								
Calcium	**39000**	**38700**	NA	NA		NA	NA	1	20	
Iron	**23900**	**23200**	NA	NA		NA	NA	3	20	
Magnesium	**14000**	**13700**	NA	NA		NA	NA	3	20	
MATRIX SPIKES										
Laboratory ID:	08-289-07									
	MS	MSD	MS	MSD		MS	MSD			
Calcium	**55800**	**60900**	20000	20000	39000	**84**	**109**	75-125	9	20
Iron	**41200**	**44200**	20000	20000	23900	**86**	**101**	75-125	7	20
Magnesium	**32300**	**33300**	20000	20000	14000	**91**	**96**	75-125	3	20

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Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED METALS
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Calcium	**40000**	1100	EPA 6010D		9-3-24	
Iron	**ND**	56	EPA 6010D		9-3-24	
Magnesium	**17000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Calcium	**44000**	1100	EPA 6010D		9-3-24	
Iron	**2200**	56	EPA 6010D		9-3-24	
Magnesium	**14000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Calcium	**65000**	5000	EPA 6010D		9-3-24	
Iron	**1900**	56	EPA 6010D		9-3-24	
Magnesium	**14000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Calcium	**49000**	1100	EPA 6010D		9-3-24	
Iron	**3900**	56	EPA 6010D		9-3-24	
Magnesium	**11000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Calcium	**52000**	1100	EPA 6010D		9-3-24	
Iron	**94**	56	EPA 6010D		9-3-24	
Magnesium	**15000**	1100	EPA 6010D		9-3-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Calcium	**50000**	1100	EPA 6010D		9-3-24	
Iron	**13000**	56	EPA 6010D		9-3-24	
Magnesium	**20000**	1100	EPA 6010D		9-3-24	

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Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED METALS
EPA 6010D

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Calcium	**37000**	1100	EPA 6010D		9-3-24	
Iron	**18000**	56	EPA 6010D		9-3-24	
Magnesium	**15000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Calcium	**54000**	1100	EPA 6010D		9-3-24	
Iron	**31000**	250	EPA 6010D		9-3-24	
Magnesium	**19000**	1100	EPA 6010D		9-3-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Calcium	**50000**	5000	EPA 6010D	8-28-24	9-3-24	
Iron	**140**	56	EPA 6010D	8-28-24	9-3-24	
Magnesium	**15000**	1100	EPA 6010D	8-28-24	9-3-24	

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Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED METALS
EPA 6010D
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0903D1					
Calcium	**ND**	1100	EPA 6010D		9-3-24	
Iron	**ND**	56	EPA 6010D		9-3-24	
Magnesium	**ND**	1100	EPA 6010D		9-3-24	
Laboratory ID:	MB0828F1					
Calcium	**ND**	1100	EPA 6010D	8-28-24	9-3-24	
Iron	**ND**	56	EPA 6010D	8-28-24	9-4-24	
Magnesium	**ND**	1100	EPA 6010D	8-28-24	9-3-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Calcium	**36800**	**36900**	NA	NA		NA		NA	0	20	
Iron	**17600**	**17600**	NA	NA		NA		NA	0	20	
Magnesium	**14800**	**14800**	NA	NA		NA		NA	0	20	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Calcium	**58100**	**57500**	22200	22200	36800	**96**	**93**	75-125	1	20	
Iron	**117000**	**118000**	100000	100000	17600	**99**	**100**	75-125	1	20	
Magnesium	**36300**	**36200**	22200	22200	14800	**97**	**97**	75-125	0	20	

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Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL ALKALINITY
SM 2320B

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Total Alkalinity	**40**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Total Alkalinity	**160**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Total Alkalinity	**200**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Total Alkalinity	**190**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Total Alkalinity	**190**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Total Alkalinity	**220**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Total Alkalinity	**210**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Total Alkalinity	**280**	2.0	SM 2320B	8-26-24	8-26-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Total Alkalinity	**200**	2.0	SM 2320B	8-26-24	8-26-24	

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Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL ALKALINITY
SM 2320B
QUALITY CONTROL

Matrix: Water
Units: mg CaCO3/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W2					
Total Alkalinity	**ND**	2.0	SM 2320B	8-26-24	8-26-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Total Alkalinity	**208**	**212**	NA		NA	NA		NA	2	10	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Total Alkalinity	**270**	**268**	100	100	208	62	60	80-120	1	20	V
SPIKE BLANK											
Laboratory ID:	SB0826W2										
	SB		SB			SB					
Total Alkalinity	**92.0**		100		NA	92		82-101	NA	NA	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED GASES
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Methane	**ND**	0.55	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*99*	*50-150*				
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Methane	**820**	5.5	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*83*	*50-150*				
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Methane	**26**	0.55	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*103*	*50-150*				
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Methane	**580**	5.5	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*84*	*50-150*				
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Methane	**76**	0.55	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*88*	*50-150*				

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED GASES
RSK 175

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Methane	**410**	3.3	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*88*	*50-150*				
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Methane	**1300**	11	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*100*	*50-150*				
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Methane	**2200**	28	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*86*	*50-150*				
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Methane	**92**	0.55	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*86*	*50-150*				

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

DISSOLVED GASES
RSK 175
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0829W1					
Methane	**ND**	0.55	RSK 175	8-29-24	8-29-24	
Ethane	**ND**	0.56	RSK 175	8-29-24	8-29-24	
Ethene	**ND**	0.58	RSK 175	8-29-24	8-29-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
1-Butene	*117*	*50-150*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Methane	**1310**	**1670**	44.2	44.2	1310	0	814	75-125	24	25	A
Ethane	**47.5**	**46.9**	83.2	83.2	ND	57	56	75-125	1	25	V
Ethene	**55.7**	**51.0**	77.7	77.7	ND	72	66	75-125	9	25	V
Surrogate:											
1-Butene						*97*	*91*	*50-150*			

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

CHLORIDE
SM 4500-Cl E

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Chloride	**140**	4.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Chloride	**12**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Chloride	**14**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Chloride	**15**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Chloride	**34**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Chloride	**31**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Chloride	**14**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Chloride	**28**	2.0	SM 4500-Cl E	8-26-24	8-26-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Chloride	**27**	2.0	SM 4500-Cl E	8-26-24	8-26-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

CHLORIDE
SM 4500-Cl E
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W2					
Chloride	**ND**	2.0	SM 4500-Cl E	8-26-24	8-26-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Chloride	**13.7**	**15.8**	NA		NA	NA		NA	14	21	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Chloride	**71.1**	**62.2**	50.0	50.0	13.7	115	97	81-115	13	20	
SPIKE BLANK											
Laboratory ID:	SB0826W2										
	SB		SB			SB					
Chloride	**56.1**		50.0		NA	112		77-115	NA	NA	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL ORGANIC CARBON
SM 5310B

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Total Organic Carbon	**ND**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Total Organic Carbon	**2.4**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Total Organic Carbon	**4.9**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Total Organic Carbon	**3.9**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Total Organic Carbon	**4.4**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Total Organic Carbon	**5.8**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Total Organic Carbon	**11**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Total Organic Carbon	**11**	1.0	SM 5310B	8-27-24	8-27-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Total Organic Carbon	**4.5**	1.0	SM 5310B	8-27-24	8-27-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

TOTAL ORGANIC CARBON
SM 5310B
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0827W2					
Total Organic Carbon	**ND**	1.0	SM 5310B	8-27-24	8-27-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Total Organic Carbon	**10.9**	**10.9**	NA		NA	NA		NA	0	11	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Total Organic Carbon	**19.7**	**20.1**	10.0	10.0	10.9	88	92	85-120	2	20	
SPIKE BLANK											
Laboratory ID:	SB0827W2										
	SB		SB			SB					
Total Organic Carbon	**10.7**		10.0		NA	107		79-120	NA	NA	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

NITRATE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L-N

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Nitrate	**2.6**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Nitrate	**0.97**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Nitrate	**0.21**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Nitrate	**0.19**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Nitrate	**0.052**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Nitrate	**0.16**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Nitrate	**0.21**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Nitrate	**0.13**	0.050	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Nitrate	**0.093**	0.050	EPA 353.2	8-23-24	8-23-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

NITRATE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L-N

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0823W1					
Nitrate	**ND**	0.050	EPA 353.2	8-23-24	8-23-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Nitrate	**0.210**	**0.216**	NA		NA	NA		NA	3	22	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Nitrate	**2.08**	**2.14**	2.00	2.00	0.210	94	97	86-119	3	20	
SPIKE BLANK											
Laboratory ID:	SB0823W1										
	SB		SB			SB					
Nitrate	**1.92**		2.00		NA	96		85-117	NA	NA	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

NITRITE (as Nitrogen)
EPA 353.2

Matrix: Water
Units: mg/L-N

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

NITRITE (as Nitrogen)
EPA 353.2
QUALITY CONTROL

Matrix: Water
Units: mg/L-N

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0823W1					
Nitrite	**ND**	0.020	EPA 353.2	8-23-24	8-23-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Nitrite	**ND**	**ND**	NA		NA	NA		NA	NA	11	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Nitrite	**0.240**	**0.244**	0.250	0.250	ND	96	98	85-121	2	20	
SPIKE BLANK											
Laboratory ID:	SB0823W1										
	SB		SB			SB					
Nitrite	**0.239**		0.250		NA	96		91-116	NA	NA	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

SULFATE
ASTM D516-11

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-09R-082224**					
Laboratory ID:	08-289-01					
Sulfate	**23**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-14-082224**					
Laboratory ID:	08-289-02					
Sulfate	**20**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-13-082224**					
Laboratory ID:	08-289-03					
Sulfate	**34**	10	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-07-082224**					
Laboratory ID:	08-289-04					
Sulfate	**14**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-12-082224**					
Laboratory ID:	08-289-05					
Sulfate	**16**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**EW-03-082224**					
Laboratory ID:	08-289-06					
Sulfate	**12**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-05-082224**					
Laboratory ID:	08-289-07					
Sulfate	**18**	10	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-06-082224**					
Laboratory ID:	08-289-08					
Sulfate	**ND**	5.0	ASTM D516-11	8-28-24	8-28-24	
Client ID:	**RMW-112-082224**					
Laboratory ID:	08-289-09					
Sulfate	**17**	5.0	ASTM D516-11	8-28-24	8-28-24	

Date of Report: September 4, 2024
Samples Submitted: August 22, 2024
Laboratory Reference: 2408-289
Project: COB-Riverside; Task 5

SULFATE
ASTM D516-11
QUALITY CONTROL

Matrix: Water
Units: mg/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0827W1					
Sulfate	**ND**	5.0	ASTM D516-11	8-28-24	8-28-24	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	08-289-07										
	ORIG	DUP									
Sulfate	**17.8**	**18.1**	NA		NA	NA		NA	2	11	
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Sulfate	**36.1**	**35.9**	20.0	20.0	17.8	92	91	69-134	1	20	
SPIKE BLANK											
Laboratory ID:	SB0827W1										
	SB		SB			SB					
Sulfate	**9.14**		10.0		NA	91		81-106	NA	NA	

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Am Test Inc.
13600 NE 126th Place Suite C
Kirkland, WA
(425) 885-1664
www.amtestlab.com

Professional Analytical Services

September 03, 2024

David Baumeister
14648 NE 95th ST
Redmond, WA 98052

Project: Onsite (Chem)
Project Number: COB-Riverside Task 5
Project Manager: David Baumeister
RE: Onsite (Chem)

Enclosed are the results of analyses for samples received by our laboratory on 8/23/2024.
Please feel free to contact me with any questions or considerations regarding this report.

Sincerely,

ElementStationManager For Aaron Young
President

Am Test Inc.
13600 NE 126th Place Suite C
Kirkland, WA
(425) 885-1664
www.amtestlab.com

ANALYSIS REPORT

Professional Analytical Services

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Date Received: 08/23/24
Date Reported: 09/03/24

Reported Samples

Lab ID	Sample	Matrix	Qualifiers	Date Sampled	Date Received
A24H0453-01	RMW-09R-082224	Water		08/22/2024	08/23/2024
A24H0453-02	RMW-14-082224	Water		08/22/2024	08/23/2024
A24H0453-03	RMW-13-082224	Water		08/22/2024	08/23/2024
A24H0453-04	RMW-07-082224	Water		08/22/2024	08/23/2024
A24H0453-05	RMW-12-082224	Water		08/22/2024	08/23/2024
A24H0453-06	EW-03-082224	Water		08/22/2024	08/23/2024
A24H0453-07	RMW-05-082224	Water		08/22/2024	08/23/2024
A24H0453-08	RMW-06-082224	Water		08/22/2024	08/23/2024
A24H0453-09	RMW-112-082224	Water		08/22/2024	08/23/2024

Am Test Inc.
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Kirkland, WA
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AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

Date Received: 08/23/24
Date Reported: 09/03/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24H0453-01
Client Identification: RMW-09R-082224
Sampling Date: 08/22/24 10:00

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/27/2024

AMTEST Identification Number: A24H0453-02
Client Identification: RMW-14-082224
Sampling Date: 08/22/24 11:20

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/27/2024

AMTEST Identification Number: A24H0453-03
Client Identification: RMW-13-082224
Sampling Date: 08/22/24 13:20

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/27/2024

AMTEST Identification Number: A24H0453-04
Client Identification: RMW-07-082224
Sampling Date: 08/22/24 13:35

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/27/2024

Am Test Inc.
13600 NE 126th Place Suite C
Kirkland, WA
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

Date Received: 08/23/24
Date Reported: 09/03/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24H0453-05
Client Identification: RMW-12-082224
Sampling Date: 08/22/24 14:35

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/27/2024

AMTEST Identification Number: A24H0453-06
Client Identification: EW-03-082224
Sampling Date: 08/22/24 14:50

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	0.08	mg/L		0.05	SM 4500-S2-D_2011	BV	08/30/2024

AMTEST Identification Number: A24H0453-07
Client Identification: RMW-05-082224
Sampling Date: 08/22/24 16:05

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/30/2024

AMTEST Identification Number: A24H0453-08
Client Identification: RMW-06-082224
Sampling Date: 08/22/24 16:15

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/30/2024

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ANALYSIS REPORT

Professional Analytical Services

Date Received: 08/23/24
Date Reported: 09/03/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24H0453-09
Client Identification: RMW-112-082224
Sampling Date: 08/22/24 14:45

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Sulfide	ND	mg/L	U	0.05	SM 4500-S2-D_2011	BV	08/30/2024

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ANALYSIS REPORT

Professional Analytical Services

Date Received: 08/23/24
Date Reported: 09/03/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Quality Control

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBH0314 - No Prep - WetChem										
LCS (BBH0314-BS1)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.25		0.05	mg/L	0.2500		102%	80-120%		
LCS (BBH0314-BS2)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.27		0.05	mg/L	0.2500		107%	80-120%		
Calibration Blank (BBH0314-CCB1)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0	U		mg/L						
Calibration Blank (BBH0314-CCB2)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0	U		mg/L						
Calibration Blank (BBH0314-CCB3)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0	U		mg/L						
Calibration Check (BBH0314-CCV1)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.49		0.05	mg/L	0.5000		98%	85-115%		
Calibration Check (BBH0314-CCV2)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.47		0.05	mg/L	0.5000		95%	85-115%		
Calibration Check (BBH0314-CCV3)					Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.51		0.05	mg/L	0.5000		102%	85-115%		
Matrix Spike (BBH0314-MS1)		**Source: A24H0275-02**			Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.33		0.05	mg/L	0.2500	ND	131%	55-145%		
Matrix Spike (BBH0314-MS2)		**Source: A24H0453-05**			Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.26		0.05	mg/L	0.2500	ND	104%	55-145%		
Matrix Spike Dup (BBH0314-MSD1)		**Source: A24H0275-02**			Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.33		0.05	mg/L	0.2500	ND	132%	55-145%	0.5	20
Matrix Spike Dup (BBH0314-MSD2)		**Source: A24H0453-05**			Prepared: 08/22/24 Analyzed: 08/27/24					
Sulfide	0.26		0.05	mg/L	0.2500	ND	102%	55-145%	2	20
Batch: BBH0411 - No Prep - WetChem										

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ANALYSIS REPORT

Professional Analytical Services

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Date Received: 08/23/24
Date Reported: 09/03/24

Quality Control
(Continued)

Conventional Chemistry Parameters by APHA/EPA Methods (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBH0411 - No Prep - WetChem (Continued)										
LCS (BBH0411-BS1)					Prepared: 08/29/24 Analyzed: 08/30/24					
Sulfide	0.26		0.05	mg/L	0.2500		102%	80-120%		
Calibration Blank (BBH0411-CCB1)					Prepared: 08/29/24 Analyzed: 08/30/24					
Sulfide	0	U		mg/L						
Calibration Check (BBH0411-CCV1)					Prepared: 08/29/24 Analyzed: 08/30/24					
Sulfide	0.50		0.05	mg/L	0.5000		100%	85-115%		
Matrix Spike (BBH0411-MS1)		**Source: A24H0453-07**			Prepared: 08/29/24 Analyzed: 08/30/24					
Sulfide	0.21		0.05	mg/L	0.2500	ND	84%	55-145%		
Matrix Spike Dup (BBH0411-MSD1)		**Source: A24H0453-07**			Prepared: 08/29/24 Analyzed: 08/30/24					
Sulfide	0.21		0.05	mg/L	0.2500	ND	82%	55-145%	2	20

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ANALYSIS REPORT

Professional Analytical Services

Date Received: 08/23/24
Date Reported: 09/03/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Notes and Definitions

Item	Definition
U	The compound was analyzed for but was not detected (Non-detect) at or above the MRL/MDL.
Dry	Sample results reported on a dry weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was matrix spiked or duplicated.

A24110453

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

Laboratory Reference #: 08-289

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day | 2 Day | 3 Day

Standard

Other:

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: COB-Riverside; Task 5

Project Name:

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
01	RMW-09R-082224	8/22/24	10:00	W	1	Sulfide
02	RMW-14-082224	8/22/24	11:20	W	1	Sulfide
03	RMW-13-082224	8/22/24	13:20	W	1	Sulfide
04	RMW-07-082224	8/22/24	13:35	W	1	Sulfide
05	RMW-12-082224	8/22/24	14:35	W	1	Sulfide
06	EW-03-082224	8/22/24	14:50	W	1	Sulfide
07	RMW-05-082224	8/22/24	16:05	W	2	Sulfide - MS/MSD (Use as Client QA/QC)
08	RMW-06-082224	8/22/24	16:15	W	1	Sulfide
09	RMW-112-082224	8/22/24	14:45	W	1	Sulfide

	Company	Date	Time	Comments/Special Instructions
Relinquished by: TL	OSE	8/23/24	2:50 PM	11.0°C
Received by:	Amtest	8/23/24	2:44	
Relinquished by:				EDDs
Received by:				
Relinquished by:				
Received by:				

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 08-289

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Andersen
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260 (4260 ★)	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	~~PCBs 8082~~ Metals (EPA 200.7/200.8) TOTAL + DISSOLVED	Organochlorine Pesticides 8081 (Ca, Fe, Mg)	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	~~Total RCRA Metals~~ Alkalinity EPA 310.2	~~Total MTCA Metals~~ RSK-175 (M,E,E)	~~TCLP Metals~~ Chloride (SM4500-ClE)	HEM (oil and grease) 1664	TOC (SM 5310B)	EPA 353.2 Nitrate, Nitrite	Sulfate ASTM D516-16	Sulfide (SM 4500-S2E)	~~Ammonia~~ MS/MSD
1	RMW-09R-082224	8/22/24	10:00	GW	11					X					X				X	X	X		X	X	X	X	
2	RMW-14-082224		11:20	GW	11					X					X				X	X	X		X	X	X	X	
3	RMW-13-082224		13:20	GW	11					X					X				X	X	X		X	X	X	X	
4	RMW-07-082224		13:35	GW	11					X					X				X	X	X		X	X	X	X	
5	RMW-12-082224		14:35	GW	11					X					X				X	X	X		X	X	X	X	
6	EW-03-082224		14:50	GW	13					X					X				X	X	X		X	X	X	X	
7	RMW-05-082224		16:05	GW	23					X					X				X	X	X		X	X	X	X	X
8	RMW-06-082224		16:15	GW	13					X					X				X	X	X		X	X	X	X	
9	RMW-112-082224**	↓	14:45	GW	10					X					X				X	X	X		X	X	X	X	

	Signature	Company	Date	Time
Relinquished		Floyd|Snider	8/22/24	17:28
Received		CDE	8/22/24	1728
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

★Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE + Vinyl Chloride
Send lab results to: labdata@floydsnider.com
Dissolved metals field filtered + labelled
★★No dissolved metals bottle - lab "FF"

Data Package: Standard ☐ Level III ☐ Level IV ☐ For

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

RMW-05-082224 - MS/MSD

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

August 27, 2024

Kristin Anderson
Floyd & Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: Analytical Data for Project COB-Riverside; Task 5
Laboratory Reference No. 2408-296

Dear Kristin:

Enclosed are the analytical results and associated quality control data for samples submitted on August 23, 2024.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: August 27, 2024
Samples Submitted: August 23, 2024
Laboratory Reference: 2408-296
Project: COB-Riverside; Task 5

Case Narrative

Samples were collected on August 23, 2024 and received by the laboratory on August 23, 2024. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: August 27, 2024
Samples Submitted: August 23, 2024
Laboratory Reference: 2408-296
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**EW-05-082324**					
Laboratory ID:	08-296-01					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				
Client ID:	**EW-06-082324**					
Laboratory ID:	08-296-02					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	0.23	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	8.8	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				
Client ID:	**EW-02-082324**					
Laboratory ID:	08-296-03					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	0.27	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	7.8	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*96*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				

Date of Report: August 27, 2024
Samples Submitted: August 23, 2024
Laboratory Reference: 2408-296
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-10D-082324**					
Laboratory ID:	08-296-04					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*97*	*78-117*				
Client ID:	**RMW-08-082324**					
Laboratory ID:	08-296-05					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.81	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				
Client ID:	**EW-01-082324**					
Laboratory ID:	08-296-06					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	3.2	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				

Date of Report: August 27, 2024
Samples Submitted: August 23, 2024
Laboratory Reference: 2408-296
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**RMW-04-082324**					
Laboratory ID:	08-296-07					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	0.33	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	0.96	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	3.3	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				
Client ID:	**EW-04-082324**					
Laboratory ID:	08-296-08					
Vinyl Chloride	0.34	0.20	EPA 8260D	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	1.3	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				
Client ID:	**Trip Blank-082324**					
Laboratory ID:	08-296-09					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*98*	*78-117*				

Date of Report: August 27, 2024
Samples Submitted: August 23, 2024
Laboratory Reference: 2408-296
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D/SIM
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0826W1					
Vinyl Chloride (SIM)	ND	0.020	EPA 8260D/SIM	8-26-24	8-26-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Trichloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Tetrachloroethene	ND	0.20	EPA 8260D	8-26-24	8-26-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*99*	*78-117*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	08-289-07										
	MS	MSD	MS	MSD		MS	MSD				
Vinyl Chloride	**9.99**	**10.2**	10.0	10.0	ND	100	102	62-121	2	15	
(trans) 1,2-Dichloroethene	**9.72**	**9.87**	10.0	10.0	ND	97	99	79-120	2	16	
(cis) 1,2-Dichloroethene	**10.6**	**10.3**	10.0	10.0	0.428	102	99	81-128	3	16	
Trichloroethene	**12.2**	**11.7**	10.0	10.0	0.548	117	112	80-130	4	12	
Tetrachloroethene	**14.9**	**14.3**	10.0	10.0	3.47	114	108	84-126	4	19	
Surrogate:											
Dibromofluoromethane						*87*	*88*	*68-133*			
Toluene-d8						*99*	*98*	*79-123*			
4-Bromofluorobenzene						*101*	*100*	*78-117*			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Chain of Custody

Page 1 of 1

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Laboratory Number: 08-296

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Anderson
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260 *	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664					% Moisture
1	EW-05-082324	8/23/24	08:50	GW	3					X																	
2	EW-06-082324		08:55	GW	3					X																	
3	EW-02-082324		09:45	GW	3					X																	
4	RMW-10D-082324		10:00	GW	3					X																	
5	RMW-08-082324		10:35	GW	3					X																	
6	EW-01-082324		10:45	GW	3					X																	
7	RMW-04-082324		11:30	GW	3					X																	
8	EW-04-082324	↓	11:45	GW	3					X																	
9	Trip Blank-082324	8/23/24		W	2					X																	

	Signature	Company	Date	Time
Relinquished	[signature]	Floyd|Snider	8/23/24	12:59
Received	[signature]	OSE	8/23/24	~~1102~~ 1259
Relinquished				
Received				
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

* Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE + Vinyl Chloride

Send lab results to: labdata@floydsnider.com

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

OnSite Environmental Inc.
14648 NE 95th Street, Redmond, WA 98052 • (425) 883-3881

October 14, 2024

Kristin Anderson
Floyd & Snider
601 Union Street, Suite 600
Seattle, WA 98101

Re: Analytical Data for Project COB-Riverside; Task 5
Laboratory Reference No. 2409-059

Dear Kristin:

Enclosed are the analytical results and associated quality control data for samples submitted on September 6, 2024.

The standard policy of OnSite Environmental, Inc. is to store your samples for 30 days from the date of receipt. If you require longer storage, please contact the laboratory.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning the data, or need additional information, please feel free to call me.

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

Case Narrative

Samples were collected on September 3, 4, 5, and 6, 2024 and received by the laboratory on September 6, 2024. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below. However the soil results for the QA/QC samples are reported on a wet-weight basis.

General QA/QC issues associated with the analytical data enclosed in this laboratory report will be indicated with a reference to a comment or explanation on the Data Qualifier page. More complex and involved QA/QC issues will be discussed in detail below.

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-08-19-22**					
Laboratory ID:	09-059-02					
Vinyl Chloride	ND	0.00098	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.00098	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.00098	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.00098	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	0.0016	0.00098	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.025	0.00098	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*115*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-06-14.5-16**					
Laboratory ID:	09-059-07					
Vinyl Chloride	ND	0.00089	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.00089	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.00089	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.00089	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	0.0015	0.00089	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.0031	0.00089	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*69-124*				
Toluene-d8	*102*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-06-16-18**					
Laboratory ID:	09-059-08					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.0032	0.0010	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*113*	*69-124*				
Toluene-d8	*102*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-06-18-20**					
Laboratory ID:	09-059-09					
Vinyl Chloride	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.0060	0.0012	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*112*	*69-124*				
Toluene-d8	*105*	*80-118*				
4-Bromofluorobenzene	*100*	*75-123*				
Client ID:	**SB-06-20-22**					
Laboratory ID:	09-059-10					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.012	0.0011	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*110*	*69-124*				
Toluene-d8	*100*	*80-118*				
4-Bromofluorobenzene	*96*	*75-123*				
Client ID:	**SB-06-22-24**					
Laboratory ID:	09-059-11					
Vinyl Chloride	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.041	0.0012	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*109*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-06-24-26**					
Laboratory ID:	09-059-12					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	0.0026	0.0011	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	0.14	0.0011	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*109*	*69-124*				
Toluene-d8	*102*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-06-26-28**					
Laboratory ID:	09-059-13					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*69-124*				
Toluene-d8	*100*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-06-28-30**					
Laboratory ID:	09-059-14					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-06-30-32**					
Laboratory ID:	09-059-15					
Vinyl Chloride	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.00084	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*105*	*80-118*				
4-Bromofluorobenzene	*100*	*75-123*				
Client ID:	**SB-06-30-32D**					
Laboratory ID:	09-059-16					
Vinyl Chloride	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.00072	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*94*	*75-123*				
Client ID:	**SB-06-32-34**					
Laboratory ID:	09-059-17					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*98*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-06-34-36**					
Laboratory ID:	09-059-18					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*104*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-06-36-38**					
Laboratory ID:	09-059-19					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-06-38-40**					
Laboratory ID:	09-059-20					
Vinyl Chloride	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*98*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-05-16-19**					
Laboratory ID:	09-059-22					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0012	0.0010	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.0027	0.0010	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*110*	*69-124*				
Toluene-d8	*105*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-05-19-22**					
Laboratory ID:	09-059-23					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.0021	0.0010	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*69-124*				
Toluene-d8	*102*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-05-25-28**					
Laboratory ID:	09-059-25					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-11-24	9-11-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-11-24	9-11-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-11-24	9-11-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-11-24	9-11-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-11-24	9-11-24	
Tetrachloroethene	0.0068	0.0011	EPA 8260D	9-11-24	9-11-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*98*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-03-16-19**					
Laboratory ID:	09-059-27					
Vinyl Chloride	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0022	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*111*	*69-124*				
Toluene-d8	*104*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-03-19-22**					
Laboratory ID:	09-059-28					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0023	0.0011	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.0063	0.0011	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*109*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-04-16-19**					
Laboratory ID:	09-059-32					
Vinyl Chloride	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
Tetrachloroethene	ND	0.0012	EPA 8260D	9-11-24	9-11-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*110*	*69-124*				
Toluene-d8	*105*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-04-19-22**					
Laboratory ID:	09-059-33					
Vinyl Chloride	ND	0.0015	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0015	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0015	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0015	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0027	0.0015	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0015	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*108*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-11-21-23**					
Laboratory ID:	09-059-36					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.0050	0.0011	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0017	0.0011	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.0068	0.0011	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-09-16-19**					
Laboratory ID:	09-059-49					
Vinyl Chloride	ND	0.0032	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0032	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0032	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.0089	0.0032	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0032	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0032	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*111*	*69-124*				
Toluene-d8	*106*	*80-118*				
4-Bromofluorobenzene	*98*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-10-16-19**					
Laboratory ID:	09-059-53					
Vinyl Chloride	0.0075	0.0014	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	0.0018	0.0014	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.11	0.0014	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.039	0.0014	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0014	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*69-124*				
Toluene-d8	*102*	*80-118*				
4-Bromofluorobenzene	*97*	*75-123*				
Client ID:	**SB-07-16-19**					
Laboratory ID:	09-059-57					
Vinyl Chloride	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.014	0.0016	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0056	0.0016	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*111*	*69-124*				
Toluene-d8	*105*	*80-118*				
4-Bromofluorobenzene	*96*	*75-123*				
Client ID:	**SB-07-16-19-D**					
Laboratory ID:	09-059-58					
Vinyl Chloride	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.0053	0.0011	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0018	0.0011	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*105*	*69-124*				
Toluene-d8	*101*	*80-118*				
4-Bromofluorobenzene	*98*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-06R-8-10**					
Laboratory ID:	09-059-63					
Vinyl Chloride	ND	0.0012	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.0025	0.0012	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*99*	*75-123*				
Client ID:	**SB-06R-12-14**					
Laboratory ID:	09-059-64					
Vinyl Chloride	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0016	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.0095	0.0016	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.073	0.0016	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*109*	*69-124*				
Toluene-d8	*104*	*80-118*				
4-Bromofluorobenzene	*101*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0909S1					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-9-24	9-9-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*104*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*100*	*75-123*				
Laboratory ID:	MB0910S1					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*106*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*96*	*75-123*				
Laboratory ID:	MB0911S1					
Vinyl Chloride	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-11-24	9-11-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*107*	*69-124*				
Toluene-d8	*103*	*80-118*				
4-Bromofluorobenzene	*100*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0909S1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**0.0563**	**0.0561**	0.0500	0.0500	113	112	52-141	0	20	
1,1-Dichloroethene	**0.0508**	**0.0526**	0.0500	0.0500	102	105	74-133	3	16	
(trans) 1,2-Dichloroethene	**0.0498**	**0.0502**	0.0500	0.0500	100	100	74-131	1	15	
(cis) 1,2-Dichloroethene	**0.0510**	**0.0508**	0.0500	0.0500	102	102	71-136	0	15	
Trichloroethene	**0.0537**	**0.0557**	0.0500	0.0500	107	111	80-130	4	15	
Tetrachloroethene	**0.0487**	**0.0498**	0.0500	0.0500	97	100	80-130	2	15	
Surrogate:										
Dibromofluoromethane					*103*	*106*	*69-124*			
Toluene-d8					*100*	*103*	*80-118*			
4-Bromofluorobenzene					*101*	*102*	*75-123*			
Laboratory ID:	SB0910S1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**0.0521**	**0.0521**	0.0500	0.0500	104	104	52-141	0	20	
1,1-Dichloroethene	**0.0524**	**0.0500**	0.0500	0.0500	105	100	74-133	5	16	
(trans) 1,2-Dichloroethene	**0.0508**	**0.0494**	0.0500	0.0500	102	99	74-131	3	15	
(cis) 1,2-Dichloroethene	**0.0527**	**0.0509**	0.0500	0.0500	105	102	71-136	3	15	
Trichloroethene	**0.0549**	**0.0536**	0.0500	0.0500	110	107	80-130	2	15	
Tetrachloroethene	**0.0486**	**0.0466**	0.0500	0.0500	97	93	80-130	4	15	
Surrogate:										
Dibromofluoromethane					*111*	*109*	*69-124*			
Toluene-d8					*105*	*101*	*80-118*			
4-Bromofluorobenzene					*103*	*101*	*75-123*			
Laboratory ID:	SB0911S1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**0.0497**	**0.0496**	0.0500	0.0500	99	99	52-141	0	20	
1,1-Dichloroethene	**0.0476**	**0.0496**	0.0500	0.0500	95	99	74-133	4	16	
(trans) 1,2-Dichloroethene	**0.0481**	**0.0489**	0.0500	0.0500	96	98	74-131	2	15	
(cis) 1,2-Dichloroethene	**0.0487**	**0.0510**	0.0500	0.0500	97	102	71-136	5	15	
Trichloroethene	**0.0523**	**0.0534**	0.0500	0.0500	105	107	80-130	2	15	
Tetrachloroethene	**0.0458**	**0.0473**	0.0500	0.0500	92	95	80-130	3	15	
Surrogate:										
Dibromofluoromethane					*105*	*106*	*69-124*			
Toluene-d8					*100*	*101*	*80-118*			
4-Bromofluorobenzene					*101*	*102*	*75-123*			

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GWB-03-15-20**					
Laboratory ID:	09-059-37					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.68	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*103*	*78-117*				
Client ID:	**GWB-03-20-25**					
Laboratory ID:	09-059-38					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*102*	*78-117*				
Client ID:	**GWB-03-25-30**					
Laboratory ID:	09-059-39					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GWB-04-15-20**					
Laboratory ID:	09-059-40					
Vinyl Chloride	1.4	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	3.6	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.50	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*103*	*78-117*				
Client ID:	**GWB-04-20-25**					
Laboratory ID:	09-059-41					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	7.1	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	0.61	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.63	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*103*	*78-117*				
Client ID:	**GWB-04-25-30**					
Laboratory ID:	09-059-42					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	0.32	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*105*	*78-117*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GWB-05-20-25**					
Laboratory ID:	09-059-43					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	12	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	1.5	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	1.2	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				
Client ID:	**GWB-05-25-30**					
Laboratory ID:	09-059-44					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	2.6	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	21	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	8.6	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*104*	*78-117*				
Client ID:	**GWB-06-20-25**					
Laboratory ID:	09-059-45					
Vinyl Chloride	0.43	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	0.47	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	21	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	18	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	11	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GWB-06-25-30**					
Laboratory ID:	09-059-46					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	0.29	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	11	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	18	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	18	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*89*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*102*	*78-117*				
Client ID:	**GWB-08-15-25**					
Laboratory ID:	09-059-47					
Vinyl Chloride	0.29	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*88*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				
Client ID:	**GWB-07-35-40**					
Laboratory ID:	09-059-48					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*68-133*				
Toluene-d8	*98*	*79-123*				
4-Bromofluorobenzene	*100*	*78-117*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**GWB-07-40-45**					
Laboratory ID:	09-059-62					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	0.26	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*90*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*105*	*78-117*				
Client ID:	**Trip Blanks-090624**					
Laboratory ID:	09-059-69					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*86*	*68-133*				
Toluene-d8	*99*	*79-123*				
4-Bromofluorobenzene	*101*	*78-117*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0910W1					
Vinyl Chloride	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(trans) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
(cis) 1,2-Dichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Trichloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Tetrachloroethene	ND	0.20	EPA 8260D	9-10-24	9-10-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*88*	*68-133*				
Toluene-d8	*100*	*79-123*				
4-Bromofluorobenzene	*103*	*78-117*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
MATRIX SPIKES											
Laboratory ID:	09-059-48										
	MS	MSD	MS	MSD		MS	MSD				
Vinyl Chloride	**9.21**	**9.16**	10.0	10.0	ND	92	92	62-121	1	15	
(trans) 1,2-Dichloroethene	**9.50**	**9.37**	10.0	10.0	ND	95	94	79-120	1	16	
(cis) 1,2-Dichloroethene	**9.75**	**9.63**	10.0	10.0	ND	98	96	81-128	1	16	
Trichloroethene	**11.4**	**11.5**	10.0	10.0	ND	114	115	80-130	1	12	
Tetrachloroethene	**10.5**	**10.1**	10.0	10.0	ND	105	101	84-126	4	19	
Surrogate:											
Dibromofluoromethane						*85*	*87*	*68-133*			
Toluene-d8						*98*	*99*	*79-123*			
4-Bromofluorobenzene						*102*	*101*	*78-117*			

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-08-25-28**					
Laboratory ID:	09-059-04					
Vinyl Chloride	ND	0.0019	EPA 8260D	9-18-24	9-18-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
Tetrachloroethene	0.0098	0.0012	EPA 8260D	9-18-24	9-18-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*69-124*				
Toluene-d8	*91*	*80-118*				
4-Bromofluorobenzene	*100*	*75-123*				
Client ID:	**SB-03-25-28**					
Laboratory ID:	09-059-30					
Vinyl Chloride	ND	0.0019	EPA 8260D	9-18-24	9-18-24	
1,1-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
(trans) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
(cis) 1,2-Dichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
Trichloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
Tetrachloroethene	ND	0.0012	EPA 8260D	9-18-24	9-18-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*69-124*				
Toluene-d8	*91*	*80-118*				
4-Bromofluorobenzene	*103*	*75-123*				
Client ID:	**SB-04-25-28**					
Laboratory ID:	09-059-35					
Vinyl Chloride	ND	0.0017	EPA 8260D	9-19-24	9-19-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-19-24	9-19-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-19-24	9-19-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-19-24	9-19-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-19-24	9-19-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-19-24	9-19-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*69-124*				
Toluene-d8	*91*	*80-118*				
4-Bromofluorobenzene	*103*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**SB-09-25-28**					
Laboratory ID:	09-059-52					
Vinyl Chloride	ND	0.0017	EPA 8260D	9-18-24	9-18-24	
1,1-Dichloroethene	ND	0.0011	EPA 8260D	9-18-24	9-18-24	
(trans) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-18-24	9-18-24	
(cis) 1,2-Dichloroethene	ND	0.0011	EPA 8260D	9-18-24	9-18-24	
Trichloroethene	ND	0.0011	EPA 8260D	9-18-24	9-18-24	
Tetrachloroethene	ND	0.0011	EPA 8260D	9-18-24	9-18-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*94*	*69-124*				
Toluene-d8	*91*	*80-118*				
4-Bromofluorobenzene	*105*	*75-123*				
Client ID:	**SB-10-25-28**					
Laboratory ID:	09-059-56					
Vinyl Chloride	ND	0.0015	EPA 8260D	9-19-24	9-19-24	
1,1-Dichloroethene	ND	0.00094	EPA 8260D	9-19-24	9-19-24	
(trans) 1,2-Dichloroethene	ND	0.00094	EPA 8260D	9-19-24	9-19-24	
(cis) 1,2-Dichloroethene	ND	0.00094	EPA 8260D	9-19-24	9-19-24	
Trichloroethene	ND	0.00094	EPA 8260D	9-19-24	9-19-24	
Tetrachloroethene	0.0085	0.00094	EPA 8260D	9-19-24	9-19-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*87*	*69-124*				
Toluene-d8	*89*	*80-118*				
4-Bromofluorobenzene	*101*	*75-123*				
Client ID:	**SB-07-25-28**					
Laboratory ID:	09-059-61					
Vinyl Chloride	ND	0.0017	EPA 8260D	9-18-24	9-18-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*93*	*69-124*				
Toluene-d8	*91*	*80-118*				
4-Bromofluorobenzene	*103*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0918S1					
Vinyl Chloride	ND	0.0016	EPA 8260D	9-18-24	9-18-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-18-24	9-18-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*92*	*69-124*				
Toluene-d8	*90*	*80-118*				
4-Bromofluorobenzene	*101*	*75-123*				
Laboratory ID:	MB0919S1					
Vinyl Chloride	ND	0.0016	EPA 8260D	9-19-24	9-19-24	
1,1-Dichloroethene	ND	0.0010	EPA 8260D	9-19-24	9-19-24	
(trans) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-19-24	9-19-24	
(cis) 1,2-Dichloroethene	ND	0.0010	EPA 8260D	9-19-24	9-19-24	
Trichloroethene	ND	0.0010	EPA 8260D	9-19-24	9-19-24	
Tetrachloroethene	ND	0.0010	EPA 8260D	9-19-24	9-19-24	
Surrogate:	*Percent Recovery*	*Control Limits*				
Dibromofluoromethane	*91*	*69-124*				
Toluene-d8	*90*	*80-118*				
4-Bromofluorobenzene	*106*	*75-123*				

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

VOLATILE ORGANICS EPA 8260D
QUALITY CONTROL

Matrix: Soil
Units: mg/kg

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0918S1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**0.0318**	**0.0323**	0.0500	0.0500	64	65	52-141	2	20	
1,1-Dichloroethene	**0.0486**	**0.0516**	0.0500	0.0500	97	103	74-133	6	16	
(trans) 1,2-Dichloroethene	**0.0480**	**0.0494**	0.0500	0.0500	96	99	74-131	3	15	
(cis) 1,2-Dichloroethene	**0.0494**	**0.0519**	0.0500	0.0500	99	104	71-136	5	15	
Trichloroethene	**0.0472**	**0.0523**	0.0500	0.0500	94	105	80-130	10	15	
Tetrachloroethene	**0.0445**	**0.0499**	0.0500	0.0500	89	100	80-130	11	15	
Surrogate:										
Dibromofluoromethane					*94*	*92*	*69-124*			
Toluene-d8					*88*	*87*	*80-118*			
4-Bromofluorobenzene					*104*	*105*	*75-123*			
Laboratory ID:	SB0919S1									
	SB	SBD	SB	SBD	SB	SBD				
Vinyl Chloride	**0.0318**	**0.0273**	0.0500	0.0500	64	55	52-141	15	20	
1,1-Dichloroethene	**0.0493**	**0.0513**	0.0500	0.0500	99	103	74-133	4	16	
(trans) 1,2-Dichloroethene	**0.0478**	**0.0501**	0.0500	0.0500	96	100	74-131	5	15	
(cis) 1,2-Dichloroethene	**0.0497**	**0.0515**	0.0500	0.0500	99	103	71-136	4	15	
Trichloroethene	**0.0488**	**0.0513**	0.0500	0.0500	98	103	80-130	5	15	
Tetrachloroethene	**0.0466**	**0.0495**	0.0500	0.0500	93	99	80-130	6	15	
Surrogate:										
Dibromofluoromethane					*90*	*91*	*69-124*			
Toluene-d8					*89*	*87*	*80-118*			
4-Bromofluorobenzene					*105*	*105*	*75-123*			

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
SB-08-19-22	09-059-02	**23**	9-12-24
SB-08-25-28	09-059-04	**23**	9-18-24
SB-06-14.5-16	09-059-07	**9**	9-12-24
SB-06-16-18	09-059-08	**21**	9-12-24
SB-06-18-20	09-059-09	**20**	9-12-24
SB-06-20-22	09-059-10	**23**	9-12-24
SB-06-22-24	09-059-11	**24**	9-12-24
SB-06-24-26	09-059-12	**24**	9-12-24
SB-06-26-28	09-059-13	**22**	9-12-24
SB-06-28-30	09-059-14	**23**	9-12-24
SB-06-30-32	09-059-15	**21**	9-12-24
SB-06-30-32D	09-059-16	**22**	9-12-24
SB-06-32-34	09-059-17	**22**	9-12-24
SB-06-34-36	09-059-18	**22**	9-12-24
SB-06-36-38	09-059-19	**23**	9-12-24
SB-06-38-40	09-059-20	**24**	9-12-24
SB-05-16-19	09-059-22	**20**	9-12-24
SB-05-19-22	09-059-23	**21**	9-12-24
SB-05-25-28	09-059-25	**25**	9-13-24
SB-03-16-19	09-059-27	**40**	9-12-24
SB-03-19-22	09-059-28	**22**	9-12-24
SB-03-25-28	09-059-30	**22**	9-18-24
SB-04-16-19	09-059-32	**20**	9-12-24
SB-04-19-22	09-059-33	**19**	9-12-24
SB-04-25-28	09-059-35	**23**	9-18-24
SB-11-21-23	09-059-36	**23**	9-12-24
SB-09-16-19	09-059-49	**53**	9-12-24

Date of Report: October 14, 2024
Samples Submitted: September 6, 2024
Laboratory Reference: 2409-059
Project: COB-Riverside; Task 5

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
SB-09-25-28	09-059-52	**21**	9-18-24
SB-10-16-19	09-059-53	**30**	9-12-24
SB-10-25-28	09-059-56	**17**	9-18-24
SB-07-16-19	09-059-57	**34**	9-12-24
SB-07-16-19-D	09-059-58	**28**	9-12-24
SB-07-25-28	09-059-61	**22**	9-18-24
SB-06R-8-10	09-059-63	**15**	9-12-24
SB-06R-12-14	09-059-64	**24**	9-12-24

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

A - Due to a high sample concentration, the amount spiked is insufficient for meaningful MS/MSD recovery data.

B - The analyte indicated was also found in the blank sample.

C - The duplicate RPD is outside control limits due to high result variability when analyte concentrations are within five times the quantitation limit.

E - The value reported exceeds the quantitation range and is an estimate.

F - Surrogate recovery data is not available due to the high concentration of coeluting target compounds.

H - The analyte indicated is a common laboratory solvent and may have been introduced during sample preparation, and be impacting the sample result.

I - Compound recovery is outside of the control limits.

J - The value reported was below the practical quantitation limit. The value is an estimate.

K - Sample duplicate RPD is outside control limits due to sample inhomogeneity. The sample was re-extracted and re-analyzed with similar results.

L - The RPD is outside of the control limits.

M - Hydrocarbons in the gasoline range are impacting the diesel range result.

M1 - Hydrocarbons in the gasoline range (toluene-naphthalene) are present in the sample.

N - Hydrocarbons in the lube oil range are impacting the diesel range result.

N1 - Hydrocarbons in diesel range are impacting lube oil range results.

O - Hydrocarbons indicative of heavier fuels are present in the sample and are impacting the gasoline result.

P - The RPD of the detected concentrations between the two columns is greater than 40.

Q - Surrogate recovery is outside of the control limits.

S - Surrogate recovery data is not available due to the necessary dilution of the sample.

T - The sample chromatogram is not similar to a typical _____.

U - The analyte was analyzed for, but was not detected above the reported sample quantitation limit.

U1 - The practical quantitation limit is elevated due to interferences present in the sample.

V - Matrix Spike/Matrix Spike Duplicate recoveries are outside control limits due to matrix effects.

W - Matrix Spike/Matrix Spike Duplicate RPD are outside control limits due to matrix effects.

X - Sample extract treated with a mercury cleanup procedure.

X1 - Sample extract treated with a sulfuric acid/silica gel cleanup procedure.

X2 - Sample extract treated with a silica gel cleanup procedure.

Y - The calibration verification for this analyte exceeded the 20% drift specified in methods 8260 & 8270, and therefore the reported result should be considered an estimate. The overall performance of the calibration verification standard met the acceptance criteria of the method.

Y1 - Negative effects of the matrix from this sample on the instrument caused values for this analyte in the bracketing continuing calibration verification standard (CCVs) to be outside of 20% acceptance criteria. Because of this, quantitation limits and sample concentrations should be considered estimates.

Z -

ND - Not Detected at PQL
PQL - Practical Quantitation Limit
RPD - Relative Percent Difference

Am Test Inc.
13600 NE 126th Place Suite C
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Professional Analytical Services

October 11, 2024

David Baumeister
14648 NE 95th ST
Redmond, WA 98052

Project: Onsite (Chem)
Project Number: COB-Riverside Task 5
Project Manager: David Baumeister
RE: Onsite (Chem)

Enclosed are the results of analyses for samples received by our laboratory on 9/9/2024.
Please feel free to contact me with any questions or considerations regarding this report.

Sincerely,

Aaron Young
President

Am Test Inc.
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Kirkland, WA
(425) 885-1664
www.amtestlab.com

ANALYSIS REPORT

Professional Analytical Services

Date Received: 09/09/24
Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Reported Samples

Lab ID	Sample	Matrix	Qualifiers	Date Sampled	Date Received
A24I0121-01	SB-06-13-16	Solid		09/03/2024	09/09/2024
A24I0121-02	SB-06-16-20	Solid		09/03/2024	09/09/2024
A24I0121-03	SB-06-32-36	Solid		09/03/2024	09/09/2024
A24I0121-04	SB-06-36-40	Solid		09/03/2024	09/09/2024

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ANALYSIS REPORT

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Date Received: 09/09/24
Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24I0121-01
Client Identification: SB-06-13-16
Sampling Date: 09/03/24 14:40

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
% Solids	84.0	%			SM 2540G_2011	HV	10/05/2024

Full Grain Size (Hydrometer/Sieve)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
PHI -2.25 (4.75 mm) Gravel	28.6	%		0.100	ASTM D422	HV	10/07/2024
PHI -2.00 (4.00 mm)	2.80	%		0.100	ASTM D422	HV	10/07/2024
PHI -1.00 (2.00 mm)	10.5	%		0.100	ASTM D422	HV	10/07/2024
PHI 0.00 (1.00 mm) Sand	10.3	%		0.100	ASTM D422	HV	10/07/2024
PHI +1.00 (0.50 mm)	14.0	%		0.100	ASTM D422	HV	10/07/2024
PHI +2.00 (0.25 mm)	9.60	%		0.100	ASTM D422	HV	10/07/2024
PHI +3.00 (0.125 mm)	2.90	%		0.100	ASTM D422	HV	10/07/2024
PHI +4.00 (0.063 mm)	3.40	%		0.100	ASTM D422	HV	10/07/2024
PHI +5.00 (0.032 mm) Silt	4.40	%		0.100	ASTM D422	HV	10/07/2024
PHI +6.00 (0.016 mm)	2.00	%		0.100	ASTM D422	HV	10/07/2024
PHI +7.00 (0.008 mm)	1.80	%		0.100	ASTM D422	HV	10/07/2024
PHI +8.00 (0.004 mm)	3.20	%		0.100	ASTM D422	HV	10/07/2024
PHI +9.00 (0.002 mm) Clay	2.50	%		0.100	ASTM D422	HV	10/07/2024
PHI +10.0 (0.001 mm)	1.50	%		0.100	ASTM D422	HV	10/07/2024
PHI >10.0 (< 0.001 mm)	2.40	%		0.100	ASTM D422	HV	10/07/2024

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ANALYSIS REPORT

Professional Analytical Services

Date Received: 09/09/24
Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24I0121-02
Client Identification: SB-06-16-20
Sampling Date: 09/03/24 12:40

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
% Solids	80.7	%			SM 2540G_2011	HV	10/05/2024

Full Grain Size (Hydrometer/Sieve)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
PHI -2.25 (4.75 mm) Gravel	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI -2.00 (4.00 mm)	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI -1.00 (2.00 mm)	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI 0.00 (1.00 mm) Sand	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI +1.00 (0.50 mm)	0.600	%		0.100	ASTM D422	HV	10/07/2024
PHI +2.00 (0.25 mm)	7.20	%		0.100	ASTM D422	HV	10/07/2024
PHI +3.00 (0.125 mm)	18.6	%		0.100	ASTM D422	HV	10/07/2024
PHI +4.00 (0.063 mm)	33.6	%		0.100	ASTM D422	HV	10/07/2024
PHI +5.00 (0.032 mm) Silt	21.4	%		0.100	ASTM D422	HV	10/07/2024
PHI +6.00 (0.016 mm)	8.40	%		0.100	ASTM D422	HV	10/07/2024
PHI +7.00 (0.008 mm)	3.40	%		0.100	ASTM D422	HV	10/07/2024
PHI +8.00 (0.004 mm)	2.10	%		0.100	ASTM D422	HV	10/07/2024
PHI +9.00 (0.002 mm) Clay	1.60	%		0.100	ASTM D422	HV	10/07/2024
PHI +10.0 (0.001 mm)	0.900	%		0.100	ASTM D422	HV	10/07/2024
PHI >10.0 (< 0.001 mm)	2.10	%		0.100	ASTM D422	HV	10/07/2024

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Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24I0121-03
Client Identification: SB-06-32-36
Sampling Date: 09/03/24 13:18

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
% Solids	82.4	%			SM 2540G_2011	HV	10/05/2024

Full Grain Size (Hydrometer/Sieve)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
PHI -2.25 (4.75 mm) Gravel	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI -2.00 (4.00 mm)	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI -1.00 (2.00 mm)	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI 0.00 (1.00 mm) Sand	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI +1.00 (0.50 mm)	0.200	%		0.100	ASTM D422	HV	10/07/2024
PHI +2.00 (0.25 mm)	22.4	%		0.100	ASTM D422	HV	10/07/2024
PHI +3.00 (0.125 mm)	24.9	%		0.100	ASTM D422	HV	10/07/2024
PHI +4.00 (0.063 mm)	21.6	%		0.100	ASTM D422	HV	10/07/2024
PHI +5.00 (0.032 mm) Silt	18.3	%		0.100	ASTM D422	HV	10/07/2024
PHI +6.00 (0.016 mm)	4.40	%		0.100	ASTM D422	HV	10/07/2024
PHI +7.00 (0.008 mm)	2.60	%		0.100	ASTM D422	HV	10/07/2024
PHI +8.00 (0.004 mm)	1.60	%		0.100	ASTM D422	HV	10/07/2024
PHI +9.00 (0.002 mm) Clay	1.10	%		0.100	ASTM D422	HV	10/07/2024
PHI +10.0 (0.001 mm)	0.600	%		0.100	ASTM D422	HV	10/07/2024
PHI >10.0 (< 0.001 mm)	2.20	%		0.100	ASTM D422	HV	10/07/2024

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Date Reported: 10/11/24

OnSite Environmental Inc.
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Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

AMTEST Identification Number: A24I0121-04
Client Identification: SB-06-36-40
Sampling Date: 09/03/24 13:28

Conventional Chemistry Parameters by APHA/EPA Methods

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
% Solids	77.5	%			SM 2540G_2011	HV	10/05/2024

Full Grain Size (Hydrometer/Sieve)

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
PHI -2.25 (4.75 mm) Gravel	ND	%		0.100	ASTM D422	HV	10/07/2024
PHI -2.00 (4.00 mm)	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI -1.00 (2.00 mm)	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI 0.00 (1.00 mm) Sand	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI +1.00 (0.50 mm)	0.100	%		0.100	ASTM D422	HV	10/07/2024
PHI +2.00 (0.25 mm)	2.60	%		0.100	ASTM D422	HV	10/07/2024
PHI +3.00 (0.125 mm)	17.5	%		0.100	ASTM D422	HV	10/07/2024
PHI +4.00 (0.063 mm)	27.2	%		0.100	ASTM D422	HV	10/07/2024
PHI +5.00 (0.032 mm) Silt	33.1	%		0.100	ASTM D422	HV	10/07/2024
PHI +6.00 (0.016 mm)	7.70	%		0.100	ASTM D422	HV	10/07/2024
PHI +7.00 (0.008 mm)	3.70	%		0.100	ASTM D422	HV	10/07/2024
PHI +8.00 (0.004 mm)	2.70	%		0.100	ASTM D422	HV	10/07/2024
PHI +9.00 (0.002 mm) Clay	1.90	%		0.100	ASTM D422	HV	10/07/2024
PHI +10.0 (0.001 mm)	1.00	%		0.100	ASTM D422	HV	10/07/2024
PHI >10.0 (< 0.001 mm)	2.20	%		0.100	ASTM D422	HV	10/07/2024

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Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Quality Control

Conventional Chemistry Parameters by APHA/EPA Methods

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBJ0180 - No Prep - WC Soil										
Duplicate (BBJ0180-DUP1)		**Source: A24I0121-03**			Prepared & Analyzed: 10/05/24					
% Solids	82.3			%		82.4			0.1	20
Duplicate (BBJ0180-DUP2)		**Source: A24I0121-03**			Prepared & Analyzed: 10/05/24					
% Solids	82.6			%		82.4			0.2	20
Duplicate (BBJ0180-DUP3)		**Source: A24I0279-04**			Prepared & Analyzed: 10/05/24					
% Solids	45.4			%		46.8			3	20
Duplicate (BBJ0180-DUP4)		**Source: A24I0279-04**			Prepared & Analyzed: 10/05/24					
% Solids	47.1			%		46.8			0.6	20

Quality Control

Full Grain Size (Hydrometer/Sieve)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBJ0181 - Hydrometer/Sieve										
Duplicate (BBJ0181-DUP1)		**Source: A24I0121-03**			Prepared & Analyzed: 10/07/24					
PHI +1.00 (0.50 mm)	0.200		0.100	%		0.200			0	200
PHI +10.0 (0.001 mm)	0.900		0.100	%		0.600			40	200
PHI +2.00 (0.25 mm)	16.1		0.100	%		22.4			33	200
PHI +3.00 (0.125 mm)	20.5		0.100	%		24.9			19	200
PHI +4.00 (0.063 mm)	32.3		0.100	%		21.6			40	200
PHI +5.00 (0.032 mm) Silt	18.0		0.100	%		18.3			2	200
PHI +6.00 (0.016 mm)	4.90		0.100	%		4.40			11	200
PHI +7.00 (0.008 mm)	2.50		0.100	%		2.60			4	200
PHI +8.00 (0.004 mm)	1.60		0.100	%		1.60			0	200
PHI +9.00 (0.002 mm) Clay	1.50		0.100	%		1.10			31	200
PHI >10.0 (< 0.001 mm)	1.50		0.100	%		2.20			38	200
PHI 0.00 (1.00 mm) Sand	ND		0.100	%		ND				200
PHI -1.00 (2.00 mm)	ND		0.100	%		ND				200
PHI -2.00 (4.00 mm)	ND		0.100	%		0.100			200	200
PHI -2.25 (4.75 mm) Gravel	ND		0.100	%		ND				200

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OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Quality Control
(Continued)

Full Grain Size (Hydrometer/Sieve) (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBJ0181 - Hydrometer/Sieve (Continued)										
Duplicate (BBJ0181-DUP2)			**Source: A24I0121-03**		Prepared & Analyzed: 10/07/24					
PHI +1.00 (0.50 mm)	0.200		0.100	%		0.200			0	200
PHI +10.0 (0.001 mm)	0.600		0.100	%		0.600			0	200
PHI +2.00 (0.25 mm)	14.6		0.100	%		22.4			42	200
PHI +3.00 (0.125 mm)	13.2		0.100	%		24.9			61	200
PHI +4.00 (0.063 mm)	26.6		0.100	%		21.6			21	200
PHI +5.00 (0.032 mm) Silt	32.5		0.100	%		18.3			56	200
PHI +6.00 (0.016 mm)	4.90		0.100	%		4.40			11	200
PHI +7.00 (0.008 mm)	2.50		0.100	%		2.60			4	200
PHI +8.00 (0.004 mm)	1.60		0.100	%		1.60			0	200
PHI +9.00 (0.002 mm) Clay	1.10		0.100	%		1.10			0	200
PHI >10.0 (< 0.001 mm)	2.20		0.100	%		2.20			0	200
PHI 0.00 (1.00 mm) Sand	ND		0.100	%		ND				200
PHI -1.00 (2.00 mm)	ND		0.100	%		ND				200
PHI -2.00 (4.00 mm)	ND		0.100	%		0.100			200	200
PHI -2.25 (4.75 mm) Gravel	ND		0.100	%		ND				200
Batch: BBJ0202 - Hydrometer/Sieve										
Duplicate (BBJ0202-DUP1)			**Source: A24I0279-04**		Prepared: 10/06/24 Analyzed: 10/07/24					
PHI +1.00 (0.50 mm)	0.100		0.100	%		0.200			67	200
PHI +10.0 (0.001 mm)	5.60		0.100	%		5.50			2	200
PHI +2.00 (0.25 mm)	ND		0.100	%		0.100			200	200
PHI +3.00 (0.125 mm)	0.100		0.100	%		ND			200	200
PHI +4.00 (0.063 mm)	0.200		0.100	%		0.400			67	200
PHI +5.00 (0.032 mm) Silt	26.7		0.100	%		26.0			3	200
PHI +6.00 (0.016 mm)	12.3		0.100	%		10.5			16	200
PHI +7.00 (0.008 mm)	15.9		0.100	%		17.2			8	200
PHI +8.00 (0.004 mm)	17.4		0.100	%		17.2			1	200
PHI +9.00 (0.002 mm) Clay	10.9		0.100	%		10.5			4	200
PHI >10.0 (< 0.001 mm)	10.6		0.100	%		12.5			16	200
PHI 0.00 (1.00 mm) Sand	ND		0.100	%		ND				200
PHI -1.00 (2.00 mm)	ND		0.100	%		ND				200
PHI -2.00 (4.00 mm)	0.100		0.100	%		ND			200	200
PHI -2.25 (4.75 mm) Gravel	0.100		0.100	%		ND			200	200
Duplicate (BBJ0202-DUP2)			**Source: A24I0279-04**		Prepared: 10/06/24 Analyzed: 10/07/24					
PHI +1.00 (0.50 mm)	0.100		0.100	%		0.200			67	200

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ANALYSIS REPORT

Professional Analytical Services

Date Received: 09/09/24
Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Quality Control
(Continued)

Full Grain Size (Hydrometer/Sieve) (Continued)

Analyte	Result	Qual	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit
Batch: BBJ0202 - Hydrometer/Sieve (Continued)										
Duplicate (BBJ0202-DUP2)			**Source: A24I0279-04**		Prepared: 10/06/24 Analyzed: 10/07/24					
PHI +10.0 (0.001 mm)	5.50		0.100	%		5.50			0	200
PHI +2.00 (0.25 mm)	0.200		0.100	%		0.100			67	200
PHI +3.00 (0.125 mm)	0.200		0.100	%		ND			200	200
PHI +4.00 (0.063 mm)	0.400		0.100	%		0.400			0	200
PHI +5.00 (0.032 mm) Silt	29.4		0.100	%		26.0			12	200
PHI +6.00 (0.016 mm)	10.8		0.100	%		10.5			3	200
PHI +7.00 (0.008 mm)	17.0		0.100	%		17.2			1	200
PHI +8.00 (0.004 mm)	15.6		0.100	%		17.2			10	200
PHI +9.00 (0.002 mm) Clay	10.3		0.100	%		10.5			2	200
PHI >10.0 (< 0.001 mm)	10.5		0.100	%		12.5			17	200
PHI 0.00 (1.00 mm) Sand	ND		0.100	%		ND				200
PHI -1.00 (2.00 mm)	ND		0.100	%		ND				200
PHI -2.00 (4.00 mm)	ND		0.100	%		ND				200
PHI -2.25 (4.75 mm) Gravel	ND		0.100	%		ND				200

Am Test Inc.
13600 NE 126th Place Suite C
Kirkland, WA
(425) 885-1664
www.amtestlab.com

ANALYSIS REPORT

Professional Analytical Services

Date Received: 09/09/24
Date Reported: 10/11/24

OnSite Environmental Inc.
14648 NE 95th ST
Redmond, WA 98052
Attention: David Baumeister
Project Name: Onsite (Chem)
Project #: COB-Riverside Task 5

Notes and Definitions

Item	Definition
Dry	Sample results reported on a dry weight basis.
ND	Analyte NOT DETECTED at or above the reporting limit.
RPD	Relative Percent Difference
%REC	Percent Recovery
Source	Sample that was matrix spiked or duplicated.

OnSite Environmental Inc.

14648 NE 95th Street, Redmond, WA 98052 · (425) 883-3881

A24I0121

Laboratory Reference #: 09-059

Laboratory: AmTest Laboratories

Attention: Aaron Young

13600 NE 126th Pl Kirkland, WA 98034

Phone Number: (425) 885-1664

Turnaround Request

1 Day | 2 Day | 3 Day | Standard

Other: _____

Project Manager: David Baumeister

email: dbaumeister@onsite-env.com

Project Number: COB-Riverside; Task 5

Project Name: _____

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	# of Cont.	Requested Analyses
01	SB-06-13-16	9/3/24	14:40	S	1	Grain Size
02	SB-06-16-20	9/3/24	12:40	S	1	Grain Size
03	SB-06-32-36	9/3/24	13:18	S	1	Grain Size
04	SB-06-36-40	9/3/24	13:28	S	1	Grain Size

	Company	Date	Time	Comments/Special Instructions
Relinquished by:	OSE	9/9/24	1224	5.8°C
Received by: KH	Amtest	9/9/24	1225	**Report Spike Blank**
Relinquished by:				**EDDs & EIM**
Received by:				
Relinquished by:				
Received by:				

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Anderson
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260 ★	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold				% Moisture
1	SB-08-15-16.5	9/3/24	11:25	S	4					X													X				
2	SB-08-19-22		11:35	S	4					X																	26
3	SB-08-22-25		11:37	S	4					X													X				
4	SB-08-25-28		11:40	S	4					⊗													X				⊗
5	SB-06 8.5-10.5		14:24	S	4					X													X				
6	SB-06-13-14.5		14:26	S	4					X													X				
7	SB-06-14.5-16		14:30	S	4					X																	10
8	SB-06-16-18		12:20	S	4					X																	1
9	SB-06-18-20		12:22	S	4					X																	
10	SB-06-20-22	↓	12:25	S	4					X																	↓

	Signature	Company	Date	Time
Relinquished	Danielle Gallagher	Floyd|Snider	9/6/24	1620
Received		AK-DEQ	9/16/24	1620
Relinquished		ALPHA	9/16/24	1645
Received			9/16/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
Send lab results to: labdata@floydsnider.com
★Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE Vinyl Chloride
⊗Added 9/10/24. DB (STA)
⊗ Added 9/17/24 NB

Data Package: Standard ☒ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☒

Chain of Custody

Page 2 of 7

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Andersen
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260 ★	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold				% Moisture
11	SB-06-22-24	9/3/24	12:30	S	4					X																	10
12	SB-06-24-26		12:40	S	4					X																	
13	SB-06-26-28		12:48	S	4					X																	
14	SB-06-28-30		12:55	S	4					X																	
15	SB-06-30-32		12:58	S	4					X																	
16	SB-06-30-32-D		12:59	S	4					X																	
17	SB-06-32-34		13:00	S	4					X																	
18	SB-06-34-36		13:15	S	4					X																	
19	SB-06-36-38		13:20	S	4					X																	
20	SB-06-38-40	↓	13:25	S	4					X																	↓

	Signature	Company	Date	Time
Relinquished	Danielle Gallagher	Floyd|Snider	9/6/24	1620
Received		ALPHA	9/16/24	1620
Relinquished		ALPHA	9/16/24	1645
Received			9/16/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
★ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & Vinyl Chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COR-Riverside
Project Manager: Kristin Anderson
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260 ★	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold				% Moisture
21	SB-05-13-16	9/3/24	14:55	S	4					X													X				
22	SB-05-16-19		15:05	S	4					X																	10
23	SB-05-19-22		15:10	S	4					X																	
24	SB-05-22-25		15:15	S	4					X													X				
25	SB-05-25-28		15:20	S	4					⊗													X D3				⊗
26	SB-03-13-16		16:10	S	4					X													X				
27	SB-03-16-19		16:16	S	4					X																	10
28	SB-03-19-22		16:22	S	4					X																	1
29	SB-03-22-25		16:30	S	4					X													X				
30	SB-03-25-28	↓	16:35	S	4					⊗													X				⊗

	Signature	Company	Date	Time
Relinquished	Danielle Gallagher	Floyd|Snider	9/6/24	1620
Received		ALPHA	9/6/24	1620
Relinquished		ALPHA	9/6/24	1645
Received		ORE	9/6/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
★ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & Vinyl Chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Andersen
Sampled by: Danielle Gallagher

Turnaround Request (in working days)

(Check One)

- ☐ Same Day
- ☐ 1 Day
- ☐ 2 Days
- ☐ 3 Days
- ☒ Standard (7 Days)
- ☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260 ★	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold				% Moisture
31	SB-04-13-16	9/4/24	08:30	S	4					X													X				
32	SB04-16-19		08:35	S	4					X																	10
33	SB-04-19-22		08:45	S	4					X																	
34	SB-04-22-25		08:50	S	4					X													X				
35	SB-04-25-28		08:55	S	4					⊗													X				⊗
36	SB-11-21-23		10:00	S	4					X																	
37	GWB-03-15-20		11:10	GW	3					X																	
38	GWB-03-20-25		12:20	GW	3					X																	
39	GWB-03-25-30		13:45	GW	3					X																	
40	GWB-04-15-20		15:05	GW	3					X																	

	Signature	Company	Date	Time
Relinquished	Danielle Gallagher	Floyd|Snider	9/6/24	1620
Received		ALPHA	9/6/24	1620
Relinquished		ALPHA	9/6/24	1645
Received		OSE	9/6/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

★ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & vinyl chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Andersen
Sampled by: Danielle Gallagher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up☐)	Volatiles 8260 *	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	MS/MSD	Hold			% Moisture
41	GWB-04-20-25	9/4/24	15:40	GW	3					X																	
42	GWB-04-25-30	9/4/24	16:15	GW	3					X																	
43	GWB-05-20-25	9/5/24	12:35	GW	3					X																	
44	GWB-05-25-30	↓	13:10	GW	3					X																	
45	GWB-06-20-25		14:35	GW	3					X																	
46	GWB-06-25-30		15:30	GW	3					X																	
47	GWB-08-15-25	↓	16:45	GW	3					X																	
48	GWB-07-35-40	9/6/24	11:50	GW	9					X													X				
49	SB-09-16-19	↓	11:10	S	4					X																	D
50	SB-09-19-22	↓	11:20	S	4					X														X			

	Signature	Company	Date	Time
Relinquished	Danielle Gallagher	Floyd|Snider	9/6/24	1620
Received		ALPHA	9/6/24	1620
Relinquished	Caitlin Davis	ALPHA	9/6/24	1645
Received		ONE	9/6/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
* Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & Vinyl Chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐
Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Anderson
Sampled by: Danielle Gallacher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260 ☆	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold				% Moisture
51	SB-09-22-25	9/6/24	11:25	S	4					X													X				
52	SB-09-25-28		10:55	S	4					⊗													X				⊗
53	SB-10-16-19		12:05	S	4					X																	10
54	SB-10-19-22		12:10	S	4					X													X				
55	SB-10-22-25		12:15	S	4					X													X				
56	SB-10-25-28		12:25	S	4					⊗													X				⊗
57	SB-07-16-19		14:10	S	4					X																	10
58	SB-07-16-19-D		14:30	S	4					X																	1
59	SB-07-19-22		14:15	S	4					X													X				
60	SB-07-22-25		14:20	S	4					X													X				

	Signature	Company	Date	Time
Relinquished	Danielle Gallacher	Floyd|Snider	9/6/24	1620
Received		ALPHA	9/6/24	1620
Relinquished		ALPHA	9/6/24	1645
Received		ORE	9/6/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
☆ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE + vinyl Chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Chain of Custody

OnSite Environmental Inc.
Analytical Laboratory Testing Services
14648 NE 95th Street • Redmond, WA 98052
Phone: (425) 883-3881 • www.onsite-env.com

Company: Floyd|Snider
Project Number: Task 5
Project Name: COB-Riverside
Project Manager: Kristin Anderson
Sampled by: Danielle Gallacher

Turnaround Request (in working days)
(Check One)
☐ Same Day ☐ 1 Day
☐ 2 Days ☐ 3 Days
☒ Standard (7 Days)
☐ _____ (other)

Laboratory Number: 09-059

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX (8021☐ 8260☐)	NWTPH-Gx	NWTPH-Dx (SG Clean-up ☐)	Volatiles 8260	Halogenated Volatiles 8260	EDB EPA 8011 (Waters Only)	Semivolatiles 8270/SIM (with low-level PAHs)	PAHs 8270/SIM (low-level)	PCBs 8082	Organochlorine Pesticides 8081	Organophosphorus Pesticides 8270/SIM	Chlorinated Acid Herbicides 8151	Total RCRA Metals +	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664	Hold	Lab Grain Size			% Moisture
61	SB-07-25-28	9/6/24	14:25	S	4					⊗													X				⊗
62	GWB-07-40-45	↓	14:55	GW	3					X																	
63	SB-06R-~~00~~8-10 SDG		15:25	S	4					X																	X
64	SB-06R-12-14	↓	15:30	S	4					X																	1
65	SB-06-13-16	9/3/24	14:40	S	2																			X			
66	SB-06-16-20	↓	12:40	S	2																			X			
67	SB-06-32-36	↓	13:18	S	2																			X			
68	SB-06-36-40	↓	13:28	S	2																			X			
~~—~~	~~DUP-01~~ SDG	~~9/6/24~~	~~15:30~~	~~S~~	1																					SDG	
69	Trip Blanks-090624	9/6/24		W	3					X																	

	Signature	Company	Date	Time
Relinquished		Floyd|Snider	9/6/24	1620
Received		ALPHA	9/6/24	1620
Relinquished		ALPHA	9/6/24	1645
Received			9/6/24	1645
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~X~~ Only PCE, TCE, cis-1,2-DCE, trans-1,2-DCE & vinyl chloride

Data Package: Standard ☐ Level III ☐ Level IV ☐

Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

Floyd/Snider
Project nan COBothell-Riverside
Project Mar Kristin Anderson
Installation 8/26/2024
Sampling D 9/16/2024
Reporting D 10/4/2024

Table1. Summary of flux values for each well

Well_ID	Sample_ID	Depth belo	Darcy Velo	VC flux	cis-1,2DCE	TCE flux	PCE flux
		(ft)	(cm/day)	(mg/m^2/d	(mg/m^2/d	(mg/m^2/d	(mg/m^2/day)
RMW-12	RMW-12-1	16	3.83	0	0.1	0.03	0.08
	RMW-12-1	18	3.96	0	0.1	0.02	0.04
	RMW-12-1	20	5.39	0.1	0.1	0.03	0.03
	RMW-12-2	22	4.22	0	0.1	0.02	0.02
	RMW-12-2	24	2.99	0	0	0.01	0.02
RMW-07	RMW-07-1	16	0.7	0.2	0	0.02	0.04
	RMW-07-1	18	1.3	2.5	1.3	0.01	0.01
	RMW-07-1	20	4	1.8	3.6	0	0.01
	RMW-07-2	22	4	0.6	2.2	0.01	0.01
	RMW-07-2	24	3.6	0.9	1.5	0.01	0.01

Table2. Summary of flux average contaminant concentration

Well_ID	Sample_ID	Depth belo	Darcy Velo	VC	cis-1,2DCE	TCE	PCE
		(ft)	(cm/day)	(ug/L)	(ug/L)	(ug/L)	(ug/L)
RMW-12	RMW-12-1	16	3.8	0	3.4	0.9	2.1
	RMW-12-1	18	4	0	1.8	0.5	1.1
	RMW-12-1	20	5.4	2.1	2.2	0.5	0.6
	RMW-12-2	22	4.2	0	1.5	0.5	0.5
	RMW-12-2	24	3	0	0.9	0.3	0.5
RMW-07	RMW-07-1	16	0.7	29	3	2.9	6.2
	RMW-07-1	18	1.3	186	96	1.1	1
	RMW-07-1	20	4	45	90	0.1	0.1
	RMW-07-2	22	4	16	56	0.2	0.2
	RMW-07-2	24	3.6	27	42	0.2	0.3

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Appendix C
Field Boring Logs

FLOYD | SNIDER
strategy • science • engineering

PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-03	
LOGGED BY: Ryne Adams	**BORING LOCATION:** W of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0		Brown, well graded **SAND** with silt.			
				0.4	
2					
				0.3	
4					
6		Gravel present.		0.2	
	SW-SM				
8				0.9	
10		▼			
				0.9	
12					
				0.4	
14					
	GW-GM	Brown, well graded **GRAVEL** with silt and trace fines, saturated.			

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
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▼ = denotes groundwater table

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-03**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** W of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	ML	Black, medium plasticity **SILT**, with organic woody material from 15 to 16 ft., saturated, no odor.		0.5	
				0.6	SB-03-16-19
18	SP-SM	Brown, poorly garded **SAND** with silt and gravel, saturated. Iron oxide present.		0.5	
20		Brown, well graded **SAND** with silt, saturated, iron oxide present, no odor.			SB-03-19-22
				0.2	
22					
		Transitions to gray.		0.3	SB-03-22-25
24	SW-SM			0.5	
26				0.2	SB-03-25-28
				0.2	
28					
				0.2	
30		Bottom of Boring = 30 ft bgs			

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-04	
LOGGED BY: Ryne Adams	**BORING LOCATION:** SW of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 8	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/4/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0	SW-SM	Brown, well graded **SAND** with silt and trace gravel, no odor.			
2				0.2	
4		Becomes moist.		0.3	
6				0.4	
8 ▼				0.5	
		Organic woody debris (about 4") present.		0.2	
10	SP	Gray, poorly graded medium **SAND**, trace fines, wet, no odor.		0.4	
	SM	Brown **silty SAND** no odor, wet.			
12		Trace gravel present.		0.4	
		Organic woody debris present.			
14				0.5	SB-04-13-16

ABBREVIATIONS:
ft bgs = feet below ground surface
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USCS = Unified Soil Classification System
▼ = denotes groundwater table

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-04**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** SW of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 8	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/4/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	GW-GM	Drark brown well graded sub angular **GRAVEL**, with silt and medium to coarse sand, wet, no odor.		0.3	
		Pocket of silty sand present.		0.3	SB-04-16-19
18		Iron oxide present.		0.3	
20	SW-SM	Dark brown well graded **SAND** with silt, medium to dense, wet, no odor.		0.4	SB-04-19-22
22		Trace cobbles present.		0.3	
24		Transitions to light brown with high dilatancy.		0.3	SB-04-22-25
26				0.3	
28				0.2	
30		Bottom of Boring = 30 ft bgs		0.3	SB-04-25-28

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-05	
LOGGED BY: Ryne Adams	**BORING LOCATION:** E of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 13	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0		Brown, well graded medium to coarse **SAND** with silt, organics at surface, wet, no odor,		0.5	
2				0.4	
4					
6		Trace gravel at 6.25 ft.		0.4	
	SW-SM				
8				0.3	
		Cobbles present.			
		Red brick present.			
10				0.3	
12					
		Iron oxide present.		0.5	
14					SB-05-13-16

ABBREVIATIONS:
ft bgs = feet below ground surface
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-05**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** E of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 13	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SW-SM	Brown/orange well graded **SAND** with silt, trace gravel 0.1 to 0.3", wet, no odor, dilatancy		0.4	
18		Light brown, poorly graded **SAND** with silt, wet, dilatancy.		0.4	SB-05-16-19
20	SP-SM			0.4	SB-05-19-22
22		Pockets of coarse **SAND** present.		0.6	
24				0.3	SB-05-22-25
26	SM	Brown **silty SAND**, wet, iron-oxidized layers present, dilatancy		0.5	
28				0.5	SB-05-25-28
30		Bottom of Boring = 30 ft bgs		0.5	

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-06	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 40	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0		Brown well graded **SAND** with silt and gravel, sand medium to coarse, gravel sub-angular 0.5" to 1", dry, no odor.grass and at surface.			
2				0.3	
4		Becomes moist.			
	SW-SM				
6				0.3	
8					
					SB-06-8.5-10.5
10 ▼		Gray, poorly graded sub-angular **GRAVEL** ~ 0.5 to 1.25", wet, no odor.		0.5	
	GP				
12		Brown-black, **SILTY SAND**, trace gravel, orange iron-oxide patches, wet, no odor.		0.4	
	SM				
					SB-06-13-14.5
14		Brown, well graded medium to coarse **SAND** with silt, trace fine gravel, wet, no odor.			
	SW-SM				

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-06**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 40	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SP-SM	Brown, poorly graded fine **SAND** with silt, iron-oxide streaks, wet, no odor.		0.5	
				0.5	SB-06-16-18
18					
	SW-SM	Brown/orange well graded fine to coarse **SAND** with silt, iron oxide present, wet, no odor.		0.5	SB-06-18-20
20	SM	Brown silty **SAND**, fine **SAND**, iron oxide present, loose, wet, high dilatancy, no odor		0.3	SB-06-20-22
22				0.3	SB-06-22-24
24		Becomes gray with lower dilatancy, medium stiff.			
				0.3	SB-06-24-26
26		Brown and light brown, **silty SAND**, medium stiff, wet, high dilatancy, no odor.		0.3	SB-06-26-28
28				0.3	SB-06-28-30
30					

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-06**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 40	**DEPTH TO WATER (ft bgs):** 10	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
30	SP-SM	Brown, poorly graded fine to medium **SAND** with silt, medium dense iron oxide present, wet, high dilatancy, no odor..		0.2	SB-06-30-32
		Grain size begins to coarsen.		0.3	SB-06-32-34
		Iron oxide pocket present.		0.5	SB-06-34-36
		Iron oxide pocket present.		0.4	SB-06-36-38
		Bottom of Boring = 40 ft bgs		0.2	SB-06-38-40

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-07	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 12	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0	SW-SM	Brown, silty **SAND**, loose, dry, no odor,		0.2	
2					
				0.3	
4					
6					
8					
10	SW	Brown, well graded fine to coarse **SAND** with trace silt. Cobble present.		0.3	
12 ▼	SM	Brown **silty SAND**, medium dense, trace gravel ~0.5", wet, no odor.		0.6	
14				0.3	

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-07	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 12	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SW-SM	Dark brown well graded fine to coarse **SAND** with silt and trace gravel ~0.2 to 0.3", wet, no odor.		0.3	
				0.3	SB-07-16-19
18				0.2	
20		Gray, poorly graded fine **SAND** with silt, medium dense, wet, dilatancy.		0.3	SB-07-19-22
22				0.2	
					SB-07-22-25
24		Becomes brown.		0.2	
	SP-SM				
26				0.2	
					SB-07-25-28
28				0.2	
				0.1	
30		Bottom of Boring = 30 ft bgs			

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-08	
LOGGED BY: Ryne Adams	**BORING LOCATION:** S of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 10.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0	SM	Light brown, fine **silty SAND**, trace sub-angular gravel ~0.25-0.5", very loose, dry, no odor.		0.1	
2					
4		Trace organics present.		0.3	
6	SP-SM	Brown, poorly graded **SAND** with silt, no odor, moist.			
8					
	SP	Brown, poorly graded **SAND** with trace siltmoist, no odor.,		0.1	
10 ▼	SM	Dark brown, fine **silty SAND** with trace gravel ~0.5-1.5" and trace organics medium stiff.		0.1	
12		Cement fiber board present.			
		Becomes black, peat present.		0.2	
14		Becomes stiff.			

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-08**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** S of Former Machine Shop		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 10.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/3/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
		Brown, medium to coarse well graded **SAND** with silt and trace gravel 0.2-0.5", wet, no odor, iron oxide present.		0.1	
16				0.2	SB-08-15-16.5
	SW-SM				
				0.3	
18					
		Light brown, poorly graded fine **SAND** with trace silt, wet, no odor.			
	SP				
20		Brown, poorly graded fine **SAND** with silt, wet, no odor, iron oxide streaks. Interspersed silt pockets present.		0.3	SB-08-19-22
22				0.3	
					SB-08-22-25
24				0.2	
	SP-SM	Grain size coarsens and increased silt present, high dilatancy.			
26					SB-08-25-28
				0.2	
28					
30		Bottom of Boring = 30 ft bgs			

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-09	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 16	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0	SW-SM	Brown, well graded **SAND** with silt, loose, dry, no odor.		0.1	
2					
4				0.1	
6				0.2	
8					
10		Cobble present.		0.1	
12				0.1	
14		Becomes moist and very loose.			

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-09**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 16	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SM	Dark brown, fine **silty SAND** with peat, medium dense.		0.4	
18				0.4	SB-09-16-19
		1" lense of gray poorly graded fine sand.		0.4	
20	SW	Brown, well graded fine to coarse **SAND**, wet, no odor.			SB-09-19-22
		Brown, fine **SILTY SAND], loose, wet, no odor.**		0.2	
22	SM				
24				0.3	SB-09-22-25
26	SP-SM	Brown, poorly graded fine **SAND** with silt, medium dense wet, high dilatancy no odor. ,		0.3	SB-09-25-28
28				0.3	
30		Bottom of Boring = 30 ft bgs		0.3	

ABBREVIATIONS:
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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-10**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 14.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0	SW-SM	Brown, well graded medium to coarse **SAND** with silt, very loose, dry, no odor, , trace iron oxide			
14		Cobble present.			

▼ = denotes groundwater table

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-10**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Upgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 30	**DEPTH TO WATER (ft bgs):** 14.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/6/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SM	Dark brown, **silty SAND** with organic matter, loose, saturated, no odor.			
18		Brown-gray, poorly graded fine **SAND** with silt, fine sand, wet, no odor, loose, iron oxide pockets at 19 ft			SB-10-16-19
		Iron oxide pockets present			
20		Becomes light brown with high dilatancy.			SB-10-19-22
22	SP-SM				
24					SB-10-22-25
26					SB-10-25-28
28					
30		Bottom of Boring = 30 ft bgs			

ABBREVIATIONS:
ft bgs = feet below ground surface
ppm = parts per million
USCS = Unified Soil Classification System
▼ = denotes groundwater table

NOTES:

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** SB-11	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Downgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 25	**DEPTH TO WATER (ft bgs):** 8.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/4/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
0		Brown, well graded medium to coarse **SAND** with silt and fine gravel 0.2-0.5", loose , moist, , no odor. Asphalt present at surface.		0.2	
2				0.2	
4				0.3	
	SW-SM				
6				0.3	
8		Black, well graded fine to medium **SAND** with silt and gravel 0.2-0.3", loose tomedium dense, wet, no odor.		0.3	
				0.4	
10				0.3	
12		Gray, well graded **SAND** with silt, loose, wet, no odor.		0.3	
	SW-SM				
14				0.3	

ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES:

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PROJECT: COB-Riverside	**SITE ADDRESS:** Bothell, WA 98011	**BORING ID:** **SB-11**	
LOGGED BY: Ryne Adams	**BORING LOCATION:** Downgradient Extraction Well Row		
DRILLED BY: Holocene	**NORTHING:**	**EASTING:**	
DRILLING EQUIPMENT: Geoprobe LAR	**GROUND SURFACE ELEVATION:**	**COORDINATE SYSTEM:**	
DRILLING METHOD: Direct push	**TOTAL DEPTH (ft bgs):** 25	**DEPTH TO WATER (ft bgs):** 8.5	
SAMPLING METHOD/SAMPLER LENGTH: 5' x 2" disposable poly liner	**BORING DIAMETER:** 2"	**DRILL DATE:** 9/4/2024	

Depth (feet)	USCS Symbol	Soil Description and Observations (color, texture, moisture, **MAJOR CONSTITUENT**, odor, staining, sheen, debris, etc.)	Drive/ Recovery	PID (ppm)	Sample ID
16	SW-SM	Gray, well graded, fine to medium **SAND** with silt, saturated.		0.2	
				0.3	
18	SM	Brown, fine **silty SAND**, dense, wet, no odor			
	SP	Gray, poorly graded **SAND**, trace fines, dense, wet, no odor		0.3	
20	GP	Brown, poorly graded fine **GRAVEL**, no odor.		0.3	
22	SP-SM	Brown, poorly graded fine **SAND** with silt, medium dense, wet, high dilatency, , no odor.		0.2	SB-11-21-23
24		Bottom of Boring = 25 ft bgs		0.2	
26					
28					
30					

ABBREVIATIONS:
ft bgs = feet below ground surface
USCS = Unified Soil Classification System
ppm = parts per million
▼ = denotes groundwater table

NOTES:

Pre-Engineering Design Investigation Data Report

Riverside HVOC Site

Appendix D
Detailed Cost Estimates

Table D.1
Summary of Cleanup Action Alternative Costs

Alternative	Restoration Time Frame (years) [1]	Construction Cost	Long-Term Monitoring	Cost [2]
2023 CAP Cleanup Action	5	$2,103,940	$630,362	$2,734,302
Alternative 1	5	$1,129,072	$630,362	$1,648,059
Alternative 2	3	$1,437,152	$218,210	$1,655,362

Notes:

1 Includes remedy implementation in time frame.

2 Includes total of construction costs, professional services (including long-term monitoring), sales tax, and a 20% contingency.

Table D.2
Detailed Costs for 2023 CAP Cleanup Action

Item	Qty	Unit	Unit Cost	Cost	Notes and Assumptions
CONSTRUCTION CAPITAL COSTS					
Soil Vapor Extraction System					
Permitting	1	LS	$ 6,000	$ 6,000	State air permit; state, county, and local construction and grading permits if applicable.
Mobilization	5	%		$ 44,287	5% of total construction costs.
Utility clearance	1	LS	$ 1,200	$ 1,200	Includes travel, conductible and non-conductible.
Paving	84	Tons	$ 250	$ 21,000	Based on needing to pave a 115' x 40' area for SVE effectiveness.
Well installation	180	FT	$ 145	$ 26,100	12 SVE wells to depth of 15 feet.
SVE piping	12	LF	$ 7,610	$ 91,323	Assumes each location has their own separate piping, as shown in Figure 6 of the CAP.
Electrical	1	LS	$ 18,618	$ 18,618	Assumes that current electrical is sufficient, but would need to be rewired by a certified electrician.
SVE system rental	36	Months	$ 19,712	$ 709,640	Assumes that the system will be rented for 3 years (per CAP).
SVE system startup	2	DAY	$ 4,930	$ 9,860	Assumes 2 days by technician.
Site cleanup and demob	2	DAY	$ 4,000	$ 8,000	Assumes 2 days by technician.
			SUBTOTAL CAPITAL COSTS	**$ 936,027**	
Bio-Reciuculation System					
Permitting	8	LS	$ 100	$ 800	UIC permit, 8 injection wells proposed in CAP.
Mobilization/setup of system	1	LA	$ 53,482	$ 53,482	ETEC quote.
Utility clearance	1	LS	$ 1,200	$ 1,200	From ULS Quote.
Well installation	490	FT	$ 145	$ 71,050	Assumes layout presented in Figure 6 of the CAP and 35 ft wells.
Well decommissioning	70	FT	$ 145	$ 10,150	Assumes EW-5 and EW-6 are overdrilled due to stuck pumps.
System piping	16	EA	$ 7,610	$ 121,760	Assumes each location has their own separate piping, as shown in Figure 6 of the CAP: 6 injection, 2 new extraction.
Electrical	1	LS	$ 28,618	$ 28,618	Assumes new electrical panel required, price equal to SVE electrical.
Recirculation system rental	24	Months	$ 5,000	$ 120,000	From ETEC quote, assumes 2 years of operation.
Site cleanup and demob	1	LS	$ 4,000	$ 4,000	From ETEC quote.
			SUBTOTAL CAPITAL COSTS	**$ 411,060**	
Indirect Costs					
Engineering design	1	LS	$ 161,050	$ 161,050	From Cost Projection Worksheet - Tasks 6 and 7.
Construction management	5	%	DC	$ 93,002.69	Assumes 10% of construction costs, minus waste T&D.
Soil drum disposal	20	EA	$ 350.00	$ 8,000	Assumes 1 drum per well installed and 2.5 each for over drilling EW-5 and EW-6.
Water drum disposal	15	EA	$ 350.00	$ 5,250	Includes purge water to develop all injetion, extraction and new monitoring wells.
Field oversight - system installation	180	Hours	$ 175	$ 31,500	Assumes between 1 and 2 employees over 12 days (10 hour days).
Completion report	1	LS	$23,750.00	$ 23,750	Per MTCA requirements. Includes as-built drawings, O&M manual.
			Subtotal	**$ 1,669,640**	
Sales tax		%	10.2	$ 137,403	Applied to construction; does not apply to indirect costs.
			Capital Costs	**$ 1,807,042**	
Contingency		%	20	$ 296,898	Contingency based on inflation on equipment and construction work.
			Capital Costs with Contingency	**$ 2,103,940**	
Annual O&M, Groundwater Monitoring, and Closure Costs					
Project management	14	Event	$ 3,000	$ 42,000	Assumes quarterly monitoring for years 1-2 and semiannual monitoring years 3-5.
Groundwater monitoring well installation	70	FT	$ 145	$ 10,150	Assumes new well at GWB-6 and one well east GWB-6.
Groundwater monitoring and sampling	14	Event	$ 9,741	$ 136,374	Assumes two 10-hour days for two employees; up to 11 wells will be sampled. Based on Cost Projection Worksheet.
Groundwater analytical costs	14	Event	$ 6,160	$ 86,240	Includes COCs and select MNA parameters.
System air samples	12	Event	$ 610	$ 7,320	Includes COCs analysis in influent and effluent air samples.
Waste disposal	3	Event	$ 1,700.00	$ 5,100.00	Disposal of purged water drums and spent media. Assume yearly during system operation.
Annual reporting	4	YEAR	$ 11,875.00	$ 47,500.00	Based on costs provided in Remedial Action Grant funding estimate.
Completion reporting	1	LS	$ 11,875	$ 11,875	Draft and final based on Ecology comments.
Confirmation soil sampling	1	LS	$8,225.00	$ 8,225.00	Includes one day of direct push soil sampling, analysis of 15 samples, 2 employees.
System O&M	36	Months	$ 2,880	$ 103,680	Assumes Weekly O&M for labor, repair, and maintenance for 12 months. 1 employee for 4 hours for each O&M trip once a week.
Electricity	36	Months	$ 400	$ 14,400	Estimated; could be more or less depends on system usage.
GAC media	7	Events	$ 7,740	$ 54,180	Based on BSC system changeout and additional event for the SVE carbon.
CarBstrate media	24	Months	$ 3,155	$ 75,718	Assumes 400 lbs of CarBstrate/month per ETEC quote.
Well abandonment	1	LS	$ 7,000	$ 7,000	Assumes cost of $300 per well for injection and SVE wells plus $1,000 mobilization fee.
Annual equipment replacement costs	2	Events	$ 10,000	$ 20,000	Assumes replacement and reinstallation of compressors, blower, pumps, misc. components, and additional support.
Annual air permit	3	Year	$ 200	$ 600	Local Air Discharge Fees, if applicable.
			Subtotal	**$ 630,362**	Total costs for O&M, groundwater monitoring, and closure costs.
			Total Present Value Cost for Alternative	**$ 2,734,302**	

Table D.3
Detailed Costs for Alternative 1

Item Description	Quantity	Unit	Unit Cost	Cost	Notes
CONSTRUCTION CAPITAL COSTS					
Bio-Reciuculation System					
Permitting	53	LS	$ 100	$ 5,300	UIC permit, assumed 31 direct push injections at 15-ft spacings and 7 permanent injection wells during initial round, 15 direct push borings during second round.
Mobilization/ System Startup	1	LS	$ 53,482	$ 53,482	Costs from ETEC quote.
Utility Clearance	1	LS	$ 1,200	$ 1,200	From ULS Quote.
Well Installation	245	FT	$ 145.00	$ 35,525	Assumes two new extraction wells, up to three injection wells and two monitoring wells. Assumes all wells are 35 feet deep.
Well Decommissioning	60	FT	$ 145.00	$ 8,700	Assumes EW-5 and EW-6 are over-drilled due to stuck pumps.
System piping	11	LF	$ 7,610	$ 83,710	Costs from ETEC quote.
Electrical	1	LS	$ 28,618	$ 28,618	Assumes new electrical panel required, price equal to SVE electrical.
Recirculation system rental	24	Months	$ 5,000	$ 120,000	Costs from ETEC quote.
Site Cleanup and Demob	1	LS	$ 4,000	$ 4,000	Costs from ETEC quote.
			SUBTOTAL CAPITAL COSTS	**$ 340,535**	
Supplemental Injections					
Hydrant permit	2	LS	$ 20,000	$ 40,000	Assumes that hydrant costs are not included in ETEC quote; 2 injection events
Direct Push Injection Drilling- Sitewide	1	LS	$ 61,680	$ 61,680	Assumes 1 injection event in western plume and 2 downgradient injection events.
Direct Push Injection Drilling- additional downgradient	1	LS	$ 30,000	$ 30,000	
CarBstrate media- Sitewide	16,000	lbs	$ 6	$ 101,280	Assumes 1 injection event in western plume and 2 downgradient injection events.
CarBstrate media- additional downgradient	8,000	lbs	$ 6	$ 50,640	
Bacterial culture- Sitewide	36	liters	$ 667	$ 24,003	Assumes 1 injection event in western plume and 2 downgradient injection events.
Bacterial culture- additional downgradient	18	liters	$ 667	$ 12,002	
Injection Equipment	2	LS	$ 7,550	$ 15,100	Holocene injection equipment costs quote; assumes 2 injection events
			SUBTOTAL CAPITAL COSTS	**$ 334,705**	
Indirect Costs					
Engineering Design	1	LS	$ 161,050	$ 161,050	From Cost Projection Worksheet - Tasks 6 and 7.
Construction management	5	%	DC	$ 16,735	Assumes 10% of construction costs, minus waste T&D.
Soil drum disposal	12	EA	$ 350	$ 5,200	Assumes 1 drum per well installed and 2.5 each for over drilling EW-5 and EW-6.
Water drum disposal	9	EA	$ 350	$ 3,150	Includes purge water to develop all injetion, extraction and new monitoring wells.
Field oversight	150	Hours	$ 175	$ 26,250	Assumes between 1 and 2 employees over 10 days (10 hour days).
Completion report	1	LS	$23,750	$ 23,750	Per MTCA requirements. Includes as-built drawings, O&M manual.
			Subtotal	**$ 911,375**	
Sales tax		%	10.2	$ 68,874	Applied to construction; does not apply to indirect costs.
			Capital Costs	**$ 980,249**	
Contingency		%	20	$ 148,823	Contingency based on inflation on equipment and construction work.
			Capital Costs with Contingency	**$ 1,129,072**	
Annual O&M, Groundwater Monitoring, and Closure Costs					
Project Management	14	Event	$ 3,000	$ 42,000	Assumes quarterly monitoring for years 1-2 and semiannual monitoring years 3-5.
Groundwater monitoring and sampling	14	Event	$ 9,741	$ 136,374	Assumes two 10-hour days for two employees; up to 11 wells will be sampled. Based on Cost Projection Worksheet.
Groundwater analytical costs	14	Event	$ 6,160	$ 86,240	Includes COCs and select MNA parameters.
Waste Disposal	2	Event	$ 1,700	$ 3,400	Disposal of purged water drums and spent GAC media from extraction system. Assume yearly during system operation.
Annual reporting	4	LS	$ 11,875	$ 47,500	Based on costs provided in Remedial Action Grant funding estimate.
Completion Reporting	1	LS	$ 11,875	$ 11,875	Draft and final based on Ecology comments.
System O&M	24	Months	$ 2,880	$ 69,120	Assumes Weekly O&M for labor, repair, and maintenance for 12 months. 1 employee for 4 hours for each O&M trip once a week.
Electricity	24	Months	$ 200	$ 4,800	Estimated; Could be more or less depends on system usage.
Well abandonment	1	LS	$ 4,000	$ 4,000	Assumes cost of $300 per well for injection and extraction wells plus $1,000 mobilization fee.
CarBstrate media	24	Months	$ 3,155	$ 75,718	Based on ETEC quote.
GAC media	4	Events	$ 7,740	$ 30,960	Assumes twice yearly changeout.
Annual equipment replacement costs	1	Events	$ 10,000	$ 7,000	Assumes replacement and reinstallation of pumps,piping, misc. components, and additional support.
			Subtotal	**$ 518,987**	
			Total Present Value Cost for Alternative	**$ 1,648,059**	

Table D.4
Detailed Costs for Alternative 2

Item Description	Quantity	Unit	Unit Cost	Cost	Notes
CONSTRUCTION CAPITAL COSTS					
Source Area PlumeStop Injections					
Hydrant permit	1	LS	$ 20,000.00	$ 20,000	Assumes that hydrant costs are not included in Regenesis quote.
Permit for injection of PlumeStop: UIC Permit	64	borings	$ 100.00	$ 6,400	15A NCAC 02C.0200 Well Construction Standards: Criteria and Standards Applicable to Injection Wells; State charges $100 per boring.
Direct Injection Push Drilling	1	LS	$ 104,585.00	$ 104,585	Costs from Regenesis quote.
Well Decommissioning	60	FT	$ 145.00	$ 8,700	Assumes EW-5 and EW-6 are overdrilled due to stuck pumps.
All Regenesis Products and Professional Services	1	LS	$ 516,445.00	$ 740,640	Costs from Regenesis quote.
Soil/water drum disposal	1	LS	$ 3,000.00	$ 3,000	Assumes that no soil will be generated and very little water.
SUBTOTAL CONSTRUCTION CAPITAL COSTS				**$ 884,000**	
Indirect Costs					
Engineering Design	1	LS	$ 161,050	$ 161,050	From Cost Projection Worksheet - Tasks 6 and 7.
Construction management	5	%	DC	$ 44,200.00	Assumes 5% of construction costs, minus waste T&D.
Soil drum disposal	6	EA	$ 350.00	$ 3,100	Assumes 1 drum per well installed and 2.5 each for overdrilling EW-5 and EW-6.
Water drum disposal	3	EA	$ 350.00	$ 1,050	Includes purge water to develop new monitoring wells.
Field oversight	200	Hours	$ 175	$ 35,000	Assumes between 1 and 2 employees over 15 days (10 hour days).
Completion report	1	LS	$23,750.00	$ 23,750	Per MTCA requirements. Includes as-built drawings, O&M manual.
Subtotal				**$ 1,152,150**	
Sales tax		%	10.2	$ 90,168	Applied to construction; does not apply to indirect costs.
Capital Costs				**$ 1,242,318**	
Contingency		%	20	$ 194,834	Contingency based on inflation on equipment and construction work.
Capital Costs with Contingency				**$ 1,437,152**	
Annual O&M, Groundwater Monitoring, and Closure Costs					
Project Management	10	Event	$ 1,000	$ 10,000	Assumes quarterly monitoring for years 1-2 and semiannual monitoring year 3.
Groundwater monitoring and sampling	10	Event	$ 9,741	$ 97,410	Assumes two 10-hour days for two employees; up to 11 wells will be sampled. Based on Cost Projection Worksheet.
Groundwater analytical costs	10	Event	$ 6,160	$ 61,600	Includes COCs and select MNA parameters.
Waste Disposal	1	Event	$ 1,700.00	$ 1,700	Disposal of purged water drums.
Annual reporting	3	LS	$ 11,875.00	$ 35,625	Based oncosts provided in Remedial Action Grant funding estimate.
Completion Reporting	1	LS	$ 11,875.00	$ 11,875	Draft and final based on Ecology comments.
Subtotal				**$ 218,210**	
Total Present Value Cost for Alternative				**$ 1,655,362**	