Final Data Gaps Investigation and Cleanup Options Report

Raplee Property
Cleanup Site ID #5275

Prepared for:

City of Stanwood

Stanwood, Washington
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MAUL FOSTER ALONGI

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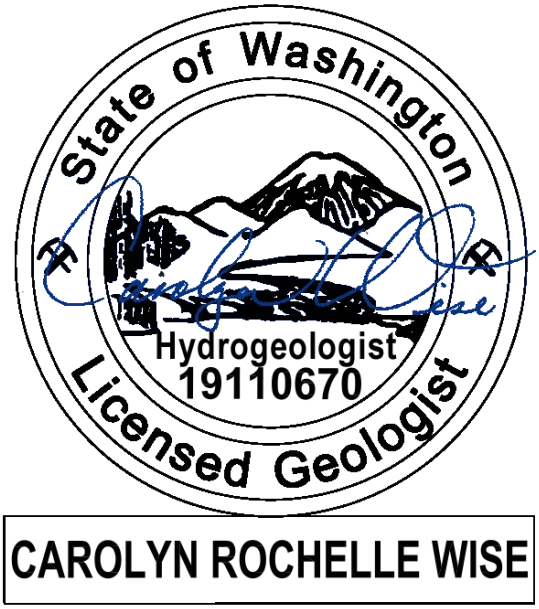
The material and data in this report were prepared under the supervision and direction of the undersigned.

Maul Foster & Alongi, Inc.



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Contents

Limitations

Figures

Following the Report

Tables

Following the Report

Appendixes

Abbreviations

bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
the City	City of Stanwood
COC	contaminant of concern
COPC	contaminant of potential concern
CSM	conceptual site model
CUL	cleanup level
DRO	diesel-range organics
Ecology	Washington Department of Ecology
EPA	U.S. Environmental Protection Agency
ESA	Environmental Science Associates
FEI	focused environmental investigation
GPR	ground-penetrating radar
GRO	gasoline-range organics
IAA	Interagency Agreement No. C2400206
IDW	investigation-derived waste
MFA	Maul Foster & Alongi, Inc.
MTCA	Model Toxics Control Act
NAPL	non-aqueous phase liquid
ORC	oxygen releasing compound
ORO	heavy-oil-range organics
Pinnacle	Pinnacle GeoSciences, Inc.
Preliminary Assessment	pre-field investigation, site reconnaissance, and data review
the Property	9816 271st Street NW in Stanwood, Washington
RCW	Revised Code Washington
SAIC	Science Applications International Corporation
SEPA	State Environmental Policy Act
the Site	the “Raplee Property” Site
South ROW	City right-of-way adjacent to the south boundary of the Property
South USTs	two USTS located south of the Property in the South ROW
TEE	terrestrial ecological evaluation
UST	underground storage tank
WAC	Washington Administrative Code
West UST	one UST in the west-central portion of the Property

1 Introduction

Maul Foster & Alongi, Inc. (MFA) has prepared this data gaps investigation and cleanup options report for the City of Stanwood (the City) for the Raplee Property located at 9816 271st Street NW in Stanwood, Washington (the Property) and the adjacent City right-of-way (South ROW; see Figure 1-1). This report summarizes the results of the soil and groundwater data gaps investigation conducted at the Property; as well as evaluates cleanup options based on site-specific conditions, technical feasibility, and preliminary cost evaluations for the Property.

The Washington Department of Ecology (Ecology) defines the "Raplee Property" Site (the Site; Cleanup Site ID #5275) as the Property and any adjacent properties may be impacted by contamination originating from the Property.

The Property is currently vacant and is located on Snohomish County parcel 32032400405900. The Property is owned by Kathleen Raplee. Historically, the Property was used for retail automotive fuel operations, including a filling and service station. It is MFA's understanding that the City is interested in acquiring the Property, cleaning up the Property and Site (if feasible), and redeveloping the Property as a public park that will enhance the downtown corridor.

1.1 Regulatory Framework

This data gaps investigation and cleanup options report has been prepared in accordance with Interagency Agreement No. C2400206 (IAA), dated May 8, 2024, between Ecology and the City. The agreement provides funding from Ecology under Revised Code Washington (RCW) 39.34.130 and RCW 39.26.180(3). Investigation activities were conducted in general accordance with the Model Toxics Control Act (MTCA) (Washington Administrative Code [WAC] 173-340), and with the soil and groundwater data gaps sampling and analysis plan (SAP) (MFA 2024b).

1.2 Purpose and Objectives

The purpose of the data gaps investigation was to characterize environmental conditions and generate data sufficient for closing data gaps regarding the nature and extent of impacts. The purpose of this report is to summarize environmental conditions and evaluate potential cleanup options. The specific objectives are as follows:

- Further characterize the nature and extent of hazardous substances in environmental media above MTCA Method A cleanup levels (CULs) for unrestricted land use.
- Refine the conceptual site model (CSM) for the Property.
- Evaluate potential risk to current or reasonably likely current and future receptors on the Property.
- Determine the effectiveness, constructability, and cost of a preferred cleanup option.

The remedial alternatives analysis is based on the information from historical environmental investigations, the focused environmental investigation (FEI) report prepared by MFA (MFA 2019), site reconnaissance and data review (MFA 2024a), and results from the data gaps investigation, which are summarized in Sections 3 and 4 of this report.

1.3 Report Organization

This document is organized as follows:

- **Section 2** discusses background information, including Property history, physical setting, and previous investigations.
- **Section 3** describes the field and analytical methods of the data gaps investigation.
- **Section 4** discusses the analytical results of the data gaps investigation.
- **Section 5** describes the updated CSM and CULs.
- **Section 6** discusses the different cleanup options considered for the Property.
- **Section 7** discusses the evaluation of the different proposed cleanup options.
- **Section 8** describes recommendations based on the evaluation of cleanup options.

2 Background

The background and physical setting information is summarized from previous investigations and a site reconnaissance and data review report prepared by MFA (MFA 2024a).

2.1 Property Description

The Property is located in the southeast quarter of section 24, township 32 north, and range 3 east of the Willamette Meridian (Figure 1-1). The approximately 0.21-acre Property is relatively level, sloping slightly to the northwest. The Property is zoned as Mainstreet Business but is currently undeveloped and vacant.

The Property is surrounded by a chain-link fence and contains brushy areas and partially intact asphalt and concrete surfaces, along with asphalt and concrete rubble and debris from a prior building demolition. Access to the Property is from the South ROW. The South ROW is an asphalt alleyway that connects 270th Street NW to the east and 99th Avenue NW to the west. A strip of grass lies between the paved alley and the Property's fence.

2.2 Current Uses of Adjoining Properties

The Site is bordered by 271st Street NW, residences, and law offices to the north; the intersection of 271st Street NW and 270th Street NW to the east; a restaurant parking lot to the south; a residential

duplex to the west. An equipment rental, hardware and lumber store, J E Hamilton & Sons, is adjacent to and southeast of the Site.

2.3 Property History

According to previous environmental reports, the first recorded sale of the Property was in 1924, when the Lien family sold the Property to J. Norin Hafstad (Science Applications International Corporation [SAIC] 2006). In 1939, Mr. Hafstad sold the Property to Mr. Ed Peterson and his wife. In 1958, Standard Oil obtained a lease on the Property. The Property was the location of a Standard Oil (now Chevron Corporation) service station from approximately 1958 to when the lease expired in 1970. From 1970 to 1998, the Property's ownership passed through many parties. In 1984, the portion of the Property with the south-bounding alleyway was sold to the City. In 1998, Kathleen Raplee purchased the Property (SAIC 2006).

Based on SAIC's review of a 1941 Sanborn Fire Insurance Map, the Property had been developed into a filling station by that time, with at least two underground storage tanks (USTs) in the northeast portion of the Property, a greasing facility in the eastern portion of the station structure, and a store in the western section (SAIC 2006).

2.4 Regulatory History

A petroleum hydrocarbon release from a UST at the Site was reported to Ecology on January 10, 2005. Pertinent information from Ecology's database is as follows:

- Facility Site ID: 2132059
- Cleanup Site ID: 5275
- UST ID: 619125
- Alternate Names
  - Standard 305192
  - Standard Oil Station 30-5192 (former)
- Site Status: Cleanup Started

The Chevron Environmental Management Company was party to a Voluntary Cleanup Program agreement with Ecology from June 7, 2006, through July 9, 2012.

2.5 Previous Environmental Investigations

A summary of previous environmental investigations at the Site, including historical data, is provided in the site reconnaissance and data review report (MFA 2024a). Brief summaries of the investigations are provided below:

2.5.1 2005 UST Decommissioning

In 2005, Glacier Environmental Services, Inc., decommissioned three USTs in the south-central portion of the Site (see Figure 2-1). The decommissioning of these USTs included emptying of the

USTs, excavation and stockpiling of soil, removal of the USTs, product piping, and vent piping, and backfilling of the excavations. During the decommissioning process, Pinnacle GeoSciences, Inc. (Pinnacle) collected soil samples from the sidewalls and the bottom of the excavation area, as well as from below former product piping, dispenser islands, and stockpiles. Analytical results from the excavation soil samples identified concentrations of gasoline-range organics (GRO); heavy-oil-range organics (ORO); and benzene, toluene, ethylbenzene, and total xylenes (BTEX, collectively) above their respective MTCA Method A CULs. In addition to these excavation exceedances, concentrations of lead and diesel-range organics (DRO) were identified in stockpile samples above their respective MTCA Method A CULs (Pinnacle 2005).

2.5.2 2006 Site Investigation

In 2006, SAIC performed an environmental assessment of the Site which included the collection of soil and groundwater for chemical analysis, an electromagnetic and ground-penetrating radar (GPR) survey, and direct exploration of identified subsurface anomalies. Previous soil borings are shown on Figure 2-1. Boring logs from these borings are included in Appendix A. The soil and groundwater analytical results from this investigation are included in Tables 2-1 and 2-2 respectively.

Apollo Geophysics conducted the electromagnetic and GPR survey of the Site to identify subsurface anomalies including USTs. Five subsurface anomalies potentially indicative of USTs were identified on and adjacent to the Property. Four of the five anomalies subsequently excavated. One of the anomalies was identified as two USTs to the south of the Property in the South ROW (the South USTs), directly under a steel 4-inch-diameter, high-pressure natural gas line. The exact depth and location of this line is unknown. SAIC observed that the USTs contained liquid petroleum mixed with water. Another GPR anomaly was identified as one UST in the west-central portion of the Property (the West UST). The fifth, unexcavated anomaly suspected to be a hydraulic hoist (SAIC 2006). None of the USTs identified in the 2006 investigation were decommissioned.

Samples submitted for analysis showed GRO, DRO, ORO, and BTEX impacts to soil and groundwater near area where the former USTs were removed (SAIC 2006). Sheen and odor were observed in borings from this area as well as near the other identified USTs at the Site. Groundwater near these existing USTs had elevated concentrations of DRO; however, soil samples from these areas did not exceed CULs for petroleum hydrocarbons or BTEX.

2.5.3 2006 to 2014 Groundwater Monitoring

From April 2006 to July 2014, Gettler-Ryan Inc., on behalf of Leidos Engineering, LLC (formerly SAIC), monitored the groundwater at four wells located at the Site (MW-01 through MW-04; see Figure 2-1) (Leidos 2014). The groundwater samples were analyzed for GRO, DRO, ORO, and BTEX. According to the most recent available groundwater monitoring report, only one of the four monitoring wells, MW-4, had concentrations of DRO and ORO above their respective MTCA Method A CULs. Additionally, MW-4 had measurable non-aqueous phase liquid (NAPL) during sampling events between January 2012 and July 2014; therefore, samples from this well were not collected during those events (Leidos 2014).

2.5.4 2019 Site Reconnaissance and Groundwater Sampling

In February of 2019, MFA conducted a FEI consisting of reconnaissance, well redevelopment, and groundwater sample collection from existing monitoring wells at the Site (MFA 2019). The sampling

showed NAPL was present in MW-04 and likely contains concentrations of GRO, DRO, and/or ORO above MTCA Method A CULs. Monitoring well MW-02 contained concentrations of DRO and ORO above the MTCA Method A CUL, and no exceedances were observed in the downgradient well MW-01 and crossgradient well MW-03. The following data gaps were identified at the Site:

- The full lateral and vertical extent of soil impacts is unknown.
- The lateral and vertical extent of groundwater impacts to the west and south of the Site is unknown.
- The lateral and vertical extent of groundwater impacts on the north and east portions of the Site appear to be bounded.
- The existing, abandoned UST(s) may be on-going sources of contamination.

2.5.5 2024 Site Reconnaissance and Data Review

A pre-field investigation, site reconnaissance, and data review (Preliminary Assessment) was conducted to gather environmental information to inform the data gaps investigation for the Site and to support the evaluation of potential cleanup options. Findings of the Preliminary Assessment are described in the site reconnaissance and data review report and summarized below (MFA 2024a).

A GPR survey was performed as part of the Preliminary Assessment to identify the locations of remaining USTs on the Property and South ROW over two mobilizations due to the presence of significant vegetation and multiple clearing efforts needed. Results of the GPR survey are presented in Appendix B.

Figure 2-1 shows approximate locations of remaining USTs from site plans included in SAIC's 2006 report, as well as the GPR anomalies identified during the 2024 surveys, as described below. The UST boundaries from the SAIC report are approximate, having been derived by georeferencing the parcel boundary from a figure in that report. Therefore, the 2024 GPR anomalies are considered more accurate representations of the remaining USTs on the Property.

The first mobilization identified one GPR anomaly:

- Anomaly 0 displayed a signal indicative of potential USTs (the South USTs) at a depth of approximately 3 feet below ground surface (bgs) within a single 7-foot by 11-foot rectangular area approximately 2 feet to the northeast of monitoring well MW-02 near the southeast corner of the fence line (see Figure 2-1) This area corresponds with the location of the South USTs identified in the 2006 site investigation (SAIC 2006) and is in the immediate vicinity of the two fill ports present near the base of the fence.

The second mobilization identified five additional GPR anomalies (see Figure 2-1):

- Anomaly 1, located near the southwest corner of the Property, measured approximately 3 feet by 4 feet at a depth of approximately 2.5 feet bgs. This anomaly was not identified during the 2006 site investigation GPR survey.
- Anomaly 2, measuring approximately 5 feet by 5 feet at a depth of approximately 3 feet bgs, corresponds with "GPR-3" in the 2006 site investigation which daylighted the West UST at this location.

- Anomaly 3, measuring 9 feet by 6 feet at a depth of 5 feet bgs, corresponds with "GPR-4" in the 2006 site investigation. Excavation for the 2006 site investigation determined that demolition debris was responsible for the GPR anomaly at this location.
- Anomaly 4, measuring 6 feet by 5 or more feet at a depth of 4 feet bgs, corresponds with "GPR-2" in the 2006 site investigation which daylighted concrete piping at this location.
- Anomaly 5, located near the former fueling islands near monitoring well MW-03 and historical boring SB-6, measures 3 feet by 4 feet at a depth of 5 feet bgs. The anomaly was not encountered during the 2006 site investigation.

The Preliminary Assessment proposed the following borings and monitoring wells to assess remaining data gaps at the Site:

- Boring SB-24 in the west side of the Site to assess potential downgradient impacts from the existing West UST in the west portion of the Site.
- Boring SB-25 in the southwest corner of the Site to assess the presence of petroleum impacts and potential NAPL migration into MW-04 from the existing West UST.
- Boring SB-26 south of the fence, in between MW-02 and MW-04, to evaluate the source of NAPL previously observed in MW-04 and the potential for a NAPL migration pathway from the existing USTs in the southeast portion of the Site.
- Boring SB-27 near the center of the Site to assess the presence of petroleum impacts to the north of the existing and former USTs in the southeast portion of the Site near the soil CUL exceedances at former boring SB-23.
- Monitoring well MW-05 to evaluate potential contaminant migration from the Site to the neighboring property to the east.
- Monitoring well MW-06 to assess potential soil and groundwater impacts downgradient of the existing South USTs in the southeast portion of the Site in the vicinity of SB-2, which had the highest heavy oil concentrations in soil.

The installation, sampling, and analysis of these borings and monitoring wells is described below in Sections 3 and 4.

2.6 Geology and Hydrogeology

The Site is located in the Snohomish River Valley, approximately 0.2 miles northeast of an oxbow of the Stillaguamish River. According to the Geologic Map of the Stanwood Quadrangle, the Site vicinity is located on Quaternary younger alluvial and estuarine deposits (Minard 1985).

MFA prepared hydrogeologic cross sections using the lithologic data presented in 2006 SAIC boring logs (see cross sections in Figures 2-2 and 2-3). Cross section transect lines are shown in Figure 2-1. SAIC reported the presence of fill in the upper 4 feet of the borings, consisting of brown medium sand and sandy silt with fine gravel with trace rounded cobbles (SAIC 2006). It is likely that during initial development of the Site, fill was placed to raise the grade above flood levels. During the 2006 well installation, SAIC encountered subsurface soils consisting primarily of gray silt or a silt/clay mixture from 4 to 14 feet below ground surface (bgs) (SAIC 2006, see hydrogeologic cross section Figures 2-2 and 2-3). When assessing petroleum impacts in the soils, contamination was found to be confined by a gray clay contact layer at 14 feet bgs (SAIC 2006).

Because of the low hydraulic conductivity of the silt/clay, the monitoring wells on the Site have poor groundwater recharge and were initially pumped dry during purging (SAIC 2006). During the February 2019 groundwater sampling fieldwork and during the 2024 data gaps investigation fieldwork, slow recharge was also observed in the sampled monitoring wells and reconnaissance wells (Appendices C and D; MFA 2019).

Groundwater elevations measured during the data gaps investigation were found to flow to the east and the south, roughly in the opposite direction as previously measured and at a greater hydraulic gradient of between 0.022 and 0.04 ft/ft for the east and south flow directions respectively (see Figure 2-4). Previous investigations found that groundwater flows northwest with a relatively flat gradient of 0.026 ft/ft was calculated during the February 2019 monitoring event (Figure 2-5; MFA 2019) and approximately 0.015 ft/ft for the July 2024 water levels (Figure 2-6) with less than 2 feet groundwater elevation difference across the entire Site (see Table 2-3) (MFA 2024a).

3 Field and Analytical Methods

The soil and groundwater data gaps investigation was conducted in general accordance with the methods and protocols described in the SAP, including standard field operating procedures for collecting soil and groundwater samples, monitoring well installation and development, decontaminating equipment, and managing waste (MFA 2024b). Soil and groundwater sample collection location details are provided in Table 3-1. MFA conducted fieldwork for the data gaps investigation between October 9 and October 17, 2024. Prior to subsurface sampling activities the Site, MFA coordinated public and private utility locates to identify potential underground utilities near the proposed sample locations.

3.1 Soil Sampling

A Washington state licensed driller with Holt Services, Inc., of Edgewood, Washington, advanced six borings on the Property using a track-mounted direct-push drill rig (SB-24 through SB-27, MW-05 and MW06; see Figure 3-1). Continuous cores were collected from the ground surface to a maximum depth of 15 feet bgs. Soil conditions were described, visual and olfactory observations were recorded, and soil was screened with a photoionization detector for volatiles. Soil types and photoionization detector screening results are detailed in the boring logs (Appendix A).

Soil samples were selected for analysis based on visual and olfactory observations. The soil samples were submitted under standard chain-of-custody procedures to Friedman & Bruya, Inc., of Seattle, Washington, and were analyzed for contaminants of potential concern (COPCs) encountered during previous site investigations and include the following:

- DRO and ORO by the Northwest Total Petroleum Hydrocarbon (NWTPH)-Dx method (with and without silica gel cleanup).
- GRO by the NWTPH-Gx method.
- BTEX by U.S. Environmental Protection Agency (EPA) Method 8021B.

3.2 Groundwater Sampling

MFA collected a total of four reconnaissance groundwater samples from of the six borings (SB-24 through SB-27; see Figure 3-2). Temporary polyvinyl chloride well screens were generally set between 5 and 15 feet bgs for collection of reconnaissance groundwater samples. Water levels and water quality parameters were measured and recorded on water field sampling data sheets (see Appendix C). Once reconnaissance groundwater sampling activities were completed, geographic coordinates of the boring locations were recorded using a handheld global positioning system device. The borings were then decommissioned by the driller using bentonite chips hydrated with potable water.

The remaining two boring locations were completed as permanent monitoring wells (MW-05 and MW-06; see Figure 3-2). The monitoring wells were constructed with a 2-inch diameter, schedule 40 polyvinyl chloride well casing with 10-foot-long 0.010-inch machine slot polyvinyl chloride well screens. The wells were screened from approximately 4 to 14 feet bgs to target the water table while allowing for the appropriate sand-pack and annular seal construction (see Table 3-1 and monitoring well completion details on the boring logs in Appendix A).

At least 24 hours after the installation of the monitoring wells, MFA developed the newly constructed monitoring wells (MW-05 and MW-06) and four existing monitoring wells (MW-01 through MW-04). The wells were surged with a bailer then purged using a peristaltic pump with dedicated, disposable tubing. Water levels and water quality parameters were measured and recorded until generally stabilized if groundwater recharge allowed (see well development forms in Appendix D). Prior to collection of groundwater samples, water level measurements from each monitoring well were recorded.

MFA collected seven groundwater samples (including one field duplicate sample) from all six monitoring wells on the Property (MW-01 through MW-06; see Figure 3-2). The samples were collected using low-flow sampling methods with a peristaltic pump and dedicated, disposable tubing. The monitoring wells were purged until water quality parameters stabilized if sufficient groundwater recharge was present. Several wells exhibited significant drawdown during purging with very low recharge rates due to the fine-grained, low hydraulic conductivity soils present at the Site. In these instances, field staff consulted with an MFA hydrogeologist and sample collection was attempted following recharge and prior to the well going dry.

Groundwater samples were collected directly into laboratory-supplied bottles. Field sampling data sheets for groundwater are provided in Appendix C. Groundwater samples were analyzed for a combination of the following COPCs:

- DRO and ORO by the NWTPH-Dx method (with and without silica gel cleanup).
- GRO by the NWTPH-Gx method.
- BTEX by EPA Method 8021B.

3.3 Groundwater Elevation

Prior to sampling and at least 24 hours following the development of the wells, concurrent depths to groundwater were measured in the six wells across the Site to determine a potentiometric groundwater surface (Figure 2-4). The well plugs were removed and allowed over 30 minutes to

equalize the pressure within the well casing prior to water level measurement. Water levels were then measured within 10 minutes of each other in all wells (Table 2-3).

The horizontal position, top-of-casing elevation, and adjacent ground surface elevation of the monitoring wells were surveyed by a state of Washington registered land surveyor with Goldsmith Land Development services of Seattle, Washington (see Appendix E). Groundwater elevations were tabulated using the surveyed top-of-casing elevations and depth to water measurements (see Table 2-3).

3.4 Investigation-Derived Waste

The investigation-derived waste (IDW) was separated into solids, liquids, and sampling debris (e.g., personal protective equipment). IDW was stored in labelled and secured, Washington State Department of Transportation-approved drums on the southern portion of the Property and disposed of at Heritage Crystal Clean treatment facility in Tacoma, Washington. Waste profiles and disposal manifests are provided in Appendix F.

3.5 Archaeological Monitoring

A professional archaeologist with Environmental Science Associates (ESA) of Seattle, Washington monitored all ground disturbing activities during the investigation for the presence of cultural resources following the procedures outlined in the archaeological monitoring plan submitted to Ecology in October 2024 (ESA 2024). The monitoring report prepared by ESA is provided in Appendix G. No archaeological resources or potential indicators of past cultural activity, such as fire modified rocks, dense charcoal, or burned soils, were observed during archaeological monitoring of borings on the Site.

4 Analytical Results

Laboratory analytical reports are provided as Appendix H. Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they met project-specific data quality objectives. A data validation memorandum summarizing data evaluation procedures, data usability, and deviations from specific field or laboratory methods is included as Appendix I. The data are considered acceptable for their intended use, with the appropriate data qualifiers assigned. The data presented in this report has been submitted to Ecology's Environmental Information Management System.

4.1 Screening Levels

Soil and groundwater were analyzed for GRO, DRO, ORO, and BTEX. Analytical results for soil and groundwater are included in Tables 2-1 and 2-2, respectively. Soil and groundwater analytical results were compared to MTCA Method A CULs for unrestricted land use.

4.2 Soil

The subsurface soils at the Property during the data gaps investigation activities generally consisted of silty sand and sandy silt with varying amounts of gravel in the upper five feet, underlain by clay to 15 feet bgs.

Soil samples were submitted for laboratory analysis to evaluate the concentration of petroleum constituents in soils. The location of the borings placed during the data gaps investigation are provided in Table 3-1 and are shown Figure 3-1.

In general, most locations were non-detect for COPCs (Figure 3-1). Two soil locations exceeded MTCA Method A CULs during the data gaps investigation:

- SB-27: Concentrations of GRO, ORO, heavy oils (the sum of DRO and ORO), and benzene in soil exceed MTCA Method A CULs at SB-27 at 2.0 feet bgs. Benzene concentrations in soil exceed MTCA Method A CULs at SB-27 at 7.5 feet bgs.
- MW-06: Benzene concentrations in soil exceeded MTCA Method A CULs in MW-06 at 5.5 and 10.5 feet bgs.

No other exceedances in soil were identified (see Table 2-1). Both SB-27 and MW-06 are located near the area of the former USTs removed from the southeast corner of the Property in 2005.

4.3 Groundwater

Groundwater samples were collected from temporary boring locations and from permanent monitoring wells at the Property (see Figure 3-2).

In general, most locations exceeded MTCA Method CULs for DRO, ORO, or sum heavy oils in groundwater. The highest sum heavy oils concentrations were located in the former UST area and at MW-04 in the southwest corner of the Property (Figure 3-2). Additionally, concentrations of benzene in groundwater exceeded MTCA Method A CULs at SB-27 and MW-06 near the area of the former USTs.

Concentrations of GRO, ethylbenzene, toluene, and xylenes were non-detect or below the MTCA Method A CUL at all locations. No exceedances of COPCs were identified in groundwater at SB-26, MW-01, and MW-03 (see Table 2-2).

5 Conceptual Site Model and Screening Criteria

The primary purpose of a CSM is to identify potential pathways by which human and ecological receptors could be exposed to site-related chemicals. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release to the environment; (2) an environmental transport medium for a released chemical; (3) a point of potential contact with the

impacted medium (referred to as the exposure point); and (4) an exposure route (e.g., soil ingestion) at the exposure point. The potential releases mechanisms and pathways are described below.

In the FEI report, a preliminary CSM was developed to describe release mechanisms, environmental transport processes, exposure routes, and receptors for sources of contamination identified on the Property (MFA 2019). The CSM is based on information collected during previous investigations and MFA's understanding of the proposed future use of the Property. The CSM has been updated to reflect the current understanding of the Site based on recent data collected in 2024. A flow chart depicting the updated CSM is presented as Figure 5-1.

5.1 Potential Sources and Release Mechanisms

Based on documented historical uses described by SAIC, historical soil and groundwater data, and on data obtained during the FEI and data gaps investigation, the following historical operations/uses at the Property and/or at adjoining properties have likely contributed to contamination at the Property:

- Former leaking USTs on the Property
- Existing abandoned USTs on and adjacent to the Property
- Former filling station operations on the Property

5.2 Fate and Transport Processes

The primary mechanisms likely to influence transport and fate of chemicals include natural biodegradation of organic chemicals, sorption of chemicals to soil, physical dispersion of adsorbed chemicals, leaching of chemicals from soil to groundwater, and volatilization from soil to air. The relative importance of these processes varies, depending on the chemical and physical properties of the released contaminant. The properties of the soil and the dynamics and elevation of groundwater also affect contaminant fate and transport.

The Property is primarily undeveloped land with partially intact asphalt and concrete surfaces. Precipitation may infiltrate through permeable ground surfaces on the Property into vadose-zone soil, potentially resulting in leaching of chemicals from near-surface soil impacts to shallow groundwater. The soil-to-groundwater leaching pathway is considered potentially complete.

Volatile contaminants may partition to the vapor phase in the source areas or downgradient of the source areas via groundwater transport of dissolved-phase contamination. Contaminant vapors partitioning from contaminated soil or groundwater could result in impacts to outdoor air quality. Building development will not occur on the Property; therefore, the volatilization to indoor air pathway on the Property is not present.

There are structures to the west of the Property boundary. Dissolved-phase concentrations of sum heavy oils (DRO plus ORO) slightly exceeded the MTCA A CUL in groundwater from MW-05 at the western Property boundary. GRO and BTEX compounds were not detected in this groundwater sample. Interpolated groundwater isoconcentration contours indicate that heavy oils concentrations attenuate to below the CUL just west of the Property boundary. In addition, DRO and ORO are non-detect or below the MTCA A CUL in soil samples collected in the western half of the Property (SB-15, SB-19, SB-20, SB-21, SB-24, and MW-01/SB-5, and MW-05. The few detections of DRO and ORO in

soil from this area were from SB-25 and MW-04/SB-3, in the southwest corner of the Property near the West UST, at concentrations well below MTCA Method A CUL (Table 2-1). The DRO and ORO concentrations as measured by the NWTPH-Dx method are the semi-volatile petroleum products rather than the volatile petroleum products measured as GRO by the NWTPH-Gx method (Ecology 2013). In the west half of the Property, GRO was only detected in historical groundwater samples in MW-04 at concentrations well below the MTCA Method A CUL. GRO has not been detected in any other groundwater sample or soil sample from the western half of the Property. Additionally, there have been no detections of the volatile BTEX compounds in any soil or groundwater sample from this portion of the Property.

Based on the low volatility of the detected petroleum constituents, lack of volatile soil detections, and low heavy oil groundwater detections adjacent to the western Property boundary, the vapor intrusion to indoor air pathway is likely not complete. Removal of the West UST and any adjacent soil impacts would further reduce the likelihood of potential for volatilization of subsurface heavy oil contaminants.

5.3 Exposure Pathways and Potential Receptors

The Property is currently vacant and fenced but is zoned for Mainstreet business (i.e., commercial). Future use of the Property may include commercial businesses or a public park. Therefore, the following human receptors may be exposed to chemicals originating from the Property based on current and potential future uses:

- Construction workers
- Occupational workers (including visitors)

The following are potentially complete exposure pathways for human receptors at the Property:

- Incidental ingestion, contact, or inhalation associated with soil or groundwater.
- Ingestion, contact, or inhalation via use of groundwater as drinking water. Currently, the Property is connected to municipal drinking water and groundwater is unlikely to be used as a source of drinking water. However, unless it can be demonstrated that groundwater is not a future potential source of drinking water based on the criteria set forth in WAC 173-340-720(2), groundwater is classified as potable to protect drinking water beneficial uses.

5.4 Terrestrial Ecological Evaluation

A simplified terrestrial ecological evaluation (TEE) was completed in 2019 during the FEI for the Property to assess the potential for ecological exposure and is included as Appendix J of this report. The intent of a simplified TEE is to ensure protection of terrestrial wildlife at industrial or commercial sites, and of terrestrial plants, soil biota, and terrestrial wildlife at other sites, as provided under WAC 173-340-7490(3)(b). MTCA specifies that the simplified TEE process is intended to identify sites that do not have a substantial potential to pose a threat of significant adverse effects to terrestrial ecological receptors. Therefore, a simplified TEE may be used to remove a site from further ecological consideration during the remedial investigation and cleanup process (WAC 173- 340-7492).

WAC 173-340-7492(2) provides the steps necessary for conducting the simplified TEE. MTCA Table 749-1 may be used to determine whether land use at a site and surrounding area is likely to result in substantial wildlife exposure. MTCA specifies that if this is demonstrated to be unlikely, no further evaluation is necessary to conclude that a site does not pose a substantial threat to potential ecological receptors.

The completed MTCA Table 749-1 included in Appendix J indicates that the Property is unlikely to pose a threat to ecological receptors and that no further evaluation is necessary. Appendix J includes a table presenting the rationale for the scoring on Table 749-1.

5.5 Contaminants of Concern

Based on the revised CSM described above, the contaminants of concern (COCs) for the Property include GRO, DRO, ORO, and BTEX, and their associated concentrations in soil and/or groundwater. MTCA Method A CULs for these COCs are provided in Tables 2-1 and 2-2. In addition, light nonaqueous phase liquid (i.e., free product) that may be highly mobile and not reliably contained has been encountered in MW-04 during previous sampling events.

6 Analysis of Cleanup Options

6.1 Cleanup Action Areas

Two cleanup action areas corresponding to areas of identified soil and/or groundwater contamination and potential USTs at the Site were identified (see Figure 6-1):

- The Southwest Cleanup Action Area includes the West UST and an approximately 700 square foot area near MW-04 where free product was previously identified.
- The Southeast Cleanup Action Area includes an approximately 1000 square foot area along the southeast portion of the Property, extending into the South ROW, where soil contamination was identified surrounding the excavation area of the former decommissioned USTs and the two off-property USTs (the South USTs) located adjacent to the southern parcel boundary of the Property.

6.2 Cleanup Technologies

Cleanup technologies initially considered for cleanup options at the Site included the following:

- Excavation and offsite disposal
- Bioremediation via backfilling excavations
- In-situ chemical oxidation
- Permeable reactive barriers
- Pump and treat system

Due to the environmental and hydrogeological conditions on the Property, pump and treat systems and permeable reactive barriers were not considered to be feasible and were not investigated further. The poor groundwater recharge observed during monitoring events and the tight lithology logged during previous environmental investigations limit the ability of a pump and treat system to effectively operate and remove impacted groundwater. Similarly, slow groundwater flow prevents a permeable barrier wall from reducing concentrations on the Property within a reasonable timeframe.

6.3 Potential Cleanup Options

Cleanup technologies were assembled into a range of cleanup options. The objectives of the cleanup options include:

- Remove sources of COCs from the Property
- Remove free product from the Property
- Prevent contaminant migration
- Reduce levels of COCs below the CULs in soil and groundwater or eliminate the exposure pathways

Potential cleanup options are described below with estimated probable costs.

6.3.1 Option 1—No Further Action

Under Option 1, no additional action is taken to address the impacted soil or groundwater at the Site and the potential risks remain. As a result, no further consideration is given to Option 1.

6.3.2 Option 2—Excavation and Backfill with Bioremediation Compound

Option 2 addresses the probable source of groundwater contamination at MW-04 by decommissioning via removal the West UST and removing soil with free product impacts (elevated COCs and/or free-product) from in the Southwest Cleanup Action Area. In the Southeast Cleanup Action Area impacted soil is removed and adjacent South USTs are decommissioned. Within both cleanup action areas, impacted soil is excavated to approximately 2 feet below the smear zone. Any remaining soil impacts in the smear zone soil are addressed by the placement of an oxygen releasing compound (ORC) into the excavation base prior to backfilling.

Option 2 includes the following actions:

UST Removal—Excavate and remove West UST located in Southwest Cleanup Action Area.

UST Decommissioning—Decommission in-place the two South USTs in the Southeast Cleanup Action Area that are located below a natural gas line. Decommissioning will include removal of any remaining product/water present in the USTs following inertion and triple rinsing, and disposing of remaining product/water and rinsewater offsite at a licensed facility. The USTs will then be filled with a controlled density, inert slurry material to decommission in-place.

Excavation and offsite disposal—Excavate the extent of free product and elevated COC impacts in the Southwestern Cleanup Action Area which is assumed to be approximately 130 cubic yards of material to a maximum depth of 5 feet. In the Southeastern Cleanup Action Area, approximately 200 cubic yards of contaminated soil down will be excavated to a maximum depth of 5.5 feet. All

excavated soil will be disposed of offsite at an appropriate landfill. Groundwater, stormwater, and/or surface water that accumulates in the excavation will be removed from the excavation, treated, and discharged to the municipal sanitary sewer. Field screening, including visual and olfactory observations of the excavated material and vapor screening with a photoionization detector, will be used to guide the excavation. Completed excavation extents would be confirmed by base and sidewall samples consistent with Ecology's *Site Assessment Guidance for Underground Storage Tank Systems* (Ecology 2022). Following confirmation that impacted soil has been removed, the excavation areas will be backfilled with clean imported material.

ORC—Apply solid phase ORC mixed with imported clean fill in the base of the excavation for long-term treatment of any remaining soil impacts or migrating COCs. ORC should be preferentially applied to areas upgradient of deeper groundwater impacts and the mixing of ORC into deeper soils should be considered where possible.

Institutional Controls—Record an environmental covenant to prevent the future use of shallow groundwater until such a time that monitoring indicates no COC impacts remain.

Monitoring—Monitor groundwater on a quarterly (i.e., four times a year) basis for 2 years or until impacts are no longer observed.

Cost—The estimated probable cost for Option 2 is $386,400 (-30%/+50%). Details are presented in Table 6-1.

6.3.3 Option 3—Excavation and In-situ Chemical Oxidation Injections

Option 3 relies on a shallower excavation depth and in-situ injection of an oxidizing compound to address impacted soil and groundwater. Option 3 consists of the same elements as Option 2 (including free product removal) with the following changes:

Excavation and offsite disposal—Excavation in the Southeastern and Southwestern Cleanup Action Areas will only extend to a depth of 3 feet to remove soil contamination above the groundwater table for an estimated 190 cubic yards of soil removal. Dewatering within the excavation should not be required. The excavation areas will be backfilled with clean imported material.

Oxidant Injections—Inject oxidant into the subsurface in the remedial action areas of the Property down to a depth of 14 feet. For the purposes of this evaluation, it is assumed that there will be 20 injection points with 4 injection events that will occur over the course of 12 months.

Monitoring—Monitor groundwater on a quarterly (i.e., four times a year) basis for 2 years or until impacts are no longer observed.

Cost—The estimated probable cost for Option 3 is $653,600 (-30%/+50%). Details are presented in Table 6-2.

6.3.4 Option 4—Complete Excavation

Option 4 relies on excavation to remove all contaminated media on the Property. Option 4 consists of the same elements as Option 2 with the following changes:

Excavation and offsite disposal—Excavation to extent of soil impacts (i.e. to a depth of approximately 14 feet) in the Southeastern Cleanup Action Area. Excavate to extent of free product and soil impacts in Southwest Cleanup Action Area, for cost estimating purposes, this depth is assumed to be 12 feet bgs, corresponding to the deepest observed soil sheen in MW-04/SB-3. The total amount of soil removed for Option 4 is assumed to be 830 cubic yards. Dewatering and shoring are required for both excavations. Excavation in the vicinity of the natural gas line overriding the South USTs would involve special accommodations for the pipe and close coordination with the natural gas utility.

Monitoring—Monitor groundwater semi-annually (i.e., two times per year) for two years post remedy to confirm success of remedy.

Cost—The estimated probable cost for Option 4 is $1,025,200 (-30%/+50%). Details are presented in Table 6-3.

7 Preliminary Evaluation of Cleanup Options

7.1 Model Toxics Control Act Threshold Requirements

Criteria typically used to evaluate cleanup alternatives are defined in the MTCA regulation (Washington Administrative Code [WAC] 173-340-360). These criteria are as follows:

- Threshold requirements:
  - Protect human health and the environment
  - Comply with cleanup standards (WAC 173-340-700 through 173 340 760)
  - Comply with applicable state and federal laws (WAC 173-340-710)
  - Provide for compliance monitoring (WAC 173-340-410 and 173-340-720 through 173-340-760)
- Other requirements:
  - Use permanent solutions to the maximum extent practicable
  - Provide for a reasonable restoration timeframe
  - Consider public concerns (WAC 173-340-600)

Option 1 does not pass the threshold requirements and is not discussed further. Options 2 through 4 meet MTCA threshold requirements and are therefore evaluated further.

The preliminary CULs, presented in Tables 2-1 and 2-2 are consistent with MTCA. Additionally, local, state, and federal laws related to environmental protection, health and safety, transportation, and disposal would apply to each proposed option. Applicable or relevant and appropriate requirements include:

- Resource Conservation and Recovery Act: Disposal of any material off-site would be subject to the Resource Conservation and Recovery Act to ensure appropriate disposal of waste, including hazardous and non-hazardous material. All options include soil excavation and off-site disposal; the material will be profiled and disposed of at a licensed Subtitle D disposal facility.
- The Washington State Environmental Policy Act (SEPA): The SEPA process is undertaken when a governmental entity makes a decision. A SEPA checklist is completed by the lead governmental agency to make a determination of impact.
- During remedial design, the selected option would be designed to comply with applicable, relevant, and appropriate requirements.

7.2 Evaluation Factors

The cleanup options are evaluated by the criteria below. The criteria used were consistent with WAC 173-340-360(3)(f). See Table 7-1 for a quantitative ranking of evaluation factors.

7.2.1 Protectiveness

Protectiveness is a factor by which human health and the environment are protected by the cleanup action, including the degree to which existing risks are reduced; the time required to reduce risk at the facility and attain cleanup standards; on-site and off-site risks resulting from implementing the cleanup option; and improvement of the overall environmental quality.

Option 4 had the highest score for protectiveness, as it removes contamination through the entire vertical extent of the plume over a short time period. Options 2 and 3 scored equally in this category because while the sources of contamination are removed from soil and groundwater, the residual concentrations are addressed over a longer period of time.

7.2.2 Permanence

Permanence is a factor by which the cleanup action alternative permanently reduces the toxicity, mobility, or volume of hazardous substances. It takes into account the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the degree of irreversibility of the waste-treatment process, and the characteristics and quantity of treatment residuals generated.

Option 4 earned the highest score for permanence as this remedy completely removes the sources of contamination and removes all of the impacted media. Options 2 and 3 earned equal scores in this category. Due to the tight nature of the formation, multiple injection events will likely be required for Option 3 to be an effective, permanent solution. Option 2 relies on the dispersion of ORC into the groundwater and subsurface soils in order to be effective. If this dispersion is not achieved, the remedy may be less permanent in the long-term.

7.2.3 Effectiveness over Long Term

Long-term effectiveness includes the degree of certainty that the alternative will be successful; the reliability of the alternative for the expected duration of hazardous substances remaining on site at concentrations that exceed CULs; the magnitude of residual risk with the alternative in place; and the effectiveness of controls required to manage treatment residues or remaining wastes.

Option 4 scored highest for effectiveness over the long-term as this remedy completely removes the sources of contamination and removes all of the impacted media. Due to the subsurface conditions Option 3 may require multiple injections which could affect the effectiveness of the remedy over the long-term. Options 2 scored lowest in this category. Option 2 required the dispersion of the ORC in the subsurface which also has the potential to lengthen the treatment period.

7.2.4 Management of Short-Term Risks

Short-term risks to remediation workers, the public, and the environment are assessed under this criterion. Generally, short-term risks are expected to be linearly related to the amount of material handled, treated, and/or transported and disposed of (e.g., worker injury per cubic yard excavated [equipment failure], public exposure per cubic yard-mile transported [highway accident]).

This factor addresses the risk to human health and the environment associated with the alternative during construction and implementation, and the effectiveness of measures that will be taken to manage such risks. Potential public exposure during transport, handling, and excavation required for the alternatives could lead to short-term risks.

Option 2 has the highest score for management of short-term risks because the remedy requires minimal contaminated soil disturbances and does not remove large volumes of contaminated groundwater from the subsurface, reducing the potential for worker exposures. Additionally, the amendments (ORC) used in Option 2 does not pose a risk to the public or construction workers. The chemical oxidants used for Option 3 pose some human health and safety risk during the injection process. Option 4 involves more risk because it requires larger volumes of contaminated media to be handled, shoring, and dewatering which increases the risk for workers during the excavation and transportation of materials. Excavation near the natural gas line overriding the South USTs under Option 4 would also increase the risk to workers.

7.2.5 Technical and Administrative Implementability

This factor addresses whether the alternative can be implemented and is technically possible. The availability of necessary materials, regulatory requirements, scheduling, access for construction operations and monitoring, and integration with existing and neighboring site uses must be considered.

Option 2 scored highest for implementability due to minimal site disturbances. Due to the shallow groundwater, the injections for Option 3 may be more difficult to complete without having the oxidant daylight. Option 4 earned a lower score in this category due to the equipment and amount of earthwork required to implement as well as the special considerations needed for excavation in the vicinity of the natural gas line.

7.2.6 Public Concerns

This factor includes considering concerns from individuals, community groups, local governments, tribes, federal and state agencies, and any other organization that may have an interest in or knowledge of the Site and that may have a preferred alternative. Through the public process, the public will have an opportunity to review and comment on plans.

8 Recommendations

Based on the results of the data gap investigation and cleanup options evaluation, Option 2 is the recommended remedial alternative. Option 2 involves the excavation and removal of impacted soils up to 5.5 feet bgs and backfill of excavations with a mixture of imported fill and solid phase ORC. Option 2 addresses the source of contamination by decommissioning the underground storage tanks on and adjacent to the Property and removing free product. While the excavation and soil removal would only extend a few feet below the water table due to soil stability considerations, targeted soil mixing could be included to get ORC product deeper into the subsurface upgradient of the deeper groundwater impacts. Option 2 is highly implementable by removing source contamination from the vadose zone soil and by treating residual groundwater through oxidation and biodegradation. Option 2 has a high degree of permanence, is protective, meets all other MTCA requirements, and is consistent with Ecology's model remedy structure for sites with petroleum impacts to groundwater (Ecology 2017).

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Limitations

The services undertaken in completing this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, or the use of segregated portions of this report.

Figures

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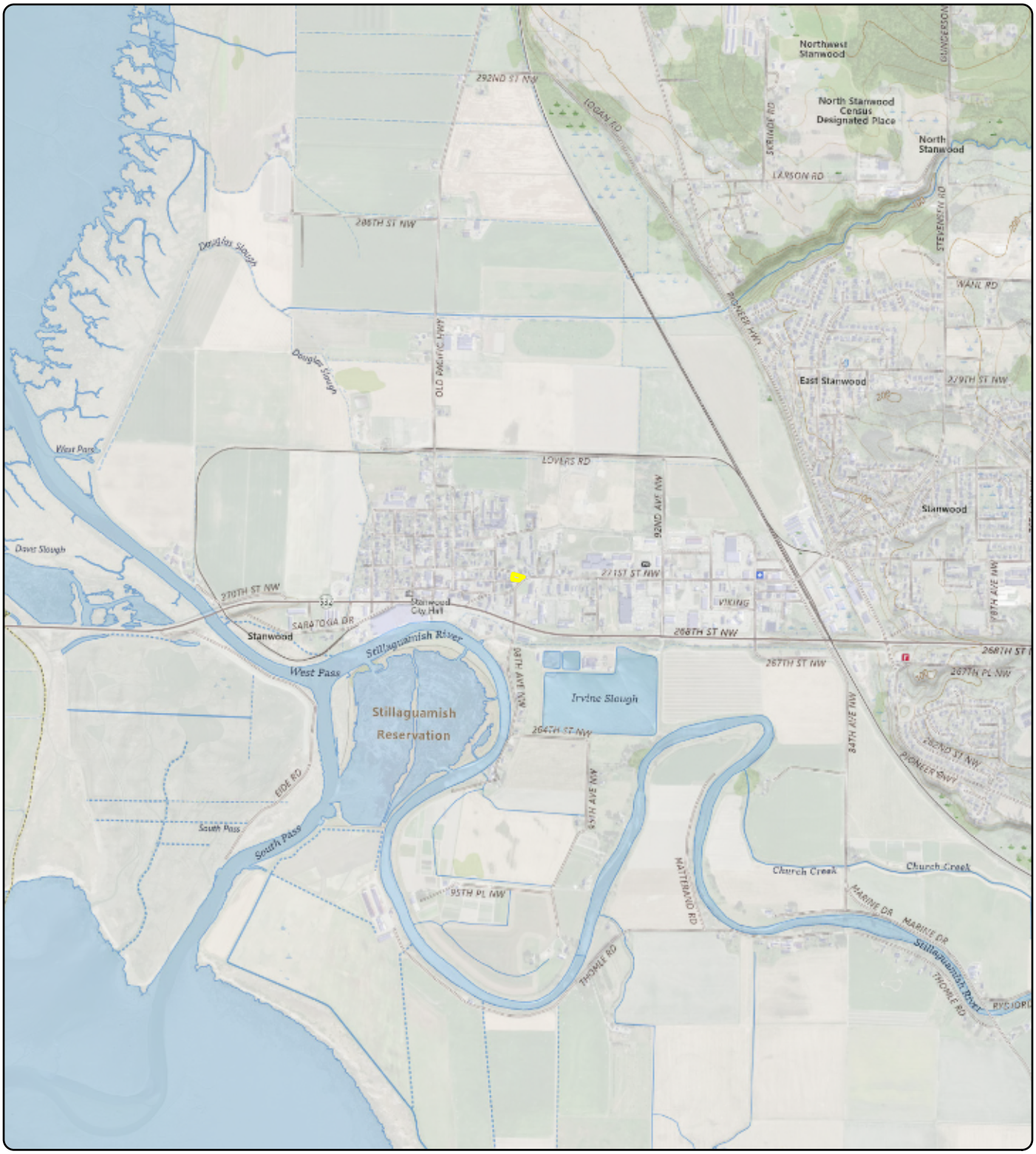

Notes
U.S. Geological Survey 7.5-minute topographic quadrangle (2020): Stanwood.
Township 32 north, range 3 east, section 25.

Data Source
Property boundary obtained from Snohomish County.

Legend

Property Parcel

Figure 1-1
Property Location

Raplee Property
Stanwood, Washington

0 2,000
Feet

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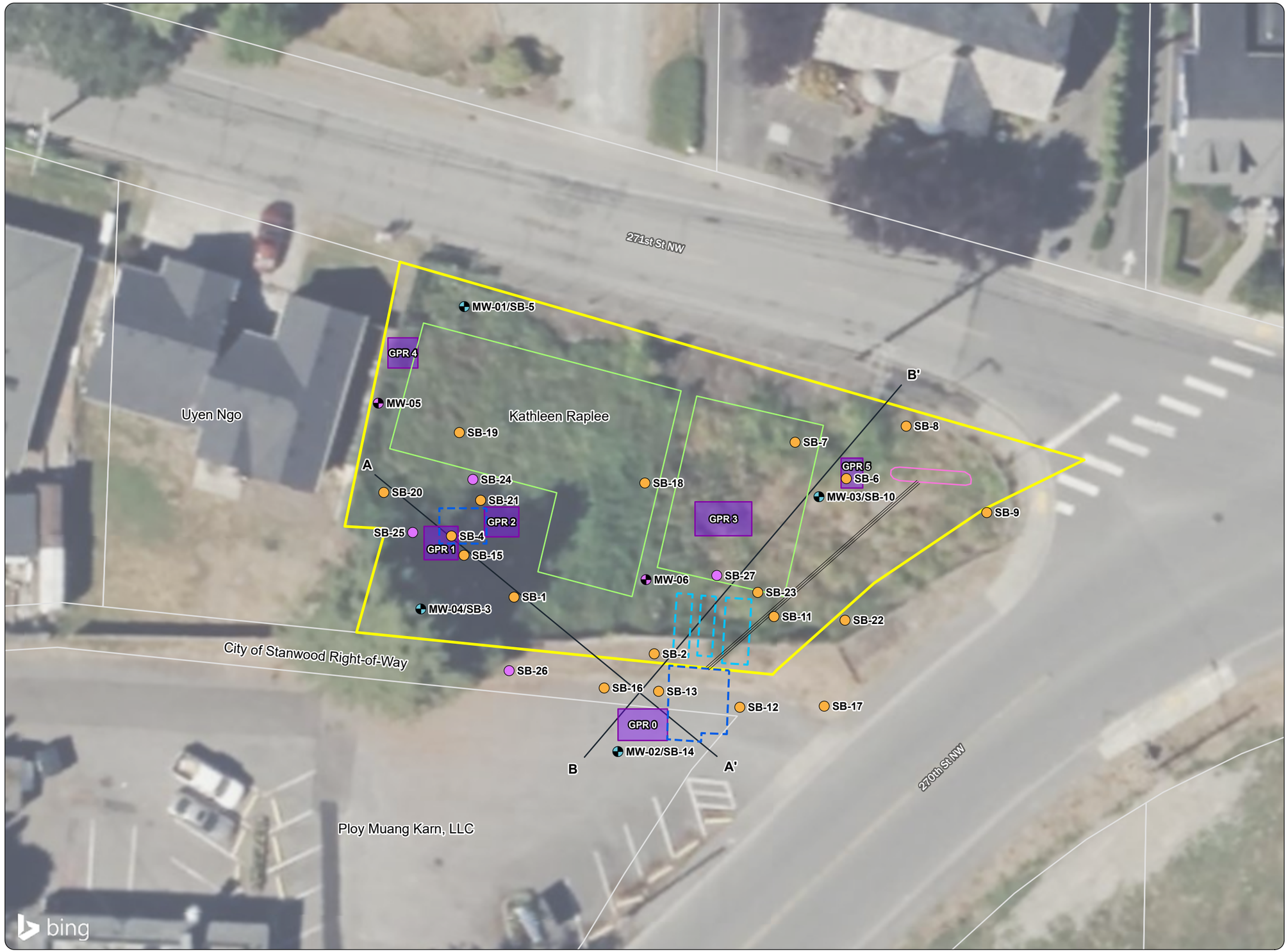
Print Date: 12/10/2024
Reviewed By: cwise
Produced By: bmurphy
Project: M1030.08.003

Figure 2-1
Sample Locations and Site Features

Raplee Property
Stanwood, Washington



Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Borings
- Monitoring Well
- 2024 GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Former Product Line
- Geologic Cross Section
- Property Parcel
- Tax Lot

Notes
Parcel ownership noted on tax lots in figure.
All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
GPR = ground penetrating radar.
UST = underground storage tank.

0 20
Feet

Data Sources
Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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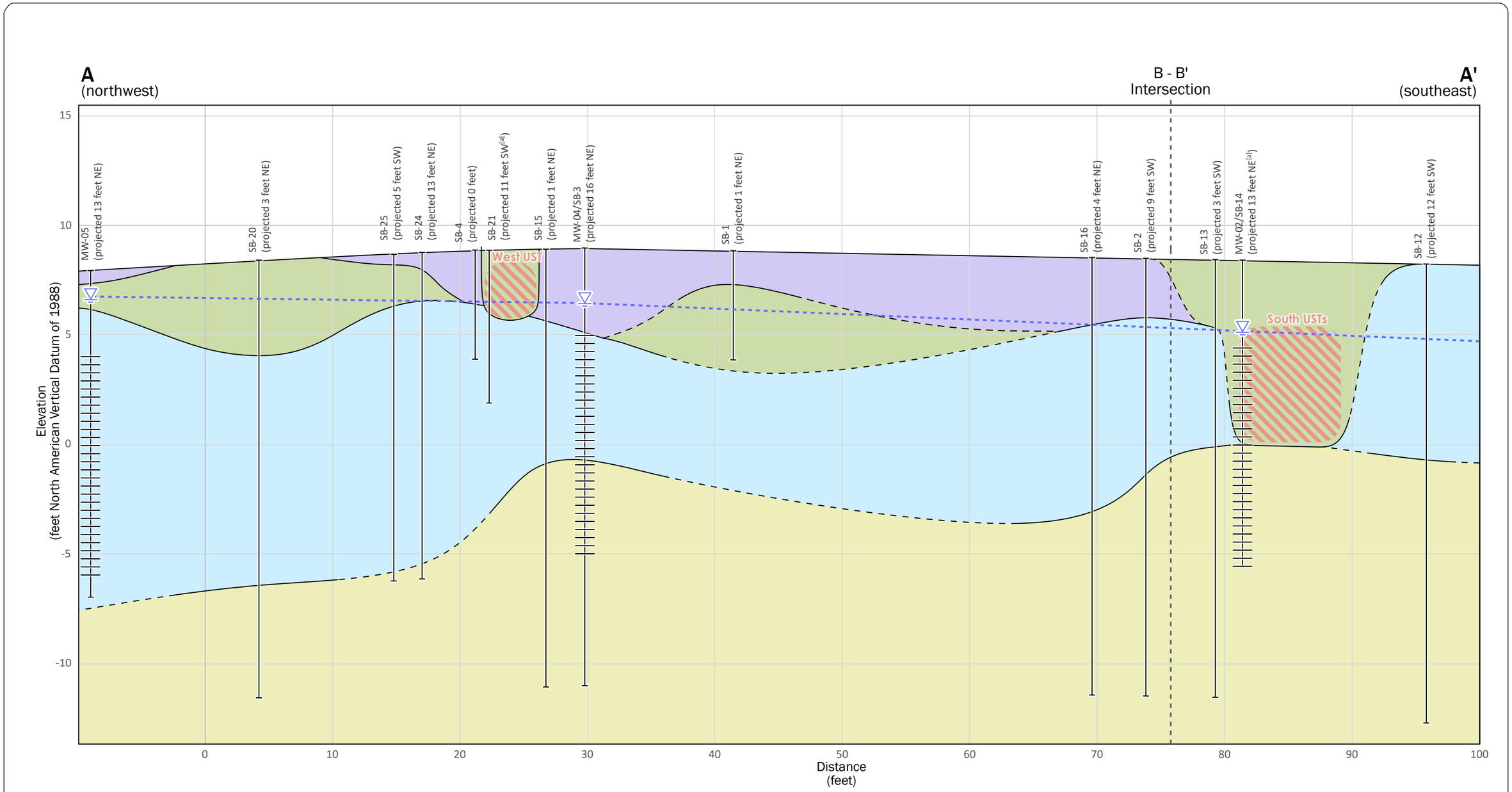
Path: X:\O_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 2-1 Sample Locations and Site Features
Print Date: 4/24/2025
Reviewed By: cwise
Produced By: stumer
Project: M1030.08.003



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Lithology

- Coarse-grained gravel fill
- Fine-grained fill with sand and occasional gravel
- Clay to silt
- Sandy silt to silt with intermittent lenses of silty sand with occasional gravel

- Water level at time of site reconnaissance visit
- Approximate water table
- Presumed UST Location

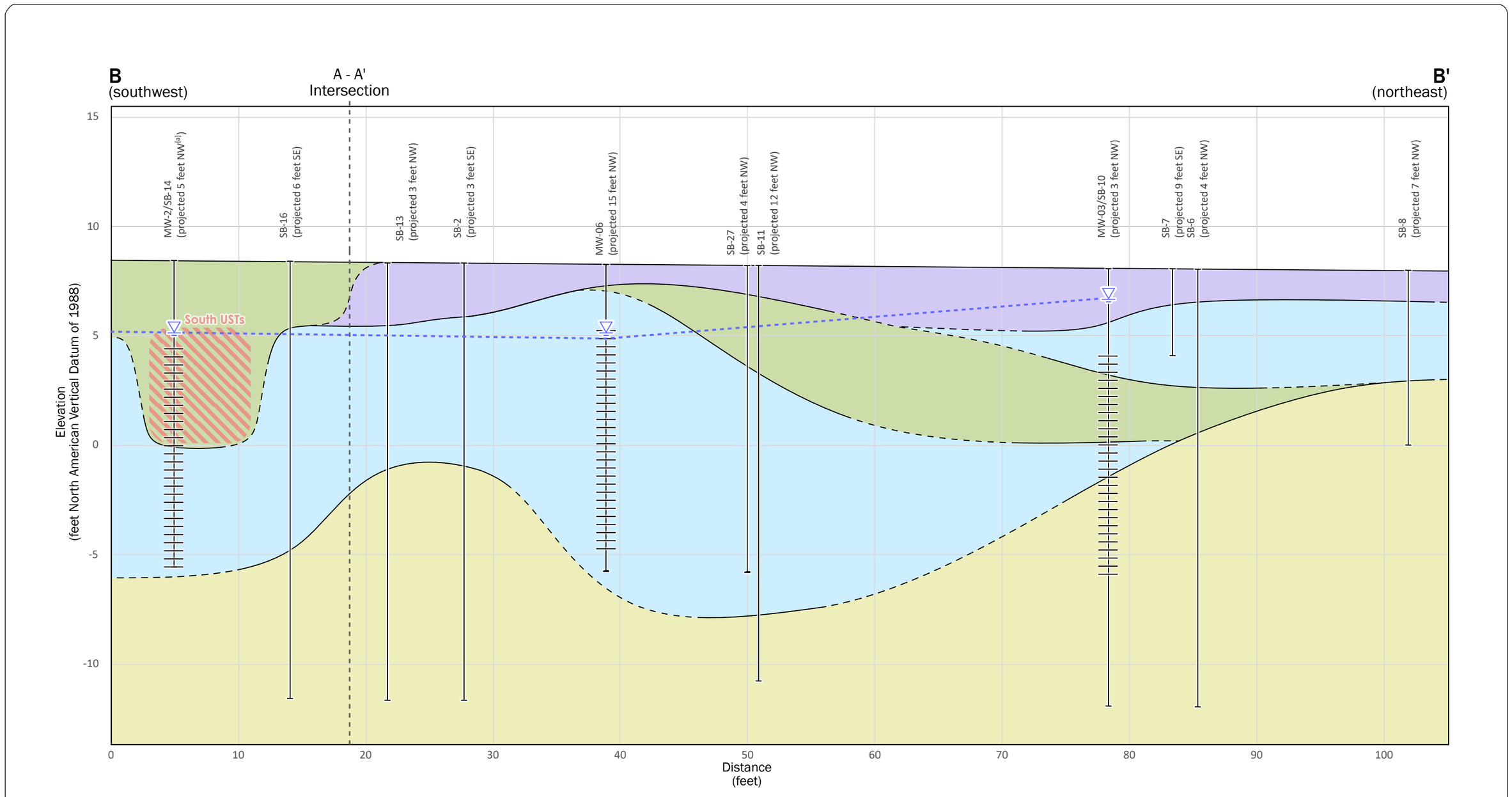
Boring Features

- Top of boring
- Well screen
- Bottom of boring

Notes:
[a]Location shown is projected; well did not physically intersect USTs.
Contacts are dashed where inferred.
Groundwater elevations were measured on October 17, 2024.
The vertical axis has 2× exaggeration for visualization purposes.
Boring locations, lithology, and elevation from SAIC 2006 Site Investigation and the October 2024 data gaps investigation.
NE = northeast.
UST = underground storage tank.
SW = southwest.

Figure 2-2
Hydrogeologic Cross Section A - A'

Raplee Property Site
Stanwood, Washington



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Lithology

- Coarse-grained gravel fill
- Fine-grained fill with sand and occasional gravel
- Clay to silt
- Sandy silt to silt with intermittent lenses of silty sand with occasional gravel

- Water level at time of site reconnaissance visit
- Approximate water table
- Presumed UST Location

Boring Features

- Top of boring
- Well screen
- Bottom of boring

Notes:
[a]Location shown is projected; well did not physically intersect USTs.
Contacts are dashed where inferred.
Groundwater elevations were measured on October 17, 2024.
The vertical axis has 2× exaggeration for visualization purposes.
Boring locations, lithology, and elevation from SAIC 2006 Site Investigation and the October 2024 data gaps investigation.
NW = northwest.
UST = underground storage tank.
SE = southeast.

Figure 2-3
Hydrogeologic Cross Section B - B'

Raplee Property Site
Stanwood, Washington

Figure 2-4
October 2024 Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington

Legend

- Potentiometric Groundwater Contour (feet NAVD 88)
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel

Notes

Depths to groundwater measured between 10:07 am and 1:29 pm on October 17, 2024.
All property feature locations are approximate.
NAVD 88 = North American Vertical Datum of 1988.

0 20
Feet

Data Sources

Aerial photograph obtained from Esri; tax lot data obtained from Snohomish County.

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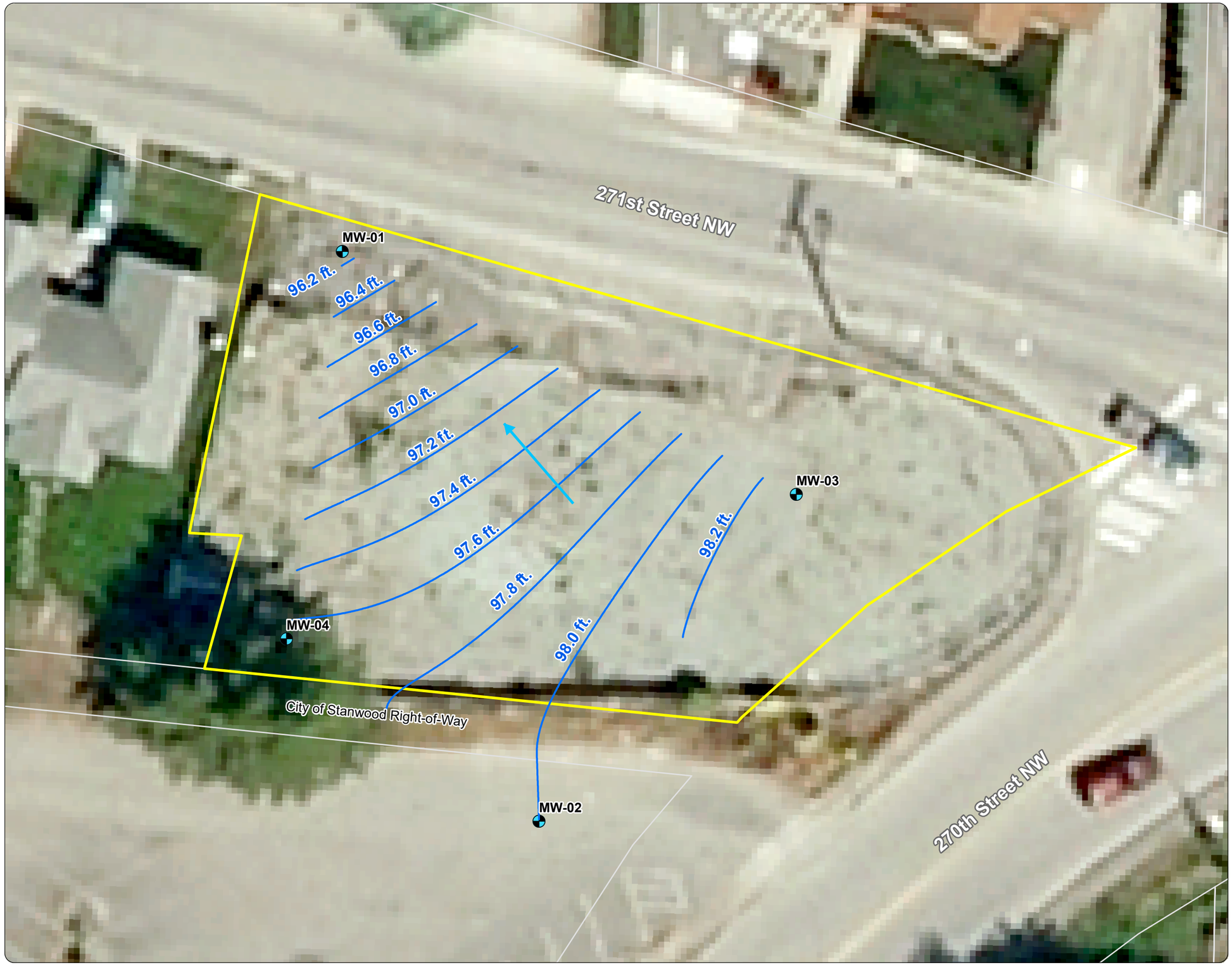

Figure 2-5
February 2019 Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington

Legend

- Potentiometric Groundwater Contour
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel
- Tax Lot

Notes:
All property feature locations are approximate.
TOC elevations are expressed in feet relative to an arbitrary datum of 100.00 feet at MW-1 (SAIC, 2006).
TOC = top of casing.

0 25
Feet

Source: Aerial photograph obtained from Mapbox. Property boundary obtained from Snohomish County GIS.

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Figure 2-6
July 2024 Potentiometric Groundwater Contours

Raplee Property
Stanwood, Washington

Legend

- Potentiometric Groundwater Contour
- Approximate Groundwater Flow Direction
- Monitoring Well
- Property Parcel
- Tax Lot

Notes:
Depths to groundwater measured between 1:01 pm and 1:27 pm on July 12, 2024.
All property feature locations are approximate.
TOC elevations are expressed in feet relative to an arbitrary datum of 100.00 feet at MW-04 SAIC, 2006).
TOC = top of casing.

0 25
Feet

Source: Aerial imagery obtained from Bing. Property boundary obtained from Snohomish County GIS.

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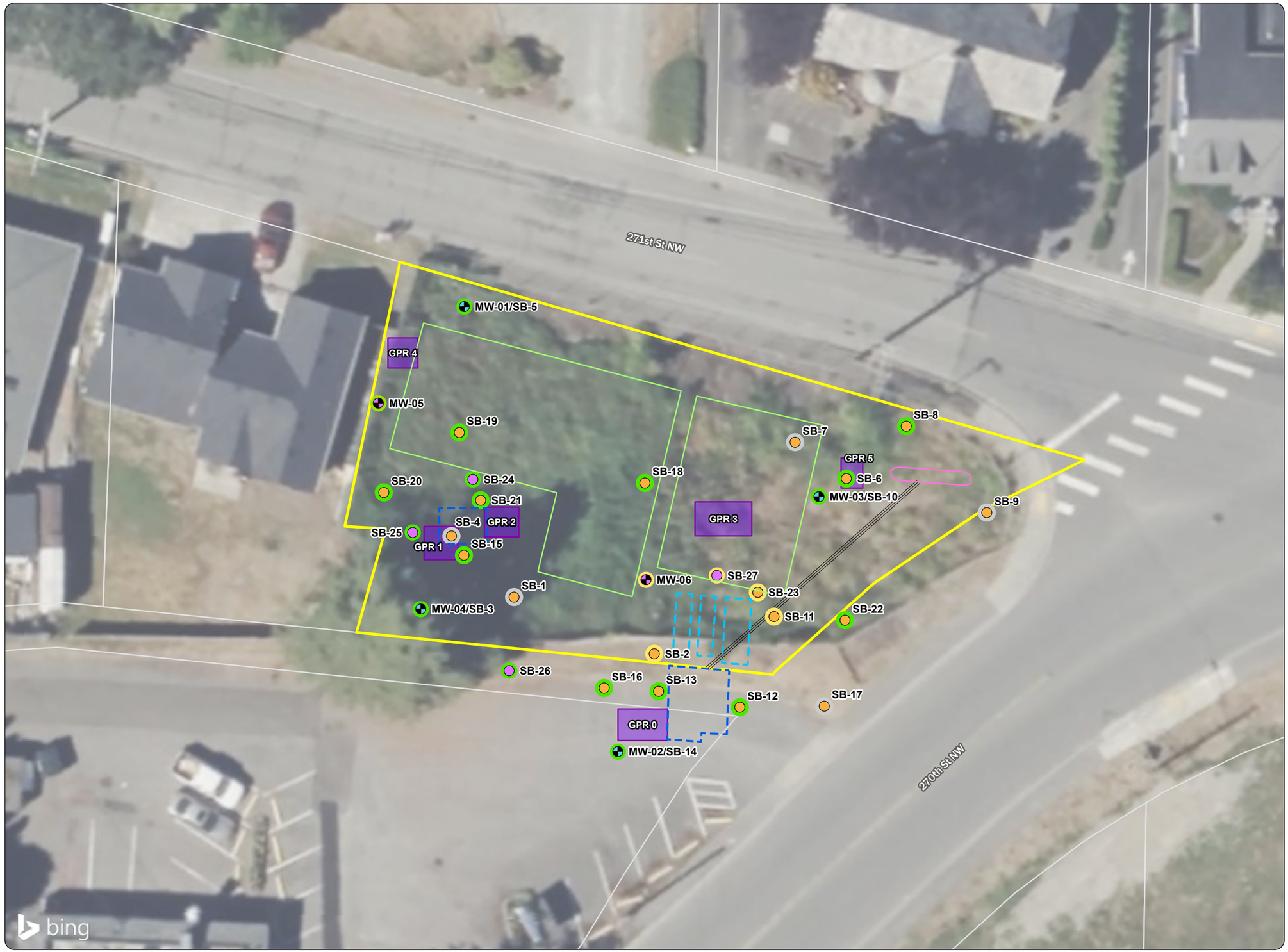
Print Date: 7/31/2024
Approved By:
Produced By: gjaravata
Project: 1030.08

Figure 3-1
Soil Sample Locations and Exceedances

Raplee Property
Stanwood, Washington



Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Boring
- Monitoring Well

Soil Exceedances

- Petroleum, BTEX, or lead non-detect or detected below the CUL.
- Petroleum, BTEX, or lead detected above the CUL.
- Soil sample not collected from boring.
- 2024 GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
BTEX = benzene, toluene, ethylbenzene, and xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
Petroleum = gasoline-range hydrocarbons, diesel-range hydrocarbons, and/or motor oil range hydrocarbons.
ug/L = micrograms per liter.
UST = underground storage tank.

0 20
Feet

Data Sources

Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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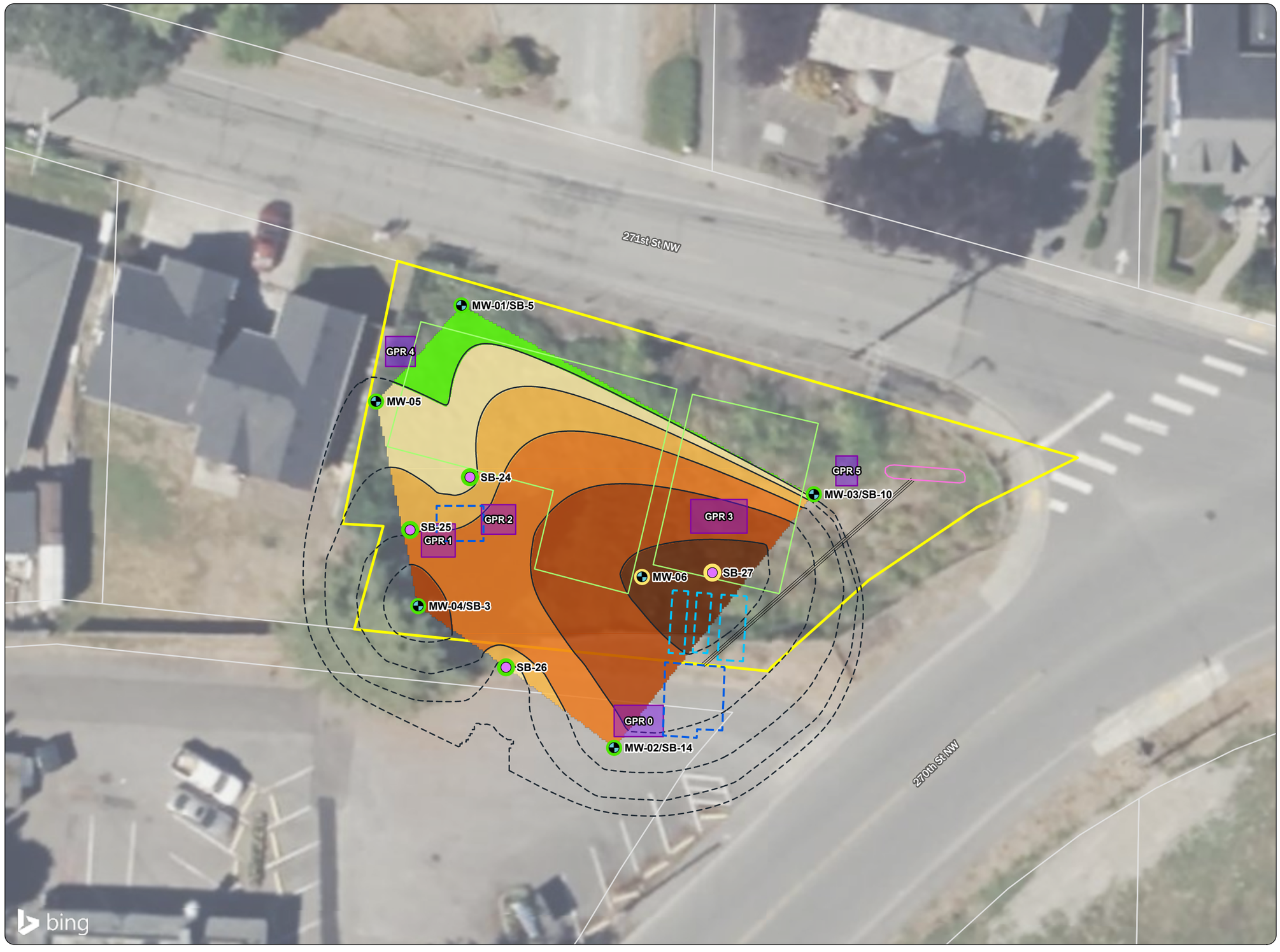
Path: X:\O_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 3-1 Soil Sample Locations and Exceedances
Print Date: 4/24/2025
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

Figure 3-2
October 2024 Groundwater Sample Locations and Exceedances

Raplee Property
Stanwood, Washington



Legend

- Reconnaissance Groundwater
- Monitoring Well

Benzene Exceedances

- Benzene not detected in groundwater
- Benzene detected above the CUL
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- 2024 GPR Anomaly
- Isoconcentration Contour (Dashed Where Inferred)

Diesel + Motor Oil-Range Hydrocarbons (ug/L)

- 0 - 500
- 500 - 1,000
- 1,000 - 2,000
- 2,000 - 4,000
- 4,000 - 8,000
- 8,000 - 16,000

- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
There were no CUL exceedances of gasoline-range hydrocarbons, ethylbenzene, toluene, or xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
ug/L = micrograms per liter.
UST = underground storage tank.

0 20
Feet

Data Sources

Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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Path: X:\Q_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 3-2 October 2024 Groundwater Sample Locations and Exceedances
Print Date: 5/13/2025
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

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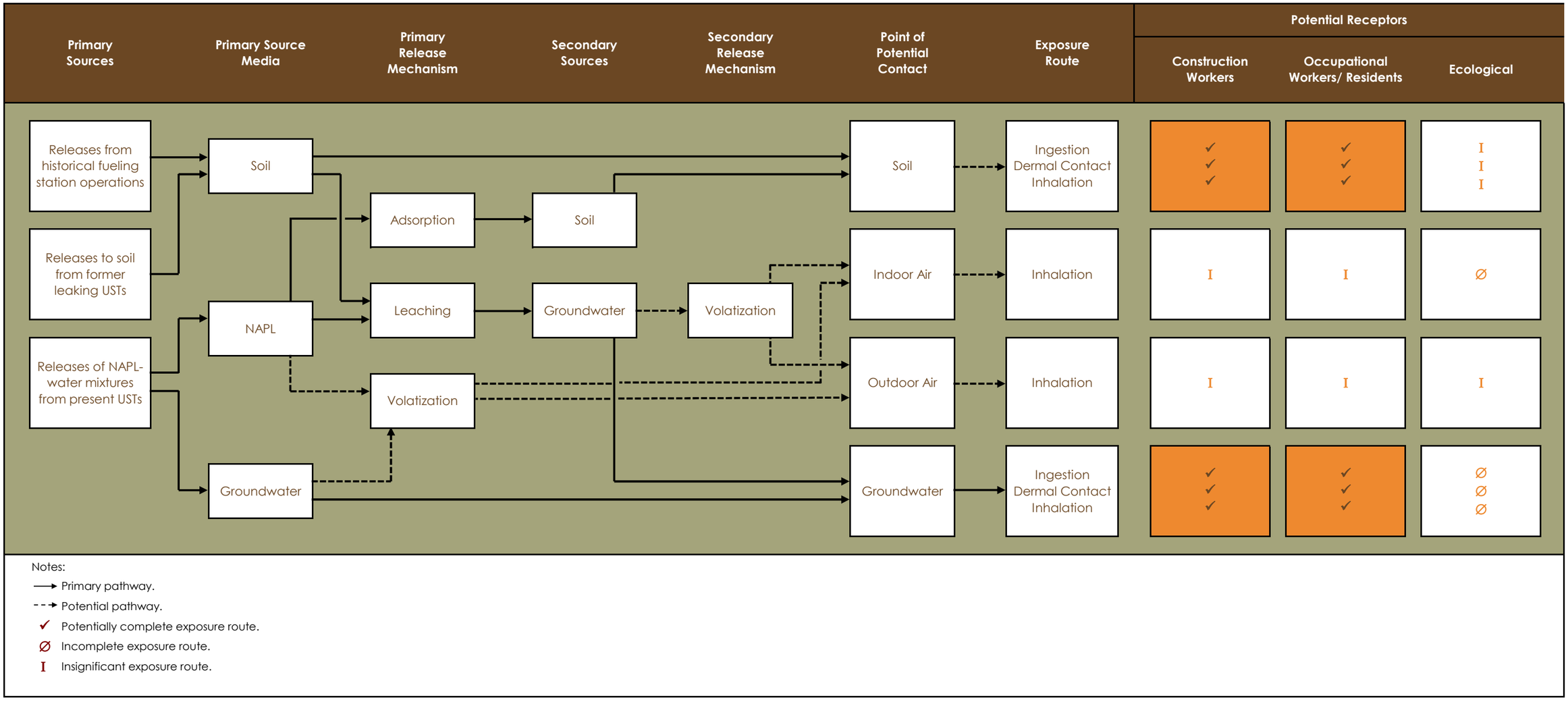
Figure 5-1
Conceptual Site Model
Raplee Property
City of Stanwood, Stanwood, Washington



Notes:

→ Primary pathway.

- - → Potential pathway.

✓ Potentially complete exposure route.

Ø Incomplete exposure route.

I Insignificant exposure route.

M1030.08.003, 1/28/2025, Fig5-1_CSM.xlsx

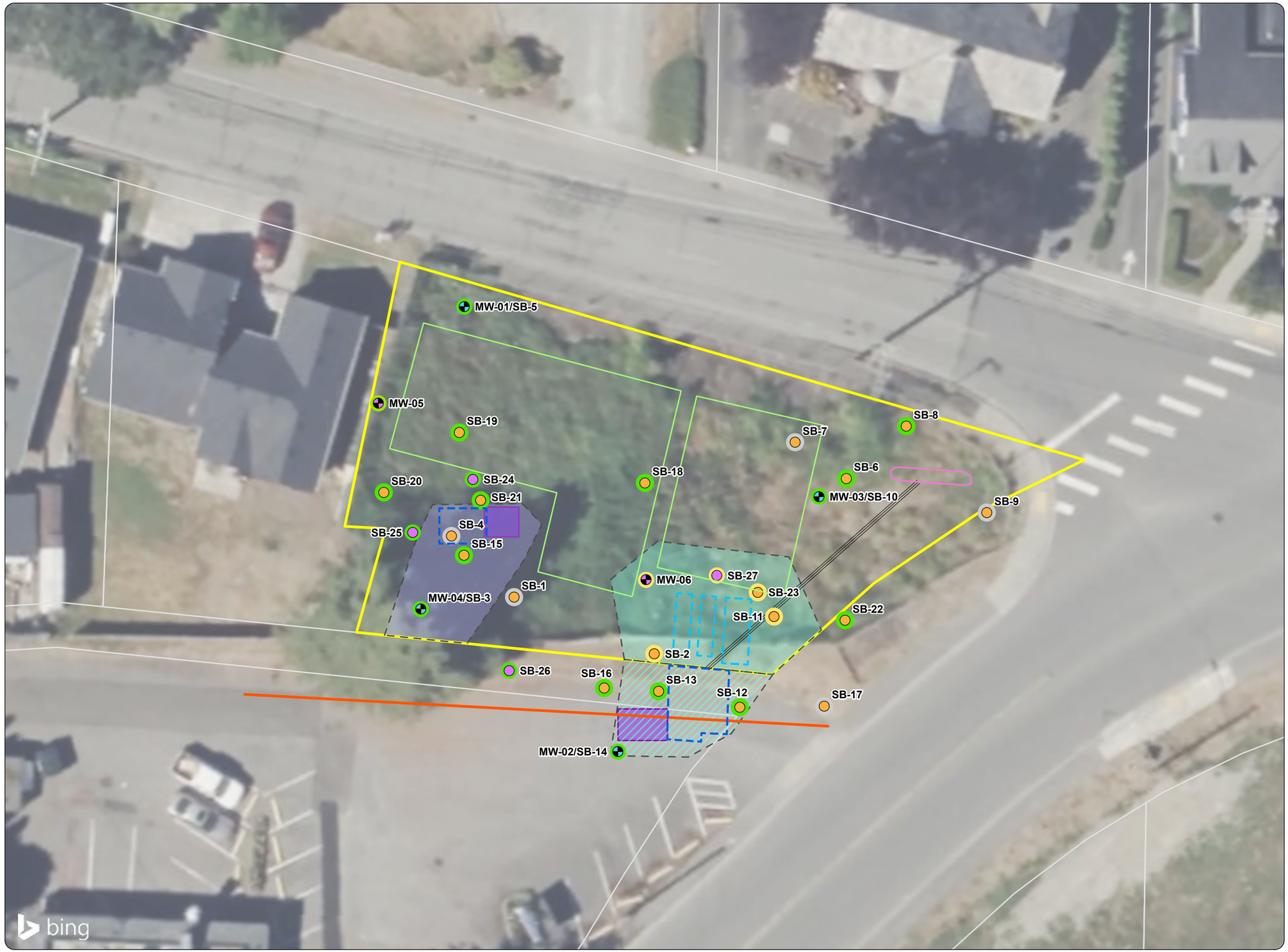


Figure 6-1
Proposed Cleanup Action Areas

Raplee Property
Stanwood, Washington

Legend

- October 2024 Soil Boring
- October 2024 Monitoring Well Boring
- Historical Soil Boring
- Monitoring Well

Soil Exceedances

- Petroleum, BTEX, or lead non-detect or detected below the CUL.
- Petroleum, BTEX, or lead detected above the CUL.
- Soil sample not collected from boring.
- Proposed Southeast Excavation
- Proposed Southwest Excavation
- UST Decommissioning In-Place (Access Limited)
- 2024 UST GPR Anomaly
- Approximate Existing UST (SAIC 2006)
- Former UST
- Former Building
- Former Service Island
- Natural Gas Line
- Former Product Lines
- Property Parcel
- Tax Lot

Notes

All property feature locations are approximate.
Former property features obtained from previous reports (Pinnacle 2005; SAIC 2006).
BTEX = benzene, toluene, ethylbenzene, and xylenes.
CUL = MTCA Method A cleanup level.
GPR = ground penetrating radar.
Petroleum = gasoline-range hydrocarbons, diesel-range hydrocarbons, and/or motor oil range hydrocarbons.
UST = underground storage tank.

0 20
Feet

Data Sources

Aerial imagery obtained from Bing; property boundary obtained from Snohomish County.

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Path: X:\0_MFA_Projects\M1030\08\003\Pro\M1030_08_003_004.aprx\Fig 6-1 Proposed Cleanup Action Areas
Print Date: 4/24/2025
Reviewed By: cwise
Produced By: sturner
Project: M1030.08.003

Tables

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Table 2-1
Soil Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Sample Name	Collection Date	Sample Depth (ft bgs)	TPH (mg/kg)				VOCs (mg/kg)				Metals (mg/kg)
			Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]	Total Lead
MTCA Method A, Unrestricted Land Use[1]:				30[c]	2,000	2,000	2,000	0.030	6.0	7.0	9.0	250
SB-2	SB-2-3	02/07/2006	3.0	340	1,200	8,700	9,900	0.3	0.1	< 0.08	2.1	--
	SB-2-14	02/07/2006	14.0	48	140	970	1,110	0.2	0.01	< 0.02	0.2	6.85
	SB-2-18	02/07/2006	18.0	< 1.1	< 3.0	< 10	< 10	< 0.006	< 0.006	< 0.006	< 0.02	--
MW-04/SB-3	SB-3-6	02/07/2006	6.0	< 1.1	15	150	165	< 0.005	< 0.005	< 0.005	< 0.2	6.03
	SB-3-15	02/07/2006	15.0	< 0.9	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.01	--
MW-01/SB-5	SB-5-18	02/07/2006	18.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-6	SB-6-6	02/07/2006	6.0	< 1.2	< 3.0	< 10	< 10	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-6-14	02/07/2006	14.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-8	SB-8-6	02/07/2006	6.0	< 0.9	< 3.0	17	18.5	< 0.005	< 0.005	< 0.005	< 0.01	--
MW-03/SB-10	SB-10-6	02/07/2006	6.0	< 1.6	< 3.0	< 10	< 10	< 0.008	< 0.008	< 0.008	< 0.02	--
	SB-10-16	02/07/2006	16.0	< 0.9	< 3.0	< 10	< 10	< 0.004	< 0.004	< 0.004	< 0.01	--
SB-11	SB-11-4	02/07/2006	4.0	2,000	68	230	298	23	44	25	240	--
	SB-11-6	02/07/2006	6.0	65	7.2	37	44.2	3.6	0.9	0.5	9.7	4.4
	SB-11-14	02/07/2006	14.0	18	< 3.0	13	14.5	5.6	0.4	0.2	2	--
	SB-11-19	02/07/2006	19.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-12	SB-12-17	02/07/2006	17.0	< 0.9	< 3.0	11	12.5	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-13	SB-13-10	02/07/2006	10.0	5.1	27	190	217	0.007	< 0.004	< 0.004	0.03	--
	SB-13-20	02/07/2006	20.0	< 0.9	< 3.0	< 10	< 10	< 0.004	< 0.004	< 0.004	< 0.01	--
MW-02/SB-14	SB-14-4	02/07/2006	4.0	19	25	73	98	0.02	0.003	0.012	0.006	35.4
	SB-14-17	02/07/2006	17.0	< 0.9	< 3.0	11	12.5	< 0.005	< 0.005	< 0.005	< 0.01	--
SB-15	SB-15-14	02/07/2006	14.0	< 1.4	< 3.0	< 10	< 10	< 0.007	< 0.007	< 0.007	< 0.02	--
SB-16	SB-16-4	02/07/2006	4.0	< 1.3	< 3.0	< 10	< 10	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-16-14	02/07/2006	14.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-18	SB-18-4	02/07/2006	4.0	1.5	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
	SB-18-14	02/07/2006	14.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-19	SB-19-4	02/07/2006	4.0	< 1.1	--	--	--	< 0.006	< 0.006	< 0.006	< 0.02	--
	SB-19-12	02/07/2006	12.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-20	SB-20-6	02/07/2006	6.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
	SB-20-14	02/07/2006	14.0	< 1.1	< 3.0	< 10	< 10	< 0.006	< 0.006	< 0.006	< 0.02	--
SB-21	SB-21-6	02/07/2006	6.0	< 1.1	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-22	SB-22-14	02/07/2006	14.0	< 1.0	< 3.0	< 10	< 10	< 0.005	< 0.005	< 0.005	< 0.02	--
SB-23	SB-23-5	04/05/2006	5.0	45	40	170	210	1.6	0.39	< 0.052	3.2	--

Table 2-1
Soil Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Sample Name	Collection Date	Sample Depth (ft bgs)	TPH (mg/kg)				VOCs (mg/kg)				Metals (mg/kg)
			Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]	Total Lead
			MTCA Method A, Unrestricted Land Use[1]:	30[c]	2,000	2,000	2,000	0.030	6.0	7.0	9.0	250
SB24	SB24-S-2.0	10/14/2024	2.0	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
	SB24-S-8.0	10/14/2024	8.0	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
SB25	SB25-S-2.0	10/14/2024	2.0	5 U	50 U	430	460	0.02 U	0.02 U	0.02 U	0.06 U	--
	SB25-S-5.5	10/14/2024	5.5	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
SB26	SB26-S-2.0	10/14/2024	2.0	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
SB27	SB27-S-2.0	10/14/2024	2.0	270	700	5,300	6,000	0.053	0.75	0.21	0.56	--
	SB27-S-7.5	10/14/2024	7.5	11 J	50 U	250 U	250 U	0.70	0.47	0.02 U	0.39	--
MW05	MW05-S-2.5	10/14/2024	2.5	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
	MWDUP-S-2.5	10/14/2024	2.5	5 U	50 U	250 U	250 U	0.02 U	0.02 U	0.02 U	0.06 U	--
MW06	MW06-S-5.5	10/14/2024	5.5	5 U	50 U	250 U	250 U	0.056	0.02 U	0.02 U	0.06 U	--
	MW06-S-10.5	10/14/2024	10.5	5 U	50 U	250 U	250 U	0.33	0.02 U	0.02 U	0.06 U	--

Notes

Data summation rules are as follows: non-detect results are multiplied by one-half when used for sums. When all results are non-detect, the highest reporting limit is provided as the sum.

Shading indicates values that exceed MTCA Method A screening criteria; non-detects (U) were not compared with screening criteria.

-- = not analyzed.

< = concentration is less than reported value.

ft bgs = feet below ground surface.

J = result is estimated.

mg/kg = milligrams per kilogram.

MTCA = Model Toxics Control Act.

TPH = total petroleum hydrocarbons.

U = result is non-detect at the method reporting limit.

VOC = volatile organic compound.

[a]Diesel+Oil is the sum of diesel- and motor oil-range hydrocarbons.

[b]Total xylenes are reported by the laboratory.

[c]Screening level for gasoline-range hydrocarbons with detectable benzene.

Reference

[1]Ecology. 2024. *Cleanup Levels and Risk Calculation (CLARC) table.* Washington State Department of Ecology, Toxics Cleanup Program. July.

Table 2-2
Groundwater Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Collection Date	TPH (ug/L)				VOCs (ug/L)			
	Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]
MTCA Method A[1]:		800[c]	500	500	500	5.0	700	1,000	1,000
MW-01	05/03/2006	< 240	310	120	430	< 2.5	4.7	< 2.5	11
	08/02/2006	< 48	260	330	590	< 0.5	< 0.5	< 0.5	< 1.5
	10/10/2006	< 48	150	< 100	200	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	< 160	< 200	< 200	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	< 50	190	130	320	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	< 81	< 100	< 100	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	130	< 100	50	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	< 50	130	< 100	50	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	< 50	610	610	1,220	< 0.5	< 0.5	< 0.5	< 1.5
	07/22/2009	< 50	650	720	1,370	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	< 50	350	160	510	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	< 50	130	100	230	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	< 50	< 160	650	730	< 0.5	< 0.5	< 0.5	< 1.5
	08/05/2011	< 50	190	130	320	< 0.5	< 0.5	< 0.5	< 1.5
	01/27/2012	< 50	< 30	< 69	< 69	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 50	< 29	< 68	< 68	< 0.5	< 0.5	< 0.5	< 1.5
	01/11/2013	< 50	< 29	< 67	< 67	< 0.5	< 0.5	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	< 68	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	< 67	< 67	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 29	< 67	< 67	< 0.5	< 0.5	< 0.5	< 1.5
	02/22/2019	100 U	180	300 U	330	1 U	1 U	1 U	3 U
		100 U	200	300 U	350	1 U	1 U	1 U	3 U
	10/17/2024	100 U	170	250 U	300	1 U	1 U	1 U	3 U
MW-02	05/03/2006	< 240	1,400	560	1,960	13	< 2.5	< 2.5	< 7.5
	08/02/2006	220	2,000	1,800	3,800	20	< 0.5	< 0.5	1.6
	10/10/2006	< 240	1,400	790	2,190	16	< 2.5	< 2.5	< 7.5
	01/15/2007	< 240	810	270	1,080	9.3	< 2.5	< 2.5	< 7.5

Table 2-2
Groundwater Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Collection Date	TPH (ug/L)				VOCs (ug/L)			
	Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]
MTCA Method A[1]:		800[c]	500	500	500	5.0	700	1,000	1,000
MW-02 continued	04/25/2007	250	830	480	1,310	13	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	7,800	< 1,000	8,300	13	< 5.0	< 5.0	< 15
	10/03/2007	< 250	1,600	1,100	2,700	4.9	< 2.5	< 2.5	< 7.5
	01/03/2008	460	1,400	800	2,200	6.7	< 0.5	1.0	< 1.5
	02/28/2009	450	2,700	2,800	5,500	2.5	< 0.5	0.6	< 1.5
	07/22/2009	360	2,500	4,000	6,500	1.1	< 0.5	0.8	1.5
	01/08/2010	470	1,800	1,400	3,200	< 0.5	0.7	0.5	< 1.5
	07/20/2010	420	2,000	1,600	3,600	< 0.5	< 0.5	0.8	< 1.5
	01/21/2011	390	2,000	1,900	3,900	< 0.5	0.6	< 0.5	< 1.5
	08/05/2011	< 250	830	880	1,710	< 2.5	< 2.5	< 2.5	< 7.5
	01/27/2012	56	< 29	< 68	< 68	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 250	31	110	141	< 2.5	< 2.5	< 2.5	< 7.5
	01/11/2013	130	32	160	192	< 0.5	0.6	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	< 68	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	< 67	< 67	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 30	< 69	< 69	< 2.0	< 0.5	< 0.5	< 1.5
	02/22/2019	190	1,900	1,900	3,800	1 U	1 U	1 U	3.4
	10/17/2024	1,000 U	1,600	1,600	3,200	5 UJ	10 U	10 U	30 U
MW-03	05/03/2006	< 240	580	240	820	< 2.5	< 2.5	< 2.5	< 7.5
	08/02/2006	< 48	350	380	730	< 0.5	< 0.5	< 0.5	< 1.5
	10/10/2006	< 48	310	140	450	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	250	< 100	300	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	< 50	260	110	370	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	250	150	400	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	330	260	590	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	< 50	280	210	490	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	< 50	290	190	480	< 0.5	< 0.5	< 0.5	1.6

Table 2-2
Groundwater Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Collection Date	TPH (ug/L)				VOCs (ug/L)			
	Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]
MTCA Method A[1]:		800[c]	500	500	500	5.0	700	1,000	1,000
MW-03 continued	07/22/2009	< 50	780	830	1,610	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	< 50	680	360	1,040	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	< 50	330	190	520	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	< 50	< 160	630	710	< 0.5	< 1.5	< 0.5	< 1.5
	08/05/2011	< 50	230	210	440	< 0.5	< 0.5	< 0.5	< 1.5
	01/27/2012	< 50	< 30	< 70	< 70	< 0.5	< 0.5	< 0.5	< 1.5
	07/02/2012	< 50	< 29	< 67	< 67	< 0.5	< 0.5	< 0.5	< 1.5
	01/11/2013	< 50	< 28	< 66	< 66	< 0.5	< 0.5	< 0.5	< 1.5
	07/12/2013	< 50	< 29	< 68	< 68	< 0.5	< 0.5	< 0.5	< 1.5
	01/10/2014	< 50	< 29	<68	<68	< 0.5	< 0.5	< 0.5	< 1.5
	07/16/2014	< 50	< 29	< 68	< 68	< 2.0	< 0.5	< 0.5	< 1.5
	02/22/2019	100 U	94	300 U	244	1 U	1 U	1 U	3 U
	10/17/2024	100 U	130	250 U	260	1 U	1 U	1 U	3 U
MW-04	05/03/2006	< 240	7,900	< 1,000	8,400	< 2.5	< 2.5	< 2.5	< 7.5
	08/02/2006	73	7,300	< 1,000	7,800	< 0.5	< 0.5	< 0.5	2.8
	10/10/2006	< 48	7,900	2,200	10,100	< 0.5	< 0.5	< 0.5	< 1.5
	01/15/2007	< 240	8,300	3,000	11,300	< 2.5	< 2.5	< 2.5	< 7.5
	04/25/2007	89	9,300	2,000	11,300	< 0.5	< 0.5	< 0.5	< 1.5
	07/15/2007	< 500	850	320	1,170	< 5.0	< 5.0	< 5.0	< 15
	10/03/2007	< 250	8,500	< 2100	9,550	< 2.5	< 2.5	< 2.5	< 7.5
	01/03/2008	61	9,100	2,200	11,300	< 0.5	< 0.5	< 0.5	< 1.5
	02/28/2009	56	5,400	2,100	7,500	< 0.5	< 0.5	< 0.5	< 1.5
	07/22/2009	100	14,000	7,600	21,600	< 0.5	< 0.5	< 0.5	< 1.5
	01/08/2010	75	13,000	18,000	31,000	< 0.5	< 0.5	< 0.5	< 1.5
	07/20/2010	69	12,000	13,000	25,000	< 0.5	< 0.5	< 0.5	< 1.5
	01/21/2011	50	14,000	< 1,800	14,900	< 0.5	< 0.5	< 0.5	< 1.5
	08/05/2011	*Unable to sample because of presence of free product.*							

Table 2-2
Groundwater Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Collection Date	TPH (ug/L)				VOCs (ug/L)			
	Analyte:	Gasoline-range hydrocarbons	Diesel-range hydrocarbons	Motor oil-range hydrocarbons	Diesel+Oil[a]	Benzene	Ethylbenzene	Toluene	Xylenes (total)[b]
MTCA Method A[1]:		800[c]	500	500	500	5.0	700	1,000	1,000
MW-04 continued	01/27/2012	*Unable to sample because of presence of free product.*							
	07/02/2012	*Unable to sample because of presence of free product.*							
	01/11/2013	*Unable to sample because of presence of free product.*							
	07/12/2013	*Unable to sample because of presence of free product.*							
	01/10/2014	*Unable to sample because of presence of free product.*							
	07/16/2014	*Unable to sample because of presence of free product.*							
	02/22/2019	*Unable to sample because of presence of free product.*							
	10/17/2024	100 U	3,700	3,500	7,200	1 U	1 U	1 U	3 U
	10/17/2024	100 U	3,700	3,700	7,400	1 U	1 U	1 U	3 U
MW05	10/17/2024	100 U	260	300	560	1 U	1 U	1 U	3 U
MW06	10/17/2024	540	6,000	3,200	9,200	190	5 U	5 U	15 U
SB24	10/14/2024	100 U	220	390	610	1 U	1 U	1 U	3 U
SB25	10/14/2024	100 U	520	1,000	1,500	1 U	1 U	1 U	3 U
SB26	10/15/2024	100 U	220 J-	250 UJ	350 J-	1 U	1 U	1 U	3 U
SB27	10/15/2024	780	4,800 J-	11,000 J-	16,000 J-	130	13	3.7	15

Table 2-2
Groundwater Analytical Results
Raplee Property, Stanwood, Washington
City of Stanwood

Notes

Data summation rules are as follows: non-detect results are multiplied by one-half when used for sums. When all results are non-detect, the highest reporting limit is provided as the sum.

Shading indicates values that exceed MTCA Method A screening criteria; non-detects (U and UJ) were not compared with screening criteria.

< = concentration is less than reported value.

J- = result is estimated, but the result may be biased low.

MTCA = Model Toxics Control Act.

TPH = total petroleum hydrocarbons.

U = result is non-detect at the method reporting limit.

ug/L = micrograms per liter.

UJ = result is non-detect with an estimated method reporting limit.

VOC = volatile organic compound.

[a]Diesel+Oil is the sum of diesel- and motor oil-range hydrocarbons.

[b]Total xylenes are reported by the laboratory.

[c]Screening level for gasoline-range hydrocarbons with detectable benzene.

Reference

[1]Ecology. 2024. *Cleanup Levels and Risk Calculation (CLARC) table*. Washington State Department of Ecology, Toxics Cleanup Program. July.

Table 2-3
Water Level Measurements
Raplee Property, Stanwood, Washington
City of Stanwood

Well ID	Screen Interval (feet)	Measuring Point Elevation (feet NAVD 88)	Date	Time	Depth to Water (feet)	Depth to Bottom (feet)	Groundwater Elevation (feet NADV 88)
MW-01	4 - 14	7.36	2/22/2019	8:32 AM	2.18	14.17	5.18
			7/12/2024	1:27 PM	1.75	13.99	5.61
			10/17/2024	9:51 AM	0.91	14.13	6.45
MW-02	4 - 14	8.56	2/22/2019	8:13 AM	1.58	14.46	6.98
			7/12/2024	1:01 PM	2.31	14.15	6.25
			10/17/2024	9:41 AM	3.40	14.15	5.16
MW-03	4 - 14	8.10	2/22/2019	8:22 AM	0.80	13.56	7.30
			7/12/2024	1:19 PM	2.34	13.54	5.76
			10/17/2024	9:46 AM	1.44	13.73	6.66
MW-04	4 - 14	8.96	2/22/2019	8:40 AM	2.33	13.76	6.63
			7/12/2024	1:14 PM	3.49	13.75	5.47
			10/17/2024	9:48 AM	2.54	14.03	6.42
MW-05	4 - 14	8.30	10/17/2024	9:51 AM	1.71	13.97	6.59
MW-06	4 - 14	8.67	10/17/2024	9:44 AM	3.50	13.99	5.17

Notes

Depth to water and depth to bottom are measured from top of well casing.

ID = identification.

NAVD 88 = North American Verticle Datum of 1988.

Table 3-1
Data Gaps Investigation Sample Collection Location Details
Raplee Property, Stanwood, Washington
City of Stanwood

Location	Horizontal Location (ft WA State Plane North Zone)		Surveyed Top of Casing Elevation (ft NAVD88)	Surveyed Ground Surface Elevation (ft NAVD88)	Soil Sample Depths (ft bgs)	Well Screen Interval (ft bgs)
	Northing	Easting				
Monitoring Well Installations						
MW01	456,836.0	1,266,984.8	7.36	7.7	18[a]	4 - 14
MW02	456,744.7	1,267,017.8	8.56	8.9	4.0, 17.0[a]	4 - 14
MW03	456,786.1	1,267,049.3	8.1	8.5	6.0, 16.0[a]	4 - 14
MW04	456,768.8	1,266,965.0	8.96	9.1	6.0, 15.0[a]	4 - 14
MW05	456,808.7	1,266,956.5	8.3	8.2	2.5	4 - 14
MW06	456,770.1	1,267,016.1	8.67	8.3	5.5, 10.5	4 - 14
Soil and Reconnaissance Groundwater Borings						
SB24	456,809.9	1,266,975.1	--	--	2.0, 8.0	5 - 15
SB25	456,792.3	1,266,968.1	--	--	2.0, 5.5	5 - 15
SB26	456,761.0	1,266,987.4	--	--	2.0	5 - 15
SB27	456,783.0	1,267,035.4	--	--	2.0, 7.5	5 - 15

Notes

[a]Soil samples collected during the SAIC 2006 site assessment.

Coordinates for the locations of soil borings advanced during previous investigations were not reported and are therefore not shown.

bgs = below ground surface.

ft = feet.

NAVD88 = North American Vertical Datum of 1988.

WA = Washington.

Table 6-1
Option 2 – Excavation and Backfill with Bioremediation Compound Probable Cost
Raplee Property, Stanwood, Washington
City of Stanwood

Title:	**Option 2 - Excavation and Backfill w/ Bioremediation Compound Probable Cost**	
Project:	Raplee Property	
Client:	City of Stanwood	
Project No./Task:	M1030.08.003	Initial
Prepared By:	C. Wise	CW
Checked By:	J. Elliott	JE
Date:	1/25/2025	
Revision #.:	0	

MAUL FOSTER ALONG

114 W Magnolia Street, Suite 500
Bellingham, WA 98225
360.594.6262 (p)
360.594.6270 (f)
www.maulfoster.com

Cost Estimate Summary - Feasibility Level

Schedule 'A' - Preliminary Actions		$	48,000
Schedule 'B' - Site Preparation		$	13,800
Schedule 'C' - Excavation and Disposal		$	99,100
Schedule 'D' - Institutional Controls		$	12,000
Schedule 'E' - ORC Backfill		$	21,500
Schedule 'F' - Permitting and Technical Services		$	31,000
Schedule 'G' - Design and Project Management		$	37,000
Schedule 'H' - Monitoring		$	51,000
Schedule 'I' - Contingency		$	73,000
	Total:	**$**	**386,400**

Assumptions:

1. The Cleanup Action Areas are shown in Figure 6-1.
2. Groundwater encountered during excavation can be discharged to the local sanitary sewer.
3. Groundwater will be monitored quarterly 2 years.
4. Three USTs will be decommissioned (one UST via removal and two USTs via in-place decommissioning).
5. All USTs identified have a capacity of 2,000 gallons and contain 6-inches of a water and free-product mixture.
6. Limited bucket mixing of ORC below the water table is assumed. Use of soil auguring should be considered to distribute ORC to address deeper contamination.
7. A 30% contingency is included to account for site and design uncertainty.
8. Probable cost is a decision making tool and should be considered to represent a range reflecting -30%/+50%.

Table 6-2
Option 3 - Excavation and In-Situ Chemical Oxidation Injections Probable Cost
Raplee Property, Stanwood, Washington
City of Stanwood

Title:	**Option 3 - In-Situ Chemical Oxidation Probable Cost**	
Project:	Raplee Property	
Client:	City of Stanwood	
Project No./Task:	M1030.08.003	Initial
Prepared By:	C. Wise	CW
Checked By:	J. Elliott	JE
Date:	1/25/2025	
Revision #.:	0	

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Cost Estimate Summary - Feasibility Level

Schedule 'A' - Preliminary Actions		$	48,000
Schedule 'B' - Site Preparation		$	7,000
Schedule 'C' - Excavation and Disposal		$	56,700
Schedule 'D' - Chemical Oxidation Injections		$	298,900
Schedule 'E' - Institutional Controls		$	12,000
Schedule 'F' - Permitting and Technical Services		$	15,000
Schedule 'G' - Design and Technical Services		$	58,000
Schedule 'H' - Monitoring and Periodic Costs		$	61,000
Schedule 'I' - Contingency		$	97,000
	Total:	**$**	**653,600**

Assumptions:

1. The Cleanup Action Areas are shown in Figure 6-1.
2. Dewatering within the excavation is not required.
3. Injections will occur over four events. Mobilization and hole reports for the four events have been included.
4. Injection near the existing underground gas line must be considered during design to ensure line safety. The oxidant or injection methodology may be adjusted.
5. Groundwater will be monitored quarterly for two years after the injections are complete.
6. Three USTs will be decommissioned (one UST via removal and two USTs via in-place decommissioning).
7. All USTs identified have a capacity of 2,000-gallons and contain 6-inches of a water and free-product mixture.
8. A 30% contingency is included to account for site and design uncertainty.
9. Probable cost is a decision tool and should be considered to represent a range reflecting -30%/+50%.

Table 6-3
Option 4 - Complete Excavation Probable Cost
Raplee Property, Stanwood, Washington
City of Stanwood

Title:	**Option 4 - Complete Excavation Probable Cost**	
Project:	Raplee Property	
Client:	City of Stanwood	
Project No./Task:	M1030.08.003	Initial
Prepared By:	C. Wise	CW
Checked By:	J. Elliott	JE
Date:	1/25/2025	
Revision #.:	0	

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Cost Estimate Summary - Feasibility Level

Schedule 'A' - Preliminary Actions		$	48,000
Schedule 'B' - Site Preparation		$	47,600
Schedule 'C' - Excavation and Disposal		$	592,000
Schedule 'D' - Permitting and Technical Services		$	31,000
Schedule 'E' - Design and Project Management		$	145,900
Schedule 'F' - Monitoring		$	26,000
Schedule 'G' - Contingency		$	134,700
	Total:	**$**	**1,025,200**

Assumptions:

1. The Cleanup Action Areas are shown in Figure 6-1.
2. Groundwater encountered during excavation can be discharged to the local sanitary sewer.
3. Additional groundwater monitoring will not be required after four sampling events have occurred.
4. Confirmation sampling from the excavation will not change the extent of the excavation boundaries shown on Figure 6-1.
5. Three USTs will be decommissioned (one UST via removal and two USTs via in-place decommissioning).
6. All USTs identified have a capacity of 2,000-gallons and contain 6-inches of a water and free-product mixture.
7. Groundwater will be monitored on a semi-annual basis for two years post remedy.
8. A 30% contingency is included to account for site and design uncertainty.
9. Probable cost is a decision making tool and should be considered to represent a range reflecting -30%/+50%.

Table 7-1
Cleanup Options Evaluation
Raplee Property, Stanwood, Washington
City of Stanwood

Alternative	Description	Protectiveness	Permanence	Long-Term Effectiveness	Management of Short-Term Risks	Implementability	**Average**	Public Concerns	**Total Cost**
Option 1	No Action	--							
Option 2	Excavation and Backfill with Bioremediation Compound	4	4	3	5	5	**4.2**	TBD	$ 386,000
Option 3	Excavation and In-situ Chemical Oxidation Injections	4	4	4	3	4	**3.8**	TBD	$ 651,800
Option 4	Complete Excavation	5	5	5	3	2	**4**	TBD	$ 703,700

Notes

1: lowest; 5: highest

--' = not applicable.

TBD = to be determined.

Appendix A

Boring Logs

MAUL FOSTER ALONGI

BORING LOG

From Science to Solutions™

Well No: SB-1
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger
Sampling Method: Grab Sample

Total Depth: 5.0 Ft
GW Depth: 0.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			Gm		Brown silty gravel with sand. No odor, no sheen (fill).
		Moist		32.1 6.2 9.5	SM		Brown silty fine to medium sand with occassional gravel, no odor, no sheen (fill).
	5			27.8			
	5.5						

Abandoned at 5 ft per PM on 02/07/06. Borig completed south of potential hoist

Locus

BORING LOG

From Science to Solutions™

Well No: SB-2
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 3.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		19.3 152.7	GP		Brown gravel with silt, Heavy sheen, strong odor (fill)
		Moist		116.3 114.6	CL		Gray/black clay with organics, heavy sheen, strong odor (fill). Collected SB-2-3.
	5	Moist		1,889	ML		Gray silt with trace of fine sand, slight sheen, slight odor.
		Moist		710			Gray sandy silt, no sheen, moderate odor.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-2
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 3.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Moist		40.3 29.6	ML		Gray sandy silt, no sheen, moderate odor.
	15	Moist		114.1 20.8			Grades to heavy sheen and strong odor. Collected SB-2-14.
		Moist		149.3 92.4			Grades to no sheen and no odor. Collected SB-2-18.
	20.0			48.5			

Boring completed west of old UST excavation.

Locus

BORING LOG

ChevronTexaco

Well No: SB-3/MW-4
Chevron Site No: 305192
Site Location: 9816 271st St, NW, Stanwood, WA
Date: 02/09/2006

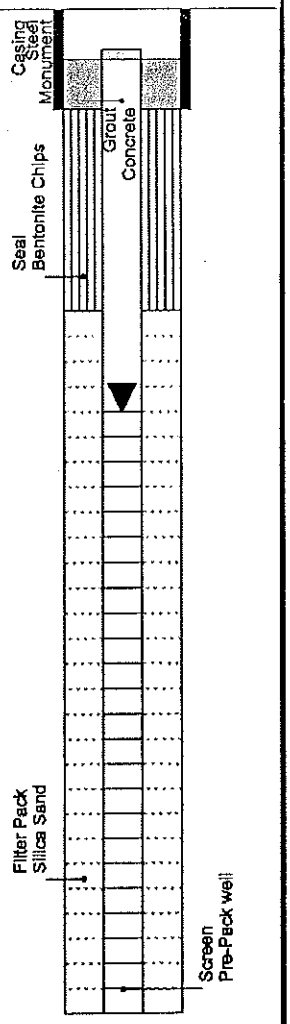
Well Diameter: 2 in
Well Depth: 14 Ft
Well Screen: 4-14 Pre-Pack well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 20.0 Ft
GW Depth: 4.0 Ft
TOC Elev: 100.00

Recov.	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			GM		Brown gravel with fine to medium sand and silt, no sheen, no odor, (fill).
		Wet		280.3	CL		Gray clay, no sheen, no odor.
	5	Wet		2155	ML		Gray clayey silt, slight sheen, strong odor Collected SB-3-6.
		Moist					Grades to slight sheen and slight odor.
	10						Boring GW Depth

Well Construction



BORING LOG

ChevronTexaco

Well No: SB-3/MW-4
Chevron Site No: 305192
Site Location: 9816 271st St, NW, Stanwood, WA
Date: 02/09/2006

Well Diameter: 2 in
Well Depth: 14 Ft
Well Screen: 4-14 Pre-Pack well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 20.0 Ft
GW Depth: 4.0 Ft
TOC Elev: 100.00

Recov	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	10	Moist		170	ML		grades to gray silt, slight sheen, slight odor.
		Moist		246.6			Grades to no odor.
	15	Moist		111.4 23.3 119.2			Grades to no odor and no sheen. Collected SB-3-15.
	20.0			17.6 0.0			

Well Construction: Filter Pack Silica Sand; Screen Pre-Pack well; Backfill

Boring completed in SW corner of property. Installed MW-4

BORING LOG

From Science to Solutions™

Well No: SB-4
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger
Sampling Method: Grab Sample

Total Depth: 5.0 Ft
GW Depth: 4.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		14.6	GM		Brownish black gravel with silt and sand, occassional brick pieces, slight sheen, no odor (fill).
		Moist		14.6	CL		Gray clay, slight sheen and no odor.
	5.0						

Boring abandoned at 5 ft per PM on 02/07/06. Boring completed west of GPR-3.

Locus

BORING LOG

ChevronTexaco

Well No: SB-5/MW-1
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Well Diameter: 2 in
Well Depth: 15 Ft
Well Screen: 5-15' Pre-Pack Well
Filter Pack: Silica Sand

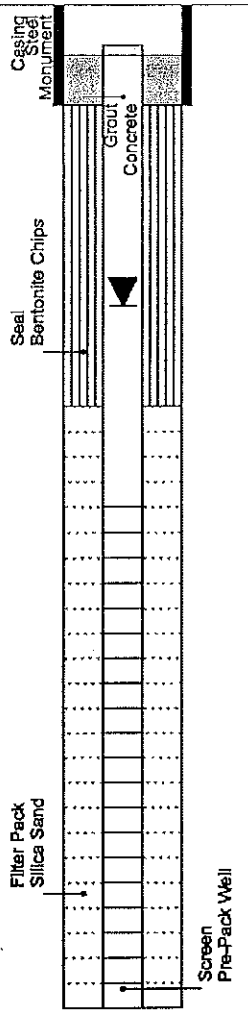
Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 24.0 Ft
GW Depth: 3.0 Ft
TOC Elevation: 98.32

Recov.	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			GP		1" asphalt underlain by brown gravel with silt and fine to medium sand, no sheen, no odor (fill).
		Wet		27.1	ML		Gray fine sandy silt, no sheen, no odor
	5	Wet		42.7 103.2	CL		Gray clay with organics, no sheen, no odor.
	10			214			

Boring GW Depth

Well Construction



BORING LOG

ChevronTexaco

Well No: SB-5/MW-1
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

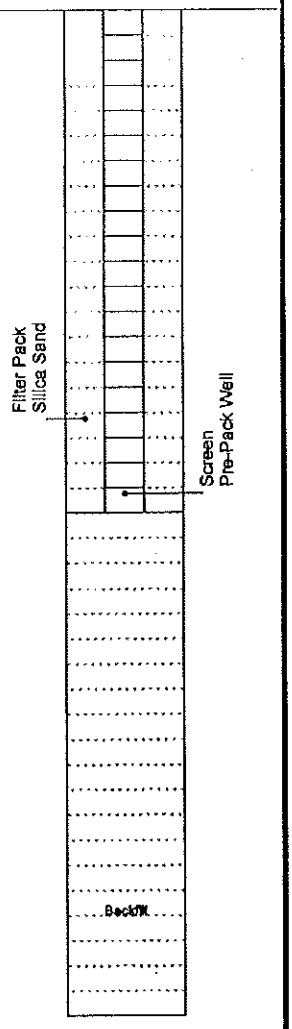
Well Diameter: 2 in
Well Depth: 15 Ft
Well Screen: 5-15' Pre-Pack Well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 24.0 Ft
GW Depth: 3.0 Ft
TOC Elevation: 98.32

Recov	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		16.3	CL		Gray clay with organics, no sheen, no odor.
	15	Moist		118.2 53 75.9 323	ML		Gray silt, no sheen, no odor. Collected SB-5-18.
	20						

Well Construction



BORING LOG

ChevronTexaco

Well No: SB-5/MW-4
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Well Diameter: 2 in
Well Depth: 15 Ft
Well Screen: 5-15' Pre-Pack Well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 24.0 Ft
GW Depth: 3.0 Ft
TOC Elevation: 98.32

Recov.	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description	Well Construction
	20	Moist		171.3 53.7	ML		Gray silt, no sheen, no odor. Collected SB-5-18	Backfill
	24.0	Moist					Grades to fine sandy silt, no sheen, no odor.	

Boring completed in NW corner of property. Installed MW-1.

BORING LOG

From Science to Solutions™

Well No: SB-6
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. Kihg, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 2.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			GP		Brown gravel with sand and silt, no sheen, no odor (fill).
		Moist		19.3 5.8 53.5	CL		Gray clay, no sheen, no odor.
	5	Moist		1872	SM		Gray silty fine to medium sand with wood pieces and organics, nos sheen, musty odor. Collected SB-6-6.
		Moist		454	ML		Gray fine sandy silt, no sheen, no odor. Collected SB-6-14.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-6
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 2.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10			192.6			
				141.2			
				159.6			
	15	Moist			ML		Gray fine sandy sill no sheen, no odor. Collected SB-6-14.
				152.2			
				100.1			
				15.6			
	20.0						

Boring completed west of pump islands

Locus

BORING LOG

Page 1 of 1

From Science to Solutions™

Well No: SB-7
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger
Sampling Method: Grab Sample

Total Depth: 4.0 Ft
GW Depth: 2.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			GP		Brown gravel with silt and sand, no sheen, no odor (fill).
		Wet		179.2	ML		Gray fine sandy silt, no sheen, no odor. Refusal at 4 feet.
	4.0						

Boring abandoned at 4 ft per PM due to refusal on 02/07/06.
Boring completed south of Pump Islands.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-8
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife
Sampling Method: Grab Sample

Total Depth: 8.0 Ft
GW Depth: 5.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			GP		Brown gravel with sand and silt, no sheen, no odor (fill).
		Moist		1.9 203.2	CL		Gray clay, no sheen, no odor.
	5	Wet		613 217	ML		Brownish gray fine sandy silt, no sheen, slight odor. Collected SB-8-6.
	8.0						

Boring abandoned at 8 ft per PM on 02/07/06. Boring completed north of pump islands.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-9
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger
Sampling Method: Grab Sample

Total Depth: 5.0 Ft
GW Depth: 4.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist			CL		Gray clay, no sheen, no odor.
		Moist		28.6	ML		Gray silt, no sheen, no odor.
	5.0						

Boring abandoned at 5 ft per PM on 02/07/06. Boring completed SE of pump islands.

Locus

BORING LOG

ChevronTexaco

Well No: SB-10/MW-3
Chevron Site No: 305192
Site Location: 9816 271st St, NW, Stanwood, WA
Date: 02/08/2006

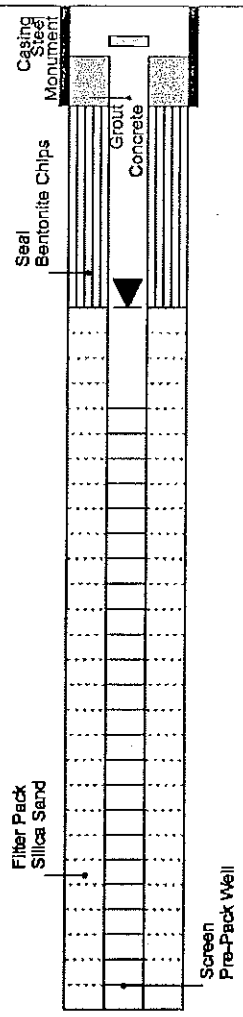
Well Diameter: 2 in
Well Depth: 14 Ft
Well Screen: 4-14 Pre-Pack Well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 20.0 Ft
GW Depth: 3.0 Ft
TOC Elevation: 99.16

Recov	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		28.3	GM		Brown gravel with silt and fine to medium sand, no odor, no sheen (fill).
		Moist		1238	CL		Gray clay, no sheen, no odor. Grades to slight odor at 4 feet.
	5	Wet		497	ML		Brownish gray fine sandy silt with occassional fine gravel, slight sheen, slight odor. Collected SB-10-6.
		Wet		98.2			Gray to black clayey silt, no sheen, no odor.
		Moist					Gray silt with organics, no sheen, no odor. Collected SB-10-16.
	10						Boring GW Depth

Well Construction



BORING LOG

ChevronTexaco

Well No: SB-10/MW-3
Chevron Site No: 305192
Site Location: 9816 271st St, NW, Stanwood, WA
Date: 02/08/2006

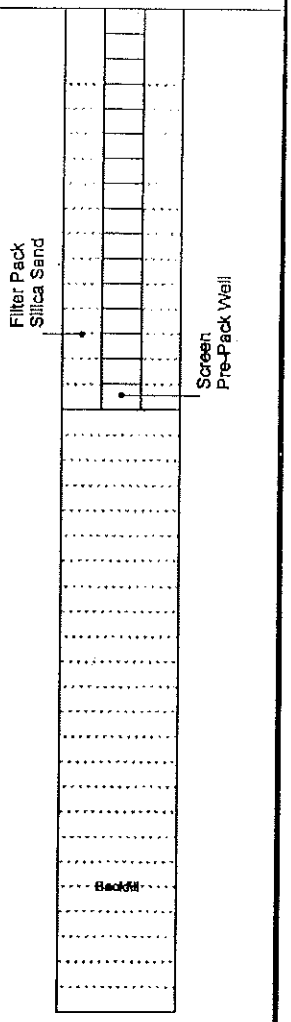
Well Diameter: 2 in
Well Depth: 14 Ft
Well Screen: 4-14 Pre-Pack Well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 20.0 Ft
GW Depth: 3.0 Ft
TOC Elevation: 99.16

Recov	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	10			723			
				131.7			
				266.9			
	15	Moist			ML		Gray silt with organics, no sheen, no odor. Collected SB-10-16.
				73.1			
				2.4			
				0.0			
	20.0						

Well Construction



Boring completed in product line trench from USTs to pump island. Installed MW-3.

BORING LOG

From Science to Solutions™

Well No: SB-11
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 19.0 Ft
GW Depth: 5.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		4,463	GP		Brown gravel with fine to medium sand and silt, no sheen, slight odor (fill).
		Moist		772.4	CL		Gray clay with fine sand, heavy sheen strong odor.
	5	Wet		1,232	ML		Brownish gray silt with occassional fine gravel, moderate sheen, strong odor. Collected SB-11-6.
		Wet		672			Gray clayey silt, slight sheen, slight odor
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-11
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 19.0 Ft
GW Depth: 5.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		291.2	ML		Gray clayey silt, slight sheen, slight odor.
		Wet		291.7			Grades to no odor.
	15	Wet		540			Grades to slight odor. Collected SB-11-14.
		Moist		168.3			Gray fine sandy silt, no sheen, no odor. Collected SB-11-19.
	19.0			247.3 23.3			

Boring completed east of old UST excavation.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-12
Chevron Site No: 305192
Site Location: 9816 271st St, NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 21.0 Ft
GW Depth: 4.5 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		332.7	CL		Blackish gray silty clay, moderate sheen, strong odor.
		Wet		4,367			Gray clay, black mottling with organics, slight sheen, moderate odor
	5	Moist		1,127			Grades to dark gray clay.
				237			
	10	Moist		236	ML		Gray silt, no sheen, no odor. Collected SB-12-17.
	11						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-12
Chevron Site No: 305192
Site Location: 9316 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 21.0 Ft
GW Depth: 4.5 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	11	Moist		506.1 72.6	ML		Gray silt, no sheen, no odor. Collected SB-12-17.
	15						
		Moist		39.5 17.3			Grades to gray fine sandy silt, no sheen, no odor.
	20						
	21.0						

Boring competed in alley east of GPR-1.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-13
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 6.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		176.2	SM		Gray silty fine to medium sand with gravel, slight sheen, moderate odor
		Moist		148.7	CL		Brownish gray clay with black organics, moderate sheen, strong odor.
	5 ▼	Wet		143			Grades to slight odor
		Wet		334 13.1	ML		Brownish gray fine sandy silt, heavy sheen, strong odor. Collected SB-13-10.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-13
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 6.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		19.8	ML		Brownish gray fine sandy silt, heavy sheen strong odor. Collected SB-13-10.
		Wet		18.9	SM		Gray silty fine sand, heavy sheen, strong odor
		Wet		23.5	ML		Gray fine sandy silt, slight sheen, moderate odor
		Wet		16.7	SM		Gray silty fine sand with fine gravel, slight sheen, no odor.
	15	Moist		22.2	ML		Gray silt, slight sheen, no odor.
		Moist		88.6	ML		Gray fine sandy silt with lenses of silty fine sand, slight sheen, no odor. Collected SB-13-10.
	20.0			39.9			

Boring completed in alley west of GPR-1.

Locus

BORING LOG

ChevronTexaco

Well No: SB-14/MW-2
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/07/2006

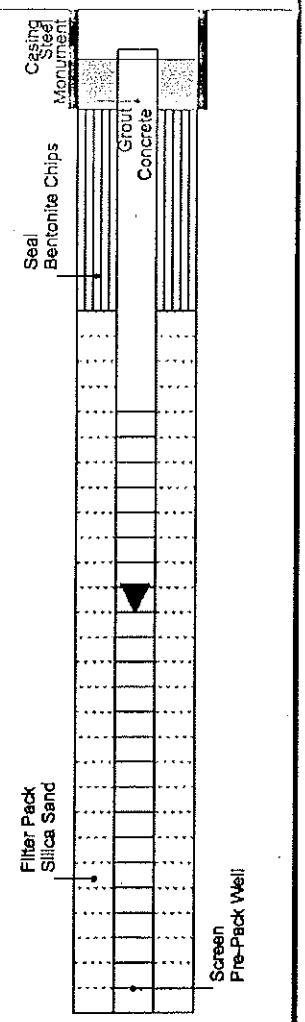
Well Diameter: 2 in
Well Depth: 14 Ft
Well Screen: 4-14 Pre-Pack Well
Filter Pack: Silica Sand

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler
Consultant: SAIC, Bothell, WA Well Casing: Sch 40, 0.10 slot

Total Depth: 17.0 Ft
GW Depth: 6.0 Ft
TOC Elevation: 99.58

Recov	Depth Ft	Moist.	Blow Cnt	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		20	SM		Gray to brown silty fine to medium sand with gravel and occassional cobble, slight sheen, light odor (fill).
	5	Wet		382 190.1	CL		Gray clay with coarse sand and organics, occassiona gravel, slight sheen, slight odor. Collected SB-14-4.
		Moist		201 103	ML		Gray silt. Organics from 10.5 to 11.5 feet, no sheen, slight odor. Collected SB-14-17.
	10						Boring GW Depth

Well Construction



BORING LOG

From Science to Solutions™

Well No: SB-15
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Duel-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 14.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		692.9	SM		Brown silty fine to coarse sand with gravel and occasssional cobbles, concrete chunks, slight sheen, slight odor (fill).
		Moist		420.3	ML		Brownish gray silt with occassional gravel, no sheen, slight odor.
	5	Moist		477.4			Grades to no gravel, slight sheen and no odor.
		Moist		557			Grades to no sheen.
		Wet					Gray fine sandy silt, no sheen, no odor.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-15
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

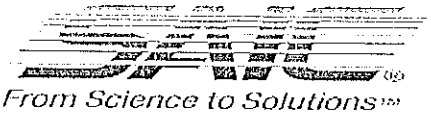
Total Depth: 20.0 Ft
GW Depth: 14.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		145.2			Gray fine sandy silt, no sheen, no odor
		Moist		416.4 13	ML		Grades to Moist. Collected SB-15-14.
	15			570.1 164.1			
		Moist		1.1			Grades to with occassional wood debris.
	20.0						

Boring completed south of GPR-3.

Locus

BORING LOG



Well No: SB-16
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 4.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		18.7			Gray fine sandy silt with gravel, slight sheen, no odor (fill).
		Wet		4,208.3			Gray silt with wood fragments, slight sheen, slight odor (fill).
	5	Wet		1,432.6	ML		Grades to no wood fragments.
		Wet		1,108			Gray silt, no sheen, no odor.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-16
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Hand Auger, Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tubic Sampler

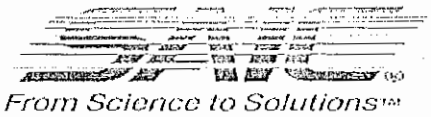
Total Depth: 20.0 Ft
GW Depth: 4.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		387.6 65.8	ML		Gray silt, no sheen, no odor
	15	Moist		131.6 161.6 43.9			Gray fine sandy silt, no sheen, no odor. Collected SB-16-14.
		Moist		28.6	SM		Gray Silty fine to medium sand, no sheen, no odor.
	20.0			0.0			

Boring completed in alley west of SB-13.

Locus

BORING LOG



Well No: SB-17
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife
Sampling Method: Grab Sample

Total Depth: 2.0 Ft
GW Depth: 2.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0						
		Wet			SM		Brown silty fine to medium sand, no sheen, no odor. Concrete pad refusal at 2 feet.
	2.0						

Boring completed east of SB-12, refusal in alley at 2 ft bgs, abandoned at 2 ft on 02/08/06.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-18
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 3.5 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		1,605	SM		Gray silty fine to medium sand with occassional gravel, no sheen, slight odor (fill).
	5	Wet		1,902 478	ML		Gray silt with wood debris and occassional gravel, no sheen, slight odor (fill). Collected SB-18-4.
		Moist		282			Gray silt with occassional fine sand, no sheen, no odor. Collected SB-18-14.
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-18
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 3.5 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10			1,242			
				94			
				152.5			
	15	Moist			ML		Gray silt with occassional fine sand, no sheen, no odor. Collected SB-18-14.
				77.9			
				94.3			
				27.6			
	20.0						

Boring completed north of GPR-4.

Locus

BORING LOG

From Science to Solutions℠

Well No: SB-19
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 1.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		16.2	SM		Brown silty fine sand, roots and occassional gravel, no sheen, slight odor (fill).
	5	Moist		114.2	ML		Light gray fine sandy silt, with roots and wood debris, no sheen, slight odor (fill).
		Wet					No Recovery.
	10	Moist			ML		Brownish gray silty fine to medium sand, no sheen, no odor.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-19
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 1.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Moist		2.8			Brownish gray silty fine to medium sand, no sheen, no odor
				6			
				1.9			
	15	Moist			ML		Gray fine sandy silt, no sheen, no odor. Bentonite added at 9 feet to keep hole open. Hole still caving at 16 feet. Little recovery to 20 feet. Collected SB-19-12
				3.8			
				2.6			
				0.9			
	20.0						

Boring completed north of GPR-3 and GPR-2.

Locus

BORING LOG

From Science to Solutions℠

Well No: SB-20
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 4.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		3.8			Gray silty, no sheen, slight odor (fill)
		Wet		20.1			Grades to occassional fine gravel (fill).
	5	Wet		40.1	ML		Grades to no gravel with occassional wood debris (fill).
				9			
		Wet					Grades to no wood debris (fill).
	10						

Locus

BORING LOG

From Science to Solutions™

Well No: SB-20
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 4.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10	Wet		3.8			Grades to no wood debris (fill)
		Moist		1.7			Grades to some wood debris and septic odor (fill). Collected SB-20-14.
				1.6	ML		
	15	Moist		1			Grades to no odor.
				0.8			
	20.0			0.5			

Boring completed south of GPR-2.

Locus

BORING LOG

From Science to Solutions™

Well No: SB-21
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/08/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife
Sampling Method: Grab Sample

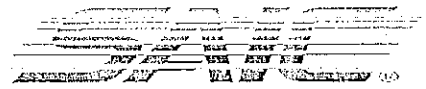
Total Depth: 8.0 Ft
GW Depth: 4.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	Moist		64.3	ML		Dark brown fine sandy silt with organics, no sheen, no odor.
	5	Wet		298.1			Grades to Gray silt. Collected SB-21-6.
	8.0						No Recovery.

Boring completed immediately north of GPR-3.

Locus

BORING LOG



Well No: SB-22
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

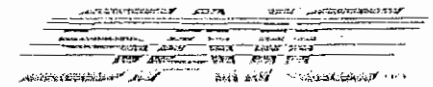
Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 2.0 Ft

Recov	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	0	dry			AS		Asphalt, 4 inches (fill).
		Dry			CMT		Concrete, 6 inches (fill)
		Wet		237.6			Gray silt with fine sand and organics, slight sheen, strong odor (fill)
		Wet		115.9			Grades to moderate odor (fill).
	5				ML		
		Moist		382.6			Grades to slight odor with wood debris (fill)
				68			
		Moist					Grades to no sheen and no odor. Collected SB-22-14
	10						

Locus

BORING LOG



Well No: SB-22
Chevron Site No: 305192
Site Location: 9816 271st St NW, Stanwood, WA
Date: 02/09/2006

Client: Chevron
Consultant: SAIC, Bothell, WA
Logged By: T. King, A. Wells

Driller: Geotech Explorations Inc.
Drilling Method: Air-Knife, Direct-Push
Sampling Method: Grab Sample, Dual-Tube Sampler

Total Depth: 20.0 Ft
GW Depth: 2.0 Ft

Recov.	Depth Ft	Moist.	Blow Count	PPM	Soil Code	Soil Pattern	Soil Description
	10			78.2			
				141			
				162.1			
	15	Moist			ML		Grades to no sheen and no odor. Collected SB-22-14.
				191.2			
				141			
				66			
	20.0						

Boring completed east of SB-11.

Locus

MAUL FOSTER ALONGI

Geologic Borehole Log

Project Number	Boring Number	Sheet
M1030.08.003	**SB-24**	**1 of 1**

Project Name	**Raplee Soil and Groundwater Data Gaps**		
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**2 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					0		0.0 to 0.4 feet: GRAVELLY SAND (SW); brown; 50% sand, fine to coarse; 40% gravel, fine to coarse, subangular to subrounded; 10% organic material (woody debris); loose; no odor; moist.
							0.4 to 0.7 feet: Light gray, pulverized rock.
2							0.7 to 2.1 feet: SILT (ML); gray; 90% fines, medium plasticity; 10% sand, fine to medium; firm; orange mottling; no odor; moist.
	▼	66		SB24-S-2.0	1		2.1 to 3.3 feet: CLAY (CL); gray; 90% fines, high plasticity; 10% sand, fine to medium; firm; orange mottling; no odor; moist.
3							
4							3.3 to 5.0 feet: NO RECOVERY.
5							
6					1		5.0 to 8.9 feet: CLAY (CL); dark gray; 100% fines, high plasticity; soft to firm; no odor; moist.
7							
		78					
8				SB24-S-8.0	0		
9							8.9 to 10.0 feet: NO RECOVERY.
10	▽			SB24-GW-10.0			10.0 to 13.0 feet: CLAY (CL); dark gray; 100% fines, high plasticity; soft to firm; no odor; wet.
11					0		
12							
		60					
13					0		
							13.0 to 15.0 feet: NO RECOVERY.
14							
15							

Total Depth = 15.0 feet bgs

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million.

Reconnaissance Well Completion Details
5.0 to 15.0 feet bgs: Temporary polyvinyl chloride slotted screen.

Borehole Abandonment Details
0 to 15.0 feet: 2.0-inch borehole.
0 to 15.0 feet: Bentonite chips hydrated with potable water.

▽ Soil becomes wet at approximately 10.0 feet as observed in the core liner at time of drilling. ▼ Water level measured at 2.61 feet, following temporary well installation on 10/14/2024.

MAUL FOSTER ALONGI

Geologic Borehole Log

Project Number	Boring Number	Sheet
M1030.08.003	**SB-25**	**1 of 1**

Project Name	**Raplee Soil and Groundwater Data Gaps**		
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**2 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					1		0.0 to 0.3 feet: SANDY GRAVELLY WOODY DEBRIS; brown; 20% sand, fine to medium; 30% gravel, fine to coarse, subangular to subrounded; 50% organic material (woody debris); loose; no odor; moist.
2							0.3 to 0.8 feet: SILTY SAND WITH GRAVEL (SM); brownish gray; 30% fines, nonplastic; 60% sand, fine to coarse; 10% gravel, fine to medium, subangular to rounded; loose; no odor; moist.
3		54		SB25-S-2.0	1		0.8 to 1.2 feet: SAND WITH SILT (SW-SM); brownish gray; 10% fines; 90% sand, fine to coarse; trace gravel, fine to medium, subangular to subrounded; loose; no odor; moist.
4	▼						@ 1.1 feet: Pulverized rock.
5	▽						1.2 to 2.7 feet: SILT (ML); brown; 90% fines, medium plasticity; 10% sand, fine; firm; orange mottling; no odor; moist.
6				SB25-S-5.5	1		2.7 to 5.0 feet: NO RECOVERY.
7							5.0 to 5.4 feet: SILT (ML); brown; 90% fines, medium plasticity; 10% sand, fine; firm; orange mottling; no odor; wet.
8		46			1		5.4 to 7.3 feet: CLAY (CL); gray; 100% fines, high plasticity; trace sand, fine; soft to firm; no odor; wet.
9							@ 7.2 feet: Trace peat.
10							7.3 to 10.0 feet: NO RECOVERY.
11				SB25-GW-10.0	0		10.0 to 12.8 feet: CLAY (CL); gray; 100% fines, high plasticity; trace sand, fine; soft to firm; no odor; wet.
12							
13		56			0		@ 12.1 feet: Trace peat.
14							12.8 to 15.0 feet: NO RECOVERY.
15							

Total Depth = 15.0 feet bgs

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million.

Reconnaissance Well Completion Details
5.0 to 15.0 feet bgs: Temporary polyvinyl chloride slotted screen.

Borehole Abandonment Details
0 to 15.0 feet: 2.0-inch borehole.
0 to 15.0 feet: Bentonite chips hydrated with potable water.

▽ Soil becomes wet at approximately 5.0 feet as observed in the core liner at time of drilling. ▼ Water level measured at 3.45 feet, following temporary well installation on 10/14/2024.

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\1030.08\003 - RAPLEE DATA GAPS\SB-24 THROUGH 27.GPJ 1/17/25

Geologic Borehole Log

MAUL FOSTER ALONGI

Project Number	Boring Number	Sheet
M1030.08.003	**SB-26**	**1 of 1**

Project Name	**Raplee Soil and Groundwater Data Gaps**		
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**2 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					0		0.0 to 1.8 feet: GRAVELLY SAND WITH SILT (SW-SM); brown; 10% fines; 60% sand, fine to coarse; 30% gravel, fine to coarse, angular to rounded; loose; no odor; moist.
2							@ 1.6 to 1.8 feet: Chunk of wood.
				SB26-S-2.0	0		1.8 to 2.2 feet: CLAY (CL); gray; 100% fines, high plasticity; trace organic material (peat); firm; no odor; moist.
3		**44**					2.2 to 5.0 feet: NO RECOVERY.
4							
5	▼						
6					0		5.0 to 7.6 feet: CLAY (CL); gray; 100% fines, high plasticity; trace organic material (peat); soft; no odor; moist to wet.
7					0		
		52					7.6 to 10.0 feet: NO RECOVERY.
8							
9							
10	▽						
11							10.0 to 12.7 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; no odor; wet.
12					0		
		60					
13					0		12.7 to 13.0 feet: SILTY SAND (SM); 30% fines, nonplastic; 70% sand, fine to medium; medium dense; no odor; wet.
				SB26-GW-13.0			13.0 to 15.0 feet: NO RECOVERY.
14							
15							

Total Depth = 15.0 feet bgs

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million.

Reconnaissance Well Completion Details
5.0 to 15.0 feet bgs: Temporary polyvinyl chloride slotted screen.

Borehole Abandonment Details
0 to 15.0 feet: 2.0-inch borehole.
0 to 15.0 feet: Bentonite chips hydrated with potable water.

▽ Soil becomes wet at approximately 10.0 feet as observed in the core liner at time of drilling. ▼ Water level measured at 4.56 feet, following temporary well installation on 10/14/2024.

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\1030.08\003 - RAPLEE DATA GAPS\SB-24 THROUGH 27.GPJ 1/17/25

MAUL FOSTER ALONGI

Geologic Borehole Log

Project Number	Boring Number	Sheet
M1030.08.003	**SB-27**	**1 of 1**

Project Name	**Raplee Soil and Groundwater Data Gaps**		
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**2 inch**

Depth (feet, bgs)	Water Levels	Percent Recovery	Screen Int.	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					0		0.0 to 0.2 feet: WOODY DEBRIS; single gravel chunk; dry. 0.2 to 0.8 feet: GRAVELLY SAND (SW); brown; 80% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; loose; no odor; moist.
2		44		SB27-S-2.0	20		0.8 to 2.2 feet: SILT (ML); brownish gray; 90% fines, medium plasticity; 10% sand, fine to medium; trace gravel, fine, subangular to subrounded; firm; orange mottling; moist. @ 1.5 to 2.2 feet: Moderate petroleum hydrocarbon-like odor. @ 1.8 to 2.2 feet: Dark gray staining.
3							2.2 to 5.0 feet: NO RECOVERY.
4							
5							5.0 to 7.7 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; slight petroleum hydrocarbon-like odor; moist to wet.
6					2		
7					2		
8		54		SB27-S-7.5	2		7.7 to 10.0 feet: NO RECOVERY.
9							
10							10.0 to 15.0 feet: NO RECOVERY.
11							
12	▼						
13							
14				SB27-GW-10.0			
15							

Total Depth = 15.0 feet bgs

0

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million.

Reconnaissance Well Completion Details
5.0 to 15.~~0 feet~~ bgs: Temporary polyvinyl chloride slotted screen.

Borehole Abandonment Details
0 to 15.0 feet: 2.0-inch borehole.
0 to 15.0 feet: Bentonite chips hydrated with potable water.

▼ Water level measured at 12.52 feet, following temporary well installation on 10/14/2024.

MFA BOREHOLE W/RECON SCREEN W:\GINT\GINTW\PROJECTS\1030.08\003 - RAPLEE DATA GAPS\SB-24 THROUGH 27.GPJ 1/17/25

Geologic Borehole Log

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Project Number	Well Number	Sheet
M1030.08.003	**MW-05**	**1 of 2**

Project Name	**Raplee Soil and Groundwater Data Gaps**	TOC Elevation (feet)	**8.30**
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	**8.2**
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	**456808.7**
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	**1266956.5**
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**4 inch**

Depth (feet, bgs)	Well Details	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					0		0.0 to 0.2 feet: GRAVELLY SANDY WOODY DEBRIS; brown; 30% sand, fine to coarse; 20% gravel, fine to medium, subangular to subrounded; 50% organic material (woody debris); loose; no odor; moist.
							0.2 to 0.6 feet: GRAVELLY SAND (SW); brown; 50% sand, fine to coarse; 30% gravel, fine to medium, subangular to subrounded; 20% organic material (rootlets); loose; no odor; metal debris, blue plastic fragments, and brown-tinted glass shards; moist.
2							0.6 to 1.7 feet: SILT (ML); brownish gray; 90% fines, medium plasticity; 10% sand, fine to medium; trace organic material (woody debris, rootlets throughout); firm; orange mottling; no odor; moist.
							@ 1.0 feet: Glass shard.
3			58	MW05-S-2.5 MWDUP-S-2.5	0		1.7 to 2.9 feet: CLAY (CL); brownish gray; 90% fines, high plasticity; 10% sand, fine to medium; trace organic material (woody debris, rootlets throughout); firm; orange mottling; no odor; moist.
4							2.9 to 5.0 feet: NO RECOVERY.
5							5.0 to 7.5 feet: CLAY (CL); gray; 100% fines, high plasticity; firm; trace sand in upper 0.5 feet; orange mottling; no odor; wet.
6					0		
7					0		@ 6.5 feet: No orange mottling. @ 7.1 feet: Becomes soft.
8			50				7.5 to 10.0 feet: NO RECOVERY.
9				MW05-GW-9.0			
10							10.0 to 13.2 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; no odor; wet.
11					1		@ 10.5 feet: Becomes firm. @ 11.2 feet: Wood chunk.
12					0		@ 12.2 feet: Wood chunk.
13			64				@ 12.6 feet: Wood chunk.
14							13.2 to 15.0 feet: NO RECOVERY.
15							

Total Depth = 15.0 feet bgs

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Geologic Borehole Log

Project Number	Well Number	Sheet
M1030.08.003	**MW-05**	**2 of 2**

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million. 6) PVC = polyvinyl chloride. 6) TOC = top of casing.

Borehole Completion Details
0 to 15.0 feet: 4-inch-diameter borehole.
0 to 2.0 feet: Concrete.
2.0 to 3.0 feet: Bentonite chips hydrated with potable water.
3.0 to 14.0 feet: 10x20 silica sand filter pack.
14.0 to 15.0: Bentonite chips hydrated with potable water.

Monitoring Well Completion Details
Washington State Department of Ecology Well No. BQT930.
Traffic grade, flush-mounted monitoring well monument.
0 to 4.0 feet bgs: 2-inch diameter, schedule 40, PVC blank riser pipe.
4.0 to 14.0 feet bgs: 2-inch diameter, schedule 40, 0.010-inch machine slot PVC well screen with threaded PVC well cap.

▽ *Soil becomes wet at approximately 5.0 feet as observed in the core liner at time of drilling.* ▼ *Water level measured at 1.69 feet below TOC on 10/17/2024 prior to sampling.*

Geologic Borehole Log

MAUL FOSTER ALONGI

Project Number	Well Number	Sheet
M1030.08.003	**MW-06**	**1 of 2**

Project Name	**Raplee Soil and Groundwater Data Gaps**	TOC Elevation (feet)	**8.67**
Project Location	**9816 271st St NW, Stanwood, WA**	Surface Elevation (feet)	**8.3**
Start/End Date	**10/14/2024 to 10/14/2024**	Northing	**456770.1**
Driller/Equipment	**Holt Services, Inc./Track-Mount Direct Push**	Easting	**1267016.1**
Geologist/Engineer	**B. Murphy**	Total Depth of Borehole	**15.0 feet**
Sample Method	**Core Barrel**	Outer Hole Diam	**4 inch**

Depth (feet, bgs)	Well Details	Water Levels	Sample Data: Percent Recovery	Sample Data: Sample ID	Sample Data: PID (ppm)	Lithologic Column	Soil Description
1					1		0.0 to 0.4 feet: GRAVELLY SAND (SW); brown; 50% sand, fine to coarse; 30% gravel, fine to medium, angular to subrounded; 20% organic material (woody debris, trace rootlets); loose; no odor; moist.
							0.4 to 0.6 feet: SANDY SILT (ML); brown; 70% fines, medium plasticity; 30% sand, fine to medium; firm; orange mottling; no odor; moist.
2							0.6 to 0.9 feet: GRAVELLY SAND WITH SILT (SW-SM); brown; 10% fines; 70% sand, fine to coarse; 20% gravel, fine to medium, subangular to rounded; medium dense; no odor; moist.
							0.9 to 1.2 feet: CLAY (CL); brown; 90% fines, high plasticity; 10% sand, fine; firm; orange mottling; no odor; moist.
3			24				1.2 to 5.0 feet: NO RECOVERY.
4		▼					
5		▽					
							5.0 to 5.5 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; moderate petroleum hydrocarbon-like odor; wet.
6				MW06-S-5.5	2		5.5 to 10.0 feet: NO RECOVERY.
7							
8			10				
9							
10							
							10.0 to 13.1 feet: CLAY (CL); gray; 100% fines, high plasticity; soft; very slight petroleum hydrocarbon-like odor in upper 1.0 foot; wet.
11				MW06-S-10.5	1		
12				MW06-GW-12.0	1		
13			62		1		
							13.1 to 15.0 feet: NO RECOVERY.
14							
15							

Total Depth = 15.0 feet bgs

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Geologic Borehole Log

Project Number	Well Number	Sheet
M1030.08.003	**MW-06**	**2 of 2**

NOTES:

1) Depths are relative to feet bgs. 2) bgs = below ground surface. 3) ID = identification. 4) PID = photoionization detector. 5) ppm = parts per million. 6) PVC = polyvinyl chloride. 6) TOC = top of casing.

Borehole Completion Details
0 to 15.0 feet: 4-inch-diameter borehole.
0 to 2.0 feet: Concrete.
2.0 to 3.0 feet: Bentonite chips hydrated with potable water.
3.0 to 14.0 feet: 10x20 silica sand filter pack.
14.0 to 15.0: Bentonite chips hydrated with potable water.

Monitoring Well Completion Details
Washington State Department of Ecology Well No. BPL283.
Traffic grade, flush-mounted monitoring well monument.
0 to 4.0 feet bgs: 2-inch diameter, schedule 40, PVC blank riser pipe.
4.0 to 14.0 feet bgs: 2-inch diameter, schedule 40, 0.010-inch machine slot PVC well screen with threaded PVC well cap.

▽ *Soil becomes wet at approximately 5.0 feet as observed in the core liner at time of drilling.* ▼ *Water level measured at 3.45 feet below TOC on 10/17/2024 prior to sampling.*

Appendix B

Ground-Penetrating Radar Reports

MAUL FOSTER ALONGI

GEOTEST
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SUBSURFACE SURVEY GROUND PENETRATING RADAR (GPR) EVALUATION					
Project Name	Raplee Property - GPR	**Project No.**	24-2153	**Date**	7/19/2024
Project Address	9816 271st Street NW Stanwood, WA 98292				
Client Address	Maul Foster & Alongi, Inc. (MFA) 1329 North State Street, Suite 301 Bellingham, WA 98225				
Attention	Carolyn Wise, MFA Senior Hydrogeologist				

PROJECT DESCRIPTION					
GPR Scan Type	Subsurface	**Date of Scan**	7/8/2024	**Operator(s)**	AD
Site Plan	Yes	**Photo**	Yes	**GPR Cross-Sections**	N/A
Location	Requested Area at the Site of Former Fuel Station				
Equipment	GSSI SIR 3000 w/ 270 MHz antenna				

GeoTest was on-site to perform a GPR subsurface investigation in the area noted above (see Image 1 for extent). This subsurface investigation was conducted to determine the presence of potential decommissioned underground storage tanks (USTs) within the requested area. The client requested this investigation in conjunction with their ongoing environmental work at the site. GeoTest's findings will aid in identifying potential sources of contamination in this area.

FINDINGS

Upon arrival, GeoTest was directed to the requested area by the client. During the scan, indications of potential USTs were marked on the ground in pink spray paint. Areas obstructed by dense vegetation could not be scanned on this date. See Image 1 for the extent of the area that could be scanned. Findings are described below:

- Indications of potential USTs were observed within a single 7' x 11' rectangular area near the southeast corner of the site fence line. These indications were observed at a depth of approximately 3' below ground surface. The client was notified of these findings prior to departure.

EQUIPMENT AND METHODOLOGY

GSSI SIR 3000 Ground Penetrating Radar

The GSSI SIR 3000 GPR is used to detect changes in subsurface composition and to identify features underground by interpreting reflected radar waves emitted from a scanning antenna. The reflected radar waves detect changes in dielectric properties of subsurface features such as metals, bedrock, varying soil, plastic, concrete, clay pipe, and organic material. The GSSI SIR 3000 unit displays cross-sectional images of the subsurface on a video monitor which can then be utilized to interpret underground features. Scanning was performed utilizing a 270 MHz antenna. Typical scan depth utilizing a 270 MHz antenna can range from 5 feet to 15 feet below the scanned surface depending on soil type and overlying mediums such as surface water, groundwater, concrete, and asphalt.

LIMITATIONS

GeoTest has prepared this report for the exclusive use of City of Stanwood and their representatives regarding the above-referenced project. Use of this report by others is at the user's sole risk.

Because depth of exploration is dependent upon the electrical properties of material(s) inspected and interpretations are opinions based on judgments made from those acquired radar signals and/or other data, GeoTest does not extend any warranties or guaranties as to the accuracy or correctness of interpretations and GeoTest will not accept liability or responsibility for any loss, damage, or expense that may be incurred or sustained by any services or interpretations performed by GeoTest, or others.

GPR scanning cannot distinguish the difference between utilities, anomalies, variable soil conditions, and/or subsurface target 100% of the time. It can only detect the center and approximate depth of targets. GeoTest recognizes that other conditions may vary from those encountered at the location where geophysical or other explorations are made. The data interpretations and recommendations made by GeoTest are based solely on the information available to them at the time of performance; and GeoTest shall not be responsible for the interpretation, by others, of the information developed.

Submitted By	 Alex Davis, G.I.T. GPR Operator

Image 1: Site map with the extent of the requested area bordered in yellow, and the approximate extent of the area scanned on this date bordered in red. The blue border indicates the approximate boundary of the fence line. The pink highlighted area indicates the approximate location of observed UST indications.

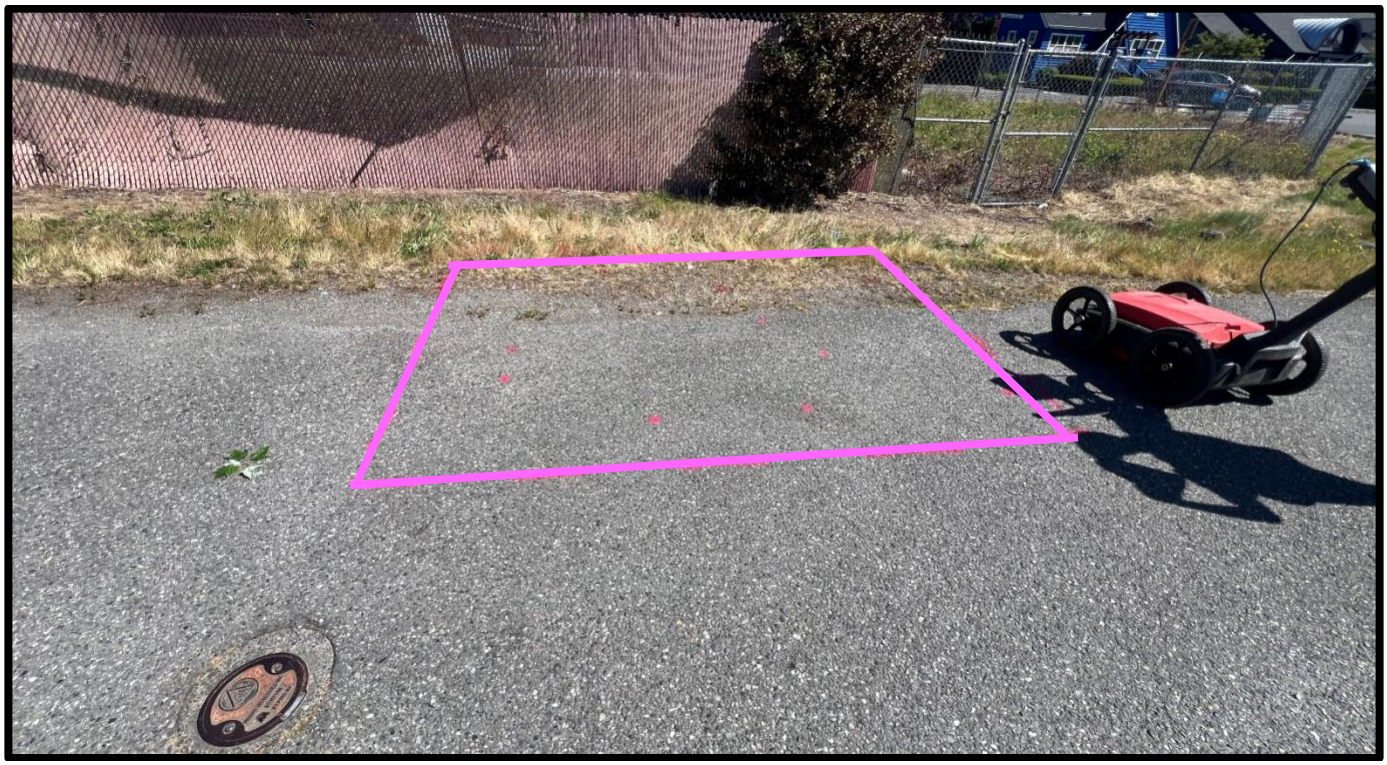

Image 2: Portion of the area scanned on this date, with pink lines indicating the approximate boundary of potential UST indications.

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SUBSURFACE SURVEY GROUND PENETRATING RADAR (GPR) EVALUATION					
Project Name	Raplee Property - GPR	**Project No.**	24-2153	**Date**	9/12/2024
Project Address	9816 271st Street NW Stanwood, WA 98292				
Client Address	Maul Foster & Alongi, Inc. (MFA) 1329 North State Street, Suite 301 Bellingham, WA 98225				
Attention	Carolyn Wise, MFA Senior Hydrogeologist				

PROJECT DESCRIPTION					
GPR Scan Type	Subsurface	**Date of Scan**	9/11/2024	**Operator(s)**	AD
Site Plan	Yes	**Photo**	Yes	**GPR Cross-Sections**	Yes
Location	Remainder of Requested Area at the Site of Former Fuel Station				
Equipment	GSSI SIR 3000 w/ 270 MHz antenna				

GeoTest was on-site to perform a GPR subsurface investigation in the area noted above (see Image 1 for extent). This subsurface investigation was conducted to determine the presence of potential decommissioned underground storage tanks (USTs) within the requested area. The client requested this investigation in conjunction with their ongoing environmental work at the site. GeoTest's findings will aid in identifying potential sources of contamination in this area. The area scanned on this date was previously inaccessible due to dense vegetation. See GeoTest's GPR Report dated 7/19/2024 for results of a previous scan conducted at this location.

FINDINGS

Upon arrival, GeoTest was directed to the requested area by a Department of Ecology (DOE) representative. During the scan, indications of potential USTs were marked on the ground in pink spray paint, along with the observed depth of each identified anomaly. Findings are described below:

- Anomaly 1 (see Image 1 for approximate location) measured approximately 3' x 4' and was observed at approximately 2.5' below the scanned surface (BSS).
- Anomaly 2 measured approximately 5' x 5' and was observed at approximately 3' BSS.
- Anomaly 3 measured approximately 9' x 6' and was observed at approximately 5' BSS.
- Anomaly 4 measured approximately 6' x 5+' and was observed at approximately 4' BSS. The site fence line obstructed the GPR scan from identifying the western edge of this anomaly.
- Anomaly 5 measured approximately 3' x 4' and was observed at approximately 5' BSS.

The results of the scan were communicated to the DOE representative prior to departure. GPR cross-sections and images of each identified anomaly can be found in the images included in this report.

EQUIPMENT AND METHODOLOGY

GSSI SIR 3000 Ground Penetrating Radar

The GSSI SIR 3000 GPR is used to detect changes in subsurface composition and to identify features underground by interpreting reflected radar waves emitted from a scanning antenna. The reflected radar waves detect changes in dielectric properties of subsurface features such as metals, bedrock, varying soil, plastic, concrete, clay pipe, and organic material. The GSSI SIR 3000 unit displays cross-sectional images of the subsurface on a video monitor which can then be utilized to interpret underground features. Scanning was performed utilizing a 270 MHz antenna. Typical scan depth utilizing a 270 MHz antenna can range from 5 feet to 15 feet below the scanned surface depending on soil type and overlying mediums such as surface water, groundwater, concrete, and asphalt.

LIMITATIONS

GeoTest has prepared this report for the exclusive use of City of Stanwood and their representatives regarding the above-referenced project. Use of this report by others is at the user's sole risk.

Because depth of exploration is dependent upon the electrical properties of material(s) inspected and interpretations are opinions based on judgments made from those acquired radar signals and/or other data, GeoTest does not extend any warranties or guaranties as to the accuracy or correctness of interpretations and GeoTest will not accept liability or responsibility for any loss, damage, or expense that may be incurred or sustained by any services or interpretations performed by GeoTest, or others.

GPR scanning cannot distinguish the difference between utilities, anomalies, variable soil conditions, and/or subsurface target 100% of the time. It can only detect the center and approximate depth of targets. GeoTest recognizes that other conditions may vary from those encountered at the location where geophysical or other explorations are made. The data interpretations and recommendations made by GeoTest are based solely on the information available to them at the time of performance; and GeoTest shall not be responsible for the interpretation, by others, of the information developed.

Submitted By	 Alex Davis, G.I.T. GPR Operator

Image 1: Site map with the extent of the requested area bordered in yellow, and the approximate extent of the area scanned on this date bordered in red. The blue border indicates the approximate boundary of the fence line. The approximate location of subsurface anomalies identified on this date are marked and numbered in pink .

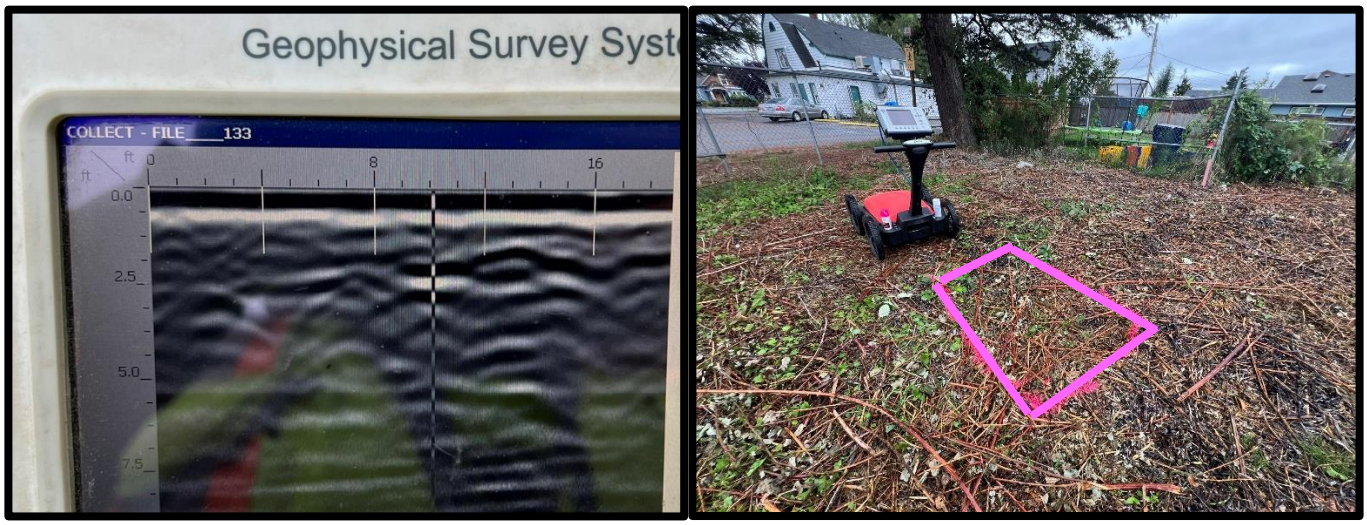

Image 2: GPR cross-section with vertical reference line centered on Anomaly 1 (left). Its observed extent is outlined in pink (right).

Image 3: GPR cross-section with vertical reference line centered on Anomaly 2 (left). Its observed extent is outlined in pink (right).

Image 4: GPR cross-section with vertical reference line centered on Anomaly 3 (left). Its observed extent is outlined in pink (right).

Image 5: GPR cross-section with vertical reference line centered on Anomaly 4 (left). Its observed extent is outlined in pink (right).

Image 6: GPR cross-section with vertical reference line centered on Anomaly 5 (left). Its observed extent is outlined in pink (right).

Appendix C

Field Sampling Data Sheets

MAUL FOSTER ALONGI

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
SB-24	Reconnaissance		Land Surface	0.75	5-15	10.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/14/2024	12:52	14.30		2.61		11.69	0.27

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method: Peristaltic Pump

Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
Purge Start Time 12:55			*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*
13:01	0.1	0.15	--	5.69	16.0	3,100	--	--	OR
13:04	0.2	0.15	--	5.44	15.5	3,090	--	--	475
13:08	0.3	0.15	--	5.26	15.2	3,080	--	--	149
13:11	0.4	0.15	--	5.20	15.2	3,070	--	--	91.2
13:15	0.6	0.15	--	5.09	15.1	3,050	--	--	27.5
13:18	0.7	0.15	--	5.03	15.0	3,050	--	--	22.1
13:21	0.9	0.15	--	5.01	15.0	3,040	--	--	19.1
13:24	1.0	0.15	--	4.99	15.0	3,030	--	--	14.9
13:27	1.1	0.15	--	4.97	15.1	3,030	--	--	12.7
13:30	1.2	0.15	--	4.95	15.1	3,040	--	--	12.4

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Brown; cloudy, then clear; no odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	SB24-GW-10.0		
Sample Date	10/14/2024	**Sample Time**	13:30

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Unable to measure water level continuously due to diameter of temporary well casing. Final depth to water measured at 3.43 feet.

OR = over range.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
SB-25	Reconnaissance		Land Surface	0.75	5-15	10.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/14/2024	11:49	14.57		3.45		11.12	0.26

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*							
Purge Start Time	11:53	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*		*± 10*	*< 5 or ± 10% if > 5*
Time	**Cumulative Purge Volume**	**Flowrate**	**Water Level**	**pH**	**Temperature**	**Conductivity**	**Dissolved Oxygen**	**ORP**	**Turbidity**
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
12:01	0.1	0.1	--	5.46	15.9	2,220	--	--	607
12:04	0.1	0.1	--	5.44	15.9	2,110	--	--	667
12:08	0.2	0.1	--	5.48	15.8	2,180	--	--	OR
12:12	0.2	0.1	--	5.41	15.7	2,220	--	--	973
12:15	0.3	0.1	--	5.40	15.7	2,150	--	--	263
12:19	0.4	0.1	--	5.39	15.9	2,130	--	--	161

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Brown; cloudy; no odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	SB25-GW-10.0		
Sample Date	10/14/2024	Sample Time	12:20
Container Type	**Preservative**	**Filtered (Y/N)**	**No. Containers**
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Unable to measure water level continuously due to diameter of temporary well casing. Groundwater dropped below tubing at 12:20. Lowered tubing 1.5 feet and collected sample. Groundwater dropped below tubing at 12:26 during sample collection. Lowered tubing 1-foot. Final depth to water measured at 8.03 feet.

OR = over range.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
SB-26	Reconnaissance		Land Surface	0.75	5-15	13.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/15/2024	8:48	15.02		4.56		10.46	0.24

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*						
Purge Start Time	8:51	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
8:54	0.1	0.1	--	7.06	15.0	1,230	--	--	346
8:57	0.1	0.1	--	6.95	15.3	1,090	--	--	452

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Brown; cloudy; no odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	SB26-GW-13.0		
Sample Date	10/15/2024	Sample Time	9:00

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	4
Amber glass	None	N	1
		Total No. Containers:	5

General Comments

Unable to measure water level continuously due to diameter of temporary well casing. Groundwater dropped below tubing at 8:58. Lowered tubing and collected sample. Well ran dry during sample collection.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
SB-27	Reconnaissance		Land Surface	0.75	5-15	13.5

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/14/2024	14:25	14.65		12.52		2.13	0.05

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method: Peristaltic Pump

Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other

Purge Start Time	14:32		*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*
Time	**Cumulative Purge Volume**	**Flowrate**	**Water Level**	**pH**	**Temperature**	**Conductivity**	**Dissolved Oxygen**	**ORP**	**Turbidity**
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
Let well reacharge overnight. Water level measured at 2.67 feet at 8:02 on 10/15/2024. Begin purging at 8:07.									
8:12	0.1	0.1	--	6.65	13.9	2,180	--	--	OR
8:15	0.2	0.1	--	6.54	14.3	2,210	--	--	OR

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Brown; cloudy; moderate petroleum hydrocarbon-like odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	SB27-GW-10.0		
Sample Date	10/15/2024	Sample Time	8:20

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Unable to measure water level continuously due to diameter of temporary well casing. 2 inches of water in well 1.5 hours after installation on 10/14/2024. Waited for well to recharge overnight and sampled immediately on 10/15/2024. Groundwater dropped below tubing during sample collection; lowered tubing. Final depth to water measured at 14.19 feet.

OR = over range.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-01	Monitoring	Flush-mount	Top of Casing	1.5	4-14	11.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/17/2024	13:29	14.13		1.15		12.98	1.19

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method: Peristaltic Pump

Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
Purge Start Time 13:30			*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*
13:40	0.3	0.11	3.64	5.85	15.3	930	--	--	63.1
14:11	1.2	0.11	6.97	5.83	16.0	890	--	--	21.7
14:15	1.3	0.11	7.24	5.87	15.5	901	2.22	178.8	21.5
14:18	1.4	0.11	7.44	5.93	15.6	903	1.85	165.1	23.1
14:21	1.5	0.11	7.61	5.94	15.6	910	1.87	157.9	26.2
14:25	1.6	0.11	7.96	5.95	15.6	918	1.88	150.5	--

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear with white particulates; orange tint; no odor; no sheen.

General Comments

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW01-GW-11.0		
Sample Date	10/17/2024	Sample Time	14:30

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-02	Monitoring	Flush-mount	Top of Casing	1.5	4-14	9.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)	
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*	*0.75" = 0.023 gal/ft* *1" = 0.041 gal/ft* *1.5" = 0.092 gal/ft* *2" = 0.163 gal/ft* *3" = 0.367 gal/ft* *4" = 0.653 gal/ft* *6" = 1.469 gal/ft* *8" = 2.611 gal/ft*
10/17/2024	10:07	14.15		3.43		10.72	0.99	

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*						
Purge Start Time	10:11	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
10:14	0.1	0.1	4.60	6.61	14.8	1,460	--	--	33.4
10:17	0.1	0.1	5.19	6.60	15.5	1,400	--	--	33.1
10:20	0.2	0.1	6.12	6.48	16.4	1,406	0.40	200.7	40.8
10:23	0.3	0.1	6.78	6.49	16.7	1,319	0.28	196.0	34.5
10:26	0.4	0.1	7.45	6.47	16.7	1,198	0.21	190.5	52.3
10:29	0.5	0.1	7.95	6.48	16.7	1,092	0.15	179.5	103
10:32	0.6	0.1	8.72	6.67	16.0	1,390	--	--	71.9
10:35	0.7	0.1	9.43	6.62	16.3	1,410	--	--	131
10:38	0.8	0.1	10.03	6.59	16.6	1,330	--	--	118
15:13	0.8	0.1	7.66	--	--	--	--	--	28.8
15:17	0.9	0.1	8.98	6.61	16.8	1,394	0.38	99.6	34.9
15:20	1.0	0.1	9.56	6.59	17.0	1,310	0.28	98.2	32.2

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*	Clear; yellow tint; no odor; blocky sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW02-GW-12.0		
Sample Date	10/17/2024	**Sample Time**	15:30

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Switched to Hanna meter at 10:30 due to turbidity. Water level dropped below tubing at 10:39; paused for recharge. Resumed purging at 15:13.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-03	Monitoring	Flush-mount	Top of Casing	1.5	4-14	9.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/17/2024	10:59	13.73		1.59		12.14	1.12

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*						
Purge Start Time	11:00	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
11:07	0.5	0.2	2.19	--	--	--	--	--	14.5
11:12	0.7	0.2	2.25	5.76	15.3	1,501	0.39	158.1	14.9
11:20	1.1	0.2	2.19	5.45	15.0	1,310	0.14	164.4	9.92
11:24	1.3	0.2	2.16	5.39	14.9	1,242	0.11	166.4	6.52
11:29	1.5	0.2	2.12	5.36	15.0	1,197	0.10	165.7	6.15
11:32	1.6	0.2	2.10	5.36	14.9	1,181	0.11	165.1	6.04
11:35	1.7	0.2	2.08	5.35	14.9	1,157	0.09	163.7	6.15
11:38	1.8	0.2	2.07	5.34	14.9	1,138	0.09	161.9	5.78

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear; colorless; moderate sulfur-like odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW03-GW-9.0		
Sample Date	10/17/2024	Sample Time	11:40

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	15
Amber glass	None	N	4
		Total No. Containers:	19

General Comments

MS/MSD collected here.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-04	Monitoring	Flush-mount	Top of Casing	1.5	4-14	9.5

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/17/2024	12:11	14.03		2.58		11.45	1.05

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*						
Purge Start Time	12:16	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
12:23	0.2	0.1	4.11	6.21	13.8	1,430	--	--	64.2
12:45	0.8	0.1	4.61	6.01	14.4	1,510	--	--	15.8
12:53	1.2	0.1	4.73	5.92	14.2	1,556	0.31	181.1	10.7
12:56	1.3	0.1	4.79	5.93	14.3	1,559	0.27	173.4	9.68
13:01	1.5	0.1	4.92	5.95	14.3	1,560	0.32	161.9	11.5
13:04	1.6	0.1	4.96	5.95	14.2	1,564	0.33	158.2	9.73

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear; brown tint; no odor; ribbon sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW04-GW-9.5		
Sample Date	10/17/2024	Sample Time	13:10

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	12
Amber glass	None	N	2
		Total No. Containers:	14

General Comments

Duplicate sample MWDUP-GW-9.5 collected here.

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-05	Monitoring	Flush-mount	Top of Casing	2.0	4-14	9.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/17/2024	12:51	13.97		1.69		12.28	2.00

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method: Peristaltic Pump

Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
Purge Start Time 12:52			*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*
12:58	0.1	0.13	2.53	5.89	13.8	1,830	--	--	39.7
13:32	1.2	0.13	3.28	4.86	13.9	1,610	--	--	26.9
13:36	1.3	0.13	3.34	4.84	13.6	1,575	1.63	190.3	16.9
13:43	1.6	0.13	3.38	4.63	13.7	1,520	0.76	195.5	11.8
13:46	1.7	0.13	3.37	4.61	13.7	1,519	0.66	192.7	10.0
13:49	1.8	0.13	3.39	4.59	13.7	1,519	0.56	190.1	7.77
13:52	1.9	0.13	3.39	4.57	13.7	1,518	0.50	187.3	7.06
13:55	2.0	0.13	3.41	4.55	13.7	1,511	0.43	184.0	--

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear; colorless; no odor; no sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW05-GW-9.0		
Sample Date	10/17/2024	**Sample Time**	14:00

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Groundwater Field Sampling Data Sheet

MAUL FOSTER ALONGI

Project Information

Project No.	Client Name	Project Name	Sampling Event	Sampler(s)
M1030.08.003	City of Stanwood	Raplee Data Gaps	October 2024	C. Sifford

Well Information

Location ID	Well Type	Monument Type	Depth Measuring Point	Well Diameter (in)	Screen Interval (ft)	Sample Depth (ft)
MW-06	Monitoring	Flush-mount	Top of Casing	2.0	4-14	12.0

Hydrology/Level Measurements

Date	Time	Depth to Bottom (ft)	Depth to Product (ft)	Depth to Water (ft)	Product Thickness (ft)	Water Column (ft)	Well Casing Volume (gal)
		DTB	*DTP*	*DTW*	*DTW - DTP*	*DTB - DTW*	*(gal/ft x water column)*
10/17/2024	10:47	13.99		3.45		10.54	1.72

0.75" = 0.023 gal/ft
1" = 0.041 gal/ft
1.5" = 0.092 gal/ft
2" = 0.163 gal/ft
3" = 0.367 gal/ft
4" = 0.653 gal/ft
6" = 1.469 gal/ft
8" = 2.611 gal/ft

Water Quality Data

Purge Method	Peristaltic Pump	*Purge/Sampling Methods: peristaltic pump, submersible pump, vacuum pump, inertia pump, dedicated pump, disposable bailer, bladder pump, other*						
Purge Start Time	10:50	*ideally < 0.3 ft drawdown*	*± 0.1*	*± 3%*	*± 3%*	*± 10% if > 0.5*	*± 10*	*< 5 or ± 10% if > 5*

Time	Cumulative Purge Volume	Flowrate	Water Level	pH	Temperature	Conductivity	Dissolved Oxygen	ORP	Turbidity
	gal	*L/min*	*ft*	*SU*	*degrees C*	*uS/cm*	*mg/L*	*mV*	*NTU*
10:53	0.1	0.11	3.99	6.15	15.0	1,780	--	--	86.0
11:03	0.3	0.11	5.55	6.02	15.4	1,820	--	--	65.2
11:14	0.8	0.11	7.48	5.96	15.3	1,830	--	--	58.1
14:44	0.8	0.11	7.05	--	--	--	--	--	--
14:51	1.1	0.11	8.37	6.12	14.3	1,738	2.97	139.6	56.5
14:54	1.2	0.11	8.83	6.11	14.3	1,776	2.40	135.7	54.1
14:57	1.3	0.11	9.36	6.11	14.2	1,779	1.99	131.4	52.1

Last row of water quality data are considered final field parameters unless otherwise noted.

Water Quality Observations *(clarity, tint, odor, sheen, etc.)*: Clear with white particulates; yellow tint; no odor; blocky sheen.

Sample Information

Sampling Method	Peristaltic Pump		
Sample Name	MW06-GW-12.0		
Sample Date	10/17/2024	Sample Time	15:00

Container Type	Preservative	Filtered (Y/N)	No. Containers
VOA	HCl	N	6
Amber glass	None	N	1
		Total No. Containers:	7

General Comments

Water level dropped below tubing at 11:25; paused for recharge. Resumed purging at 14:44.

Appendix D

Well Development Forms

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/9/2024	
Project Location: Stanwood, WA	Well ID: MW-01	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 13.98	Final DTB: 14.13
MFA Staff Name: C. Sifford	Initial DTW: 1.79	Final DTW: 13.27
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 1.12 gal	
Total Water Purged: 5.7 gal	Casing Diameter: 1.5 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
12:53	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
13:02	0	--	--	--	--	--	--	--	--	Complete surging.
13:12	0	--	--	--	--	--	--	--	--	Begin purging with bailer.
13:18	0.5	--	--	--	--	--	--	--	--	Complete purging.
13:22	0.5	0.1	--	--	--	--	--	--	4.20	Begin purging with peristaltic pump.
13:29	0.6	0.2	355	6.23	16.4	1250	--	--	6.06	Continue purging.
13:59	2.1	0.2	132	6.42	15.8	1320	--	--	12.97	Continue purging.
14:04	2.1	--	--	--	--	--	--	--	Dry	Well ran dry. Pause for recharge.
16:13	2.1	--	--	--	--	--	--	--	1.47	Restart purging.
16:16	2.2	0.2	16.5	6.73	16.1	1730	--	--	2.41	Continue purging.
16:24	2.4	0.2	6.03	6.07	16.4	1150	--	--	4.30	Continue purging.
16:39	3.2	0.2	5.77	5.86	15.8	1044	1.17	133.3	6.54	Continue purging. Connect to YSI.
16:52	3.8	0.2	8.55	5.97	15.6	1106	1.53	85.9	8.33	Continue purging.
17:15	4.5	0.2	5.27	6.19	15.3	1219	3.19	55.7	10.43	Continue purging.
17:36	5.5	0.2	5.89	6.20	15.1	1326	3.16	37.6	12.12	Continue purging.
17:43	5.7	0.2	4.52	6.19	15.0	1582	2.72	33.9	12.89	Conductivity readings fluctuating between 1300 and 1600. Other parameters appear stabilized. Well ran dry at 17:51. Development complete.
--	--	--	--	--	--	--	--	--	--	
--	--	--	--	--	--	--	--	--	--	

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Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/9/2024	
Project Location: Stanwood, WA	Well ID: MW-02	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 14.16	Final DTB: 14.17
MFA Staff Name: C. Sifford	Initial DTW: 2.67	Final DTW: Dry
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 1.06 gal	
Total Water Purged: 1.7 gal	Casing Diameter: 1.5 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
11:01	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
11:14	0	--	--	--	--	--	--	--	--	Complete surging. Begin purging with bailer.
11:22	0.4	--	--	--	--	--	--	--	--	Complete purging.
11:24	0.4	0.2	--	--	--	--	--	--	7.36	Begin purging with peristaltic pump.
11:44	1.4	0.2	--	--	--	--	--	--	Dry	Well ran dry. Pause for recharge.
13:09	1.4	--	--	--	--	--	--	--	12.98	Check water level.
14:50	1.4	--	--	--	--	--	--	--	12.09	Restart purging.
14:56	1.5	0.1	710	6.86	17.3	1460	--	--	12.78	Continue purging.
15:03	1.6	--	697	6.86	17.2	1440	--	--	Dry	Well ran dry. Pause for recharge.
16:44	1.6	--	--	--	--	--	--	--	13.20	Check water level.
17:22	1.6	--	--	--	--	--	--	--	12.86	Restart purging.
12:25	1.7	0.1	83.3	6.83	16.4	1370	--	--	13.72	Continue purging.
12:27	1.7	--	--	--	--	--	--	--	Dry	Well ran dry. Development complete.

Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/9/2024	
Project Location: Stanwood, WA	Well ID: MW-03	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 13.43	Final DTB: 13.73
MFA Staff Name: C. Sifford	Initial DTW: 2.25	Final DTW: 3.42
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 1.06 gal	
Total Water Purged: 7.3 gal	Casing Diameter: 1.5 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
14:19	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
14:26	0	--	--	--	--	--	--	--	--	Complete surging.
14:27	0	--	--	--	--	--	--	--	--	Begin purging with bailer.
14:34	0.4	--	--	--	--	--	--	--	--	Complete purging.
14:37	0.4	0.2	--	--	--	--	--	--	2.17	Begin purging with peristaltic pump.
14:41	0.5	0.2	416	6.59	16.3	2180	--	--	3.16	Continue purging.
14:53	1.2	0.2	36.5	5.81	16.4	1680	--	--	3.36	Continue purging.
15:11	2.2	0.2	16.9	5.21	15.9	1640	0.49	241.4	3.41	Continue purging. Connect to YSI.
15:38	4.3	0.2	5.76	5.24	15.8	1159	0.11	174.0	3.41	Continue purging.
15:52	5.0	0.2	3.97	5.24	15.8	1126	0.11	157.0	3.42	Continue purging.
16:04	5.7	0.2	4.99	5.24	15.7	1111	0.10	144.0	3.43	Continue purging.
16:18	6.6	0.2	4.55	5.27	15.7	1102	0.13	131.1	3.42	Continue purging.
16:27	7.3	0.2	3.86	5.26	15.7	1102	0.11	125.9	3.42	Stable. Development complete.

Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/9/2024	
Project Location: Stanwood, WA	Well ID: MW-04	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 14.02	Final DTB: 14.03
MFA Staff Name: C. Sifford	Initial DTW: 3.21	Final DTW: Dry
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 0.99 gal	
Total Water Purged: 2.8 gal	Casing Diameter: 1.5 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
12:11	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
12:23	0	--	--	--	--	--	--	--	--	Bailer disconnected.
12:32	0	--	--	--	--	--	--	--	2.96	Begin purging with peristaltic pump.
12:36	0.1	0.1	OR	6.18	14.7	1430	--	--	4.63	Continue purging. Rainbow sheen observed.
13:03	1.1	0.1	OR	6.52	14.3	1390	--	--	Dry	Well ran dry. Pause for recharge.
13:06	1.1	--	--	--	--	--	--	--	--	Remove bailer.
15:18	1.1	--	--	--	--	--	--	--	4.56	Restart purging.
15:21	1.2	0.1	20.3	6.38	15.3	1380	--	--	5.67	Continue purging.
15:33	1.5	0.1	16.0	6.27	15.2	1380	--	--	8.51	Continue purging.
15:47	2.1	0.1	11.4	6.18	15.0	1360	--	--	11.42	Continue purging.
15:58	2.4	0.1	125	6.26	15.2	1370	--	--	12.72	Continue purging.
16:02	2.5	0.1	40.9	6.33	14.7	1360	--	--	Dry	Well ran dry. Pause for recharge.
16:47	2.5	--	--	--	--	--	--	--	10.43	Check water level.
16:49	2.5	0.1	--	--	--	--	--	--	10.43	Restart purging.
16:59	2.7	0.1	8.29	6.33	14.4	1360	--	--	12.32	Continue purging.
17:03	2.8	0.1	--	--	--	--	--	--	Dry	Well ran dry. Development complete.

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Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
OR = over range.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/15/2024	
Project Location: Stanwood, WA	Well ID: MW-05	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 13.99	Final DTB: --
MFA Staff Name: C. Sifford	Initial DTW: 2.35	Final DTW: Dry
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 1.90 gal	
Total Water Purged: 8.5 gal	Casing Diameter: 2 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
10:43	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
10:55	0	--	--	--	--	--	--	--	--	Complete surging.
10:55	0	--	--	--	--	--	--	--	--	Begin purging with bailer.
11:00	2.0	--	--	--	--	--	--	--	8.36	Complete purging.
11:05	2.0	0.19	--	--	--	--	--	--	--	Begin purging with peristaltic pump.
11:10	2.1	0.19	257	5.78	14.5	1620	--	--	8.29	Continue purging.
11:21	2.6	0.19	12.0	5.10	14.4	1540	--	--	8.34	Continue purging.
11:58	4.4	0.19	7.93	4.91	14.0	1590	3.44	167.5	8.63	Continue purging.
12:23	6.0	0.25	66.3	5.66	13.6	1734	3.48	115.4	11.15	Continue purging.
13:08	8.2	0.18	14.0	5.58	13.4	1747	4.19	103.9	13.23	Continue purging.
13:14	8.5	0.18	--	--	--	--	--	--	Dry	Well ran dry. Development complete.

Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

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Well Development Field Form

Project No.: M1030.08.003	Date: 10/15/2024	
Project Location: Stanwood, WA	Well ID: MW-06	
Project Name: Raplee Soil and Groundwater Data Gaps	Initial DTB: 13.99	Final DTB: 13.98
MFA Staff Name: C. Sifford	Initial DTW: 5.47	Final DTW: Dry
Development Method: Bailer Surge, Peristaltic Pump Purge	Well Casing Vol.: 1.38 gal	
Total Water Purged: 1.6	Casing Diameter: 2 inches	

(0.75" = 0.023 gal/ft) (1" = 0.041 gal/ft) (1.5" = 0.092 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (8" = 2.611 gal/ft)

Time	Purge Vol. (gal)	Pump Rate (L/min)	Turbidity (NTUs)	pH	Temp. (°C)	Conductivity (uS/cm)	DO (mg/L)	ORP (mV)	DTW (ft)	Comments
11:38	0	--	--	--	--	--	--	--	--	Begin surging with bailer.
11:47	0	--	--	--	--	--	--	--	--	Complete surging.
11:47	0	--	--	--	--	--	--	--	--	Begin purging with bailer.
11:50	1.3	--	--	--	--	--	--	--	Dry	Complete purging.
11:50	1.3	--	--	--	--	--	--	--	--	Well ran dry. Pause for recharge.
12:39	1.3	--	--	--	--	--	--	--	12.22	Check water level.
13:35	1.3	0.18	136	--	--	--	--	--	11.83	Begin purging with peristaltic pump.
13:38	1.4	0.18	24.9	6.48	14.7	1380	--	--	12.59	Continue purging.
13:41	1.5	0.18	364	6.54	14.5	1430	--	--	13.41	Continue purging.
13:44	1.6	0.18	277	6.58	14.3	1440	--	--	Dry	Well ran dry. Development complete.

Notes:
Depths are relative to ft below top of casing.
°C = degrees Celsius.
cumltv. = cumulative.
DO = dissolved oxygen.
DTB = depth to bottom.
DTW = depth to water.
ft = feet.
gal = gallon.
L/min = liters per minute.
mg/L = milligrams per liter.
mV = millivolts.
NTUs = nephelometric turbidity units.
ORP = oxygen reduction potential.
vol. = volume.
uS/cm = microsiemens per centimeter.

Appendix E

Well Survey Report

MAUL FOSTER ALONGI

GOLDSMITH
LAND DEVELOPMENT SERVICES

November 27, 2024

Maul Foster Alongi, Inc.
1329 North State Street
Suite 301
Bellingham, WA 98225

Attention: Christian Sifford

Re: Stanwood – Monitor Well Survey Project No. M1030.08.003

Dear Christian,

At your request, we have obtained Y (northing), X (easting), and Z (elevation) coordinates for six (6) new monitor well locations at 9816 271st Street NW, Stanwood WA 98292. The survey was conducted on November 6, 2024. All horizontal locations are to the center of the existing monitor well casing. The elevations shown on the table below reflect the ground elevation adjacent to each well and the elevation of the north rim of the PVC pipe in each casing.

The horizontal and vertical datum reflect NAD 83/2011 Epoch 2010.00 State Plane, Washington North Zone, and NAVD 88 per the Washington State Reference Network (WSRN).

Monitor Well Designation	HGG Point Number	Northing (Y)	Easting (X)	North Rim 2" PVC	Adjacent Ground Elevation
MW-01	30006	456,836.0	1,266,984.8	7.36	7.7
MW-02	30015	456,744.7	1,267,017.8	8.56	8.9
MW-03	30009	456,786.1	1,267,049.3	8.10	8.5
MW-04	30000	456,768.8	1,266,965.0	8.96	9.1
MW-05	30003	456,808.7	1,266,956.5	8.30	8.2
MW-06	30012	456,770.1	1,267,016.1	8.67	8.3

Two site benchmarks were set:

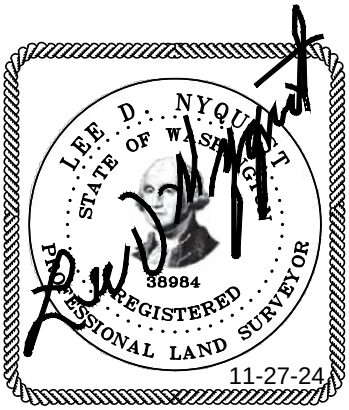
BM #1 is a MAG nail and washer set in the top of curb in the southwest quadrant of the intersection with 271st Street NW and 270th Street NW. The point is at the southerly curb drop for the curb ramp.
Elevation = 9.28 feet.

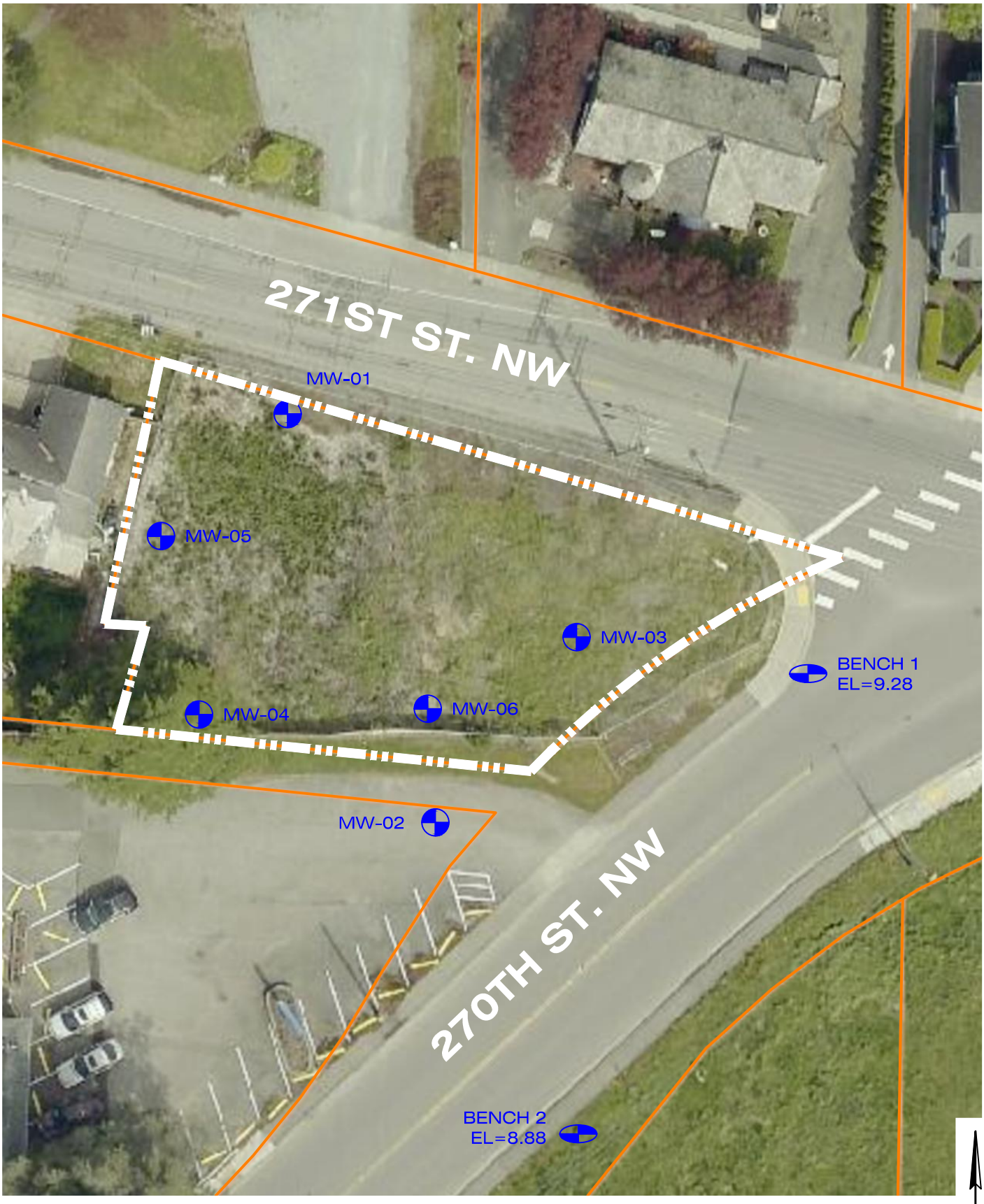
11400 SE 8th St, Suite 450, Bellevue, WA 98004
PO Box 3565, Bellevue, WA 98009
T: 425.462.1080 |**F**: 425.462.7719
www.goldsmithengineering.com

BM #2 is a MAG nail and washer set in the sidewalk on the southerly side of 270th Street NW, southwesterly of the intersection with 271st Street NW, 0.3 feet northwesterly of the back of walk and 15 feet southwesterly of an “Adopt a Street” sign.
Elevation = 8.88 feet.

Sincerely,

Lee Nyquist, P.L.S. | Goldsmith Engineering
Director of Survey | 425.462.1080 |
lnyquist@goldsmithengineering.com





RAPLEE SITE
MONITOR WELL EXHIBIT

9816 271ST ST. NW, STANWOOD, WA 98292

JOB NO. 24088
NOVEMBER 27, 2024

0 15 30
SCALE: 1" = 30'

N

GOLDSMITH
LAND DEVELOPMENT SERVICES
PO Box 3565, Bellevue, WA 98004 T 425 462 1080 F 425 462 7719

L:\2024\24088\3 DEVELOPMENT\CAD\HOST DRAWINGS\EXHIBITS\24088E01.DWG 2024/11/27 11:20

Appendix F

Disposal Documentation

MAUL FOSTER ALONGI

ACT enviro	TSDF	GENERATOR WASTE PROFILE SHEET

Treatment Code

A. GENERAL INFORMATION

Generator Name:	Kathleen Raplee	Profile Number	
Mailing Address:	c/o Maul Foster 1329 North State Street, Suite 301	Generator US EPA ID:	N/A
	Bellingham WA 98225	Generator State ID:	N/A
Site Pick-up Address:	9816 271st St NW	Phone:	541-391-3672
	Stanwood, WA 98292	Fax:	
Technical Contact:	Christian Sifford Title PM	Email:	csifford@maulfoster.com
Name of Waste:	Non Hazardous Soil		
Process Generating Waste:	Investigation Derived Waste, Soil and Water, from monitoring well sampling activities at a former fueling station		
NAICS CODE:	531110	SOURCE CODE: G49	FORM CODE: W301

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25 C OR 77 F

Physical State:	Soil	Color: (Describe)	Brown	Clarity:	Soil, Solid	Phase Separation Number of Layers =	One				
pH: (Select one of the following ranges)	<2	>12.5	Specific Gravity:	<0.8	X >1.2	Flash Point (F):	<73	X >200	BTU Value:	< 2000	X
	4-6			0.8-1.0			73-100			2,000 - 5000	
	7			1.0			101-140			5000 - 10, 000	
	X 7-12.4			1.0-1.2			141-200			> 10,000	

C. CHEMICAL COMPOSITION / UHC's

BASED UPON: ANALYTICAL (INCLUDED) X GENERATOR KNOWLEDGE

Constituent:	RANGE Lower	Upper	
Soil	50	75	%
Water	25	50	%
Gasoline	0	270	mg/kg
Diesel	0	700	mg/kg
Motor Oil	0	5300	mg/kg
Benzene	0	0.7	mg/kg

D. METALS

	mg/kg	totals	
N/A	Arsenic		
N/A	Barium		
N/A	Cadmium	N/A	Copper
N/A	Chromium	N/A	Nickel
N/A	Mercury	N/A	Zinc
N/A	Lead		
N/A	Selenium		
N/A	Silver		

E. OTHER COMPONENTS

OXIDIZER	No	REACTIVE SULFIDES PPM	No
EXPLOSIVE	No	REACTIVE CYANIDES PPM	No
SHOCK SENSITIVE	No	WATER/AIR REACTIVE	No
TIRES	No	THERMALLY UNSTABLE	No
PYROPHORIC	No	TSCA REGULATED PCB WASTE	No
RADIOACTIVE	No	COMPRESSED GASSES	No
EXEMPT RAD	No	CERCLA/SUPERFUND	No
Ethiological	No	Pesticide Manufacturing Waste	No

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III YES X NO

Debris YES X NO <500 PPM VOC as generated YES X NO

Subject to NESHAP Regulations YES X NO

US EPA Hazardous Waste: Yes No X WW NWW

US EPA Hazardous Waste Codes: None

F. SHIPPING INFORMATION

DOT Hazardous Material YES NO X Exempted

Proper Shipping Name: Non RCRA/Non Regulated Material

Hazard Class: N/A

ID #: N/A PG: N/A RQ: N/A

Anticipated Volume (Units): 1 x 55DM

Per: One time X Month

Quarter Year

G. Special Handling Information:

Subtitle D LF

H. GENERATOR'S CERTIFICATION:

X Yes No I certify this material may be disposed of without further treatment.

I hereby certify that all information in this and all attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify ACT in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Kathleen Raplee Title: owner Date: 11-19-24

Print Name: KATHLEEN RAPLEE

TSDF

GENERATOR WASTE PROFILE SHEET

Treatment Code

A. GENERAL INFORMATION

Generator Name:	Kathleen Raplee	Profile Number	
Mailing Address:	c/o Maul Foster 1329 North State Street, Suite 301	Generator US EPA ID:	N/A
	Bellingham WA 98225	Generator State ID:	N/A
Site Pick-up Address:	9816 271st St NW	Phone:	541-391-3672
	Stanwood, WA 98292	Fax:	
Technical Contact:	Christian Sifford Title: PM	Email:	csifford@maulfoster.com
Name of Waste:	Non Hazardous Water		
Process Generating Waste:	Investigation Derived Waste, Water, from monitoring well sampling activities at a former fueling station		
NAICS CODE:	531110	SOURCE CODE: G49	FORM CODE: W219

B. PHYSICAL CHARACTERISTICS OF WASTE AT 25 C OR 77 F

Physical State:	Water	Color: (Describe)	Cloudy Brown	Clarity:	Liquid, Cloudy	Phase Separation Number of Layers =	One				
pH: (Select one of the following ranges)	<2	>12.5	Specific Gravity:	<0.8	>1.2	Flash Point (F):	<73	X >200	BTU Value:	< 2000	X
	4-6			0.8-1.0			73-100			2,000 - 5000	
	7			X 1.0			101-140			5000 - 10, 000	
	X 7-12.4			1.0-1.2			141-200			> 10,000	

C. CHEMICAL COMPOSITION / UHC's

BASED UPON: ANALYTICAL (INCLUDED) X GENERATOR KNOWLEDGE

Constituent:	RANGE Lower	Upper	
Water	95	100	%
Sediment	0	5	%
Gasoline	0	780	ug/l
Diesel	0	6000	ug/l
Motor Oil	0	11000	ug/l
Benzene	0	190	ug/l

D. METALS

mg/kg | totals

N/A	Arsenic		
N/A	Barium		
N/A	Cadmium	N/A	Copper
N/A	Chromium	N/A	Nickel
N/A	Mercury	N/A	Zinc
N/A	Lead		
N/A	Selenium		
N/A	Silver		

E. OTHER COMPONENTS

OXIDIZER	No	REACTIVE SULFIDES PPM	No
EXPLOSIVE	No	REACTIVE CYANIDES PPM	No
SHOCK SENSITIVE	No	WATER/AIR REACTIVE	No
FIRES	No	THERMALLY UNSTABLE	No
PYROPHORIC	No	TSCA REGULATED PCB WASTE	No
RADIOACTIVE	No	COMPRESSED GASSES	No
EXEMPT RAD	No	CERCLA/SUPERFUND	No
Ethiological	No	Pesticide Manufacturing Waste	No

HALOGENATED ORGANIC COMPOUNDS PER 40 CFR 268, APPENDIX III YES X NO

Debris YES X NO | <500 PPM VOC as generated YES X NO

Subject to NESHAP Regulations YES X NO

US EPA Hazardous Waste: Yes No X | WW | NWW

US EPA Hazardous Waste Codes: None

F. SHIPPING INFORMATION

DOT Hazardous Material YES NO X Exempted

Proper Shipping Name: Non RCRA/Non Regulated Material

Hazard Class: N/A

ID #: N/A PG: N/A RQ: N/A

Anticipated Volume (Units): 1 x SSDM

Per: One time X | Year | Month

Quarter | Year | Month

G. Special Handling Information:

Wastewater Treatment

H. GENERATOR'S CERTIFICATION:

X Yes No — I certify this material may be disposed of without further treatment.

I hereby certify that all information in this and all attached documents is complete and accurate, and that all known or suspected hazards have been disclosed. I further certify that any samples submitted with this profile are representative of the waste to be shipped and are taken in accordance with SW 846 or other approved procedures. I agree to notify ACT in writing when the process generating this waste stream changes or when I have reason to believe the data contained herein is not complete and accurate.

Signature: Kathleen Raplee Title: owner Date: 11-19-24

Print Name: KATHLEEN RAPLEE

ACT enviro

Home Office:
967 Mabury Road
San Jose, CA 95133
408 548-5050 P
408 548-5052 F

6212 S 75th Avenue #4
Laveen, AZ 85339

2010 Mission Road
Escondido, CA 92029

24602 Pacific Hwy S
Kent, WA 98032

265 Riggs Avenue
Merced, CA 95341

600 Iowa Street
Redlands, CA 92373

4 Wayne Court, Building 9
Sacramento, CA 95829

13722 Carmenita Road
Santa Fe Springs, CA 90670

6137 Edith Blvd NE
Albuquerque, NM 87107

208 Murray Road SE
Albuquerque, NM 87105

5750 E. 58th Ave, Unit G
Commerce City, CO 80022

511 Highway 213
Chaparral, NM 88081

13600 SE Ambler Road
Clackamas, OR 97015

WORK ORDER

Work Order # 554715 / IA-15647
Proposal #
Date 12/12/2024
Acct. Sales Manage Kyle Satterthwaite

Customer Information

Name: **Kathleen Raplee**
Address: **9816 271st Street NW**
Stanwood, WA 98292

EPA ID # **WAVSQG**
Main Contact: **Amanda Bixby 360-635-8371**
Phone:

Secondary Contact:
Phone:

PO # **M1030.08.003**

Service Request

Description:

Include copy of Designation of Authorized Representative with paperwork
Please send driver with lift gate and drum dolly to site for 1 x 55DM soil and 1 x 55DM water. Drums are staged behind a dummy gate on grass. Soil drum isn't full, but may want to bring a sheet of plywood for dolly. Authorization letter on file to sign manifest on behalf of Generator.

1 - 55 - DM - SOIL - 100262
1 - 55 - DM - WATER - 100262
820 - EA - Environmental Service Charge

Materials and Equipment

Supplies	New			Reconditioned		
	Metal	Poly	Fiber	Metal	Poly	Fiber
85-gallon overpack						
55-gallon closed top						
55-gallon open top						
30-gallon closed top						
30-gallon open top						
20-gallon closed top						
20-gallon open top						
15-gallon closed top						
15-gallon open top						
10-gallon closed top						
10-gallon open top						
5- gallon closed top						
5- gallon open top						
1- gallon open top						
PIH Packaging						
275-gallon tote						
Cubic Yard Box						
4ft Light Tube Drum						
8ft Light Tube Drum						

Services

Disposal Services:

Quantity	Container Size	Profile #/Waste Type	Shipping Document #	Treatment Facility
1	DM55	100262 soil	D0684 6666	Heritage
1	DM55	100262 water	D0684 6666	Heritage

Packing Materials	#
Vermiculite, Bag	
Clay Absorbent, Bag	
Bubble Wrap, Roll	
Bubble Wrap Bags, Box	
Drum Liners	
Pallet	
SuperSack	
Radioactive Waste Boxes	
Biological Waste Boxes	
Red Biological Waste Bags	

Personal Protective Equipment	#
Level D	
Level C	
Level B	

Other Materials	#

Transportation Services:

Number of Containers	Facility/Destination

Notes: 3:20 PM Arrival

Labor:	Hours/Regular	Hours/Overtime	Service Provided
Project Manager			
Chemist			
Technician			
Driver.	2		
Other:			

Notes: on benalf of generator

Customer Signature: [signature] Date: 12-12-24

PRINT NAME: Dylan P. Koopmans

NON-HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of	3. Emergency Response Phone	4. Waste Tracking Number
	WAVSQG	1	888-785-7225	554715/D684666

GENERATOR

5. Generator's Name and Mailing Address

Kathleen Raplee c/o Maul Foster
1329 North State Street Suite 301
Bellingham, WA 98225
Generator's Phone: 360-635-8371

Generator's Site Address (if different than mailing address)

Kathleen Raplee
9816 271st Street NW
Stanwood, WA 98292

6. Transporter 1 Company Name: ADVANCED CHEMICAL TRANSPORT LLC — U.S. EPA ID Number: CAR000070546

7. Transporter 2 Company Name — U.S. EPA ID Number

8. Designated Facility Name and Site Address

Heritage Crystal Clean
1901 East D Street
Tacoma, WA 98421
Facility's Phone:

U.S. EPA ID Number: NON HAZ

	9. Waste Shipping Name and Description	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	
1.	Non-RCRA/Non-DOT Regulated Material Solid (SOIL)	1	DM	250	P	
2.	Non-RCRA/Non-DOT Regulated Material Liquid (WATER)	1	DM	450	P	
3.						
4.						

13. Special Handling Instructions and Additional Information

Project Number 554715 Document #: D684666

1) 100262 KAH- 1 X DM 55
2) 100262 KAH- 1 X DM 55

14. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Generator's/Offeror's Printed/Typed Name: Dylan P. Koopmans on behalf of generator — Signature: Dylan — Month: 12 Day: 12 Year: 24

INT'L

15. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit:

Transporter Signature (for exports only): Date leaving U.S.:

TRANSPORTER

16. Transporter Acknowledgment of Receipt of Materials

Transporter 1 Printed/Typed Name: Dylan P. Koopmans — Signature: Dylan — Month: 12 Day: 12 Year: 24

Transporter 2 Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY

17. Discrepancy

17a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

17b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

17c. Signature of Alternate Facility (or Generator) — Month Day Year

18. Designated Facility Owner or Operator: Certification of receipt of materials covered by the manifest except as noted in Item 17a

Printed/Typed Name — Signature — Month Day Year

DESIGNATED FACILITY TO GENERATOR

Appendix G

Archaeological Monitoring Report

MAUL FOSTER ALONGI

CULTURAL RESOURCES REPORT COVER SHEET

DAHP Project Number: 2024-03-01908 (Please contact the lead agency for the project number. If associated to SEPA, please contact SEPA@dahp.wa.gov to obtain the project number before creating a new project.)

Author: Jesse Van De Vanter, Bryan Hoyt, and Chris Lockwood

Title of Report: 9816 271st Street Northwest, Soil and Groundwater Investigation, City of Stanwood, Snohomish County, Washington

Date of Report: November 2024

County(ies): Snohomish Section: 24 Township: 32 North Range: 3 East

Quad: Stanwood Acres: <1.0

PDF of Report uploaded to WISAARD report module (REQUIRED) ☒ Yes

Historic Property Inventory Forms to be Approved Online? ☐ Yes ☒ No

Archaeological Site(s)/Isolate(s) found or amended? ☐ Yes ☒ No

TCP(s) found? ☐ Yes ☒ No

Replace a draft? ☒ Yes ☐ No

Satisfy a DAHP Archaeological Excavation Permit requirement? ☐ Yes # ☒ No

Were Human Remains Found? ☐ Yes DAHP Case # ☒ No

DAHP Archaeological Site #:

- Submission of PDFs into WISAARD's report module is required.
- Please be sure that any PDF submitted to WISAARD has its cover sheet, figures, graphics, appendices, attachments, correspondence, etc., compiled into a single PDF file.
- Please check that the PDF displays correctly when opened.

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
www.esassoc.com

Cultural Resources Short Report

Title:	9816 271st Street Northwest, Soil and Groundwater Investigation, City of Stanwood, Snohomish County, Washington – Archaeological Monitoring of Environmental Investigation Borings		
Author(s):	Jesse Van De Vanter, Bryan Hoyt, and Chris Lockwood, Ph.D.		
Date:	November 2024		
Acreage:	<1.0 Acre (total drilling disturbance is 3.9 cubic feet)	**ESA Project No.**	D202400452.00
Agency:	Washington State Department of Ecology	**Project Proponent:**	City of Stanwood
Regulatory:	Washington State Governor's Executive Order 21-02		
USGS Quad:	Stanwood, WA (7.5')	**Township /Range/Section:**	T 32 N, R 3 E, S 24
Address:	9816 271st Street Northwest Stanwood, WA	**County:**	Snohomish, WA
Parcel:	32032400405900		

PROJECT UNDERSTANDING

Environmental Science Associates (ESA) was retained by Maul Foster & Alongi, Inc. (MFA), on behalf of the City of Stanwood (City), to conduct archaeological monitoring during environmental investigation borings for the 9816 271st Street Northwest Project (Project) (Figure 1). The Project is located in Township 32 North, Range 3 East, Section 24, on Snohomish County parcel 32032400405900 and the adjacent right-of-way to the south, in Stanwood, Snohomish County, Washington. The parcel is referred to as the Raplee Property and has an associated Washington State Department of Ecology (Ecology) Cleanup Site ID #5275.

The City is considering purchasing the parcel and redeveloping it as a public park. The property formerly contained a Standard Oil service and fueling station, which was active between 1958 and 1970 (Wise 2024), and which resulted in contamination from fuel storage. MFA is assisting the City by developing a site cleanup option evaluation, including preliminary assessment and site investigation to address data gaps. This report details results of archaeological monitoring associated with environmental investigation

borings advanced to fill site data gaps. Prior to monitoring, ESA prepared an Archaeological Resources Monitoring Plan (AMP) (Hoyt 2024), which was used in conjunction with the site-specific Ecology Inadvertent Discovery Plan, to guide archaeological monitoring procedures during drilling of the environmental investigation borings.

REGULATORY BACKGROUND

Funding for the Project comes from Ecology, as provided under Revised Code Washington (RCW) 39.34.130 and RCW 39.26.180(3), and via an Interagency Agreement between Ecology and City. As a result of state funding, Ecology is functioning as the Lead Agency with regard to Washington State Governor's Executive Order 21-02 (GEO 21-02).

GEO 21-02 requires that agencies consult, or delegate consultation to non-state recipients of state funds, with the Washington State Department of Archaeology and Historic Preservation (DAHP) and Affected Tribes on the potential impacts of projects on cultural resources (archaeological sites, historic structures, buildings, and objects, and tribal sacred places). GEO 21-02 applies to projects with state-funded construction or acquisition, and which are not otherwise subject to review under the National Historic Preservation Act of 1966 (commonly referred to as "Section 106"), including grant or pass-through funding that culminates in construction or land acquisitions The Executive Order requires that the state agency provide documentation of that consultation to DAHP, if requested.

Ecology has conducted consultation with Affected Tribes and Washington State Department of Archaeology and Historic Preservation (DAHP) in accordance with GEO 21-02. It has been deemed necessary by Ecology, and concurred by DAHP, that a professional archaeologist will provide technical assistance and conduct field monitoring and data recovery if needed. Affected Tribes consulted with by Ecology include the Muckleshoot Indian Tribe, Sauk-Suiattle Indian Tribe, Snoqualmie Tribe of Indians, Stillaguamish Tribe of Indians, Suquamish Tribe, Swinomish Indian Tribal Community, and the Tulalip Tribes.

Additional laws that apply to archaeological projects conducted within the State of Washington include: Archaeological Sites and Resources (Revised Code of Washington [RCW] 27.53), Indian Graves and Records (RCW 27.44), Human Remains (RCW 68.50), and Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60).

ARCHAEOLOGICAL MONITORING

No archaeological resources or potential indicators of past cultural activity, such as fire modified rocks, dense charcoal, or burned soils, were observed during archaeological monitoring of site investigation borings.

Archaeological monitoring was conducted by ESA Archaeologist Jesse Van De Vanter on October 14th, 2024. Weather conditions during monitoring consisted of seasonable temperatures, overcast to clear skies, and occasional rain. ESA followed all protocols detailed in AMP (Attachment 1) prepared for the Project, as well as the Ecology Inadvertent Discovery Plan.

Van De Vanter observed six environmental investigation borings, including four soil and reconnaissance groundwater borings (SB24 – SB27), and two monitoring well borings (MW05 and MW06). Each of the

borings was located within the fenced portion of the property abutting 271st St NW and 270th St NW, except for boring SB-26 which was located in the City right-of-way to the south of the property (Figure 2). Each boring was advanced to 15 feet (4.6 meters) below surface (bs) by Holt Services, Inc., utilizing a Geoprobe 7822DT direct-push drill rig fitted with a 2.25-inch core barrel (Figure 3). Continuous core samples were collected in 5-foot increments from the surface to 15 feet bs for observation and chemical analysis. .

ESA characterized each push sample. Because direct push sampling could be impacted by variably dense soils, the precise top and bottom elevations of each stratigraphic unit were commonly difficult to determine; in such cases, stratigraphic elevations were approximated. Stratigraphic units, however, retained relative relationship to each other, regardless of depth measurements. Data were recorded using smartphones and tablets with Global Positioning System/Global Navigation Satellite System (GPS+GLONASS), with a positional accuracy of 9.8 feet (3 meters) or less. Core materials were visually inspected for the presence of artifacts or human remains.

Observed stratigraphy across the property consisted of road/parking lot fill (crushed rock) and mixed fill/disturbed soil from surface to 3 feet (0.9 meters), then transitioning to intact gray silty clay loam fine alluvium from 3 to 8 feet (0.9-2.4 meters), and light gray silty clay fine alluvium from 8 to 15 feet (2.4-4.6 meters). These borings match expectations regarding the topography of the landform, mapped Puget series complex soil type (NRCS 2000), as well as the prior use of the property as a service station. In general, the near surface deposits have been heavily impacted by prior land use and include mixing of the former A-horizon with the underlying alluvial parent material and imported gravelly fill material. Stratigraphy then transitions into a natural alluvial sequence. Figure 4 demonstrates the typical soil profile as observed within the samples. A full description of each boring is included as Attachment 2.

REFERENCES

Hoyt, Bryan

2024 *9816 271st Street Northwest, Soil and Groundwater Investigation, City of Stanwood, Washington, Archaeological Resources Monitoring Plan.* Prepared for City of Stanwood by ESA, Seattle. On file, ESA, Seattle.

Natural Resources Conservation Service (NRCS)

2000 Puget Series. Electronic document, https://soilseries.sc.egov.usda.gov/OSD_Docs//P/PUGET.html, accessed October 17, 2024.

Wise, Carolyn

2024 *Site Reconnaissance and Date Review Report, Raplee Property Cleanup Site ID #5275.* Prepared for City of Stanwood by Maul Foster & Alongi, Inc, Bellingham. On file, ESA, Seattle.

LIST OF FIGURES

ATTACHMENTS

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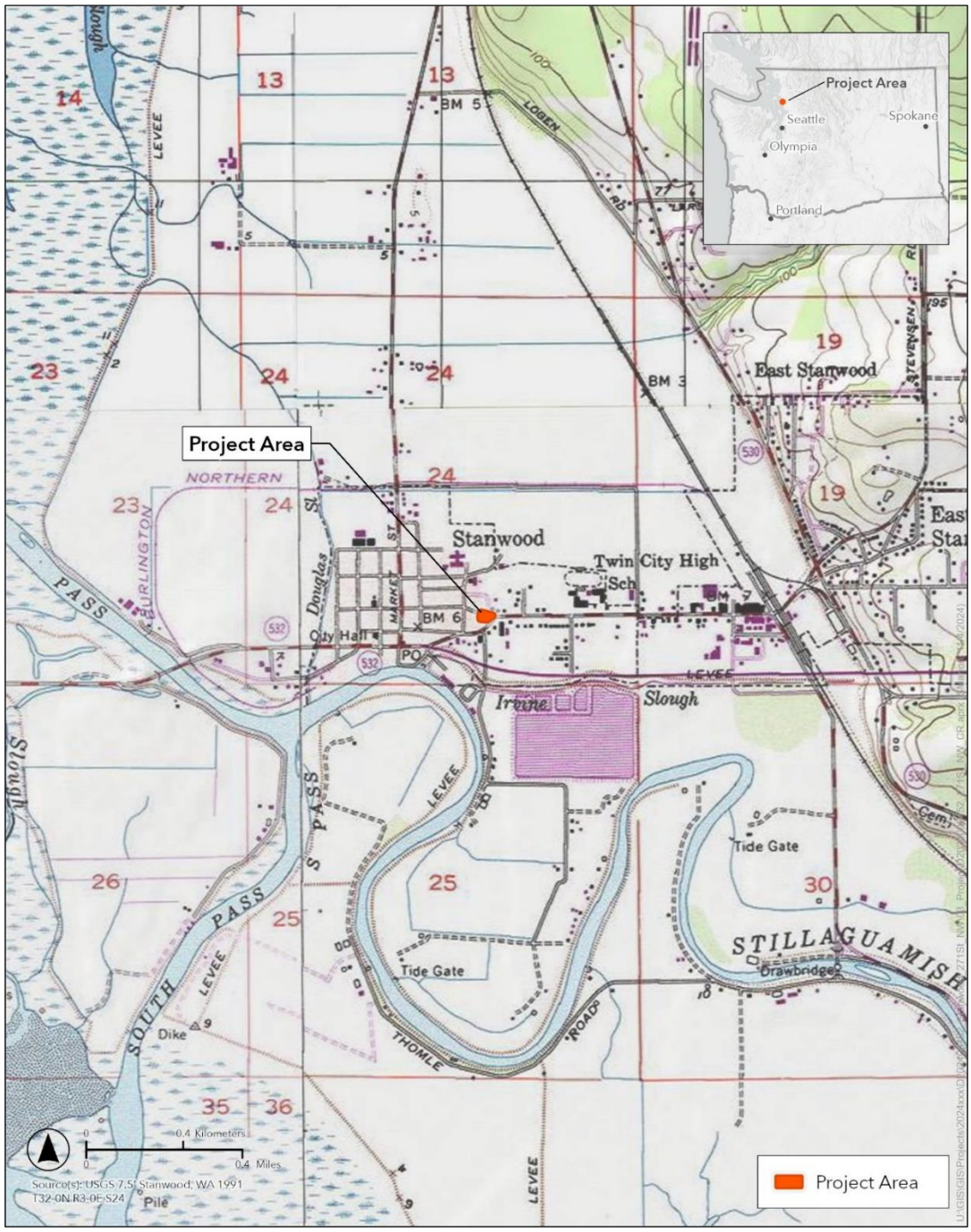
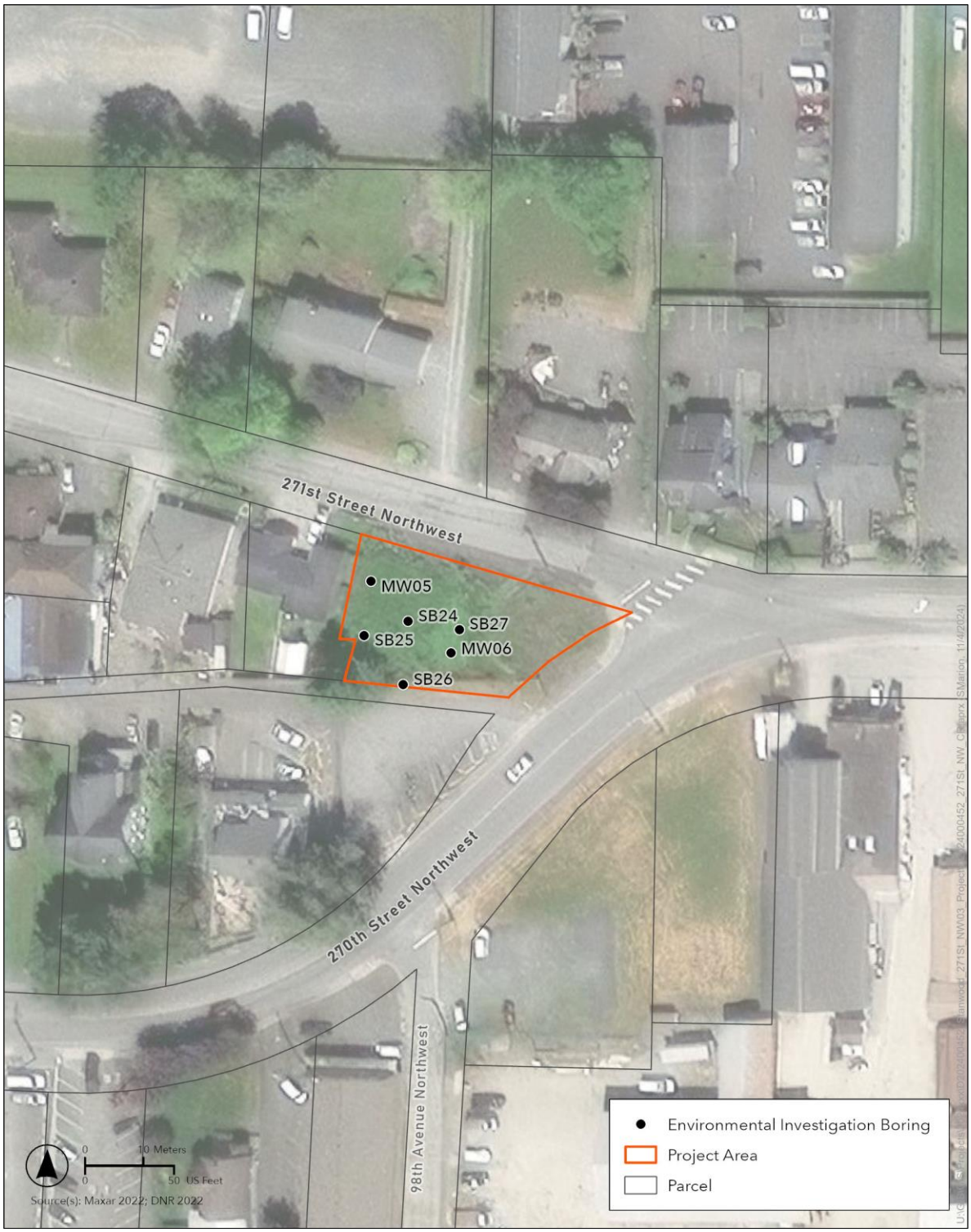
Suite 200
Seattle, WA 98121
206.789.9658
www.esassoc.com



SOURCE: ESA 2024

Figure 1
9816 271st Street Northwest Soil and Groundwater Investigation Project Area

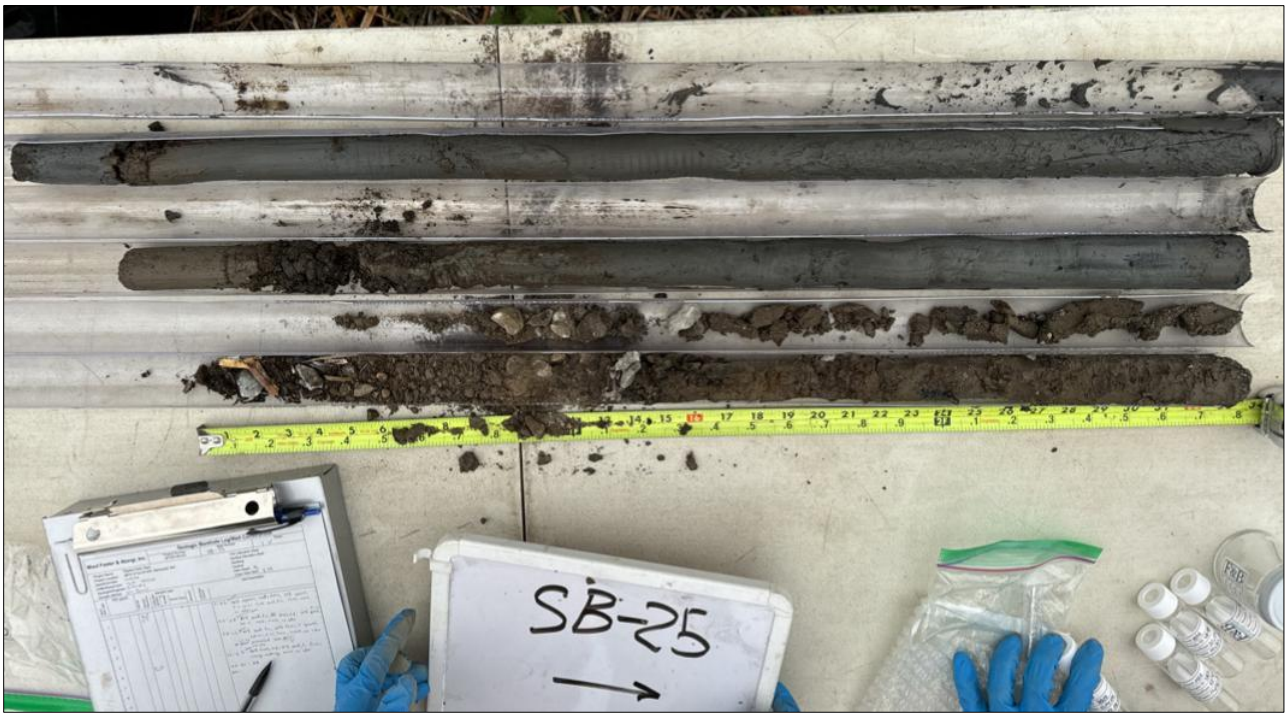


SOURCE: ESA 2024

Figure 2
Locations of environmental investigation borings

SOURCE: ESA 2024

Figure 3
Overview of MW05 location, view to the northwest



SOURCE: ESA 2024

Figure 4
Close up view of typical sample as observed at SB25

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ATTACHMENT 1

9816 271ST STREET NORTHWEST

SOIL AND GROUNDWATER INVESTIGATION

CITY OF STANWOOD, SNOHOMISH COUNTY, WASHINGTON.

ARCHAEOLOGICAL RESOURCES MONITORING PLAN

9816 271ST STREET NORTHWEST, SOIL AND GROUNDWATER INVESTIGATION, CITY OF STANWOOD, WASHINGTON

Archaeological Resources Monitoring Plan

Prepared for

City of Stanwood

October 2024

Prepared for
City of Stanwood

Prepared by
Bryan Hoyt

This report is exempt from public distribution and disclosure

(RCW 42.56.300)

ESA Project Number D202400452.00

TABLE OF CONTENTS

1.0 INTRODUCTION

Environmental Science Associates (ESA) has been retained by Maul, Foster & Alongi, Inc. (MFA), on behalf of the City of Stanwood, to conduct archaeological monitoring for environmental investigation work at 9816 271st Street Northwest Project (Project) within the City of Stanwood, Snohomish County, Washington (Figure 1). The Project is located in Township 32 North, Range 3 East, Section 24.

This Archaeological Monitoring Plan (AMP) describes methods to be used during archaeological monitoring of drilling of soil borings and monitoring wells. Attached to the AMP is the Washington State Department of Ecology Inadvertent Discovery Plan, which details procedures to follow in the event archaeological resources or human remains are discovered during archaeological monitoring. This AMP only applies to the subsurface environmental sampling component of the Project. Because the Project is still in design the AMP is not applicable to the construction phase of the Project.

2.0 PROJECT DESCRIPTION

The City of Stanwood (City) plans to remediate a former fueling station located at 9816 271st Street Northwest (Figure 2). MFA is assisting the City with site investigation, including conducting environmental investigation borings to address site condition data gaps.

Planned methodology includes drilling of four soil and reconnaissance groundwater borings and the installation of two monitoring wells. Borings and monitoring wells (borings) will be located across the fenced interior of the property, as well as within the street margins to the south. Borings will be advanced by a driller licensed in the State of Washington using direct push drilling techniques and continuous core retrieval. A truck- or track-mounted drill rig will be used for each of the 6 borings. Borings will be extended to a planned depth of 15 feet below surface. Total estimated extent of ground disturbance, based on four two-inch diameter soil boring and two four-inch diameter monitoring well borings, is 3.9 cubic feet.

3.0 REGULATORY ENVIRONMENT

Funding for the Project comes from the Washington State Department of Ecology (Ecology), as provided under Revised Code Washington (RCW) 39.34.130 and RCW 39.26.180(3), and via an Interagency Agreement between Ecology and City. As a result of state funding, Ecology is functioning as the Lead Agency with regard to Washington State Governor's Executive Order 21-02 (GEO 21-02).

GEO 21-02 requires agencies consult, or delegate consultation to non-state recipients of state funds, with the Washington State Department of Archaeology and Historic Preservation (DAHP) and Affected Tribes on the potential impacts of projects on cultural resources (archaeological sites, historic structures, buildings, and objects, and tribal sacred places). GEO 21-02 applies to projects with state-funded construction or acquisition projects that are not subject to review under the National Historic Preservation Act of 1966 (commonly referred to as "Section 106"),

including grant or pass-through funding that culminates in construction or land acquisitions The Executive Order requires that the state agency provide documentation of that consultation to DAHP, if requested.

Ecology has conducted consultation with Affected Tribes and Washington State Department of Archaeology and Historic Preservation (DAHP) in accordance with EO 21-02. It has been deemed necessary by Ecology, and concurred by DAHP, that a professional archaeologist will provide technical assistance and conduct field monitoring and data recovery if needed.

Additional laws that apply to archaeological projects conducted within the State of Washington include: Archaeological Sites and Resources (Revised Code of Washington [RCW] 27.53), Indian Graves and Records (RCW 27.44), Human Remains (RCW 68.50), and Abandoned and Historic Cemeteries and Historic Graves (RCW 68.60).

4.0 ARCHAEOLOGICAL MONITORING

Prior to commencement of drilling the ESA archaeologist will conduct a brief on-site tailgate training session with appropriate Ecology, MFA, and drilling subcontractor staff. The training will provide the field team with an overview of what to look for while conducting ground-disturbing activities as it pertains to cultural resources, as well as the procedures to follow if cultural resources are encountered.

The archaeologist will observe drilling at each of the 6 boring locations. Borings will be advanced using direct push drilling techniques. The archaeologist will examine the soil cores and cuttings during drilling. All monitoring will be conducted at a safe distance from the drill rig. The archaeologist will document stratigraphy, and presence/absence of cultural materials. The archaeologist will map each boring location with a GPS device, document the stratigraphic profile, and photograph each sample.

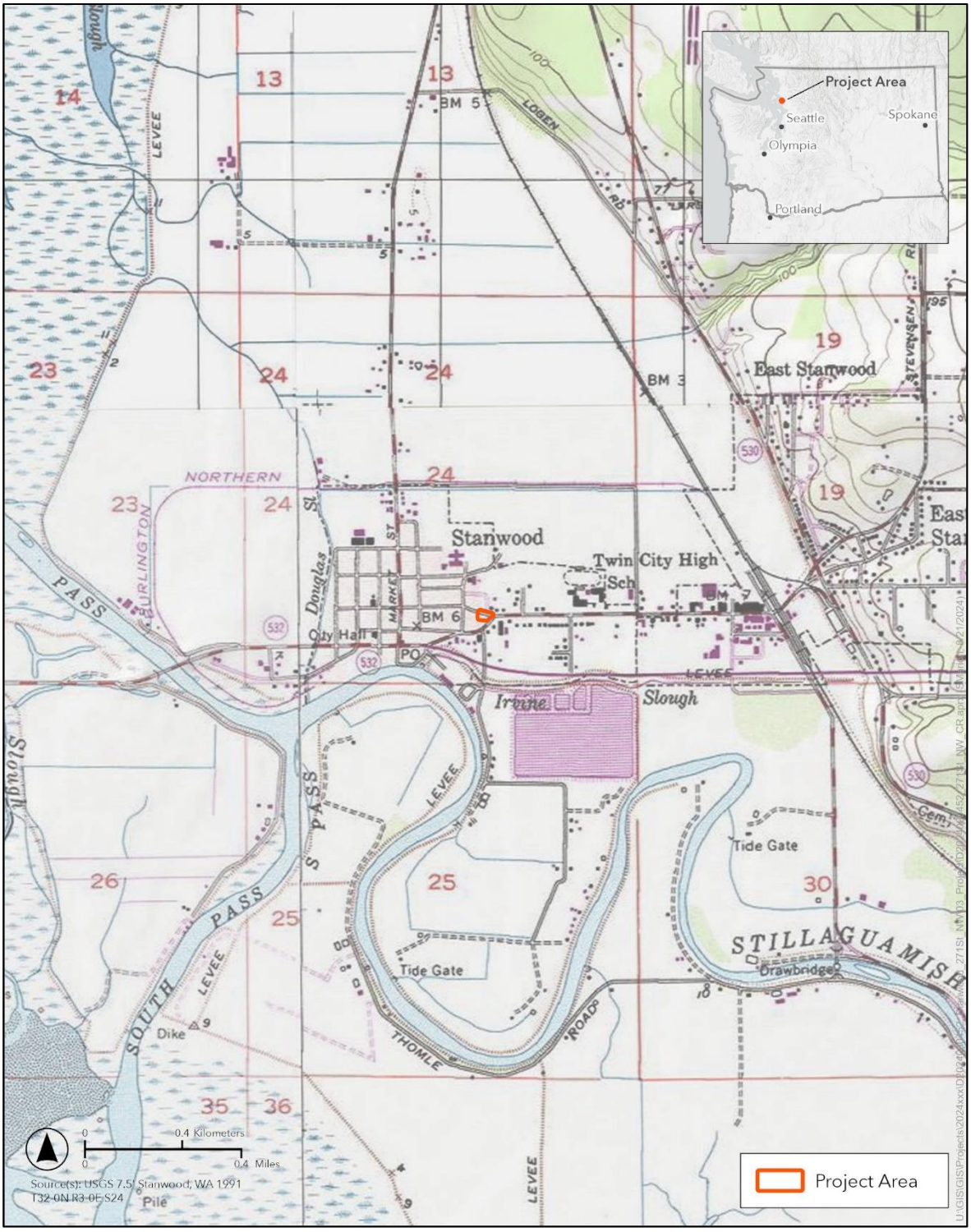
The Project location has the potential for buried contaminants. If contaminated, or potentially contaminated, material is identified, the ESA archaeologist will not handle the material. The archaeologist will attempt to describe and document the samples without touching the material. The archaeologist will follow all protocols detailed in the site specific Project Safety Plan.

5.0 INADVERTENT DISCOVERIES

Ecology, as the lead agency under EO21-02, employs an Inadvertent Discovery Plan (IDP) for use in the event archaeological materials or human remains are discovered during ground disturbing activities. This plan provides the procedures to be followed in the event of a discovery, as well as pertinent contact names and numbers. ESA will follow all procedures outlined in the IDP if archaeological materials or human remains are identified during monitoring for the geotechnical borings. The IDP is included as Attachment 1.

6.0 REPORTING

At the conclusion of monitoring, ESA will prepare an Archaeological Monitoring Report that meets DAHP standards. The report will include a USGS topographic map and an aerial photograph with boring locations, and detailed stratigraphic information for each boring.



Prepared by ESA 2024

Figure 1
9826 271st Street Northwest Project Area

Prepared by ESA 2024

Figure 2
9826 271st Street Northwest Project Area

Attachment 1

Ecology Inadvertent Discovery Plan

INADVERTENT DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): Raplee Property Location: 9816 271st Street NW, Stanwood, WA

Project Lead/Organization: Maul Foster & Alongi, Inc County: Snohomish

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. ***Always assume these are live and never touch or move.***
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact		Alternate Contact	
Name:	Carolyn Wise	Name:	Phil Wiescher
Organization:	Maul Foster & Alongi, Inc.	Organization:	Maul Foster & Alongi, Inc.
Phone:	360-594-6255	Phone:	360-594-6267
Email:	cwise@maulfoster.com	Email:	pwiescher@maulfoster.com

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager		Alternate or Cultural Resource Contact	
Name:	Olu Akeroro	Name:	
Program:	Northwest Region Toxics Cleanup Program	Program:	
Phone:	206-594-0116	Phone:	
Email:	oake461@ecy.wa.gov	Email:	

STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe:	Stillaguamish Tribe of Indians	Tribe:	Tulalip Tribes of Washington
Name:	Kerry Lyste	Name:	Richard Young
Title:	THPO, Cultural Resources	Title:	Cultural Resources
Phone:	(360) 652-7362 ext. 226	Phone:	(360) 716-2652
Email:	klyste@stillaguamish.com	Email:	ryoung@tulaliptribes-nsn.gov
Tribe:	Swinomish Indian Tribal Community	Tribe:	Suquamish Tribe
Name:	Josephine Jefferson	Name:	Stephanie Trudel
Title:	THPO	Title:	THPO
Phone:	(360) 466-7352	Phone:	(360) 394.8533
Email:	jjefferson@swinomish.nsn.us	Email:	strudel@Suquamish.nsn.us

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:		State Agency:	
Agency:		Agency:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under ***Stop-Protect-Notify.*** For specific instructions on how to handle a human remains discovery, see: *RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions*.

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist
Guy.Tasa@dahp.wa.gov
(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

   Enter contact information below (required):
   - Local Medical Examiner or Coroner name and phone: Snohomish County Medical Examiner: 425-438-6200
   - Local Law Enforcement main name and phone: Stanwood Police Department: 425-407-3999
   - Local Non-Emergency phone number (911 if without a non-emergency number): 425-407-3999
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

Further activities:

- Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law RCW 27.53 and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below

surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP's inadvertent discovery language website.

Ecology's IDP Video (https://www.youtube.com/watch?v=ioX-4cXfbDY)

Informational Resources

DAHP (https://dahp.wa.gov)

Washington State Archeology (DAHP 2003)
(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

Association of Washington Archaeologists (https://www.archaeologyinwashington.com)

Potentially Interested Tribes

Interactive Map of Tribes by Area
(https://dahp.wa.gov/archaeology/tribal-consultation-information)

WSDOT Tribal Contact Website
(https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Tribe: Snoqualmie Indian Tribe
Name: Steven Moses; Director, Archaeology and Historic Preservation
Phone: (425) 495-6097
Email: steve@snoqualmietribe.us

Tribe: Sauk-Suiattle Indian Tribe
Name: Kevin Joseph; Tribal Historic Preservation Officer
Phone:
Email: kJoseph@sauk-suiattle.com

Tribe: Muckleshoot Indian Tribe
Name: Laura Murphy; Archaeologist
Phone: (253) 876-3272
Email: laura.murphy@muckleshoot.nsn.us

Project Archaeologist
Chris Lockwood
Environmental Science Associates
206-204-6956
clockwood@esassoc.com

Implement the IDP if you see…

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.

Stone artifacts from Oregon.

Stone artifacts from Washington.

Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see…

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.

Above: Fishing Weight - credit CRITFC Treaty Fishing Rights website.

Artifacts from unknown locations (left and right images).

Implement the IDP if you see…

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (dentalium) or tusk.

Upper Left:*Bone Awls from Oregon.*

Upper Center: *Bone Wedge from California.*

Upper Right: *Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.*

Above: *Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.*

Implement the IDP if you see…

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.

Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry*.

Implement the IDP if you see…

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- "Unusual" accumulations of rock (especially fire-cracked rock).
- "Unusual" shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a "layer cake" appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the "unusual" or out of place (for example, rock piles in areas with otherwise few rocks).

Shell Midden pocket in modern fill discovered in sewer trench.

Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.

Hearth excavated near Hamilton, WA.

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.

Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*

Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.

Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*

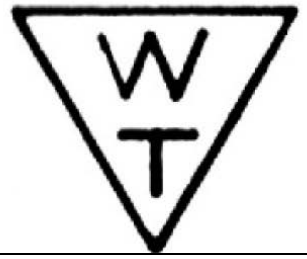
Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Implement the IDP if you see…

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.

Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: *Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.*



Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).

Can opening dates, courtesy of W.M. Schroeder.

Implement the IDP if you see…

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.

Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

Implement the IDP if you see...

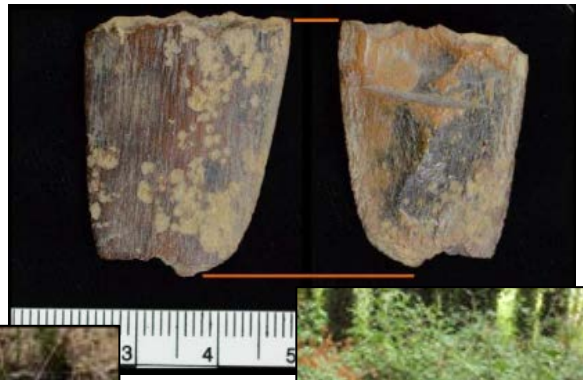
Potential human remains.

Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.

Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.



Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: *Read the plan!*

2801 Alaskan Way
Suite 200
Seattle, WA 98121
206.789.9658
www.esassoc.com

ATTACHMENT 2

9816 271ST STREET NORTHWEST

SOIL AND GROUNDWATER INVESTIGATION

BORING LOGS

HOLE	LAYER	DEPTH (feet)	TOOL	COLOR	TEXTURE	SAND MODE	GRAVEL MODE	CONSISTENCE	PEDS	BOTTOM BOUNDARY	SOIL HORIZON	SPECIAL FEATURES	MODERN DEBRIS	CULTURAL	COMMENTS
MW05	1	0-2	Boring	dark brown	sandy loam (no bedding)	fine no sand sorting	15-35% moderately-sorted subangular fine	soft	granular/crumb weak fine	clear smooth	fill	mottled oxidized	yes	no	Heavily disturbed A horizon/fill with blue plastic fragments and nondiagnostic glass fragments within layer.
MW05	2	2-9	Boring	grayish-brown	silt loam (no bedding)	fine no sand sorting	no gravel	moderately hard	subangular blocky moderate fine	clear smooth	B	organics groundwater oxidized	no	no	Groundwater at 6 ftbs.
MW05	3	9-15	Boring	light gray	silty clay (no bedding)	fine no sand sorting	no gravel	firm	platy strong fine	no horizon	C	groundwater	no	no	Terminated at desired depth.
MW06	1	0-1	Boring	grayish-brown	silt loam (no bedding)	fine no sand sorting	5-15% moderately-sorted subangular fine	moderately hard	granular/crumb moderate fine	clear smooth	mixed	oxidized	no	no	Poor recovery first 10 feet, mixed Silt loam B horizon with disturbed gravelly fill.
MW06	2	1-15	Boring	light gray	silty clay (no bedding)	fine no sand sorting	no gravel	firm	platy strong fine	no horizon	C		no	no	Terminated at desired depth.
SB24	1	0-3.5	Boring	light brown	sandy loam (no bedding)	fine no sand sorting	15-35% moderately-sorted subangular fine	moderately hard	granular/crumb weak fine	clear smooth	fill	mottled oxidized	no	no	Disturbed A/B horizon and fill.
SB24	2	3.5-15	Boring	light gray	silty clay (no bedding)	very fine no sand sorting	no gravel	firm	platy strong fine	no horizon	C		no	no	Terminated at desired depth.
SB25	1	0-3	Boring	light brown	sandy loam (no bedding)	fine well-sorted	35-60% moderately-sorted subangular fine	soft	granular/crumb weak fine	clear smooth	fill		no	no	
SB25	2	3-8	Boring	grayish-brown	silt loam (no bedding)	very fine poorly-sorted	<5% no sorting subrounded fine	moderately hard	subangular blocky moderate medium	abrupt smooth	B	organics groundwater oxidized	no	no	Groundwater at 5 ftbs.
SB25	3	8-15	Boring	light gray	silty clay (no bedding)	very fine no sand sorting	no gravel	firm	platy strong no ped size	no horizon	C	groundwater	no	no	Terminated at desired depth.
SB26	1	0-5	Boring	light brown	silt loam (no bedding)	fine well-sorted	5-15% poorly-sorted subangular fine	moderately hard	subangular blocky moderate fine	clear smooth	mixed	oxidized	no	no	Disturbed B horizon and fill.
SB26	2	5-15	Boring	light gray	silty clay (no bedding)	fine no sand sorting	no gravel	firm	platy strong fine	no horizon	C		no	no	Terminated at desired depth.
SB27	1	0-5	Boring	grayish-brown	silt loam (no bedding)	fine well-sorted	5-15% well-sorted subangular fine	moderately hard	subangular blocky weak fine	clear smooth	Mixed/B	organics oxidized	no	no	Disturbed B horizon with contaminated dark brown/black soils at 5 ftbs.
SB27	2	5-10	Boring	light gray	silty clay (no bedding)	fine no sand sorting	no gravel	firm	platy strong fine	no horizon	C		no	no	No recovery below 10 feet.Terminated at poor/no recovery.

Appendix H

Analytical Lab Reports

MAUL FOSTER ALONGI

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
Eric Young, B.S.

5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

October 24, 2024

Carolyn Wise, Project Manager
Maul Foster Alongi
1329 N State St, Suite 301
Bellingham, WA 98225

Dear Ms Wise:

Included are the results from the testing of material submitted on October 16, 2024 from the Raplee Data Gaps M1030.08.003, F&BI 410322 project. There are 14 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA1024R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 16, 2024 by Friedman & Bruya, Inc. from the Maul Foster Alongi Raplee Data Gaps M1030.08.003, F&BI 410322 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
410322 -01	SB24-S-2.0
410322 -02	SB24-S-8.0
410322 -03	SB25-S-2.0
410322 -04	SB25-S-5.5
410322 -05	SB26-S-2.0
410322 -06	SB27-S-2.0
410322 -07	SB27-S-7.5
410322 -08	MW05-S-2.5
410322 -09	MWDup-S-2.5
410322 -10	MW06-S-5.5
410322 -11	MW06-S-10.5
410322 -12	SB24-GW-10.0
410322 -13	SB25-GW-10.0
410322 -14	Trip Blank 1

All quality control requirements were acceptable.

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: NA
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF THE SOIL SAMPLES FOR PERCENT MOISTURE USING ASTM D2216-98

Sample ID Laboratory ID	% Moisture
SB24-S-2.0 410322-01	35
SB24-S-8.0 410322-02	35
SB25-S-2.0 410322-03	37
SB25-S-5.5 410322-04	31
SB26-S-2.0 410322-05	44
SB27-S-2.0 410322-06	28
SB27-S-7.5 410322-07	37
MW05-S-2.5 410322-08	35
MWDup-S-2.5 410322-09	37
MW06-S-5.5 410322-10	31
MW06-S-10.5 410322-11	34

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/21/24
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
SB24-S-2.0 410322-01	<0.02	<0.02	<0.02	<0.06	<5	75
SB24-S-8.0 410322-02	<0.02	<0.02	<0.02	<0.06	<5	84
SB25-S-2.0 410322-03	<0.02	<0.02	<0.02	<0.06	<5	75
SB25-S-5.5 410322-04	<0.02	<0.02	<0.02	<0.06	<5	83
SB26-S-2.0 410322-05	<0.02	<0.02	<0.02	<0.06	<5	76
SB27-S-2.0 410322-06	0.053	0.21	0.75	0.56	270	96
SB27-S-7.5 410322-07	0.70	<0.02	0.47	0.39	11	80
MW05-S-2.5 410322-08	<0.02	<0.02	<0.02	<0.06	<5	76
MWDup-S-2.5 410322-09	<0.02	<0.02	<0.02	<0.06	<5	77
MW06-S-5.5 410322-10	0.056	<0.02	<0.02	<0.06	<5	83

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/21/24
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW06-S-10.5 410322-11	0.33	<0.02	<0.02	<0.06	<5	83
Method Blank 04-2424 MB	<0.02	<0.02	<0.02	<0.06	<5	79

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/18/24
Date Analyzed: 10/18/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (50-150)
Trip Blank 1 410322-14	<1	<1	<1	<3	94
Method Blank 04-2423 MB	<1	<1	<1	<3	93

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/18/24
Date Analyzed: 10/18/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
SB24-GW-10.0 410322-12	<1	<1	<1	<3	<100	97
SB25-GW-10.0 410322-13	<1	<1	<1	<3	<100	96
Method Blank 04-2423 MB	<1	<1	<1	<3	<100	93

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/17/24
Date Analyzed: 10/17/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
SB24-GW-10.0 410322-12	220 x	390 x	76
SB25-GW-10.0 410322-13	520 x	1,000 x	82
Method Blank 04-2570 MB	<50	<250	80

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/21/24
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
SB24-S-2.0 410322-01	<50	<250	104
SB24-S-8.0 410322-02	<50	<250	106
SB25-S-2.0 410322-03	<50	430	102
SB25-S-5.5 410322-04	<50	<250	104
SB26-S-2.0 410322-05	<50	<250	106
SB27-S-2.0 410322-06	700 x	5,300	106
SB27-S-7.5 410322-07	<50	<250	105
MW05-S-2.5 410322-08	<50	<250	102
MWDup-S-2.5 410322-09	<50	<250	108
MW06-S-5.5 410322-10	<50	<250	103

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322
Date Extracted: 10/21/24
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
MW06-S-10.5 410322-11	<50	<250	104
Method Blank 04-2576 MB	<50	<250	103

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 410322-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benzene	mg/kg (ppm)	1.0	0.70	120 b	120 b	50-150	0 b
Toluene	mg/kg (ppm)	1.0	<0.02	150	140	50-150	7
Ethylbenzene	mg/kg (ppm)	1.0	0.47	133 b	143 b	50-150	7 b
Xylenes	mg/kg (ppm)	3.0	0.39	147	144	50-150	2
Gasoline	mg/kg (ppm)	40	11	155 b	152 b	50-150	2 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	1.0	79	70-130
Toluene	mg/kg (ppm)	1.0	81	70-130
Ethylbenzene	mg/kg (ppm)	1.0	80	70-130
Xylenes	mg/kg (ppm)	3.0	80	70-130
Gasoline	mg/kg (ppm)	40	75	70-130

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 410322-12 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	114	70-130
Toluene	ug/L (ppb)	50	110	70-130
Ethylbenzene	ug/L (ppb)	50	110	70-130
Xylenes	ug/L (ppb)	150	113	70-130
Gasoline	ug/L (ppb)	1,000	91	70-130

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	84	72-139	17

Date of Report: 10/24/24
Date Received: 10/16/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410322

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 410322-07 (Matrix Spike)

Analyte	Reporting Units	Spike Level	(Wet wt) Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	104	102	64-136	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	78-121

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

410322

SAMPLE CHAIN OF CUSTODY

10/16/24 VW2/C2/VSA3/B2

Report To Carolyn Wise
Company Maul Foster & Alongi
Address 1329 N State St, Ste 301
City, State, ZIP Bellingham, WA 98225
Phone 360-696-5982 Email cwise@maulfoster.com

SAMPLERS (signature)

PROJECT NAME: Rapke Data Gaps
PO #: M1030.08.003

REMARKS
Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME
☑ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type (AP 10/16)	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
SB24-S-2.0	01 A-E	10/14/24	12:15	Soil	5	X	X	X									
SB24-S-8.0	02		12:25		5	X	X	X									
SB25-S-2.0	03		10:30		5	X	X	X									
SB25-S-5.5	04		10:50		5	X	X	X									
SB26-S-2.0	05		15:40		5	X	X	X									
SB27-S-2.0	06		12:55		5	X	X	X									
SB27-S-7.5	07 A-K		13:40		11	X	X	X									MS/MSD
MW05-S-2.5	08 A-E		11:15		5	X	X	X									
MWDup-S-2.5	09		11:15		5	X	X	X									
MW06-S-5.5	10		14:15		5	X	X	X									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Christian Sifford	MFA	10/14/24	16:50
Received by:	Anh Phan	FBI	10/16/24	11:34
Relinquished by:		Samples received at 2 °C		
Received by:				

Friedman & Bruya, Inc.
5500 4th Ave S.
Seattle WA 98108
(206) 285-8282
office@friedmanandbruya.com

410322

SAMPLE CHAIN OF CUSTODY 10/16/24 VW2/C2/VSA3/B2

Page # 2 of 2

Report To Carolyn Wise
Company Maul Foster Alongi
Address 1329 N State, Ste 301
City, State, ZIP Bellingham, WA 98225
Phone 360-690-5982 Email cwise@maulfoster.com

SAMPLERS (signature)

PROJECT NAME: Raplee Data Gaps
PO #: M1030.08.003

REMARKS
Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
						ANALYSES REQUESTED											
MW06-S-10.5	11	10/14/24	14:40	Soil	5	X	X	X									
SB24-GW-10.0	12 A-G	"	13:30	Water	7	X	X	X									
SB25-GW-10.0	13	"	12:20	Water	7	X	X	X									
Trip Blank 2	14 A-B	10/14/24	—	Water	2			X									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Christian Sifford	MFA	10/14/24	16:50
Received by:	Anh Phan	FBI	10/16/24	11:34
Relinquished by:		Samples received at 2 °C		
Received by:				

Friedman & Bruya, Inc.
5500 4th Ave S.
Seattle WA 98108
(206) 285-8282
office@friedmanandbruya.com

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 410322 CLIENT MFA INITIALS/ DATE: AP 10/16/24

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 2 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☐ Over the Counter ☐ Picked up by F&BI ☑ FedEx/UPS/GSO

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO Initials/ Date: AP 10/16/24
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 2 days

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☑ NA ☐ YES ☐ NO

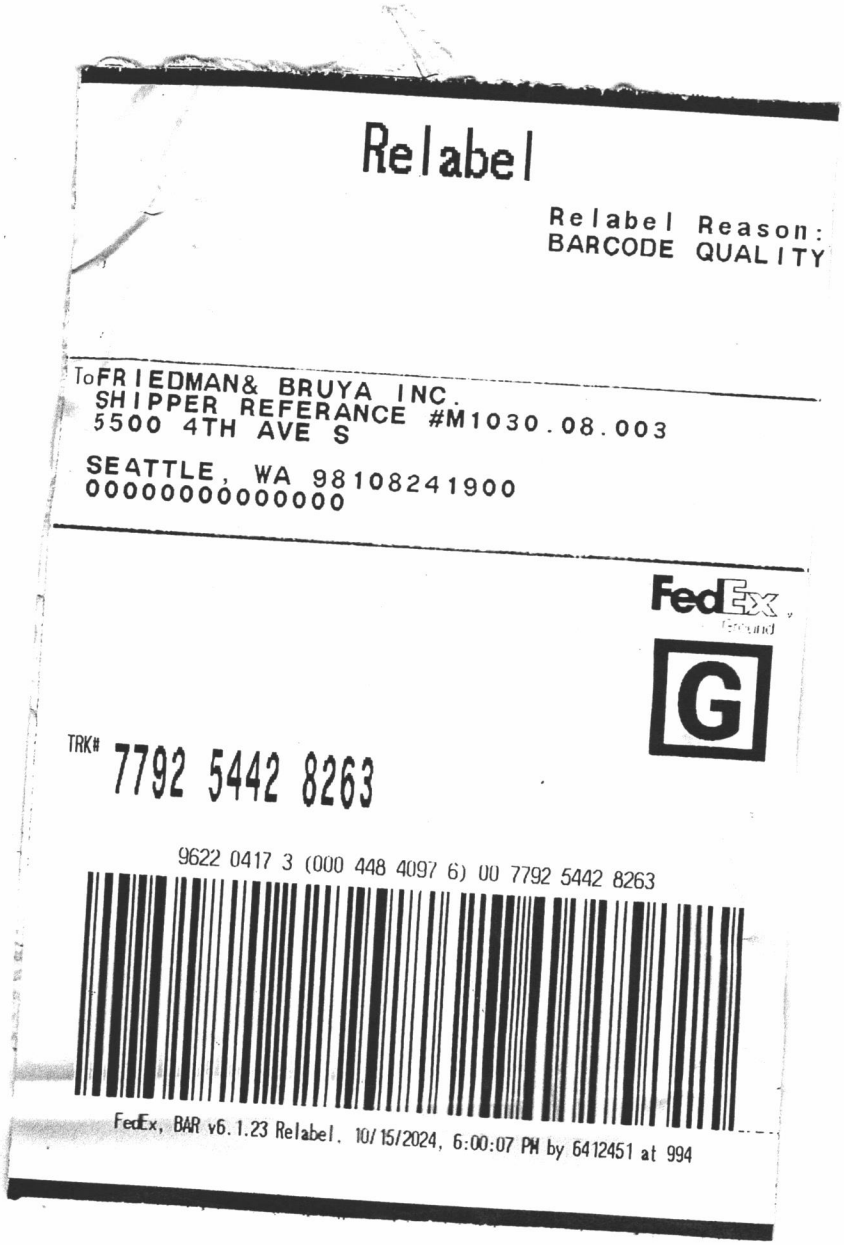
Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☑ Yes ☐ No	☐ Not on COC/label
Date Sampled	☑ Yes ☐ No	☐ Not on COC/label
Time Sampled	☑ Yes ☐ No	☐ Not on COC/label
# of Containers	☑ Yes ☐ No	
Relinquished	☑ Yes ☐ No	
Requested analysis	☑ Yes ☐ On Hold	

Other comments (use a separate page if needed)

Air Samples: Were any additional canisters/tubes received? ☑ NA ☐ YES ☐ NO

Number of unused TO15 canisters _____ **Number of unused TO17 tubes** _____



Relabel

Relabel Reason:
BARCODE QUALITY

To FRIEDMAN& BRUYA INC.
SHIPPER REFERANCE #M1030.08.003
5500 4TH AVE S

SEATTLE, WA 98108241900
00000000000000

FedEx Ground

G

TRK# 7792 5442 8263

9622 0417 3 (000 448 4097 6) 00 7792 5442 8263

FedEx, BAR v6.1.23 Relabel, 10/15/2024, 6:00:07 PM by 6412451 at 994

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Vineta Mills, M.S.
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5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

October 25, 2024

Carolyn Wise, Project Manager
Maul Foster Alongi
1329 N State St, Suite 301
Bellingham, WA 98225

Dear Ms Wise:

Included are the results from the testing of material submitted on October 17, 2024 from the Raplee Data Gaps M1030.08.003, F&BI 410348 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA1025R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 17, 2024 by Friedman & Bruya, Inc. from the Maul Foster Alongi Raplee Data Gaps M1030.08.003, F&BI 410348 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
410348 -01	SB26-GW-13.0
410348 -02	SB27-GW-10.0
410348 -03	Trip Blank 2

All quality control requirements were acceptable.

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348
Date Extracted: 10/23/24
Date Analyzed: 10/23/24 and 10/24/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
SB26-GW-13.0 410348-01	<1	<1	<1	<3	<100	95
SB27-GW-10.0 410348-02	130	3.7	13	15	780	94
Method Blank 04-2431 MB	<1	<1	<1	<3	<100	98

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348
Date Extracted: 10/23/24
Date Analyzed: 10/23/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (50-150)
Trip Blank 2 410348-03	<1	<1	<1	<3	91
Method Blank 04-2431 MB	<1	<1	<1	<3	98

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348
Date Extracted: 10/18/24
Date Analyzed: 10/18/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
SB26-GW-13.0 410348-01	220 x	<250	ip
SB27-GW-10.0 410348-02	4,800	11,000	ip
Method Blank 04-2570 MB2	<50	<250	75

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 410348-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	106	70-130
Toluene	ug/L (ppb)	50	104	70-130
Ethylbenzene	ug/L (ppb)	50	104	70-130
Xylenes	ug/L (ppb)	150	107	70-130
Gasoline	ug/L (ppb)	1,000	100	70-130

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Laboratory Code: 410348-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	106	70-130
Toluene	ug/L (ppb)	50	104	70-130
Ethylbenzene	ug/L (ppb)	50	104	70-130
Xylenes	ug/L (ppb)	150	107	70-130

Date of Report: 10/25/24
Date Received: 10/17/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410348

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	100	84	72-139	17

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

410348

SAMPLE CHAIN OF CUSTODY

10/17/24 VW2/C2

Page # 1 of 1

Report To Carolyn Wise
Company Maul Foster & Alongi
Address 1329 N State St, Ste 301
City, State, ZIP Bellingham, WA 98225
Phone 360-594-6255 Email cwise@maulfoster.com

SAMPLERS (signature)

PROJECT NAME: Raplee Data Gaps
PO #: M1030.08.003

REMARKS
Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
SB26-GW-13.0	01 A-E	10/15/24	9:00	groundwater	5	X	X	X									Limited volume
SB27-GW-10.0	02 A-G	10/15/24	8:20	"	7	X	X	X									
Trip Blank 2	03 A-B	10/15/24	NA	water	2			X									

Samples received at 2 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Christian Sifford	MFA	10/15/24	15:30
Received by:	Anh Phan	FBI	10/17/24	11:57
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
5500 4th Ave S.
Seattle WA 98108
(206) 285-8282
office@friedmanandbruya.com

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 410348 CLIENT MFA INITIALS/ DATE: AP 10/17/24

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 2 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☐ Over the Counter ☐ Picked up by F&BI ☑ FedEx/UPS/GSO

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO Initials/ AP Date: 10/17/24
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 2 days

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☑ YES ☐ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☐ NA ☑ YES ☐ NO

Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☑ Yes ☐ No	☐ Not on COC/label
Date Sampled	☑ Yes ☐ No	☐ Not on COC/label
Time Sampled	☑ Yes ☐ No	☐ Not on COC/label
# of Containers	☑ Yes ☐ No	
Relinquished	☑ Yes ☐ No	
Requested analysis	☑ Yes ☐ On Hold	

Other comments (use a separate page if needed)

Air Samples: Were any additional canisters/tubes received? ☑ NA ☐ YES ☐ NO

Number of unused TO15 canisters _____ **Number of unused TO17 tubes** _____

FROM:
MAUL FOSTER ALONGI
MAUL FOSTER & ALONGI
1329 N State St
BELLINGHAM WA 98225
US

(360) 433-0251

SHIP DATE: 150CT24
ACTWGT: 14.50 LB
CAD: 6571946/ROSA2570
DIMMED: 13 X 9 X 9 IN

BILL 3rd PARTY

TO **Friedman & Bruya Inc**

5500 4th Ave S

SEATTLE WA 98108 **(US)**

(206) 285-8282 REF: M1030.08.003
INV:
PO: DEPT:

FedEx Ground

TRK# **7792 8268 9514**

98108

9622 0417 3 (000 448 2658) 2 00 7792 8268 9514

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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Vineta Mills, M.S.
Eric Young, B.S.

5500 4th Ave South
Seattle, WA 98108-2419
(206) 285-8282
office@friedmanandbruya.com
www.friedmanandbruya.com

October 28, 2024

Carolyn Wise, Project Manager
Maul Foster Alongi
1329 N State St, Suite 301
Bellingham, WA 98225

Dear Ms Wise:

Included are the results from the testing of material submitted on October 18, 2024 from the Raplee Data Gaps M1030.08.003, F&BI 410370 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
MFA1028R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on October 18, 2024 by Friedman & Bruya, Inc. from the Maul Foster Alongi Raplee Data Gaps M1030.08.003, F&BI 410370 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Maul Foster Alongi
410370 -01	MW03-GW-9.0
410370 -02	MW04-GW-9.5
410370 -03	MWDUP-GW-9.5
410370 -04	MW05-GW-9.0
410370 -05	MW01-GW-11.0
410370 -06	MW06-GW-12.0
410370 -07	MW02-GW-12.0
410370 -08	Trip Blank 3

The NWTPH-Gx and 8021B sample MW02-GW-12.0 was diluted due to matrix effect (foamy). The reporting limits were raised accordingly.

All other quality control requirements were acceptable.

Date of Report: 10/28/24
Date Received: 10/18/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410370
Date Extracted: 10/24/24
Date Analyzed: 10/24/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
MW03-GW-9.0 410370-01	<1	<1	<1	<3	<100	99
MW04-GW-9.5 410370-02	<1	<1	<1	<3	<100	99
MWDUP-GW-9.5 410370-03	<1	<1	<1	<3	<100	94
MW05-GW-9.0 410370-04	<1	<1	<1	<3	<100	87
MW01-GW-11.0 410370-05	<1	<1	<1	<3	<100	86
MW06-GW-12.0 410370-06 1/5	190	<5	<5	<15	540	92
MW02-GW-12.0 410370-07 1/10	<5 j	<10	<10	<30	<1,000	90
Method Blank 04-2433 MB	<1	<1	<1	<3	<100	90

Date of Report: 10/28/24
Date Received: 10/18/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410370
Date Extracted: 10/24/24
Date Analyzed: 10/24/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES USING EPA METHOD 8021B

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Surrogate (% Recovery) Limit (50-150)
Trip Blank 3 410370-08	<1	<1	<1	<3	95
Method Blank 04-2433 MB	<1	<1	<1	<3	90

Date of Report: 10/28/24
Date Received: 10/18/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410370
Date Extracted: 10/21/24
Date Analyzed: 10/21/24

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
MW03-GW-9.0 410370-01	130 x	<250	86
MW04-GW-9.5 410370-02	3,700 x	3,500 x	72
MWDUP-GW-9.5 410370-03	3,700 x	3,700 x	76
MW05-GW-9.0 410370-04	260 x	300 x	89
MW01-GW-11.0 410370-05	170 x	<250	78
MW06-GW-12.0 410370-06	6,000 x	3,200 x	84
MW02-GW-12.0 410370-07	1,600 x	1,600 x	83
Method Blank 04-2580 MB	<50	<250	82

Date of Report: 10/28/24
Date Received: 10/18/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 410370-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benzene	ug/L (ppb)	50	<1	108	112	50-150	4
Toluene	ug/L (ppb)	50	<1	106	110	50-150	4
Ethylbenzene	ug/L (ppb)	50	<1	106	110	50-150	4
Xylenes	ug/L (ppb)	150	<3	107	111	50-150	4
Gasoline	ug/L (ppb)	1,000	<100	94	101	50-150	7

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	110	70-130
Toluene	ug/L (ppb)	50	108	70-130
Ethylbenzene	ug/L (ppb)	50	108	70-130
Xylenes	ug/L (ppb)	150	107	70-130
Gasoline	ug/L (ppb)	1,000	99	70-130

Date of Report: 10/28/24
Date Received: 10/18/24
Project: Raplee Data Gaps M1030.08.003, F&BI 410370

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 410370-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	<50	120	128	50-150	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	ug/L (ppb)	2,500	88	65-151

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria, biased low; or, the calibration results for the analyte were outside of acceptance criteria, biased high, with a detection for the analyte in the sample. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the standard reporting limit. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

k – The calibration results for the analyte were outside of acceptance criteria, biased high, and the analyte was not detected in the sample.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

410370

SAMPLE CHAIN OF CUSTODY

10/18/24 VW4/C4

Report To Carolyn Wise
Company Maul Foster & Alongi
Address 1329 N State St, Ste 301
City, State, ZIP Bellingham WA 98225
Phone 360-594-6258 Email cwise@maulfoster.com

SAMPLERS (*signature*)

PROJECT NAME: Ruptex Data Gaps
PO #: MW30.08.003

REMARKS
Project specific RLs? - Yes / No

INVOICE TO: accounting@maulfoster.com

Page # 1 of 1

TURNAROUND TIME
☒ Standard turnaround
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Archive samples
☐ Other
Default: Dispose after 30 days

						ANALYSES REQUESTED										
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					Notes
MW03-GW-9.0	01 A-S	10/17/24	11:40	water	19	X	X	X									MS/MSD
MW04-GW-9.5	02 A-G	↓	13:10	water	7	X	X	X									
MWDUP-GW-9.5	03		13:10	water	7	X	X	X									
MW05-GW-9.0	04		14:00	water	7	X	X	X									
MW01-GW-11.0	05		14:30	water	7	X	X	X									
MW06-GW-12.0	06		15:00	water	7	X	X	X									1/2 Lamber cap cracked
MW02-GW-12.0	07		15:30	water	7	X	X	X									↓ EWB 10/18
Trip Blank 3	08 A-B	↓	NA	water	2			X									

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Christian Stffocel	MFA	10/17/24	16:30
Received by:	Anh Phan	FBI	10/18/24	11:00
Relinquished by:		Samples received at 1 °C		
Received by:				

Friedman & Bruya, Inc.
5500 4th Ave S.
Seattle WA 98108
(206) 285-8282
office@friedmanandbruya.com

SAMPLE CONDITION UPON RECEIPT CHECKLIST

PROJECT # 410370 CLIENT MFA INITIALS/ DATE: AP 10/18/24

If custody seals are present on cooler, are they intact? ☑ NA ☐ YES ☐ NO

Cooler/Sample temperature 1 °C
Thermometer ID: Fluke 96312917

Were samples received on ice/cold packs? ☑ YES ☐ NO

How did samples arrive?
☐ Over the Counter ☐ Picked up by F&BI ☑ FedEx/UPS/GSO

Is there a Chain-of-Custody* (COC)? ☑ YES ☐ NO Initials/ Date: EWB 10/18
*or other representative documents, letters, and/or shipping memos

Number of days samples have been sitting prior to receipt at laboratory 1 days

Are the samples clearly identified? (explain "no" answer below) ☑ YES ☐ NO

Were all sample containers received intact (i.e. not broken, leaking etc.)? (explain "no" answer below) ☐ YES ☑ NO

Were appropriate sample containers used? ☑ YES ☐ NO ☐ Unknown

If custody seals are present on samples, are they intact? ☑ NA ☐ YES ☐ NO

Are samples requiring no headspace, headspace free? ☐ NA ☑ YES ☐ NO

Is the following information provided on the COC, and does it match the sample label?
(explain "no" answer below)

Sample ID's	☑ Yes ☐ No	☐ Not on COC/label
Date Sampled	☑ Yes ☐ No	☐ Not on COC/label
Time Sampled	☑ Yes ☐ No	☐ Not on COC/label
# of Containers	☑ Yes ☐ No	
Relinquished	☑ Yes ☐ No	
Requested analysis	☑ Yes ☐ On Hold	

Other comments (use a separate page if needed)
06,07 1/2 L amber rec w/ cracked cap. Some Sample leaked into Ziploc since bottles were sideways in cooler

Air Samples: Were any additional canisters/tubes received? ☑ NA ☐ YES ☐ NO

Number of unused TO15 canisters _____ **Number of unused TO17 tubes** _____

FROM:
(360) 433-0251
M1030.08.003
FOSTER & ALONGI
State St
WA 98225

SHIP DATE: 17OCT24
ACTWGT: 59.40 LB
CAD: 6570778/ROSA2570
DIMMED: 25 X 14 X 14 IN
BILL: 3rd PARTY

Part # 156297-435 RRDB EXP 06/25

TO
n & Bruya
M1030.08.003
Ave S
SEATTLE WA 98108
(206) 285-8282
(US)
REF: REF - M1030.08.003
INV:
PO:
DEPT:

FedEx
Ground

TRK# 7793 3847 9000

98108

9622 0417 3 (000 448 4097) 6 00 7793 3847 9000

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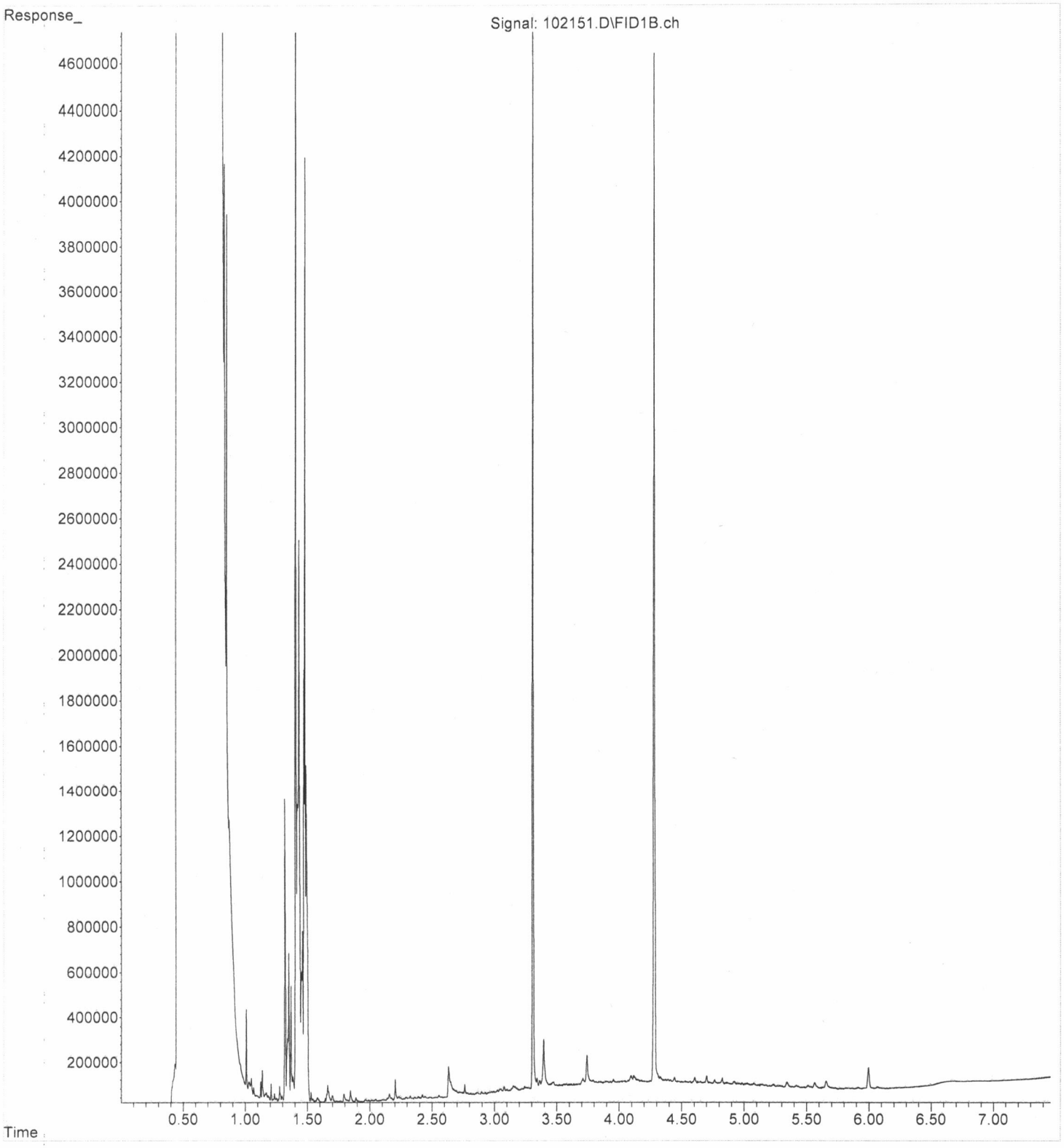
Instrument : GC14
Sample Name: 410370-01
Misc Info : ERR
Vial Number: 31



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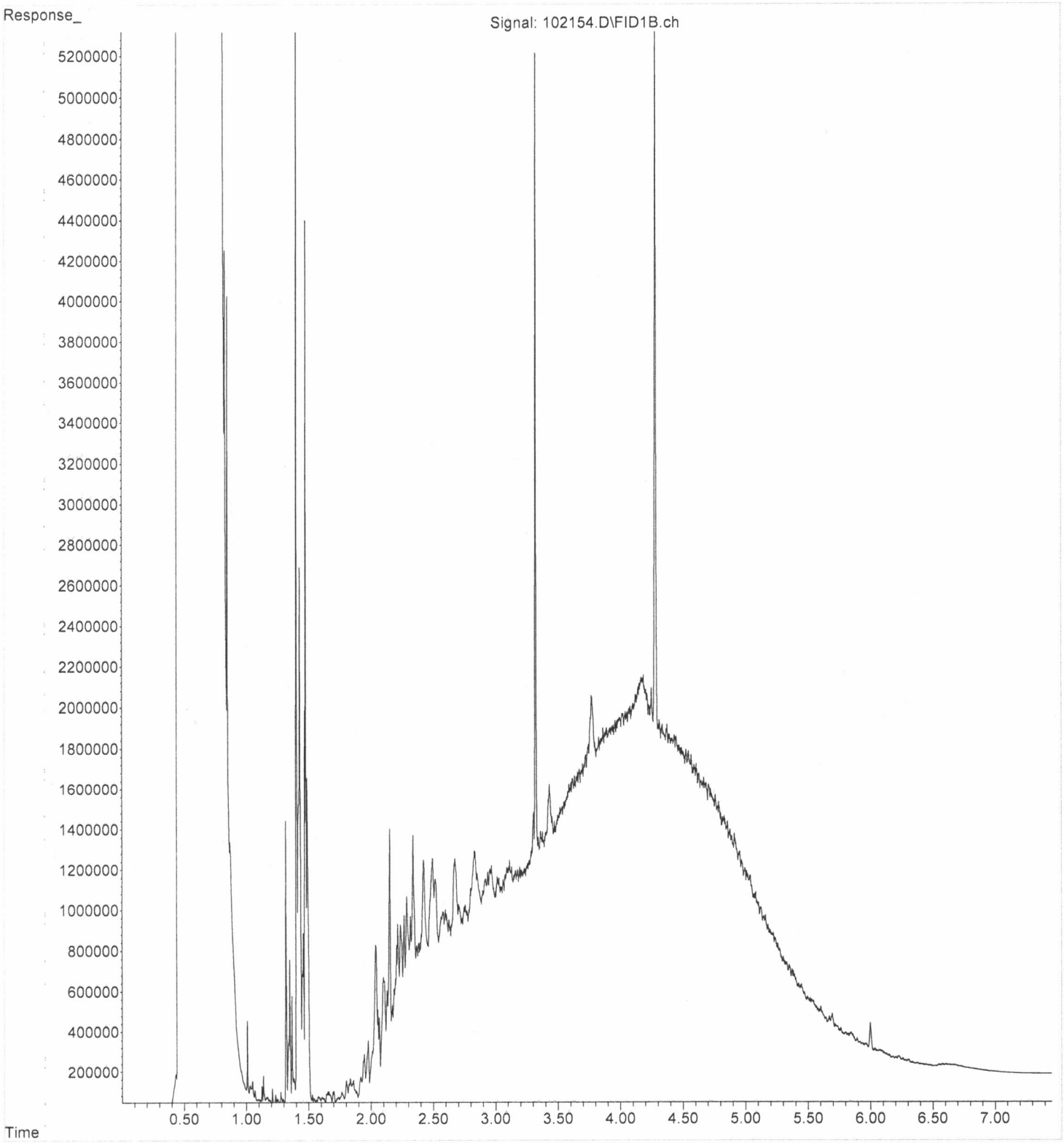
ERR



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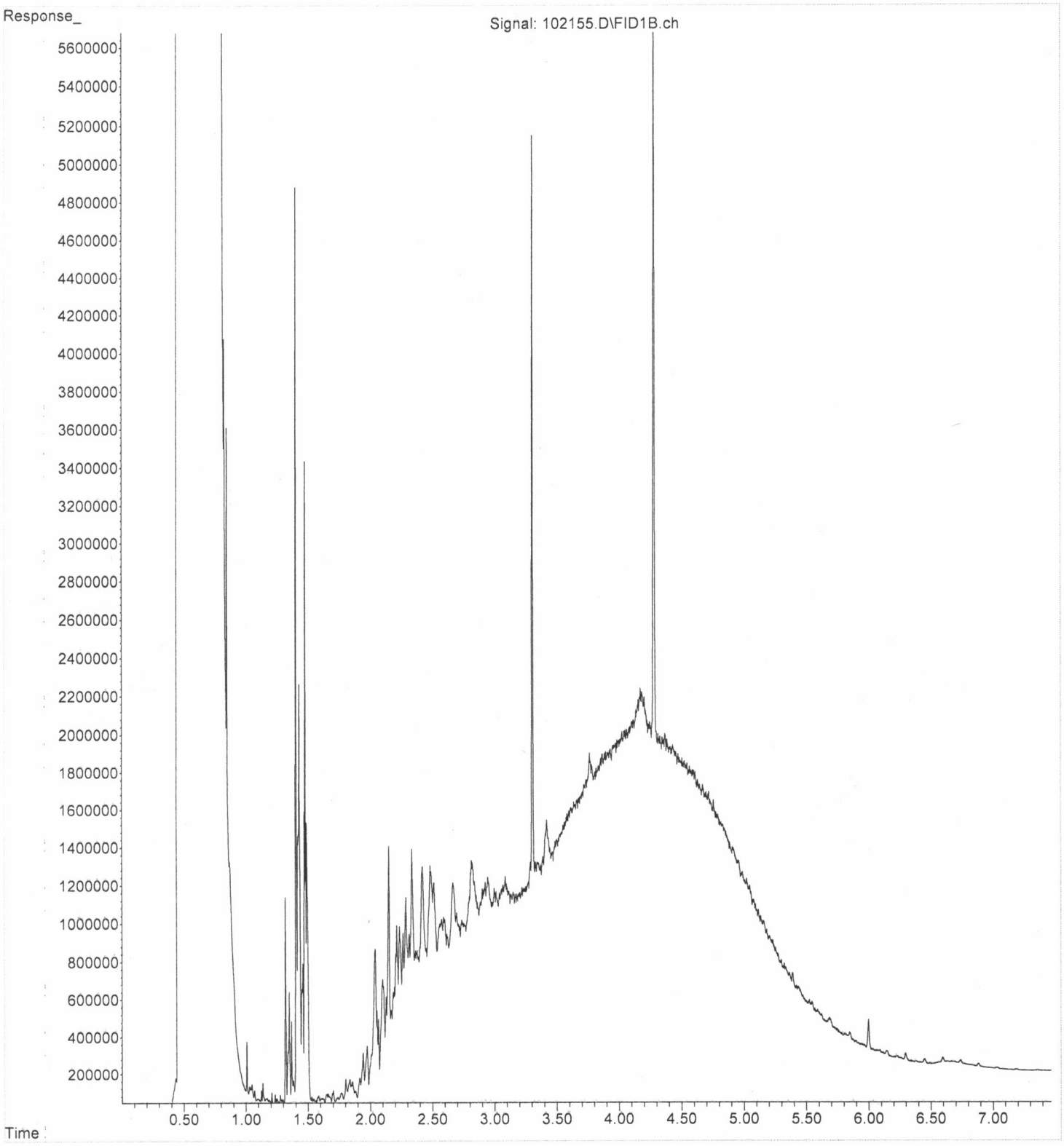

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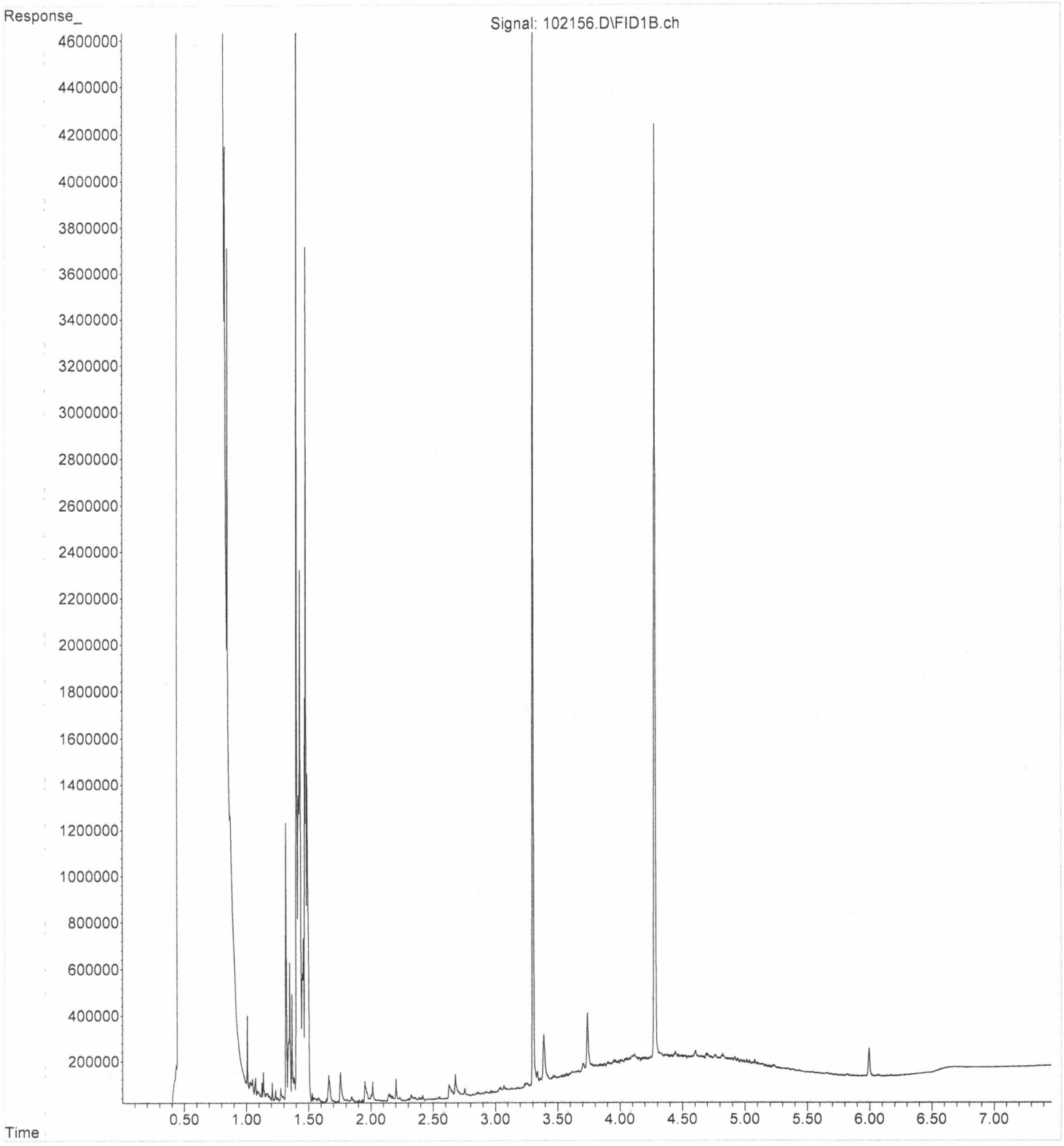

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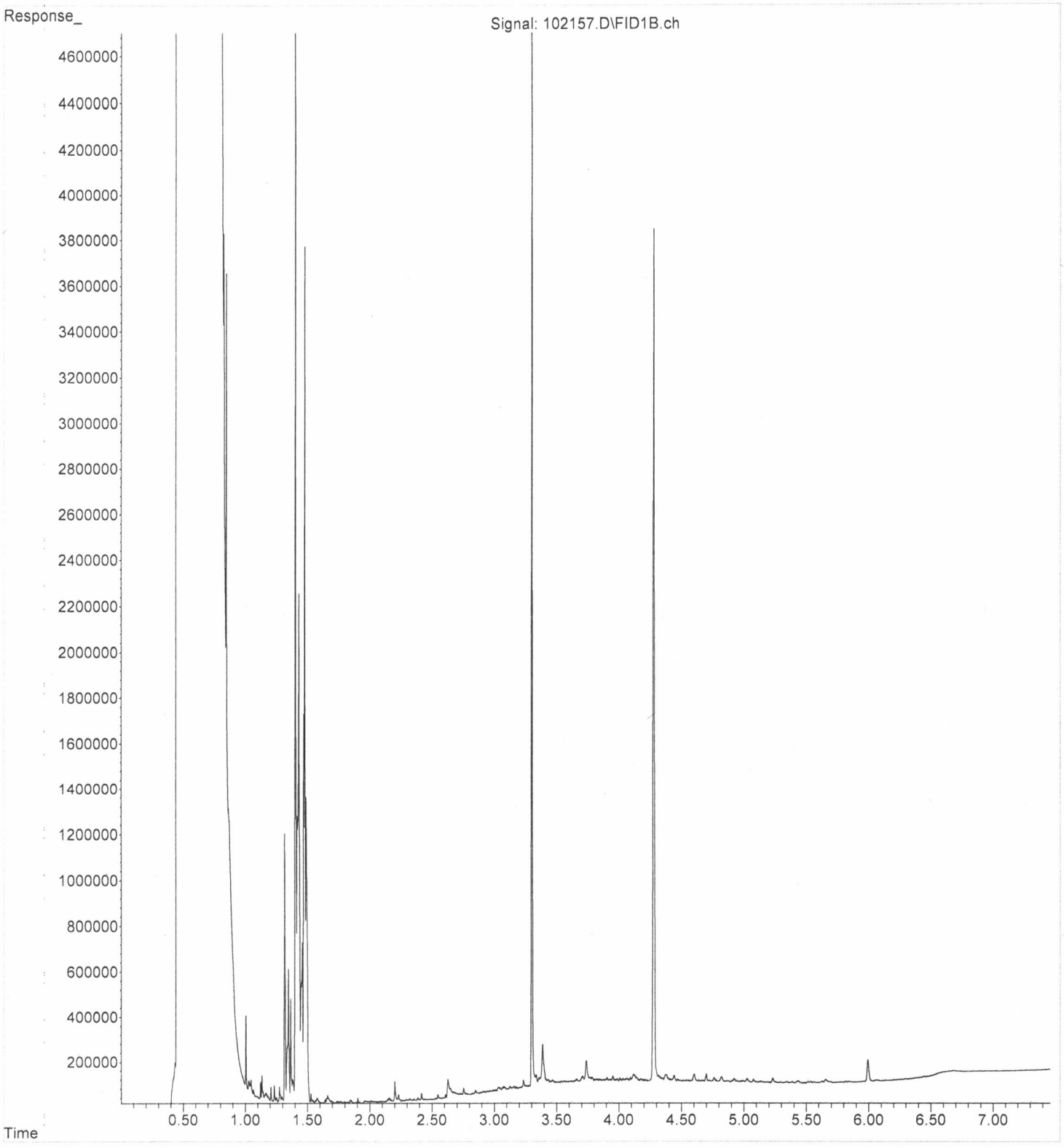

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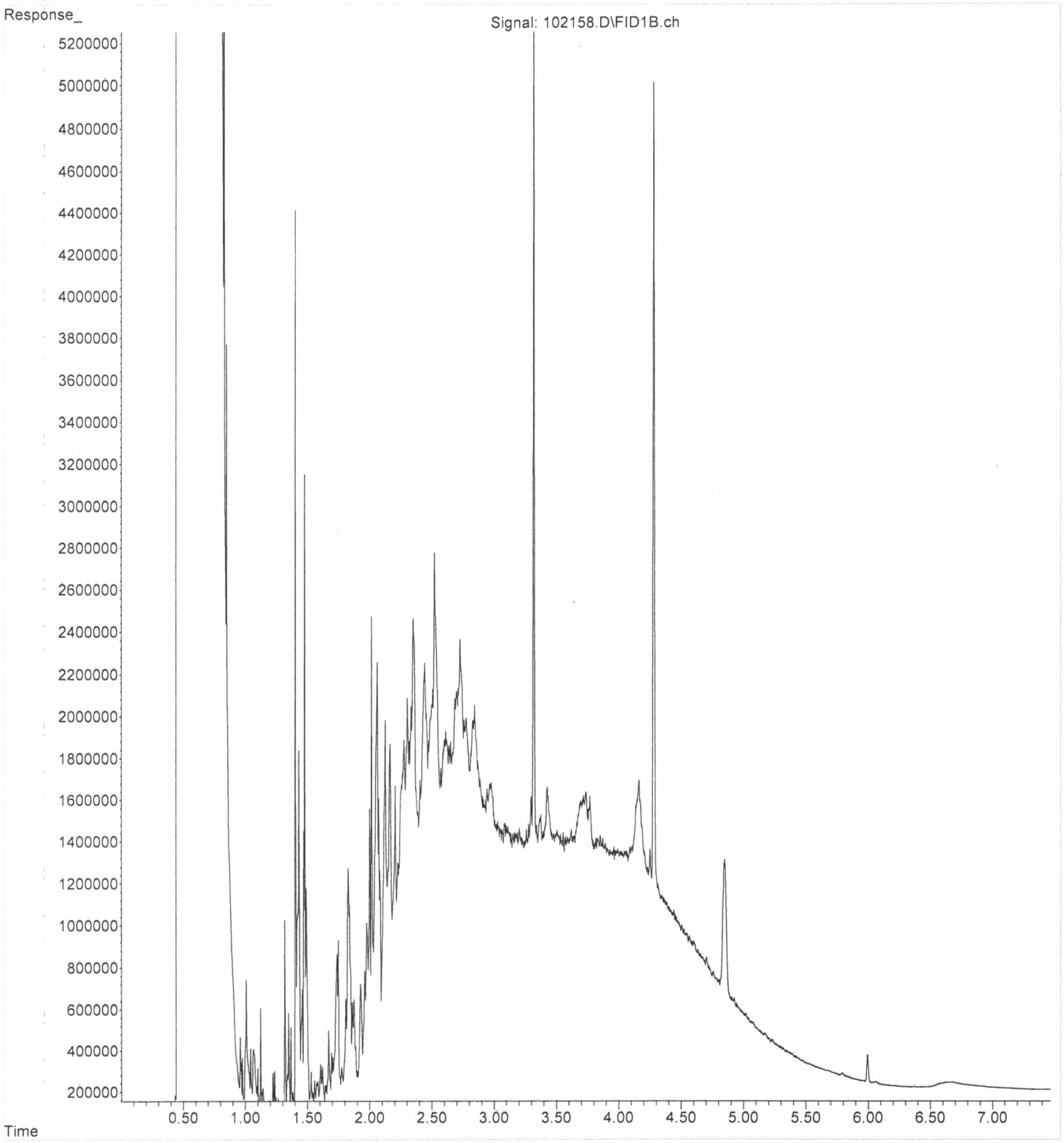

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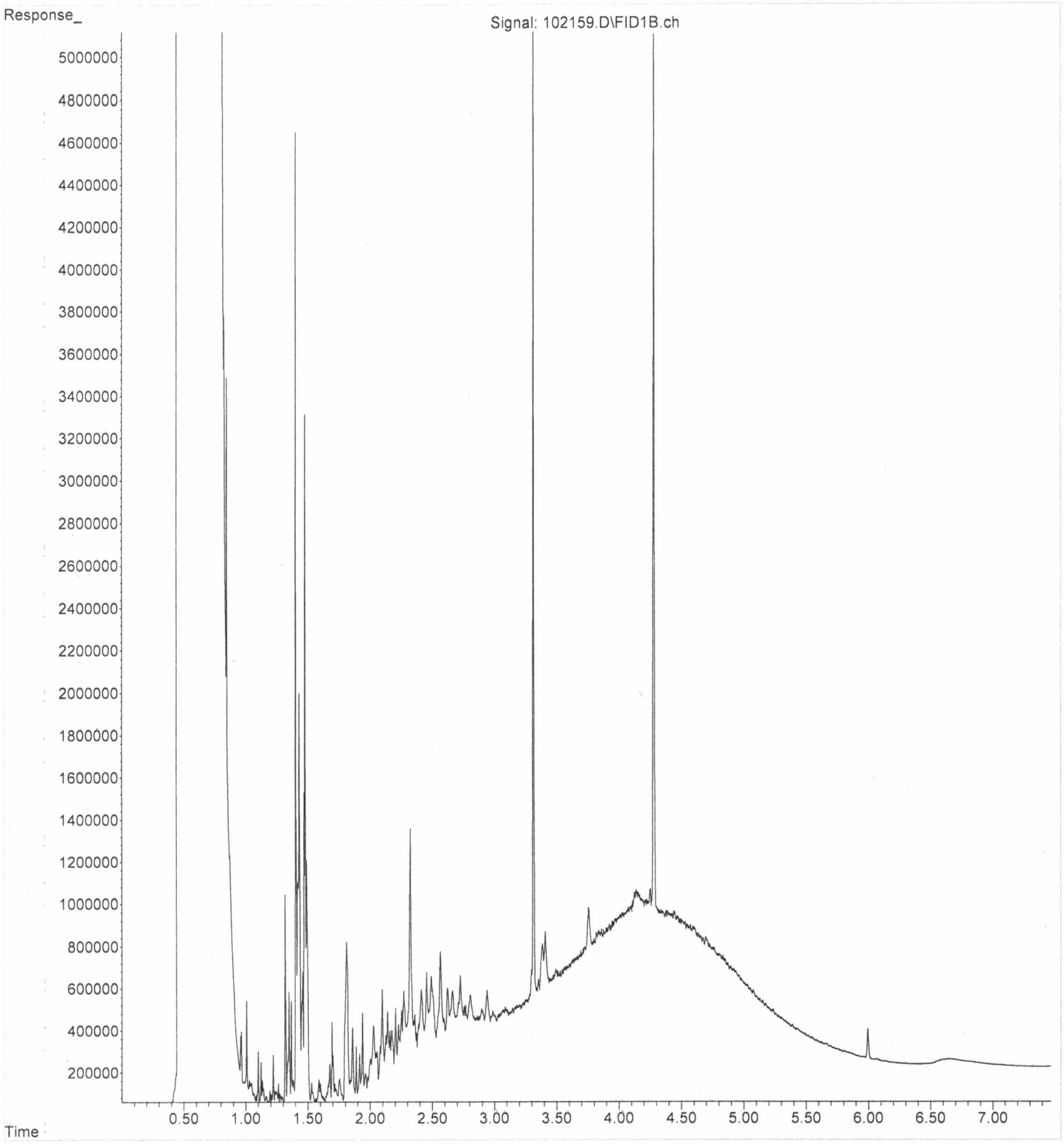

Appendix I

Data Validation Memorandum

MAUL
FOSTER
ALONGI

Data Validation Memorandum

Project No. M1030.08.003 | November 4, 2024 | City of Stanwood

Maul Foster & Alongi, Inc. (MFA), conducted an independent Stage 2A review of the quality of analytical results for groundwater, soil, and associated quality control samples collected in October 2024 at the property located at 9816 271st Street NW in Stanwood, Washington.

Friedman & Bruya, Inc. (F&B), performed the analyses. MFA reviewed F&B report numbers 410322, 410348, and 410370. The analyses performed and the samples analyzed are listed in the following tables.

Analysis	Reference
Diesel- and motor-oil-range hydrocarbons	NWTPH-Dx
Gasoline-range hydrocarbons	NWTPH-Gx
Percent moisture	ASTM D2216-98
Volatile organic compounds	EPA 8021B

Notes
ASTM = ASTM International.
EPA = U.S. Environmental Protection Agency.
NWTPH = Northwest Total Petroleum Hydrocarbons.

Samples Analyzed		
Report 410322		
SB24-S-2.0	SB27-S-2.0	MW06-S-10.5
SB24-S-8.0	SB27-S-7.5	SB24-GW-10.0
SB25-S-2.0	MW05-S-2.5	SB25-GW-10.0
SB25-S-5.5	MWDup-S-2.5	Trip Blank 1
SB26-S-2.0	MW06-S-5.5	--
Report 410348		
SB26-GW-13.0	SB27-GW-10.0	Trip Blank 2
Report 410370		
MW03-GW-9.0	MW05-GW-9.0	MW02-GW-12.0
MW04-GW-9.5	MW01-GW-11.0	Trip Blank 3
MWDUP-GW-9.5	MW06-GW-12.0	--

Data Validation Procedures

Analytical results were evaluated according to applicable sections of U.S. Environmental Protection Agency (EPA) guidelines for data review (EPA 2020) and appropriate laboratory- and method-specific guidelines (EPA 1986, F&B 2022).

Data validation procedures were modified, as appropriate, to accommodate quality control requirements for methods that EPA data review guidelines do not specifically address (e.g., Northwest Total Petroleum Hydrocarbons [NWTPH]-Dx).

ASTM International Method D2216-98 percent moisture results reported by the laboratory for dry-weight correction were reviewed for completeness but were not included in Stage 2A data validation.

Based on the data quality assurance/quality control review described herein, the data, with the appropriate final data qualifiers assigned, are considered acceptable for their intended use. Final data qualifiers represent qualifiers originating from the laboratory and accepted by the reviewer, and data qualifiers assigned by the reviewer during validation.

Final data qualifiers:

- J = result is estimated.
- J- = result is estimated, but the result may be biased low.
- U = result is non-detect at the method reporting limit (MRL).
- UJ = result is non-detect with an estimated MRL.

General Qualifications

Total Petroleum Hydrocarbons

According to reports 410322, 410348, and 410370, several NWTPH-Dx diesel- and motor-oil-range hydrocarbons were flagged by the laboratory due to chromatographic patterns that do not resemble the fuel standard used for quantitation. Results are reported as diesel- and motor-oil-range hydrocarbons rather than specific fuel products; thus, qualification by the reviewer was not required.

Sample Conditions

Sample Custody

Sample custody was appropriately documented on the chain-of-custody (COC) forms accompanying the reports.

The reviewer confirmed that the gap in custody on the COC forms accompanying all reports is due to shipment via a third-party service.

Holding Times

Extractions and analyses were performed within the recommended holding times.

Preservation and Sample Storage

According to the cooler receipt form accompanying report 410370, the 500-milliliter amber bottles for samples MW06-GW-12.0 and MW02-GW-12.0 were received at F&B with cracked caps and some sample volume leaked into the associated bags. The reviewer confirmed that samples were individually bagged in the cooler so cross-contamination was not likely, and that the laboratory had sufficient volume for NWTPH-Dx analysis. Qualification by the reviewer was not required.

The samples were preserved and stored appropriately.

Reporting Limits

The laboratory evaluated results to MRLs. Samples that required dilutions because of high analyte concentrations, matrix interferences, and/or dilutions necessary for preparation and/or analysis were reported with raised MRLs.

According to the case narrative accompanying report 410370, the NWPTH-Gx and EPA Method 8021B analyses of sample MW02-GW-12.0 were diluted due to a foamy matrix. Qualification by the reviewer was not required.

According to report 410370, F&B flagged the EPA Method 8021B benzene result for MW02-GW-12.0 with UJ due to an MRL below the standard level. The reviewer accepted the laboratory qualification.

Blank Results

Method Blanks

Laboratory method blanks are used to evaluate whether laboratory contamination was introduced during sample preparation and analysis. Laboratory method blank analyses were performed at the required frequencies, in accordance with laboratory- and method-specific requirements.

All laboratory method blank results were non-detect to MRLs.

Equipment Rinsate Blanks

Equipment rinsate blanks are used to evaluate the adequacy of the field equipment decontamination process when decontaminated sampling equipment is used to collect samples.

These blanks were not required for this sampling event, as all samples were collected using dedicated or single-use equipment.

Trip Blanks

Trip blanks are used to evaluate whether volatile organic compound contamination was introduced during shipping and field handling procedures.

Trip blanks were submitted with all sample delivery groups for EPA Method 8021B analysis, as shown in the following table.

Report	Trip Blank
410322	Trip Blank 1
410348	Trip Blank 2
410370	Trip Blank 3

The trip blanks were non-detect to MRLs for all target analytes.

Laboratory Control Sample and Laboratory Control Sample Duplicate Results

Laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) results are used to evaluate laboratory precision and accuracy. All LCS and LCSD were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

All LCS and LCSD results were within acceptance limits for percent recovery and relative percent difference (RPD).

Laboratory Duplicate Results

Laboratory duplicate results are used to evaluate laboratory precision and sample homogeneity. All laboratory duplicate samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

Laboratory duplicate results greater than five times the MRL were evaluated using laboratory RPD control limits. A secondary criterion was used when laboratory duplicate results were non-detect or less than five times the MRL. Results meet the secondary criterion if the absolute difference of the laboratory duplicate sample result and the parent sample result, or the MRL for non-detects, is equal to or less than the MRL value of the parent sample.

All laboratory duplicate results met the acceptance criteria.

Matrix Spike and Matrix Spike Duplicate Results

Matrix spike (MS) and matrix spike duplicate (MSD) results are used to evaluate laboratory precision, accuracy, and the effect of the sample matrix on sample preparation and target analyte recovery. All MS and MSD samples were prepared and analyzed at the required frequency, in accordance with laboratory- and method-specific requirements.

According to report 410322, the NWTPH-Gx MS and MSD prepared with sample SB27-S-7.5 had gasoline-range hydrocarbons results above the 150 percent acceptance limit, at 155 percent and 152 percent, respectively. The reviewer qualified the associated sample result, as shown in the following table.

Report	Sample	Analyte	Original Result (mg/kg)	Qualified Result (mg/kg)
410322	SB27-S-7.5	Gasoline-range hydrocarbons	11	11 J

Notes
J = result is estimated.
mg/kg = milligrams per kilogram.

All remaining MS and MSD results were within acceptance limits for percent recovery and RPD.

Surrogate Results

Surrogate results are used to evaluate laboratory performance of target organic compounds for individual samples.

According to report 410348, the NWTPH-Dx surrogate recoveries for samples SB26-GW-13.0 and SB27-GW-10.0 were outside control limits due to sample matrix effects. The reviewer confirmed via the electronic data deliverable that the o-terphenyl surrogate results for samples SB26-GW-13.0 and SB27-GW-10.0 were below the lower percent recovery acceptance limit of 50 percent, at 10 percent and 38 percent, respectively. The reviewer qualified the associated sample results, as shown in the following table.

Report	Sample	Analyte	Original Result (ug/L)	Qualified Result (ug/L)
410348	SB26-GW-13.0	Diesel-range hydrocarbons	220	220 J-
		Motor-oil-range hydrocarbons	250 U	250 UJ
	SB27-GW-10.0	Diesel-range hydrocarbons	4,800	4,800 J-
		Motor-oil-range hydrocarbons	11,000	11,000 J-

Notes
J- = result is estimated, but the result may be biased low.
U = result is non-detect at the method reporting limit.
ug/L = micrograms per liter.
UJ = result is non-detect with an estimated method reporting limit.

All remaining surrogate results were within percent recovery acceptance limits.

Field Duplicate Results

Field duplicate results are used to evaluate field precision and sample homogeneity. The following field duplicate and parent sample pairs were submitted for analysis:

Report	Parent Sample	Field Duplicate Sample
410322	MW05-S-2.5	MWDup-S-2.5
410370	MW04-GW-9.5	MWDUP-GW-9.5

MFA uses acceptance criteria of 100 percent RPD for results that are less than five times the MRL or 50 percent RPD for results that are greater than five times the MRL. RPD was not evaluated when both results in the sample pair were non-detect.

All field duplicate results met the RPD acceptance criteria.

Data Package

The data package was reviewed for transcription errors, omissions, and anomalies.

There are sample chromatograms accompanying report 410370. Review of instrument outputs is not required for Stage 2A data validation.

No other issues were found.

References

EPA. 1986. *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* EPA publication SW-846. 3rd ed. U.S. Environmental Protection Agency. Final updates I (1993), II (1995), IIA (1994), IIB (1995), III (1997), IIIA (1999), IIIB (2005), IV (2008), V (2015), VI phase I (2017), VI phase II (2018), VI phase III (2019), VII phase I (2019), and VII phase II (2020).

EPA. 2020. *National Functional Guidelines for Organic Superfund Methods Data Review.* EPA 540-R-20-005. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation: Washington, DC. November.

F&B. 2022. *Quality Assurance Manual.* Rev. 18. Friedman & Bruya, Inc.: Seattle, WA. December 9.

Appendix J

Terrestrial Ecological Evaluation

MAUL FOSTER ALONGI

Table 749-1

Simplified Terrestrial Ecological Evaluation-Exposure Analysis Procedure

Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre).	
1) From the table below, find the number of points corresponding to the area and enter this number in the field to the right.	
Area (acres) / Points 0.25 or less / 4 0.5 / 5 1.0 / 6 1.5 / 7 2.0 / 8 2.5 / 9 3.0 / 10 3.5 / 11 4.0 or more / 12	4
2) Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1	3
3)[a] Enter a score in the box to the right for the habitat quality of the site, using the following rating system[b]. High=1, Intermediate=2, Low=3	3
4) Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.[c]	2
5) Are there any of the following soil contaminants present: Chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4
6) Add the numbers in the boxes on lines 2-5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.	12

Notes for Table 749-1

[a] It is expected that this habitat evaluation will be undertaken by an experienced field biologist. If this is not the case, enter a conservative score of (1) for questions 3 and 4.

[b] **Habitat rating system.** Rate the quality of the habitat as high, intermediate or low based on your professional judgment as a field biologist. The following are suggested factors to consider in making this evaluation:

> **Low:** Early successional vegetative stands; vegetation predominantly noxious, nonnative, exotic plant species or weeds. Areas severely disturbed by human activity, including intensively cultivated croplands. Areas isolated from other habitat used by wildlife.

High: Area is ecologically significant for one or more of the following reasons: Late-successional native plant communities present; relatively high species diversity; used by an uncommon or rare species; priority habitat (as defined by the Washington Department of fish and Wildlife); part of a larger area of habitat where size or fragmentation may be important for the retention of some species.

Intermediate: Area does not rate as either high or low.

[c] Indicate "yes" if the area attracts wildlife or is likely to do so. Examples: Birds frequently visit the area to feed; evidence of high use b mammals (tracks, scat, etc.); habitat "island" in an industrial area; unusual features of an area that make it important for feeding animals; heavy use during seasonal migrations.

[Area Calculation Aid] [Aerial Photo with Area Designations] [TEE Table 749-1] [Index of Tables]

[Exclusions Main] [TEE Definitions] [Simplified or Site-Specific?] [Simplified Ecological Evaluation] [Site-Specific Ecological Evaluation] [WAC 173-340-7493]

[TEE Home]

Appendix J Table
Simplified TEE Scoresheet
Raplee Property, Stanwood, Washington
City of Stanwood

Line Number	Scoring Parameters	Score	Rationale
1	Estimate the area of contiguous (connected) undeveloped land on the site or within 500 feet of any area of the site to the nearest 1/2 acre (1/4 acre if the area is less than 0.5 acre). From the table below, find the number of points corresponding to the area and enter this number in the field to the right. Area (acres) — Points 0.25 or less — 4 0.5 — 5 1.0 — 6 1.5 — 7 2.0 — 8 2.5 — 9 3.0 — 10 3.5 — 11 4.0 or more — 12	4	The 0.21-acre Property is partially developed and all other land within 500 feet of the site is developed. These areas are unlikely to attract wildlife. The total area of contiguous undeveloped land was conservatively chosen as 0.25 acre or less.
2	Is this an industrial or commercial property? If yes, enter a score of 3. If no, enter a score of 1.	3	The Property is zoned as commercial.
3	Enter a score in the box to the right for the habitat quality of the site, using the following rating system: High=1, Intermediate=2, Low=3.	3	Undeveloped areas of the Property are ruderal vegetation, nonnative species, and grasses. Mature trees/shrubs that would provide some habitat structure are absent.
4	Is the undeveloped land likely to attract wildlife? If yes, enter a score of 1 in the box to the right. If no, enter a score of 2.	2	Habitat quality at the property is low and is surrounded by commercial/residential development and a chainlink fence. There is little potential for attracting urban wildlife.
5	Are any of the following soil contaminants present: chlorinated dioxins/furans, PCB mixtures, DDT, DDE, DDD, aldrin, chlordane, dieldrin, endosulfan, endrin, heptachlor, benzene hexachloride, toxaphene, hexachlorobenzene, pentachlorophenol, pentachlorobenzene? If yes, enter a score of 1 in the box to the right. If no, enter a score of 4.	4	None of the listed soil contaminants are present at the Property.
Add the numbers in the boxes on lines 2–5 and enter this number in the box to the right. If this number is larger than the number in the box on line 1, the simplified evaluation may be ended.		12	Simplified evaluation ended. Total score exceeds 4.

Notes

Table adapted from Model Toxics Control Act Table 749-1.

PCB = polychlorinated biphenyl.