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REMEDIAL INVESTIGATION AND FEASIBILITY STUDY REPORT
WHIDBEY MARINE & AUTO SUPPLY SITE
1695 EAST MAIN STREET
FREELAND, WASHINGTON

by
Haley & Aldrich, Inc.
Seattle, Washington

for
Washington State Department of Ecology
Shoreline, Washington

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PREPARED FOR
WASHINGTON STATE DEPARTMENT OF ECOLOGY
SHORELINE, WASHINGTON

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1. Introduction

Haley & Aldrich, Inc. (Haley & Aldrich[1]) has prepared this report to present results of the remedial investigation and feasibility study (RIFS) at the Whidbey Marine & Auto Supply site (Site; Facility Site ID number 17222251; Cleanup Site ID number 5610) on behalf of the Washington State Department of Ecology (Ecology). The Site includes the former Whidbey Marine & Auto Supply property (Property) located at 1695 East Main Street in Freeland, Washington, and other properties where contamination originated from historical service station operations on the Property.

The primary objectives of this work were: to address data gaps following historical investigation conducted between 2005 and 2017 identified by Haley & Aldrich in the 2022 Remedial Investigation (RI) Work Plan (Haley & Aldrich, 2022); to adequately characterize the nature and extent of contamination at the Site for the purposes of identifying and developing remedial action alternatives; and to develop and evaluate remedial action alternatives. This work included further characterization of contaminants in soil and groundwater on the Property and surrounding areas. This RIFS was conducted in accordance with the Model Toxics Control Act (MTCA) Washington Administrative Code (WAC) 173-340-350, the RI Work Plan dated May 2022 (Haley & Aldrich), and the RI Work Plan Revisions dated September 2023 (Haley & Aldrich).

1.1 PROPERTY DESCRIPTION AND HISTORY

The Property refers to Island County tax parcel number R22911-076-1270, which is owned by David H. Campbell and is approximately 0.45 acres. The Property and Site vicinity are shown on Figure 1. The Property is currently occupied by Scotty's Towing and Island Auction LLC.

Whidbey Marine & Auto Supply occupied the Property between approximately 1971 to 2014. A gasoline and diesel service station was operated for a portion of the time during which Whidbey Marine & Auto occupied the Property. Per Property records, four underground storage tanks (USTs) were installed at the Property between 1982 and 1986. The USTs consisted of a 3,000-gallon diesel UST, two 10,000-gallon gasoline USTs, and an 8,000-gallon gasoline UST. In 2005, a gasoline release from one of the 10,000-gallon gasoline USTs was reported to Ecology. Both the stoppage of fuel sales and the sale of the Property occurred in 2009. The four USTs located on the Property were removed in January of 2011 by Ultra-Tank Services, Inc (Farallon Consulting [Farallon], 2011b).

[1] This project was begun by Hart Crowser, Inc. (Hart Crowser), which was acquired by Haley & Aldrich in 2020, and Haley & Aldrich is continuing the work.

2. Site Background

2.1 PREVIOUS ENVIRONMENTAL INVESTIGATIONS AND INTERIM ACTIONS

The lists below summarize past environmental assessments and interim actions that occurred at the Site.

2.1.1 Initial Environmental Assessments

- Farallon, 2005 – Farallon completed an initial reconnaissance subsurface investigation consisting of seven soil borings, which included installation of one groundwater monitoring well that was installed in the perched groundwater zone identified during drilling. Benzene and/or gasoline range petroleum hydrocarbons (TPH-G) concentrations exceeding MTCA Method A cleanup levels (CULs) were detected in multiple soil samples (Farallon, 2006a).
- Farallon, 2006 – Farallon installed a soil vapor extraction (SVE) system, two additional groundwater monitoring wells, one soil boring, and three SVE wells. Groundwater samples from the perched groundwater zone exceeded MTCA Method A CULs for benzene (Farallon, 2006b).
- Farallon, 2006/2007 – Farallon conducted two rounds of groundwater monitoring of the three existing wells on site, then installed two more groundwater monitoring wells and conducted another groundwater monitoring event of all five wells on site (Farallon, 2007).
- Farallon, 2008 – Farallon conducted a supplementary subsurface investigation which included installation of three more groundwater monitoring wells, one air sparge (AS) well, and one SVE well. This was followed by another two rounds of groundwater monitoring (Farallon, 2008a, 2008b, and 2008c).
- Farallon, 2009 – Farallon installed four more groundwater monitoring wells, which were located on the Site, but off the Property. Farallon then conducted another groundwater monitoring event. Multiple wells still had concentrations of TPH-G and/or benzene, toluene, ethylbenzene, and/or xylenes (BTEX) exceeding the MTCA Method A CULs (Farallon, 2009).
- Farallon, 2012 – Farallon began monitoring light nonaqueous-phase liquid in the monitoring well network. Farallon also installed four more groundwater monitoring wells downgradient of the Property, in the direction of the Freeland Water and Sewer District's drinking water wells (Farallon, 2012a and 2012b).
- SoundEarth Strategies, Inc. (SoundEarth), 2017 – SoundEarth conducted a preliminary planning assessment to evaluate remedial alternatives (SoundEarth, 2017). SoundEarth provided three cleanup action alternatives; AS and SVE remediation system, groundwater extraction and treatment system, and monitoring natural attenuation with an environmental covenant. Of these alternatives, SoundEarth recommended the installation of an AS and SVE remediation system.

2.1.2 Interim Actions

- An SVE system, consisting of three SVE wells, one dual-purpose SVE/monitoring well, and a catalytic ox idation unit, was installed at the Site between June and September 2006. The SVE system was operated between 2006 and 2009. The SVE operations at the Site removed over 12,000 pounds of gasoline-range organic vapors from vadose-zone soil (Farallon, 2015).

- In January 2011, four USTs and the associated piping and pumps were removed for closure by Ultra-Tank Services, Inc. Approximately 15 feet of piping connecting pump 4 to one of the USTs was left in place due to proximity of building structures and utilities (Farallon, 2011a). The analytical results for the soil samples collected during the UST closure indicated that concentrations of TPH-G, heavy oil range petroleum hydrocarbons (TPH-O), and BTEX were not detected above their respective MTCA Method A CULs.
- In 2011, RegenOx, and Oxygen Release Compound-Advanced (ORC-A) were injected into a total of 59 borings over the course of February, March, and April 2011 between 55 to 60 feet below ground surface (bgs; Farallon, 2011b).

2.2 ENVIRONMENTAL JUSTICE

The objective of this section is to understand what Environmental Justice (EJ) concerns may exist for the Site and to anticipate potential EJ concerns related to the Site and the adjacent communities. This effort is required by Ecology, per WAC 173-340-350(6)(h)(i). To meet this new requirement, Haley & Aldrich utilized multiple tools to evaluate various indicators for this Site as they relate to EJ and evaluate potential impacts to vulnerable populations and overburdened communities.

2.2.1 Washington Environmental Health Disparities Mapping

The Washington State Department of Health (WSDH) has an EJ mapping tool. The Washington Environmental Health Disparities (EHD) Map (WSDH, 2025) is an interactive mapping tool that compares communities across the state for environmental health disparities. The community identified by the census tract in which the Site is located has relatively low overall cumulative environmental health disparities in the state, with a rank of 1 out of 10. However, the area around the Site has a rank of 8 out of 10 for sensitive populations.

Furthermore, the Site census tract has a relatively high rank for transportation expense, unaffordable housing (greater than 30 percent of income), unemployment, and low birth weight - combined. Additional outputs from the EHD mapping tool are also provided in Appendix A and Table A-1.

These screening results should not be used as a definitive representation of conditions in the community or an assessment of individual risk, but rather as one line of evidence to characterize potential community environmental health burdens and social vulnerability.

2.2.2 EPA Environmental Justice Review

The United States (U.S.) Environmental Protection Agency (EPA, 2025) has developed an EJ screening and mapping tool (EJScreen), that uses standard and nationally consistent data to identify and highlight places that may have higher environmental burdens and more vulnerable populations (EPA, 2025). These maps provide data for mapped regions in percentile format for a variety of indexes, such as pollution measures (e.g., particulate matter and ozone), as well as potentially hazardous substances (e.g., lead paint and USTs).

The EJScreen Community Report generated using the EJScreen tool shows that the area within a 5-mile radius around the Site is below the 80th percentile for the 13 EJ pollution and sources indices, compared to other populations across the state and the nation. For reference, the 80th percentile is a suggested starting point for the purpose of identifying geographic areas in the United States that may warrant further consideration, analysis, or outreach (EPA, 2023). The EJScreen Community Report indicates that the Site exceeds the 80th percentile for two socioeconomic indicators: drinking water non-compliance and over age 64. Additional screening details specific to this Site, including socioeconomic indices, are provided in Appendix A.

2.3 CLIMATE CHANGE

As required by WAC 173-340-350(6)(f), details on the current and projected climatological characteristics for this Site are included. The objective of this section is to understand what climate change concerns may exist for the Site and to anticipate potential climate change concerns that may affect the migration of chemicals.

According to the EJScreen Community Report, the area around the Site is in the 49th statewide percentile for flood risk, 0 percentile for fire risk, is not in a 100-year floodplain or area that would be affected by up a 6-foot rise in sea level, and did not have any recorded days above 90 degrees Fahrenheit between 2019 and 2023 (Appendix A).

Key climate change impacts in the region are generally expected to include increased temperatures, more frequent extreme heat events paired with urban heat islands, increased drought risk, increase in invasive plant species, pests, and pathogens, sea-level rise, changes in hydrology leading to changes in forests and salmon habitats, increased precipitation resulting in increased stormwater runoff and erosion, and more frequent and intense precipitation events that may lead to prominent flooding (Rutledge and Brandt, 2022). Based on data provided and analyzed by the University of Washington, by 2050, the frequency of 2-year to 100-year storm events will increase between approximately 15 to 48 percent in the area around the Site (Climate Impacts Group, 2023). An increase in precipitation and extreme storm events could impact the Site by mobilizing chemicals on or near the surface; this will be further evaluated in the feasibility study (FS) and built into the planning of any remedial alternatives proposed for this Site.

3. Remedial Investigation Field and Laboratory Methods

RI activities performed by Haley & Aldrich in 2023 and 2024 included soil borings, monitoring well installation and development, and quarterly groundwater monitoring. An Inadvertent Discovery Plan was prepared as part of the RI Data Gaps Work Plan and was referenced and implemented during subsurface investigation activities. No historical artifacts were encountered during any of the RI activities.

3.1 SONIC BORINGS

Nine soil borings were advanced by Anderson Environmental Contracting, LLC (AEC), a State-of-Washington-licensed driller, using a sonic drilling rig. Borings were advanced to depths ranging from 110 to 150 feet bgs. Five of the borings were completed as deep monitoring wells, screened in the Sea-Level Aquifer at depths between approximately 100 and 114 feet bgs, at elevations between approximately 20 and 15 feet (North American Vertical Datum of 1988 [NAVD88]; MW-19D through MW-23D). The four deep soil borings that were not completed as monitoring wells were designated HA-1, HA-2, HA-3, and HA-4. A Haley & Aldrich field representative was on site for all subsurface investigation activities.

Soil boring logs, including construction details for wells, are included as Appendix B. The well and boring locations are shown in Figure 2, and the details are summarized in Table 1 (attached).

3.2 SOIL SCREENING AND SAMPLING PROCEDURES

Haley & Aldrich collected soil samples for chemical analyses directly from the sonic sleeves with a clean stainless-steel spoon and/or clean disposable nitrile gloves and placed them in pre-cleaned, laboratory-supplied glass sample jars and 40-milliliter volatile organics analysis (VOA) bottles. VOA bottles were filled with a 5-gram soil plug according to EPA Method 5035 procedures. The jars were sealed and labeled. Filled sample jars were stored in an ice-chilled cooler and submitted to the analytical laboratory under chain of custody protocols.

Soil samples were field screened at approximately 5-foot intervals for evidence of volatile organic compound (VOC)-related impacts using: (1) visual and olfactory observations; (2) sheen screening; and (3) headspace vapor screening using a MiniRAE photoionization detector. Field screening results were used as a general guideline to identify potential chemical constituents in soil samples. The effectiveness of field screening varies with temperature, moisture content, organic content, soil type, and age of the constituents. Visual examination consists of inspecting the soil for evidence of discoloration, staining, and/or abnormal components. The presence of a water sheen was evaluated by placing a small volume of soil in a pan of water and observing the water surface for signs of sheen.

The field screening observations were used to select which samples to submit for chemical analyses. In general, samples with the highest MiniRAE readings or most obvious physical presence of VOC-related impacts were selected for analysis.

3.3 SOIL ANALYTICAL METHODS

Soil samples were analyzed by Friedman & Bruya, Inc. (Friedman & Bruya) of Seattle, Washington, for the following chemicals of potential concern (COPCs) that were identified based on previous investigations and the historical use of the Property: TPH-G, diesel and heavy-oil range total petroleum hydrocarbons (TPH-D and TPH-O, respectively), BTEX, and total metals (arsenic and lead). Soil samples were also analyzed for additional VOCs, including 1-2-dibromoethane, 1-2-dichloroethane, methyl tertiary-butyl ether (EDB, EDC, and MTBE) and polycyclic hydrocarbons (PAHs) to evaluate the potential impact from other petroleum components. A few select soil samples were also analyzed for total organic carbon (TOC) and volatile petroleum hydrocarbons and extractable petroleum hydrocarbons (VPH and EPH, respectively) to evaluate transport and potential *in situ* remedial alternatives and the potential development of Site-specific cleanup standards. Analytical methods are summarized in Table 2, below.

Table 2. Soil Analytical Methods

Parameter	Analytical Method
VOCs	EPA 8260D
Total Metals	EPA 6010C, SW6020B
TPH-G	NWTPH-GX
TPH-D	NWTPH-DX
TPH-O	NWTPH-DX
VPH	NWTPH-VPH
EPH	NWTPH-EPH
EDB, EDC, MTBE	EPA 8260D
PAHs	EPA 8270E
TOC	EPA 9060

The laboratory reports and review of the chemical data quality from the RI activities are included in Appendix C. Analytical results for soil samples collected during RI activities are presented in Table 3.

3.4 MONITORING WELL INSTALLATION, DEVELOPMENT, AND SURVEYING

3.4.1 Monitoring Well Installation

The five monitoring wells were constructed using 2-inch-diameter Schedule 40 polyvinyl chloride riser pipe for casing and a 10-foot, 0.010-inch machine-slotted screen. Monitoring wells were installed in accordance with *Washington State Well Construction Standards* per Chapter 173-360 WAC. Well construction details for monitoring wells constructed as part of the RI are presented on the soil boring logs in Appendix B.

3.4.2 Monitoring Well Development and Surveying

Existing monitoring wells MW-2S, MW-4S, MW-6S, MW-7S, MW-8S, MW-9D, and MW-12D through MW-18D were developed between September 25 and 26, 2023, by Haley & Aldrich representatives. Newly installed monitoring wells (MW-19D through MW-23D) were developed between January 24 and 26, 2024. Monitoring wells MW-1S, MW-3S, MW-10D, and MW-11D were redeveloped during this same period. It had been several years since these wells had been sampled and they were redeveloped in preparation of being reintroduced into the scope for upcoming quarterly groundwater monitoring events. Development or redevelopment was conducted using a combination of surging and purging methods with a submersible bailer and pump with disposable tubing. A field representative from AEC developed the wells, and a Haley & Aldrich field representative was present measuring and recording sediment thickness at the bottom of the wells before and after well development. Well development began by surging using a stainless-steel bailer, which also removed sediment from the bottom of the wells. Development was completed by using a submersible pump or Hydrolift pump until the well ran dry or the water cleared (whichever occurred first). If the water had not cleared after 10 casing volumes, the well was over-purged until the water was cleared. The equipment used during development was decontaminated between monitoring wells to prevent cross-contamination. A summary of observations and measurements made during development are provided in Table B-1.

The entire monitoring well network (except for MW-18D, which was inaccessible at the time) was surveyed by Apex Engineering on January 30, 2024. The horizontal datum was the North American Datum of 1983/2011 Washington North Zone, and the vertical datum was NAVD88.

3.5 GROUNDWATER SAMPLING PROCEDURES

3.5.1 Grab Groundwater Sampling

Grab groundwater samples were collected from four borings (HA-1, HA-2, HA-3, and MW-22D) during the January 2024 drilling event and submitted for analysis of TPH-G, TPH-D, TPH-O, BTEX, chlorinated volatile organic compounds (cVOCs), and/or total suspended solids (TSS). Grab groundwater samples were collected from temporary wells screened at depths ranging from 50 to 69 feet bgs, within the perched groundwater zone, which was determined in the field based on soil stratigraphy. No. 10/20 silica sand was placed in the annular space from the base of the boring to approximately 1 to 2 feet above the top of the well screen, which was then sealed using bentonite chips to prevent vertical migration of groundwater.

3.5.2 Monitoring Well Sampling

A baseline monitoring well groundwater sampling event including 12 monitoring wells was conducted in September 2023. Following the baseline event, a total of four quarterly groundwater sampling events were conducted in 2024. The first quarterly sampling event took place in February 2024 following the installation of the five new groundwater monitoring wells. The second, third, and fourth quarter sampling events took place in May, August, and November 2024, respectively. The monitoring wells sampled in each quarterly event varied slightly based on observed chemical detections and historical chemical trends, as available. The information on which specific wells were analyzed in each event is included in Table 1. The five groundwater monitoring wells installed as part of the RI work (MW-19D through MW-23D) were sampled every quarter.

Prior to sampling, field personnel recorded well conditions and the depth to water in the wells. Wells were purged and sampled using a submersible pump or bladder pump and low-flow groundwater sampling techniques at a depth representing the top of the screened interval. Groundwater samples were collected from field parameters of pH, specific conductivity, temperature, dissolved oxygen, and oxidation reduction potential were stabilized or after three casing volumes of water had been purged (whichever was less). If the well was purged dry, it was allowed to recover and then sampled immediately. To prevent cross-contamination of the wells, disposable polyethylene tubing was used for each groundwater sample. Samples collected for dissolved metals analysis were filtered in the field using a 0.45-micron filter.

3.6 GROUNDWATER ANALYTICAL METHODS

Groundwater samples were analyzed by Friedman & Bruya for one or more of the following COPCs that were identified based on previous investigations and the historical use of the property: TPH, BTEX, and metals (arsenic and lead). Groundwater samples were also analyzed for additional VOCs and PAHs to evaluate the potential impact from other petroleum components and as the RI progressed, select samples were analyzed for cVOCs based on preliminary RI results. Select groundwater samples were also analyzed alkalinity, ammonia, dissolved gases, anions, sulfide, TOC, and dissolved metals (manganese and iron) to evaluate the potential for monitored natural attenuation (MNA). Analytical methods are summarized in Table 4, below. Analytical results for groundwater samples collected during RI activities are presented in Table 5.

Table 4. Groundwater Analytical Methods

Parameter	Analytical Method
TPH-G	NWTPH-GX
TPH-D	NWTPH-DX
TPH-O	NWTPH-DX
PAHs	EPA 8270E
Alkalinity	SM 2320 B-97
Ammonia	SM 4500-NH3
Anions	EPA 300.0
Dissolved Gases	SM 3500-Cr B-09
Dissolved Metals	EPA 6010C
Sulfide	SM 4500-S2
Total Metals	EPA 6020A
TOC	SM 5310
TSS	SM 2540
VOCs	EPA 8260D

4. Site Physical Characteristics

4.1 GEOLOGY

The Geologic Map of the Freeland and Northern Part of the Hansville 7.5-Minute Quadrangles, Island County, Washington (Polenz M., Schasse H., Petersen B, 2006), indicates that the Property is underlain primarily by Everson Glaciomarine Drift deposits. Soil encountered during previous investigations and borings advanced by Haley & Aldrich at the Site generally consisted of sands and silty sands to depths of at least 115 feet bgs. Fine to coarse sand with trace silt was also encountered to approximately 55 to 65 feet bgs. A silt and/or clay layer was encountered between approximately 50 and 65 feet bgs beneath the Property. The silt and/or clay layer appeared to be continuous but thins out to the west and is not observed in the boring to the furthest west (MW-21D), and ranges from approximately 15 feet thick in boring HA-2, to 3 inches thick in MW-11D (Figures 3 and 4). The silt and/or clay layer also appeared to continue to the south before thinning (Figure 3). Soil from 65 feet bgs to total depth explored of 115 feet bgs generally consisted of fine to coarse sand with trace silt. Figure 2 show the cross-section locations and the borings and wells used to construct the cross sections.

4.2 HYDROGEOLOGY

Groundwater measurements collected during the 2024 RI activities are presented in Table 6 (attached). Figures 5 and 6 show groundwater contours and flow directions observed during the quarterly groundwater monitoring events. The monitoring wells were gauged for free product during the 2024 RI activities, but no free product was measured.

Two distinct groundwater zones underly the Property: a perched zone and a regional aquifer (Sea-Level Aquifer). A perched groundwater zone was encountered between 50 and 56 feet bgs (approximately 65 and 59 feet NAVD88) and appears to be consistent with the silt layer observed in soil borings. Groundwater level measurements in perched groundwater zone wells have been between 50.51 and 57.25 feet bgs. Groundwater potentiometric maps, presenting previous groundwater monitoring events, have indicated that perched groundwater flows generally to the west-southwest. Perched groundwater was not encountered in soil borings west of MW-6S and MW-7S and was encountered sporadically in soil borings south of the Property, and perched groundwater in well MW-5S has been historically dry. This indicates that the perched groundwater zone is not continuous and appears to terminate between wells MW-7S and MW-9D and at MW-22D. Based on the discontinuous silt layer and the absence of perched groundwater to the west, groundwater west of MW-6S and MW-7S likely migrates vertically to the deeper Sea-Level Aquifer.

The Sea-Level Aquifer was encountered between 102 and 106 feet bgs in monitoring wells MW-1S and MW-9D through MW-23D. Groundwater measurements in the Sea-Level Aquifer monitoring wells have ranged between 99.66 and 104.80 feet bgs. Groundwater potentiometric maps indicate the Sea-Level Aquifer generally flows to the east-southeast. The Sea-Level Aquifer is Whidbey Island’s primary drinking water source. Four drinking water wells are located approximately 1,900 to 2,900 feet south and south-southeast of the Property (Figure 1).

5. Analytical Results

Analytical data and the laboratory's internal quality assurance and quality control data were reviewed to assess whether they meet project-specific data quality objectives. This review was performed consistent with accepted EPA procedures for evaluating laboratory analytical data and appropriate laboratory and method-specific guidelines (EPA, 2020a and 2020b). The chemical data review summarizing data evaluation procedures, usability of data, and deviations from specific field data and/or laboratory methods for the investigation data are presented in the Data User Summary Report (DUSR) within Appendix C. The data is considered acceptable for their intended use, with the appropriate data qualifiers assigned. Sample results are presented in the following section. The DUSR, and all laboratory reports are provided in Appendix C.

To screen the supplemental RI data, the following applicable transport pathways were considered:

- Direct contact with soil contaminants;
- Ingestion of groundwater contaminants in drinking water;
- Leaching of soil contaminants to potable groundwater from the vadose or saturated zone; and
- Volatilization of volatile constituents in groundwater to indoor air.

5.1 SOIL

The locations and analytical results for the 55 soil samples, including the duplicate samples, are presented in Table 3, attached. TPH, BTEX, and cVOC analytical results in the vadose zone, the perched groundwater zone, and the Sea-Level Aquifer are presented in Figures 7, 8, and 9, respectively, and tabulated in Table 3. These three hydrogeologic units are defined in *Sections 4.1 - Geology* and *4.2 - Hydrogeology*. If an analytical result exceeded the MTCA-based screening level for a parameter, the exceedance is annotated on the table. The results boxes shown on Figures 7 through 9 contain an abbreviated list of the chemicals of concern (COCs) in soil as defined in *Section* 7.1.2.1 and are compared to the proposed cleanup levels discussed in *Section 7.2*. The process for the determination of COCs is discussed in *Section 7.1*. Silica gel cleanup was applied to samples collected from MW-19D to determine the potential for natural organics within the soil. Analytical results for samples analyzed with silica gel cleanup were compared to applicable screening levels and are presented in Table 3.

5.1.1 Vadose Zone Soil

The vadose zone is generally considered to be from ground surface down to a depth of 50 feet bgs at the Site. Analytical results from soil samples collected within the vadose zone were compared to the MTCA Method B screening levels for the protection of groundwater in vadose zone or for the protection of direct contact for soil samples collected within the upper 15 feet. The key results of the vadose zone soil sampling are discussed below.

- Two soil samples collected within the Property boundary and South Harbor Avenue right-of-way (ROW; HA-2 and MW-19D) had detections of benzo(a)pyrene and carcinogenic PAH total toxic equivalent concentrations (cPAH-TEQ) exceeding their respective MTCA Method B screening level for the protection of direct contact and groundwater in the vadose zone (Table 3). Benzo(a)pyrene and cPAH-TEQ were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable screening levels in all other samples collected within the perched groundwater zone during the 2024 RI activities.

- TPH-D+O was detected in one sample collected from MW-19D at concentrations above the MTCA Method B screening level for the protection of groundwater in the vadose zone. However, based on significant decrease in reported TPH-D+O result following silica gel cleanup, it appears that the TPH is likely derived from the presence of natural organics or hydrocarbon degradation products.
- All other analytes were either not detected at or above laboratory reporting limits or were detected at concentrations less than applicable MTCA screening levels in soil samples collected within the vadose zone during the 2024 RI activities.

5.1.2 Perched Groundwater Zone Soil

The perched groundwater zone is generally observed between 50 and 75 feet bgs at the Site. Analytical results from soil samples collected within the perched groundwater zone were compared to MTCA Method B screening levels for the protection of groundwater in vadose zone or for the protection of groundwater in saturated zone, depending on whether perched groundwater was encountered in each boring. Perched groundwater was observed in borings HA-1 through HA-4 and MW-22D. Analytical results from soil samples collected within the perched groundwater zone are discussed below.

- TPH-G was detected in one sample collected from a boring to the west of the Property (HA-4), exceeding the MTCA Method B screening level for the protection of groundwater in saturated soil. TPH-G was either not detected at or above laboratory reporting limits or was detected at concentrations below applicable screening levels in all other samples collected within the perched groundwater zone during the 2024 RI activities.
- One or more PAH was detected in one soil sample collected from a boring within the Property boundary (HA-2) at concentrations exceeding their respective screening levels for the protection of groundwater in saturated soil. PAHs were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable screening levels in all other samples collected within the perched groundwater zone during the 2024 RI activities.
- One or more non-chlorinated VOCs (i.e., VOCs that are not cVOCs and are primarily petroleum-related [i.e., 1,2,4-Trimethylbenzene, 1,3,5-Trimethylbenzene, and hexane]) were detected in one soil sample collected from a boring to the west of the Property (HA-4), exceeding their respective MTCA Method B screening levels for the protection of groundwater in saturated soil. Non-chlorinated VOCs were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable screening levels in all other samples collected within the perched groundwater zone during the 2024 RI activities.
- Two samples collected from borings on the Property and to the south of the Property (HA-2 and MW-22D, respectively) had detections of arsenic at concentrations exceeding Puget Sound Ecology-derived natural background threshold value for arsenic in soil (Ecology, 1994). The 90th percentile was selected by Ecology as the default assumption for determining natural background concentrations. Arsenic was either not detected at concentrations at or greater than laboratory reporting limits or were detected at concentrations below applicable screening levels in all other samples analyzed.

- All other analytes were either not detected at or above laboratory reporting limits or were detected at concentrations less than applicable MTCA screening levels in soil samples collected with the perched groundwater zone during the 2024 RI activities.

5.1.3 Sea-Level Aquifer Zone Soil

The Sea-Level Aquifer is generally observed below 100 feet bgs at the Site. Analytical results from soil samples collected within the Sea-Level Aquifer were compared to the MTCA Method B screening levels for the protection of groundwater in saturated zone. Analytical results from soil samples collected within the Sea-Level Aquifer are discussed below.

- TPH-G was detected in five samples collected from borings within the Property boundary and to the east, west, southwest, and south of the Property (HA-1, HA-2, HA-3, MW-21D, and MW-23D), at concentrations exceeding the Method B screening level for the protection of groundwater in saturated soil of 30 milligrams per kilogram (mg/kg), when benzene is present. TPH-G was either not detected at or above laboratory reporting limits or was detected at concentrations below applicable screening levels in all other samples collected within the Sea-Level Aquifer during the 2024 RI activities.
- One or more constituents of BTEX were detected in seven samples collected from borings within the Property boundary and to the east, west, southwest, and south of the Property (HA-1, HA-2, HA-3, HA-4, MW-21D, MW-22D, and MW-23D) at concentrations exceeding their respective MTCA Method B screening levels for the protection of groundwater in saturated soil. BTEX was either not detected at or above laboratory reporting limits or was detected at concentrations below applicable screening levels in all other samples collected within the Sea-Level Aquifer during the 2024 RI activities.
- One or more non-chlorinated VOCs (primarily petroleum-related) were detected in eight samples collected from borings within the Property boundary and to the east, west, southwest, and south of the Property (HA-1, HA-2, HA-3, HA-4, MW-21D, MW-22D, and MW-23D) at concentrations exceeding their respective MTCA Method B screening levels for the protection of groundwater in saturated soil. Non-chlorinated VOCs were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable screening levels in all other samples collected within the Sea-Level Aquifer during the 2024 RI activities.
- Tetrachloroethene (PCE) was detected in four samples collected from borings within the Property boundary and to the east and southwest of the Property (HA-1, HA-2, HA-3, and MW-21D) at concentrations exceeding the MTCA Method B screening level for the protection of groundwater in saturated soil. PCE was either not detected at or above laboratory reporting limits or was detected at concentrations below applicable screening levels in all other samples collected within the Sea-Level Aquifer during the 2024 RI activities.
- All other analytes were either not detected at or above laboratory reporting limits or were detected at concentrations less than applicable MTCA screening levels in soil samples collected with the Sea-Level Aquifer during the 2024 RI activities.

5.2 GROUNDWATER

The following section describes the analytical results from groundwater samples collected between September 2023 and November 2024. Groundwater field parameters and groundwater analytical results are presented in Table 5 (attached). Refer to Table 1 for monitoring wells sampled during each groundwater monitoring event and Figures 10, 11, and 12, for analytical results for a subset of COCs within the perched groundwater zone and Sea-Level Aquifer.

5.2.1 Perched Groundwater

The following subsection briefly describe the analytical results within the perched groundwater from the groundwater baseline and quarterly groundwater monitoring events.

- TPH-G was detected in three monitoring wells (MW-4S, MW-6S, and MW-8S) and one temporary well (HA-2) at concentrations exceeding the MTCA Method B screening level for the protection of potable groundwater in one or more of the monitoring events the wells were sampled. TPH-G was either not detected at concentrations greater than or equal to laboratory reporting limits or was detected at concentrations less than applicable screening levels in all other samples collected within the perched groundwater.
- TPH-D+O (the sum of TPH-D and TPH-O) was detected in four monitoring wells (MW-2S, MW-4S, MW-6S, and MW-8S) at concentrations exceeding the MTCA Method B screening level for the protection of potable groundwater in one or more of the monitoring events.
- One or more non-chlorinated VOC and PAHs (primarily petroleum related) were detected in three monitoring wells (MW-4S, MW-6S, and MW-8S) at concentrations exceeding their respective MTCA Method B screening level for the protection of potable groundwater. Non-chlorinated VOCs and PAHs were either not detected at concentrations greater than or equal to laboratory reporting limits or were detected at concentrations less than applicable screening levels in all other samples collected within the perched groundwater.
- All other analytes were either not detected at or above laboratory reporting limits or were detected at concentrations less than applicable MTCA screening levels in groundwater samples collected from monitoring wells screened in the perched groundwater during the 2024 RI activities.

5.2.1.1 Natural Attenuation Parameters

The following subsection briefly describes the analytical results for natural attenuation parameters from the perched groundwater from the groundwater baseline and quarterly groundwater monitoring events.

- Total alkalinity (as calcium carbonate [CaCO3]) concentrations ranged between 122 and 207 milligrams per liter (mg/L).
- Chloride concentrations ranged between 20.6 and 35 mg/L.
- Nitrate (as nitrogen [N]) concentrations ranged between 0.202 and 8.41 mg/L.
- Nitrite (as N) concentrations ranged between not being detected at or above laboratory reporting limits and 0.154 mg/L.
- Sulfate concentrations ranged between 8.4 and 21.1 mg/L.
- Sulfide concentrations ranged between not being detected at or above laboratory reporting limits and 0.355 mg/L.
- TOC concentrations ranged between 2.83 and 4.86 mg/L.

5.2.2 Sea-Level Aquifer

The following subsection briefly describes the analytical results within the Sea-Level Aquifer from the groundwater baseline and quarterly groundwater monitoring events.

- TPH-G was detected in six monitoring wells (MW-9D, MW-12D, MW-13D, MW-17D, MW-21D, and MW-23D) at concentrations exceeding the MTCA Method B screening level for the protection of potable groundwater in one or more of the monitoring events the wells were sampled. TPH-G was either not detected at concentrations greater than or equal to laboratory reporting limits or was detected at concentrations less than applicable screening levels in all other samples collected with the Sea-Level Aquifer.
- TPH-D+O was detected in six monitoring wells (MW-9D, MW-12D, MW-13D, MW-17D, MW-21D, and MW-23D) at concentrations exceeding the MTCA Method B screening level for the protection of potable groundwater in one or more of the monitoring events the wells were sampled. TPH was either not detected at concentrations greater than or equal to laboratory reporting limits or was detected at concentrations less than applicable screening levels in all other samples collected with the Sea-Level Aquifer.
- One or more constituents of BTEX were detected in six monitoring wells (MW-9D, MW-12D, MW-13D, MW-17D, MW-21D, and MW-23D) at concentrations exceeding their respective MTCA Method B screening levels for the protection of potable groundwater. BTEX was either not detected at concentrations greater than or equal to laboratory reporting limits or was detected at concentrations less than applicable screening levels in all other samples collected with the Sea-Level Aquifer.
- One or more non-chlorinated VOC and PAHs (primarily petroleum-related) were detected in in six monitoring wells (MW-9D, MW-12D, MW-13D, MW-17D, MW-21D, and MW-23D) at concentrations exceeding their respective MTCA Method B screening levels for the protection of potable groundwater. TPH-G was either not detected at concentrations greater than or equal to laboratory reporting limits or was detected at concentrations less than applicable screening levels in all other samples collected with the Sea-Level Aquifer.
- PCE and/or trichloroethene (TCE) were detected in three monitoring wells (MW-12D, MW-17D, and MW-21D) at concentrations exceeding their respective MTCA Method B screening levels for the protection of potable groundwater in one or more of the monitoring events the wells were sampled. PCE and TCE were either not detected at concentrations greater than or equal to laboratory reporting limits or were detected at concentrations less than applicable screening levels in all other samples collected with the Sea-Level Aquifer.
- All other analytes were either not detected at or above laboratory reporting limits or were detected at concentrations less than applicable MTCA screening levels in groundwater samples collected from monitoring wells screened in the Sea-Level Aquifer during the 2024 RI activities.

5.2.2.1 Natural Attenuation Parameters

The following subsection briefly describes the analytical results for natural attenuation parameters from the Sea-Level Aquifer from the groundwater baseline and quarterly groundwater monitoring events.

- Total alkalinity (as $CaCO_3$) concentrations ranged between 26.2 and 279 mg/L.
- Chloride concentrations ranged between 5.37 and 62.7 mg/L.

- Nitrate (as N) concentrations ranged between not being detected at or above laboratory reporting and 38.9 mg/L.
- Nitrite (as N) was not being detected at or above laboratory reporting limits.
- Sulfate concentrations ranged between not being detected at or above laboratory reporting and 27.6 mg/L.
- Sulfide concentrations ranged between not being detected at or above laboratory reporting limits and 3.4 mg/L.
- TOC concentrations ranged between 0.942 and 18.0 mg/L.

6. Conceptual Site Model

This section presents the conceptual understanding of the Site based on the results of historical research, previous remedial actions performed at the Site, and more recent subsurface investigations. The geology and hydrogeology, chemicals and media of concern, the fate and transport characteristics of hazardous substances released, and the potential exposure pathways are discussed in this section.

A conceptual site model (CSM) presents the links between contaminant sources, release mechanisms, exposure pathways and routes, and receptors to summarize the current understanding of the risk to human health and the environment. The CSM is the basis for developing technically feasible remedial alternatives and selecting a final remedial action and may be refined throughout the cleanup action process as additional information becomes available. The current CSM for the Site is discussed below and depicted on Figure 13.

6.1 CONTAMINANT SOURCE AND RELEASE

The likely source of petroleum released to the Site was an on-Property release of unleaded gasoline from a UST in 2005 (Farallon, 2006a). Potential source(s) of cVOCs detected in soil and groundwater is not known but may be associated with historical dry cleaner operations on nearby properties based on a review of historical property records including the EDR City Directory Image report, EDR Radius Map™ (SoundEarth, 2017), and Island County Real Property Cards. Based on sampling data collected to date, it appears that there may be two distinct cVOC occurrences in the Sea-Level Aquifer, on the Property and to the west of South Harbor Ave (Figure 12). However, the precise origin of cVOC release to the Site is unknown.

6.2 FATE AND TRANSPORT

Gasoline is a mixture of relatively volatile hydrocarbons, including normal and branched chain alkanes, cycloalkanes, alkenes, and aromatics, that vary widely in their physical and chemical properties (Agency for Toxic Substances and Disease Registry [ATSDR], 1995). Each batch of gasoline is likely to have a unique chemical composition as a result of the variable composition of the petroleum starting materials and the specific types of processing methods used in the formulation of different seasonal and performance grades of the product (ATSDR, 1995). Upon release to the environment, gasoline is not transported as a mixture; rather, the various components of the mixture selectively partition to the atmosphere, soil, or water according to their individual physical/chemical properties.

In general, when VOCs and TPH are released into the subsurface, they will migrate downward through the unsaturated zone due to gravity. The volume of mobile contaminants will decrease as it travels through the soil column as it sorbs onto soil particles. If a sufficient quantity is released, it will overcome soil capillary forces and will migrate down to the water table and mound and spread horizontally. Site data collected during all RI activities indicates that the majority of the VOC and TPH-G located on the Site has either been remediated via soil vapor extraction interim action or migrated and dissolved into the water column.

VOCs can also degrade over time through chemical or biological processes. VOCs can volatilize into soil gas where they can migrate through the unsaturated zone as soil vapor. Soil vapor can ultimately be released to the ambient air or overlying buildings. cVOCs may also degrade from “parent” compounds (e.g., PCE) to “daughter” compounds via reductive dechlorination (EPA, 1998b) in soil or groundwater. This is the process where chlorine atoms are replaced by electrons coupled to hydrogen atoms, resulting in sequential dechlorination from PCE to TCE to dichloroethene to vinyl chloride and eventually to ethene. It is currently unknown whether dichlorination is occurring at the Site as dichloroethene, vinyl chloride, and ethene were not detected during the 2024 RI activities.

6.3 POTENTIAL RECEPTORS AND EXPOSURE PATHWAYS

For a contaminant to present a risk to human health and/or the environment, the pathway from the contaminant to the receptor must be complete. A complete exposure pathway consists of four necessary elements: (1) a source and mechanism of chemical release; (2) a transport or retention medium for released chemical(s); (3) a point of potential contact with the impacted medium (referred to as exposure point); and (4) an exposure route (e.g., soil ingestion) at the exposure point. The potential receptors and exposure pathways are presented below.

Several classes of potential human receptors have been identified. Potential human receptors include current and future users at the properties on the Site and potential human drinking water consumers of downgradient wells. Potential transport pathways are as follows.

Soil

- Direct contact of soil exposure pathway (incomplete).
- Soil leaching-to-groundwater transport pathway (complete).

Groundwater

- Groundwater-ingestion exposure pathway (currently incomplete, could be complete in the future).
- Groundwater-to-surface water transport pathway (incomplete).

Vapor

- Inhalation of indoor air exposure pathway (potentially complete).
  - Additional investigation of data gaps associated with the cVOC CSM and additional Tier 1 data collection, including soil gas and/or sub-slab vapor sampling, or possibly a Tier 2 Indoor Air Evaluation at the existing building on the Property and possibly other buildings depending on results of the cVOC CSM findings, should be completed

6.3.1 Potential Human Health Exposure Scenarios

The primary purpose of the human health CSM is to identify potential receptor groups and to describe pathways by which those populations may be exposed to Site-related chemicals in the environment. =

The Property and nearby properties are currently occupied with commercial businesses and are accessible to employees and visitors. Four drinking water wells are located approximately 1,900 to 2,900 feet south and south-southeast of the Property; these drinking water wells are not impacted by the Site but have the potential to be impacted in the future. The petroleum plume extent is known and stable and does not impact any downgradient surface water bodies. The cVOC plume trends are unknown, but based on currently known extent and the distance of over 1.5 mile to the nearest surface water body, it is unlikely to impact any downgradient surface water bodies. The future Property uses are expected to remain the same. The direct contact of soil and indoor and outdoor air exposure pathways to construction or occupational workers or residents is currently incomplete, but as discussed in *Section 7.5*, additional data is needed to conclude that with certainty.

The CSM presented in this report is developed to ensure that all potentially significant pathways and receptors under current and reasonable future Site scenarios are evaluated. Terrestrial ecological receptors were considered but were determined not to be relevant based on the simplified Terrestrial Ecological Evaluation (TEE; see *Section 6.4*). Recreational fishers and aquatic biota receptors were also considered via exposure to surface water or sediment impacted by possible Sea-Level Aquifer groundwater discharging to downgradient surface water bodies, but were determined not to be relevant given the known and reasonable future maximum extent of the Sea-Level Aquifer groundwater plume. Based on the current Property use, the anticipated receptors may include construction workers, occupational workers, and residents. Future land use may change, but would likely involve commercial activities. The following pathways are therefore potentially complete for human exposure:

Construction Workers - There are currently no construction workers on the Property. However, construction activities could be performed in the future part of any remediation activities, redevelopment, or utility maintenance. Construction workers could potentially be exposed to chemicals in environmental media on the Site by the following pathways:

- Direct skin contact with, incidental ingestion, or inhalation of chemically impacted groundwater at the Site.

Occupational Workers or Residents - The Property and the surrounding properties are currently occupied by commercial businesses and four drinking water wells are located to the south and southeast of the Property. The Property can still be accessed by trespassers who could be exposed to chemicals migrating to the water or from the subsurface soils by the following potential pathways:

- Direct skin contact with, ingestion, or inhalation of chemically impacted groundwater at the Site extracted via drinking water wells.

6.4 TERRESTRIAL ECOLOGICAL EVALUATION

For the purpose of this RIFS, the initial step of the TEE process to determine whether a site qualifies for a TEE exclusion was completed. If a site meets at least one of the four exclusionary criteria described in WAC 173-340-7491, then no further evaluation of ecological risk is necessary.

The four exclusionary criteria are:

1. *Exclusion 1: Contamination below the point of compliance*. This means all soil contamination shall be below the standard point of compliance of 15 feet bgs.
2. *Exclusion 2: Incomplete exposure pathway*. The primary pathway to soil for ecological receptors would be direct contact and ingestion. The pathway could be considered incomplete if there were barriers for plants or animals to contact soils (e.g., pavement, buildings, or protective cap).
3. *Exclusion 3: Type of contamination and proximity to ecological receptors*. For sites contaminated with hazardous substances other than those specified in WAC 173-340-7491, there must be less than 1.5 acres of contiguous undeveloped land on the site or within 500 feet of any area located on the site.

4. *Exclusion 4: Concentrations below background levels*. For certain naturally occurring contaminants, or for contaminated sites found in urban areas, there may be contamination that is not directly attributable to the site.

Evaluation of Exclusions:

1. Exclusion 1 does not apply to the Site. Benzo(a)pyrene was detected in one sample collected from HA-2 at a depth of approximately 7 to 8 feet bgs at a concentration greater than applicable MTCA screening levels.
2. Exclusion 2 does not apply to the Site. While most of the Site is paved or covered with buildings, there are portions of the Property that are currently unpaved and contain impacted soil.
3. Exclusion 3 does not apply to the Site. There is undeveloped land within 500 feet southeast of the Site and the undeveloped land is greater than 1.5 acres.
4. Exclusion 4 does not apply to the Site. Some of the contaminants found in soils at the Site are not naturally occurring and are unlikely to be present from other sources.

The Site evaluated under this RIFS does not qualify for the exclusions under WAC 173-340-7491. Once it has been established that none of the exclusionary criteria apply, either a simplified or Site-specific TEE is required. Per WAC 173-340-7492, a simplified TEE is appropriate because Site is not a natural area or used by vulnerable species and does not contain extensive habitat.

A simplified TEE was conducted to assess the potential risk of exposure to wildlife from Site contamination. The simplified TEE may be ended if:

1. The total area of soil contamination at the Site is not more than 350 square feet. This does not apply to the Site as the estimated extent of soil contamination is greater than 350 square feet.
2. Land use makes substantial wildlife exposure unlikely, using Table 749-1 to make the evaluation. The results of Table 749-1, provided in Appendix D, indicate that wildlife exposure may be possible.
3. There are no potential exposure pathways from soil contamination to wildlife. This does not apply to the Site as physical barriers are not in place to prevent exposure to wildlife.
4. No hazardous substance listed in Table 749-2 was detected in soil at a depth within the point of compliance and at concentrations higher than the values provided in Table 749-2 during the 2024 RI activities. This does apply to the Site as the benzo(a)pyrene concentration (0.26 mg/kg) detected in HA-2 at depths less than the point of compliance (15 feet bgs) is less than the value in Table 749-2 of 300 mg/kg. Historical TPH-G and TPH-D+O data were detected at concentrations exceeding the values in Table 749-2 at depths less than the point of compliance; however, field screening and soil samples collected during the 2024 RI activities indicate shallow contamination has been remediated by the SVE system that operated between 2006 and 2009.

Since the simplified TEE was ended, it was determined that the Site does not pose a substantial threat of significant adverse effects to terrestrial ecological receptors.

7. Identification of COCs and Proposed Cleanup Standards

The following sections describe how COCs were identified, establishment of proposed cleanup standards, the distribution of COCs in soil and groundwater relative to proposed cleanup standards, and identification of data gaps.

7.1 COC IDENTIFICATION PROCESS

7.1.1 Identification of Chemicals of Potential Concern

Identification of COPCs involved comparing the concentrations of the constituents to conservative, risk-based screening levels. Screening levels for each medium and constituent reflect concentrations that are protective for the possible transport and exposure pathways identified in the CSM (*Section 6*). Screening levels are shown in Tables 3 and 5.

Those constituents whose concentration in a sample from the supplemental RI data set exceeded their corresponding screening levels were identified as COPCs.

7.1.1.1 Soil

Soil screening levels were based on the following.

- Direct contact exposure and calculated using the lower of the non-cancer or cancer levels calculated using MTCA Equations 740-1 and 740-2, respectively, using MTCA default assumptions for unrestricted exposure (WAC 173-340-740[3][b][iii][B]).
- Vadose or saturated zone soil leaching to potable groundwater and calculated using the fixed parameter three-phase partitioning model in accordance with WAC 173-340-747(4).
- In cases where the practical quantitation limit (PQL) is higher than the direct contact, leaching, or ecological levels, the PQL is used as the screening level in accordance with WAC 173-340-740(5)(c).

Table 3 shows the comparisons of the concentrations in soil for each constituent to the lowest applicable screening level and identifies those constituents where there is an exceedance (i.e., those constituents that are COPCs). The following constituents were identified as COPCs in soil:

- 1,2,4-trimethylbenzene
- 1,3,5-trimethylbenzene
- 2-phenylbutane (sec-butylbenzene)
- hexane
- isopropylbenzene (cumene)
- n-propylbenzene
- naphthalene, total
- 1-methylnaphthalene
- 2-methylnaphthalene

- benzo(a)pyrene
- cPAH-TEQ
- TPH-G
- BTEX
- PCE
- bromodichloromethane
- dibromochloromethane

7.1.1.2 Groundwater

Groundwater screening levels were based on the following.

- Protection of drinking water calculated by identifying maximum contaminant levels and calculating screening levels per MTCA Equations 720-1 and 720-2 (WAC 173-340-720[4][b][iii][A] and -720[4][b][iii][B]) using the toxicity values in Ecology's online CULs and risk calculation database (Ecology, 2024). Screening levels that were based on maximum contaminant levels or other applicable state or federal laws were then adjusted as needed so that the total excess cancer risk does not exceed one in one hundred thousand and the hazard index does not exceed one in accordance with WAC 173-340-720(7)(b).
- Volatilization of volatile constituents in groundwater to indoor air calculated using screening levels protective of commercial workers (Ecology, 2024).

Table 5 shows the comparisons of the concentration in groundwater for each constituent to the lowest applicable screening level and identifies those constituents where there is an exceedance (i.e., those constituents that are COPCs). The following constituents were identified as COPCs in groundwater:

- 1,2,4-trichlorobenzene
- 1,3,5-trimethylbenzene
- 1-methylnaphthalene
- 2-methylnaphthalene
- naphthalene
- hexane
- BTEX
- TPH-G
- TPH (TPH-D+TPH-O)
- arsenic
- manganese
- PCE
- TCE

7.1.2 Identification of COCs

COCs comprise the subset of COPCs that will be utilized for establishing cleanup requirements for the Site and evaluating cleanup alternatives in the FS. Those COPCs that contribute little or nothing to the overall risk to human health and the environment are screened out from consideration and the remaining constituents are identified as COCs for purposes of defining Site cleanup requirements.

Factors that were considered when identifying COCs include a constituent's toxicity, mobility in the environment, natural background concentration, and prevalence at the Site (e.g., frequency of detection).

7.1.2.1 Soil

Of the soil COPCs identified in Section 7.1.1.1, the following constituents are not retained as COCs for soil:

- 2-phenylbutane (sec-butylbenzene)
- benzo(a)pyrene
- cPAH-TEQ
- bromodichloromethane
- dibromochloromethane
- isopropylbenzene (cumene)
- n-propylbenzene

2-phenylbutane. 2-Phenylbutane was identified as a COPC because its maximum concentration exceeded the soil screening level protective of groundwater as a drinking water source. However, it is not retained as a COC in soil because it was not detected in groundwater at levels exceeding drinking water criteria, indicating that the soil-to-groundwater pathway is not complete for this constituent.

Benzo(a)pyrene and cPAH-TEQ. Benzo(a)pyrene and cPAH-TEQ were identified as COPCs because their maximum concentration exceeded the soil screening levels for the protection of direct contact. However, they are not retained as COCs in soil because they were detected at concentrations exceeding the MTCA Method B screening level for protection of direct contact in less than 10 percent of the samples analyzed. and the maximum detected concentrations of each chemical were less than two times the Method B CULs for direct contact (WAC 173-340-720).

Bromodichloromethane. Bromodichloromethane was identified as a COPC because its maximum concentration exceeded the soil screening level protective of groundwater as a drinking water source. However, it is not retained as a COC in soil because it was not detected in groundwater, indicating that the soil-to-groundwater pathway is not complete for this constituent.

Isopropylbenzene. Isopropylbenzene was identified as a COPC because its maximum concentration exceeded the soil screening level protective of groundwater as a drinking water source. However, it is not retained as a COC in soil because it was not detected in groundwater at levels exceeding drinking water criteria, indicating that the soil-to-groundwater pathway is not complete for this constituent.

n-propylbenzene. n-propylbenzene was identified as a COPC because its maximum concentration exceeded the soil screening level protective of groundwater as a drinking water source. However, it is not retained as a COC in soil because it was not detected in groundwater at levels exceeding drinking water criteria, indicating that the soil-to-groundwater pathway is not complete for this constituent.

Based on the evaluations presented above, the COCs for soil are:

- 1,2,4-trimethylbenzene
- 1,3,5-trimethylbenzene
- PCE
- 1-methylnaphthalene
- 2-methylnaphthalene
- naphthalene, total
- TPH-G
- benzene
- toluene
- ethylbenzene
- xylene (total)

7.1.2.2 Groundwater

Of the groundwater COPCs identified in *Section 7.1.2*, the following constituents are not retained as COCs for groundwater:

- hexane
- arsenic
- manganese

Hexane. Hexane was identified as a COPC because its maximum concentration exceeded the groundwater screening level protective of vapor intrusion (VI). However, hexane is a petroleum constituent and the vertical separation distance for petroleum products is 15 feet (Ecology, 2022) and groundwater is greater than 15 feet below the building slab. Therefore, the VI screening level does not apply to this COPC.

Arsenic. This constituent is not retained as a COC in groundwater because there is no known source of arsenic at the Property and the exceedances were generally observed at monitoring wells with elevated concentrations of petroleum. This would indicate that arsenic exceedances are caused by reducing conditions created by natural biodegradation of petroleum hydrocarbons in contact with groundwater. Furthermore, arsenic was detected at concentrations less than applicable MTCA screening levels in soil, indicating there is no release at the Site.

Manganese. This constituent is not retained as a COC in groundwater because there is no known source of manganese at the Property and the exceedances were generally observed at monitoring wells with elevated concentrations of petroleum. This would indicate that manganese exceedances are caused by reducing conditions created by natural biodegradation of petroleum hydrocarbons in contact with groundwater.

Based on the evaluations presented above, the COCs for groundwater are:

- 1,2,4-trichlorobenzene
- 1,3,5-trimethylbenzene
- 1-methylnaphthalene
- 2-methylnaphthalene
- naphthalene
- PCE
- TCE
- benzene
- toluene
- ethylbenzene
- xylene (total)
- TPH-G
- TPH-D+O

7.2 PROPOSED CLEANUP STANDARDS

Proposed cleanup standards for COCs by media are shown on Table 7, below. For soil, MTCA Method B CULs for the protection of direct contact, the protection of groundwater from leaching of saturated-zone soils, and the protection of groundwater from leaching of vadose-zone soils are used. For groundwater COCs, MTCA Method B CULs for the protection of drinking water and protection of commercial worker indoor air from volatilization from groundwater are used[2]. Proposed points of compliance for this Site are the standard points of compliance for soil and groundwater in accordance with WAC 173-340-740(6) and WAC 173-340-720(8)(b), respectively.

Table 7, below, summarizes the proposed soil and groundwater CULs, respectively, selected for the Site COCs.

[2] A Site-specific MTCA Method B TPH screening level for the protection of groundwater of 58 mg/kg was calculated by the evaluation of EPH and VPH results for samples HA-1-S6, HA-2-S7, and MW-21D-S7 using the MTCA TPH 12.0 tool. However, the MTCA Method A TPH soil screening levels were used because the Site-specific screening level was lower than the corresponding MTCA Method A screening level (Ecology, 2023). The Site-specific MTCA Method B TPH calculation worksheets are provided in Appendix E.

Table 7. Proposed Site CULs		
Chemicals of Concern	**Medium**	
	Soil[a] (Saturated-zone/Vadose-zone) in mg/kg	**Groundwater[b] in µg/L**
1,2,4-trichlorobenzene	0.072/1.3	80
1,3,5-trimethylbenzene	0.071/1.3	80
1-methylnaphthalene	0.0042/0.082	0.858
2-methylnaphthalene	0.088/1.7	32
naphthalene	0.24/4.5	160
PCE	0.0028/0.05	5
TCE	N/A	4
benzene	0.0017/0.027	5
toluene	0.27/4.5	640
ethylbenzene	0.34/5.9	700
xylene (total)	0.83/14	1600/320
TPH-G	30	800
TPH (TPH-D+TPH-O)	2000	500

Notes:

a. *The lowest value between MTCA Method B soil CUL for the protection of direct contact cancer and noncancer, protection of groundwater from leaching of saturated-zone soils, and protection of groundwater from leaching of vadose-zone soils. The lowest values applicable for saturated-zone and vadose-zone soils are listed.*

b. *The lowest value between MTCA Method B groundwater CUL for the protection of drinking water and protection of commercial worker indoor air from volatilization from groundwater cancer and noncancer.*

If the lowest applicable MTCA screening levels is less than PQLs, the PQL will be used as the CUL, in accordance with WAC 173-340-7492, and will be established at the time the cleanup action plan is finalized.

µg/L = micrograms per liter

N/A = Not Applicable as the constituent is not a COC in that medium.

7.3 SOIL IMPACTS

7.3.1 Vadose Zone

During the 2024 RI activities, COCs within the vadose zone were either not detected at or above laboratory reporting limits or were detected at concentrations less than their respective MTCA Method B CULs (Figure 7).

Historical borings around the former USTs confirmed previous shallow petroleum hydrocarbon impacts to soil in the immediate vicinity of the former USTs from approximately 15 to 30 feet bgs. A confirmed release from a former UST is the primary source for petroleum impacts to soil and groundwater at the Site. Field screening conducted during previous investigations indicated much of the vadose zone soil contamination was remediated by the SVE system that operated between 2006 and 2009.

7.3.2 Perched Groundwater Zone

Analytical results from samples collected from soil borings to date indicate that petroleum-related impacts are present in soil within the perched groundwater zone, between approximately 50 and 65 feet bgs (Figures 3 and 4). During the 2024 RI activities, the perched groundwater was only encountered in borings HA-1 through HA-4 and MW-22D. Samples collected from these borings within the perched groundwater zone were compared to the MTCA Method B CULs for the protection of groundwater from leaching of saturated-zone soil. If the perched groundwater was not encountered, soil samples collected from within the perched groundwater zone were compared to the MTCA Method B CULs for the protection of groundwater from leaching of vadose-zone soil. TPH, SVOCs, and/or non-chlorinated VOCs were generally observed in the areas directly below the former USTs (AS-3, B08, HA-2, MW-1S, MW-2S, and MW-17D), to the west of the Property (HA-4, MW-6S, MW-7S, and MW-9D), and to the southwest (MW-12D). TPH, SVOCs, and/or non-chlorinated VOCs were either not detected at or above laboratory reporting limits or were detected at concentrations less than their respective MTCA Method B CULs for the protection of groundwater in samples collected from borings to the north (MW-8S and HA-3), south (MW-13D, MW-14D, and MW-23D), east of the former USTs (HA-1), and to the west of MW-9D (MW-11D and MW-10D; Figure 8).

PCE and TCE were either not detected at or above laboratory reporting limits or detected at concentrations less than their respective MTCA Method B CULs for the protection of groundwater from leaching of saturated-zone or vadose-zone soil in samples collected within the perched groundwater zone.

7.3.3 Sea-Level Aquifer

Analytical results from all soil borings to date indicate that impacts are present in soil within the Sea-Level Aquifer below approximately 65 feet bgs (Figures 3 and 4). As shown in Figure 9, TPH, SVOCs, and/or non-chlorinated VOCs were generally observed in the areas directly below the former USTs (HA-1, HA-2, and MW-17D), to the west and south west of the Property (HA-3, HA-4, MW-8S, MW-11D, MW-12D, and MW-21D), and to the south of the Property (MW-13D, MW-22D, and MW-23D). TPH, SVOCs, and/or non-chlorinated VOCs were either not detected at or above laboratory reporting limits or were detected at concentrations less than their respective MTCA Method B CULs for the protection of groundwater in samples collected from borings to southeast of the Property (MW-14D), south of MW-22D (MW-15D and MW-20D) and MW-12D (MW-19D), and to the west in MW-10D.

PCE was also detected at or above the MTCA Method B CUL for the protection of groundwater in samples collected from HA-1 (duplicate), HA-2, HA-3, and MW-21D.

7.4 GROUNDWATER IMPACTS

Data from the baseline sampling event and the quarterly sampling events were used to observe current trends in the COC concentrations in both the perched groundwater and Sea-Level Aquifer beneath the Site.

7.4.1 Perched Groundwater Impacts

Data from the baseline sampling event and the quarterly sampling events were used to observe current COC concentrations at the Site. COC concentrations indicate that petroleum hydrocarbon impacts to groundwater are present in the perched groundwater. Groundwater COCs were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable MTCA CULs in samples collected to the north and east of the former USTs (MW-1S, MW-3S, and HA-1).

COC concentrations directly beneath the former USTs (HA-2, MW-2S, and MW-4S) were generally detected at concentrations greater than applicable screening levels from samples collected during the baseline sampling event in September 2023 and from grab groundwater samples collected during the remedial investigation drilling activities in January 2024. Perched groundwater with COC concentrations above screening levels extends laterally from the immediate vicinity of the former USTs and flows to the west (Figure 5). MW-5 is currently and historically dry, confirming the termination of the perched groundwater zone west of MW-6 and MW-7. Based on the steep perched groundwater zone gradient and the termination of the perched groundwater zone (Figure 5), groundwater west of MW-6 and MW-7 appears to flow vertically into the Sea-Level Aquifer near MW-9.

COC concentrations in samples collected from wells located to the west of the former USTs were detected above screening levels at MW-8S for all sampling events when samples were collected, and at MW-6 for two of the quarterly sampling events (Figure 10).

Groundwater COCs were either not detected at or above laboratory reporting limits or were detected at concentrations below applicable MTCA CULs in samples collected upgradient of the former USTs (MW-1S, MW-3S, and HA-1) to the north and east (Figure 10).

7.4.2 Sea-Level Aquifer Groundwater Impacts

Sea-Level Aquifer groundwater generally flows to the southeast (Figure 6). Petroleum impacts to the Sea-Level Aquifer are consistent with the contoured flow direction to the southeast and south, observed in concentrations above MTCA screening levels in wells MW-6 through MW-9, MW-12, MW-13, MW17, MW-21D, and MW-23D (Figure 11). However, as discussed below, more than one source of petroleum and cVOCs may exist.

MW-12D and MW-21D are located west-southwest of MW-9D and upgradient of the known UST petroleum source area, and concentrations of TPH-G exceeding the MTCA Method B screening levels were detected in soil at 45 feet bgs in MW-12D. Based on the groundwater flow direction, shallow soil exceedances in MW-12D, and petroleum hydrocarbons not being detected at concentrations greater than applicable screening levels in wells between MW-9D and MW-12D (MW-10D and MW-11D), a secondary source of petroleum hydrocarbons may exist west of MW-12D. However, comparison of TPH chromatograms (fingerprints), included in the lab reports provided in Appendix C, between wells MW-21D and MW-9D were not significantly different.

It does appear that there are multiple sources of cVOCs to Site groundwater. As shown in Figure 12, cVOCs were detected at concentrations greater than applicable screening wells in two distinct areas, including MW-12D and MW-21D to the southwest and in MW-17D within the Property. The western cVOC plume primarily contains PCE, versus the MW-17D plume which contains both PCE and several degradation products (TCE and DCE). This could indicate either different rates of degradation or source release.

7.4.3 Natural Attenuation Evaluation

Natural attenuation includes a variety of physical, chemical, or biological processes that act without human intervention to reduce the mass, toxicity, mobility, volume, or concentration of contaminants (EPA, 1998a).

The UST source of petroleum impacts to soil and groundwater was removed in 2011 and no free product (i.e., non-aqueous phase liquid) was observed during the 2023 and 2024 groundwater sampling, indicating that the source of petroleum impacts (i.e., residual contamination in soil) is contained. However, the source of cVOC contamination is not known, so it is unknown whether the source is removed or contained. Furthermore, petroleum concentrations in groundwater detected during the baseline and quarterly sampling were generally similar to the concentrations detected during previous investigations conducted by SoundEarth and Farallon, indicating that the petroleum plume in groundwater is relatively stable.

During the quarterly groundwater sampling events, one or more background wells (MW-3S, MW-10D, and MW-11D) were sampled, except for the second quarter. Based on field parameters and natural attenuation parameters, biodegradation appears to be occurring. Dissolved oxygen, nitrate, and sulfate concentrations in background wells were generally greater than the concentrations observed in wells located within the plume, indicating that biodegradation is likely occurring.

MNA is most effective when the contaminant source has been removed and only small amounts of contaminants remain in the soil and/or groundwater. Natural attenuation is considered an appropriate remedy if requirements set out in WAC 173-340-370(7) are met. The explanations as to how these requirements are met are as follows:

1. *Source control (including removal and/or treatment of hazardous substances) has been conducted to the maximum extent practicable.* Several rounds of petroleum source removal activities have been conducted at the Site. Additional source removal is planned as described in *Sections 8.4.1* through *8.4.4*.
2. *Leaving contaminants on-Site during the restoration time frame does not pose an unacceptable threat to human health or the environment.* During the restoration time frame, potential receptors will be protected by institutional controls and compliance monitoring to prevent the use of groundwater as drinking water. Existing drinking water production wells have not been impacted by the Site petroleum release and will not likely be impacted in the future.
3. *There is evidence that natural biodegradation or chemical degradation is occurring and will continue to occur at a reasonable rate at the site.* This criterion is determined by the following factors:
    a. *The status of the groundwater plume; if the plume is stable or shrinking, the restoration time frame will be shortened, and the plume will not continue to migrate and potentially impact other media or receptors.* The residual area of petroleum contamination is likely stable, because the petroleum was released over 17 years ago. Additionally, the likelihood of petroleum plume expansion is limited by the absence of free product observed during the 2024 RI Activities. The source of cVOCs on the Property is unknown. There was no evidence of groundwater plume expansion during the four quarters of groundwater monitoring completed during the 2024 RI Activities.
    b. *Destructive mechanisms of natural attenuation (i.e., chemical or biological degradation) are occurring and are substantial contributors to contaminant reductions observed at the Site.* According to Ecology's Guidance on Remediation of Petroleum-Contaminated Ground Water by

Natural Attenuation (Ecology, 2005), geochemical indicators and physical observations of a reduced contaminant plume can be used to determine if natural attenuation will be effective. As discussed earlier in this section, dissolved oxygen, nitrate, and sulfate concentrations in background wells were generally greater than the concentrations observed in wells located within the plume. Dissolved oxygen measured in MW-17D was measured at concentrations less than 1 mg/L, indicating the area around MW-17D is anaerobic which would favor the attenuation of PCE and TCE.

4. *Appropriate monitoring requirements are conducted to ensure that the natural attenuation process is taking place, and that human health and the environment are protected.* A monitoring plan will be prepared with sampling procedures, locations, frequency, and analyses (see descriptions in *Sections 8.4.1* through *8.4.4*).

7.5 DATA GAPS

Data gaps were identified during CSM development. These data gaps are discussed below, and further investigation of these data gaps would help in the complete understanding of the Site and nature and extent of contamination. A potential data gaps investigation and estimated costs are included in Appendix F.

Presence/Absence and Extent of Petroleum Impacts in the Upper 15 feet. Data collected during the 2024 RI activities (primarily field screening results from HA-2) did not indicate residual petroleum contamination in the upper 15 feet in the source area. Additionally, the vadose zone was treated via SVE for 2006 and 2009, and the results from the 2001 UST removal indicated that soil impacts in the upper 15 feet had been removed. However, insufficient data is available today to conclude that with certainty. Additional drilling and soil sampling within the petroleum source area on the Property is recommended to confirm the presence/absence and extent of residual petroleum impacts at the direct contact point of compliance.

Source and Extent of cVOCs in Soil and Groundwater. cVOCs (PCE and TCE) were detected in soil and groundwater samples collected during the 2024 RI activities at concentrations greater than applicable screening levels. cVOCs were not analyzed in soil samples collected prior to the 2024 RI activities and the extent of cVOCs in groundwater was not identified during the 2024 RI activities; thus, the source and full extent of cVOC impacts at the Site are currently unknown. Furthermore, based on analytical results and because the source of cVOCs is unknown, there may be more than one source of cVOCs.

Extent of Petroleum Impacts in the Sea-Level Aquifer. Petroleum-contaminated soil and/or groundwater was identified in the well installed to the furthest west of the Site (MW-21D) and borings advanced to the north and east of the Site (HA-3 and HA-1, respectively). Previous studies had identified potential off-Site contamination (SoundEarth, 2017), and the source and extent of petroleum-impacts on the western side of the Site is currently unknown. Furthermore, the full extent of petroleum-impacts in the Sea-Level Aquifer to the north and west of the former UST source area is currently unknown. It is recommended that additional monitoring wells be installed to the west, north, and east of the Site to close this data gap.

Potential for VI. The risk to human health from VI associated with known Site petroleum releases is low. The petroleum is weathered (loss of more volatile constituents) and groundwater is greater than 15 feet below the Whidbey Marine building slab. However, cVOCs were also detected in soil and groundwater above applicable VI screening levels at depths of approximately 50 to 60 feet bgs and 100 feet bgs in soil, and approximately 105 feet bgs in groundwater. Due to the depth of cVOC exceedances, the risk of VI is likely low; however, soil gas and indoor air samples were not collected during the 2024 RI activities so the VI pathway cannot be eliminated. Additionally, as stated above, the source of cVOCs is currently unknown. Therefore, the shallowest extent and highest concentrations of cVOCs beneath the slab and their contributions to potential VI is also unknown. It is recommended that additional investigation be completed to close this data gap, including investigation of data gaps associated with the cVOC CSM and additional on-Property Tier 1 data collection, including soil gas and/or sub-slab vapor sampling, or possibly a Tier 2 Indoor Air Evaluation at the existing building on the Property. Additional soil gas/sub-slab vapor, and/or indoor air sampling may be expanded to other buildings, depending on results of the cVOC CSM findings.

7.6 APPLIABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

This section identifies potential applicable or relevant and appropriate requirements (ARARs) for assessing and implementing remedial alternatives at the Site. The potential ARARs focus on federal, state, or local statutes, regulations, criteria, and guidelines. The types of potential ARARs evaluated for the Site include contaminant-, location-, and action-specific, as defined in the following paragraphs. Each type of potential ARAR is evaluated in Table 8 (attached), and applicable ARARs are listed below.

In general, only the substantive requirements of ARARs are applied to MTCA cleanup sites being conducted under a legally binding agreement with Ecology (WAC 173-340-710[9][b]). Thus, cleanup actions under a formal agreement with Ecology are generally exempt from the procedural requirements specified in certain state and federal laws. This exemption also applies to permits or approvals required by local governments.

Contaminant-specific ARARs are usually health- or risk-based numerical values or methodologies that, when applied to site-specific conditions, result in the establishment of numerical contaminant values that regulatory agencies generally recognize as protective of human health and the environment.

Applicable contaminant-specific ARARs include:

- National Primary Drinking Water Regulations establish maximum contaminant levels for organic and inorganic chemicals in drinking water.
- Washington MTCA (Revised Code of Washington [RCW] 70A.305; Chapter 173-340 WAC) regulating soil and groundwater CULs.

Action-specific ARARs are relevant to specific cleanup action methods and technologies, and to actions conducted to support cleanup. Action-specific ARARs dictate how certain activities, such as treatment, disposal practices, and media monitoring programs, must be conducted. Typically, these ARARs are not fully defined until a preferred cleanup action has been selected and refined. However, considering the range of potential action-specific ARARs early in the process can help focus the selection of a preferred remedial alternative.

Applicable action-specific ARARs include the following.

- U.S. Clean Air Act (42 United States Code [USC] § 7401 et seq. and 40 Code of Federal Regulations [CFR] Part 50),Washington Clean Air Act and Implementing Regulations (RCW 70A.15; Chapter 173-400 WAC), Regional Emission Standards for Toxic Air Pollutants (Puget Sound Clean Air Agency [PSCAA] Regulations I and III), and Air Pollution Control Authority (Island County Coud [ICC] Chapter 8.20) to protect ambient air quality by limiting air emissions and taking reasonable precautions to prevent fugitive dust from becoming airborne, which are applicable to remedial alternatives involving construction.
- U.S. Resource Conservation and Recovery Act (42 USC § 6901 et seq.), Subtitle D—Managing Municipal and Solid Waste (40 CFR Parts 257 and 258), and Washington Solid Waste Handling Standards (RCW 70A.205; Chapter 173-350 WAC) to establish guidelines and criteria for management of non-hazardous solid waste, which are applicable to remedial alternatives involving off-Site disposal of contaminated soil designated as non-hazardous waste. Washington Solid Waste Handling Standards (RCW 70.95 and WAC 173-351 and 173-304), establishes minimum standards for handling and disposing of solid waste, including contaminated soils, construction debris, and garbage generated during site remediation.
- U.S. Occupational Safety and Health Act (29 CFR Parts 1904, 1910, and 1926) and Washington Industrial Safety and Health Act (RCW 49.17; Title 296 WAC) to establish site worker and visitor health and safety requirements during implementation of the cleanup action.
- Accreditation of Environmental Laboratories (RCW 43.21A.230 and WAC 173-50) required persons or organizations submitting analytical data under the purview of Ecology, Department of Health, and other entities, to use environmental laboratories which are accredited.
- U.S. Federal Water Pollution Control Act--Water Quality Certification (Clean Water Act; 33 USC § 1341, Section 401) and Implementing Regulations to obtain certification from the state that discharges will comply with applicable water quality standards.
- Washington State Environmental Policy Act (SEPA - RCW 43.21C; Chapter 197-11 WAC) to identify and analyze environmental impacts associated with the selected cleanup action.
- Noise Control Act of 1974 (RCW 70.107, WAC 173-60, WCC 9.40) and Island County Noise Level Reduction Ordinance (ICC Chapter 14.01B) establishes maximum noise levels. Construction activities will be limited to normal working hours, to the extent possible, to minimize noise impacts.

Location-specific ARARs are restrictions placed on the concentration of hazardous substances or the conduct of activities solely because they are in a specific location. Some examples of special locations are floodplains, wetlands, historic sites, and sensitive ecosystems or habitats.

There are no applicable location-specific ARARs.

8. Remedial Alternatives

8.1 REMEDIAL ACTION OBJECTIVES

Remedial Action Objectives (RAOs) established for the Site are intended to comply with applicable environmental regulations and protect human health and the environment. The Site-specific RAOs include the following:

- Protection of groundwater from contaminated soil; and
- Protection of groundwater for drinking water use.

Per Ecology direction, attaining unrestricted Site use is not a goal of the cleanup. Additionally, per *Section 7.5*, the presence/absence of residual soil impacts at the direct contact point of compliance and the potential for VI are data gaps. As such, protection from direct contact of soil and protection of indoor air quality for inhalation are not listed as RAOs. However, it is imperative that the data gaps listed in *Section 7.5* are investigated in advance of cleanup implementation. Assumptions were made to address the data gaps to complete the FS. If results from the data gaps investigation are inconsistent with the assumptions made for the FS, then a different preferred remedy may be selected and/or the inclusion of additional technologies may be warranted.

8.2 TREATMENT VOLUME ESTIMATES

The total volume of soil and groundwater requiring treatment in the perched groundwater zone is estimated to be 41,250 cubic feet (CF). This is based on the reasonable maximum thickness of the perched groundwater zone (5 feet) and area extent of perched groundwater zone impacts. Soil impacts at this depth range in areas either 1) without the presence of groundwater or 2) with empirically demonstrated non-impacted groundwater were excluded from this volume estimate because active treatment is not warranted to achieve the RAOs.

The total volume of soil and groundwater requiring treatment in the Sea-Level Aquifer is estimated to be 910,500 CF. This is based on the reasonable maximum thickness of soil contamination in the sea level aquifer (100 to 115 feet bgs) and area extent of sea level aquifer groundwater impacts. Soil impacts at this depth range with empirically demonstrated non-impacted groundwater were excluded from this volume estimate because active treatment is not warranted to achieve the RAOs.

8.3 REMEDIATION TECHNOLOGY SCREENING

Remedial action technologies considered in the evaluation are applicable to impacted soil cleanup, appropriate for the media at the Site, and capable of achieving the RAOs. Reliability, relative cost, and feasibility given the contaminant characteristics and physical conditions at the Property were assessed.

Implementability of a technology—defined as the relative ease of installation and the time required to achieve a given level of performance—is assessed according to Property conditions. Implementability considers:

1. Constructability (ability to build, construct, or implement the technology under actual Property conditions);

2. Time required to achieve the required level of performance as defined by the CULs and point of compliance (POCs);
3. Permitting ability;
4. Availability of the technology; and
5. Other technology-specific factors.

To assess reliability of a prospective technology, the EPA recommends identifying its stage of development, its performance record, and any inherent construction, operation, and maintenance problems. Technologies that are not fully demonstrated, perform poorly, or are unreliable should be eliminated (EPA, 1985).

Relative costs of technologies and process options are used to distinguish between similar technologies with similar expected effectiveness. The alternatives retained for a more detailed evaluation, therefore, are likely the most cost-effective and appropriate for the particular Property conditions.

Table 9 (attached) summarizes the screening assessment process and indicates which technologies were retained for further evaluation as remedial alternatives, and which were eliminated from consideration based on implementability, effectiveness, reliability, or cost. The following technologies were retained for potential implementation in one or more remedial alternatives:

- MNA;
- Compliance monitoring;
- Institutional controls
- *In situ* enhanced bioremediation (sorption);
- *In situ* chemical treatment; and
- Thermal treatment.

Each of these remediation technologies are commonly applied at sites with similar conditions and chemical occurrences.

Both AS/SVE and dual phase extraction (DPE) had previously been considered as remedial alternatives for the Site (SoundEarth, 2017). AS/SVE was screened out during the technology evaluation due to its relatively low effectiveness for naphthalenes, high capital cost, and relatively high operation and maintenance (O&M) costs. Naphthalenes were not listed as a COC during previous evaluations. DPE was screened out due to its high capital cost, and relatively high O&M costs and limited effectiveness. *In situ* chemical treatment was favored for remedial alternative development over AS/SVE and DPE due to its lower O&M costs.

8.4 REMEDIAL ALTERNATIVE DESCRIPTIONS

The technologies retained in the screening process were used to develop four remedial alternatives for further evaluation (Alternatives 1 through 4). For the purposes of evaluating and selecting remedial alternatives, it is assumed that the current Site use will continue for the foreseeable future[3]. Therefore,

[3] Except for Alternative 1 *In situ* thermal. See assumptions for Alternative 1 in *Section 7.3.1*, below.

the removal of miscellaneous Site features (e.g., scrap metal, abandoned cars) and building demolitions are not included in the FS or associated cost estimates. Furthermore, the remedial action alternatives were developed based on the reasonable maximum extent contamination observed during the 2024 RI activities. Reasonable maximum extent of contamination with inferred boundaries shown as dashed lines are included on Figures 8 through 12. The components of the remedial alternatives are summarized below and illustrated in Figures 14 through 17.

The remedial alternatives were developed consistent with Ecology's Guidance for Remediation of Petroleum Contaminated Sites (Ecology, 2016). All remedial alternatives include compliance monitoring to meet WAC 173-340-410 requirements. Costs were estimated using direct vendor quotes, online cost estimating tools, and recent Haley & Aldrich experience with similar projects. Detailed cost estimates at an accuracy range of -30 percent to +50 percent for each remedial alternative are provided in Tables 10 through 13 (attached).

8.4.1 Alternative 1 - Thermal

Alternative 1 is the most aggressive and permanent alternative. It was developed for the purpose of cost benefit analysis of the level of treatment that would be required to attain the cleanup standards in a reasonable restoration time frame for the Property. The Property restoration time frame is assumed to be two years and the Site restoration time frame is assumed to be 30 years. For this alternative, it is assumed the existing business would be closed and the Property would be purchased by Ecology for the purposes of cleanup. Alternative 1 consists of the following components:

- *In situ* thermal;
- MNA;
- Institutional controls; and
- Compliance monitoring.

***In Situ* Thermal Remediation.** *In situ* thermal remediation consists of heating the subsurface to vaporize all Site COCs. Electrical resistivity heating was selected as the most efficient heating methodology for this Site due to the relatively rapid heating process resulting from passing a current between electrodes installed in the subsurface. Once the treatment zone is heated to the boiling point of water, volatile and semi-volatile contaminants are volatilized. The contaminant containing vapor is then collected via vapor extraction wells and treated through catalytic oxidation, effectively destroying the contaminant mass.

Alternative 1 assumes that the existing building will be demolished and the entire Property is accessible for thermal treatment. Thermal remediation activities will only extend up to the Property boundary. For purposes of this RIFS and based on existing soil data and engineering estimations, it is assumed the entire source area is treated, and remaining concentrations of COCs in and groundwater will be reduced, decreasing the time frame for MNA to achieve cleanup standards.

For cost estimating purposes, this RIFS assumed the *in situ* thermal design and implementation would be implemented by TRS Group. Thermal remediation is projected to treat the entire volume of contaminated media in the perched groundwater zone (41,250 CF) and 178,050 CF of contaminated media in the Sea-Level Aquifer. This is based on treating the on-Property reasonable maximum extents of contamination.

MNA. MNA relies on the natural processes of biodegradation, dispersion, dilution, sorption, volatilization, chemical stabilization, and/or biological stabilization to decrease (or "attenuate") concentrations of contaminants in soil and groundwater. MNA is differentiated by natural attenuation in that the Site is under intentional, long-term monitoring to demonstrate there are no increased levels of risk to human health and the environment.

For Alternative 1, MNA would be implemented to reduce concentrations of COCs in off-Property soil and groundwater. Two additional monitoring wells in the perched groundwater and three monitoring wells in the Sea-Level Aquifer will also be installed to establish background concentrations of natural attenuation parameters and further delineate the plume (Figure 14). These proposed wells were included in the conceptual cost estimates to perform the data gaps investigations, *Appendix F*, and costs for which are excluded from the alternative cost estimates. The MNA evaluation for the Site is provided in *Section 7.4.3 - Natural Attenuation Evaluation*.

Institutional Controls. Institutional controls will be implemented in areas where COC concentrations in soil and/or groundwater remain above the CULs. These properties include: parcels 029-R22911-071-1190, 029-R22911-093-1210, 029-R22911-057-1000, 029-R22911-076-1000, 029-R22911-063-1130, and 029-R22911-059-1250. For purposes of the RIFS, a no further action determination would be attainable for the Property.

Institutional controls include filing environmental covenants and implementing administrative land use and activities restrictions for the areas with residual soil and/or groundwater contamination. The environmental covenants/administrative include land use and activities restrictions (i.e., prohibit direct contact with soil, and the extraction of groundwater). The requirements of the environmental covenant are presented in WAC 173-340-440(9).

Compliance Monitoring. Protection and performance monitoring will be conducted during implementation of the cleanup action to confirm that human health and the environment are adequately protected throughout the restoration time frame. Groundwater confirmation monitoring will be conducted to meet regulatory compliance and confirm the cleanup action has met the cleanup standards.

A Sampling and Analysis Plan and a Quality Assurance Project Plan will be prepared to summarize compliance sampling procedures, locations, frequency, and analyses. These plans will be submitted to Ecology for review and approval in conjunction with the Engineering Design Report.

The estimated net present value cost for Alternative 1 is $7,711,000 (Table 10).

8.4.2 Alternative 2 – Chemical Oxidation

Alternative 2 was developed as a secondary mass destruction alternative with the assumption that current Site use will remain. It is assumed that even after two rounds of chemical treatment, additional contaminant mass will remain on all properties at the Site; however, the significant reduction in contaminant mass will reduce risk associated with the off-Property groundwater plume. The restoration time frame for the Site is assumed to be 30 years. Alternative 2 consists of the following components:

- *In situ* chemical oxidation (ISCO) treatment;
- MNA;

- Institutional controls; and
- Compliance monitoring.

ISCO. ISCO is the injection or addition of reagent amendments that target specific contaminants in the subsurface environment to degrade or destroy contaminants in place. Alternative 2 considers injection as a delivery method for these amendments.

ISCO will be implemented to reduce concentrations of TPH-G and VOCs on the Site, except within the ROW. The remedial program will be designed based on the nature of the contaminant, the target groundwater matrix, distribution, and the availability of any existing infrastructure (monitoring wells). For cost estimating purposes, this RIFS assumed the ISCO program will include a single injection event for the perched groundwater and two rounds of injections in the Sea-Level Aquifer of Evonik Klozur One (persulfate activated with chelated iron and permanganate) through injection wells installed using a sonic drill rig. Klozur One was selected for cost estimate purposes due to its ability to remediate all Site COCs and ability to persist in the environment to provide treatment over a longer period of time. A lab-scale test will be completed during remedial design and reagent selection will be confirmed at that time. The ISCO injection matrix consists of 13 injection wells to be installed throughout the on-Property perched groundwater zone and screened from 55 to 60 feet bgs and 43 Sea-Level Aquifer injection wells to be installed throughout the accessible portion of the Sea-Level Aquifer groundwater plume and screened from 100 to 115 feet bgs.

ISCO is projected to treat the entire volume of contaminated media in the perched groundwater zone (41,250 CF) and 498,600 CF of contaminated media in the Sea-Level Aquifer. This is based on the perched groundwater zone and impacted Sea-Level Aquifer thickness (5 feet and 15 feet, respectively). Sea-Level Aquifer treatment thickness is based on petroleum-based COCs being less dense than water and remaining in the upper portion of the aquifer. The radius of influence is assumed to be 15 feet, and the Known Site Boundary will be treated to the extent practical (Figure 15).

MNA. Similar to Alternative 1, MNA will be implemented to reduce concentrations of COCs in soil and groundwater to the southwest and south of the Property. Two additional monitoring wells in the perched groundwater and three monitoring wells in the Sea-Level Aquifer will also be installed to establish background concentrations of natural attenuation parameters and further delineate the plume (Figure 15).

Institutional Controls. Similar to Alternative 1**,** institutional controls will be placed on all Site properties for the duration of the restoration time frame.

Compliance Monitoring. Similar to Alternative 1, protection and performance monitoring will be conducted during implementation of the cleanup action. Confirmation groundwater monitoring will be conducted to meet regulatory compliance and to confirm the cleanup action has attained cleanup standards.

A Sampling and Analysis Plan and Quality Assurance Project Plan will be prepared to summarize compliance sampling procedures, locations, frequency, and analyses. These plans will be submitted to Ecology for review and approval in conjunction with the Engineering Design Report.

The estimated net present value cost for Alternative 2 is $4,683,000 (Table 11).

8.4.3 Alternative 3 – Permeable Sorptive Barrier

Alternative 3 was developed primarily for cost benefit evaluation of a risk-mitigation alternative. This alternative does not target source area mass destruction but instead aims to reduce the off-Property and downgradient transport of the dissolved groundwater plume. The restoration time frame for the Site is assumed to be 30 years. Alternative 3 consists of the following components:

- Permeable Sorptive Barrier (PSB);
- MNA;
- Institutional controls; and
- Compliance monitoring.

Permeable Sorptive Barrier. Alternative 3 assumes the injection of liquid-activated carbon into the Perched and Sea-Level Aquifers in a barrier-wall formation to intercept and remediate groundwater flowing off Property. Activated carbon works as a sorbent for organic (carbon-based) sorbates; all Site groundwater COCs are organics. Contaminant removal by sorption is a function of the mass of available sorbent, its sorption equilibrium with contaminant mass, and the desorption and biodegradation rates. The PSB will be implemented to reduce concentrations of Site COCs on the Site to the north of East Main Street and on the Property to the south of East Main Street (029-R22911-059-1250; Figure 16). It is assumed that access is restricted to 029-R22911-057-1000 and 029-R22911-063-1130.

Alternative 3 utilizes injection wells installed via sonic drilling as a delivery method for these amendments. The PSB consists of seven injection wells to be installed along the downgradient terminus of the on-Property perched groundwater zone screened from 55 to 60 feet bgs, and 17 injection wells to be installed along the accessible downgradient plume boundary of the Sea-Level Aquifer and screened from 100 to 115 feet bgs (Figure 16).

The remedial program will be designed based on the nature of the contaminant, the target groundwater matrix, distribution, and the availability of any existing infrastructure (monitoring wells). For cost estimating purposes, this RIFS assumed the PSB program will include injections of Regenesis PlumeStop through injection wells using a sonic drill rig. Regenesis PlumeStop colloidal (liquid) carbon was chosen for cost estimating purposes due to previous experience and case studies of the material showing it can reliably remediate Site COCs.

The duration of PSB effectiveness is estimated at 10 to 20 years. A second application of liquid carbon application is included in this alternative in year 15, the necessity and timing of which will be dependent on PSB performance as determined via compliance monitoring. The second application is assumed to be the same design as the original application, the scope of which could be reduced depending on PSB performance.

The PSB is projected to treat 30,550 CF of contaminated media in the perched groundwater zone and 172,995 CF of contaminated media in the Sea-Level Aquifer. This is based on the perched groundwater zone and impacted Sea-Level Aquifer thickness (5 feet and 15 feet, respectively) the radius of influence (assumed to be 15-feet), and the total barrier lengths.

MNA. Similar to Alternative 1, MNA will be implemented to reduce concentrations of COCs in soil and groundwater to the southwest and south of the Site. Two additional monitoring wells in the perched groundwater and three monitoring wells in the Sea-Level Aquifer will also be installed to establish background concentrations of natural attenuation parameters and further delineate the plume (Figure 16).

Institutional Controls. Similar to Alternative 1, institutional controls will be placed on all Site properties for the duration of the restoration time frame.

Compliance Monitoring. Similar to Alternative 1, protection and performance monitoring will be conducted during implementation of the cleanup action. Confirmation groundwater monitoring will be conducted to meet regulatory compliance and to confirm the cleanup action has attained cleanup standards.

A Sampling and Analysis Plan and Quality Assurance Project Plan will be prepared to summarize compliance sampling procedures, locations, frequency, and analyses. These plans will be submitted to Ecology for review and approval in conjunction with the Engineering Design Report.

The estimated net present value cost for Alternative 3 is $2,520,000 (Table 12).

8.4.4 Alternative 4 – MNA

Alternative 4 is the least aggressive and invasive alternative and was developed primarily to evaluate the risk-mitigation cost associated with avoiding active treatment. The restoration time frame is assumed to be 30 years for the purposes of cost estimation but is likely longer. Alternative 4 consists of the following components:

- Institutional controls (all properties);
- MNA; and
- Compliance monitoring for 30 years.

MNA. MNA will be implemented to reduce concentrations of COCs in soil and groundwater at the Site. Two additional monitoring wells in the perched groundwater and three monitoring wells in the Sea-Level Aquifer will also be installed to establish background concentrations of natural attenuation parameters and further delineate the plume (Figure 17). MNA does not include any active treatment (0 CF) of contaminated media.

Institutional Controls. Institutional controls will be placed on all Site properties for the duration of the restoration time frame.

Compliance Monitoring. Similar to Alternative 1, long-term performance monitoring will be conducted during implementation of the cleanup action. Confirmation groundwater monitoring will be conducted to meet regulatory compliance and to confirm the cleanup action has attained cleanup standards.

A Sampling and Analysis Plan and Quality Assurance Project Plan will be prepared to summarize compliance sampling procedures, locations, frequency, and analyses and the long-term monitoring activities. These plans will be submitted to Ecology for review and approval in conjunction with the Engineering Design Report

The estimated net present value cost for Alternative 4 is $934,000 (Table 13).

9. Evaluation of Remedial Alternatives

As described in WAC 173-340-360(3), ten general requirements must be met for an alternative to be considered for selection as a remedy. Then, several action- and media-specific requirements—which vary depending on the nature of the Site and the alternatives being considered—and consideration of public concerns and tribal rights and interests are used to further refine the cleanup action selection if applicable. Each of these evaluation criteria are described in the following sections.

9.1 GENERAL REQUIREMENTS

9.1.1 Protect Human Health and the Environment

The alternative must provide for overall protection of human health and the environment, including likely vulnerable populations and overburdened communities.

All of the alternatives prevent human and ecological exposure by monitoring the groundwater plume for the duration of the restoration time frame.

9.1.2 Comply With Cleanup Standards

The alternative must comply with cleanup standards (CULs and the POCs where such CULs must be met) as established in WAC 173-340-700 through 173-340-760.

All four alternatives comply with cleanup standards by the end of the restoration time frame.

9.1.3 Comply with Applicable State and Federal Laws

The alternative must comply with both applicable requirements and requirements determined to be relevant and appropriate, as defined through WAC 173-340-710. Additionally, the alternative must address local, state, and federal laws related to environmental protection, health and safety, transportation, and disposal.

All four alternatives will attain and comply with all applicable ARARs, which are summarized in Table 8.

9.1.4 Prevent or Minimize Releases and Migration of Hazardous Substances

The alternative must prevent or minimize present and future releases and migration of hazardous substances in the environment.

All four remedial alternatives can be carefully designed and implemented to minimize the migration of hazardous substances. However, all four alternatives come with some risk of migrating the existing groundwater plume due to the multi-aquifer system. In order of most risk to least:

1. Alternative 1 could mobilize contamination from the perched groundwater to the Sea-Level Aquifer during thermal well installation and could mobilize contamination from soil to groundwater during heating.
2. Alternative 2 could mobilize contamination from the perched groundwater to the Sea-Level Aquifer during injection well installation. Injections could also mobilize contamination in both

the Perched and Sea-Level Aquifer via either pore volume displacement or incomplete mixing of groundwater and injectate solution.

3. Alternative 3 could mobilize contamination from the perched groundwater to the Sea-Level Aquifer during injection well installation; however, this risk is mitigated by the follow up injection of carbon which immobilizes contaminant mass.
4. Alternative 4 could result in inadvertent mobilization of the groundwater plume if Site conditions, climatic conditions, and/or hydrogeologic conditions changed over the restoration time frame.

9.1.5 Provide Resilience to Climate Change Impacts

The alternative must provide resilience to climate change impacts that have a high likelihood of occurring and severely compromising its long-term effectiveness.

All four alternatives are resilient to climate change impacts, to varying degrees. Sea-level rise is of potential concern at the Site because the Sea-Level Aquifer is at approximate elevation of 14 feet (NAVD88) and sea-level rise could result in hydrogeologic change. Additionally, as discussed in *Section 2.3*, increased precipitation frequency and intensity and resulting increases in stormwater infiltration could result in hydrogeologic change. Hydrogeologic changes could mobilize contamination and are more of a risk for the less protective and less permanent alternatives.

All four remedial alternatives comply with climate change resilience by minimizing the risk of COC mobilization and conducting continuous monitoring to observe the plume.

9.1.6 Provide for Compliance Monitoring

The alternative must provide for compliance monitoring, as established under WAC 173-340-410 and WAC 173-340-720 through 173-340-760. There are three types of compliance monitoring: protection, performance, and confirmational. Protection monitoring is designed to protect human health and the environment during the remediation activities and operation and maintenance phases of the cleanup action. Performance monitoring confirms that the cleanup action has met cleanup and/or performance standards. Confirmational monitoring confirms the long-term effectiveness of the cleanup action once cleanup standards have been met or other performance standards have been attained.

All four remedial alternatives would meet requirements for compliance monitoring, as they require varying levels of all three types of compliance monitoring.

9.1.7 Not Rely Primarily on Institutional Controls and Monitoring

A cleanup action should not rely primarily on institutional controls and monitoring where it is technically possible to implement a more permanent cleanup action.

All four of the remedial alternatives meet this requirement because they do not primarily rely on institutional controls and monitoring.

9.1.8 Not Rely Primarily on Dilution and Dispersion

The regulations state that cleanup actions should not rely primarily on dilution and dispersion unless the incremental costs of any active cleanup action measures over the costs of dilution and dispersion grossly exceed the incremental degree of benefits of active cleanup action measures over the benefits of dilution and dispersion.

All four remedial alternatives do not rely on dilution or dispersion.

9.1.9 Reasonable Restoration Time Frame

The alternative must provide a reasonable restoration time frame. Per WAC 173-340-360(4), determining whether an alternative provides for a reasonable restoration time frame involves balancing risks against the practicability of achieving a shorter time frame.

The restoration time frame, as defined in WAC 173-340-360, is the period needed for a cleanup action to achieve the CULs at the POC. For purposes of this FS, restoration time frames are assumed to be 30 years for all alternatives, primarily because active treatment within public rights-of-way is assumed to be infeasible and MNA is an element of all of the alternatives, which is likely to take a minimum of 30 years. However, Alternatives 1, 2, and 3 will likely result in the destruction or immobilization of most of the source area contamination within a significantly shorter timeframe.

9.1.10 Use Permanent Solutions to the Maximum Extent Practicable

As outlined in WAC 173-340-360(5), evaluation of this requirement involves conducting a disproportionate cost analysis (DCA), wherein the costs and benefits of each alternative are assessed, as defined by several evaluation criteria. The specific criteria that must be evaluated are specified in WAC 173-340-360(5)(d) and are discussed in *Section 9.5*, and the results of the DCA are discussed in *Section 9.6*.

9.2 ACTION-SPECIFIC REQUIREMENTS

A number of action-specific requirements are also listed in WAC 173-340-360(3)(b), although not all of these requirements are applicable to the Site or the alternatives being considered. The alternatives all meet the action-specific requirements, if applicable, as described below.

9.2.1 Remediation Levels

Remediation levels are defined as the particular concentration of a hazardous substance in any media above which a particular cleanup action component will be required as part of a cleanup action at the site; see WAC 173-340-200. Specific requirements pertaining to use of remediation levels are in WAC 173-340-355.

9.2.2 Institutional Controls

Institutional controls must comply with the specific requirements of WAC 173-340-440 and should demonstrably reduce risks to ensure a protective cleanup action. This requirement is applicable because all of the alternatives include institutional controls that restrict use of groundwater throughout the restoration time frame. Institutional controls shall be implemented in accordance with

WAC 173-340-440, including documenting institutional controls in a restrictive covenant on the Property and notifying local governments.

9.2.3 Financial Assurances

Financial assurances must be provided at sites where the remedy includes engineered and/or institutional controls, in accordance with WAC 173-340-440(11). This requirement is applicable because all of the remedial alternatives include institutional controls. Financial assurances shall be of sufficient amount to cover all costs associated with operation and maintenance of the cleanup action, including institutional controls, compliance monitoring, and corrective measures.

9.2.4 Periodic Reviews

Periodic reviews must be conducted in accordance with WAC 173-340-420(2), including whenever Ecology conducts a remedy and whenever Ecology approves a remedy under an order, agreed order or consent decree. This requirement is applicable since Ecology is conducting the remedy.

9.3 MEDIA-SPECIFIC REQUIREMENTS

A number of media-specific requirements are also listed in WAC 173-340-360(3)(c), although not all of these requirements are applicable to the Site or the alternatives being considered. The alternatives all meet the media-specific requirements, if applicable, as described below.

9.3.1 Soil at Current or Potential Future Residential Areas and Childcare Centers

Specific requirements pertaining to soil cleanup at current or potential future residential areas, schools, and childcare centers are found in WAC 173-340-360(3)(c)(i). The Site is located in an area that could potentially be redeveloped as residential or childcare center; however, soil compliance at the direct contact point of compliance is a data gap, so this requirement may or may not be applicable. Additionally, all of the remedial alternatives include institutional controls which could prevent any parcel(s) with residual soil contamination in the upper 15 feet from being redeveloped as residential or as a childcare center.

9.3.2 Groundwater Cleanup Actions

This requirement states that a permanent cleanup action shall be used to achieve CULs for groundwater at the standard POCs where a permanent cleanup action is practicable or determined by the department to be in the public interest (WAC 173-340-360[3][c][ii]). The requirement also states that a nonpermanent groundwater cleanup action must treat or remove the source of groundwater contamination and contain contaminated groundwater to the maximum extent practicable (WAC 173-340-360[3][c][iii]).

This requirement is applicable because groundwater is the primary impacted media at the Site. While all of the alternatives are permanent, they are so to varying degrees. Alternatives 1, 2, and 3 best comply with this media-specific requirement because they include active source area treatment and/or containment of contaminated groundwater to the maximum extent practicable. Alternative 4 does not contain groundwater contamination to the maximum extent practicable until the completion of the restoration time frame (30 years or longer).

9.4 CONSIDERATION OF PUBLIC CONCERNS AND TRIBAL RIGHTS AND INTERESTS

Consideration of public concerns, including the concerns of likely vulnerable populations and overburdened communities, and Indian Tribes' rights and interests is mandated for Ecology-conducted or Ecology-supervised cleanup actions. For this remedy, Ecology will provide a mandatory public review and comment period on the draft FS. All public comments and concerns will be taken into consideration when finalizing the FS.

9.5 DISPROPORTIONATE COST ANALYSIS PROCEDURE

Alternatives that meet requirements for cleanup actions are assessed to determine which use permanent solutions to the maximum extent practicable per WAC 173-340-360(5). This assessment is conducted by performing a DCA. A DCA was conducted for all four alternatives since all alternatives meet the cleanup action requirements.

9.5.1 DCA Criteria

The alternatives are compared by evaluating the following criteria: protectiveness, permanence, cost, effectiveness over the long term, short-term risk management, and technical and administrative implementability. These evaluation criteria are defined below. The regulation gives a general discussion of the types of factors to consider when evaluating each criterion.

9.5.1.1 Protectiveness

The overall protectiveness provided by the alternative to human health and the environment, including likely vulnerable populations and overburdened communities. The degree to which existing risks are reduced, the time required to reduce risks at the Site and attain cleanup standards, the on-Site and off-Site risks remaining after implementing the alternative, and the improvement of the overall environmental quality provided by the alternative are evaluated against this criterion.

9.5.1.2 Permanence

This criterion evaluates the degree to which the alternative permanently reduces the toxicity, mobility, or mass of hazardous substances, including 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 waste treatment processes, and the characteristics and quantity of treatment residuals generated.

9.5.1.3 Cost

This criterion evaluates the costs associated with the alternative, including remediation costs (e.g., pre-remediation activity engineering design and permitting, physical remediation, waste management and disposal, compliance monitoring, establishment of institutional controls, and regulatory oversight) and post-remediation activity costs (e.g., operation and maintenance activities, replacement or repair of equipment, permit renewal, compliance monitoring, institutional controls, financial assurances, periodic reviews, and regulatory oversight).

9.5.1.4 Long-Term Effectiveness

Long-term effectiveness includes the degree of certainty that the alternative will be successful, the reliability of the alternative during the period of time hazardous substances are expected to remain on Site at concentrations that exceed CULs, the resilience of the alternative to climate change impacts, the magnitude of residual risk with the alternative in place, and the effectiveness of controls required to manage treatment residues or remaining wastes. The following types of cleanup action components can be used as a guide, in descending order, when assessing the relative degree of long-term effectiveness: reuse or recycling; destruction or detoxification; immobilization or stabilization; on-Site or off-Site disposal in an engineered, lined, and monitored facility; on-Site isolation or containment with attendant engineering controls; and institutional controls and monitoring.

9.5.1.5 Short-Term Risk Management

This criterion evaluates the risk to human health and the environment, including likely vulnerable populations and overburdened communities, associated with the alternative during remediation activities and implementation, and the effectiveness of measures taken to manage such risks.

9.5.1.6 Technical and Administrative Implementability

This criterion assesses the ability of the alternative to be implemented, including consideration of the technical difficulty of designing, constructing, and implementing the alternative in a reliable and effective manner; availability of necessary off-Site facilities, services, and materials; administrative and regulatory requirements; scheduling, size, and complexity; monitoring requirements; access for remediation operations and monitoring; and integration with existing Property operations and other current or potential cleanup actions.

9.5.2 DCA Procedure

To conduct the DCA, the alternatives are ranked by degree of permanence and the alternative that provides the greatest degree of permanence shall be the baseline remedial alternative (WAC 173-340-360[5][c][iii]). The benefits and costs of each alternative are determined using the criteria outlined in *Section 9.5.1*. Per draft Ecology DCA guidance (Ecology, 2025), each benefit has been given equal weighting.

We used professional judgment to score the alternatives on a scale of 1 (lowest) to 10 (highest) against the five non-cost DCA criteria outlined in *Section 9.5.1*.

A total weighted benefits score is obtained for each alternative by multiplying the five non-cost scores by their corresponding weighting factors and summing the weighted values. When assessing whether a remedial alternative uses permanent solutions to the maximum extent practicable, the test used WAC 173-340-360[5][c][iv], as follows:

> *"First, compare the costs and benefits of the baseline alternative with the costs and benefits of only the next most permanent alternative (not any of the other alternatives); and second, determine whether the incremental costs of the baseline alternative over the next most permanent alternative are disproportionate to the incremental degree of benefits of the baseline alternative over the next most permanent alternative.*

If the incremental costs are not disproportionate to the incremental degree of benefits, then the baseline alternative uses permanent solutions to the maximum extent practicable and the analysis under this subsection is complete.

If the benefits of the two alternatives are the same or similar, then the lower cost alternative uses permanent solutions to the maximum extent practicable and the analysis under this subsection is complete.

If the incremental costs are disproportionate to the incremental degree of benefits, then eliminate the baseline alternative from further analysis and make the next most permanent alternative the baseline for future analysis."

9.6 DISPROPORTIONATE COST ANALYSIS EVALUATION

We evaluated the alternatives against the DCA criteria outlined in *Section 9.5.1* to determine whether the costs associated with each remedial alternative are disproportionate relative to the incremental benefit of a lower-cost alternative. The evaluation of the DCA criteria for each alternative is summarized below and in Tables 14 and 15(attached).

- **Protectiveness.** Alternative 1 is judged to be the most protective due to the mass destruction of COC-contaminated soil and groundwater on the Property. Alternative 4 is the least protective because no contaminated soil or groundwater will be remediated; and therefore, on-Site risks will remain after implementing the alternative. Alternative 2 is more protective than Alternative 3 because some of the COC-contaminated soil and groundwater will be destroyed via ISCO.
- **Permanence.** Alternative 1 is judged to be the most permanent due to the mass destruction of COC-contaminated soil and groundwater on the Property. Alternative 4 is the least permanent because no contaminated soil or groundwater will be actively treated; and therefore, on-Site risks will remain until completion of the restoration time frame. Alternative 2 is more permanent than Alternative 3 because some of the COC-contaminated soil and groundwater will be destroyed via ISCO.
- **Effectiveness over the long term**: Alternative 1 is the most effective over the long term because there is a higher degree of certainty that it will be successful in attaining cleanup standards than the other alternatives the Property. Alternative 4 is the least effective over the long term because contaminated soil and groundwater will remain, and institutional controls and monitoring are less effective over the long term than mass destruction or containment. Alternative 2 is more likely to be effective than Alternative 3 in the long term because the carbon substrate will both bind contamination and increase the rate of biodegradation.
- **Short-term risks.** Alternative 3 has the least short-term risks because it is the least invasive remedy that actively limits mobility of the downgradient groundwater plume towards the drinking water wells. Alternative 2 has the most short-term risks because in addition to being the most labor intensive to implement, it comes with risk of mobilizing additional source mass to groundwater during both installation and treatment, increasing short-term risks during remedial activities. Alternative 4 has fewer short-term risks than Alternative 2 and Alternative 1, but more short-term risks than Alternative 3 because it has as a similar level of implementation risk as Alternative 3, but higher short-term risk of leaving the groundwater plume unrestricted.

- **Technical and administrative implementability.** Alternative 4 is the most implementable because compliance monitoring and institutional controls have less complexity than remedial activity implementation. Alternative 1 is the least implementable because thermal treatment will be a challenge due to the necessity of Property business closure, likely Property acquisition, permitting, and the need for significant power infrastructure upgrades. Alternative 3 is more implementable than Alternative 2 because it requires fewer additional wells, the injectant excludes active subsurface chemical reactions, and this remedy success is not dependent on treating the entire source area.

The total weighted benefit score ranged from 4.4 for Alternative 4 to 6.60 for Alternative 1, and the costs ranged from $934,000 for Alternative 4 to $7,711,000 for Alternative 1. The components of these costs and assumptions made in the estimates are detailed in Tables 10 through 13.

The remedial alternatives are ranked by degree of permanence. This FS determined that Alternative 1 was the most permanent, followed by Alternatives 2, 3, and 4. The most permanent alternative is used as the baseline remedial alternative against which other alternatives are compared. Therefore, Alternative 1 is the baseline alternative against which the other alternatives are compared. Tables 14 and 15 outline the DCA evaluation, which is discussed further below.

The baseline alternative (Alternative 1) was compared incrementally to the next most permanent alternatives (Alternatives 2, then 3, then 4, respectively). The incremental costs of Alternatives 1, 2, and 3 were determined by the DCA process to be sufficiently disproportionate to the incremental degree of benefits; the DCA process selected MNA as the apparent permanent to the maximum extent practicable (PMEP) alternative. However, as stated in *Section 9.3.2*, Alternative 4 does not satisfy the action-specific requirement of containing contaminated groundwater to the maximum extent practicable. Therefore, Alternative 4 is eliminated from the DCA and Alternative 3 is selected as the PMEP alternative that satisfies all of the requirements of WAC 173-340-360.

10. Remedial Alternative Selection and Conclusions

Alternative 3 is the selected remedial alternative because it is the PMEP alternative that satisfies the requirements of WAC 173-340-360. Alternative 3 consists of a PSB, MNA, institutional controls, and compliance monitoring. Implementation of this alternative will reduce the risk associated with the groundwater to drinking water exposure pathway. It is assumed that all Site property uses will remain the same for the foreseeable future. If the Site is redeveloped, the future landowner will need to evaluate whether the selected alternative is protective of the proposed use.

The UST source of petroleum impacts to soil and groundwater was removed in 2011 and no free product (i.e., non-aqueous phase liquid) was observed during the 2023 and 2024 groundwater sampling, indicating that the source of petroleum impacts (i.e., residual contamination in soil) is contained. However, the data gaps listed in *Section 7.5* should be investigated via a data gaps investigation or similar in advance of cleanup implementation. If the results of a data gaps investigation are inconsistent with the assumptions made for the FS, then a different preferred remedy may be selected and/or the inclusion of additional technologies may be warranted. Additionally, engineering design of Alternative 3 will be dependent on better understanding the source and extent of cVOCs at the Site. Alternative 3 does not address the potential for residual soil contamination at the direct contact point of compliance nor VI; should additional investigation, including additional CSM development and Tier 1 or Tier 2 VI Evaluation, determine that indoor air is a media of concern at the Site, additional mitigation measures may need to be added to the cleanup to protect human health.

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TABLES

TABLE 1
MONITORING WELL CONSTRUCTION AND SOIL BORING DETAILS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Monitoring Well or Boring Location	Consultant	Completion Date	Sampling Event					GSE	TOC Elevation (ft NAVD88)	Total Depth (ft bgs)	Casing Diameter (in.)	Screen Length (ft)	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (ft bgs)	Top of Screen Elevation (ft NAVD88)	Bottom of Screen Elevation (ft NAVD88)
			Baseline September 2023	1st Quarter February 2024	2nd Quarter May 2024	3rd Quarter August 2024	4th Quarter November 2024									
MW-1S	Farallon	10/17/2005	--	X	--	--	--	117.17	116.82	125	2	35	30	65	86.82	51.82
MW-2S	Farallon	11/17/2005	X	--	X	X		118.00	117.63	66.5	2	10	50	60	67.63	57.63
MW-3S	Farallon	11/17/2005		X	--	X	X	118.00	117.63	61.5	2	10	50	60	67.63	57.63
MW-4S	Farallon	2/1/2007	X	--	X	--	--	117.78	117.44	58.0	2	10	46	56	71.44	61.44
MW-5S	Farallon	2/1/2007	--	--	--	--	--	116.00	115.60	65.0	2	10	53	63	62.60	52.60
MW-6S	Farallon	3/24/2008	X	--	X	X	X	117.07	116.71	64.5	2	10	51	61	65.71	55.71
MW-7S	Farallon	3/25/2008	--	--	--	--	--	117.19	116.98	64.5	2	10	49	59	67.98	57.98
MW-8S	Farallon	3/26/2008	X	--	X	X	X	117.69	117.36	75.5	2	10	51	61	66.36	56.36
MW-9D	Farallon	4/13/2009	X	--	X	X	X	116.55	116.22	110.0	2	10	100	110	16.22	6.22
MW-10D	Farallon	4/14/2009	--	X	--	--	X	115.44	115.15	110	2	10	100	110	15.15	5.15
MW-11D	Farallon	4/15/2009	--	X	--	--	X	115.91	115.62	110	2	10	100	110	15.62	5.62
MW-12D	Farallon	4/15/2009	X	--	X	X	X	116.31	115.94	110	2	10	100	110	15.94	5.94
MW-13D	Farallon	12/2/2013	X	--	X	--	--	118.27	117.88	108	4	10	98	108	19.88	9.88
MW-14D	Farallon	12/3/2013	X	--	--	--	--	118.01	117.76	109	2	10	99	109	18.76	8.76
MW-15D	Farallon	12/4/2013	X	--	--	--	--	118.817	118.32	111	2	10	101	111	17.32	7.32
MW-16D	Farallon	12/5/2013	X	--	--	--	--	119.067	118.64	110	2	10	100	110	18.64	8.64
MW-17D	SES	7/26/2017	X	--	X	X	X	117.40	117.15	116	2	15	100	115	17.15	2.15
MW-18D	SES	8/14/2017	X	--	--	X	--	--	--	115.5	2	15	100	115	--	--
MW-19D	HA	1/11/2024	--	X	X	X	X	117.94	117.57	120	2	10	102	112	15.57	5.57
MW-20D	HA	1/15/2024	--	X	X	X	X	118.55	118.12	115	2	10	101	111	17.12	7.12
MW-21D	HA	1/17/2024	--	X	X	X	X	116.58	116.20	115	2	10	100	110	16.20	6.20
MW-22D	HA	1/19/2024	--	X	X	X	X	119.40	118.94	120	2	10	104	114	14.94	4.94
MW-23D	HA	1/22/2023	--	X	X	X	X	118.90	118.44	120	2	10	101	111	17.44	7.44
B-1	Farallon	10/17/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-2	Farallon	10/18/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-3	Farallon	10/19/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-4	Farallon	10/20/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-5	Farallon	10/21/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-6	Farallon	10/22/2005	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-7	Farallon	11/17/2006	--	--	--	--	--	--	--	--	--	--	--	--	--	--
B-8	SES	7/26/2017	--	--	--	--	--	--	--	66	--	--	--	--	--	--
B-9	SES	8/15/2017	--	--	--	--	--	--	--	71.5	--	--	--	--	--	--
HA-1	HA	1/26/2024	--	--	--	--	--	117.17	--	110	--	--	--	--	--	--
HA-2	HA	1/25/2024	--	--	--	--	--	118.00	--	150	--	--	--	--	--	--
HA-3	HA	1/24/2024	--	--	--	--	--	118.00	--	120	--	--	--	--	--	--
HA-4	HA	1/29/2024	--	--	--	--	--	117.78	--	110	--	--	--	--	--	--

Notes:
-- = Not Available or Not Applicable
bgs = below ground surface
Farallon = Farallon Consulting Inc.
GSE = Ground surface Elevation
HA = Haley & Aldrich Inc.
in = inches
NAVD88 = North American Vertical Datum of 1988
SES = Sound Earth Sciences
TOC = top of well casing elevation
X = Well was sampled during event

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name	Protective of Groundwater Saturated	Protective of Groundwater Vadose at 13 Degrees C	Method B Direct Contact Cancerous	Method B Direct Contact Noncancerous	HA-1						HA-2		
Sample Name					HA-1-S1	HA-1-S2	HA-1-S3	HA-1-S4	HA-1-S6	HA-1-DUP	HA-2-S1.5	HA-2-S2	HA-2-S3
Sample Date					01/26/2024	01/26/2024	01/26/2024	01/26/2024	01/26/2024	01/26/2024	01/24/2024	01/24/2024	01/24/2024
Sample Type					Primary	Primary	Primary	Primary	Primary	Duplicate	Primary	Primary	Primary
Lab Sample ID					401358-01	401358-02	401358-03	401358-04	401358-06	401358-07	401358-08	401358-09	401358-10
Sample Depth (bgs)					15 - 17 (ft)	25 - 27 (ft)	50 - 51 (ft)	52 - 53 (ft)	107 - 109 (ft)	107 - 109 (ft)	7 - 8 (ft)	15 - 17 (ft)	25 - 27 (ft)
Volatile Organic Compounds (mg/kg)													
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	**1 J**	**190 J**	0.05 U	0.05 U	0.05 U
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.005 U	0.005 U	0.005 U	0.005 U	0.05 U	0.05 U	0.005 U	0.005 U	0.005 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	**0.26 J**	**56 J**	0.05 U	0.05 U	0.05 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	**4 J**	0.05 U	0.05 U	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Acetone	2.1	29	NA	72000	-	-	-	-	5 U	5 U	-	-	-
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Chloroethane	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.5 U	0.5 U	0.1 U	0.1 U	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	**0.56 J**	0.05 U	0.05 U	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	**1.9 J**	0.05 U	0.05 U	0.05 U
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Hexane	1.8	72	NA	4800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 UJ	**8.9 J**	0.25 U	0.25 U	0.25 U
Isopropylbenzene (Cumene)	0.79	15	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	**8.3 J**	0.05 U	0.05 U	0.05 U
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.2 U	0.2 U	0.2 U	0.2 U	0.5 U	0.5 U	0.2 U	0.2 U	0.2 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	**0.53 J**	**35 J**	0.01 U	0.01 U	0.01 U
n-Propylbenzene	0.88	16	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	**0.11 J**	**28 J**	0.05 U	0.05 U	0.05 U
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 UJ	**3.6 J**	0.05 U	0.05 U	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	0.002 U	0.002 U	0.002 U	0.002 U	0.025 UJ	**0.035 J**	0.002 U	0.002 U	0.002 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.002 U	0.002 U	0.002 U	0.002 U	0.02 U	0.02 U	0.002 U	0.002 U	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.002 U	0.002 U	0.002 U	0.002 U	0.05 U	0.05 U	0.002 U	0.002 U	0.002 U
Semi-Volatile Organic Compounds (mg/kg)													
1-Methylnaphthalene	0.0042	0.082	34	5600	0.01 U	0.01 U	0.01 U	0.01 U	**0.6**	**0.46**	0.01 U	0.01 U	0.01 U
2-Methylnaphthalene	0.088	1.7	NA	320	0.01 U	0.01 U	0.01 U	0.01 U	**1.2**	**1**	0.01 U	0.01 U	0.01 U
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Anthracene	57	1100	NA	24000	0.01 U	0.01 U	0.01 U	0.01 U	**0.018**	**0.012**	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.16**	0.01 U	0.01 U
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.26**	0.01 U	0.01 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.41**	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.13**	0.01 U	0.01 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.14**	0.01 U	0.01 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.24**	0.01 U	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.049**	0.01 U	0.01 U
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.17**	0.01 U	0.01 U
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	**0.17**	0.01 U	0.01 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	**0.29**	**0.35**	0.01 U	0.01 U	0.01 U
Naphthalene, Total(1)	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	**2.09**	**1.81**	0.01 U	0.01 U	0.01 U
Phenanthrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	**0.037 J**	**0.025 J**	0.01 U	0.01 U	0.01 U
Pyrene	16	330	NA	2400	0.01 U	0.01 U	0.01 U	0.01 U	**0.011 J**	0.01 UJ	**0.32**	0.01 U	0.01 U
cPAHs-TEQ(2)	0.19	3.9	24	0.19	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	**0.355**	0.0076 U	0.0076 U
Total Petroleum Hydrocarbons-SG (mg/kg)													
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)(3)	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (mg/kg)													
Benzene	0.0017	0.027	18	320	0.001 U	0.001 U	0.001 U	0.001 U	0.03 UJ	**0.13 J**	0.001 U	0.001 U	0.001 U
Toluene	0.27	4.5	NA	6400	**0.0036**	**0.0042**	**0.0019**	**0.0014**	**0.98 J**	**100 J**	0.001 U	**0.0027**	**0.0034**
Ethylbenzene	0.34	5.9	NA	8000	**0.0014**	**0.0019**	0.001 U	0.001 U	**0.32 J**	**63 J**	0.001 U	0.001 U	**0.001**
m,p-Xylenes	NA	NA	NA	NA	**0.0064**	**0.0085**	0.003 U	0.003 U	**1.3 J**	**260 J**	0.003 U	**0.0042**	**0.0049**
o-Xylene	0.84	14	NA	16000	**0.0023**	**0.002**	0.0015 U	0.0015 U	**0.56 J**	**94 J**	0.0015 U	0.0015 U	**0.0016**
Xylene (Total)(4)	0.83	14	NA	16000	**0.0087**	0.0105	0.003 U	0.003 U	**1.86 J**	**354 J**	0.003 U	0.0042	0.0065
Gasoline Range Organics	30/100(5)	NA	NA	NA	5 U	5 U	5 U	5 U	**2000 J**	**1000 J**	5 U	5 U	5 U
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)(3)	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
EPH (mg/kg)													
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	22.7 UJ	22.6 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	22.7 UJ	22.6 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	**17.8 J**	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	-	-	-	-	11.3 UJ	11.3 UJ	-	-	-
VPH (mg/kg)													
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	-	-	-	-	17.1 U	18.8 U	-	-	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	-	-	-	-	**20 J**	**123 J**	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	17.1 UJ	**278 J**	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	**43.8 J**	**469 J**	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	**101 J**	**1460 J**	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	**57.9 J**	**688 J**	-	-	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	-	-	-	-	**33.9 J**	**215 J**	-	-	-
Inorganic Compounds (mg/kg)													
Arsenic	7.3 (4)	7.3 (4)	7.3 (4)	24	**1.48**	**1.4**	**2.28**	**2.65**	**1.79**	**1.84**	**1.47**	**1.49**	**1.83**
Lead	150	3000	NA	NA	**1.2**	**1.2**	**1.93**	**2.25**	**1.55**	**1.59**	**2.08**	**1.25**	**1.23**
Other													
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	0.15 U	-	0.15 U	0.15 U	0.15 U	-	-	0.15 U

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name					HA-2						HA-3			
Sample Name					HA-2-S4	HA-2-S5	HA-2-S7	HA-2-S8	HA-2-S9	HA-2-S10	HA-3-S1	HA-3-S2	HA-3-S3	HA-3-S4
Sample Date		Protective of	Method B		01/24/2024	01/24/2024	01/25/2024	01/25/2024	01/25/2024	01/25/2024	01/23/2024	01/23/2024	01/23/2024	01/23/2024
Sample Type	Protective of	Groundwater	Direct	Method B	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Lab Sample ID	Groundwater	Vadose at 13	Contact	Direct Contact	401358-11	401358-12	401358-14	401358-15	401358-16	401358-17	401358-18	401358-19	401358-20	401358-21
Sample Depth (bgs)	Saturated	Degrees C	Cancerous	Noncancerous	49 - 51 (ft)	53 - 54 (ft)	104 (ft)	108 (ft)	144 - 145 (ft)	145 - 147 (ft)	15 - 17 (ft)	25 - 27 (ft)	55 - 57 (ft)	59 - 60 (ft)
Volatile Organic Compounds (mg/kg)														
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	0.25 U	0.25 U	-	-	0.25 U	0.25 U	0.25 U	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	0.25 U	0.25 U	-	-	0.25 U	0.25 U	0.25 U	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	0.05 U	0.05 U	**460**	**0.22**	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.005 U	0.005 U	0.05 U	0.005 U	-	-	0.005 U	0.005 U	0.005 U	0.005 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	0.05 U	0.05 U	**130**	**0.051**	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	1 U	1 U	-	-	1 U	1 U	1 U	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U	**8.5**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	1 U	1 U	-	-	1 U	1 U	1 U	1 U
Acetone	2.1	29	NA	72000	-	-	5 U	5 U	-	-	-	-	-	-
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	**5**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Chloroethane	NA	NA	NA	NA	0.1 U	0.1 U	0.5 U	0.1 U	0.1 UJ	0.1 UJ	0.1 U	0.1 U	0.1 U	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	0.05 U	0.05 U	**3.9**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	**0.1**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	0.25 U	0.25 U	-	-	0.25 U	0.25 U	0.25 U	0.25 U
Hexane	1.8	72	NA	4800	0.25 U	0.25 U	-	0.25 U	-	-	0.25 U	0.25 U	0.25 U	0.25 U
Isopropylbenzene (Cumene)	0.79	15	NA	8000	0.05 U	0.05 U	25 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.002 U	0.002 U	0.05 U	0.002 U	-	-	0.002 U	0.002 U	0.002 U	0.002 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.2 U	0.2 U	0.5 U	0.2 U	0.2 UJ	0.2 UJ	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	**96**	**0.18**	-	-	0.01 U	0.01 U	0.01 U	0.01 U
n-Propylbenzene	0.88	16	NA	8000	0.05 U	0.05 U	**79**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	**8.7**	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	**0.0027**	0.002 U	**0.037**	**0.0022**	0.002 UJ	0.002 UJ	0.002 U	0.002 U	**0.0021**	0.002 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	-	-	0.05 U	0.05 U	0.05 U	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.002 U	0.002 U	0.02 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	0.5 U	-	-	-	0.5 U	0.5 U	0.5 U	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.002 U	0.002 U	0.05 U	0.002 U	0.002 UJ	0.002 UJ	0.002 U	0.002 U	0.002 U	0.002 U
Semi-Volatile Organic Compounds (mg/kg)														
1-Methylnaphthalene	0.0042	0.082	34	5600	**0.097**	0.01 U	**18**	**0.01**	-	-	0.01 U	0.01 U	0.01 U	0.01 U
2-Methylnaphthalene	0.088	1.7	NA	320	**0.18**	0.01 U	**42**	**0.029**	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Anthracene	57	1100	NA	24000	0.01 U	0.01 U	**0.12**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	**0.05**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U	**0.022**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	**0.012**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	**0.014**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	**0.019**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U	**0.036**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Naphthalene	0.24	4.5	NA	1600	**0.01**	0.01 U	**43**	**0.019**	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Naphthalene, Total[(1)]	0.24	4.5	NA	1600	**0.287**	0.01 U	**103**	**0.058**			0.01 U	0.01 U	0.01 U	0.01 U
Phenanthrene	NA	NA	NA	NA	0.01 U	0.01 U	**0.21**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
Pyrene	16	330	NA	2400	0.01 U	0.01 U	**0.052**	0.01 U	-	-	0.01 U	0.01 U	0.01 U	0.01 U
cPAHs-TEQ[(2)]	0.19	3.9	24	0.19	0.0076 U	0.0076 U	**0.0299**	0.0076 U	-	-	0.0076 U	0.0076 U	0.0076 U	0.0076 U
Total Petroleum Hydrocarbons-SG (mg/kg)														
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)[(3)]	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (mg/kg)														
Benzene	0.0017	0.027	18	320	0.001 U	0.001 U	**1.5**	**0.013**	-	-	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.27	4.5	NA	6400	**0.0035**	0.001 U	**430**	**0.45**	-	-	0.001 U	**0.0018**	**0.003**	0.001 U
Ethylbenzene	0.34	5.9	NA	8000	0.001 U	0.001 U	**180**	**0.12**	-	-	0.001 U	0.001 U	0.001 U	0.001 U
m,p-Xylenes	NA	NA	NA	NA	**0.0057**	0.003 U	**800**	**0.46**	-	-	0.003 U	0.003 U	0.003 U	0.003 U
o-Xylene	0.84	14	NA	16000	**0.0019**	0.0015 U	**330**	**0.16**	-	-	0.0015 U	0.0015 U	0.0015 U	0.0015 U
Xylene (Total)[(4)]	0.83	14	NA	16000	**0.0076**	0.003 U	**1130**	**0.62**			0.003 U	0.003 U	0.003 U	0.003 U
Gasoline Range Organics	30/100[(5)]	NA	NA	NA	5 U	5 U	**17000**	**6.4**	5 U	5 U	5 U	5 U	5 U	5 U
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	50 U	50 U	**1400**	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)[(3)]	2000	NA	NA	NA	250 U	250 U	**1400**	250 U	250 U	250 U	250 U	250 U	250 U	250 U
EPH (mg/kg)														
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	**117 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	**93.8 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	-	-	**53.6 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	-	-	11.3 UJ	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	-	-	11.3 UJ	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	**332 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	**344 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	-	-	**252 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	-	-	**46.9 J**	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	-	-	11.3 UJ	-	-	-	-	-	-	-
VPH (mg/kg)														
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	-	-	**114**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	-	-	**498**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	**304**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	**456**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	**1760**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	**695**	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	-	-	**205**	-	-	-	-	-	-	-
Inorganic Compounds (mg/kg)														
Arsenic	7.3 [(4)]	7.3 [(4)]	7.3 [(4)]	24	**4.72**	**7.76**	**1.86**	**1.73**	-	-	**1.55**	**1.38**	**2.26**	**2.58**
Lead	150	3000	NA	NA	**2.14**	**6.01**	**1.82**	**1.86**	-	-	**1.21**	**1.2**	**2.03**	**2.02**
Other														
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	0.15 U	0.15 U	-	-	-	-	-	-	-

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name					HA-3	HA-4						MW-19D	
Sample Name					HA-3-S6	HA-4-S1	HA-4-S2	HA-4-S3	HA-4-S4	HA-4-S5	HA-4-S6	MW-19D-S1	MW-19D-S2
Sample Date		Protective of	Method B		01/23/2024	01/29/2024	01/29/2024	01/29/2024	01/29/2024	01/29/2024	01/29/2024	01/10/2024	01/10/2024
Sample Type	Protective of	Groundwater	Direct	Method B	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Lab Sample ID	Groundwater	Vadose at 13	Contact	Direct Contact	401358-23	402019-01	402019-02	402019-03	402019-04	402019-05	402019-06	401180-01	401180-02
Sample Depth (bgs)	Saturated	Degrees C	Cancerous	Noncancerous	105 (ft)	15 - 17 (ft)	25 - 27 (ft)	53 - 55 (ft)	59 (ft)	61 (ft)	101 (ft)	15 - 17.5 (ft)	20 - 23 (ft)
Volatile Organic Compounds (mg/kg)													
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.5 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	**520**	0.05 U	0.05 U	0.05 U	**0.33**	-	**0.75**	0.05 U	**0.082**
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.05 U	0.005 U	0.005 U	0.005 U	0.005 U	-	0.005 U	0.005 U	0.005 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	**150**	0.05 U	0.05 U	0.05 U	**0.18**	-	**0.18**	0.05 U	0.05 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	1 U	1 U	1 U	-	1 U	1 U	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	**9.3**	0.05 U	0.05 U	0.05 U	**0.49**	-	0.05 U	0.05 U	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	1 U	1 U	1 U	-	1 U	1 U	1 U
Acetone	2.1	29	NA	72000	5 U	-	-	-	-	-	-	5 UJ	5 UJ
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Chloroethane	NA	NA	NA	NA	0.5 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	**4.1**	0.05 U	0.05 U	0.05 U	**0.21**	-	0.05 U	0.05 U	0.05 U
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U
Hexane	1.8	72	NA	4800	**250**	0.25 U	0.25 U	0.25 U	**2.8**	-	0.25 U	0.25 U	0.25 U
Isopropylbenzene (Cumene)	0.79	15	NA	8000	**29**	0.05 U	0.05 U	0.05 U	**0.068**	-	0.05 U	0.05 U	0.05 U
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.5 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	0.24	4.5	NA	1600	**86**	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.36**	0.01 U	**0.026**
n-Propylbenzene	0.88	16	NA	8000	**97**	0.05 U	0.05 U	0.05 U	**0.26**	-	**0.11**	0.05 U	0.05 U
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	**0.16**	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.02 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.05 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Semi-Volatile Organic Compounds (mg/kg)													
1-Methylnaphthalene	0.0042	0.082	34	5600	**4.8**	0.01 U	0.01 U	0.01 U	**0.065**	-	**0.011**	0.01 U	**0.06**
2-Methylnaphthalene	0.088	1.7	NA	320	**14**	0.01 U	0.01 U	0.01 U	**0.15**	-	**0.026**	0.01 U	**0.1**
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.05 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.05 U
Anthracene	57	1100	NA	24000	**0.062**	0.01 U	0.01 U	0.01 U	**0.03**	-	0.01 U	0.01 U	0.05 U
Benzo(a)anthracene	NA	NA	NA	NA	**0.028**	0.01 U	0.01 U	0.01 U	**0.027**	-	0.01 U	0.01 U	0.05 U
Benzo(a)pyrene	0.19	3.9	0.19	24	**0.011**	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	**0.051**
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Fluoranthene	32	630	NA	3200	**0.021**	0.01 U	0.01 U	0.01 U	**0.013**	-	0.01 U	0.01 U	0.05 U
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.05 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.5 U
Naphthalene	0.24	4.5	NA	1600	**4.7**	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.024**	0.01 U	0.05 U
Naphthalene, Total(1)	0.24	4.5	NA	1600	**23.5**	0.01 U	0.01 U	0.01 U	**0.215**		**0.061**	0.01 U	**0.16**
Phenanthrene	NA	NA	NA	NA	**0.11**	0.01 U	0.01 U	0.01 U	**0.044**	-	0.01 U	0.01 U	0.05 U
Pyrene	16	330	NA	2400	**0.028**	0.01 U	0.01 U	0.01 U	**0.026**	-	0.01 U	0.01 U	0.05 U
cPAHs-TEQ(2)	0.19	3.9	24	0.19	**0.009**	0.0076 U	0.0076 U	0.0076 U	**0.0098**	-	0.0076 U	0.0076 U	**0.353**
Total Petroleum Hydrocarbons-SG (mg/kg)													
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-	-	-	-	-	-	50 U	**240**
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-	-	-	-	-	-	250 U	**1100**
Total Petroleum Hydrocarbons (C10-C36)(3)	NA	NA	NA	NA	-	-	-	-	-	-	-	250 U	**1340**
Total Petroleum Hydrocarbons (mg/kg)													
Benzene	0.0017	0.027	18	320	0.03 U	0.001 U	0.001 U	**0.0014**	0.001 U	-	0.001 U	0.001 U	0.001 U
Toluene	0.27	4.5	NA	6400	**160**	0.001 U	0.001 U	**0.012**	**0.0046**	-	**0.036**	0.001 U	**0.002**
Ethylbenzene	0.34	5.9	NA	8000	**280**	0.001 U	0.001 U	**0.0024**	0.001 U	-	**0.52**	0.001 U	0.001 U
m,p-Xylenes	NA	NA	NA	NA	**1000**	0.002 U	0.002 U	**0.018**	**0.0098**	-	**2.1**	0.002 U	**0.0047**
o-Xylene	0.84	14	NA	16000	**350**	0.001 U	0.001 U	**0.004**	**0.0013**	-	**0.8**	0.001 U	**0.0045**
Xylene (Total)(4)	0.83	14	NA	16000	**1350**	0.002 U	0.002 U	**0.022**	**0.0111**	-	**2.9**	0.002 U	**0.0092**
Gasoline Range Organics	30/100(5)	NA	NA	NA	**11000**	5 U	5 U	5 U	**700**	5 U	**9.1**	5 U	**10**
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	**340**	50 U	50 U	50 U	50 U	50 U	50 U	-	**370**
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	-	**1700**
Total Petroleum Hydrocarbons (C10-C36)(3)	2000	NA	NA	NA	**340**	250 U	250 U	250 U	250 U	250 U	250 U	-	**2070**
EPH (mg/kg)													
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	21.9 UJ	-	-	-	21.9 U	-	-	-	107 U
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	**18.9 J**	-	-	-	**15.9**	-	-	-	53.5 U
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	**12.5 J**	-	-	-	**17.3**	-	-	-	**28.2 J**
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	11 UJ	-	-	-	11 U	-	-	-	**21.1 J**
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	11 UJ	-	-	-	11 U	-	-	-	**91.3**
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	**27.4 J**	-	-	-	21.9 U	-	-	-	107 U
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	**60.7 J**	-	-	-	11 U	-	-	-	53.5 U
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	**61.9 J**	-	-	-	**30.1**	-	-	-	**20 J**
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	**22 J**	-	-	-	**20.9**	-	-	-	**52 J**
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	11 UJ	-	-	-	11 U	-	-	-	**41.4 J**
VPH (mg/kg)													
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	**536 J-**	-	-	-	**2.22**	-	-	-	0.997 U
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	**1530 J-**	-	-	-	**16.2**	-	-	-	**0.46 J**
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	**553 J-**	-	-	-	**37.1**	-	-	-	0.997 U
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	**802 J-**	-	-	-	**36**	-	-	-	**1.52 J**
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	**1920 J-**	-	-	-	**17**	-	-	-	**0.187 J**
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	**1120 J-**	-	-	-	**28.6**	-	-	-	**1.44 J**
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	**276 J-**	-	-	-	**16.8**	-	-	-	**1.44 J**
Inorganic Compounds (mg/kg)													
Arsenic	7.3 (4)	7.3 (4)	7.3 (4)	24	**2.22**	**4.57**	**1.57**	**2.3**	**1.26**	-	**1.98**	**2.06**	**2.19**
Lead	150	3000	NA	NA	**1.73**	**2.92**	**1.26**	**1.78**	**1.26**	-	**1.97**	**1.48**	**2.93**
Other													
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	-	0.15 U	-	0.15 U	-	0.15 U	-	-

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name					MW-19D				MW-20D				
Sample Name					MW-19D-S3	MW-19D-S4	MW-19D-S5	MW-19D-S6	MW-20D-S1	MW-20D-S2	MW-20D-S3	MW-20D-S4	MW-20D-S5
Sample Date		Protective of	Method B		01/10/2024	01/10/2024	01/10/2024	01/10/2024	01/11/2024	01/11/2024	01/12/2024	01/12/2024	01/12/2024
Sample Type	Protective of	Groundwater	Direct	Method B	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Lab Sample ID	Groundwater	Vadose at 13	Contact	Direct Contact	401180-03	401180-04	401180-05	401180-06	401180-08	401180-09	401180-10	401180-11	401180-12
Sample Depth (bgs)	Saturated	Degrees C	Cancerous	Noncancerous	43 - 44 (ft)	50 - 52.5 (ft)	75 - 75.5 (ft)	102.5 - 105 (ft)	15 - 17.5 (ft)	25 - 27.5 (ft)	42.5 - 45 (ft)	47 - 48 (ft)	58 - 60 (ft)
Volatile Organic Compounds (mg/kg)													
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,1-Dichloroethane	0.0026	0.041	180	16000	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.005 U	0.005 U	-	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,2-Dichloroethane	0.0016	0.023	11	480	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	-
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	-
Acetone	2.1	29	NA	72000	5 UJ	5 UJ	-	5 UJ	5 UJ	5 UJ	5 UJ	5 UJ	-
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Chloroethane	NA	NA	NA	NA	0.1 U	0.1 U	-	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-
Hexane	1.8	72	NA	4800	0.25 U	0.25 U	-	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-
Isopropylbenzene (Cumene)	0.79	15	NA	8000	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.2 U	0.2 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
n-Propylbenzene	0.88	16	NA	8000	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Tetrachloroethene (PCE)	0.0028	0.05	480	480	0.002 U	0.002 U	-	0.002 U	**0.013**	**0.013**	**0.0092**	**0.0046**	0.002 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	-	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-
Trichloroethene (TCE)	0.0015	0.025	12	40	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Semi-Volatile Organic Compounds (mg/kg)													
1-Methylnaphthalene	0.0042	0.082	34	5600	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
2-Methylnaphthalene	0.088	1.7	NA	320	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Anthracene	57	1100	NA	24000	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Naphthalene, Total[1]	0.24	4.5	NA	1600	0.01 U	0.01 U		0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	
Phenanthrene	NA	NA	NA	NA	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
Pyrene	16	330	NA	2400	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-
cPAHs-TEQ[2]	0.19	3.9	24	0.19	0.0076 U	0.0076 U	-	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	-
Total Petroleum Hydrocarbons-SG (mg/kg)													
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)[3]	NA	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (mg/kg)													
Benzene	0.0017	0.027	18	320	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.27	4.5	NA	6400	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.34	5.9	NA	8000	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
m,p-Xylenes	NA	NA	NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
o-Xylene	0.84	14	NA	16000	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Xylene (Total)[4]	0.83	14	NA	16000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U
Gasoline Range Organics	30/100[5]	NA	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)[3]	2000	NA	NA	NA	-	-	-	-	-	-	-	-	-
EPH (mg/kg)													
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
VPH (mg/kg)													
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Inorganic Compounds (mg/kg)													
Arsenic	7.3 [4]	7.3 [4]	7.3 [4]	24	**1.79**	**1.56**	-	**3.4**	**1.33**	**1.35**	**1.93**	**1.73**	-
Lead	150	3000	NA	NA	**1.41**	**1.23**	-	**2.32**	**1.17**	**1.2**	**1.48**	**1.43**	-
Other													
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name	Protective of Groundwater Saturated	Protective of Groundwater Vadose at 13 Degrees C	Method B Direct Contact Cancerous	Method B Direct Contact Noncancerous	MW-20D	MW-21D							MW-22D
Sample Name					MW-20D-S6	MW-21D-S1	MW-21D-S2	MW-21D-S3	MW-21D-S4	MW-21D-S5	MW-21D-S6	MW-21D-S7	MW-22D-S1
Sample Date					01/15/2024	01/16/2024	01/16/2024	01/16/2024	01/16/2024	01/16/2024	01/16/2024	01/16/2024	01/17/2024
Sample Type					Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Lab Sample ID					401269-01	401269-02	401269-03	401269-04	401269-05	401269-06	401269-07	401269-08	401269-09
Sample Depth (bgs)					106 - 108 (ft)	15 - 17.5 (ft)	20 - 22 (ft)	25 - 27 (ft)	48 - 50 (ft)	54 - 56 (ft)	61 - 63 (ft)	100 - 102 (ft)	14 - 16 (ft)
Volatile Organic Compounds (mg/kg)													
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**23**	0.05 U
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	-
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	0.005 U	0.005 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**9**	0.05 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**0.39**	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U	1 U
Acetone	2.1	29	NA	72000	5 U	5 U	5 U	5 U	5 U	5 U	-	5 U	-
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Chloroethane	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	-	0.1 U	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**0.34**	0.05 U
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U	0.25 U
Hexane	1.8	72	NA	4800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	**1.7**	0.25 U
Isopropylbenzene (Cumene)	0.79	15	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**0.55**	0.05 U
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	-	0.2 U	0.2 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**3.5**	0.01 U
n-Propylbenzene	0.88	16	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	**2.7**	0.05 U
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	0.002 U	**0.015**	**0.0092**	**0.019**	**0.042**	**0.022**	-	**0.27**	**0.018**
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U	0.002 U
Semi-Volatile Organic Compounds (mg/kg)													
1-Methylnaphthalene	0.0042	0.082	34	5600	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**5.8**	0.01 U
2-Methylnaphthalene	0.088	1.7	NA	320	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**16**	0.01 U
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.014**	0.01 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Anthracene	57	1100	NA	24000	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.053**	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**7.6**	0.01 U
Naphthalene, Total(1)	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U		**29.4**	0.01 U
Phenanthrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.088**	0.01 U
Pyrene	16	330	NA	2400	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	**0.02**	0.01 U
cPAHs-TEQ(2)	0.19	3.9	24	0.19	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	-	0.0076 U	0.0076 U
Total Petroleum Hydrocarbons-SG (mg/kg)													
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)(3)	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (mg/kg)													
Benzene	0.0017	0.027	18	320	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	0.001 U	0.001 U
Toluene	0.27	4.5	NA	6400	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	0.003 U	0.001 U
Ethylbenzene	0.34	5.9	NA	8000	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	**1.3**	0.001 U
m,p-Xylenes	NA	NA	NA	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	**5.8**	0.002 U
o-Xylene	0.84	14	NA	16000	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	-	**1.8**	0.001 U
Xylene (Total)(4)	0.83	14	NA	16000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	**7.6**	0.002 U
Gasoline Range Organics	30/100(5)	NA	NA	NA	5 U	5 U	5 U	5 U	5 U	5 U	5 U	**1200**	5 U
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U	**990**	50 U
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)(3)	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	**990**	250 U
EPH (mg/kg)													
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**27.5**	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**80.4**	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**54.8**	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	11.5 U	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	11.5 U	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**23.8**	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**91.8**	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**102**	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**20.8**	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	11.5 U	-
VPH (mg/kg)													
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	1.4 U	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**22.7**	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**33.6 J**	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**47.6 J**	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**44.9 J**	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**29 J**	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	**18.8 J**	-
Inorganic Compounds (mg/kg)													
Arsenic	7.3 (4)	7.3 (4)	7.3 (4)	24	**4.02**	**1.54**	**1.57**	**2.61**	**1.57**	**1.99**	-	**1.89**	**1.63**
Lead	150	3000	NA	NA	**2.07**	**1.33**	**1.34**	**2.05**	**1.27**	**1.58**	-	**5.75**	**1.15**
Other													
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	-	0.15 U	-	0.15 U	-	-	0.15 U	-

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name					**MW-22D**				**MW-23D**				
Sample Name					MW-22D-S2	MW-22D-S4	MW-22D-S5	MW-22D-S8	MW-23D-S1	MW-23D-S2	MW-23D-S3	MW-23D-S5	MW-23D-S4
Sample Date		**Protective of**	**Method B**		01/17/2024	01/17/2024	01/17/2024	01/19/2024	01/19/2024	01/19/2024	01/22/2024	01/22/2024	01/22/2024
Sample Type	**Protective of**	**Groundwater**	**Direct**	**Method B**	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary
Lab Sample ID	**Groundwater**	**Vadose at 13**	**Contact**	**Direct Contact**	401269-10	401269-12	401269-13	401269-16	401269-17	401269-18	401358-24	401358-26	401358-25
Sample Depth (bgs)	**Saturated**	**Degrees C**	**Cancerous**	**Noncancerous**	26 - 27 (ft)	57 - 58 (ft)	63 - 65 (ft)	117.5 - 120 (ft)	15 - 17 (ft)	25 - 27 (ft)	59 (ft)	61 (ft)	63 (ft)
Volatile Organic Compounds (mg/kg)													
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	0.05 U	0.05 U	0.05 U	**0.42**	0.05 U	0.05 U	0.05 U	-	0.05 U
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	-	0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	0.005 U	-	0.005 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	0.05 U	0.05 U	0.05 U	**0.13**	0.05 U	0.05 U	0.05 U	-	0.05 U
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U	1 U	1 U	1 U	1 U	1 U	-	1 U
Acetone	2.1	29	NA	72000	5 U	5 U	5 U	5 U	-	5 U	-	-	-
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Chloroethane	NA	NA	NA	NA	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 UJ	0.1 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U
Hexane	1.8	72	NA	4800	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	-	0.25 U
Isopropylbenzene (Cumene)	0.79	15	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	-	0.002 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 UJ	0.2 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	**0.22**	0.01 U	0.01 U	0.01 U	-	0.01 U
n-Propylbenzene	0.88	16	NA	8000	0.05 U	0.05 U	0.05 U	**0.061**	0.05 U	0.05 U	0.05 U	-	0.05 U
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	**0.011**	**0.0024**	0.002 U	0.002 U	**0.0048**	**0.0036**	0.002 U	0.002 UJ	0.002 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	-	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 U	0.002 UJ	0.002 U
Semi-Volatile Organic Compounds (mg/kg)													
1-Methylnaphthalene	0.0042	0.082	34	5600	0.01 U	0.01 U	0.01 U	**0.012**	0.01 U	0.01 U	**0.011**	-	0.01 U
2-Methylnaphthalene	0.088	1.7	NA	320	0.01 U	0.01 U	0.01 U	**0.032**	0.01 U	0.01 U	**0.026**	-	0.01 U
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Anthracene	57	1100	NA	24000	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Fluorene	2.6	51	NA	3200	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Naphthalene	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	**0.03**	0.01 U	0.01 U	**0.01**	-	0.01 U
Naphthalene, Total(1)	0.24	4.5	NA	1600	0.01 U	0.01 U	0.01 U	**0.074**	0.01 U	0.01 U	**0.047**		0.01 U
Phenanthrene	NA	NA	NA	NA	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
Pyrene	16	330	NA	2400	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
cPAHs-TEQ(2)	0.19	3.9	24	0.19	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	0.0076 U	-	0.0076 U
Total Petroleum Hydrocarbons-SG (mg/kg)													
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)(3)	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (mg/kg)													
Benzene	0.0017	0.027	18	320	0.001 U	0.001 U	0.001 U	**0.004**	0.001 U	0.001 U	0.001 U	0.02 U	0.001 U
Toluene	0.27	4.5	NA	6400	0.001 U	0.001 U	0.001 U	**0.13**	0.001 U	0.001 U	0.001 U	0.02 U	0.001 U
Ethylbenzene	0.34	5.9	NA	8000	0.001 U	0.001 U	0.001 U	**0.69**	0.001 U	0.001 U	0.001 U	0.02 U	0.001 U
m,p-Xylenes	NA	NA	NA	NA	0.002 U	0.002 U	0.002 U	**2.4**	0.002 U	0.002 U	0.003 U	-	0.003 U
o-Xylene	0.84	14	NA	16000	0.001 U	0.001 U	0.001 U	**0.81**	0.001 U	0.001 U	0.0015 U	-	0.0015 U
Xylene (Total)(4)	0.83	14	NA	16000	0.002 U	0.002 U	0.002 U	**3.21**	0.002 U	0.002 U	0.003 U	0.06 U	0.003 U
Gasoline Range Organics	30/100(5)	NA	NA	NA	5 U	5 U	5 U	**14**	5 U	5 U	5 U	5 U	5 U
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)(3)	2000	NA	NA	NA	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U
EPH (mg/kg)													
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
VPH (mg/kg)													
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	-	-	-	-	-	-	-	-	-
Inorganic Compounds (mg/kg)													
Arsenic	7.3 (4)	7.3 (4)	7.3 (4)	24	**1.84**	**4.03**	**7.55**	**1.91**	**1.42**	**1.58**	**5.4**	-	**4.78**
Lead	150	3000	NA	NA	**1.51**	**2.48**	**4.6**	**1.6**	**1.18**	**1.31**	**3.16**	-	**3.69**
Other													
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	-	-	-	-	-	0.15 U	-	-	0.15 U

TABLE 3
ANALYTICAL RESULTS FOR SOIL
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Type Lab Sample ID Sample Depth (bgs)	Protective of Groundwater Saturated	Protective of Groundwater Vadose at 13 Degrees C	Method B Direct Contact Cancerous	Method B Direct Contact Noncancerous	MW-23D MW-23D-S6 01/22/2024 Primary 401358-27 106 (ft)	MW-23D MW-23D-DUP 01/22/2024 Duplicate 401358-28 106 (ft)
Volatile Organic Compounds (mg/kg)						
1,1,1,2-Tetrachloroethane	0.00063	0.0098	38	2400	0.05 U	0.05 U
1,1,1-Trichloroethane	0.084	1.5	NA	160000	0.05 U	0.05 U
1,1,2,2-Tetrachloroethane	8.00E-05	0.0012	5	1600	0.05 U	0.05 U
1,1,2-Trichloroethane	0.0011	0.017	18	320	0.05 U	0.05 U
1,1-Dichloroethane	0.0026	0.041	180	16000	0.05 U	0.05 U
1,1-Dichloroethene	0.0025	0.046	NA	4000	0.05 U	0.05 U
1,1-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U
1,2,3-Trichlorobenzene	0.011	0.2	NA	64	0.25 U	0.25 U
1,2,3-Trichloropropane	1.50E-07	2.40E-06	0.0063	320	0.05 U	0.05 U
1,2,4-Trichlorobenzene	0.029	0.56	34	800	0.25 U	0.25 U
1,2,4-Trimethylbenzene	0.072	1.3	NA	800	**16 J+**	**9.8**
1,2-Dibromo-3-chloropropane (DBCP)	5.80E-05	0.00091	0.23	16	0.5 U	0.5 U
1,2-Dibromoethane (Ethylene Dibromide)	1.80E-05	0.00027	0.5	720	0.05 U	0.05 U
1,2-Dichlorobenzene	0.4	7	NA	7200	0.05 U	0.05 U
1,2-Dichloroethane	0.0016	0.023	11	480	0.05 U	0.05 U
1,2-Dichloropropane	0.0017	0.025	27	3200	0.05 U	0.05 U
1,3,5-Trimethylbenzene	0.071	1.3	NA	800	**7.2 J+**	**5.1**
1,3-Dichlorobenzene	NA	NA	NA	NA	0.05 U	0.05 U
1,3-Dichloropropane	0.057	0.88	NA	1600	0.05 U	0.05 U
1,4-Dichlorobenzene	0.068	1.2	190	5600	0.05 U	0.05 U
2,2-Dichloropropane	NA	NA	NA	NA	0.05 U	0.05 U
2-Butanone (Methyl Ethyl Ketone)	1.4	20	NA	48000	1 U	1 U
2-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U
2-Hexanone (Methyl Butyl Ketone)	0.012	0.17	NA	400	0.5 U	0.5 U
2-Phenylbutane (sec-Butylbenzene)	1.3	25	NA	8000	0.05 U	0.05 U
4-Chlorotoluene	0.11	1.9	NA	1600	0.05 U	0.05 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	0.19	2.7	NA	6400	1 U	1 U
Acetone	2.1	29	NA	72000	5 U	5 U
Bromobenzene	0.033	0.56	NA	640	0.05 U	0.05 U
Bromodichloromethane	0.0022	0.033	16	1600	0.05 U	0.05 U
Bromoform	0.023	0.36	130	1600	0.05 U	0.05 U
Bromomethane (Methyl Bromide)	0.0033	0.051	NA	110	0.5 U	0.5 U
Carbon tetrachloride	0.0022	0.041	14	320	0.05 U	0.05 U
Chlorobenzene	0.051	0.86	NA	1600	0.05 U	0.05 U
Chloroethane	NA	NA	NA	NA	0.5 U	0.5 U
Chloroform (Trichloromethane)	0.0048	0.074	32	800	0.05 U	0.05 U
Chloromethane (Methyl Chloride)	NA	NA	NA	NA	0.5 U	0.5 U
cis-1,2-Dichloroethene	0.0052	0.079	NA	160	0.05 U	0.05 U
cis-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	NA	**0.33 J+**	**0.22**
Dibromochloromethane	0.0017	0.024	12	1600	0.05 U	0.05 U
Dibromomethane	0.025	0.36	NA	800	0.05 U	0.05 U
Dichlorodifluoromethane (CFC-12)	0.53	38	NA	16000	0.5 U	0.5 U
Hexachlorobutadiene	0.00063	0.012	13	80	0.25 U	0.25 U
Hexane	1.8	72	NA	4800	**0.89**	**1.1**
Isopropylbenzene (Cumene)	0.79	15	NA	8000	**0.81**	**0.57**
Methyl Tert Butyl Ether (MTBE)	0.0072	0.1	560	NA	0.05 U	0.05 U
Methylene chloride (Dichloromethane)	0.0015	0.022	94	480	0.5 U	0.5 U
Naphthalene	0.24	4.5	NA	1600	**4.6 J+**	**3.6**
n-Propylbenzene	0.88	16	NA	8000	**3.4 J+**	**2.6**
Styrene	0.12	2.2	NA	16000	0.05 U	0.05 U
tert-Butylbenzene	1	20	NA	8000	0.05 U	0.05 U
Tetrachloroethene (PCE)	0.0028	0.05	480	480	0.025 U	0.025 U
trans-1,2-Dichloroethene	0.032	0.52	NA	1600	0.05 U	0.05 U
trans-1,3-Dichloropropene	NA	NA	NA	NA	0.05 U	0.05 U
Trichloroethene (TCE)	0.0015	0.025	12	40	0.02 U	0.02 U
Trichlorofluoromethane (CFC-11)	0.79	23	NA	24000	0.5 U	0.5 U
Vinyl chloride	9.00E-05	0.0017	0.67	240	0.05 U	0.05 U
Semi-Volatile Organic Compounds (mg/kg)						
1-Methylnaphthalene	0.0042	0.082	34	5600	**0.25**	**0.18**
2-Methylnaphthalene	0.088	1.7	NA	320	**0.6**	**0.42**
Acenaphthene	2.5	49	NA	4800	0.01 U	0.01 U
Acenaphthylene	NA	NA	NA	NA	0.01 U	0.01 U
Anthracene	57	1100	NA	24000	0.01 U	0.01 U
Benzo(a)anthracene	NA	NA	NA	NA	0.01 U	0.01 U
Benzo(a)pyrene	0.19	3.9	0.19	24	0.01 U	0.01 U
Benzo(b)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U
Benzo(g,h,i)perylene	NA	NA	NA	NA	0.01 U	0.01 U
Benzo(k)fluoranthene	NA	NA	NA	NA	0.01 U	0.01 U
Chrysene	NA	NA	NA	NA	0.01 U	0.01 U
Dibenz(a,h)anthracene	NA	NA	NA	NA	0.01 U	0.01 U
Fluoranthene	32	630	NA	3200	0.01 U	0.01 U
Fluorene	2.6	51	NA	3200	**0.02**	**0.013**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	0.01 U	0.01 U
Naphthalene	0.24	4.5	NA	1600	**0.49**	**0.35**
Naphthalene, Total(1)	0.24	4.5	NA	1600	**1.34**	**0.95**
Phenanthrene	NA	NA	NA	NA	**0.03**	**0.02**
Pyrene	16	330	NA	2400	0.01 U	0.01 U
cPAHs-TEQ(2)	0.19	3.9	24	0.19	0.0076 U	0.0076 U
Total Petroleum Hydrocarbons-SG (mg/kg)						
Total Petroleum Hydrocarbons (C10-C25) DRO	NA	NA	NA	NA	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	NA	NA	NA	NA	-	-
Total Petroleum Hydrocarbons (C10-C36)(3)	NA	NA	NA	NA	-	-
Total Petroleum Hydrocarbons (mg/kg)						
Benzene	0.0017	0.027	18	320	0.03 U	0.03 U
Toluene	0.27	4.5	NA	6400	**5.2 J**	**2.9 J**
Ethylbenzene	0.34	5.9	NA	8000	**4.6**	**3.3**
m,p-Xylenes	NA	NA	NA	NA	**18**	**13**
o-Xylene	0.84	14	NA	16000	**3.4**	**2.7**
Xylene (Total)(4)	0.83	14	NA	16000	**21.4**	**15.7**
Gasoline Range Organics	30/100(5)	NA	NA	NA	**1100**	**1000**
Total Petroleum Hydrocarbons (C10-C25) DRO	2000	NA	NA	NA	**230 J**	**65 J**
Total Petroleum Hydrocarbons (C25-C36) ORO	2000	NA	NA	NA	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)(3)	2000	NA	NA	NA	**230 J**	**65 J**
EPH (mg/kg)						
Extractable Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	21.9 UJ	-
Extractable Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	**28.5 J**	-
Extractable Petroleum Hydrocarbons (C12-C16) Aliphatic	NA	NA	NA	NA	**21.3 J**	-
Extractable Petroleum Hydrocarbons (C16-C21) Aliphatic	NA	NA	NA	NA	10.9 UJ	-
Extractable Petroleum Hydrocarbons (C21-C34) Aliphatic	NA	NA	NA	NA	10.9 UJ	-
Extractable Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	21.9 UJ	-
Extractable Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	10.9 UJ	-
Extractable Petroleum Hydrocarbons (C12-C16) Aromatic	NA	NA	NA	NA	10.9 UJ	-
Extractable Petroleum Hydrocarbons (C16-C21) Aromatic	NA	NA	NA	NA	10.9 UJ	-
Extractable Petroleum Hydrocarbons (C21-C34) Aromatic	NA	NA	NA	NA	10.9 UJ	-
VPH (mg/kg)						
Volatile Petroleum Hydrocarbons (C5-C6) Aliphatic	NA	NA	NA	NA	**10.7 J**	-
Volatile Petroleum Hydrocarbons (C6-C8) Aliphatic	NA	NA	NA	NA	**11.2 J**	-
Volatile Petroleum Hydrocarbons (C8-C10) Aliphatic	NA	NA	NA	NA	**67.1 J**	-
Volatile Petroleum Hydrocarbons (C10-C12) Aliphatic	NA	NA	NA	NA	**170 J**	-
Volatile Petroleum Hydrocarbons (C8-C10) Aromatic	NA	NA	NA	NA	**111 J**	-
Volatile Petroleum Hydrocarbons (C10-C12) Aromatic	NA	NA	NA	NA	**250 J**	-
Volatile Petroleum Hydrocarbons (C12-C13) Aromatic	NA	NA	NA	NA	**64 J**	-
Inorganic Compounds (mg/kg)						
Arsenic	7.3 (4)	7.3 (4)	7.3 (4)	24	**2.09**	**1.67**
Lead	150	3000	NA	NA	**3.39**	**3.1**
Other						
Total Organic Carbon (TOC) (%)	NA	NA	NA	NA	0.15 U	0.15 U

Notes:

(1): total naphthalene is the summation of 1-Methylnaphthalene, 2-Methylnaphthalene, and Naphthalene analyzed by analytical method SW8270E.

(2): Toxicity Equivalent using April 2015 (revised July 2021) Ecology's Implementation Memo No. 10: Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs), Publication No. 15-09-049.
For non-detects (<RL), a value of one-half the RL has been used for TEQ calculation.
cPAH calculated for samples with individual PAHs identified as a non-detect will be qualified with U.

(3) Total Petroleum Hydrocarbons (C10-C-36) were summed in accordance with Publication No. 04-09-086.
A value of zero has been used for non-detects in the calculation.

(4): 7.3 is the Puget Sound background threshold value for Arsenic in soil 'based on Ecology's 1994 Metals Background Study.

(5): 30 mg/kg if benzene is present, otherwise, 100 mg/kg

***Bold** denotes a detected concentration.*

nondetect values are not screened against the cleanup levels

Purple shading denotes a detected analyte concentration exceeding a MTCA Method A Unrestricted Land Use or Method B Direct Contact Cancerous/Noncancerous Cleanup Level; this screening only applies to sample HA-2-S1.5 collected above 15 ft bgs.

Blue shading denotes a detected analyte concentration exceeding a MTCA Protective of Groundwater Vadose at 13 degrees C Cleanup Level. This screening applies to soil above the water table; estimated at 42 ft bgs.

Green shading denotes a detected analyte concentration exceeding a MTCA Protective of Groundwater Saturated Cleanup Level. This screening applies to soil below the water table

When multiple action levels are exceeded a bracketed bold superscript corresponding to each screening level is denoted. A: MTCA Protective of Groundwater Saturated; B: Protective of Groundwater Vadose at 13 degrees C; C: Method A Unrestricted Land Use, D: MTCA Method B Direct Contact Cancerous, E: MTCA Method B Direct Contact Noncancerous.

-: Not analyzed
bgs: below ground surface
C: Celsius
ft: feet
J: result is an estimate
J+: result is an estimate, biased high
J-: result is an estimate, biased high
mg/kg: milligrams per kilogram
MTCA: Model Toxics Control Act
NA: Not Available
U: not detected above the indicated laboratory reporting limit

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	HA-1 HA-1-GW 01/26/2024 57 (ft)	HA-2 HA-2-GW 01/24/2024 55 (ft)	HA-3 HA-3-GW 01/23/2024 -	HA-3 DUP-01 01/23/2024 -	MW-1S MW-1S-20240205 2/5/2024 55 (ft)	MW-2S MW-2S-20230928 09/28/2023 56 (ft)	MW-2S MW-2S-20240508 05/08/2024 55 (ft)	MW-2S MW-2S-20240807 08/07/2024 55 (ft)	MW-3S MW-3S-20240205 02/05/2024 54 (ft)	MW-3S MW-3S-20240807 08/07/2024 54 (ft)	MW-3S MW-3S-4Q24 11/05/2024 59 (ft)	MW-4S MW-4S-20230928 09/28/2023 56 (ft)	MW-4S MW-4S-20240507 05/07/2024 54 (ft)	MW-6S MW-6S-20230928 09/28/2023 60 (ft)	MW-6S MW-6S-20240508 05/08/2024 59 (ft)
Volatile Organic Compounds (μg/L)																		
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,1,1-Trichloroethane	200	NA	5400	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	-	-	-	-	-	0.2 U	0.2 U	0.2 U	-	0.2 U	0.2 U	4 U	2 U	0.2 U	2 U
1,1,2-Trichloroethane	3	8.8	5.1	-	-	-	-	-	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	10 U	5 U	0.5 U	5 U
1,1-Dichloroethane	7.68	11	NA	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
1,1-Dichloroethene	7	NA	130	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
1,1-Dichloropropene	NA	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,2,3-Trichlorobenzene	6.4	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,2,3-Trichloropropane	0.000384	NA	20	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,2,4-Trichlorobenzene	15.1	NA	39	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,2,4-Trimethylbenzene	80	NA	240	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	**1400**	**1700**	**12**	**280**
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	-	-	-	-	-	10 U	10 U	10 U	-	10 U	10 U	200 U	100 U	10 U	100 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	-	-	-	-	-	0.01 U	0.01 U	0.01 U	-	0.01 U	0.01 U	0.2 U	0.1 U	0.01 U	0.1 U
1,2-Dichlorobenzene	600	NA	2500	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,2-Dichloroethane	4.81	3.5	120	0.2 U	0.2 U	-	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	4 U	2 U	0.2 U	2 U
1,2-Dichloropropane	5	10	28	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,3,5-Trimethylbenzene	80	NA	170	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	**350**	**470**	**2.4**	**95**
1,3-Dichlorobenzene	NA	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,3-Dichloropropane	160	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
1,4-Dichlorobenzene	75	5	8000	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
2,2-Dichloropropane	NA	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	-	-	-	-	-	20 U	20 U	20 U	-	20 U	20 U	400 U	200 U	20 U	200 U
2-Chlorotoluene	160	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	-	-	-	-	-	10 U	10 U	10 U	-	10 U	10 U	200 U	100 U	10 U	100 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
4-Chlorotoluene	160	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	-	-	-	-	-	10 U	10 U	10 U	-	10 U	10 U	200 U	100 U	10 U	100 U
Acetone	7200	NA	NA	-	-	-	-	-	50 U	50 U	50 U	-	50 U	50 U	1000 U	500 U	50 U	500 U
Bromobenzene	64	NA	630	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Bromodichloromethane	7.06	1.4	NA	-	-	-	-	-	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	10 U	5 U	0.5 U	5 U
Bromoform	55.4	220	NA	-	-	-	-	-	5 U	5 U	5 U	-	5 U	5 U	100 U	50 U	5 U	50 U
Bromomethane (Methyl Bromide)	11.2	NA	11	-	-	-	-	-	5 U	5 U	5 U	-	5 U	5 U	100 U	50 U	5 U	50 U
Carbon tetrachloride	5	0.62	68	-	-	-	-	-	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	10 U	5 U	0.5 U	5 U
Chlorobenzene	100	NA	340	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Chloroethane	NA	NA	15000	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
Chloroform (Trichloromethane)	14.1	1.2	490	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Chloromethane (Methyl Chloride)	NA	NA	150	-	-	-	-	-	10 U	10 U	10 U	-	10 U	10 U	200 U	100 U	10 U	100 U
cis-1,2-Dichloroethene	16	NA	180	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
cis-1,3-Dichloropropene	NA	NA	NA	-	-	-	-	-	0.4 U	0.4 U	0.4 U	-	0.4 U	0.4 U	8 U	4 U	0.4 U	4 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Dibromochloromethane	5.21	NA	NA	-	-	-	-	-	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	10 U	5 U	0.5 U	5 U
Dibromomethane	80	NA	97	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Hexachlorobutadiene	0.561	0.64	NA	-	-	-	-	-	0.5 U	0.5 U	0.5 U	-	0.5 U	0.5 U	10 U	5 U	0.5 U	5 U
Hexane	480	NA	7.2	-	-	-	-	-	5 U	5 U	5 U	-	5 U	5 U	100 U	**160**	5 U	50 U
Isopropylbenzene (Cumene)	800	NA	910	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	**79**	**120**	1 U	**21**
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Methylene chloride (Dichloromethane)	5	780	3300	5 U	5 U	-	-	5 U	5 U	5 U	5 U	5 U	5 U	5 U	100 U	50 U	5 U	50 U
Naphthalene	160	8.8	160	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	**5.7**	**130**
n-Propylbenzene	800	NA	2300	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	**160**	**240**	**1.1**	**36**
Styrene	100	NA	8500	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
tert-Butylbenzene	800	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Tetrachloroethene	5	25	48	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	5 U
trans-1,2-Dichloroethene	100	NA	77	1 U	1 U	-	-	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	1 U	10 U
trans-1,3-Dichloropropene	NA	NA	NA	-	-	-	-	-	0.4 U	0.4 U	0.4 U	-	0.4 U	0.4 U	8 U	4 U	0.4 U	4 U
Trichloroethene	4	1.4	3.9	0.5 U	0.5 U	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4 UJ	5 U	0.5 U	5 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Vinyl chloride	0.292	0.33	54	0.02 U	0.02 U	-	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.4 U	0.2 U	0.02 U	0.2 U
Semi-Volatile Organic Compounds (μg/L)																		
1-Methylnaphthalene	0.858	NA	0.17	-	-	-	-	-	0.4 U	**0.22**	0.2 U	-	0.2 U	0.2 U	**5.3**	**31**	0.2 U	**2.9**
2-Methylnaphthalene	32	NA	NA	-	-	-	-	-	0.4 U	0.2 U	0.2 U	-	0.2 U	0.2 U	**0.43**	**69**	0.2 U	0.2 U
Acenaphthene	480	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	**0.063**	**0.11**	0.02 U	**0.028**
Acenaphthylene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	2400	NA	NA	-	-	-	-	-	0.04 U	**0.022**	0.02 U	-	0.02 U	0.02 U	0.02 U	**0.037**	0.02 U	0.02 U

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	HA-1 HA-1-GW 01/26/2024 57 (ft)	HA-2 HA-2-GW 01/24/2024 55 (ft)	HA-3 HA-3-GW 01/23/2024 -	HA-3 DUP-01 01/23/2024 -	MW-1S MW-1S-20240205 2/5/2024 55 (ft)	MW-2S MW-2S-20230928 09/28/2023 56 (ft)	MW-2S MW-2S-20240508 05/08/2024 55 (ft)	MW-2S MW-2S-20240807 08/07/2024 55 (ft)	MW-3S MW-3S-20240205 02/05/2024 54 (ft)	MW-3S MW-3S-20240807 08/07/2024 54 (ft)	MW-3S MW-3S-4Q24 11/05/2024 59 (ft)	MW-4S MW-4S-20230928 09/28/2023 56 (ft)	MW-4S MW-4S-20240507 05/07/2024 54 (ft)	MW-6S MW-6S-20230928 09/28/2023 60 (ft)	MW-6S MW-6S-20240508 05/08/2024 59 (ft)
Benzo(a)anthracene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	0.2	NA	NA	-	-	-	-	-	0.053	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(b)fluoranthene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	-	-	-	-	-	0.08 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.04 U	0.02 U	0.04 U	0.02 U
Benzo(k)fluoranthene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chrysene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Fluoranthene	640	NA	NA	-	-	-	-	-	0.093	0.041	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.023	0.02 U
Fluorene	320	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.045	0.14	0.02 U	0.02 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	-	-	-	-	-	0.04 U	0.02 U	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	160	8.8	160	-	-	-	-	-	0.45	0.31	0.2 U	-	0.2 U	0.2 U	0.46	1.1	0.52	11
Naphthalene, Total[2]	NA	NA	NA	-	-	-	-	-	0.45	0.53	0.2	-	0.2	0.2 U	6.19	101.1	0.52	13.9
Phenanthrene	NA	NA	NA	-	-	-	-	-	0.077	0.063	0.02 U	-	0.023	0.02 U	0.02 U	0.12	0.03	0.02 U
Pyrene	240	NA	NA	-	-	-	-	-	0.087	0.029	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.056	0.02 U
cPAHs-TEQ[3]	0.2	NA	NA	-	-	-	-	-	0.058	0.015 U	0.15	-	0.15	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Total Petroleum Hydrocarbons-SG (µg/L)																		
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	-	-	-	-	60 U	-	-	-	60 U	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	-	-	-	-	300 U	-	-	-	300 U	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	-	-	-	-	300 U	-	-	-	300 U	-	-	-	-	-	-
Total Petroleum Hydrocarbons (µg/L)																		
Benzene	5	2.4	100	1 U	1	1 U	1 U	1 U	0.35 U	0.35 U	0.35 U	1 U	0.35 U	0.35 U	7 U	3.5 U	0.35 U	3.5 U
Toluene	640	NA	15000	1.8	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2	1 U	20 U	10 U	1 U	10 U
Ethylbenzene	700	NA	2800	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	20 U	10 U	7.4	140
m,p-Xylenes	NA	NA	NA	-	-	-	-	-	2 U	2 U	2 U	-	2 U	2 U	40 U	20 U	7.3	180
o-Xylene	1600	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	20 U	10 U	1 U	10 U
Xylene (Total)[5]	1600	NA	320	3 U	5	3 U	3 U	3 U	2 U	2 U	2	3 U	2	2 U	40 U	20 U	7.3	180
Gasoline Range Organics	800/1000[6]	NA	NA	100 U	900	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U	12000	15000	210	5300
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	60 U	390	60 U	60 U	70	460	230	120	63	50 U	50 U	1300	2100	80	1100
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	300 U	250 U	300 U	300 U	300 U	910	200 U	400 U	300 U	250 U	250 U	300 U	250 U	320 U	300 U
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	300 U	390	300 U	300 U	70	1370	230	120	63	250	250 U	1300	2100	80	1100
Inorganic Compounds (µg/L)																		
Arsenic, Dissolved	13.3[7]	NA	NA	-	-	-	-	-	1.5	2.3 J-	2.6	-	2.1	2	3.26	1.8 J-	12.2	1.3 J-
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-	160 J	-	94 J	-	-	-	-	-
Lead, Dissolved	15	NA	NA	-	-	-	-	-	1 U	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	1 U
Manganese, Dissolved	50	NA	NA	-	-	-	-	-	9.27	-	4.1	-	2.8	1 U	464	500	138	-
Arsenic, Total	13.3[7]	NA	NA	-	-	-	-	-	1.95	2.5 J-	2.3	-	2.1	1.8	3.82	1.8 J-	5.49	1 UJ
Lead, Total	15	NA	NA	-	-	-	-	-	1.7	1 U	1 U	-	1 U	1 U	1 U	1 U	1 U	1 U
Other																		
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	150	-	134	136	122	128	150	-
Ammonia (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	0.15 UJ	-	0.15 UJ	0.15 R	0.1 R	0.15 R	0.1 R	-
Carbon (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	2.24	-	1.45	1.67	-	3.36	-	-
Chloride (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	26.6	-	20.6	24.2	24.7	21.7	24.7	-
Ethane (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	0.01 U	-	0.01 U	0.01 U	0.0151 U	0.01 U	0.0151 U	-
Ethene (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	0.01 U	-	0.01 U	0.01 U	0.0146 U	0.01 U	0.0146 U	-
Methane (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	0.005 U	-	0.005 U	0.005 U	0.00675 U	0.00887	0.00675 U	-
Nitrate (as N) (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	3.7	-	7.56	8.41	0.202	0.426 J+	0.432	-
Nitrite (as N) (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	1 UJ 2 UJ	-	1 UJ 2 UJ	0.4 U	0.24 U	0.424 J+	0.24 U	-
Sulfate (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	21.1	-	17.9	-	13.8	11.4	8.4	-
Sulfide (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	0.05 U	-	0.05 U	0.05 U	0.05 U	0.0641	0.05 U	-
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	-	-	-	-	3.9	-	2.83	-
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	1200	1200	8300	7200	-	-	65	5 U	-	6.8	6.8 J-	5 U	5 U	5 U	5 U
Field Parameters																		
Temperature (Deg C)	NA	NA	NA	-	-	-	-	12.5	14.3	15.4	15.1	12.3	15.8	12.6	15.4	13.8	16.3	14.7
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	-	-	-	-	9.25	8.93	6.86	7.09	8.47	7.12	6.11	3.79	0.6	2.26	0.66
Ferrous Iron, Field (mg/L)	NA	NA	NA	-	-	-	-	-	-	-	-	-	-	0	1	1.5	1.2	-
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	-	-	-	-	140	82.4	92.9	175	128	105	68	-39.3	-17.1	-7	-36
Turbidity, Field (NTU)	NA	NA	NA	-	-	-	-	17	68	3.88	5	5	5.66	1	5.2	3.3	4.8	2
pH, Field (pH units)	NA	NA	NA	-	-	-	-	6.54	7.71	7.65	7.57	6.84	6.81	6.76	6.98	6.89	6.63	6.85
Conductivity, Field (µS/cm)	NA	NA	NA	-	-	-	-	490	604	451.1	453	339	372.8	415	338.5	320	371.4	369

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name / Sample Name / Sample Date / Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-6S MW-6S-20240806 08/06/2024 59 (ft)	MW-6S MW-6S-4Q24 11/05/2024 60 (ft)	MW-8S MW-8S-GW-20230927 09/27/2023 59 (ft)	MW-8S MW-8S-20240508 05/08/2024 -	MW-8S MW-8S-20240806 08/06/2024 -	MW-8S MW-8S-4Q24 11/05/2024 59 (ft)	MW-9D MW-9D-20230928 09/28/2023 -	MW-9D FD-01-20230928 09/28/2023 -	MW-9D MW-9D-20240509 05/09/2024 104 (ft)	MW-9D FD-01-20240806 08/06/2024 -	MW-9D MW-9D-20240806 08/06/2024 102.7 (ft)	MW-9D MW-9D-4Q24 11/07/2024 105 (ft)	MW-9D FD-01-4Q24 11/07/2024 105 (ft)
Volatile Organic Compounds (µg/L)																
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,1,1-Trichloroethane	200	NA	5400	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,1,2-Trichloroethane	3	8.8	5.1	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
1,1-Dichloroethane	7.68	11	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,1-Dichloroethene	7	NA	130	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,1-Dichloropropene	NA	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,2,3-Trichlorobenzene	6.4	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,2,3-Trichloropropane	0.000384	NA	20	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,2,4-Trichlorobenzene	15.1	NA	39	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,2,4-Trimethylbenzene	80	NA	240	150	1 U	130	190	240	770	2500	2500	1400	1800	1900	2200	2200
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	100 U	10 U	10 U	10 U	10 U	100 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	600	NA	2500	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,2-Dichloroethane	4.81	3.5	120	2 U	0.2 U	0.2 U	0.2 U	0.2 U	2 U	20 U	20 U	20 U	20 U	20 U	20 U	20 U
1,2-Dichloropropane	5	10	28	10 U	1 U	1 U	1 U	1	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,3,5-Trimethylbenzene	80	NA	170	40	1 U	150	110	100	320	720	720	370	510	530	580	580
1,3-Dichlorobenzene	NA	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,3-Dichloropropane	160	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
1,4-Dichlorobenzene	75	5	8000	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2,2-Dichloropropane	NA	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	200 U	20 U	67	20 U	31	200 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U	2000 U
2-Chlorotoluene	160	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	100 U	10 U	10 U	10 U	10 U	100 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	10 U	1 U	8.4	5.2	5.3	10	100 U	100 U	100 U	100 U	100 U	100 U	100 U
4-Chlorotoluene	160	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	100 U	10 U	10 U	10 U	10 U	100 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
Acetone	7200	NA	NA	500 U	50 U	50 U	50 U	50 U	500 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U	5000 U
Bromobenzene	64	NA	630	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Bromodichloromethane	7.06	1.4	NA	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Bromoform	55.4	220	NA	50 U	5 U	5 U	5 U	5 U	50 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Bromomethane (Methyl Bromide)	11.2	NA	11	50 U	5 U	5 U	5 U	5 U	50 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Carbon tetrachloride	5	0.62	68	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Chlorobenzene	100	NA	340	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Chloroethane	NA	NA	15000	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Chloroform (Trichloromethane)	14.1	1.2	490	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Chloromethane (Methyl Chloride)	NA	NA	150	100 U	10 U	10 U	10 U	10 U	100 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U	1000 U
cis-1,2-Dichloroethene	16	NA	180	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
cis-1,3-Dichloropropene	NA	NA	NA	4 U	0.4 U	0.4 U	0.4 U	0.4 U	4 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	10 U	1 U	4.2	2.7	2.5	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Dibromochloromethane	5.21	NA	NA	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Dibromomethane	80	NA	97	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Hexachlorobutadiene	0.561	0.64	NA	5 U	0.5 U	0.5 U	0.5 U	0.5 U	5 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Hexane	480	NA	7.2	50 U	5 U	54	36	34	68	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Isopropylbenzene (Cumene)	800	NA	910	12	1 U	59	35	38	83	100	100	100 U	100 U	100 U	100	100 U
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Methylene chloride (Dichloromethane)	5	780	3300	50 U	5 U	5 U	5 U	5.6 J	50 U	500 U	500 U	500 U	500 U	500 U	500 U	500 U
Naphthalene	160	8.8	160	52	1 U	28	10	6.6	12	810	820	530	570	590	660	730
n-Propylbenzene	800	NA	2300	19	1 U	60	41	40	150	290	280	150	190	200	220	220
Styrene	100	NA	8500	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	150	100 U	100 U	100 U
tert-Butylbenzene	800	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Tetrachloroethene	5	25	48	5 U	1 U	1 U	1 U	1 U	5 U	100 U	100 U	5 U	5 U	5 U	100 U	100 U
trans-1,2-Dichloroethene	100	NA	77	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
trans-1,3-Dichloropropene	NA	NA	NA	4 U	0.4 U	0.4 U	0.4 U	0.4 U	4 U	40 U	40 U	40 U	40 U	40 U	40 U	40 U
Trichloroethene	4	1.4	3.9	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	4 UJ	4 UJ	5 U	5 U	5 U	50 U	50 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	10 U	1 U	1 U	1 U	1 U	10 U	100 U	100 U	100 U	100 U	100 U	100 U	100 U
Vinyl chloride	0.292	0.33	54	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Semi-Volatile Organic Compounds (µg/L)																
1-Methylnaphthalene	0.858	NA	0.17	4.9	0.2 U	58	22	18	62	100	95	26	64	54	47	54
2-Methylnaphthalene	32	NA	NA	7.2	0.2 U	53	17	15	85	220	200	28	120	96	89	100
Acenaphthene	480	NA	NA	0.02 U	0.02 U	0.27	0.082	0.068	0.17	0.24	0.2	0.18	0.23	0.2	0.23	0.24
Acenaphthylene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	2400	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.5	0.42	0.1	0.12	0.1	0.098	0.11

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater (1)	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-6S MW-6S-20240806 08/06/2024 59 (ft)	MW-6S MW-6S-4Q24 11/05/2024 60 (ft)	MW-8S MW-8S-GW-20230927 09/27/2023 59 (ft)	MW-8S MW-8S-20240508 05/08/2024 -	MW-8S MW-8S-20240806 08/06/2024 -	MW-8S MW-8S-4Q24 11/05/2024 59 (ft)	MW-9D MW-9D-20230928 09/28/2023 -	MW-9D FD-01-20230928 09/28/2023 -	MW-9D MW-9D-20240509 05/09/2024 104 (ft)	MW-9D FD-01-20240806 08/06/2024 -	MW-9D MW-9D-20240806 08/06/2024 102.7 (ft)	MW-9D MW-9D-4Q24 11/07/2024 105 (ft)	MW-9D FD-01-4Q24 11/07/2024 105 (ft)
Benzo(a)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.19**	**0.16**	**0.067**	**0.04**	**0.041**	**0.035**	**0.035**
Benzo(a)pyrene	0.2	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.16**	**0.14**	**0.045**	**0.027**	**0.029**	**0.025**	**0.025**
Benzo(b)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.077**	**0.071**	**0.022**	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	0.02 U	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U	**0.064**	**0.052**	**0.062**	**0.041**	**0.044**	**0.041**	**0.041**
Benzo(k)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.034**	**0.03**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chrysene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.066**	**0.056**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Fluoranthene	640	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.15**	**0.14**	**0.032**	**0.037**	**0.032**	**0.03**	**0.027**
Fluorene	320	NA	NA	**0.022**	0.02 U	**0.14**	**0.082**	**0.068**	**0.21**	**0.74**	**0.63**	**0.21**	**0.29**	**0.24**	**0.23**	**0.27**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.037**	**0.027**	**0.03**	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	160	8.8	160	**25**	**0.33**	**19**	**7.3**	**2.5**	**12**	**550**	**520**	**160**	**420**	**340**	**370**	**420**
Naphthalene, Total(2)	NA	NA	NA	**37.1**	0.33 U	**130**	**46.3**	**35.5**	**159**	**870**	**815**	**214**	**604**	**490**	**506**	**574**
Phenanthrene	NA	NA	NA	0.02 U	**0.022**	**0.069**	**0.048**	**0.038**	**0.12**	**1.1**	**0.97**	**0.11**	**0.29**	**0.24**	**0.25**	**0.27**
Pyrene	240	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.24**	**0.2**	**0.06**	**0.048**	**0.046**	**0.039**	**0.041**
cPAHs-TEQ(3)	0.2	NA	NA	**0.15**	0.015 U	0.015 U	0.015 U	**0.15**	0.015 U	**0.195**	**0.17**	**0.059**	**0.072**	**0.074**	**0.033**	**0.033**
Total Petroleum Hydrocarbons-SG (µg/L)																
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36)(4)	500	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (µg/L)																
Benzene	5	2.4	100	3.5 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	35 U	35 U	5 U	3.5 U	3.5 U	3.5 U	3.5 U
Toluene	640	NA	15000	10 U	1 U	1 U	1 U	1 U	10 U	**1500**	**1500**	**1800**	**1200**	**1400**	**2300**	**2200**
Ethylbenzene	700	NA	2800	**65**	1 U	1 U	1 U	1 U	10 U	**2700**	**2600**	**2300**	**2600**	**2800**	**3600**	**3400**
m,p-Xylenes	NA	NA	NA	**87**	2 U	2 U	2 U	2 U	20 U	**11000**	**11000**	**8600**	**7800**	**8700**	**13000**	**12000**
o-Xylene	1600	NA	NA	10 U	1 U	1 U	1 U	1 U	10 U	**5000**	**4800**	**4200**	**4600**	**5100**	**6300**	**5800**
Xylene (Total)(5)	1600	NA	320	**87**	2 U	2 U	2 U	**2**	20 U	**16000**	**15800**	**12800**	**12400**	**13800**	**17800**	**19300**
Gasoline Range Organics	800/1000(6)	NA	NA	**1900**	100 U	**4700**	**3200**	**3000**	**8800**	**73000**	**73000**	**57000**	**53000**	**59000**	**73000**	**67000**
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	**450**	60 U	**1400**	**720**	**550**	**1500 S**	**7500 J**	**1900 J**	**4100**	**3300**	**2600**	**3300 S**	**3100 S**
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	300 U	300 U	250 U	300 U	300 U	250 U	250 U	250 U	300 U	250 U	250 U	250 U	300 U
Total Petroleum Hydrocarbons (C10-C36)(4)	500	NA	NA	**450**	300 U	**1400**	**720**	**550**	**1500 S**	**7500 J**	**1900 J**	**4100**	**3300**	**2600**	**3300 S**	**3100 S**
Inorganic Compounds (µg/L)																
Arsenic, Dissolved	13.3(7)	NA	NA	**1.5**	-	**4**	**3.3 J-**	**4.2**	**4.7**	**22.3**	**28.5**	-	**16**	**17**	**2.5**	**2.4**
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead, Dissolved	15	NA	NA	1 U	-	1 U	1 U	1 U	1 U	1 UJ	**2.72 J**	1 U	1 U	1 U	1 U	1 U
Manganese, Dissolved	50	NA	NA	-	-	**502**	**440**	**810**	**1400**	**2660**	**2870**	-	**2300**	**2400**	-	-
Arsenic, Total	13.3(7)	NA	NA	**1.8**	-	**4.1**	**3.7 J-**	**4.2**	**5.2**	**49.6**	**49.2**	**35 J-**	**22**	**22**	**22**	**23**
Lead, Total	15	NA	NA	1 U	-	1 U	1 U	1 U	1 U	**12.5**	**12.8**	**5.9**	**3**	**3.1**	**3**	**3.1**
Other																
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	-	-	**207**	**169**	**189**	**191**	**182**	**177**	**210**	**46.2**	**43.9**	**136**	**119**
Ammonia (mg/L)	NA	NA	NA	-	-	0.1 U	0.15 R	0.15 UJ	0.15 R	0.1 R	0.1 R	0.15 R	0.15 UJ	0.15 UJ	0.15 U	0.15 U
Carbon (mg/L)	NA	NA	NA	-	-	-	**2.62**	-	**4.39**	-	-	**10.8**	-	-	**8.25**	**9.25**
Chloride (mg/L)	NA	NA	NA	-	-	**33.3**	**23**	**34.2**	**35**	**28.4**	**28.4**	**28.2**	**29.2**	**29.8**	**27.9**	**27.4**
Ethane (mg/L)	NA	NA	NA	-	-	0.0151 U	0.01 U	0.01 U	0.01 U	0.0151 U	0.0151 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Ethene (mg/L)	NA	NA	NA	-	-	0.0146 U	0.01 U	0.01 U	0.01 U	0.0146 U	0.0146 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
Methane (mg/L)	NA	NA	NA	-	-	0.00675 U	0.005 U	0.005 U	**0.00501**	0.00675 U	0.00675 U	**0.00882**	0.005 U	0.005 U	**0.011**	**0.012**
Nitrate (as N) (mg/L)	NA	NA	NA	-	-	**3.23**	**3.96 J+**	**2.39**	**1.83**	0.2 U	0.2 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U
Nitrite (as N) (mg/L)	NA	NA	NA	-	-	**1.54**	0.2 UJ	0.4 U	0.4 U	0.24 U	0.24 U	0.2 U	0.4 U	0.4 U	0.4 U	0.4 U
Sulfate (mg/L)	NA	NA	NA	-	-	**19.4**	**14.6**	**23.7 J-**	-	**5.13**	**5.18**	**2.41**	**8.5 J-**	**8.57 J-**	**1.97**	**1.27**
Sulfide (mg/L)	NA	NA	NA	-	-	0.05 U	**0.0865**	**0.0731**	**0.355**	**0.0645**	**0.0612**	**0.223**	**0.313**	**0.253**	**0.0706**	**0.0532**
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	-	-	**4.86**	-	-	-	**17.8**	**18**	-	-	-	-	-
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	5 U	-	**60**	5 U	**5.6**	**10 J-**	**18 J**	**49 J**	**34**	**16**	**16**	**10**	**8.1**
Field Parameters																
Temperature (Deg C)	NA	NA	NA	**17.4**	**13.6**	**15.3**	**13.4**	**16.7**	**13.2**	**16.3**	**16.3**	**16.5**	**17.9**	**17.9**	**14.8**	**14.8**
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	**2.39**	**1.7**	**0.59**	**1.04**	**0.73**	**0.74**	**0.29**	**0.29**	**0.34**	**6.2**	**6.2**	**0.89**	**0.89**
Ferrous Iron, Field (mg/L)	NA	NA	NA	-	-	**0**	**2**	-	**1.8**	-	-	**3.5**	-	-	**4.8**	**4.8**
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	**162**	**-117**	**-15.9**	**78**	**193**	**-199**	**-41**	**-41**	**-53.2**	**-421**	**-421**	**-151**	**-151**
Turbidity, Field (NTU)	NA	NA	NA	**8**	**1**	**16.3**	**4**	**17**	**6**	**21**	**21**	**45.04**	**14**	**14**	**14**	**14**
pH, Field (pH units)	NA	NA	NA	**6.86**	**6.66**	**6.78**	**6.71**	**6.75**	**6.86**	**6.57**	**6.57**	**6.72**	**6.66**	**6.66**	**6.66**	**6.66**
Conductivity, Field (µS/cm)	NA	NA	NA	**342**	**358**	**538**	**440**	**497**	**490**	**420**	**420**	**453.1**	**471**	**471**	**329**	**329**

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name / Sample Name / Sample Date / Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [(1)]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-10D MW-10D-W-20240207 02/07/2024 103 (ft)	MW-10D MW-10D-4Q24 11/06/2024 105 (ft)	MW-11D MW-11D-W-20240207 02/07/2024 104 (ft)	MW-11D MW-11D-4Q24 11/06/2024 105 (ft)	MW-12D MW-12D-20230928 09/28/2023 104 (ft)	MW-12D MW-12D-20240508 05/08/2024 103.5 (ft)	MW-12D MW-12D-20240805 08/05/2024 104 (ft)	MW-12D MW-12D-4Q24 11/06/2024 106 (ft)	MW-13D MW-13D-GW-20230927 09/27/2023 -	MW-13D MW-13D-20240509 05/09/2024 -	MW-14D MW-14D-GW-20230926 09/26/2023 106 (ft)	MW-15D MW-15D-GW-20230927 09/27/2023 106 (ft)
Volatile Organic Compounds (µg/L)															
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,1,1-Trichloroethane	200	NA	5400	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	-	0.2 U	-	0.2 U	20 U	10 U	10 U	20 U	4 U	10 U	0.2 U	0.2 U
1,1,2-Trichloroethane	3	8.8	5.1	-	0.5 U	-	0.5 U	50 U	25 U	25 U	50 U	10 U	25 U	0.5 U	0.5 U
1,1-Dichloroethane	7.68	11	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,1-Dichloroethene	7	NA	130	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,1-Dichloropropene	NA	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,2,3-Trichlorobenzene	6.4	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,2,3-Trichloropropane	0.000384	NA	20	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,2,4-Trichlorobenzene	15.1	NA	39	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,2,4-Trimethylbenzene	80	NA	240	-	1 U	-	**2.6**	**2000**	**2100**	**2200**	**1800**	**660**	**340**	1 U	1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	-	10 U	-	10 U	1000 U	500 U	500 U	1000 U	200 U	500 U	10 U	10 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	-	0.01 U	-	0.01 U	1 U	0.5 U	0.5 U	1 U	20 U	0.5 U	0.01 U	1 U
1,2-Dichlorobenzene	600	NA	2500	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,2-Dichloroethane	4.81	3.5	120	-	0.2 U	-	0.2 U	20 U	10 U	10 U	20 U	4 U	10 U	0.2 U	0.2 U
1,2-Dichloropropane	5	10	28	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,3,5-Trimethylbenzene	80	NA	170	-	1 U	-	1 U	**570**	**550**	**580**	**460**	**230**	**140**	1 U	1 U
1,3-Dichlorobenzene	NA	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,3-Dichloropropane	160	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
1,4-Dichlorobenzene	75	5	8000	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
2,2-Dichloropropane	NA	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	-	20 U	-	20 U	2000 U	1000 U	1000 U	2000 U	400 U	1000 U	20 U	20 U
2-Chlorotoluene	160	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	-	10 U	-	10 U	1000 U	500 U	500 U	1000 U	200 U	500 U	10 U	10 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
4-Chlorotoluene	160	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	-	10 U	-	10 U	1000 U	500 U	500 U	1000 U	200 U	500 U	10 U	10 U
Acetone	7200	NA	NA	-	50 U	-	50 U	5000 U	2500 U	2500 U	5000 U	1000 U	2500 U	50 U	50 U
Bromobenzene	64	NA	630	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Bromodichloromethane	7.06	1.4	NA	-	0.5 U	-	0.5 U	50 U	25 U	25 U	50 U	10 U	25 U	0.5 U	0.5 U
Bromoform	55.4	220	NA	-	5 U	-	5 U	500 U	250 U	250 U	500 U	100 U	250 U	5 U	5 U
Bromomethane (Methyl Bromide)	11.2	NA	11	-	5 U	-	5 U	500 U	250 U	250 U	500 U	100 U	250 U	5 U	5 U
Carbon tetrachloride	5	0.62	68	-	0.5 U	-	0.5 U	50 U	25 U	25 U	50 U	10 U	25 U	0.5 U	0.5 U
Chlorobenzene	100	NA	340	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Chloroethane	NA	NA	15000	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Chloroform (Trichloromethane)	14.1	1.2	490	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Chloromethane (Methyl Chloride)	NA	NA	150	-	10 U	-	10 U	1000 U	500 U	500 U	1000 U	200 U	500 U	10 U	10 U
cis-1,2-Dichloroethene	16	NA	180	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
cis-1,3-Dichloropropene	NA	NA	NA	-	0.4 U	-	0.4 U	40 U	20 U	20 U	40 U	8 U	20 U	0.4 U	0.4 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Dibromochloromethane	5.21	NA	NA	-	0.5 U	-	0.5 U	50 U	25 U	25 U	50 U	10 U	25 U	0.5 U	0.5 U
Dibromomethane	80	NA	97	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Hexachlorobutadiene	0.561	0.64	NA	-	0.5 U	-	0.5 U	50 U	25 U	25 U	50 U	10 U	25 U	0.5 U	0.5 U
Hexane	480	NA	7.2	-	5 U	-	5 U	500 U	250 U	250 U	500 U	**160**	250 U	5 U	5 U
Isopropylbenzene (Cumene)	800	NA	910	-	1 U	-	1 U	100 U	**61**	**65**	100 U	**53**	50 U	1 U	1 U
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Methylene chloride (Dichloromethane)	5	780	3300	-	5 U	-	5 U	500 U	250 U	250 U	500 U	100 U	250 U	5 U	5 U
Naphthalene	160	8.8	160	-	1 U	-	1 U	**700**	**700**	**720**	**590**	**250**	**140**	1 U	1 U
n-Propylbenzene	800	NA	2300	-	1 U	-	1 U	**180**	**180**	**180**	**150**	**98**	**62**	1 U	1 U
Styrene	100	NA	8500	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
tert-Butylbenzene	800	NA	NA	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Tetrachloroethene	5	25	48	-	**32**	-	**2.2**	100 U	**16 J**	**15 J**	100 U	20 U	5 U	1 U	1 U
trans-1,2-Dichloroethene	100	NA	77	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
trans-1,3-Dichloropropene	NA	NA	NA	-	0.4 U	-	0.4 U	40 U	20 U	20 U	40 U	8 U	20 U	0.4 U	0.4 U
Trichloroethene	4	1.4	3.9	-	0.5 U	-	0.5 U	4 UJ	5 U	1.2 U	50 U	4 UJ	5 U	0.5 U	0.5 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	-	1 U	-	1 U	100 U	50 U	50 U	100 U	20 U	50 U	1 U	1 U
Vinyl chloride	0.292	0.33	54	-	0.02 U	-	0.02 U	2 U	1 U	1 U	2 U	0.4 U	1 U	0.02 U	0.02 U
Semi-Volatile Organic Compounds (µg/L)															
1-Methylnaphthalene	0.858	NA	0.17	-	0.2 U	-	0.2 U	**40**	**35**	**51**	**56**	**32**	**17**	0.2 U	0.2 U
2-Methylnaphthalene	32	NA	NA	-	0.2 U	-	**0.32**	**94**	**63**	**120**	**130**	**51**	**22**	0.2 U	**0.33**
Acenaphthene	480	NA	NA	-	0.02 U	-	0.02 U	**0.083**	**0.04**	**0.11**	**0.1**	0.02 U	**0.046**	0.02 U	0.02 U
Acenaphthylene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	2400	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-10D MW-10D-W-20240207 02/07/2024 103 (ft)	MW-10D MW-10D-4Q24 11/06/2024 105 (ft)	MW-11D MW-11D-W-20240207 02/07/2024 104 (ft)	MW-11D MW-11D-4Q24 11/06/2024 105 (ft)	MW-12D MW-12D-20230928 09/28/2023 104 (ft)	MW-12D MW-12D-20240508 05/08/2024 103.5 (ft)	MW-12D MW-12D-20240805 08/05/2024 104 (ft)	MW-12D MW-12D-4Q24 11/06/2024 106 (ft)	MW-13D MW-13D-GW-20230927 09/27/2023 -	MW-13D MW-13D-20240509 05/09/2024 -	MW-14D MW-14D-GW-20230926 09/26/2023 106 (ft)	MW-15D MW-15D-GW-20230927 09/27/2023 106 (ft)
Benzo(a)anthracene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	0.2	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(b)fluoranthene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	-	0.02 U	-	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U	0.04 U	0.02 U	0.04 U	0.04 U
Benzo(k)fluoranthene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chrysene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Fluoranthene	640	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.022**	0.02 U	0.02 U	0.02 U
Fluorene	320	NA	NA	-	0.02 U	-	0.02 U	**0.1**	**0.1**	**0.13**	**0.2**	**0.027**	**0.023**	0.02 U	0.02 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	160	8.8	160	-	0.2 U	-	**0.98**	**360**	**350**	**460**	**500**	**150**	**72**	0.2 U	**0.76**
Naphthalene, Total [2]	NA	NA	NA	-	0.2 U	-	**1.3**	**494**	**448**	**631**	**686**	**233**	**111**	0.2 U	**1.09**
Phenanthrene	NA	NA	NA	-	0.02 U	-	0.02 U	**0.16**	**0.11**	**0.17**	**0.27**	**0.066**	**0.024**	0.02 U	0.02 U
Pyrene	240	NA	NA	-	0.02 U	-	0.02 U	0.02 U	0.02 U	0.02 U	**0.022**	**0.06**	0.02 U	0.02 U	**0.028**
cPAHs-TEQ [3]	0.2	NA	NA	-	0.015 U	-	0.015 U	0.015 U	0.015 U	**0.15**	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U
Total Petroleum Hydrocarbons-SG (µg/L)															
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	60 U	-	50 U	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	300 U	-	250 U	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (C10-C36) [4]	500	NA	NA	300 U	-	250 U	-	-	-	-	-	-	-	-	-
Total Petroleum Hydrocarbons (µg/L)															
Benzene	5	2.4	100	1 U	0.35 U	1 U	0.35 U	35 U	5 U	1.7 U	3.5 U	7 U	5 U	0.35 U	0.35 U
Toluene	640	NA	15000	1 U	1 U	1 U	**4.2**	**3100**	**3300**	**3900**	**3000**	**160**	50 U	1 U	1 U
Ethylbenzene	700	NA	2800	1 U	1 U	1 U	**2.2**	**1900**	**1900**	**2000**	**1600**	**910**	**620**	1 U	1 U
m,p-Xylenes	NA	NA	NA	-	2 U	-	**8.9**	**7200**	**7100**	**7400**	**6200**	**3700**	**2600**	2 U	2 U
o-Xylene	1600	NA	NA	-	1 U	-	**3.2**	**2800**	**2500**	**3100**	**2600**	**680**	**260**	1 U	1 U
Xylene (Total) [5]	1600	NA	320	3 U	2 U	3 U	**12.1**	**10000**	**9600**	**10500**	**8800**	**4380**	**2860**	2 U	2 U
Gasoline Range Organics	800/1000 [6]	NA	NA	100 U	100 U	100 U	**110**	**50000**	**53000**	**55000**	**49000**	**26000**	**14000**	100 U	100 U
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	60 U	50 U	**71**	**54 S**	**5100**	**4200**	**4300**	**5700 S**	**3500**	**1900**	50 U	**84**
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	300 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	300 U	250 U	250 U	300 U
Total Petroleum Hydrocarbons (C10-C36) [4]	500	NA	NA	300 U	250 U	**71**	**54 S**	**5100**	**4200**	**4300**	**5700 S**	**3500**	**1900**	250 U	**84**
Inorganic Compounds (µg/L)															
Arsenic, Dissolved	13.3 [7]	NA	NA	-	**2.5**	-	1 U	**18.9**	-	**16**	**23**	**11.4**	-	**1.23**	**2.43**
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-
Lead, Dissolved	15	NA	NA	-	1 U	-	1 U	**2.35**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Manganese, Dissolved	50	NA	NA	-	**4.3**	-	**9**	**4300**	**3900**	**4200**	**3700**	**2510**	-	**1.7**	**5.47**
Arsenic, Total	13.3 [7]	NA	NA	-	**2.7**	-	**1.2**	**21.1**	**31 J-**	**22**	**30**	**11.4**	**9.6 J-**	**1.91**	**3.79**
Lead, Total	15	NA	NA	-	1 U	-	1 U	**2.72**	**1.5**	**3.5**	**3.4**	**1.12**	1 U	1 U	**1.55**
Other															
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	-	**81.5**	-	**39.6**	**257**	**262**	**47.9**	**279**	**192**	-	**88.8**	**110**
Ammonia (mg/L)	NA	NA	NA	-	0.15 U	-	0.15 U	0.1 R	0.15 R	0.15 UJ	0.15 U	0.1 U	-	0.1 R	0.1 U
Carbon (mg/L)	NA	NA	NA	-	**0.943**	-	**1.44**	-	**12.5**	**11.3**	**10.8**	-	-	-	-
Chloride (mg/L)	NA	NA	NA	-	**18.2**	-	**20.7**	**11.3**	**11.2**	**12.2**	**12.3**	**18.8**	-	**8.48**	**7.23**
Ethane (mg/L)	NA	NA	NA	-	0.01 U	-	0.01 U	0.0151 U	0.01 U	0.01 U	0.01 U	0.0151 U	-	0.0151 U	0.0151 U
Ethene (mg/L)	NA	NA	NA	-	0.01 U	-	0.01 U	0.0146 U	0.01 U	0.01 U	0.01 U	0.0146 U	-	0.0146 U	0.0146 U
Methane (mg/L)	NA	NA	NA	-	**0.00702**	-	0.005 U	0.00675 U	**0.00686**	0.005 U	0.005 U	0.00675 U	-	0.00675 U	0.00675 U
Nitrate (as N) (mg/L)	NA	NA	NA	-	**3.6**	-	**1.64**	0.2 U	0.2 U	0.4 U	0.2 U	0.2 U	-	**5.92 J**	**10.8 J**
Nitrite (as N) (mg/L)	NA	NA	NA	-	0.2 U	-	0.2 U	0.24 U	0.2 U	0.4 U	0.2 U	0.24 U	-	0.12 U	0.24 U
Sulfate (mg/L)	NA	NA	NA	-	**15.7**	-	**14.2**	**2.77**	**1.8**	2 UJ	**2.08**	**8.79**	-	**6.01**	**10.5**
Sulfide (mg/L)	NA	NA	NA	-	0.05 U	-	0.05 U	0.05 U	**0.135**	**3.4**	0.05 U	0.05 U	-	0.05 U	0.05 U
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	-	-	-	-	**15.4**	-	-	-	**6.49**	-	**1.25**	**1.55**
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	-	5 U	-	5 U	**42**	**9.2**	**20**	**40**	**19**	5 U	**19**	**78**
Field Parameters															
Temperature (Deg C)	NA	NA	NA	**13.9**	**15.4**	**12.9**	**15**	**15.6**	**16.6**	**18**	**15.1**	**14.8**	**14.2**	**14.2**	**14.3**
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	**6.89**	**7.27**	**4.52**	**8.26**	**0.4**	**0.54**	**0.24**	**-0.02**	**0.49**	**0.47**	**8.3**	**6.8**
Ferrous Iron, Field (mg/L)	NA	NA	NA	-	**0**	-	**0**	**5.5**	**4.7**	-	**5.8**	**3**	-	**0**	**0**
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	**205.8**	**138**	**112.2**	**120.2**	**-62**	**-66.5**	**-73.3**	**-56.4**	**-40**	**-3.8**	**143**	**151.2**
Turbidity, Field (NTU)	NA	NA	NA	**18.22**	**1**	**5.32**	**1.73**	**12**	**9.29**	**11.63**	**22.45**	**17**	**2**	**20**	**29.8**
pH, Field (pH units)	NA	NA	NA	**6.28**	**6.3**	**6.44**	**6.58**	**6.72**	**6.71**	**6.71**	**6.69**	**6.61**	**6.57**	**6.61**	**6.61**
Conductivity, Field (µS/cm)	NA	NA	NA	**266.2**	**250**	**395.5**	**190.2**	**491**	**496.8**	**499.1**	**487.5**	**357**	**361**	**263**	**322.9**

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [(1)]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-16D MW-16D-GW-20230927 09/27/2023 108 (ft)	MW-17D MW-17D-GW-20230927 09/27/2023 -	MW-17D MW-17D-20240508 05/08/2024 105 (ft)	MW-17D MW-17D-20240806 08/06/2024 -	MW-17D MW-17D-4Q24 11/06/2024 110 (ft)	MW-18D MW-18D-GW-20230926 09/26/2023 106 (ft)	MW-18D MW-18D-20240805 08/05/2024 106 (ft)	MW-19D MW-19D-W-20240206 02/06/2024 108 (ft)	MW-19D MW-19D-20240507 05/07/2024 105 (ft)	MW-19D MW-19D-20240805 08/05/2024 110 (ft)	MW-19D MW-19D-4Q24 11/06/2024 107 (ft)
Volatile Organic Compounds (µg/L)														
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	200	NA	5400	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	0.2 U	2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,1,2-Trichloroethane	3	8.8	5.1	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
1,1-Dichloroethane	7.68	11	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	NA	130	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	NA	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichlorobenzene	6.4	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	0.000384	NA	20	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene	15.1	NA	39	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trimethylbenzene	80	NA	240	1 U	**290**	**160**	**320**	**240**	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	10 U	100 U	100 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	1 U	10 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U	0.01 U
1,2-Dichlorobenzene	600	NA	2500	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	4.81	3.5	120	0.2 U	2 U	2 U	2 U	**1.2**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	5	10	28	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3,5-Trimethylbenzene	80	NA	170	1 U	**79**	**36**	**84**	**42**	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	NA	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	160	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	75	5	8000	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	NA	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	20 U	200 U	200 U	200 U	20 U	20 U	20 U	-	20 U	20 U	20 U
2-Chlorotoluene	160	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	10 U	100 U	100 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	1 U	10 U	10 U	10 U	**2**	1 U	1 U	1 U	1 U	1 U	1 U
4-Chlorotoluene	160	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	10 U	100 U	100 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Acetone	7200	NA	NA	50 U	500 U	500 U	500 U	50 U	50 U	50 U	-	50 U	50 U	50 U
Bromobenzene	64	NA	630	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	7.06	1.4	NA	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Bromoform	55.4	220	NA	5 U	50 U	50 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromomethane (Methyl Bromide)	11.2	NA	11	5 U	50 U	50 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon tetrachloride	5	0.62	68	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Chlorobenzene	100	NA	340	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	NA	NA	15000	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform (Trichloromethane)	14.1	1.2	490	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane (Methyl Chloride)	NA	NA	150	10 U	100 U	100 U	100 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
cis-1,2-Dichloroethene	16	NA	180	1 U	10 U	10 U	**11**	**6.5**	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	NA	NA	NA	0.4 U	4 U	4 U	4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	1 U	10 U	10 U	10 U	**1.1**	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	5.21	NA	NA	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Dibromomethane	80	NA	97	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Hexachlorobutadiene	0.561	0.64	NA	0.5 U	5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Hexane	480	NA	7.2	5 U	50 U	50 U	50 U	**15**	5 U	5 U	5 U	5 U	5 U	5 U
Isopropylbenzene (Cumene)	800	NA	910	1 U	**16**	10 U	**27**	**12**	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene chloride (Dichloromethane)	5	780	3300	5 U	50 U	50 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	160	8.8	160	1 U	**130**	**65**	**89**	**88**	1 U	1 U	1 U	1 U	1 U	1 U
n-Propylbenzene	800	NA	2300	1 U	**43**	**20**	**42**	**30**	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	100	NA	8500	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
tert-Butylbenzene	800	NA	NA	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	25	48	1 U	10 U	5 U	**100**	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	100	NA	77	1 U	10 U	10 U	10 U	**3.5**	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NA	NA	NA	0.4 U	4 U	4 U	4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
Trichloroethene	4	1.4	3.9	0.5 U	**11**	**10**	**64**	**10**	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	1 U	10 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl chloride	0.292	0.33	54	0.02 U	0.2 U	0.2 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Semi-Volatile Organic Compounds (µg/L)														
1-Methylnaphthalene	0.858	NA	0.17	0.2 U	**9.1**	**6.4**	**9.1**	**8.1**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
2-Methylnaphthalene	32	NA	NA	0.2 U	**20**	**13**	**18**	**15**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Acenaphthene	480	NA	NA	0.02 U	**0.044**	**0.029**	**0.046**	**0.033**	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Acenaphthylene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	2400	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name / Sample Name / Sample Date / Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-16D MW-16D-GW-20230927 09/27/2023 108 (ft)	MW-17D MW-17D-GW-20230927 09/27/2023 -	MW-17D MW-17D-20240508 05/08/2024 105 (ft)	MW-17D MW-17D-20240806 08/06/2024 -	MW-17D MW-17D-4Q24 11/06/2024 110 (ft)	MW-18D MW-18D-GW-20230926 09/26/2023 106 (ft)	MW-18D MW-18D-20240805 08/05/2024 106 (ft)	MW-19D MW-19D-W-20240206 02/06/2024 108 (ft)	MW-19D MW-19D-20240507 05/07/2024 105 (ft)	MW-19D MW-19D-20240805 08/05/2024 110 (ft)	MW-19D MW-19D-4Q24 11/06/2024 107 (ft)
Benzo(a)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	0.2	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(b)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	0.04 U	0.04 U	0.02 U	0.02 U	0.02 U	0.04 U	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U
Benzo(k)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chrysene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Fluoranthene	640	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.024**	**0.028**	0.02 U	0.02 U	0.02 U
Fluorene	320	NA	NA	0.02 U	**0.032**	**0.022**	**0.041**	**0.029**	0.02 U	**0.021**	0.02 U	0.02 U	0.02 U	0.02 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	160	8.8	160	0.2 U	**93**	**48**	**49**	**66**	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Naphthalene, Total[2]	NA	NA	NA	0.2 U	**122**	**67.4**	**76.1**	**89.1**	0.2 U	**0.2**	0.2 U	0.2 U	**0.2**	0.2 U
Phenanthrene	NA	NA	NA	0.02 U	**0.026**	**0.023**	**0.059**	**0.025**	0.02 U	**0.073**	0.02 U	0.02 U	0.02 U	0.02 U
Pyrene	240	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.02**	0.02 U	0.02 U	0.02 U
cPAHs-TEQ[3]	0.2	NA	NA	0.015 U	0.015 U	0.015 U	**0.15**	0.015 U	0.015 U	**0.15**	0.015 U	0.015 U	**0.15**	0.015 U
Total Petroleum Hydrocarbons-SG (µg/L)														
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	-	-	-	-	-	-	-	50 U	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	-	-	-	-	-	-	-	250 U	-	-	-
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	-	-	-	-	-	-	-	250 U	-	-	-
Total Petroleum Hydrocarbons (µg/L)														
Benzene	5	2.4	100	0.35 U	**200**	**42**	**160**	**52**	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Toluene	640	NA	15000	1 U	**430**	**81**	**2700**	**14**	1 U	1 U	1 U	1 U	1 U	1 U
Ethylbenzene	700	NA	2800	1 U	**540**	**230**	**1200**	**340**	1 U	1 U	1 U	1 U	1 U	1 U
m,p-Xylenes	NA	NA	NA	2 U	**1200**	**480**	**2600**	**520**	2 U	2 U	2 U	2 U	2 U	2 U
o-Xylene	1600	NA	NA	1 U	**360**	**38**	**1400**	**13**	1 U	1 U	1 U	1 U	1 U	1 U
Xylene (Total)[5]	1600	NA	320	2 U	**1560**	**518**	**4000**	**533**	2 U	**2**	2 U	2 U	**2**	2 U
Gasoline Range Organics	800/1000[6]	NA	NA	100 U	**9800**	**3700**	**24000**	**4200**	100 U	100 U	100 U	100 U	100 U	100 U
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	**90**	**860**	**430**	**600**	**610 S**	60 U	**91**	50 U	**57**	**72**	**110 S**
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	320 U	250 U	250 U	250 U	250 U	300 U	300 U	250 U	250 U	250 U	250 U
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	**90**	**860**	**430**	**600**	**610 S**	300 U	**91**	250 U	**57**	**72**	**110 S**
Inorganic Compounds (µg/L)														
Arsenic, Dissolved	13.3[7]	NA	NA	**5.85**	**36.7**	-	**29**	**26**	**2.25**	**2.4**	**10.9**	**11 J-**	**12**	**14**
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-	-	-	-	-
Lead, Dissolved	15	NA	NA	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Manganese, Dissolved	50	NA	NA	**2.4**	**3720**	**3400**	**4000**	**2800**	**1.66**	**2.5**	**73.2**	**42**	-	**9.9**
Arsenic, Total	13.3[7]	NA	NA	**5.38**	**34**	**28 J-**	**30**	**29**	**5.66**	**6.4**	**13.4**	**12 J-**	**13**	**15**
Lead, Total	15	NA	NA	1 U	1 U	1 U	1 U	1 U	**2.7**	**4.8**	**1.15**	1 U	1 U	**1.9**
Other														
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	**104**	**196**	**192**	**221**	**179**	**102**	**26.2**	**118**	**140**	-	-
Ammonia (mg/L)	NA	NA	NA	0.1 U	0.1 U	0.15 R	0.15 UJ	0.15 U	0.1 R	0.15 UJ	0.1 U	0.15 R	-	-
Carbon (mg/L)	NA	NA	NA	-	-	**1.58**	-	**1.74**	-	**1.42**	-	**1.47**	-	-
Chloride (mg/L)	NA	NA	NA	**6.18**	**24.9**	**22.9**	**27.6**	**35**	**26**	**25.7**	**34.8**	**30.9**	-	-
Ethane (mg/L)	NA	NA	NA	0.0151 U	0.0151 U	0.01 U	0.01 U	0.01 U	0.0151 U	0.01 U	0.0151 U	0.01 U	-	-
Ethene (mg/L)	NA	NA	NA	0.0146 U	0.0146 U	0.01 U	0.01 U	0.01 U	0.0146 U	0.01 U	0.0146 U	0.01 U	-	-
Methane (mg/L)	NA	NA	NA	0.00675 U	**0.123**	**0.505**	**0.742**	**0.838**	0.00675 U	0.005 U	**0.0595**	**0.0069**	-	-
Nitrate (as N) (mg/L)	NA	NA	NA	**1.75**	0.2 U	0.2 U	0.4 U	0.2 U	**15.5 J**	**16.9 J**	**38.9 J-**	**34.4 J+**	-	-
Nitrite (as N) (mg/L)	NA	NA	NA	0.24 U	0.24 U	0.2 U	0.4 U	0.2 U	0.12 U	0.4 U	0.6 U	0.2 UJ	-	-
Sulfate (mg/L)	NA	NA	NA	**8.66**	**2.97**	**11.8**	2 UJ	**10.5**	**20.4**	**20.6 J-**	**27.6**	**25.8**	-	-
Sulfide (mg/L)	NA	NA	NA	0.05 U	0.05 U	**0.0574**	**0.108**	0.05 U	**0.07**	1 U	**0.205**	**0.178**	-	-
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	**0.942**	**5.16**	-	-	-	**1.51**	-	**1.8**	-	-	-
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	**6.4**	**55**	**18**	**88**	**27**	**310**	**260**	**53**	**62**	**29**	**120**
Field Parameters														
Temperature (Deg C)	NA	NA	NA	**14.6**	**15.4**	**16.1**	**15.4**	**14.6**	**16.1**	**18**	**14.6**	**17**	**16.4**	**15.4**
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	**8.01**	**0.36**	**0.34**	**2.5**	**0.77**	**6.59**	**6.99**	**5.75**	**6.86**	**6.79**	**7.65**
Ferrous Iron, Field (mg/L)	NA	NA	NA	**0**	**7.5**	**5.5**	-	**4.4**	**0**	-	-	**0**	-	-
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	**125**	**-102**	**-111.8**	**-88**	**-158**	**156**	**192.1**	**156.4**	**133.2**	**28**	**145**
Turbidity, Field (NTU)	NA	NA	NA	**9**	**23**	**8.08**	**9**	**5**	**171**	**182.5**	**110.54**	**66.85**	**198**	**71**
pH, Field (pH units)	NA	NA	NA	**7.17**	**6.95**	**6.96**	**7.01**	**6.98**	**6.74**	**6.77**	**6.37**	**6.42**	**6.32**	**6.45**
Conductivity, Field (µS/cm)	NA	NA	NA	**237**	**439**	**429**	**476**	**440**	**425**	**426.1**	**671**	**6.12**	**591**	**586**

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [(1)]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-20D MW-20D-W-20240206 02/06/2024 107 (ft)	MW-20D MW-20D-20240509 05/09/2024 106 (ft)	MW-20D MW-20D-20240806 08/06/2024 -	MW-20D MW-20D-4Q24 11/07/2024 107 (ft)	MW-21D MW-21D-W-20240206 02/06/2024 106 (ft)	MW-21D DUP-01-20240206 02/06/2024 106 (ft)	MW-21D MW-21D-20240508 05/08/2024 104 (ft)	MW-21D FD-01-20240508 05/08/2024 104 (ft)	MW-21D MW-21D-20240805 08/05/2024 -	MW-21D MW-21D-4Q24 11/05/2024 103.5 (ft)	MW-22D MW-22D-GRAB 01/18/2024 64 - 69 (ft)	MW-22D MW-22D-20240205 02/05/2024 107 (ft)
Volatile Organic Compounds (µg/L)															
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,1,1-Trichloroethane	200	NA	5400	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	-	0.2 U
1,1,2-Trichloroethane	3	8.8	5.1	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
1,1-Dichloroethane	7.68	11	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	7	NA	130	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	NA	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,2,3-Trichlorobenzene	6.4	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,2,3-Trichloropropane	0.000384	NA	20	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,2,4-Trichlorobenzene	15.1	NA	39	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,2,4-Trimethylbenzene	80	NA	240	1 U	1 U	1 U	1 U	**350**	**340**	**70**	**63**	**87**	**270**	-	**4.3**
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	10 U	10 U	10 U	10 U	100 U	100 U	10 U	10 U	10 U	10 U	-	10 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	0.01 U	0.01 U	0.01 U	0.01 U	0.1 U	0.1 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.01 U
1,2-Dichlorobenzene	600	NA	2500	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,2-Dichloroethane	4.81	3.5	120	0.2 U	0.2 U	0.2 U	0.2 U	2 U	2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
1,2-Dichloropropane	5	10	28	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,3,5-Trimethylbenzene	80	NA	170	1 U	1 U	1 U	1 U	**120**	**120**	**25**	**23**	**25**	**79**	-	**1.6**
1,3-Dichlorobenzene	NA	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,3-Dichloropropane	160	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
1,4-Dichlorobenzene	75	5	8000	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
2,2-Dichloropropane	NA	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	-	20 U	20 U	20 U	-	-	20 U	20 U	20 U	20 U	-	20 U
2-Chlorotoluene	160	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	10 U	10 U	10 U	10 U	100 U	100 U	10 U	10 U	10 U	10 U	-	10 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
4-Chlorotoluene	160	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	10 U	10 U	10 U	10 U	100 U	100 U	10 U	10 U	10 U	10 U	-	10 U
Acetone	7200	NA	NA	-	50 U	50 U	50 U	-	-	50 U	50 U	50 U	50 U	-	-
Bromobenzene	64	NA	630	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Bromodichloromethane	7.06	1.4	NA	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Bromoform	55.4	220	NA	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	5 U	5 U	-	5 U
Bromomethane (Methyl Bromide)	11.2	NA	11	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	5 U	5 U	-	5 U
Carbon tetrachloride	5	0.62	68	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Chlorobenzene	100	NA	340	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Chloroethane	NA	NA	15000	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform (Trichloromethane)	14.1	1.2	490	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Chloromethane (Methyl Chloride)	NA	NA	150	10 U	10 U	10 U	10 U	100 U	100 U	10 U	10 U	10 U	10 U	-	10 U
cis-1,2-Dichloroethene	16	NA	180	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	4 U	4 U	0.4 U	0.4 U	0.4 U	0.4 U	-	0.4 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Dibromochloromethane	5.21	NA	NA	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Dibromomethane	80	NA	97	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Hexachlorobutadiene	0.561	0.64	NA	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	0.5 U
Hexane	480	NA	7.2	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	5 U	**9.6**	-	5 U
Isopropylbenzene (Cumene)	800	NA	910	1 U	1 U	1 U	1 U	10 U	10 U	**2.3**	**2.1**	**3.6**	**7.8**	-	1 U
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Methylene chloride (Dichloromethane)	5	780	3300	5 U	5 U	5 U	5 U	50 U	50 U	5 U	5 U	5 U	5 U	5 U	5 U
Naphthalene	160	8.8	160	1 U	1 U	1 U	1 U	**94**	**98**	**20**	**19**	**34**	**76**	-	**2.2**
n-Propylbenzene	800	NA	2300	1 U	1 U	1 U	1 U	**28**	**27**	**6.2**	**5.7**	**9.4**	**23**	-	1 U
Styrene	100	NA	8500	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
tert-Butylbenzene	800	NA	NA	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	1 U
Tetrachloroethene	5	25	48	1 U	1 U	1 U	1 U	**54**	**55**	**51**	**50**	**44**	**45**	1 U	1 U
trans-1,2-Dichloroethene	100	NA	77	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	NA	NA	NA	0.4 U	0.4 U	0.4 U	0.4 U	4 U	4 U	0.4 U	0.4 U	0.4 U	0.4 U	-	0.4 U
Trichloroethene	4	1.4	3.9	0.5 U	0.5 U	0.5 U	0.5 U	5 U	5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	1 U	1 U	1 U	1 U	10 U	10 U	1 U	1 U	1 U	1 U	-	-
Vinyl chloride	0.292	0.33	54	0.02 U	0.02 U	0.02 U	0.02 U	0.2 U	0.2 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Semi-Volatile Organic Compounds (µg/L)															
1-Methylnaphthalene	0.858	NA	0.17	0.2 U	0.2 U	0.2 U	0.2 U	**9.1**	**9.5**	0.2 U	0.2 U	**1.4**	**7.5**	-	0.2 U
2-Methylnaphthalene	32	NA	NA	0.2 U	0.2 U	0.2 U	0.2 U	**15**	**15**	0.2 U	0.2 U	**1.9**	**19**	-	0.2 U
Acenaphthene	480	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	**0.04**	**0.04**	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Acenaphthylene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Anthracene	2400	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U

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WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-20D MW-20D-W-20240206 02/06/2024 107 (ft)	MW-20D MW-20D-20240509 05/09/2024 106 (ft)	MW-20D MW-20D-20240806 08/06/2024 -	MW-20D MW-20D-4Q24 11/07/2024 107 (ft)	MW-21D MW-21D-W-20240206 02/06/2024 106 (ft)	MW-21D DUP-01-20240206 02/06/2024 106 (ft)	MW-21D MW-21D-20240508 05/08/2024 104 (ft)	MW-21D FD-01-20240508 05/08/2024 104 (ft)	MW-21D MW-21D-20240805 08/05/2024 -	MW-21D MW-21D-4Q24 11/05/2024 103.5 (ft)	MW-22D MW-22D-GRAB 01/18/2024 64 - 69 (ft)	MW-22D MW-22D-20240205 02/05/2024 107 (ft)
Benzo(a)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Benzo(a)pyrene	0.2	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Benzo(b)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	0.04 U	0.02 U	0.02 U	0.02 U	0.04 U	0.04 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.04 U
Benzo(k)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Chrysene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Fluoranthene	640	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Fluorene	320	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	**0.061**	**0.063**	0.02 U	0.02 U	0.02 U	**0.021**	-	0.02 U
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
Naphthalene	160	8.8	160	**0.58**	**0.2**	0.4 U	**0.47**	**39**	**42**	0.2 UJ	**0.47 J**	**11**	**49**	-	**1.4**
Naphthalene, Total[2]	NA	NA	NA	**0.58**	**0.2**	**0.2**	0.47 U	**63**	**67**	0.2 UJ	**0.47 J**	**14.3**	**75.5**	-	**1.4**
Phenanthrene	NA	NA	NA	0.02 U	0.02 U	**0.023**	0.02 U	**0.042**	**0.04**	0.02 U	0.02 U	0.02 U	**0.021**	-	0.02 U
Pyrene	240	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	-	0.02 U
cPAHs-TEQ[3]	0.2	NA	NA	0.015 U	0.015 U	**0.15**	0.015 U	0.015 U	0.015 U	0.015 U	0.015 U	**0.15**	0.015 U	-	0.015 U
Total Petroleum Hydrocarbons-SG (µg/L)															
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	50 U	-	-	-	**1400**	**1500**	-	-	-	-	-	60 U
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	250 U	-	-	-	250 U	250 U	-	-	-	-	-	300 U
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	250 U	-	-	-	**1400**	**1500**	-	-	-	-	-	300 U
Total Petroleum Hydrocarbons (µg/L)															
Benzene	5	2.4	100	**0.37**	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	0.35 U
Toluene	640	NA	15000	1 U	1 U	**4.9**	**3.4**	10 U	10 U	1 U	1 U	1 U	1 U	**6.1**	**9.7**
Ethylbenzene	700	NA	2800	**3.3**	**1**	1 U	**1.5**	**91**	**84**	**19**	**18**	**38**	**73**	1 U	**8.9**
m,p-Xylenes	NA	NA	NA	**2.1**	**3.7**	**2**	**5.2**	**360**	**340**	**73**	**68**	**120**	**270**	-	**26**
o-Xylene	1600	NA	NA	1 U	**1.8**	1 U	**1.9**	**140**	**130**	**28**	**26**	**54**	**100**	-	**11**
Xylene (Total)[5]	1600	NA	320	**2.1**	**5.5**	**2**	**7.1**	**500**	**470**	**101**	**94**	**174**	**370**	3 U	**37**
Gasoline Range Organics	800/1000[6]	NA	NA	100 U	100 U	100 U	100 U	**6600**	**6100**	**1300**	**1200**	**1300**	**3600**	100 U	**220**
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	**110**	60 U	50 U	**93 S**	**1600**	**1600**	**350**	**340**	**270**	**470 S**	**250**	**130**
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	250 U	300 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	250 U	300 U
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	**360**	300 U	**250**	**93 S**	**1600**	**1600**	**350**	**340**	**270**	**470 S**	**250**	**130**
Inorganic Compounds (µg/L)															
Arsenic, Dissolved	13.3[7]	NA	NA	**1.61**	**2.1 J-**	**2.9**	**2.5**	**1.51**	**1.3**	**1.7 J-**	**1.7 J-**	**1.1**	**2.3**	-	**2.56**
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-	-	-	-	-	-
Lead, Dissolved	15	NA	NA	1 U	1 U	1 U	1 U	**2.53**	**2.21**	**2.2**	**2.2**	**1.8**	**2**	-	**1.48**
Manganese, Dissolved	50	NA	NA	**1180**	-	-	-	**189**	**147**	**83**	**80**	**43**	**31**	-	**1010**
Arsenic, Total	13.3[7]	NA	NA	**4.46**	**4.7 J-**	**3.5**	**5.8**	**3.41**	**2.48**	**1.9 J-**	**1.5 J-**	**5.5**	**2.7**	-	**2.07**
Lead, Total	15	NA	NA	**1.02**	**1.8**	1 U	**1.7**	**5.1 J**	**3.58 J**	**2.6**	**2.6**	**6.2**	**2.2**	-	1 U
Other															
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	**170**	-	-	-	**135**	**138**	**127**	**127**	**120**	**130**	-	**147**
Ammonia (mg/L)	NA	NA	NA	0.1 U	-	-	-	0.1 U	0.1 U	0.15 R	0.15 R	0.15 UJ	0.15 R	-	0.1 U
Carbon (mg/L)	NA	NA	NA	-	-	-	-	-	-	**2.06**	**1.88**	**1.38**	**1.67**	-	-
Chloride (mg/L)	NA	NA	NA	**7.94**	-	-	-	**52.4**	**51.9**	**58.3**	**55.7**	**62.7**	**55.3**	-	**6.32**
Ethane (mg/L)	NA	NA	NA	0.0151 U	-	-	-	0.0151 U	0.0151 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.0151 U
Ethene (mg/L)	NA	NA	NA	0.0146 U	-	-	-	0.0146 U	0.0146 U	0.01 U	0.01 U	0.01 U	0.01 U	-	0.0146 U
Methane (mg/L)	NA	NA	NA	**0.0142**	-	-	-	0.00675 U	0.00675 U	0.005 U	**0.00601**	0.005 U	0.005 U	-	0.00675 U
Nitrate (as N) (mg/L)	NA	NA	NA	**1.3**	-	-	-	**1.37**	**1.37**	**1.52 J+**	**1.52 J+**	**1.67**	**1.92**	-	0.5 U
Nitrite (as N) (mg/L)	NA	NA	NA	0.6 U	-	-	-	0.6 U	0.6 U	0.2 UJ	0.2 UJ	0.4 U	0.4 U	-	0.6 U
Sulfate (mg/L)	NA	NA	NA	**9.69**	-	-	-	**7.48**	**7.46**	**7.55**	**7.68**	**7.11 J-**	-	-	**7.03**
Sulfide (mg/L)	NA	NA	NA	**0.247**	-	-	-	**0.207 J**	**0.151 J**	**0.072**	**0.0641**	**2.2**	0.05 U	-	0.05 U
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	**1.62**	-	-	-	**2.14**	**2.23**	-	-	-	-	-	**1.48**
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	**360**	**160**	**60**	**110**	**310 J**	**160 J**	**5.6**	**6.4**	**280**	**8.4 J-**	**710**	**82**
Field Parameters															
Temperature (Deg C)	NA	NA	NA	**13.2**	**14.7**	**15.1**	**14.6**	**14.4**	**14.4**	**16.2**	**16.2**	**18.1**	**16.1**	-	**11.7**
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	**1**	**3.75**	**48**	**5.68**	**1.9**	**1.9**	**2.45**	**2.45**	**2.46**	**2.74**	-	**1.3**
Ferrous Iron, Field (mg/L)	NA	NA	NA	-	-	-	-	-	-	**0.6**	**0.6**	-	**0**	-	-
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	**-383.9**	**74.2**	**73.9**	**62**	**23.4**	**23.4**	**39.1**	**39.1**	**151**	**86.5**	-	**-349.1**
Turbidity, Field (NTU)	NA	NA	NA	**125**	**181.1**	**70**	**45**	**140.48**	**140.48**	**59.3**	**59.3**	**17**	**71.91**	-	**94.72**
pH, Field (pH units)	NA	NA	NA	**7**	**6.81**	**6.85**	**6.8**	**6.51**	**6.51**	**6.59**	**6.59**	**6.44**	**6.52**	-	**6.73**
Conductivity, Field (µS/cm)	NA	NA	NA	**384.7**	**344.2**	**313.2**	**300**	**446.6**	**446.6**	**418.9**	**418.9**	**446**	**424**	-	**333.7**

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-22D MW-22D-20240509 05/09/2024 105.2 (ft)	MW-22D MW-22D-20240805 08/05/2024 -	MW-22D MW-22D-4Q24 11/07/2024 108 (ft)	MW-23D MW-23D-20240205 02/05/2024 106 (ft)	MW-23D MW-23D-20240509 05/09/2024 107 (ft)	MW-23D MW-23D-20240805 08/05/2024 106.5 (ft)	MW-23D MW-23D-4Q24 11/07/2024 107 (ft)
Volatile Organic Compounds (µg/L)										
1,1,1,2-Tetrachloroethane	1.68	7.1	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,1,1-Trichloroethane	200	NA	5400	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,1,2,2-Tetrachloroethane	0.219	5.9	NA	0.2 U	0.2 U	0.2 U	10 U	40 U	40 U	20 U
1,1,2-Trichloroethane	3	8.8	5.1	0.5 U	0.5 U	0.5 U	25 U	100 U	100 U	50 U
1,1-Dichloroethane	7.68	11	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,1-Dichloroethene	7	NA	130	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,1-Dichloropropene	NA	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,2,3-Trichlorobenzene	6.4	NA	NA	1 U	1 U	1 U	200 U	200 U	200 U	100 U
1,2,3-Trichloropropane	0.000384	NA	20	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,2,4-Trichlorobenzene	15.1	NA	39	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,2,4-Trimethylbenzene	80	NA	240	**1**	1 U	1 U	**560**	**770**	**670**	**680**
1,2-Dibromo-3-chloropropane (DBCP)	0.144	0.042	35	10 U	10 U	10 U	500 U	2000 U	2000 U	1000 U
1,2-Dibromoethane (Ethylene Dibromide)	0.05	0.3	290	0.01 U	0.01 U	0.01 U	20 U	2 U	2 U	1 U
1,2-Dichlorobenzene	600	NA	2500	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,2-Dichloroethane	4.81	3.5	120	0.2 U	0.2 U	0.2 U	10 U	40 U	40 U	20 U
1,2-Dichloropropane	5	10	28	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,3,5-Trimethylbenzene	80	NA	170	1 U	1 U	1 U	**200**	**300**	**260**	**310**
1,3-Dichlorobenzene	NA	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,3-Dichloropropane	160	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
1,4-Dichlorobenzene	75	5	8000	1 U	1 U	1 U	50 U	200 U	200 U	100 U
2,2-Dichloropropane	NA	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
2-Butanone (Methyl Ethyl Ketone)	4800	NA	1.70E+06	20 U	20 U	20 U	4000 U	4000 U	4000 U	2000 U
2-Chlorotoluene	160	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
2-Hexanone (Methyl Butyl Ketone)	40	NA	7300	10 U	10 U	10 U	500 U	2000 U	2000 U	1000 U
2-Phenylbutane (sec-Butylbenzene)	800	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
4-Chlorotoluene	160	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
4-Methyl-2-Pentanone (Methyl Isobutyl Ketone)	640	NA	470000	10 U	10 U	10 U	500 U	2000 U	2000 U	1000 U
Acetone	7200	NA	NA	50 U	50 U	50 U	-	10000 U	10000 U	5000 U
Bromobenzene	64	NA	630	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Bromodichloromethane	7.06	1.4	NA	0.5 U	0.5 U	0.5 U	25 U	100 U	100 U	50 U
Bromoform	55.4	220	NA	5 U	5 U	5 U	250 U	1000 U	1000 U	500 U
Bromomethane (Methyl Bromide)	11.2	NA	11	5 U	5 U	5 U	250 U	1000 U	1000 U	500 U
Carbon tetrachloride	5	0.62	68	0.5 U	0.5 U	0.5 U	25 U	100 U	100 U	50 U
Chlorobenzene	100	NA	340	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Chloroethane	NA	NA	15000	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Chloroform (Trichloromethane)	14.1	1.2	490	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Chloromethane (Methyl Chloride)	NA	NA	150	10 U	10 U	10 U	2000 U	2000 U	2000 U	1000 U
cis-1,2-Dichloroethene	16	NA	180	1 U	1 U	1 U	50 U	200 U	200 U	100 U
cis-1,3-Dichloropropene	NA	NA	NA	0.4 U	0.4 U	0.4 U	20 U	80 U	80 U	40 U
Cymene (p-Isopropyltoluene)	NA	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Dibromochloromethane	5.21	NA	NA	0.5 U	0.5 U	0.5 U	25 U	100 U	100 U	50 U
Dibromomethane	80	NA	97	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Dichlorodifluoromethane (CFC-12)	1600	NA	4.2	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Hexachlorobutadiene	0.561	0.64	NA	0.5 U	0.5 U	0.5 U	25 U	100 U	100 U	50 U
Hexane	480	NA	7.2	5 U	5 U	5 U	250 U	1000 U	1000 U	500 U
Isopropylbenzene (Cumene)	800	NA	910	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Methyl Tert Butyl Ether (MTBE)	24.3	860	120000	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Methylene chloride (Dichloromethane)	5	780	3300	5 U	5 U	5 U	250 U	1000 U	1000 U	500 U
Naphthalene	160	8.8	160	1 U	1 U	1 U	**270**	**450**	**620**	**470**
n-Propylbenzene	800	NA	2300	1 U	1 U	1 U	**75**	200 U	200 U	**100**
Styrene	100	NA	8500	1 U	1 U	1 U	50 U	200 U	200 U	100 U
tert-Butylbenzene	800	NA	NA	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Tetrachloroethene	5	25	48	1 U	1 U	1 U	200 U	5 U	5 U	100 U
trans-1,2-Dichloroethene	100	NA	77	1 U	1 U	1 U	50 U	200 U	200 U	100 U
trans-1,3-Dichloropropene	NA	NA	NA	0.4 U	0.4 U	0.4 U	20 U	80 U	80 U	40 U
Trichloroethene	4	1.4	3.9	0.5 U	0.5 U	0.5 U	100 U	5 U	5 U	50 U
Trichlorofluoromethane (CFC-11)	2400	NA	120	1 U	1 U	1 U	50 U	200 U	200 U	100 U
Vinyl chloride	0.292	0.33	54	0.02 U	0.02 U	0.02 U	1 U	4 U	4 U	2 U
Semi-Volatile Organic Compounds (µg/L)										
1-Methylnaphthalene	0.858	NA	0.17	0.2 U	0.2 U	0.2 U	**32**	**34**	**42**	**27**
2-Methylnaphthalene	32	NA	NA	0.2 U	0.2 U	0.2 U	**65**	**68**	**78**	**57**
Acenaphthene	480	NA	NA	0.02 U	0.02 U	0.02 U	**0.1**	**0.14**	**0.15**	**0.12**
Acenaphthylene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Anthracene	2400	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.026**	0.02 U

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location Name Sample Name Sample Date Sample Depth (bgs)	MTCA Method B Potable Cleanup Level for Groundwater [1]	Groundwater Screening Level VI Method B Cancerous	Groundwater Screening Level VI Method B Noncancerous	MW-22D MW-22D-20240509 05/09/2024 105.2 (ft)	MW-22D MW-22D-20240805 08/05/2024 -	MW-22D MW-22D-4Q24 11/07/2024 108 (ft)	MW-23D MW-23D-20240205 02/05/2024 106 (ft)	MW-23D MW-23D-20240509 05/09/2024 107 (ft)	MW-23D MW-23D-20240805 08/05/2024 106.5 (ft)	MW-23D MW-23D-4Q24 11/07/2024 107 (ft)
Benzo(a)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(a)pyrene	0.2	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(b)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Benzo(g,h,i)perylene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.04 U	0.02 U	0.02 U	0.02 U
Benzo(k)fluoranthene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Chrysene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Dibenz(a,h)anthracene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Fluoranthene	640	NA	NA	0.02 U	0.02 U	**0.029**	0.02 U	0.02 U	**0.037**	0.02 U
Fluorene	320	NA	NA	0.02 U	0.02 U	0.02 U	**0.18**	**0.19**	**0.24**	**0.15**
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
Naphthalene	160	8.8	160	**0.51**	**0.46**	**0.32**	**230**	**250**	**310**	**240**
Naphthalene, Total[2]	NA	NA	NA	**0.51**	**0.46**	0.32 U	**327**	**352**	**430**	**324**
Phenanthrene	NA	NA	NA	0.02 U	0.02 U	**0.021**	**0.18 J+**	**0.15**	**0.23**	**0.13**
Pyrene	240	NA	NA	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**0.036**	0.02 U
cPAHs-TEQ[3]	0.2	NA	NA	0.015 U	**0.15**	0.015 U	0.015 U	0.015 U	**0.15**	0.015 U
Total Petroleum Hydrocarbons-SG (µg/L)										
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	-	-	-	**2900**	-	-	-
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	-	-	-	300 U	-	-	-
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	-	-	-	**2900**	-	-	-
Total Petroleum Hydrocarbons (µg/L)										
Benzene	5	2.4	100	0.35 U	0.35 U	0.35 U	**10 J**	**9.2 J**	**8.2 J**	**11**
Toluene	640	NA	15000	**5.5**	1 U	1 U	**15000**	**20000**	**16000**	**14000**
Ethylbenzene	700	NA	2800	**2.5**	**3.5**	**2.7**	**1300**	**2200**	**1700**	**1800**
m,p-Xylenes	NA	NA	NA	**6.5**	**5.4**	**6.2**	**4600**	**7900**	**5600**	**6000**
o-Xylene	1600	NA	NA	**2**	**2**	**2.4**	**1100**	**1900**	**1400**	**1400**
Xylene (Total)[5]	1600	NA	320	**8.5**	**7.4**	**8.6**	**5700**	**9800**	**7000**	**7400**
Gasoline Range Organics	800/1000[6]	NA	NA	**160**	100 U	100 U	**62000**	**94000**	**71000**	**59000**
Total Petroleum Hydrocarbons (C10-C25) DRO	500	NA	NA	50 U	50 U	50 U	**7000**	**7000**	**5500**	**4500 S**
Total Petroleum Hydrocarbons (C25-C36) ORO	500	NA	NA	250 U	250 U	250 U	300 U	320 U	300 U	250 U
Total Petroleum Hydrocarbons (C10-C36)[4]	500	NA	NA	250 U	**250**	250 U	**7000**	**7000**	**5500**	**4500 S**
Inorganic Compounds (µg/L)										
Arsenic, Dissolved	13.3[7]	NA	NA	**1.1 J-**	**1.6**	1 U	**11.4**	-	**15**	**8.7**
Iron, Dissolved	300	NA	NA	-	-	-	-	-	-	-
Lead, Dissolved	15	NA	NA	1 U	1 U	1 U	**1.26**	1 U	1 U	1 U
Manganese, Dissolved	50	NA	NA	**460**	-	-	**2000**	**2500**	**2800**	-
Arsenic, Total	13.3[7]	NA	NA	**1.5 J-**	**1.9**	**3.2**	**11.6**	**17 J-**	**19**	**22**
Lead, Total	15	NA	NA	1 U	1 U	1 U	**1.59**	**1.6**	**7.3**	**3.3**
Other										
Alkalinity, Total (as CaCO3) (mg/L)	NA	NA	NA	**123**	-	-	**244**	**248**	**38.1**	**262**
Ammonia (mg/L)	NA	NA	NA	0.15 R	-	-	0.1 U	0.15 R	0.15 UJ	0.15 U
Carbon (mg/L)	NA	NA	NA	**1.52**	-	-	-	**10.6**	**10.9**	**9.93**
Chloride (mg/L)	NA	NA	NA	**5.37**	-	-	**27.1**	**27**	**27.7**	**27.5**
Ethane (mg/L)	NA	NA	NA	0.01 U	-	-	0.0151 U	0.01 U	0.01 U	0.01 U
Ethene (mg/L)	NA	NA	NA	0.01 U	-	-	0.0146 U	0.01 U	0.01 U	0.01 U
Methane (mg/L)	NA	NA	NA	0.005 U	-	-	**0.0599**	**0.107**	**0.0973**	**0.139**
Nitrate (as N) (mg/L)	NA	NA	NA	**1.02**	-	-	0.5 U	0.2 U	0.4 U	0.4 U
Nitrite (as N) (mg/L)	NA	NA	NA	0.2 U	-	-	0.6 U	0.2 U	0.4 U	0.4 U
Sulfate (mg/L)	NA	NA	NA	**6.42**	-	-	3 U	**2.22**	2 UJ	1 U
Sulfide (mg/L)	NA	NA	NA	0.05 U	-	-	**0.0672**	**0.186**	**2.4**	0.05 U
Total Organic Carbon (TOC) (mg/L)	NA	NA	NA	-	-	-	**11.3**	-	-	-
Total Suspended Solids (TSS) (mg/L)	NA	NA	NA	**36**	**77**	5 U	**46**	**39**	**75**	**98**
Field Parameters										
Temperature (Deg C)	NA	NA	NA	**15.3**	**16.1**	**14.3**	**13.2**	**16.4**	**17.6**	**14.8**
Dissolved Oxygen, Field (mg/L)	NA	NA	NA	**3.07**	**3.8**	**4.68**	**0.38**	**0.39**	**0.36**	**0.88**
Ferrous Iron, Field (mg/L)	NA	NA	NA	**1.5**	-	-	-	**7.5**	-	**5.4**
Oxidation Reduction Potential (ORP), Field (mv)	NA	NA	NA	**23**	**176**	**44**	**-184.9**	**-60**	**-67.5**	**-112**
Turbidity, Field (NTU)	NA	NA	NA	**15**	**71**	**21**	**12.54**	**8**	**71.43**	**23**
pH, Field (pH units)	NA	NA	NA	**6.5**	**6.38**	**6.5**	**6.71**	**6.72**	**6.77**	**6.72**
Conductivity, Field (µS/cm)	NA	NA	NA	**260**	**252**	**244**	**572**	**532**	**524**	**528**

TABLE 5
ANALYTICAL RESULTS FOR GROUNDWATER
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Notes:

(1): MTCA Method B Potable Cleanup Level for groundwater obtained from February 2024 CLARC data table. If no value was provided, the Method A value was used, if available.
(2): Total naphthalene is the summation of 1-Methylnaphthalene, 2-Methylnaphthalene, and Naphthalene analyzed by analytical method SW8270E.
(3): Toxicity Equivalent using April 2015 (revised July 2021) Ecology's Implementation Memo No. 10: Evaluating the Human Health Toxicity of Carcinogenic PAHs (cPAHs) Using Toxicity Equivalency Factors (TEFs), Publication No. 15-09-049.
For non-detects (<RL), a value of one-half the RL has been used for TEQ calculation.
cPAH calculated for samples with individual PAHs identified as a non-detect will be qualified with U.
(4) Total Petroleum Hydrocarbons (C10-C-36) were summed in accordance with Publication No. 04-09-086.
A value of zero has been used for non-detects in the calculation.
(5): Xylene (Total) is the summation of m-, p-, and o-Xylene (Method 8326) or reported as the total (Method 8021)
(6): 800 µg/L if benzene is present, otherwise, 1000 µg/L
(7): 13.3 is the Island County background threshold value for Arsenic based on Ecology's 2022 Charles San Juan study
Bold *denotes a detected concentration.*
Nondetect values are not screened against the cleanup levels
Blue shading denotes a detected analyte concentration exceeding a MTCA Method B Potable Cleanup Level for Groundwater.
Purple shading denotes a detected analyte concentration exceeding a MTCA Groundwater Screening Level Vapor Intrusion (VI) Method B.
Green shading denotes a detected analyte concentration exceeding both a MTCA Groundwater Screening Level VI Method B and MTCA Method B Potable Cleanup Level for Groundwater.
-: Not analyzed
µg/L: micrograms per liter
µS/cm: microSiemen per centimeter
bgs: below ground surface
Deg C: Degrees Celsius
ft: feet
J: result is an estimate
J+: result is an estimate, biased high
J-: result is an estimate, biased low
mg/L: milligrams per liter
MTCA: Model Toxics Control Act
mv: millivolts
NA: Not Available
NTU: Nephelometric Turbidity Units
R: data is unusable, result is rejected
S: Result is suspect, see DUSR for details
SG: Silica Gel Cleanup
U: not detected above the indicated laboratory reporting limit

TABLE 6
WATER LEVEL MEASUREMENTS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Monitoring Well or Boring Location	Date	GSE	TOC	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Top of Screen Elevation (feet NAVD88)	Bottom of Screen Elevation (feet NAVD88)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)[a]
MW-1S	7/20/2023	117.17	116.82	30	65	86.82	51.82	50.82	66.00
	9/25/2023							--	--
	02/05/24							50.78	66.04
	05/07/24							50.45	66.37
	8/5/2024							51.08	65.74
	11/5/2024							51.4	65.42
MW-2S	7/20/2023	118.00	117.63	50	60	67.63	57.63	53.50	64.13
	9/25/2023							53.85	63.78
	02/05/24							53.60	64.03
	05/07/24							53.27	64.36
	8/5/2024							53.76	63.87
	11/5/2024							54.04	63.59
MW-3S	7/20/2023	118.00	117.63	50	60	67.63	57.63	--	--
	9/25/2023							--	--
	02/05/24							52.23	65.40
	05/07/24							--	--
	8/5/2024							52.45	65.18
	11/5/2024							52.72	64.91
MW-4S	7/20/2023	117.78	117.44	46	56	71.44	61.44	53.08	64.36
	9/25/2023							53.4	64.04
	02/05/24							53.10	64.34
	05/07/24							52.77	64.67
	8/5/2024							49.86	67.58
	11/5/2024							52.77	64.67
MW-5S	7/20/2023	116.00	115.60	53	63	62.60	52.60	62.73	52.87
	9/25/2023							62.73	52.87
	02/05/24							62.77	52.83
	05/07/24							62.71	52.89
	8/5/2024							62.28	53.32
	11/5/2024							62.65	52.95
MW-6S	7/20/2023	117.07	116.71	51	61	65.71	55.71	57.68	59.03
	9/25/2023							58.05	58.66
	02/05/24							57.63	59.08
	05/07/24							57.43	59.28
	8/5/2024							58.03	58.68
	11/5/2024							58.45	58.26
MW-7S	7/20/2023	117.19	116.98	49	59	67.98	57.98	57.13	59.85
	9/25/2023							57.85	59.13
	02/05/24							57.05	59.93
	05/07/24							56.60	60.38
	8/5/2024							57.63	59.35
	11/5/2024							58.23	58.75
MW-8S	7/20/2023	117.69	117.36	51	61	66.36	56.36	54.56	62.80
	9/25/2023							54.84	62.52
	02/05/24							54.65	62.71
	05/07/24							54.38	62.98
	8/5/2024							55.77	61.59
	11/5/2024							55.02	62.34
MW-9D	7/20/2023	116.55	116.22	100	110	16.22	6.22	102.00	14.22
	9/25/2023							102.05	14.17
	02/05/24							102.32	13.90
	05/07/24							102.33	13.89
	8/5/2024							102.35	13.87
	11/5/2024							102.59	13.63
MW-10D	7/20/2023	115.44	115.15	100	110	15.15	5.15	101.50	13.65
	9/25/2023							100.64	14.51
	02/05/24							100.87	14.28
	05/07/24							100.89	14.26
	8/5/2024							100.82	14.33
	11/5/2024							101.12	14.03
MW-11D	7/20/2023	115.91	115.62	100	110	15.62	5.62	101.40	14.22
	9/25/2023							101.43	14.19
	02/05/24							101.68	13.94
	05/07/24							101.74	13.88
	8/5/2024							101.69	13.93
	11/5/2024							101.96	13.66
MW-12D	7/20/2023	116.31	115.94	100	110	15.94	5.94	101.40	14.54
	9/25/2023							101.56	14.38
	02/05/24							101.62	14.32
	05/07/24							101.80	14.14
	8/5/2024							101.75	14.19
	11/5/2024							102.03	13.91
MW-13D	7/20/2023	118.27	117.88	98	108	19.88	9.88	103.61	14.27
	9/25/2023							103.74	14.14
	02/05/24							103.96	13.92
	05/07/24							104.05	13.83
	8/5/2024							104.05	13.83
	11/5/2024							104.25	13.63

TABLE 6
WATER LEVEL MEASUREMENTS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Monitoring Well or Boring Location	Date	GSE	TOC	Depth to Top of Screen (feet bgs)	Depth to Bottom of Screen (feet bgs)	Top of Screen Elevation (feet NAVD88)	Bottom of Screen Elevation (feet NAVD88)	Depth to Water (feet below TOC)	Groundwater Elevation (feet)[a]
MW-14D	7/20/2023	118.01	117.76	99	109	18.76	8.76	103.62	14.14
	9/25/2023							103.71	14.05
	02/05/24							--	--
	05/07/24							103.89	13.87
	8/5/2024							103.92	13.84
	11/5/2024							104.12	13.64
MW-15D	7/20/2023	118.817	118.32	101	111	17.32	7.32	104.33	13.99
	9/25/2023							104.34	13.98
	02/05/24							104.37	13.95
	05/07/24							104.63	13.69
	8/5/2024							104.50	13.82
	11/5/2024							104.89	13.43
MW-16D	7/20/2023	119.067	118.64	100	110	18.64	8.64	105.55	13.09
	9/25/2023							104.57	14.07
	02/05/24							104.61	14.03
	05/07/24							104.83	13.81
	8/5/2024							104.84	13.80
	11/5/2024							105.1	13.54
MW-17D	7/20/2023	117.40	117.15	100	115	17.15	2.15	102.86	14.29
	9/25/2023							102.93	14.22
	02/05/24							103.16	13.99
	05/07/24							103.28	13.87
	8/5/2024							103.24	13.91
	11/5/2024							103.5	13.65
MW-18D	7/20/2023	--	--	100	115	--	--	103.13	--
	9/25/2023							103.16	--
	02/05/24							103.28	--
	05/07/24							--	--
	8/5/2024							103.46	--
	11/5/2024							103.73	--
MW-19D	7/20/2023	117.94	117.57	102	112	15.57	5.57	--	--
	9/25/2023							--	--
	02/05/24							103.56	14.01
	05/07/24							103.65	13.92
	8/5/2024							103.62	13.95
	11/5/2024							103.91	13.66
MW-20D	7/20/2023	118.55	118.12	101	111	17.12	7.12	--	--
	9/25/2023							--	--
	02/05/24							104.11	14.01
	05/07/24							104.33	13.79
	8/5/2024							104.33	13.79
	11/5/2024							104.61	13.51
MW-21D	7/20/2023	116.58	116.20	100	110	16.20	6.20	--	--
	9/25/2023							--	--
	02/05/24							101.84	14.36
	05/07/24							102.03	14.17
	8/5/2024							102.00	14.20
	11/5/2024							102.27	13.93
MW-22D	9/25/2023	119.40	118.94	104	114	14.94	4.94	--	--
	1/19/2024							--	--
	02/05/24							104.90	14.04
	05/07/24							105.21	13.73
	8/5/2024							105.13	13.81
	11/5/2024							105.41	13.53
MW-23D	1/22/2023	118.90	118.44	101	111	17.44	7.44	--	--
	9/25/2023							--	--
	02/05/24							104.52	13.92
	05/07/24							104.65	13.79
	8/5/2024							104.58	13.86
	11/5/2024							104.86	13.58

Notes:

-- = Not Available or Not Applicable
bgs = below ground surface
GSE = ground surface elevation
NAVD88 = North American Vertical Datum of 1988
TOC = top of well casing elevation

TABLE 8
POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Authority	Resource	Implementing Laws/Regulations	ARAR?	Applicability
Contaminant-Specific ARARs				
Federal	Drinking Water	National Primary Drinking Water Regulations	Yes	Maximum contaminant levels (MCLs) for organic and inorganic chemicals in drinking water are applicable since drinking water wells could be impacted by the Site.
State	Soil	MTCA [RCW 70A.305; Chapter 173-340 WAC]	Yes	The MTCA soil cleanup levels are applicable.
State	Groundwater	MTCA [RCW 70A.305; Chapter 173-340 WAC]	Yes	The MTCA groundwater cleanup levels are applicable.
State	Air	MTCA [RCW 70.305; Chapter 173-340 WAC]	No	The MTCA air cleanup levels are not applicable as indoor air is not a media of concern.
Action-Specific ARARs				
Federal	Air	Clean Air Act [42 USC § 7401 et seq.; 40 CFR Part 50]	Yes	The federal Clean Air Act creates a national framework designed to protect ambient air quality by limiting air emissions.
State	Air	Clean Air Act and Implementing Regulations [RCW 70A.15; Chapter 173-400 WAC]	Yes	These regulations require the owner or operator of a source of fugitive dust to take reasonable precautions to prevent fugitive dust from becoming airborne and to maintain and operate the source to minimize emissions primarily during construction.
Local	Air Emissions	Regional Emission Standards for Toxic Air Pollutants [PSCAA Regulations I and III] Air Pollution Control Authority [ICC Chapter 8.20]	Yes	This requirement is similar to the CAA above but is more localized, addressing performance standards for land uses within the city. The Northwest Clean Air Agency regulations cover specific air quality issues within its regional jurisdiction. These air quality standards and pollution control regulations are applicable to cleanup action alternatives involving construction.
Federal	Solid Waste	RCRA [42 USC § 6901 et seq.], Subtitle D -- Managing Municipal and Solid Waste [40 CFR Parts 257 and 258]	Yes	Subtitle D of RCRA establishes a framework for management of non-hazardous solid waste. These regulations establish guidelines and criteria from which states develop solid waste regulations. These requirements are applicable to cleanup action alternatives that involve off-site disposal of impacted soil and/or groundwater designated as non-hazardous waste.
Federal/State	Solid Waste	U.S. Transportation of Hazardous Materials [49 CFR Part 105 to 177] Washington Transportation of Hazardous Materials [Chapter 446-50 WAC]	No	Transportation of hazardous waste or materials must meet state and federal requirements.
Federal/State	Solid Waste	U.S. Land Disposal Restrictions [40 CFR Part 268] Washington Land Disposal Restrictions [Chapter 173-303-140 WAC]	No	Best management practices for dangerous wastes are required to meet state and federal requirements. These requirements are likely not appliable because soil will likely not be designated as hazardous waste.
Federal/State	Solid Waste	U.S. RCRA [42 USC § 6901 et seq.], Subtitle C -- Hazardous Waste Management [40 CFR Parts 260 to 262] Washington Dangerous Waste Regulations [Chapter 173-303 WAC]	No	Subtitle C of RCRA pertains to the management of hazardous waste. This requirement is likely not applicable because soil and/or groundwater will likely not be designated as hazardous waste.
State	Solid Waste	Solid Waste Handling Standards [RCW 70A.205; Chapter 173-350 WAC]	No	Washington Solid Waste Handling Standards apply to facilities and activities that manage solid waste. The regulations set minimum functional performance standards for proper handling and disposal of solid waste; describe responsibilities of various entities; and stipulate requirements for solid waste handling facility location, design, construction, operation, and closure.
Federal/State	Remedy Construction	U.S. OSHA [29 CFR Parts 1904, 1910, and 1926] WISHA [RCW 49.17; Title 296 WAC]	Yes	Site worker and visitor health and safety requirements established by OSHA/WISHA are to be met during implementation of the cleanup action.
State	Remedy Construction	UIC Program [Chapter 173-218 WAC]	Yes	UIC regulations apply to cleanup action alternatives that include injection of biological or chemical oxidants into injection wells or trenches.
State/ Local	Remedy Construction	SEPA [RCW 43.21C; Chapter 197-11 WAC]	Yes	A SEPA review identifies and analyzes environmental impacts associated with the selected cleanup action alternative. A SEPA review is required for local permitting and pursuant to MTCA.
Local	Remedy Construction	Island County Erosion and Sedimentation Control Requirements [ICC Chapter 11.03.230] and Island County Erosion Control and [ICC Chapter 11.02.330]	No	Guidelines for erosion control and construction stormwater management.
State/ Local	Remedy Construction	Washington Noise Control [RCW 70A.20; Chapter 173-60 WAC] Island County Noise Level Reduction Ordinance [ICC Chapter 14.01B]	Yes	Potentially relevant, depending on construction activities and equipment selected.
Local	Remedy Construction	Clearing and Grading Requirements [ICC Chapter 11.02]	No	

TABLE 8
POTENTIAL APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Authority	Resource	Implementing Laws/Regulations	ARAR?	Applicability
Action-Specific ARARs (continued)				
Federal	Surface Water	Federal Water Pollution Control Act--Water Quality Certification [CWA; 33 USC § 1341, Section 401] and Implementing Regulations	No	Section 401 of the CWA provides that applicants for a permit to conduct any activity involving potential discharges into waters or wetlands shall obtain certification from the state that discharges will comply with applicable water quality standards. These activities are not expected for the proposed cleanup action alternatives.
Federal/State	Surface Water	U.S. Federal Water Pollution Control Act--NPDES [CWA; 33 USC § 1342, Section 402] and Implementing Regulations Washington Waste Discharge General Permit Program [RCW 90.48; Chapter 173-226 WAC]	No	The NPDES program establishes requirements for point source discharges, including stormwater runoff.
State	Surface Water	Hydraulic Code [RCW 77.55; Chapter 220-660 WAC]	No	The Hydraulic Code requires that any construction activity that uses, diverts, obstructs, or changes the bed or flow of state waters must be done under the terms of a Hydraulic Project Approval permit issued by the Washington State Department of Fish and Wildlife. These activities are not expected as part of the cleanup action alternatives.
State	Groundwater	Minimum Standards for Construction and Maintenance of Wells [RCW 18.104; Chapter 173-160 WAC]	Yes	Washington state has developed minimum standards for constructing water and monitoring wells, and for the decommissioning of wells. These regulations are applicable to all cleanup action alternatives involving drilling or decommissioning wells.
Location-Specific ARARs				
Federal	Endangered Species; Critical Habitats	ESA [16 USC §§ 1531-1544] and Implementing Regulations	No	The ESA protects species of fish, wildlife, and plants that are listed as threatened or endangered with extinction. It also protects designated critical habitat for listed species. The ESA outlines procedures for federal agencies to follow, including consultation with resource agencies, when taking actions that may jeopardize listed species. No threatened or endangered species or habitat areas are expected to be impacted by the cleanup action alternatives.
Federal/State	Historic Areas	U.S. Archaeological and Historic Preservation Act [16 USC § 469, 470 et seq.; 36 CFR Parts 65 and 800] Washington Archaeological Sites and Resources [RCW 27.44, 27.48, and 27.53; Chapter 25-48 WAC]	No	Actions must be taken to preserve and recover significant artifacts, preserve historic and archaeological properties and resources, and minimize harm to national landmarks. There are no known or suspected historic or archaeological sites on the Site.
State	Aquatic Lands	Aquatic Land Management [RCW 79.105; Chapter 332-30 WAC]	No	The Aquatic Lands Management law develops criteria for managing state-owned aquatic lands. Aquatic lands are to be managed to promote uses and protect resources as specified in the regulations. The cleanup action alternatives do not occur on state-owned aquatic lands.
State	Shorelines and Surface Water	Shoreline Management Act of 1971 [RCW 90.58] and Implementing Regulations	No	Actions are prohibited within 200 feet of shorelines of statewide significance unless permitted. Cleanup action alternatives do not occur within 200 feet of a shoreline.
State	Wetlands	Shoreline Management Act of 1971 [RCW 90.58] and Implementing Regulations	No	The construction or management of property in wetlands is required to minimize potential harm, avoid adverse effects, and preserve and enhance wetlands. The cleanup action alternatives do not occur within a wetland.
State	Public Lands	Public Lands Management [RCW 79.02]	No	Activities on public lands are restricted, regulated, or proscribed. The cleanup action alternatives do not occur on state-owned public lands.
Local	Shoreline	Shoreline Master Program Regulations and Procedures [ICC Chapter 17.05A]	No	Shoreline Master Program applies to all "development" as defined by this chapter and RCW 90.58, whether or not a shoreline permit or statement of permit exemption is required.

Notes:

ARAR = Applicable or Relevant and Appropriate Requirement
CAA = Clean Air Act
CFR = Code of Federal Regulations
CWA = Clean Water Act.
DAHP = Washington Department of Archaeology and Historic Preservation
DPD = Department of Planning and Development
ESA = Endangered Species Act
ICC = Island County Code
MTCA = Model Toxics Control Act
NPDES = National Pollutant Discharge Elimination System
NRHP = National Register of Historic Places
OSHA = Occupational Safety and Health Act
PSCAA = Puget Sound Clean Air Agency
RCRA = Resource Conservation and Recovery Act
RCW = Revised Code of Washington
SEPA = State Environmental Policy Act
UIC = Underground Injection Controls
USC = United States Code
WAC = Washington Administrative Code
WISHA = Washington Industrial Safety and Health Act

TABLE 9
REMEDIATION TECHNOLOGY SCREENING
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Remediation Technology	Description	Implementability	Reliability	Relative Cost	Screening Comments	Technology Retained?
No remediation technology involved.	There in no intentional approach involved to remediate or monitor contamination.	High.	Not reliable, as contamination will not be addressed or monitoring.	No capital or O&M cost.	Although this action is the least costly, it is not an effective or responsible approach.	No
Compliance Monitoring	Protection, Performance, and Compliance (WAC 173-340-410)	Technically implementable.	Effective for assessing groundwater conditions at the site.	Negligible capital cost. Low O&M cost.	Necessary with other technologies.	Yes
Monitored natural attenuation	Naturally occurring physical, chemical, and biological processes that reduce contaminant mobility or concentration.	Technically implementable. Cleanup time frame longer than for other remedial options.	Long restoration time frame for site COCs as the sole remedy. Most effective when paired with other technologies.	Negligible capital cost. Low O&M cost.	Long cleanup time frame. Limited effectiveness for treatment of site COCs.	Yes
Institutional Controls	Administrative measures to control access or exposure to contaminated media. i.e.// Placement of an environmental covenant on the affected property.	Technically implementable.	Reliable conventional administrative measures.	Low capital and O&M cost.	Applicable in combination with other technologies.	Yes
In situ enhanced bioremediation	Enhanced Aerobic Biodegradation (EAB) through addition of nutrients and electron acceptors to stimulate microbial growth and breakdown of contaminants.	Technically implementable. Permitting and/or infrastructure required (e.g., injection wells). May require more than one application to attain RAOs. Relatively long cleanup time frame.	Established technology. Effective for some site COCs (TPH and VOCs).	Moderate capital and O&M costs.	Ineffective for some site COCs (SVOCs). High concentrations will extend cleanup time frame Moderate cost.	No
	Sorption / Immobilization. Injecting a carbon source into the subsurface to absorb dissolved-phase contaminants to retained them for biodegradation.	Technically implementable. Permitting and/or infrastructure required (e.g., injection wells). Long cleanup time frame.	Widely accepted technology, though full lifecycle success questionable. Effective for some Site COCs (TPH).	Moderate capital and O&M costs.	Limited effectiveness to ineffective for some site COCs (SVOCs). Moderate cost.	Yes
In situ Chemical treatment	Injection of chemicals to degrade or destroy contaminants in place.	Technically implementable. Requires handling large quantities of chemicals. Permitting and/or infrastructure required (e.g., injection wells). May require multiple applications of chemical to attain RAOs.	Established technology. Varying effectiveness for all GW COCs.	High capital and low O&M costs.	Varying effectiveness for all GW COCs. Moderately high cost.	Yes
Air Sparge (AS) & Soil vapor extraction (SVE)	Air Injection into the saturated zone and removal of volatile contaminants through vacuum extraction in the vadose zone. Could be used in conjunction with other technologies including steam injection, or six-phase soil heating.	Technically implementable. Would require design and construction of subsurface infrastructure for an AS / SVE system.	Subsurface geology will affect AS / SVE effectiveness. Oxygen introduced through AS may also promote biodegradation of organic compounds. Limited effectiveness to ineffective for some site COCs (SVOCs).	High capital cost for new system installation. Moderate to high O&M costs.	Limited effectiveness to ineffective for some site COCs (SVOCs). High cost.	No
Dual-Phase Extraction (DPE)	Extracting and treating contaminated groundwater and vapor.	Technically implementable. Depth to perched groundwater and sea level aquifer requires more robust infrastructure.	Effective for all dissolved phase contaminants. Diminishing returns occur when dissolved phase is limited by soil desorption rate.	High capital cost for system installation and relatively high O&M costs.	High initial effectiveness with rapid decline. Unlikely to achieve RAOs. High Cost.	No
Thermal treatment	Application of heat via subsurface steam injection, electrical resistive heating, or other method to remove strippable contaminants. Volatilized compounds captured and treated at surface.	Technically implementable. Requires off-gas capture and treatment. Depth to perched and sea level aquifers requires more robust infrastructure.	Effective for all COCs. Requires off-gas capture and treatment to be effective.	High capital and O&M costs.	Infrastructure heavy technology. High cost.	Yes

Notes:
AS = air sparging
COC = chemical of concern
GW = groundwater
O&M = operation and maintenance
RAO = remedial action objective
SVE = soil vapor extraction
SVOC = semi-volatile organic compound
TPH = total petroleum hydrocarbon
WAC = Washington Administrative Code

TABLE 10
REMEDIAL ACTION ALTERNATIVE 1 COST ESTIMATE
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location:	WHIDBEY MARINE & AUTO SUPPLY 1695 EAST MAIN ST FREELAND, WASHINGTON	**Description:** Alternative 1 consists of in situ thermal treatment of the on-Property petroleum source area, and monitored natural attenuation for all off-Property impacts. The estimate assumes that institutional controls, such as a restrictive covenant, will be prepared and implemented. Costs have been estimated using recent Haley & Aldrich experience with similar items on other projects.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2025	
Date:	February 2025	

CAPITAL COSTS					
In Situ Thermal Remediation					
Property Purchase	1	LS	$226,000	$226,000	Island County 2024-2025 Tax Year Appraised Value
Building Demolition	1	LS	$58,100	$58,100	RS Means Online
Thermal Remediation Package	1	LS	$5,275,000	$5,275,000	Engineer's estimate Provided by TRS
In Situ Thermal Treatment Subtotal				*$5,559,100*	
Contingency	20%	--	--	*$1,111,820*	EPA 540-R-00-002. Scope and bid contingency. Percentage of capital
Professional/Technical Services					Costs exclude Ecology review fees.
Independent Cleanup Action Report	1	EA	$50,000	$50,000	Engineer's estimate. Includes revisions and discussions with Ecology.
Restrictive covenant and signage	1	LS	$25,000	$25,000	Engineer's estimate.
Project management	5	%	$277,955	$277,955	EPA 540-R-00-002. Project management. Percentage of capital costs.
Remediation oversight & management	4	%	$70,000	$70,000	Engineer's estimate. Assumes TRS is primary Construction Manager. Percentage of capital costs.
Post Remediation Groundwater Sampling	4	EA	$22,500	$90,000	Engineer's estimate. Assumes 8 wells without reporting
Professional/Technical Services Subtotal				*$512,955*	
TOTAL CAPITAL COSTS				**$7,183,875**	

ANNUAL O&M COSTS DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Monitored Natural Attenuation	1	EA	$37,500	*$37,500*	Engineer's estimate. Assumes annual sampling of 10 groundwater wells, including the collection of 1 duplicate sample. Includes Reporting
Contingency	20%	--	--	*$7,500*	EPA 540-R-00-002. Scope and bid contingency. Percentage of annual cost.
Professional/Technical Services	10%	--	--	*$4,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of annual cost and contingency.
TOTAL ANNUAL O&M COSTS				**$49,500**	

PERIODIC COSTS (YEARS 5, 10) DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Reporting	1	EA	$5,000	*$5,000*	Engineer's estimate. Years 5, 10. Five-year reviews and reporting.
Site Closure Groundwater Monitoring	4	EA	$40,000	*$160,000*	Engineer's estimate. Year 30. 4 quarters.
Professional/Technical Services	10%	--	--	*$16,500*	EPA 540-R-00-002. Years 5, 10. Costs exclude Ecology review fees. Project management. Percentage of periodic cost and contingency.

PRESENT VALUE ANALYSIS

Discount rate 4.47%
Total years 10

NOTES

Present value analysis uses the U.S. Treasury 10-year discount rate of 4.47 percent. (WAC 173-340-360)
Cost estimate does not include sales tax.

COST TYPE	YEAR	TOTAL COST	ANNUAL COST	DISCOUNT FACTOR	NET PRESENT VALUE
Capital	0	$7,183,875	$7,183,875	1.000	$7,183,875
Annual O&M	1-10	$495,000	$49,500	7.924	$392,258
Periodic	5	$21,500	$21,500	0.804	$17,277
	10	$181,500	$181,500	0.646	$117,209
					$7,710,619
TOTAL NET PRESENT VALUE					**$7,711,000**

Notes:
Ecology = Washington State Department of Ecology
EPA = United States Environmental Protection Agency
LS = lump sum
O&M = operation and maintenance
SF = square feet
SY = square yards

TABLE 11
REMEDIAL ACTION ALTERNATIVE 2 COST ESTIMATE
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location:	WHIDBEY MARINE & AUTO SUPPLY 1695 EAST MAIN ST FREELAND, WASHINGTON	**Description:** Alternative 2 consists of in situ chemical oxidation within the property lines (1685, 1689, 1694, and 1695 East Main St) in the perched groundwater and Sea Level Aquifer and monitored natural attenuation for contamination outside of the treatment areas. The estimate assumes that institutional controls, such as a restrictive covenant, will be prepared and implemented. Costs have been estimated using recent Haley & Aldrich experience with similar items on other projects.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2025	
Date:	February 2025	

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
ISCO					
Mobilization and Demobilization	1	LS	$15,240	$15,240	Engineer's estimate; Project Specific Experience.
Drilling and Installation within perched groundwater	13	EA	$11,340	$147,420	Engineer's estimate; Project Specific Experience.
Drilling and Installation Within Deep Aquifer	43	EA	$17,860	$767,980	Engineer's estimate; Project Specific Experience.
Injection Vendor	1	LS	$139,208	$139,208	Vendor Quote (Cascade Environmental).
ISCO Injection Chemicals	1	LS	$987,450	$987,450	Vendor Quote (Evonik Active Oxygens, KlozurOne).
In Situ Chemical Oxidation Subtotal				*$2,057,298*	
Second Injection Event				*$438,451*	Assumes second event for Sea Level Aquifer
Contingency	20%	--	--	*$499,150*	EPA 540-R-00-002. Scope and bid contingency. Percentage of capital costs.
Professional/Technical Services					Costs exclude Ecology review fees.
Independent Cleanup Action Report	1	EA	$50,000	$50,000	Engineer's estimate. Includes revisions and discussions with Ecology.
Restrictive covenant and signage	1	LS	$25,000	$25,000	Engineer's estimate.
Project management	1	EA	$179,694	$179,694	EPA 540-R-00-002. Project management. Percentage of capital costs.
Remedial design	1	EA	$306,774	$306,774	EPA 540-R-00-002. Remedial Design. Percentage of capital costs.
Remediation oversight & management	1	EA	$204,516	$204,516	EPA 540-R-00-002. Construction Management. Percentage of capital costs.
Post Remediation Groundwater Sampling	4	EA	$22,500	$90,000	Engineer's estimate. Assumes 8 wells without reporting
Professional/Technical Services Subtotal				*$855,983*	
TOTAL CAPITAL COSTS				**$3,850,882**	

ANNUAL O&M COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Monitored Natural Attenuation	1	EA	$37,500	*$37,500*	Engineer's estimate. Assumes annual sampling of 10 groundwater wells, including the collection of 1 duplicate sample.
Contingency	20%	--	--	*$7,500*	EPA 540-R-00-002. Scope and bid contingency. Percentage of annual cost.
Professional/Technical Services	10%	--	--	*$4,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of annual cost and contingency.
TOTAL ANNUAL O&M COSTS				**$49,500**	

PERIODIC COSTS (YEARS 5, 10, 15, 20, 25, 30)

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Reporting	1	EA	$5,000	*$5,000*	Engineer's estimate. Years 5, 10, 15, 20, 25, 30. Five-year reviews and reporting.
Site Closure Groundwater Monitoring	4	EA	$40,000	*$160,000*	Engineer's estimate. Year 30. 4 quarters.
Professional/Technical Services	10%	--	--	*$16,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of periodic cost and contingency.

PRESENT VALUE ANALYSIS

Discount rate 4.84%
Total years 30

COST TYPE	YEAR	TOTAL COST	ANNUAL COST	DISCOUNT FACTOR	NET PRESENT VALUE
Capital	0	$3,850,882	$3,850,882	1.000	$3,850,882
Annual O&M	1-30	$990,000	$49,500	15.657	$775,014
Periodic	5	$5,000	$5,000	0.790	$3,948
	10	$5,000	$5,000	0.623	$3,117
	15	$5,000	$5,000	0.492	$2,461
	20	$5,000	$5,000	0.389	$1,943
	25	$5,000	$5,000	0.307	$1,534
	30	$181,500	$181,500	0.242	$43,961
					$4,682,859

TOTAL NET PRESENT VALUE **$4,683,000**

NOTES

Present value analysis uses the U.S. Treasury 30-year discount rate of 4.84 percent. (WAC 173-340-360)
Cost estimate does not include sales tax.

Notes:
Ecology = Washington State Department of Ecology
EPA = United States Environmental Protection Agency
LS = lump sum
O&M = operation and maintenance
SF = square feet
SY = square yards

TABLE 12
REMEDIAL ACTION ALTERNATIVE 3 COST ESTIMATE
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location:	WHIDBEY MARINE & AUTO SUPPLY 1695 EAST MAIN ST FREELAND, WASHINGTON	**Description:** Alternative 3 consists of the installation of a permeable reactive barrier along the downgradient property lines (1685, 1689, and 1695 East Main St) in the perched groundwater and Sea Level Aquifer and the installation of a permeable reactive barrier near the plume boundary on 1694 E Main St and monitored natural attenuation for contamination outside of the treatment areas. The estimate assumes that institutional controls, such as a restrictive covenant, will be prepared and implemented. Costs have been estimated using the recent Haley & Aldrich experience with similar items on other projects.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2025	
Date:	February 2025	

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Permeable Reactive Barrier					
Mobilization and Demobilization	1	LS	$15,240	$15,240	Engineer's estimate; Project Specific Experience.
Drilling and Installation within perched groundwater	7	EA	$11,340	$79,380	Engineer's estimate; Project Specific Experience.
Drilling and Installation Within Deep Aquifer	17	EA	$17,860	$303,620	Engineer's estimate; Project Specific Experience.
Injections Vendor	1	LS	$63,290	$63,290	Vendor Quote (Cascade Environmental)
Carbon Injection Chemical	1	LS	$275,000	$275,000	Vendor Quote (Regenesis, PlumeStop)
Permeable Reactive Barrier Subtotal				*$736,530*	
Contingency	20%	--	--	*$147,306*	EPA 540-R-00-002. Scope and bid contingency. Percentage of capital costs.
Second PSB Injection Event (Year 15)				*$705,039*	Assumes a second full scale PSB injection in Year 15; includes associated Professional / Technical Services and 20% Contingency
Professional/Technical Services					Costs exclude Ecology review fees.
Independent Cleanup Action Report	1	EA	$50,000	$50,000	Engineer's estimate. Includes revisions and discussions with Ecology.
Restrictive covenant and signage	1	LS	$25,000	$25,000	Engineer's estimate.
Project management	1	LS	$70,707	$70,707	EPA 540-R-00-002. Project management. Percentage of capital costs.
Remedial design	1	LS	$132,575	$132,575	EPA 540-R-00-002. Remedial Design. Percentage of capital costs.
Remediation oversight & management	1	LS	$88,384	$88,384	EPA 540-R-00-002. Construction Management. Percentage of capital costs.
Post Remediation Groundwater Sampling	4	EA	$22,500	$90,000	Engineer's estimate. Assumes 8 wells without reporting
Professional/Technical Services Subtotal				*$456,666*	
TOTAL CAPITAL COSTS				**$1,340,502**	

ANNUAL O&M COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Monitored Natural Attenuation	1	EA	$37,500	*$37,500*	Engineer's estimate. Assumes annual sampling of 10 groundwater wells, including the collection of 1 duplicate sample.
Contingency	20%	--	--	*$7,500*	EPA 540-R-00-002. Scope and bid contingency. Percentage of annual cost.
Professional/Technical Services	10%	--	--	*$4,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of annual cost and contingency.
TOTAL ANNUAL O&M COSTS				**$49,500**	

PERIODIC COSTS (YEARS 5, 10, 15, 20, 25, 30)

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Reporting	1	EA	$5,000	*$5,000*	Engineer's estimate. Years 5, 10, 15, 20, 25, 30. Five-year reviews and reporting.
Site Closure Groundwater Monitoring	4	EA	$40,000	*$160,000*	Engineer's estimate. Year 30. 4 quarters.
Professional/Technical Services (Year 30)	10%	--	--	*$16,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of periodic cost and contingency. Year 30

PRESENT VALUE ANALYSIS

Discount rate 4.84%
Total years 30

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE
Capital	0	$1,340,502	$1,340,502	1.000	$1,340,502
Annual O&M	1-30	$495,000	$49,500	15.657	$775,014
Periodic	5	$5,000	$5,000	0.790	$3,948
	10	$5,000	$5,000	0.623	$3,117
	15	$710,039	$710,039	0.492	$349,443
	20	$5,000	$5,000	0.389	$1,943
	25	$5,000	$5,000	0.307	$1,534
	30	$181,500	$181,500	0.242	$43,961
					$2,519,462
TOTAL NET PRESENT VALUE					**$2,520,000**

NOTES
Present value analysis uses the U.S. Treasury 30-year discount rate of 4.84 percent. (WAC 173-340-360)
Cost estimate does not include sales tax.

Notes:
Ecology = Washington State Department of Ecology
EPA = United States Environmental Protection Agency
LS = lump sum
O&M = operation and maintenance
SF = square feet

TABLE 13
REMEDIAL ACTION ALTERNATIVE 4 COST ESTIMATE
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

Location:	WHIDBEY MARINE & AUTO SUPPLY 1695 EAST MAIN ST FREELAND, WASHINGTON	**Description:** Alternative 4 consists of the monitored natural attenuation and compliance monitoring. The estimate assumes that institutional controls, such as a restrictive covenant, will be prepared and implemented. Costs have been estimated using recent Haley & Aldrich experience with similar items on other projects.
Phase:	Feasibility Study (-35% to +50%)	
Base Year:	2025	
Date:	February 2025	

CAPITAL COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
MNA					
Single event groundwater sampling and analysis	1	LS	$20,000	$20,000	Engineer's estimate. Assumes 5 wells.
MNA Subtotal				*$20,000*	
					Costs exclude Ecology review fees.
Contingency	20%	--	--	*$4,000*	Engineer's estimate. Includes revisions and discussions with Ecology.
					Engineer's estimate.
Professional/Technical Services					Engineer's estimate.
Groundwater sampling report	1	LS	$50,000	$50,000	
Restrictive covenant and signage	1	LS	$25,000	$25,000	
Project management	1	LS	$2,400	$2,400	EPA 540-R-00-002. Project management. Percentage of capital costs.
Professional/Technical Services Subtotal				*$77,400*	
TOTAL CAPITAL COSTS				**$102,000**	

ANNUAL O&M COSTS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Monitored Natural Attenuation	1	EA	$37,500	*$37,500*	Engineer's estimate. Assumes annual sampling of 10 groundwater wells, including the collection of 1 duplicate sample.
Contingency	20%	--	--	*$7,500*	EPA 540-R-00-002. Scope and bid contingency. Percentage of annual
Professional/Technical Services	10%	--	--	*$4,500*	Project management. Percentage of annual cost and contingency.
TOTAL ANNUAL O&M COSTS				**$49,500**	

PERIODIC COSTS (YEARS 5, 10, 15, 20, 25, 30)

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES
Reporting	1	EA	$5,000	*$5,000*	Engineer's estimate. Years 5, 10, 15, 20, 25, 30. Five-year reviews and reporting.
Site Closure Groundwater Monitoring	4	EA	$40,000	*$160,000*	Engineer's estimate. Year 30. 4 quarters.
Professional/Technical Services (Year 30)	10%	--	--	*$16,500*	EPA 540-R-00-002. Costs exclude Ecology review fees. Project management. Percentage of periodic cost and contingency. Year 30

PRESENT VALUE ANALYSIS

NOTES

Present value analysis uses the U.S. Treasury 30-year discount rate of 4.84 percent. (WAC 173-340-360)
Cost estimate does not include sales tax.

Discount rate 4.84%
Total years 30

COST TYPE	YEAR	TOTAL COST	TOTAL COST PER YEAR	DISCOUNT FACTOR	NET PRESENT VALUE
Capital	0	$102,000	$102,000	1.000	$102,000
Annual O&M	1-30	$1,485,000	$49,500	15.657	$775,014
Periodic	5	$5,000	$5,000	0.790	$3,948
	10	$5,000	$5,000	0.623	$3,117
	15	$5,000	$5,000	0.492	$2,461
	20	$5,000	$5,000	0.389	$1,943
	25	$5,000	$5,000	0.307	$1,534
	30	$181,500	$181,500	0.242	$43,961
					$933,977
TOTAL NET PRESENT VALUE					**$934,000**

Notes:
Ecology = Washington State Department of Ecology
EPA = United States Environmental Protection Agency
LS = lump sum
O&M = operation and maintenance
SF = square feet
SY = square yards

TABLE 14
ALTERNATIVES EVALUATION AND BENEFIT SCORING
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

DCA Benefit Criteria	Criteria and Weighting (%)[a]	Alternative 1. In Situ Thermal Remediation and MNA	Relative Degrees of Benefit[b]	Alternative 2. In Situ Chemical Oxidation and MNA	Relative Degrees of Benefit	Alternative 3. Permeable Sorptive Barrier and MNA	Relative Degrees of Benefit	Alternative 4. Monitored Natural Attenuation	Relative Degrees of Benefit
Protectiveness	20%	This alternative achieves the highest level of protectiveness because it vaporizes and eliminates the on-Property source area. The groundwater plume will remediate on an accelerated time frame without ongoing contributions from the source.	7.0	This alternative also includes source mass destruction however there is less certainty that sufficient source mass reduction will occur to accelerate groundwater remediation.	6.0	This alternative does not include source mass destruction but does immobilize contaminants in the groundwater plume, effectively preventing ongoing source contamination of groundwater.	5.0	This alternative is the least protective as the source and groundwater plume are left as is for a long restoration time frame. The plume is unrestricted.	2.0
Permanence	20%	This alternative provides the highest level of permanent reduction in contaminant mass because the source is vaporized, remaining contaminants are scrubbed, and removed from the Property, however not from the untreated portions of the Site.	8.0	This alternative provides permanent reduction in contaminant mass. This alternative is less permanent than Alternative 1 due to residual contamination and risk of back diffusion.	7.0	This alternative is less permanent than the previous two because contamination will remain, but it will be more bioavailable and there is no risk of back diffusion.	6.0	This alternative is the least permanent because all contamination will remain in place.	3.0
Long-term effectiveness	20%	This alternative achieves the highest level of long-term effectiveness because the contaminant source is destroyed. Long-term risk of source area recontaminating groundwater is unlikely. Risk from untreated area remains	7.0	This alternative is also effective long-term due to mass destruction. However remaining source mass in soil could recontaminate groundwater via desorption. Potential to need more than two injection events over the restoration time frame.	6.0	This alternative is less effective long term because the carbon substrate isn't permanent. Cleanup occurs when the breakdown of carbon is slower than the induced bioremediation. Potential to need more than one injection event over the restoration time frame.	5.0	This alternative achieves the lowest level of tong-term effectiveness because there is no intervention until MNA is complete on a long restoration time frame.	2.0
Short-term risk management	20%	This alternative has the highest short-term risk profile because in addition to being the most labor intensive to implement, it comes with risk of mobilizing additional source mass to groundwater during both installation and treatment.	3.0	This alternative has a high level of labor during execution and high risk of mobilizing more contaminant mass via injection than is treated. There is added long term risk of performing injections on so many properties	4.0	Moderate short-term risks associated with drilling and a limited number of injections. This alternative achieves the highest score for short-term risk management because it is the least invasive remedy that actively limits mobility of the downgradient groundwater plume towards the drinking water wells.	8.0	This alternative as a similar level of implementation risk as Alternative 3, but higher short-term risk of leaving the groundwater plume unrestricted.	6.0
Implementability	20%	Implementability of thermal treatment will be a challenge due to the necessity of property business closure, likely property acquisition, and permitting. This remedy also requires a significant power infrastructure upgrade.	4.0	This alternative will also be a challenge to implement due to the unknown limits of source area beneath the building and the necessity of evenly distributing large volumes of oxidant injectate. While standard means and methods can be utilized, the exact duration and number of injection rounds is unknown.	6.0	This alternative will be much easier to implement than the previous two because it requires less than half of the additional wells. Also, the injectate is carbon and excludes active subsurface chemical reactions. This remedy is also not dependent on treating the entire source area for success.	8.0	This remedy is the easiest to implement and would be overall easier to conduct than the RI activities.	9.0
Total weighted benefits score[c]	**100%**	**5.80**		**5.80**		**6.40**		**4.40**	
Estimated Cost[d]		**$7,711,000**		**$4,683,000**		**$2,520,000**		**$934,000**	
Benefit/Cost Ratio		**0.75**		**1.24**		**2.54**		**4.71**	

Notes:

a. Weighting factors equal. See justification described in Section 3.5.2.
b. Ranking score based on relative ability to achieve criteria on 1 (lowest) to 10 (highest) scale.
c. Total weighted benefit score is obtained by multiplying the rating for each criterion by its weighting factor, and summing the results for the five criteria.
d. Net present value costs are estimated in 2025 dollars, and were calculated using a 4.97 percent discount rate. Itemized estimates are provided in Tables 4-6
d. The benefit/cost ratio is obtained by dividing the alternative's MTCA benefits ranking by its estimated cost (in Millions).
% = percent
DCA = disproportionate cost analysis
MNA = monitored natural attenuation

TABLE 15
DCA CALCULATIONS
WHIDBEY MARINE & AUTO SITE
FREELAND, WASHINGTON

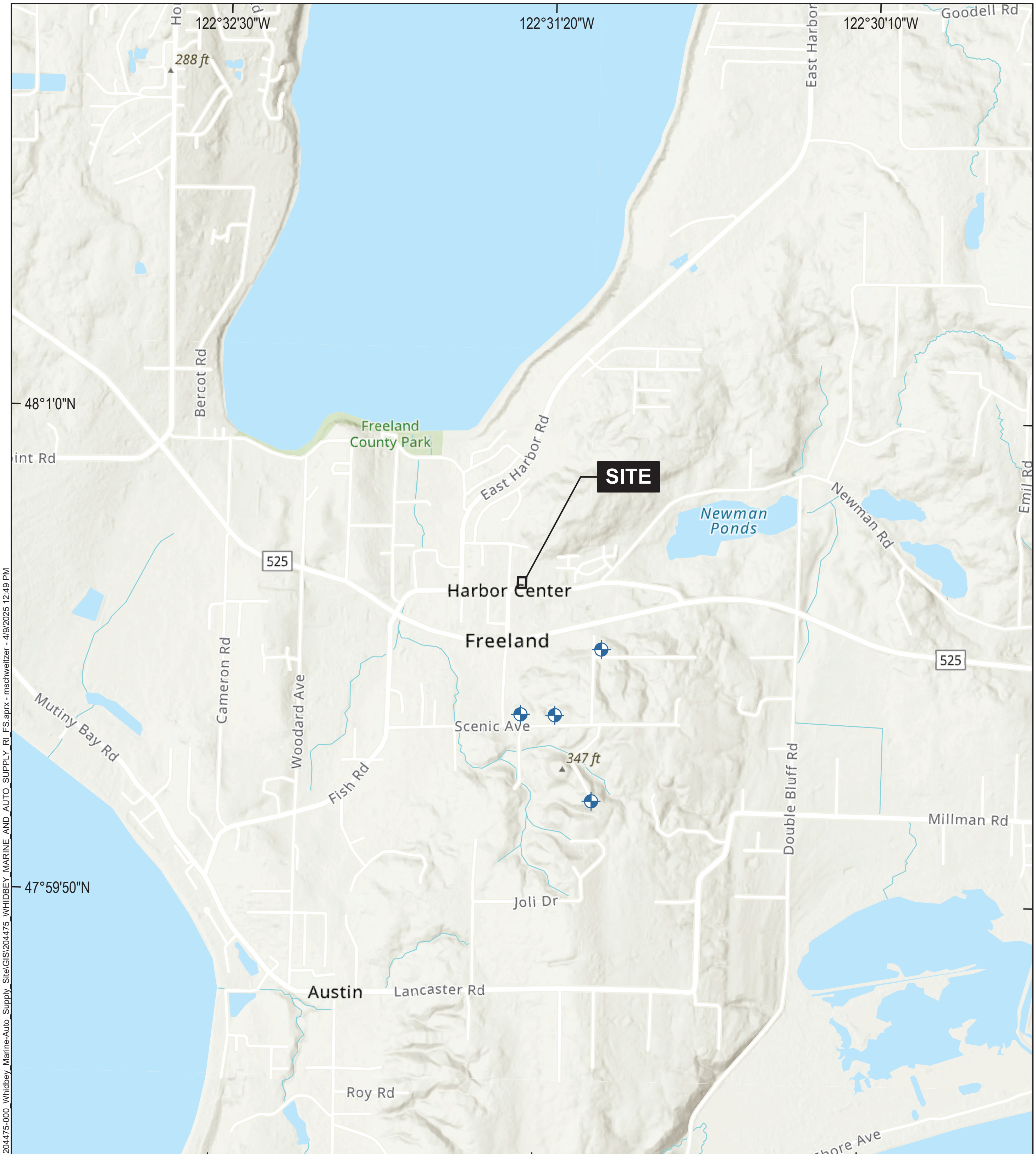
	Alternative	Cost ($ millions)	Degrees of Benefit	Permanence		↓	DCA Order	Alternative	Permanence Score	Cost ($ millions)	Degree of Benefit	Cost Effectiveness ($/B)	Apparent PMEP Alternative
				Score	Rank								
Estimated costs and degrees of benefit	**Alternative 1**	**$7.71**	**5.8**	**8.0**	1	Alternatives in order of decreasing permanence	1	**Alternative 1**	8.0	$7.71	5.8	**$1.33**	**NO**
	Alternative 2	**$4.68**	**5.8**	**7.0**	2		2	**Alternative 2**	7.0	$4.68	5.8	**$0.81**	**NO**
	Alternative 3	**$2.52**	**6.4**	**6.0**	3		3	**Alternative 3**	6.0	$2.52	6.4	**$0.39**	**PMEP**
	~~**Alternative 4**~~	~~**$0.93**~~	~~**4.4**~~	~~**3.0**~~	4		4	~~**Alternative 4**~~	~~3.0~~	~~$0.93~~	~~4.4~~	~~**$0.24**~~	**N/A**

Notes:

a. Alternative 4 is determined to not meet media-specific requirements in Washington Administrative Code 173-340-360 and is disqualified from the DCA.

DCA = disproportionate cost analysis

FIGURES



LEGEND

DRINKING WATER WELL

MAP SOURCE: ESRI
SITE COORDINATES: 48°00'35"N, 122°31'25"W

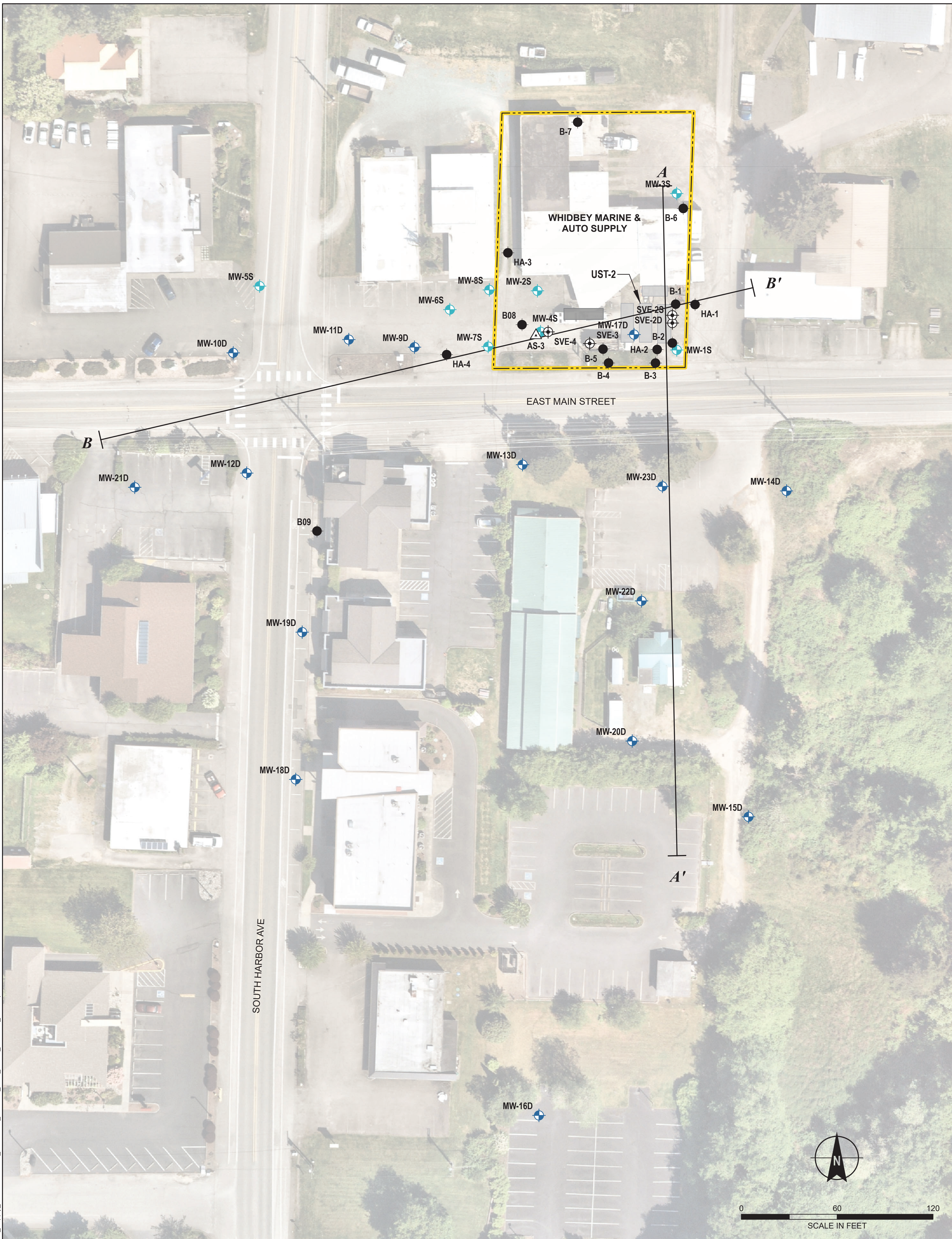
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

VICINITY MAP

APPROXIMATE SCALE: 1 IN = 2000 FT
APRIL 2025

FIGURE 1

GIS: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000 Whidbey Marine-Auto Supply Site\GIS\204475 WHIDBEY MARINE AND AUTO SUPPLY RI FS.aprx - mschweitzer - 4/9/2025 12:49 PM



LEGEND

EXISTING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- SOIL BORING
- CROSS SECTION
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
4. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

HALEY ALDRICH

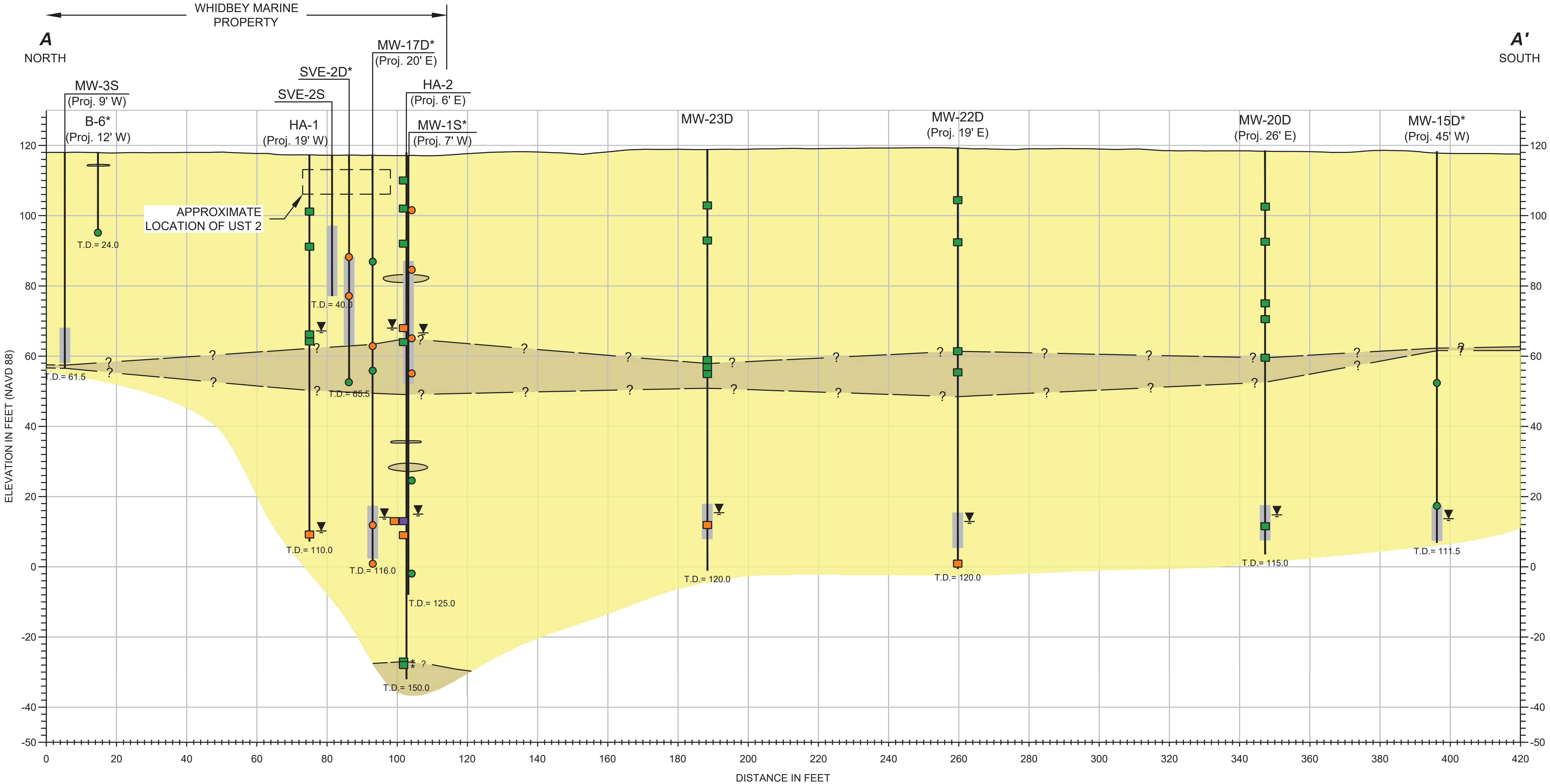
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

SITE AND EXPLORATION PLAN

APRIL 2025

FIGURE 2

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000_Whidbey_Marine-Auto_Supply_Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweitzer - LAST SAVED: 4/10/2025 3:49 PM



LEGEND

BORING NAME WITH OFFSET — B-1 (Proj. 92' S)

BORING LOCATION

WATER LEVEL

SCREEN INTERVAL

- HALEY & ALDRICH DATA
- HISTORICAL DATA
- TPH AND NON-cVOC CONCENTRATIONS GREATER THAN APPLICABLE MTCA SCREENING LEVELS
- PCE AND/OR TCE CONCENTRATIONS GREATER THAN APPLICABLE MTCA SCREENING LEVELS
- NO COC EXCEEDANCES
- * cVOCs NOT ANALYZED

- SILT/SANDY SILT/CLAY
- SAND/SILTY SAND/GRAVEL

NOTES:

1. THIS SUBSURFACE PROFILE IS GENERALIZED FROM MATERIALS OBSERVED IN SOIL BORINGS. VARIATIONS MAY EXIST BETWEEN PROFILE AND ACTUAL CONDITIONS.
2. MTCA = MODEL TOXICS CONTROL ACT
   COC = CHEMICAL OF CONCERN
   TPH = TOTAL PETROLEUM HYDROCARBONS
   PCE = TETRACHLOROETHENE
   TCE = TRICHLOROETHEN
   cVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

0 30 60
SCALE IN FEET

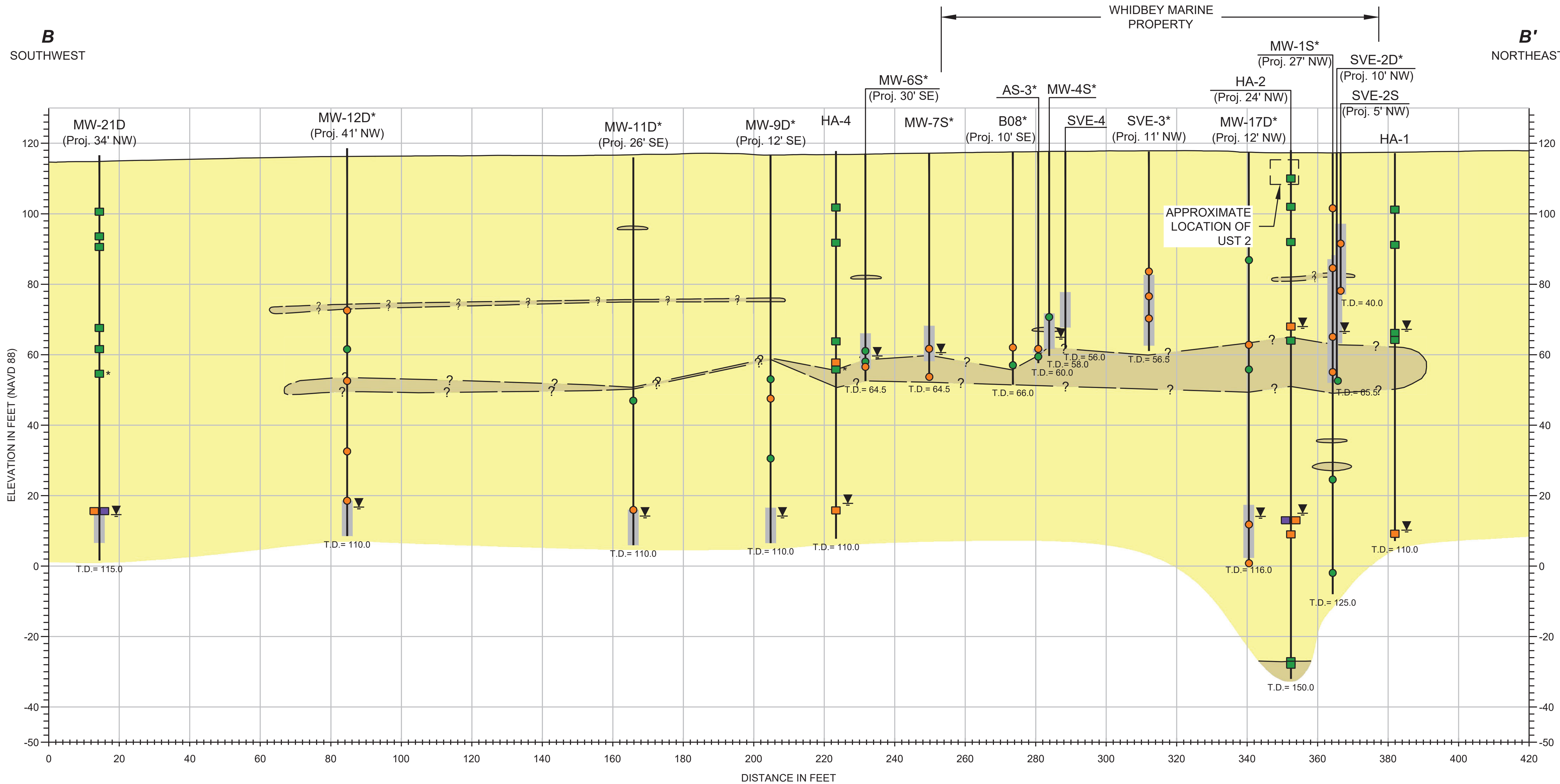
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

CROSS SECTION A-A'

APRIL 2024

FIGURE 3



LEGEND

BORING NAME WITH OFFSET — B-1 (Proj. 92' S)

BORING LOCATION —

WATER LEVEL

SCREEN INTERVAL

- ☐ HALEY & ALDRICH DATA
- ○ HISTORICAL DATA
- TPH AND NON-cVOC CONCENTRATIONS GREATER THAN APPLICABLE MTCA SCREENING LEVELS
- PCE AND/OR TCE CONCENTRATIONS GREATER THAN APPLICABLE MTCA SCREENING LEVELS
- NO COC EXCEEDANCES
- * cVOCs NOT ANALYZED

SILT/SANDY SILT/CLAY

SAND/SILTY SAND/GRAVEL

NOTES:

1. THIS SUBSURFACE PROFILE IS GENERALIZED FROM MATERIALS OBSERVED IN SOIL BORINGS. VARIATIONS MAY EXIST BETWEEN PROFILE AND ACTUAL CONDITIONS.
2. MTCA = MODEL TOXICS CONTROL ACT
COC = CHEMICAL OF CONCERN
TPH = TOTAL PETROLEUM HYDROCARBONS
PCE = TETRACHLOROETHENE
TCE = TRICHLOROETHEN
cVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

0 30 60
SCALE IN FEET

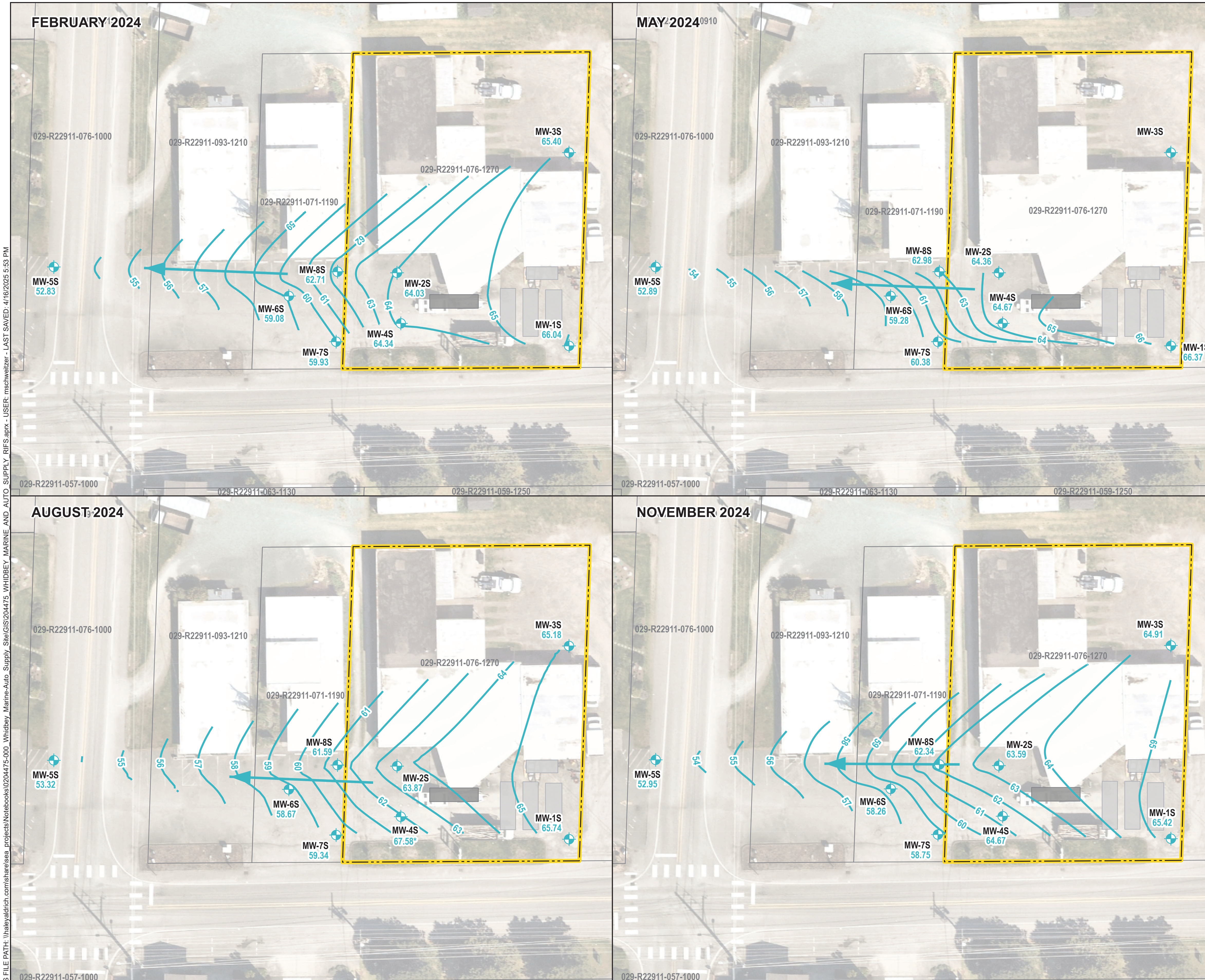
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

CROSS SECTION B-B'

AUGUST 2024

FIGURE 4



LEGEND

EXISTING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- SOIL BORING
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION, PERCHED ZONE
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- PARCEL BOUNDARY
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. VERTICAL DATUM: NAVD 88
3. * = ELEVATION WAS NOT INCLUDED TO CALCULATE ELEVATION CONTOUR
43. SITE FEATURES DATA SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
5. MONITORING WELL LOCATION DATA SOURCE: APEX ENGINEERING, 30 JANUARY 2024
6. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
7. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

0 50 100
SCALE IN FEET

HALEY ALDRICH

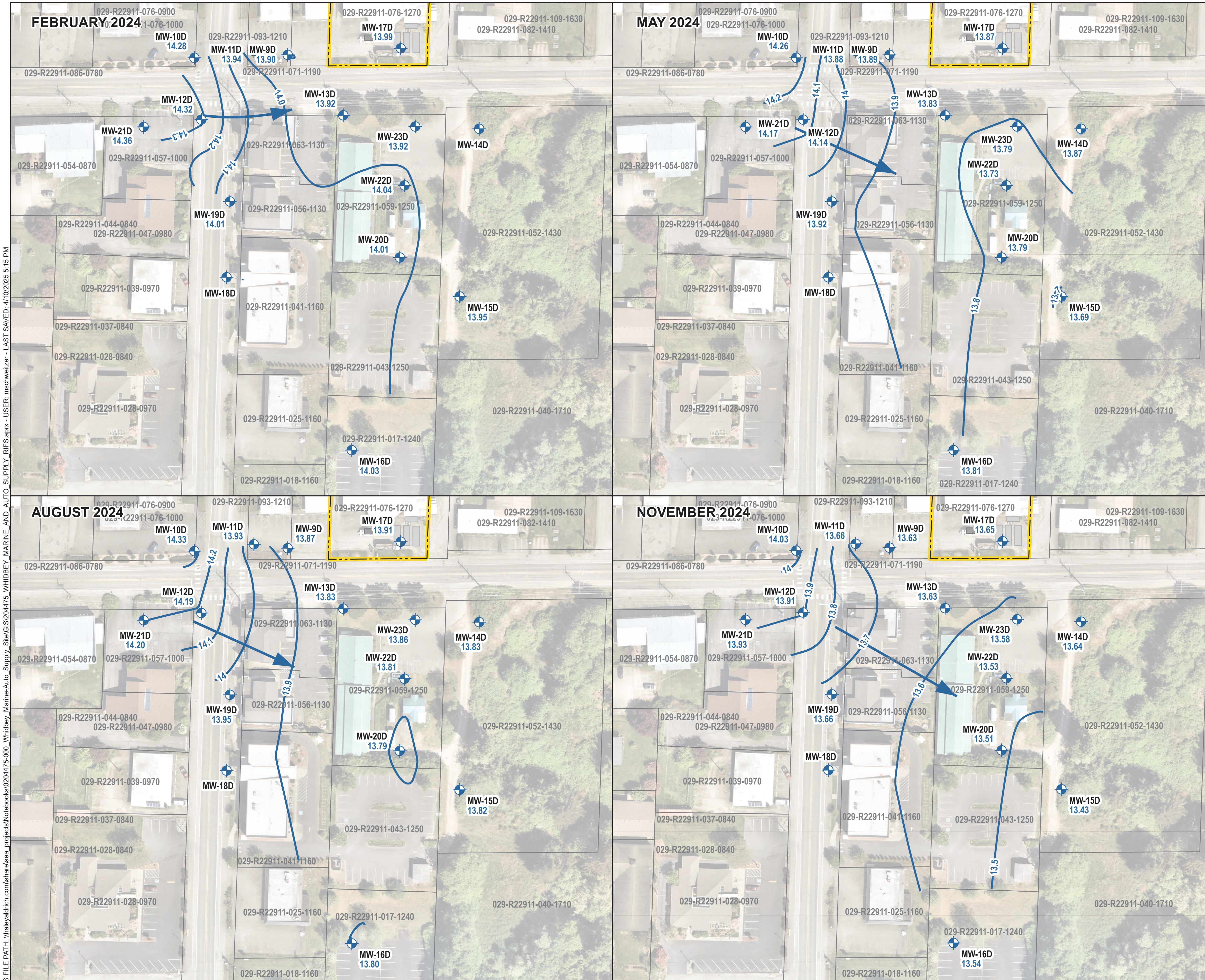
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

PERCHED GROUNDWATER ELEVATION CONTOURS

APRIL 2025

FIGURE 5

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000 Whidbey Marine-Auto Supply Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweitzer - LAST SAVED: 4/16/2025 5:53 PM



LEGEND

EXISTING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL VAPOR EXTRACTION WELL
- AIR SPARGE WELL
- SOIL BORING
- GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION, SEA LEVEL AQUIFER
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- PARCEL BOUNDARY
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. VERTICAL DATUM: NAVD 88
3. SITE FEATURES DATA SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
4. MONITORING WELL LOCATION DATA SOURCE: APEX ENGINEERING, 30 JANUARY 2024
5. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
6. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

0 125 250
SCALE IN FEET

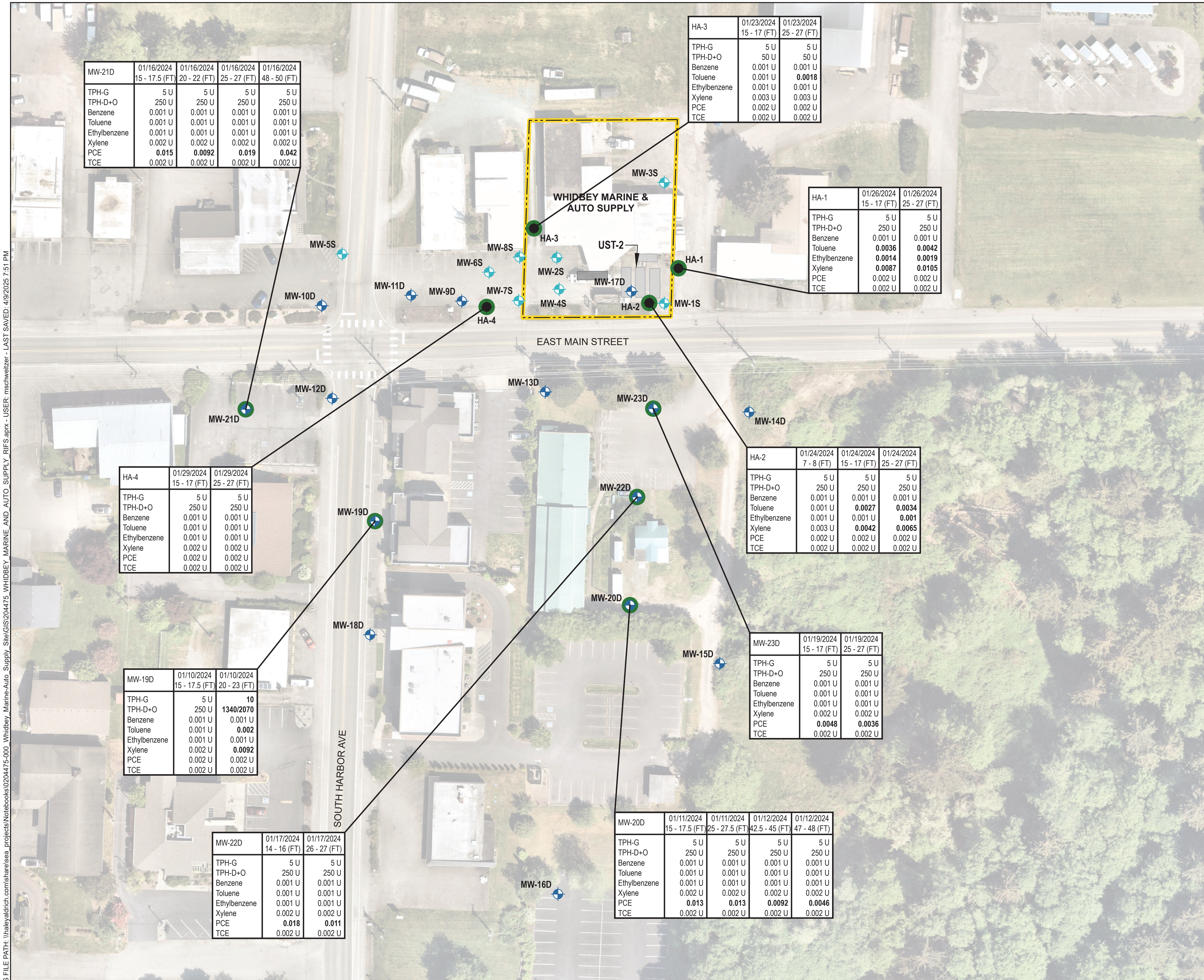
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

SEA-LEVEL AQUIFER ELEVATION CONTOURS

APRIL 2025

FIGURE 6



MW-21D	01/16/2024 15 - 17.5 (FT)	01/16/2024 20 - 22 (FT)	01/16/2024 25 - 27 (FT)	01/16/2024 48 - 50 (FT)
TPH-G	5 U	5 U	5 U	5 U
TPH-D+O	250 U	250 U	250 U	250 U
Benzene	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U
Xylene	0.002 U	0.002 U	0.002 U	0.002 U
PCE	**0.015**	**0.0092**	**0.019**	**0.042**
TCE	0.002 U	0.002 U	0.002 U	0.002 U

HA-3	01/23/2024 15 - 17 (FT)	01/23/2024 25 - 27 (FT)
TPH-G	5 U	5 U
TPH-D+O	50 U	50 U
Benzene	0.001 U	0.001 U
Toluene	0.001 U	**0.0018**
Ethylbenzene	0.001 U	0.001 U
Xylene	0.003 U	0.003 U
PCE	0.002 U	0.002 U
TCE	0.002 U	0.002 U

HA-1	01/26/2024 15 - 17 (FT)	01/26/2024 25 - 27 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	**0.0036**	**0.0042**
Ethylbenzene	**0.0014**	**0.0019**
Xylene	**0.0087**	**0.0105**
PCE	0.002 U	0.002 U
TCE	0.002 U	0.002 U

HA-4	01/29/2024 15 - 17 (FT)	01/29/2024 25 - 27 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	0.002 U	0.002 U
PCE	0.002 U	0.002 U
TCE	0.002 U	0.002 U

HA-2	01/24/2024 7 - 8 (FT)	01/24/2024 15 - 17 (FT)	01/24/2024 25 - 27 (FT)
TPH-G	5 U	5 U	5 U
TPH-D+O	250 U	250 U	250 U
Benzene	0.001 U	0.001 U	0.001 U
Toluene	0.001 U	**0.0027**	**0.0034**
Ethylbenzene	0.001 U	0.001 U	**0.001**
Xylene	0.003 U	**0.0042**	**0.0065**
PCE	0.002 U	0.002 U	0.002 U
TCE	0.002 U	0.002 U	0.002 U

MW-23D	01/19/2024 15 - 17 (FT)	01/19/2024 25 - 27 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	0.002 U	0.002 U
PCE	**0.0048**	**0.0036**
TCE	0.002 U	0.002 U

MW-19D	01/10/2024 15 - 17.5 (FT)	01/10/2024 20 - 23 (FT)
TPH-G	5 U	**10**
TPH-D+O	250 U	**1340/2070**
Benzene	0.001 U	0.001 U
Toluene	0.001 U	**0.002**
Ethylbenzene	0.001 U	0.001 U
Xylene	0.002 U	**0.0092**
PCE	0.002 U	0.002 U
TCE	0.002 U	0.002 U

MW-22D	01/17/2024 14 - 16 (FT)	01/17/2024 26 - 27 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	0.002 U	0.002 U
PCE	**0.018**	**0.011**
TCE	0.002 U	0.002 U

MW-20D	01/11/2024 15 - 17.5 (FT)	01/11/2024 25 - 27.5 (FT)	01/12/2024 42.5 - 45 (FT)	01/12/2024 47 - 48 (FT)
TPH-G	5 U	5 U	5 U	5 U
TPH-D+O	250 U	250 U	250 U	250 U
Benzene	0.001 U	0.001 U	0.001 U	0.001 U
Toluene	0.001 U	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U	0.001 U	0.001 U
Xylene	0.002 U	0.002 U	0.002 U	0.002 U
PCE	**0.013**	**0.013**	**0.0092**	**0.0046**
TCE	0.002 U	0.002 U	0.002 U	0.002 U

LEGEND

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- TPH NON-DETECTS OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELs
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. RESULTS SHOWN IN mg/kg.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. **BOLDED VALUES** INDICATE A DETECTED RESULT.
6. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
7. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
8. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

0 80 160
SCALE IN FEET

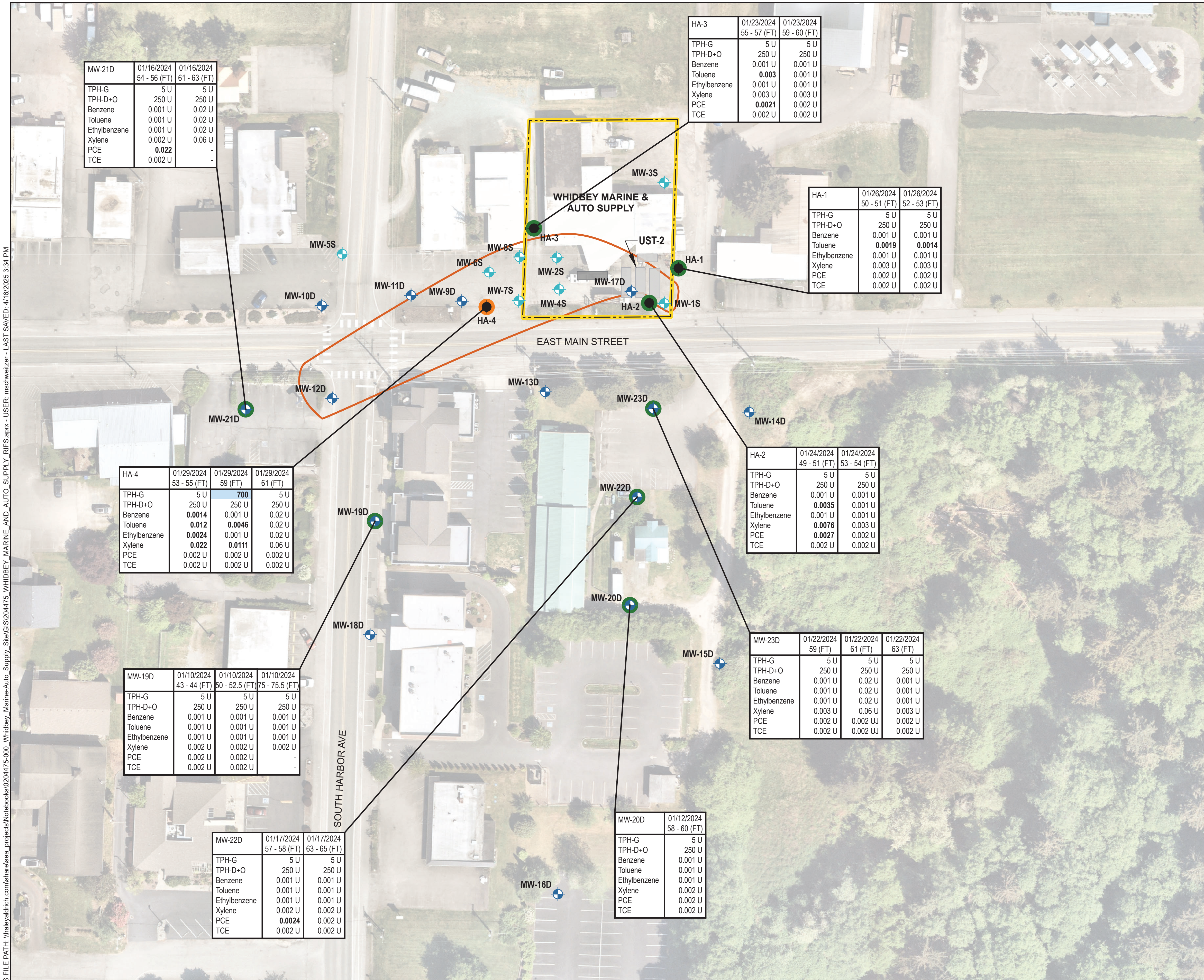
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

TPH AND SELECT VOC RESULTS IN VADOSE-ZONE SOIL

APRIL 2025

FIGURE 7



MW-21D	01/16/2024 54 - 56 (FT)	01/16/2024 61 - 63 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.02 U
Toluene	0.001 U	0.02 U
Ethylbenzene	0.001 U	0.02 U
Xylene	0.002 U	0.06 U
PCE	**0.022**	-
TCE	0.002 U	-

HA-3	01/23/2024 55 - 57 (FT)	01/23/2024 59 - 60 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	**0.003**	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	0.003 U	0.003 U
PCE	**0.0021**	0.002 U
TCE	0.002 U	0.002 U

HA-1	01/26/2024 50 - 51 (FT)	01/26/2024 52 - 53 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	**0.0019**	**0.0014**
Ethylbenzene	0.001 U	0.001 U
Xylene	0.003 U	0.003 U
PCE	0.002 U	0.002 U
TCE	0.002 U	0.002 U

HA-4	01/29/2024 53 - 55 (FT)	01/29/2024 59 (FT)	01/29/2024 61 (FT)
TPH-G	5 U	**700**	5 U
TPH-D+O	250 U	250 U	250 U
Benzene	**0.0014**	0.001 U	0.02 U
Toluene	**0.012**	**0.0046**	0.02 U
Ethylbenzene	**0.0024**	0.001 U	0.02 U
Xylene	**0.022**	**0.0111**	0.06 U
PCE	0.002 U	0.002 U	0.002 U
TCE	0.002 U	0.002 U	0.002 U

HA-2	01/24/2024 49 - 51 (FT)	01/24/2024 53 - 54 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	**0.0035**	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	**0.0076**	0.003 U
PCE	**0.0027**	0.002 U
TCE	0.002 U	0.002 U

MW-19D	01/10/2024 43 - 44 (FT)	01/10/2024 50 - 52.5 (FT)	01/10/2024 75 - 75.5 (FT)
TPH-G	5 U	5 U	5 U
TPH-D+O	250 U	250 U	250 U
Benzene	0.001 U	0.001 U	0.001 U
Toluene	0.001 U	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U	0.001 U
Xylene	0.002 U	0.002 U	0.002 U
PCE	0.002 U	0.002 U	-
TCE	0.002 U	0.002 U	-

MW-23D	01/22/2024 59 (FT)	01/22/2024 61 (FT)	01/22/2024 63 (FT)
TPH-G	5 U	5 U	5 U
TPH-D+O	250 U	250 U	250 U
Benzene	0.001 U	0.02 U	0.001 U
Toluene	0.001 U	0.02 U	0.001 U
Ethylbenzene	0.001 U	0.02 U	0.001 U
Xylene	0.003 U	0.06 U	0.003 U
PCE	0.002 U	0.002 UJ	0.002 U
TCE	0.002 U	0.002 UJ	0.002 U

MW-22D	01/17/2024 57 - 58 (FT)	01/17/2024 63 - 65 (FT)
TPH-G	5 U	5 U
TPH-D+O	250 U	250 U
Benzene	0.001 U	0.001 U
Toluene	0.001 U	0.001 U
Ethylbenzene	0.001 U	0.001 U
Xylene	0.002 U	0.002 U
PCE	**0.0024**	0.002 U
TCE	0.002 U	0.002 U

MW-20D	01/12/2024 58 - 60 (FT)
TPH-G	5 U
TPH-D+O	250 U
Benzene	0.001 U
Toluene	0.001 U
Ethylbenzene	0.001 U
Xylene	0.002 U
PCE	0.002 U
TCE	0.002 U

LEGEND

EXISTING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- TPH NON-DETECTS OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELS
- TPH DETECTED ABOVE SITE-SPECIFIC MTCA SCREENING LEVELS
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- APPROXIMATE EXTENT OF CONTAMINATION IN PERCHED AQUIFER SOIL
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. RESULTS SHOWN IN mg/kg.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. DATA COLLECTED DURING PREVIOUS INVESTIGATIONS WAS USED TO CREATE THE APPROXIMATE EXTENT OF CONTAMINATION
6. **BOLDED VALUES** INDICATE A DETECTED RESULT.
7. BLUE SHADING DENOTED AN ANALYTE CONCENTRATION DETECTED ABOVE IT'S RESPECTIVE SCREENING LEVEL. THE METHOD B CLEANUP LEVEL PROTECTIVE OF GROUNDWATER - SATURATED WAS APPLIED TO BORINGS WHERE THE PERCHED AQUIFER WAS DETECTED (ON-PROPERTY AND MW-22). THE METHOD B CLEANUP LEVEL PROTECTIVE OF GROUNDWATER - VADOSE WAS APPLIED ELSEWHERE.
8. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
9. EXISTING WELLS AND SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
10. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 80 160
SCALE IN FEET

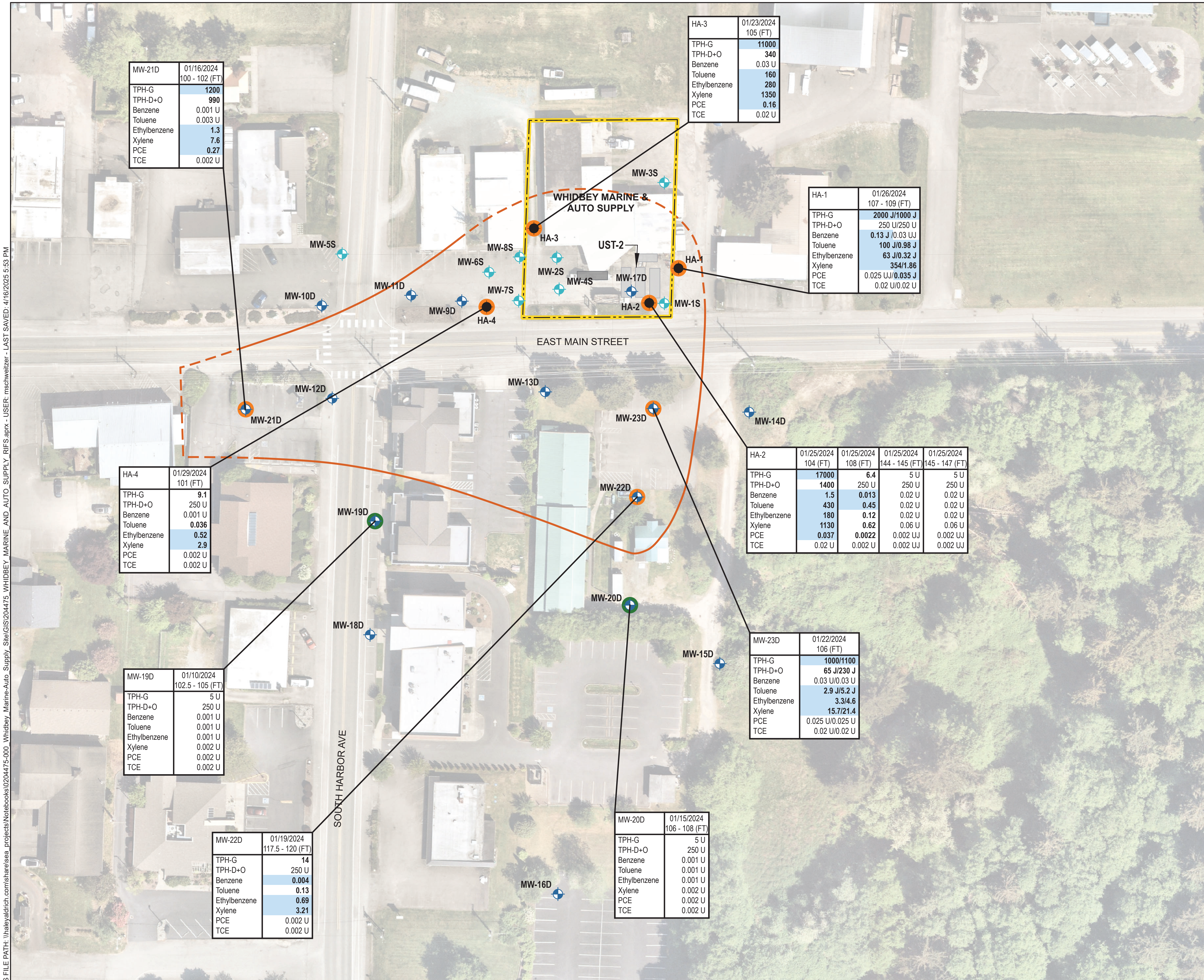
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

TPH AND SELECT VOC RESULTS IN PERCHED GROUNDWATER ZONE SOIL

APRIL 2025

FIGURE 8



HA-3	01/23/2024 105 (FT)
TPH-G	**11000**
TPH-D+O	**340**
Benzene	0.03 U
Toluene	**160**
Ethylbenzene	**280**
Xylene	**1350**
PCE	**0.16**
TCE	0.02 U

MW-21D	01/16/2024 100 - 102 (FT)
TPH-G	**1200**
TPH-D+O	**990**
Benzene	0.001 U
Toluene	0.003 U
Ethylbenzene	**1.3**
Xylene	**7.6**
PCE	**0.27**
TCE	0.002 U

HA-1	01/26/2024 107 - 109 (FT)
TPH-G	**2000 J/1000 J**
TPH-D+O	250 U/250 U
Benzene	**0.13 J** /0.03 UJ
Toluene	**100 J/0.98 J**
Ethylbenzene	**63 J/0.32 J**
Xylene	**354/1.86**
PCE	0.025 UJ/**0.035 J**
TCE	0.02 U/0.02 U

HA-4	01/29/2024 101 (FT)
TPH-G	**9.1**
TPH-D+O	250 U
Benzene	0.001 U
Toluene	**0.036**
Ethylbenzene	**0.52**
Xylene	**2.9**
PCE	0.002 U
TCE	0.002 U

HA-2	01/25/2024 104 (FT)	01/25/2024 108 (FT)	01/25/2024 144 - 145 (FT)	01/25/2024 145 - 147 (FT)
TPH-G	**17000**	**6.4**	5 U	5 U
TPH-D+O	**1400**	250 U	250 U	250 U
Benzene	**1.5**	**0.013**	0.02 U	0.02 U
Toluene	**430**	**0.45**	0.02 U	0.02 U
Ethylbenzene	**180**	**0.12**	0.02 U	0.02 U
Xylene	**1130**	**0.62**	0.06 U	0.06 U
PCE	**0.037**	**0.0022**	0.002 UJ	0.002 UJ
TCE	0.02 U	0.002 U	0.002 UJ	0.002 UJ

MW-19D	01/10/2024 102.5 - 105 (FT)
TPH-G	5 U
TPH-D+O	250 U
Benzene	0.001 U
Toluene	0.001 U
Ethylbenzene	0.001 U
Xylene	0.002 U
PCE	0.002 U
TCE	0.002 U

MW-23D	01/22/2024 106 (FT)
TPH-G	**1000/1100**
TPH-D+O	**65 J/230 J**
Benzene	0.03 U/0.03 U
Toluene	**2.9 J/5.2 J**
Ethylbenzene	**3.3/4.6**
Xylene	**15.7/21.4**
PCE	0.025 U/0.025 U
TCE	0.02 U/0.02 U

MW-22D	01/19/2024 117.5 - 120 (FT)
TPH-G	**14**
TPH-D+O	250 U
Benzene	**0.004**
Toluene	**0.13**
Ethylbenzene	**0.69**
Xylene	**3.21**
PCE	0.002 U
TCE	0.002 U

MW-20D	01/15/2024 106 - 108 (FT)
TPH-G	5 U
TPH-D+O	250 U
Benzene	0.001 U
Toluene	0.001 U
Ethylbenzene	0.001 U
Xylene	0.002 U
PCE	0.002 U
TCE	0.002 U

LEGEND

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- COCs EITHER NON-DETECT OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELs
- COCs DETECTED ABOVE APPLICABLE MTCA SCREENING LEVELs
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- APPROXIMATE EXTENT OF CONTAMINATION IN SEA-LEVEL AQUIFER SOIL, DASHED WHERE INFERRED
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE.
3. RESULTS SHOWN IN mg/kg.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. DATA COLLECTED DURING PREVIOUS INVESTIGATIONS WAS USED TO CREATE THE APPROXIMATE EXTENT OF CONTAMINATION
6. **BOLDED VALUES** INDICATE A DETECTED RESULT.
7. BLUE SHADING DENOTES A DETECTED ANALYTE CONCENTRATION EXCEEDING THE MTCA METHOD B CLEANUP LEVEL PROTECTIVE OF GROUNDWATER - SATURATED. THIS SCREENING APPLIES TO SOIL BELOW THE WATER TABLE.
8. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
9. EXISTING WELLS AND SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
10. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 80 160
SCALE IN FEET

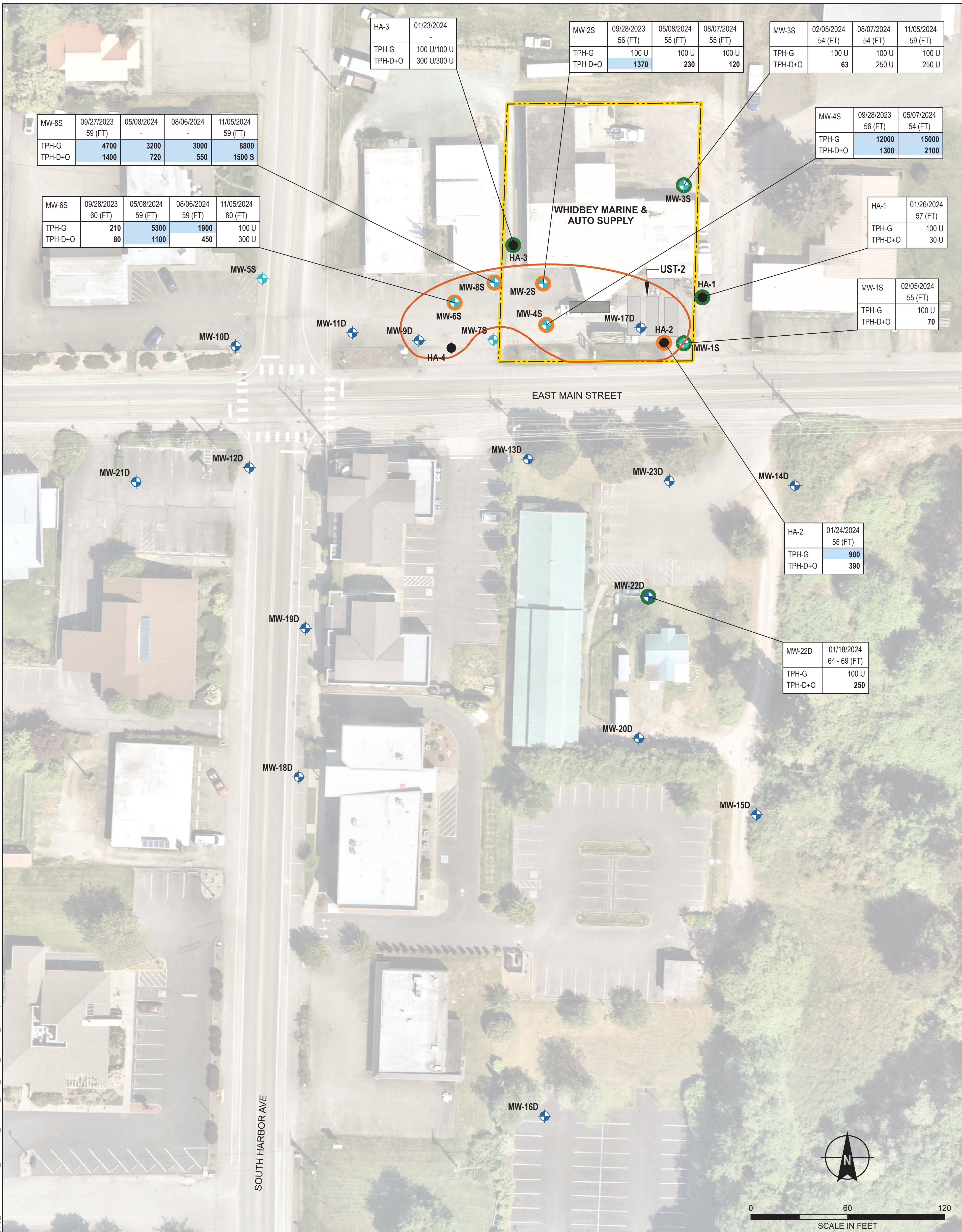
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

TPH AND SELECT VOC RESULTS IN SEA-LEVEL AQUIFER SOIL

APRIL 2025

FIGURE 9



LEGEND

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- COCS EITHER NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELS
- ONE OR MORE COC DETECTED ABOVE APPLICABLE MTCA SCREENING LEVELS
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- APPROXIMATE EXTENT OF PETROLEUM CONTAMINATED GROUNDWATER IN THE PERCHED AQUIFER
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. RESULTS SHOWN IN ug/L.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. ONLY TPH-G (GASOLINE RANGE ORGANICS) AND TPH-D+O (DIESEL RANGE ORGANICS+OIL RANGE ORGANICS) ARE SHOWN IN DATABOXES.
6. **BOLDED VALUES** INDICATE A DETECTED RESULT.
7. BLUE SHADING DENOTES A DETECTED ANALYTE CONCENTRATION EXCEEDING APPLICABLE MTCA CLEANUP LEVELS.
8. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
9. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017.
10. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

HALEY ALDRICH

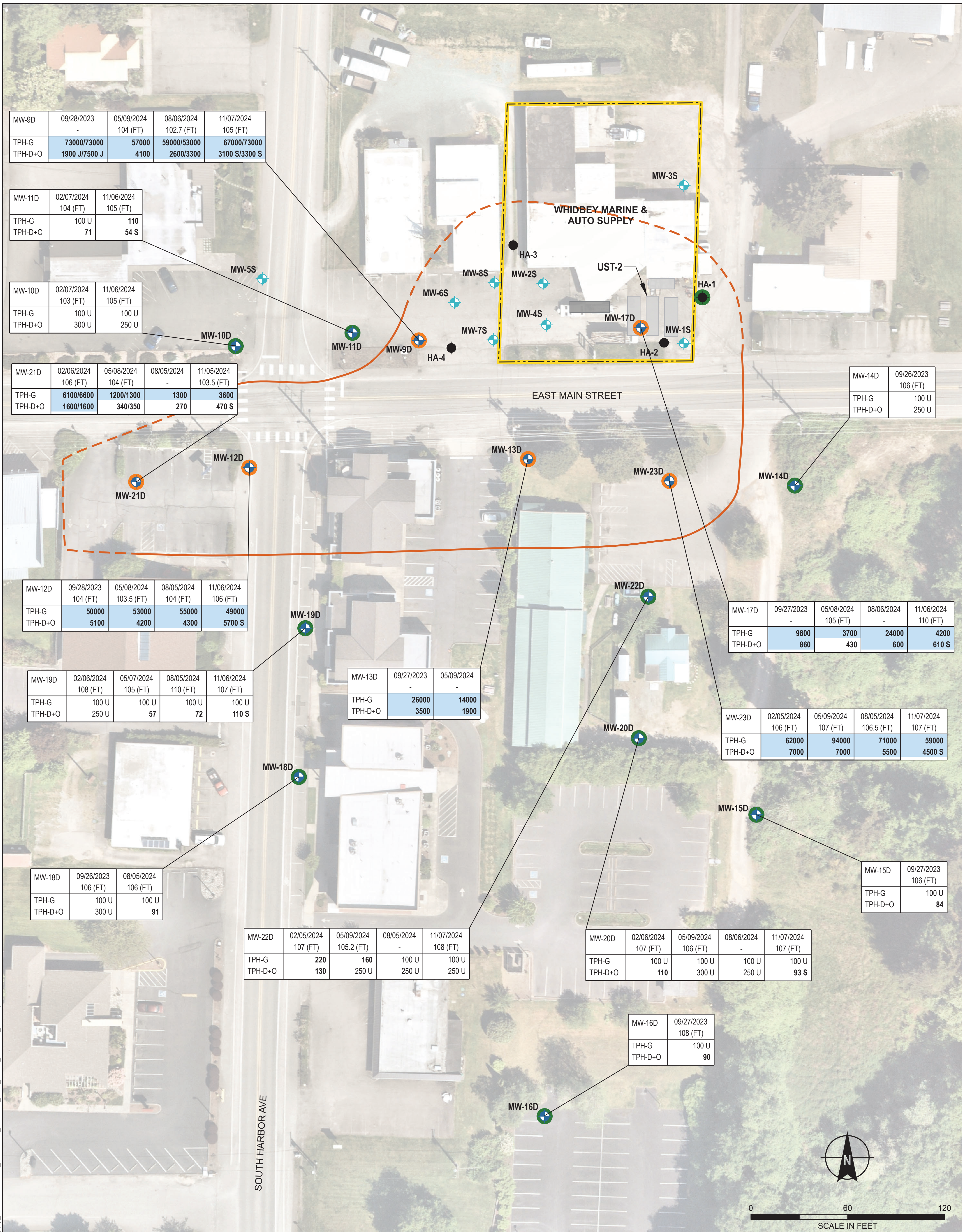
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

TPH RESULTS IN PERCHED GROUNDWATER

APRIL 2025

FIGURE 10

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000_Whidbey_Marine-Auto_Supply_Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweltzer - LAST SAVED: 4/16/2025 4:47 PM



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LEGEND

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- TPH AND/OR NON-CVOC EITHER NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELS
- ONE OR MORE COC DETECTED ABOVE APPLICABLE MTCA SCREENING LEVELS
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- APPROXIMATE EXTENT OF PETROLEUM CONTAMINATED GROUNDWATER IN THE SEA-LEVEL AQUIFER, DASHED WHERE INFERRED
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. RESULTS SHOWN IN ug/L.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. ONLY TPH-G (GASOLINE RANGE ORGANICS) AND TPH-D+O (DIESEL RANGE ORGANICS+OIL RANGE ORGANICS) ARE SHOWN IN DATABOXES.
6. **BOLDED VALUES** INDICATE A DETECTED RESULT.
7. BLUE SHADING DENOTES A DETECTED ANALYTE CONCENTRATION EXCEEDING APPLICABLE MTCA CLEANUP LEVELS.
8. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
9. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017.
10. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

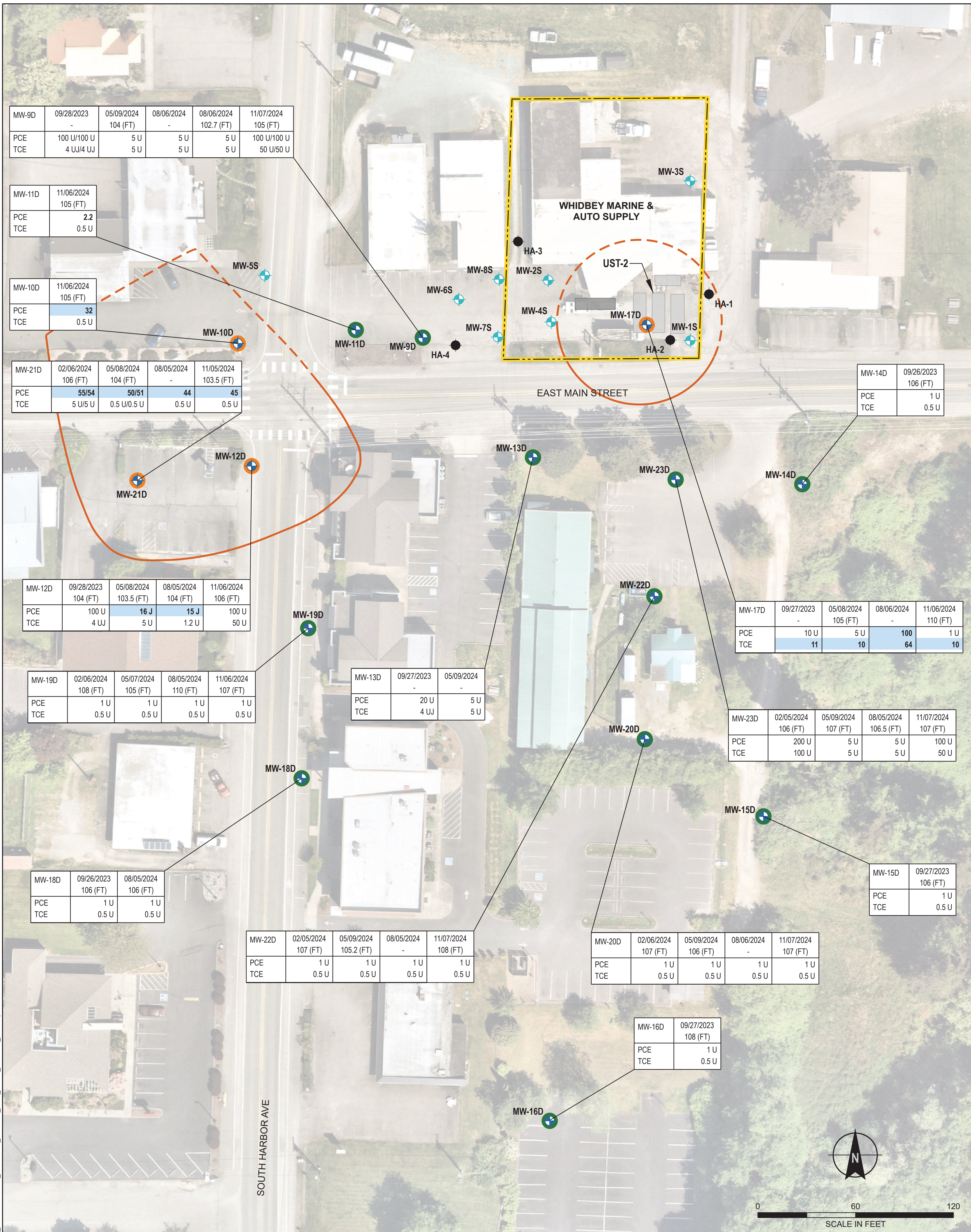
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

TPH RESULTS IN SEA-LEVEL AQUIFER GROUNDWATER

APRIL 2025

FIGURE 11



LEGEND

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- SOIL BORING
- EITHER NOT DETECTED AT OR ABOVE LABORATORY REPORTING LIMITS OR DETECTED BELOW APPLICABLE MTCA SCREENING LEVELS
- DETECTED ABOVE APPLICABLE MTCA SCREENING LEVELS
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- APPROXIMATE EXTENT OF CVOC CONTAMINATED GROUNDWATER IN THE SEA-LEVEL AQUIFER, DASHED WHERE INFERRED
- PROPERTY BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. RESULTS SHOWN IN ug/L.
4. ONLY DATA COLLECTED DURING THE 2024 RI ACTIVITIES IS SHOWN.
5. ONLY PCE (TETRACHLOROETHENE) AND TCE (TRICHLOROETHENE) ARE SHOWN IN DATABOXES.
6. **BOLDED VALUES** INDICATE A DETECTED RESULT.
7. BLUE SHADING DENOTES A DETECTED ANALYTE CONCENTRATION EXCEEDING APPLICABLE MTCA CLEANUP LEVELS.
8. MTCA - WASHINGTON STATE MODEL TOXICS CONTROL ACT
9. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017.
10. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

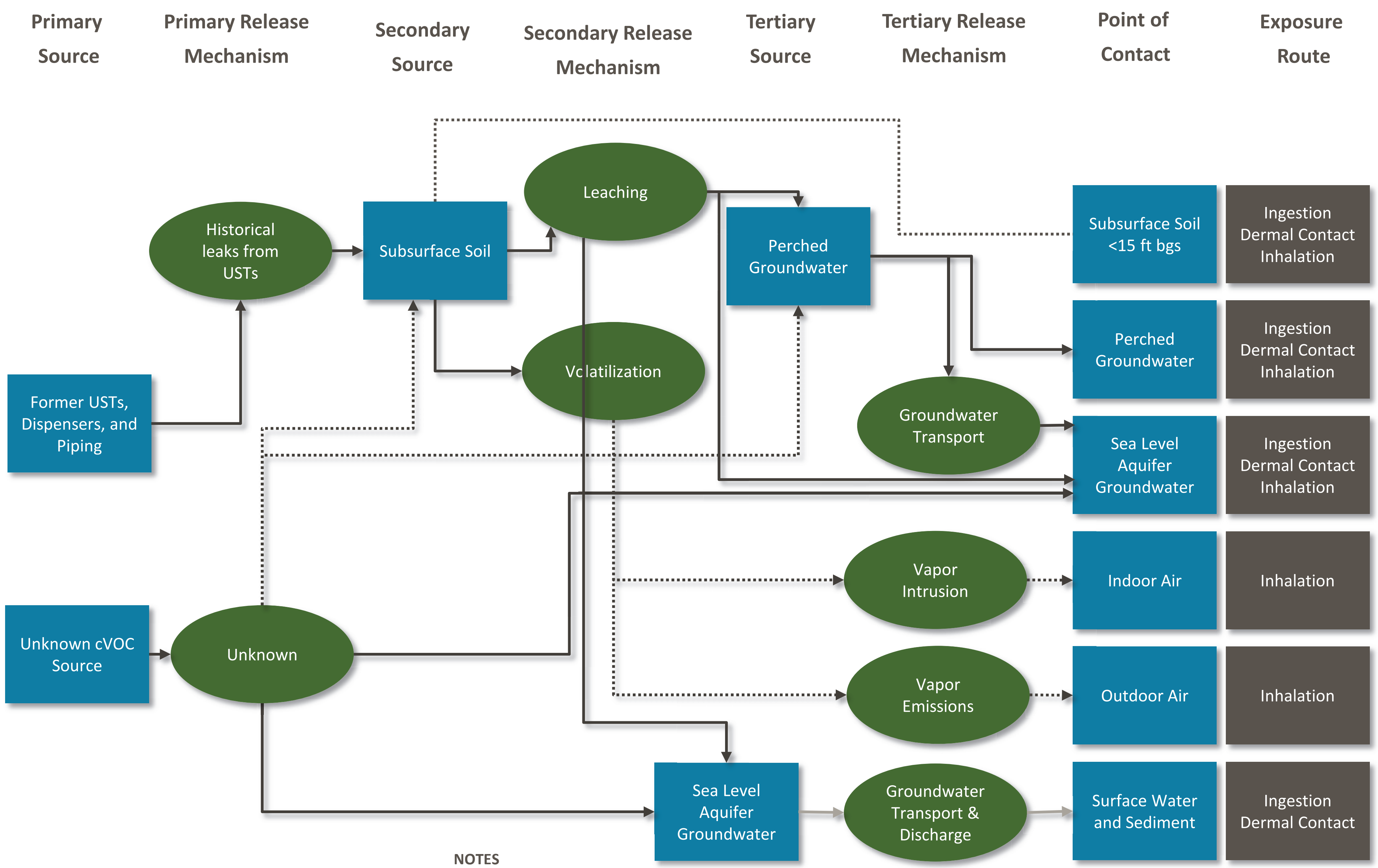
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

PCE AND TCE RESULTS IN SEA-LEVEL AQUIFER GROUNDWATER

APRIL 2025

FIGURE 12



Current and Potential Future Receptors

Point of Contact	Exposure Route	Construction Workers	Occupational Workers/ Residents	Recreational Fishers	Terrestrial/ Aquatic Biota
Subsurface Soil <15 ft bgs	Ingestion Dermal Contact Inhalation	?/I ? ?	? ? ?/I	Ø Ø Ø	Ø Ø Ø
Perched Groundwater	Ingestion Dermal Contact Inhalation	O O O	O O O	Ø Ø Ø	Ø Ø Ø
Sea Level Aquifer Groundwater	Ingestion Dermal Contact Inhalation	O O O	O O O	Ø Ø Ø	Ø Ø Ø
Indoor Air	Inhalation	?	?	Ø	Ø
Outdoor Air	Inhalation	? /I	? /I	Ø	Ø
Surface Water and Sediment	Ingestion Dermal Contact	O O	O O	Ø Ø	Ø Ø

LEGEND

- → POTENTIALLY COMPLETE PATHWAY
- ⋯→ UNKNOWN PATHWAY
- → CURRENTLY INCOMPLETE, BUT POTENTIAL FUTURE PATHWAY
- ✓ POTENTIALLY COMPLETE EXPOSURE ROUTE
- Ø INCOMPLETE EXPOSURE ROUTE
- I INSIGNIFICANT EXPOSURE ROUTE
- ? UNKNOWN EXPOSURE ROUTE
- O CURRENTLY INCOMPLETE, BUT POTENTIAL FUTURE EXPOSURE ROUTE

NOTES

1. FT BGS = FEET BELOW GROUND SURFACE.
2. cVOC = CHLORINATED VOLATILE ORGANIC COMPOUNDS.
3. UST = UNDERGROUND STORAGE TANK.
4. IT IS ASSUMED THAT GIVEN THE DEPTH OF GROUNDWATER, VOLATILIZATION WILL NOT OCCUR.
5. CURRENT SUBSURFACE SOIL CONTAMINANT CONCENTRATIONS ARE UNKNOWN; THEREFORE, VAPOR AND SUBSURFACE SOIL (<15 FT BGS) EXPOSURE PATHWAYS ARE UNKNOWN.
6. IT WAS DETERMINED THAT THE SITE DOES NOT POSE A SUBSTANTIAL THREAT OF SIGNIFICANT ADVERSE EFFECTS TO TERRESTRIAL ECOLOGICAL RECEPTORS
7. BASED ON CURRENT PLUME EXTENT, EXISTING DRINKING WATER WELL LOCATIONS, AND KNOWN SURFACE WATER BODY LOCATIONS, GROUNDWATER AND SURFACE WATER EXPOSURE PATHWAYS ARE CURRENTLY INCOMPLETE.
8. cVOCs HAVE BEEN DETECTED IN SEA LEVEL AQUIFER GROUNDWATER, BUT NOT PERCHED GROUNDWATER.
9. RECREATIONAL FISHER AND AQUATIC BIOTA RECEPTOR EXPOSURE PATHWAYS ARE CONSIDERED INCOMPLETE: THE PETROLEUM PLUME EXTENT IS KNOWN AND STABLE AND DOES NOT IMPACT ANY DOWNGRADIENT SURFACE WATER BODIES; THE CVOC PLUME TRENDS ARE UNKNOWN BUT ARE UNLIKELY TO IMPACT SURFACE WATER BODIES BASED ON CURRENTLY KNOWN EXTENT AND THE DISTANCE OF OVER 1.5 MILE TO THE NEAREST SURFACE WATER BODY.

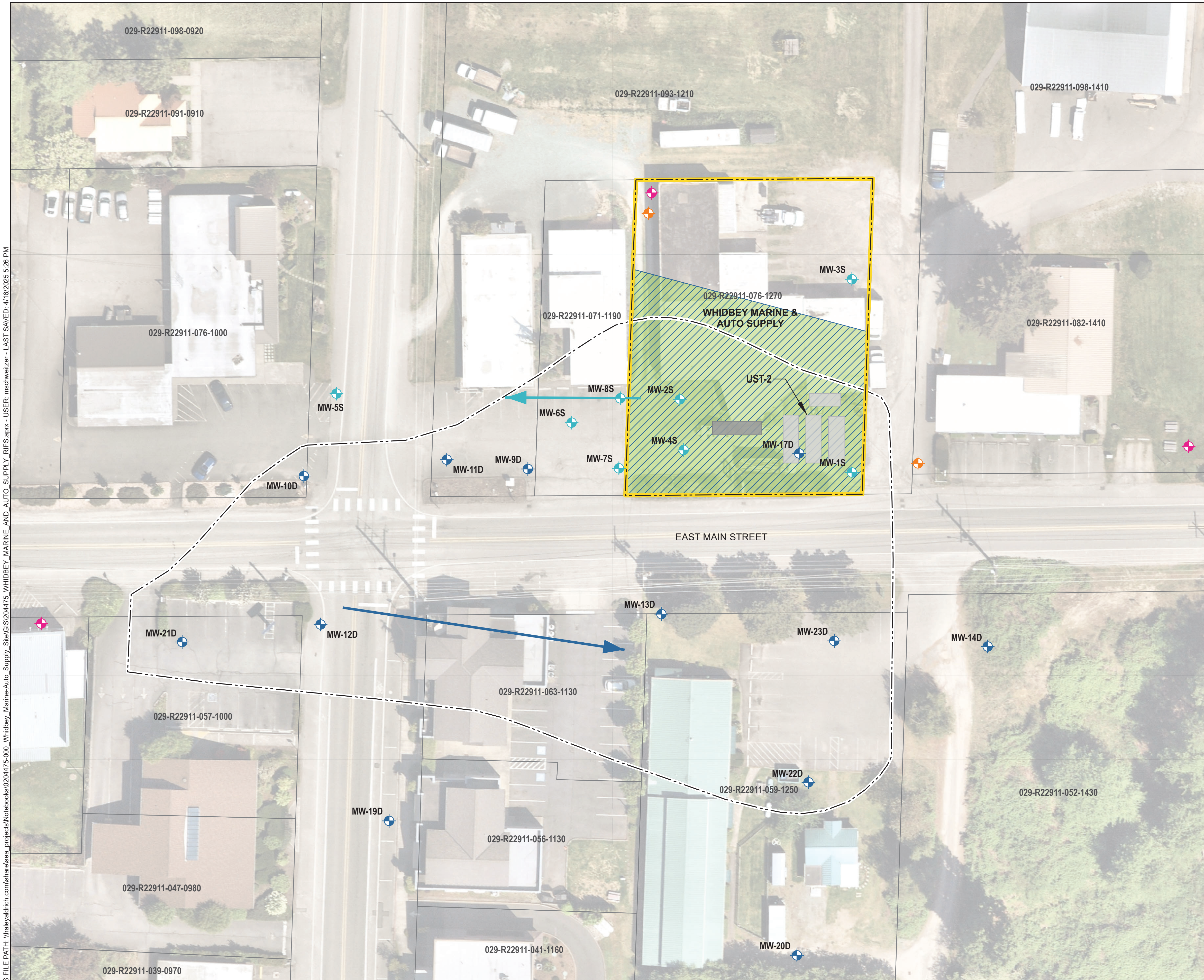
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

CONCEPTUAL SITE MODEL

NOVEMBER 2023

FIGURE 13



LEGEND

PROPOSED MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL

EXISTING MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- GROUNDWATER FLOW DIRECTION, PERCHED ZONE
- GROUNDWATER FLOW DIRECTION, SEA LEVEL AQUIFER
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- THERMAL TREATMENT IN PERCHED AQUIFER
- THERMAL TREATMENT IN SEA LEVEL AQUIFER
- CURRENTLY KNOWN SITE BOUNDARY
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

NOTES

1. ALL LOCATIONS AND DIMENSIONS ARE APPROXIMATE.
2. MONITORING WELLS WERE SURVEYED BY APEX ENGINEERING ON 30 JANUARY 2024, WITH THE EXCEPTION OF MW-18 WHICH WAS INACCESSIBLE
3. GROUNDWATER FLOW DIRECTIONS ARE INFERRED FROM MEASUREMENTS MADE BY HALEY & ALDRICH DURING 2024 SAMPLING.
4. CURRENTLY KNOWN SITE BOUNDARY REPRESENTS THE APPROXIMATE EXTENT OF KNOWN CHEMICAL CONCENTRATIONS DETECTED ABOVE APPLICABLE SCREENING LEVELS. THE SOURCE OF SOME CHEMICAL EXCEEDANCES IS CURRENTLY UNKNOWN AND MAY NOT BE ASSOCIATED WITH A RELEASE FROM THE WHIDBEY MARINE & AUTO SUPPLY PROPERTY
5. SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
6. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
7. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 50 100

SCALE IN FEET

HALEY ALDRICH

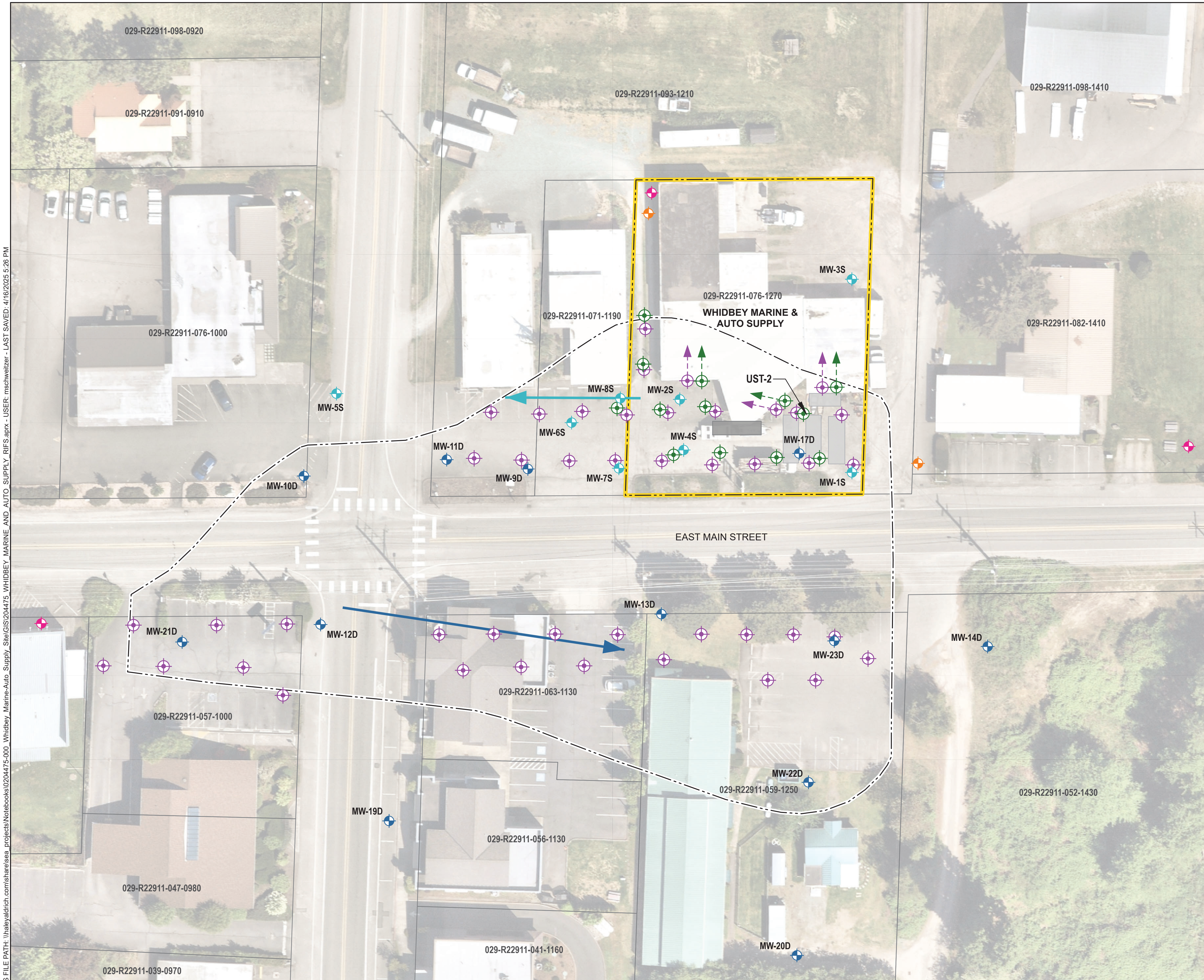
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

REMEDIATION ALTERNATIVE 1
THERMAL

APRIL 2025

FIGURE 14

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000_Whidbey_Marine-Auto_Supply_Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweitzer - LAST SAVED: 4/16/2025 5:26 PM



GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000_Whidbey_Marine-Auto_Supply_Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweltzer - LAST SAVED: 4/16/2025 5:26 PM

LEGEND

- ISCO WELL IN PERCHED AQUIFER
- ISCO WELL IN SEA LEVEL AQUIFER
- ANGLED ISCO WELL IN PERCHED AQUIFER
- ANGLED ISCO WELL IN SEA LEVEL AQUIFER

PROPOSED MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL

EXISTING MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- GROUNDWATER FLOW DIRECTION, PERCHED ZONE
- GROUNDWATER FLOW DIRECTION, SEA LEVEL AQUIFER
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
- CURRENTLY KNOWN SITE BOUNDARY
- PROPERTY BOUNDARY
- PARCEL BOUNDARY

NOTES

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6. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
7. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 50 100

SCALE IN FEET

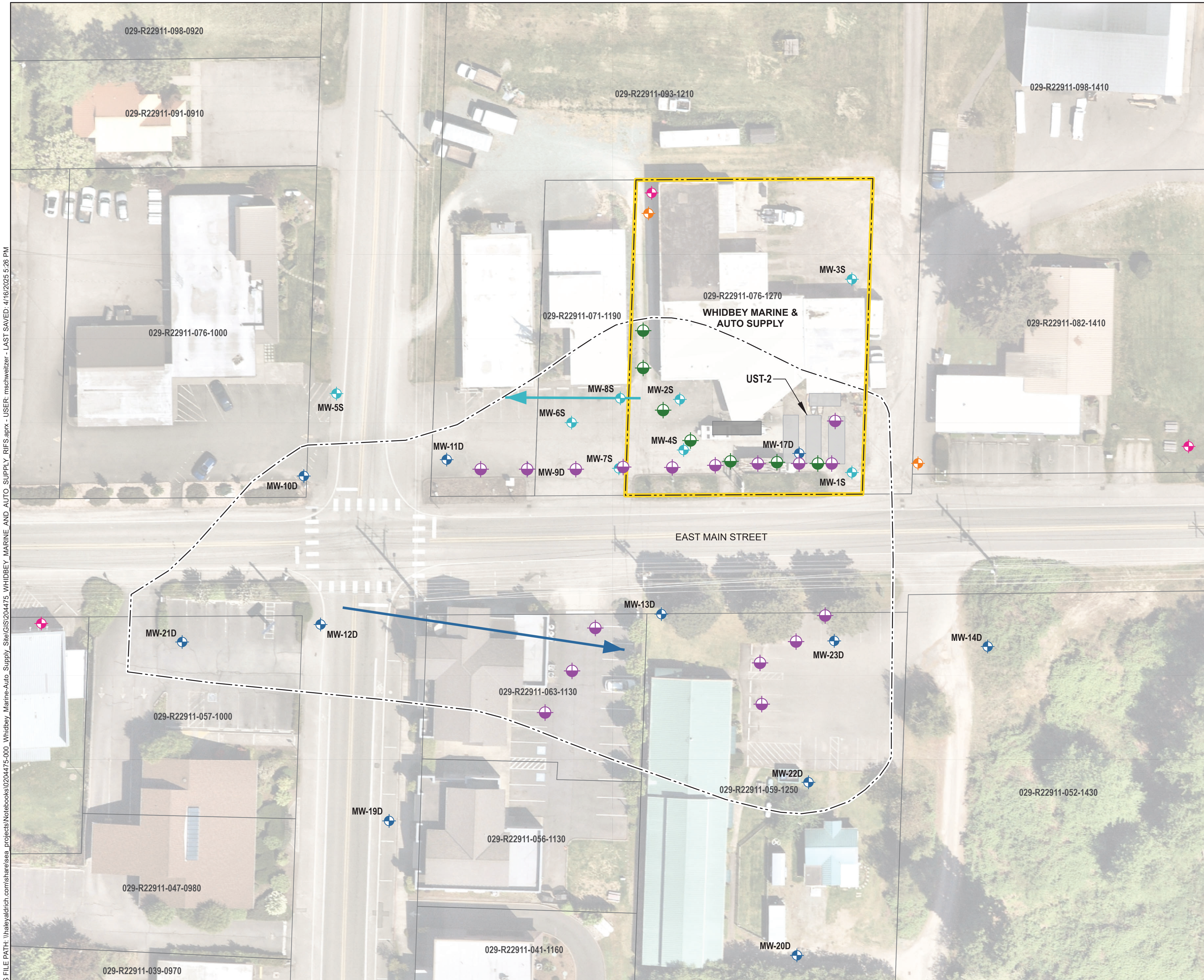
HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

REMEDIATION ALTERNATIVE 2
CHEMICAL OXIDATION

APRIL 2025

FIGURE 15



LEGEND

- SORPTION WELL IN PERCHED AQUIFER
- SORPTION WELL IN SEA LEVEL AQUIFER

PROPOSED MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL

EXISTING MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- GROUNDWATER FLOW DIRECTION, PERCHED ZONE
- GROUNDWATER FLOW DIRECTION, SEA LEVEL AQUIFER
- FORMER PUMP ISLAND
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6. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
7. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 50 100

SCALE IN FEET

HALEY ALDRICH

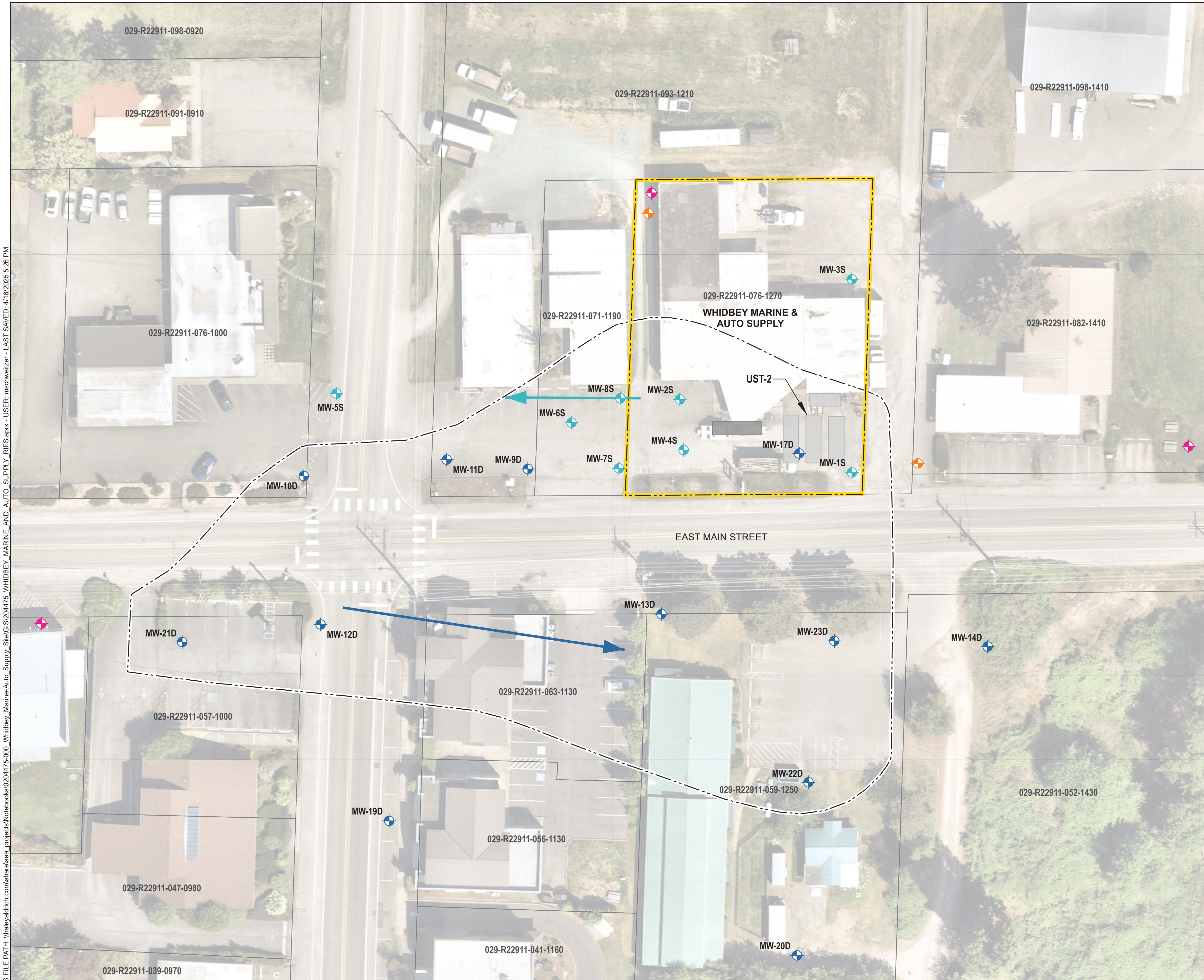
WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

REMEDIATION ALTERNATIVE 3
PERMEABLE SORPTIVE BARRIER

APRIL 2025

FIGURE 16

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000 Whidbey Marine-Auto Supply Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweitzer - LAST SAVED: 4/16/2025 5:26 PM



LEGEND

PROPOSED MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL

EXISTING MONITORING WELLS

- PERCHED ZONE MONITORING WELL
- SEA LEVEL AQUIFER MONITORING WELL
- GROUNDWATER FLOW DIRECTION, PERCHED ZONE
- GROUNDWATER FLOW DIRECTION, SEA LEVEL AQUIFER
- FORMER PUMP ISLAND
- FORMER UNDERGROUND STORAGE TANK (UST)
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5. WELLS INSTALLED PRIOR TO 2024 AND SITE FEATURES DATE SOURCE: DIGITIZED FROM "FIGURE 3", PRELIMINARY PLANNING ASSESSMENT, SES, 2017
6. ASSESSOR PARCEL DATA SOURCE: ISLAND COUNTY
7. AERIAL IMAGERY SOURCE: NEARMAP, 14 MAY 2023

N

0 50 100
SCALE IN FEET

HALEY ALDRICH

WHIDBEY MARINE & AUTO SUPPLY
1695 EAST MAIN STREET
FREELAND, WASHINGTON

REMEDIATION ALTERNATIVE 4
MONITORED NATURAL ATTENUATION

APRIL 2025

FIGURE 17

GIS FILE PATH: \\haleyaldrich.com\share\sea_projects\Notebooks\0204475-000_Whidbey_Marine-Auto_Supply_Site\GIS\204475_WHIDBEY_MARINE_AND_AUTO_SUPPLY_RIFS.aprx - USER: mschweitzer - LAST SAVED: 4/16/2025 5:26 PM