Site Characterization Report

Coldeen Property

15631 Westside Highway Southwest
Vashon, Washington

Prepared for
Washington State Department of Ecology
Toxics Cleanup Program

March 13, 2020
19500-08

HARTCROWSER

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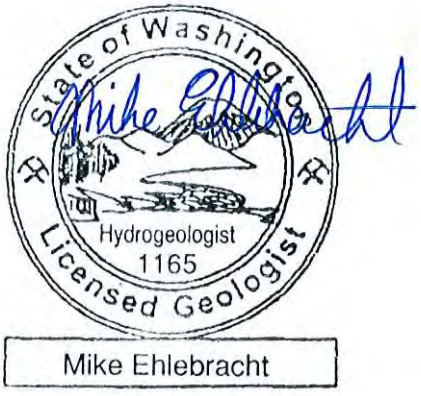

Marissa K. Goodman, EIT
Project Environmental Engineer
Marissa.Goodman@hartcrowser.com

Michael W. Ehlebracht, LHG
Principal Geochemist
Mike.Ehlebracht@hartcrowser.com

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Site Characterization Report

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1.0 INTRODUCTION

This report presents the results of a site characterization at the Coldeen property (Site) in Vashon, Washington (Figure 1). The Site is currently defined by the Washington State Department of Ecology (Ecology) as a leaking underground storage tank (LUST) site. The primary objectives of this work were to assess Site conditions in the vicinity of the former underground storage tank (UST) and existing fuel pump and determine if supplemental cleanup is required in this area to achieve a No Further Action (NFA) determination from Ecology. The site characterization was conducted in general accordance with the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP), dated April 10, 2019 (Hart Crowser 2019a) and updated on September 23, 2019 (Hart Crowser 2019b).

2.0 SITE BACKGROUND

2.1 Site Description and History

The Site is approximately 3,400 square feet in area and is located on the west side of Westside Highway Southwest, between Southwest 158th Street and Southwest Ober Beach Road. The surrounding area is primarily undeveloped or residential.

The Site formerly contained a general store and gasoline station that operated from the early 1920s to 1940. The station building, which is on the King County Historic Register, was then converted into an occupied residence. As part of real estate due diligence activities, a 700-gallon UST was discovered in front of the former station building. The historic fuel pump is still in place.

The gasoline UST was removed in 1994 and was found to contain approximately 100 gallons of water. No evidence of petroleum sheens was observed, and groundwater was not encountered in the excavation. However, soil samples collected from the UST excavation contained concentrations of gasoline-range hydrocarbons, benzene, and xylenes above Model Toxics Control Act (MTCA) cleanup levels. According to the Site Hazard Assessment (SHA) conducted for the Site in 2013, approximately 12 cubic yards of petroleum-contaminated soils were excavated during the 1994 UST removal but elevated concentrations of gasoline-range hydrocarbons and benzene, toluene, ethylbenzene, and xylenes (BTEX) compounds were still observed.

Ecology received funding to conduct additional characterization at the Site to determine if supplemental cleanup is required to achieve a NFA determination. This site investigation is focused on the former UST area located east of the existing building on the property.

2.2 Geology and Hydrogeology

The area included in this site characterization is generally flat with a slight slope to the west and is mostly uncovered except for the building. A description of regional and Site subsurface geology and hydrogeology is provided below. Our understanding of the Site's geology and hydrogeology is based on our recent site characterization.

2.2.1 Geology

The Site is in the Puget Sound lowland, which is characterized by north–south trending ridges capped by Vashon till. According to the Washington Geologic Information Portal, accessed March 15, 2019, the surface geologic unit on the Site is Vashon Stade till, consisting mostly of compact diamict with subangular to rounded clasts, glacially transported and deposited.

Several soil borings from this site characterization consisted of surficial fill material generally comprising very soft to medium stiff sandy silt or organic soil, or loose to medium dense silty sand, to a depth ranging between approximately 4 and 8.5 feet. The surficial fill material, where encountered, was underlain by glacial till deposits generally consisting of stiff to hard sandy silt or lean clay, or medium dense to very dense silty or clayey sand, all with various amounts of gravel to the maximum explored depth of 20 feet below ground surface (bgs). Site lithology is presented in the generalized subsurface cross-section (Figure 3).

2.2.2 Hydrogeology

During this site characterization, perched groundwater was encountered in nine of the eleven borings at depths ranging from approximately 2 to 11 feet bgs during drilling, generally near contact between the fill and till units or within layers in the till containing higher percentages of sand and/or gravel. Not all of the explorations encountered the perched water zone, indicating it is not continuous. After monitoring well installation, development, and equilibration, groundwater depths ranged from approximately 1.5 to 3.8 feet below the top of casing in both the April and October 2019 sampling events. Well logs from near the Site found in Ecology's Well Report database indicated water levels were generally between 118 and 245 feet bgs in wells installed from 1981 to 2007. Based on surrounding area topography and our groundwater elevation contour maps (Figures 4 and 5), the groundwater flow at the Site is to the northwest toward Ober Creek and/or Puget Sound.

3.0 SITE CHARACTERIZATION

3.1 Field Investigation Activities and Observations

On April 22, 23, and 24, 2019, we advanced nine push-probe/hollow-stem auger (HSA) borings on a push-probe/HSA combination drill rig (HC-1 through HC-5, HC-7, and MW-1 through MW-3) to depths of 20 feet or refusal at the Site (Figure 2). Three of the soil borings were completed as groundwater monitoring wells (MW-1 through MW-3). We collected soil samples at 2.5-foot intervals and groundwater samples from the three monitoring wells.

On October 22, 2019, we advanced two soil borings using a hand auger (HC-8 and HC-9) to depths of approximately 4.5 to 6 feet at the Site (Figure 2). One soil boring (HC-8) was advanced at a 50-degree angle from the vertical; depths for HC-8 are measured along the axis of the boring. We collected soil samples at approximately 1 to 2.5-foot intervals and groundwater samples from the three monitoring wells. One soil vapor sample (SV-1) was collected from HC-8 at 1 foot bgs. On October 23, 2019, we collected one indoor air sample from inside the building (IA-1) and one ambient upwind air sample outside (UA-1).

Table 1 presents a summary of soil boring and monitoring well installation details.

Table 1 - Soil Boring and Monitoring Well Summary Table

Boring/Well ID	Boring Depth (feet)	Well Screen Interval (depth in feet)	Surface Elevation (feet)[a]	Top of Casing Elevation (feet)[a]
HC-1	20	--	--	--
HC-2	14	--	--	--
HC-3	14.5	--	222.7	--
HC-4	15	--	--	--
HC-5	15	--	222.9	--
HC-7	15	--	--	--
HC-8	6	--	--	--
HC-9	4.5	--	--	--
MW-1	14.5	4-12.5	222.0	221.47
MW-2	15	5-15	220.4	219.80
MW-3	14.5	4-10	215.8	215.18

Notes:

a. Elevations are referenced to NAVD 88.

Soil samples were field-screened using sheen tests, visual and olfactory observations, and/or a photoionization detector (PID) to detect volatile organic compounds (VOCs) in the headspace. Soil samples from borings HC-3 and MW-3 had slight sheens noted. Soil samples from borings HC-4, HC-8, HC-9, and MW-1 had slight to moderate sheens noted. Petroleum-like odors were noted in HC-4 at approximately 5.5 to 8.5 feet bgs (moderate odor) and at approximately 11 to 12.5 feet bgs (strong odor). Strong petroleum-like odors were noted in HC-8 at approximately 5.5 to 6 feet bgs, HC-9 at approximately 3 to 4.5 feet bgs, and MW-1 at approximately 7 to 8.5 feet bgs and 11 to 13 feet bgs. Soil samples collected from borings HC-3 (5 to 7.5 feet bgs), HC-4 (5 to 12.5 feet bgs), HC-8 (5.5 to 6 feet bgs), HC-9 (3 to 4.5 feet bgs), MW-1 (5 to 7.5 feet bgs and 10 to 12.5 feet bgs), and MW-3 (2.5 to 5 feet bgs) exhibited elevated PID readings. Non-aqueous phase liquid (NAPL) was not observed in any of the borings. Field screening results are shown on the exploration logs in Appendix A.

3.2 Monitoring Well Construction and Development

Three borings (MW-1 through MW-3) were completed as monitoring wells after soil screening and sampling was completed. All wells were installed and constructed in accordance with Washington

Administrative Code (WAC) and Revised Code of Washington (RCW) rules and regulations. Each monitoring well was constructed of a 2-inch-diameter Schedule 40 polyvinyl chloride (PVC) casing with a 6- to 10-foot-long, 0.010-inch-slot screen. Clean silica sand pack (10/20 sand) was placed between the boring wall and PVC screen from the bottom of the well to approximately 0.5 to 1 foot above the screened interval. A 2- to 3.5-foot bentonite seal was placed above the sand to within 0.5 to 1 foot of the ground surface. Each well was secured with a flush-mounted, traffic-rated monument.

Each monitoring well was developed at least 24 hours after construction and sampled at least 48 hours after development, as outlined in the SAP/QAPP, dated April 10, 2019 (Hart Crowser 2019a) and updated on September 23, 2019 (Hart Crowser 2019b). On April 29 and October 22, 2019, groundwater samples were collected from the three monitoring wells (MW-1 through MW-3). After measuring the depth to groundwater, samples were collected from the wells using standard low-flow sampling techniques as outlined in the SAP/QAPP. Each well was purged until the field parameters of pH, temperature, and specific conductivity met the stability criteria (i.e., specific conductivity ± 10 percent, pH ± 0.1 pH units, and temperature ± 0.1 °C). During purging, visual and olfactory observations were recorded; a petroleum-like odor was noted in MW-1 during both sampling events. Following stabilization, groundwater samples were collected for laboratory testing by directly filling pre-cleaned sample containers provided by the laboratory.

3.3 Soil Sample Chemical Analysis and Results

The soil samples were submitted to OnSite Environmental, Inc. (OnSite) in Redmond, Washington and analyzed for one or more of: gasoline-range total petroleum hydrocarbons (TPH-G), BTEX, and total lead. We selected 30 soil samples for analysis based on field screening results and sample location and depth. The soil sample analytical results are summarized in Table 2, and the laboratory reports are in Appendix B.

We compared the results with MTCA Method A soil cleanup levels for unrestricted land use. Analytical results were:

- Thirty soil samples were analyzed for TPH-G, which was detected in eight samples. Six soil samples (from borings HC-3, HC-4, HC-9, and MW-1) had concentrations ranging from 270 to 6,700 milligrams per kilogram (mg/kg), which exceed the MTCA Method A cleanup level of 30 mg/kg applicable to benzene-containing soil samples.

- Thirty soil samples were analyzed for BTEX. Benzene was detected in two samples from boring HC-4 at concentrations ranging from 0.056 to 0.33 mg/kg, exceeding the MTCA Method A cleanup level of 0.03 mg/kg. Ethylbenzene was detected in six samples, one of which (from boring HC-4) at a concentration (16 mg/kg) exceeding the MTCA Method A cleanup level of 6 mg/kg. Toluene was detected in four samples at concentrations of up to 3.3 mg/kg, below the MTCA Method A cleanup level of 7 mg/kg. Xylenes were detected in six samples, one of which (from boring HC-4) exhibited a concentration (39 mg/kg) exceeding the MTCA Method A cleanup level of 9 mg/kg.

- Twenty-seven soil samples were analyzed for lead, which was detected in three samples at concentrations ranging from 10 to 24 mg/kg. These concentrations are well below the MTCA Method

A cleanup level of 250 mg/kg and are within the range of anticipated regional background concentrations (Ecology 1994).

3.4 Groundwater Sample Chemical Analysis and Results

Groundwater samples were collected and analyzed from three monitoring wells (MW-1 through MW-3) in April 2019 and October 2019. The groundwater samples were submitted to OnSite in Redmond, Washington and analyzed for one or more of: TPH-G, BTEX, 1,2-dibromoethane (EDB), 1,2-dichloroethane (EDC), methyl tert-butyl ether (MTBE), and total and dissolved lead. The groundwater sample analytical results are summarized in Table 3, and the laboratory reports are in Appendix B.

We compared results with MTCA Method A groundwater cleanup levels. Analytical results were:

- Eight groundwater samples (MW-1 through MW-3 and a field duplicate in both the April and October 2019 sampling events) were analyzed for TPH-G, which was detected in three samples collected from MW-1 at concentrations of up to 3,500 micrograms per liter (µg/L), exceeding the MTCA Method A cleanup level of 800 µg/L applicable to groundwater with benzene present.

- Eight groundwater samples (MW-1 through MW-3 and a field duplicate in both the April and October 2019 sampling events) were analyzed for BTEX. Benzene was detected in two samples collected from MW-1 and toluene, ethylbenzene, and xylenes were detected in three samples collected from MW-1, all at concentrations below applicable MTCA Method A cleanup levels.

- Four groundwater samples (MW-1 through MW-3 and a field duplicate in the April 2019 sampling event) were analyzed for MTBE, EDB, and EDC, which were not detected at or above laboratory reporting limits in any of the samples.

- Four groundwater samples (MW-1 through MW-3 and a field duplicate in the April 2019 sampling event) were analyzed for total and dissolved lead, which were not detected at or above laboratory reporting limits in any of the samples.

3.5 Soil Vapor Sample Chemical Analysis and Results

One soil vapor sample was collected and analyzed from approximately 1 foot bgs in the angled hand-augered boring (HC-8). The soil vapor sample was submitted to Fremont Analytical, Inc. (Fremont Analytical) in Seattle, Washington and analyzed for BTEX, naphthalene, air-phase hydrocarbon (APH) petroleum fractionation, major gases (oxygen, carbon dioxide, and methane), and helium. The soil vapor sample analytical results are summarized in Table 4, and the laboratory report is in Appendix B.

We compared results with MTCA Method B sub-slab soil gas screening levels. Analytical results were:

- APH petroleum fractions C5-C8 aliphatics and C9-C12 aliphatics were detected at concentrations of 4,520 micrograms per cubic meter (µg/m^3) and 1,030 µg/m^3, respectively. APH petroleum fractions C9-C10 aromatics were not detected at or above laboratory reporting limits. Per Ecology's

Implementation Memorandum No. 18, the MTCA Method B screening levels for APH petroleum fractions have been removed.

- BTEX were detected at concentrations below applicable MTCA Method B screening levels. Naphthalene was detected at a concentration (3.93 µg/m^3) exceeding the MTCA Method B screening level of 2.5 µg/m^3.

- Total petroleum hydrocarbons (TPH) is calculated as the summation of BTEX, naphthalene, and APH petroleum fraction concentrations. TPH was detected at a concentration of 5,588 µg/m^3, which exceeds the MTCA Method B screening level of 4,700 µg/m^3.

- Methane was not detected at or above the laboratory reporting limit. Carbon dioxide was detected at approximately 0.51 percent and oxygen was detected at approximately 24.4 percent.

- Helium was not detected at or above the laboratory reporting limit indicating that the surface seal during collection of the soil vapor sample was adequate and did not allow ambient air short circuiting.

3.6 Indoor and Ambient Air Chemical Analysis and Results

One indoor air sample was collected and analyzed from inside the existing building and one ambient air sample was collected and analyzed from outside and upwind of the building. The air samples were submitted to Fremont Analytical in Seattle, Washington and analyzed for BTEX, naphthalene, and APH petroleum fractionation. The air sample analytical results are summarized in Table 5, and the laboratory report is in Appendix B. The potential vapor intrusion contribution (discussed in this report as the corrected indoor air concentration) was calculated by subtracting the ambient upwind sample concentration from the indoor air measurement.

We compared the corrected results with MTCA Method B indoor air cleanup levels. Analytical results were:

- APH petroleum fractions C5-C8 aliphatics and C9-C12 aliphatics were detected at concentrations of 290.4 µg/m^3 and 173.2 µg/m^3, respectively. APH petroleum fractions C9-C10 aromatics were not detected at or above laboratory reporting limits. Per Ecology's Implementation Memorandum No. 18, the MTCA Method B cleanup levels for APH petroleum fractions have been removed.

- Benzene and ethylbenzene were either not detected at or above laboratory reporting limits or the concentration in the ambient upwind sample exceeded the concentration of the indoor air sample. Toluene was detected at a concentration (1.02 µg/m^3) well below the MTCA Method B cleanup level of 2,300 µg/m^3. Total xylenes were detected at a concentration (0.08 µg/m^3) well below the MTCA Method B cleanup level of 46 µg/m^3. Naphthalene was detected at a concentration (1.308 µg/m^3) exceeding the MTCA Method B cleanup level of 0.074 µg/m^3.

- TPH is calculated as the summation of BTEX, naphthalene, and APH petroleum fraction concentrations. TPH was detected at a concentration of 466 µg/m^3, which exceeds the MTCA Method B cleanup level of 140 µg/m^3.

- TPH and naphthalene concentrations measured in the upwind ambient air sample exceed their MTCA Method B cleanup levels.

3.7 Terrestrial Ecological Evaluation

A terrestrial ecological evaluation (TEE) is required under MTCA for sites where there has been a release or threatened release of a hazardous substance that may pose a threat to human health and the environment. Many urban and residential sites like the Coldeen Property qualify for exclusions and are not required to conduct a TEE. However, the Coldeen Property does not qualify for an exclusion based on the presence of more than 1.5 acres of contiguous undeveloped land within 500 feet of the Site (WAC 173-340-7491).

The Site qualifies for a simplified TEE per WAC 173-340-7491(2), because the Site has limited quality habitat and there is a low potential for soil biota and terrestrial plants and animals to be exposed to the residual petroleum contamination. The former UST and pump area where petroleum-impacted soils occur is unpaved but is limited to a small area between the residence and the Westside Highway. Ecological exposures are anticipated to be minimal due to the limited amount of contaminated soil and the limited access due to the paved highway and residential structures surrounding the impacted area.

Based on the simplified TEE evaluation procedures outlined in WAC 173-340-7492, ecologically protective soil concentrations must be established. TPH-G concentrations for the Site currently exceed the unrestricted land use soil protective concentration of 200 mg/kg (Table 749-2), so the proposed soil cleanup level for TPH-G will be at or below this concentration to protect ecological receptors (see Section 5.1). All other hazardous substances at the Site are either not listed in Table 749-2 or were detected at concentrations below the unrestricted land use soil protective concentrations listed in Table 749-2.

4.0 CONCEPTUAL SITE MODEL

This section provides a conceptual understanding of the Site that is based on the results of historical research and subsurface investigations. The chemicals and media of concern, the fate and transport characteristics of the release of hazardous substances, 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 cleanup alternatives and selecting a final cleanup, and may be refined throughout the cleanup action process as additional information becomes available.

4.1 Contaminant Source and Release

The source of TPH-G and petroleum-related VOC contamination at the Site is associated with the former 700-gallon gasoline UST that was used for the previous gasoline station operations.

4.1.1 Contaminants of Concern

The site characterization indicates the contaminants of concern (COCs) at the Site are TPH-G, benzene, ethylbenzene, and xylenes in soil; TPH-G in groundwater; and naphthalene and TPH in air.

4.1.2 Media of Concern

Soil, groundwater, and air have been identified as the affected media at the Site because results of the environmental investigations to date show elevated concentrations of the COCs.

4.2 Fate and Transport

The primary physical, biological, and chemical processes that can influence contaminant concentrations and migration include:

- Adsorption to soil;
- Leaching or dissolution into groundwater;
- Biodegradation; and
- Volatilization.

In general, when petroleum is released into the subsurface, it will migrate downward through the unsaturated zone due to gravity. As it travels through the soil column, it will sorb onto soil particles. Although no NAPL has been observed in any of the borings on the Site, in general, if a sufficient quantity of NAPL is released to overcome soil capillary forces, it will migrate down to the water table and mound and spread horizontally (light NAPL). Petroleum can leach or dissolve into groundwater and migrate with groundwater flow, though there is no evidence of petroleum-contaminated groundwater migration on the Site.

Petroleum can also degrade over time through chemical or biological processes. Volatile constituents evaporate and can migrate through the unsaturated zone as soil vapor. Some vapor may escape to the atmosphere or accumulate in enclosed spaces such as buildings. Biological degradation occurs predominantly in the aqueous, residual, and vapor phases. Compounds that are the most volatile are typically the most easily biodegraded.

4.3 Potential 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. The potential exposure pathways for the media of concern are summarized below.

4.3.1 Soil

- Direct ingestion;
- Dermal contact;
- Volatilization of contaminants from soil to air;
- Infiltration, percolation, or dissolution/desorption into groundwater;
- Plant uptake; and

- Fugitive dust.

The direct contact pathways for human receptors (direct ingestion and dermal contact) are complete but limited to humans who come into close contact with the media. The soil-to-groundwater pathway is complete and the soil-to-air pathway is potentially complete. The fugitive dust pathway is incomplete because surface soil is not impacted; soil contamination was found at depths ranging from 4.5 to 12.5 feet bgs.

The pathways related to ecological receptors (soil biota, plants, and wildlife) are summarized below; see Section 3.7 for more details. The plant uptake pathway and direct contact pathways for wildlife receptors (direct ingestion and dermal contact) are complete.

4.3.2 Groundwater

- Direct ingestion;
- Dermal contact; and
- Volatilization of contaminants from groundwater to air.

The direct contact pathways for human receptors (direct ingestion and dermal contact) are complete but limited to humans who come into close contact with the media, for example by workers digging in soil below the water table; the groundwater is not used for drinking water. The groundwater-to-air pathway is potentially complete.

4.3.3 Air

- Inhalation.

Petroleum and VOCs can volatilize in soil and groundwater, potentially leading to gas phase migration of the COCs to the surface. Inhalation of indoor air inside the building is a complete exposure pathway.

4.4 Potential Receptors

Several classes of potential human and ecological receptors have been identified. Potential human receptors include current and future residents and other incidental users such as utility workers who may be exposed to contaminated soil. Potential ecological receptors include plants and animals exposed to impacted media and secondary food chain consumers such as birds and mammals.

As noted in Sections 3.7 and 4.3, there are human and ecological receptors based on the complete exposure pathways (direct contact, plant uptake, and inhalation).

4.5 Nature and Extent of Contamination

The nature and extent of contaminated media at the Site is described in the following sections.

4.5.1 Soil

TPH-G was detected above the MTCA Method A cleanup level in boring HC-3 at 7.5 feet bgs, boring HC-4 at 7.5 and 12.5 feet bgs, boring HC-9 at 4.5 feet bgs, and boring MW-1 at 7.5 and 12.5 feet bgs. The TPH-G-

contaminated soil appears to be limited to the smear zone in soil surrounding the former UST. Soil samples collected at similar depths from nearby borings had TPH-G concentrations below the MTCA Method A cleanup level. The TPH-G-impacted soil appears to be a localized, isolated hot spot bound to the north (by HC-1), east (by HC-5), south (by HC-2), and west (by HC-7). The exact extent of TPH-G-contaminated soil remaining in-place below the building is not known. Additionally, the TPH-G-contaminated soil is bound vertically by soil samples at 10 and 12.5 feet bgs in boring HC-3, 15 feet bgs in boring HC-4, and 15 feet bgs in boring MW-1.

Benzene was detected above the MTCA Method A cleanup level in boring HC-4 at 7.5 and 12.5 feet bgs. Ethylbenzene and xylenes were detected above the MTCA Method A cleanup level in boring HC-4 at 7.5 feet bgs. The VOC-contaminated soil appears to be limited to the smear zone in soil surrounding the former UST. Soil samples collected at similar depths from nearby borings had VOC concentrations below the MTCA Method A cleanup levels. The VOC-impacted soil appears to be a localized, isolated hot spot bound to the north (by HC-1), east (by HC-3), south (by MW-1), and west (by HC-7). The exact extent of VOC-contaminated soil remaining in-place below the building is not known. Additionally, the VOC-contaminated soil is bound vertically by a soil sample at 15 feet bgs in boring HC-4.

4.5.2 Groundwater

TPH-G was detected above the MTCA Method A cleanup level in monitoring well MW-1 in both the April and October 2019 sampling events. TPH-G was not detected at or above laboratory reporting limits in the groundwater samples collected from monitoring wells MW-2 and MW-3 in either the April or October 2019 sampling events. Since the contaminated perched groundwater is not mobile or part of a connected aquifer, its extent has been delineated.

4.5.3 Air

Naphthalene and TPH were detected above the MTCA Method B cleanup levels in the indoor air sample collected inside the building. Since this is the only building inside the lateral inclusion zone, the extent of air contamination has been delineated.

5.0 CLEANUP STANDARDS

Cleanup standards include cleanup levels and points of compliance (POCs) as described in WAC 173-340-700 through WAC 173-340-760. Cleanup standards must also incorporate other state and federal regulatory requirements applicable to the cleanup action and/or its location as appropriate. The following sections summarize applicable cleanup standards for the Site.

5.1 Cleanup Levels

Soil cleanup levels must protect direct contact, the soil-to-groundwater pathway, terrestrial ecological receptors, and vapor intrusion. MTCA Method A soil cleanup levels for unrestricted land use have been selected for the Site, which provide sufficient protection to all these pathways. Groundwater cleanup levels must protect direct contact and vapor intrusion. MTCA Method A groundwater cleanup levels have been selected for the Site, which provide sufficient protection to all these pathways. Air cleanup levels

must be protective of the unrestricted inhalation pathway. MTCA Method B indoor air cleanup levels have been selected for the Site, which provide sufficient protection to this pathway.

Table 6 below summarizes the specific cleanup levels for the Site COCs in all affected media.

Table 6 – Proposed Cleanup Levels

Contaminant of Concern	Soil Cleanup Level (mg/kg)[a]	Groundwater Cleanup Level (µg/L)[b]	Air Cleanup Level (µg/m^3)[c]
TPH-G	30/100[d]	800/1,000[e]	–
Benzene	0.03	–	–
Ethylbenzene	6	–	–
Xylenes	9	–	–
Naphthalene	–	–	0.074
TPH	–	–	140

Notes: – indicates the COC is not a concern in that media (i.e., concentrations do not exceed cleanup levels).

a. MTCA Method A soil cleanup level for unrestricted land use.
b. MTCA Method A groundwater cleanup level.
c. MTCA Method B indoor air cleanup level.
d. 100 mg/kg for gasoline mixtures without benzene and for which ethylbenzene, toluene, and xylenes together are less than 1 percent of the gasoline mixture; 30 mg/kg for all other gasoline mixtures.
e. 800 µg/L when benzene is present in groundwater; 1,000 µg/L when no detectable benzene.

5.2 Point of Compliance

Soil. The standard POC for soil contamination by direct contact and for TEE is 15 feet bgs, which is a reasonable estimate of the depth that could be accessed during normal redevelopment activities (WAC 173-340-740[6][d] and WAC 173-340-7490[4][b]). For sites with institutional controls to prevent excavation of deeper soil, a conditional POC may be set at the biologically active soil zone, which is assumed to be 6 feet bgs (WAC 173-340-7490[4][a]). The standard POC for soil for the protection from vapors is throughout the site from the ground surface to the uppermost groundwater saturated zone (WAC 173-340-740[6][c]). The standard POC for soil for the protection of groundwater is throughout the site (WAC 173-340-740[6][b]).

Groundwater. The standard POC for groundwater is throughout the site, from the uppermost level of the saturated zone extending vertically to the lowest depth which could potentially be affected (WAC 173-340-720[8][b]).

Air. The standard POC for air is ambient air throughout the site (WAC 173-340-750[6]).

6.0 CONCLUSIONS AND RECOMMENDATIONS

This investigation was focused on the former UST area and based on the results of this site characterization, we have determined that soil, groundwater, and indoor air surrounding the former UST area are impacted with TPH-G and petroleum-related VOCs. Additional site investigations are not required to develop and evaluate potential remedial alternatives for the former UST area covered in this investigation, although due to the high temporal and seasonal variability of indoor air sampling, a second round of air sampling may be useful to confirm the indoor air data. A supplemental cleanup, vapor intrusion mitigation, and/or institutional control (i.e., environmental covenant) are likely required to protect human health and the environment. We recommend conducting a feasibility study with disproportionate cost analysis to develop and evaluate potential remedial alternatives for soil, groundwater, and indoor air impacts. The feasibility study would recommend the most appropriate alternative based on chemical and physical conditions at the Site and a cost-benefit analysis.

7.0 LIMITATIONS

Work for this project was performed, and this report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. This report is intended for the exclusive use of the Washington State Department of Ecology for specific application to the referenced property. This work plan is not meant to represent a legal opinion. No other warranty, express or implied, is made.

8.0 REFERENCES

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TME 1994a. Coldeen property 15631 Westside Hwy. SW, Vashon Island, Wash. Prepared by TME Environmental Services, Inc. for Beneficial Finance, May 23, 1994.

TME 1994b. Letter prepared by TME Environmental Services, Inc. for Chris Coldeen, June 1, 1994.

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Table 2 - Analytical Results for Soil Samples

Sample ID	Sampling Date	Depth in Feet	Concentration in milligrams per kilogram (mg/kg)							
			Gasoline	Lead	Benzene	Ethylbenzene	Toluene	m, p-Xylene	o-Xylene	Total Xylenes
HC1-S2-5	4/22/2019	5.0	6.6 U	6 U	0.02 U	0.066 U	0.066 U	0.066 U	0.066 U	0.066 U
HC1-S3-7.5	4/22/2019	7.5	5.7 U	5.9 U	0.02 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U
HC1-S5-12.5	4/22/2019	12.5	5.4 U	5.6 U	0.02 U	0.054 U	0.054 U	0.054 U	0.054 U	0.054 U
HC2-S2-5	4/22/2019	5.0	5.1 U	5.8 U	0.02 U	0.051 U	0.051 U	0.051 U	0.051 U	0.051 U
HC2-S3-7.5	4/22/2019	7.5	6.9 U	6.2 U	0.02 U	0.069 U	0.069 U	0.069 U	0.069 U	0.069 U
HC2-S5-12.5	4/22/2019	12.5	5.6 U	5.6 U	0.02 U	0.056 U	0.056 U	0.056 U	0.056 U	0.056 U
HC3-S3-7.5	4/22/2019	7.5	**270**	5.7 U	0.02 U	**0.064**	**0.077**	**0.48**	0.052 U	**0.48**
HC3-S4-10	4/22/2019	10.0	4.8 U	5.6 U	0.02 U	0.048 U	0.048 U	0.048 U	0.048 U	0.048 U
HC3-S5-12.5	4/22/2019	12.5	5.3 U	5.6 U	0.02 U	0.053 U	0.053 U	0.053 U	0.053 U	0.053 U
HC4-S3-7.5	4/22/2019	7.5	**6700**	5.8 U	**0.33**	**16**	**3.3**	**35**	**4**	**39**
HC4-S5-12.5	4/22/2019	12.5	**2400**	**10**	**0.056**	**3.2**	**0.39**	**7**	0.12 U	**7**
HC4-S6-15	4/22/2019	15.0	5.2 U	5.6 U	0.02 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
HC5-S2-5	4/24/2019	5.0	5.7 U	5.8 U	0.02 U	0.057 U	0.057 U	0.057 U	0.057 U	0.057 U
HC5-S3-7.5	4/24/2019	7.5	5.1 U	5.6 U	0.02 U	0.051 U	0.051 U	0.051 U	0.051 U	0.051 U
HC5-S5-12.5	4/24/2019	12.5	5.2 U	5.6 U	0.02 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
HC7-S2-5	4/24/2019	5.0	5.2 U	5.6 U	0.02 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
HC7-S3-7.5	4/24/2019	7.5	4.6 U	5.5 U	0.02 U	0.046 U	0.046 U	0.046 U	0.046 U	0.046 U
HC7-S5-12.5	4/24/2019	12.5	6.3 U	5.9 U	0.02 U	0.063 U	0.063 U	0.063 U	0.063 U	0.063 U
HC8-S3-6.0	10/22/2019	6[a]	**6.7**		0.02 U	0.056 U	0.056 U	0.062	0.056 U	0.062
HC9-S2-3.5	10/22/2019	3.5	**11**		0.02 U	0.047 U	0.047 U	0.047 U	0.047 U	0.047 U
HC9-S3-4.5	10/22/2019	4.5	**1100**		0.022 U	**5.4**	**0.32**	**5.4**	**0.2**	**5.6**
MW1-S3-7.5	4/23/2019	7.5	**500**	**18**	0.028 U	**0.75**	0.14 U	**1.3**	0.14 U	**1.3**
MW1-S5-12.5	4/23/2019	12.5	**310**	5.9 U	0.02 U	**0.12**	0.049 U	**0.63**	0.049 U	**0.63**
MW1-S6-15	4/23/2019	14.5	5.4 U	5.5 U	0.02 U	0.054 U	0.054 U	0.054 U	0.054 U	0.054 U
MW2-S2-5	4/24/2019	5.0	6.3 U	**24**	0.02 U	0.063 U	0.063 U	0.063 U	0.063 U	0.063 U
MW2-S3-7.5	4/24/2019	7.5	5.5 U	6.1 U	0.02 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U
MW2-S5-12.5	4/24/2019	12.5	6 U	5.9 U	0.02 U	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U
MW3-S2-5	4/23/2019	5.0	5.9 U	5.9 U	0.02 U	0.059 U	0.059 U	0.059 U	0.059 U	0.059 U
MW3-S3-7.5	4/23/2019	7.5	5.5 U	5.9 U	0.02 U	0.055 U	0.055 U	0.055 U	0.055 U	0.055 U
MW3-S5-12.5	4/23/2019	12.5	5.2 U	5.6 U	0.02 U	0.052 U	0.052 U	0.052 U	0.052 U	0.052 U
MTCA Method A Cleanup Level[b]			30/100[c]	250	0.03	6	7			9

U = Not detected at reporting limit indicated.

Detected concentrations are bolded.

Concentrations that exceed cleanup level are s

a. HC-8 was advanced at a 50-degree angle from the vertical. The depth is measured along the axis of the boring.

b. MTCA Method A soil cleanup level for unrestricted land use.

c. 100 mg/kg for gasoline mixtures without benzene, otherwise, 30 mg/kg.

Table 3 - Analytical Results for Groundwater Samples

Monitoring Well ID	Sampling Date	Concentration in µg/L								
		Gasoline	Dissolved Lead	Total Lead	Benzene	Toluene	Ethylbenzene	m,p-Xylene	o-Xylene	Total Xylenes
MTCA Method A Cleanup Level		800/1000[a]	15	15	5	1000	700			1000
MW-1	4/29/2019	**3500**	1 U	1.1 U	**0.47**	**8.3**	**82**	**130**	**35**	**165**
Duplicate	4/29/2019	**3100**	1 U	1.1 U	**0.4**	**7.3**	**69**	**110**	**30**	**140**
	10/22/2019	**3100**			1 U	**8.5**	**75**	**83**	**35**	**118**
MW-2	4/29/2019	100 U	1 U	1.1 U	0.2 U	1 U	0.2 U	0.4 U	0.2 U	0.4 U
	10/22/2019	100 U			1 U	1 U	1 U	1 U	1 U	1 U
Duplicate	10/22/2019	100 U			1 U	1 U	1 U	1 U	1 U	1 U
MW-3	4/29/2019	100 U	1 U	1.1 U	0.2 U	1 U	0.2 U	0.4 U	0.2 U	0.4 U
	10/22/2019	100 U			1 U	1 U	1 U	1 U	1 U	1 U

Table 3 - Analytical Results for Groundwater Samples

Monitoring Well ID	Sampling Date	Concentration in µg/L		
		Methyl t-Butyl Ether (MTBE)	1,2-Dichloroethane (EDC)	1,2-Dibromoethane (EDB)
MTCA Method A Cleanup Level		20	5	0.01
MW-1	4/29/2019	0.4 U	0.4 U	0.0097 U
Duplicate	4/29/2019	0.4 U	0.4 U	0.0098 U
	10/22/2019			
MW-2	4/29/2019	0.2 U	0.2 U	0.0096 U
	10/22/2019			
Duplicate	10/22/2019			
MW-3	4/29/2019	0.2 U	0.2 U	0.0097 U
	10/22/2019			

U = Not detected at reporting limit indicated.

a. 800 µg/L when benzene is present in groundwater; 1000 µg/L when benzene is not detected.

Detected concentrations are bolded.

Concentrations that exceed cleanup level are shaded.

Table 4 - Analytical Results for Soil Vapor Sample

Sample ID	MTCA Method B Sub-Slab Soil Gas Screening Level	SV-1	
Sampling Date		10/22/2019	
APH and VOCs by EPA TO-15 in µg/m^3			
APH C5-C8 Aliphatics		**4,520**	
APH C9-C12 Aliphatics		**1,030**	
APH C9-C10 Aromatics		314	U
Benzene	11	**1.28**	
Toluene	76,000	**12.4**	
Ethylbenzene	15,000	**8.3**	
m,p-Xylene		**8.77**	
o-Xylene		**3.28**	
Total Xylenes	1,500	**12.05**	
Naphthalene	2.5	**3.93**	
Total Petroleum Hydrocarbon[a]	4,700	**5,588**	
Major Gases by EPA 3C in %			
Carbon Dioxide		**0.514**	
Methane		0.1	U
Oxygen		**24.4**	**J**
Helium by GC/TCD in ppt		50	U

U = Not detected at reporting limit indicated.

J = Estimated value.

Detected concentrations are bolded.

Concentrations that exceed MTCA Method B screening levels are shaded.

APH = Air-phase hydrocarbons

VOC = Volatile organic compound

µg/m^3 = microgram per cubic meter

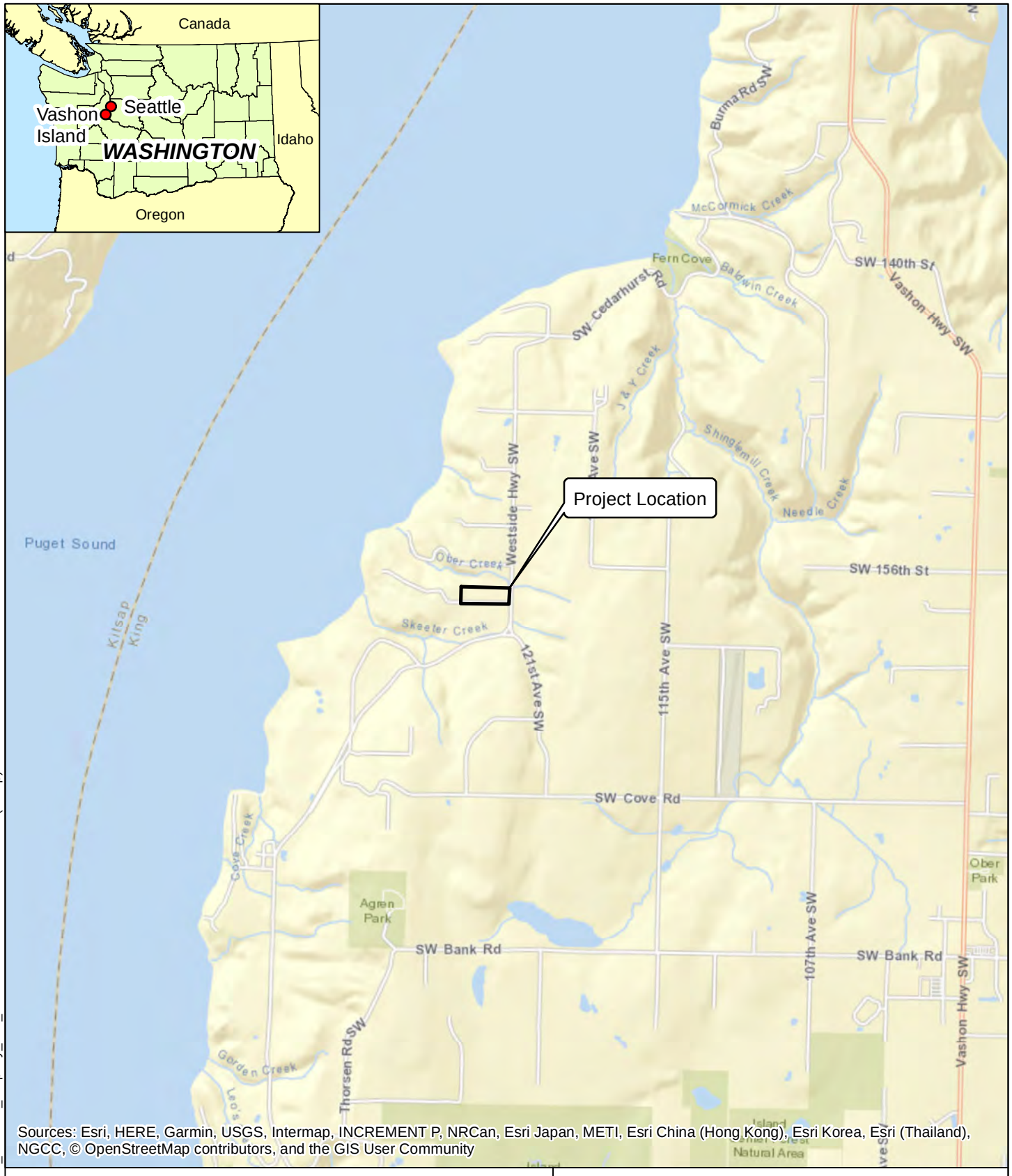
ppt = parts per thousand

a. Total petroleum hydrocarbon calculated by summing concentrations for benzene, toluene, ethylbenzene, total xylenes, naphthalene, APH C5-C8 aliphatics, APH C9-C12 aliphatics, and APH C9-C10 aromatics.

Table 5 - Analytical Results for Indoor and Ambient Air Samples

Sample ID Sampling Date	MTCA Method B Indoor Air Cleanup Level	UA-1 10/23/2019	IA-1 10/23/2019	IA-1 Corrected[b] 10/23/2019
APH and VOCs by EPA TO-15 in µg/m^3				
APH C5-C8 Aliphatics		**91.6**	**382**	**290.4**
APH C9-C12 Aliphatics		**73.8**	**247**	**173.2**
APH C9-C10 Aromatics		7.86 U	7.86 U	7.86 U
Benzene	0.32	**0.608**	**0.593**	N/A
Toluene	2,300	**2.16**	**3.18**	**1.02**
Ethylbenzene	460	**0.543**	0.434 U	0.434 U
m,p-Xylenes		**1.21**	**1.29**	**0.08**
o-Xylene		**0.645**	**0.505**	N/A
Total Xylenes	46	**1.855**	**1.795**	**0.08**
Naphthalene	0.074	**0.852**	**2.16**	**1.308**
Total Petroleum Hydrocarbon[a]	140	**171.42**	**636.73**	**466**

U = Not detected at reporting limit indicated.
Detected concentrations are bolded.
Corrected indoor air concentrations that exceed MTCA Method B cleanup levels are shaded.
N/A = Indoor air sample concentration is less than ambient upwind sample concentration; no contribution from vapor intrusion in the indoor air sample.
APH = Air-phase hydrocarbons
VOC = Volatile organic compound
µg/m^3 = microgram per cubic meter
a. Total petroleum hydrocarbon calculated by summing concentrations for benzene, toluene, ethylbenzene, total xylenes, naphthalene, APH C5-C8 aliphatics, APH C9-C12 aliphatics, and APH C9-C10 aromatics.
b. Corrected concentration calculated by subtracting upwind ambient air concentration (UA-1) from indoor air sample concentration.



0 1,000 2,000 4,000 Feet

Note: Feature locations are approximate.

N

Coldeen Property Site Characterization
Vashon Island, Washington

Vicinity Map

19500-08 3/19

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Figure 1

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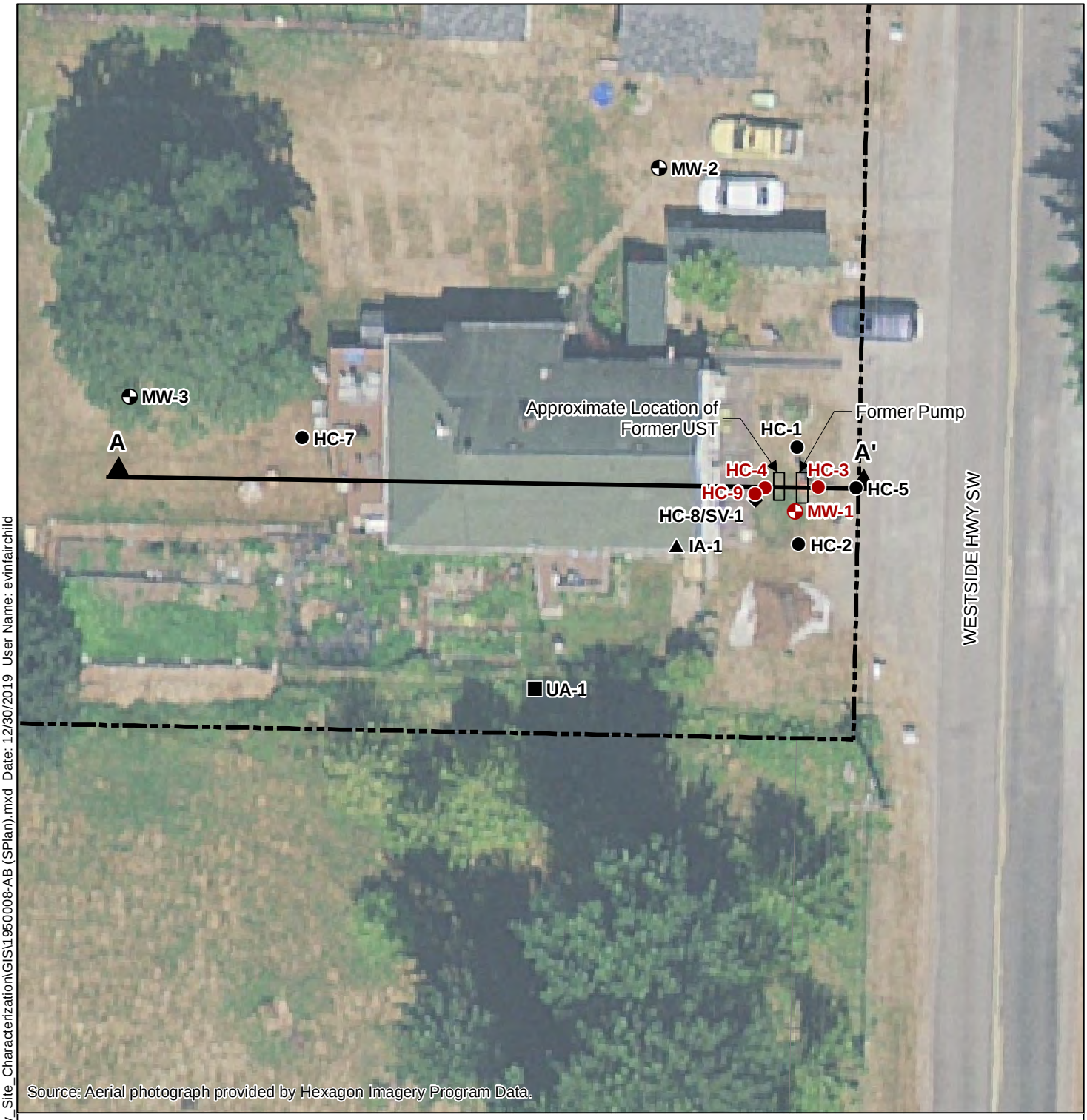

Legend

- Upwind Ambient Air Sample (Hart Crowser 2019)
- Indoor Air Sample (Hart Crowser 2019)
- Angled Boring with Soil Vapor Sample (Hart Crowser 2019)
- Monitoring Well (Hart Crowser 2019)
- Boring (Hart Crowser 2019)
- Cross Section
- Property Boundary

0 12.5 25 50 Feet

N

Notes:
1. Feature locations are approximate.
2. Red indicates soil sample with concentration(s) exceeding MTCA Method A cleanup levels.

Coldeen Property Site Characterization
Vashon Island, Washington

Site and Exploration Plan

19500-08 12/19

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Figure
2

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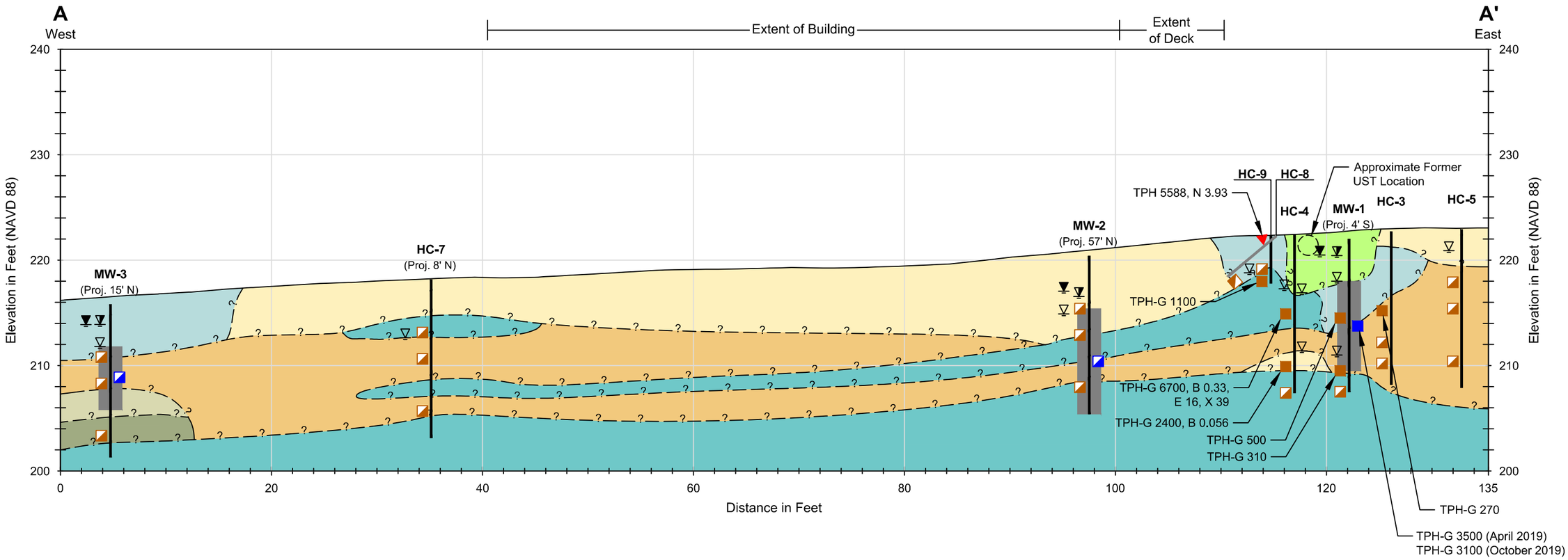
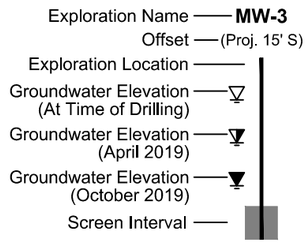


Legend

- Organic Fines - Organic Soil (OL), medium stiff
- Soft Fines - Sandy silt with gravel, sandy silt, and silt with sand (ML), very soft to soft
- Hard Fines - Sandy silt with gravel, sandy silt, silt with sand, and silt (ML) and sandy lean clay with gravel and lean clay with gravel (CL), stiff to hard
- Loose Sands - Silty sand with gravel and silty sand (SM) and clayey sand with gravel (SC), loose to medium dense
- Dense Sands - Silty sand with gravel (SM), dense to very dense
- Loose Gravels - Clayey gravel with sand (GC), loose
- Dense Gravels - Silty gravel with sand (GM), very dense



- Groundwater Sample with Concentrations Above MTCA Method A Cleanup Levels
- Groundwater Sample with Concentrations Below MTCA Method A Cleanup Levels
- Soil Sample with Concentrations Above MTCA Method A Cleanup Levels
- Soil Sample with Concentrations Below MTCA Method A Cleanup Levels
- Soil Vapor Sample with Concentrations Above MTCA Method B Screening Levels

0 10 20
Scale in Feet

Analytical Results
Only concentrations exceeding MTCA cleanup or screening levels are shown.
B = Benzene
E = Ethylbenzene
N = Naphthalene
TPH = Total petroleum hydrocarbon calculated by summing concentrations for BTEXN, APH C5-C8 aliphatics, APH C9-C12 aliphatics, and APH C9-C10 aromatics
TPH-G = Gasoline-range total petroleum hydrocarbons
X = Xylenes
Groundwater results in micrograms per liter (µg/L)
Soil results in milligrams per kilogram (mg/kg)
Soil vapor results in micrograms per cubic meter ($\mu g/m^3$)

Notes:

1) HC-9 shown slightly offset to the west of HC-8 for visual clarity. HC-8 was drilled at an angle of 50° from vertical and is shown in gray for visual clarity.
2) All constituents analyzed in groundwater samples in MW-2 and MW-3 were not detected at or above laboratory reporting limits in both the April and October 2019 sampling events.

Coldeen Property
Vashon Island, Washington

Generalized Subsurface Cross Section A-A'

19500-08 02/20

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Figure
3

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Legend

- ■ Upwind Ambient Air Sample (Hart Crowser 2019)
- ▲ Indoor Air Sample (Hart Crowser
- ◆ Angled Boring with Soil Vapor Sample (Hart Crowser 2019)
- Monitoring Well (Hart Crowser 2019)
- ● Boring (Hart Crowser 2019)
- Approximate Groundwater Elevation Contour in Feet (NAVD 88)
- (213.29) Groundwater Elevation in Feet (NAVD 88)
- Approximate Groundwater Flow Direction
- Property Boundary

Notes:
1. Feature locations are approximate.
2. Red indicates soil sample with concentration(s) exceeding MTCA Method A cleanup levels.
3. Groundwater elevations measured on April 29, 2019.

0 12.5 25 50 Feet

N

Coldeen Property Site Characterization
Vashon Island, Washington

Groundwater Elevation Contour Map (April 2019)

19500-08 03/20

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Figure 4

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Legend

- Upwind Ambient Air Sample (Hart Crowser 2019)
- Indoor Air Sample (Hart Crowser
- Angled Boring with Soil Vapor Sample (Hart Crowser 2019)
- Monitoring Well (Hart Crowser 2019)
- Boring (Hart Crowser 2019)
- Approximate Groundwater Elevation Contour in Feet (NAVD 88)
- (213.29) Groundwater Elevation in Feet (NAVD 88)
- Approximate Groundwater Flow Direction
- Property Boundary

Notes:
1. Feature locations are approximate.
2. Red indicates soil sample with concentration(s) exceeding MTCA Method A cleanup levels.
3. Groundwater elevations measured on October 22, 2019.

0 12.5 25 50 Feet

N

Coldeen Property Site Characterization
Vashon Island, Washington

Groundwater Elevation Contour Map (October 2019)

19500-08 03/20

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Figure 5

APPENDIX A
Soil Screening Methods and Exploration Logs

APPENDIX A
SOIL SCREENING METHODS AND EXPLORATION LOGS

Soil Screening Methods

Field screening results were used as a general guideline to identify potential chemical constituents in soil samples. In addition, field screening results were used as a basis for selecting soil samples for chemical analysis.

Soil samples were field screened at approximately 2.5-foot depth intervals for evidence of volatile organic compounds (VOCs)-related impacts using (1) visual and olfactory observations, (2) sheen screening, and (3) headspace vapor screening using a MiniRAE photoionization detector (PID). 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. Visual screening is generally more effective when impacts are related to heavy petroleum hydrocarbons, such as motor or hydraulic oil, or when hydrocarbon concentrations are high.

We tested water sheen by placing a small volume of soil in a pan of water and observing the water surface for signs of sheen. Sheens were classified as follows:

No sheen (NS)	No visible sheen on water surface.
Slight sheen (SS)	Light colorless film, spotty to globular; spread is irregular, not rapid; areas of no sheen remain; film dissipates rapidly.
Moderate sheen (MS)	Light to heavy film, may have some color or iridescence; globular to stringy; spread is irregular to flowing; few remaining areas of no sheen on water surface.
Heavy sheen (HS)	Heavy colorful film with iridescence; stringy; spread is rapid; sheen flows off the sample; most of the water surface may be covered with sheen.

Headspace vapor screening is intended to indicate the presence of volatile organic vapors; it involves placing a soil sample in a plastic sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The PID probe is then inserted in the bag and the instrument measures the concentration of organic vapors in the sample headspace. The highest vapor reading for each sample is then recorded on the boring log. The PID measures concentrations in parts per million (ppm), is calibrated to isobutylene, and can typically quantify organic vapor concentrations in the range of 0 to 1,000 ppm.

All field screening observations were recorded on the boring logs, and this information was used to select which samples to submit for chemical analysis. In general, samples with the highest readings were selected for analysis.

Sample Description

Identification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. ASTM D 2488 visual-manual identification methods were used as a guide. Where laboratory testing confirmed visual-manual identifications, then ASTM D 2487 was used to classify the soils.

Relative Density/Consistency

Soil density/consistency in borings is related primarily to the standard penetration resistance (N). Soil density/consistency in test pits and probes is estimated based on visual observation and is presented parenthetically on the logs.

SAND or GRAVEL Relative Density	N (Blows/Foot)	SILT or CLAY Consistency	N (Blows/Foot)
Very loose	0 to 4	Very soft	0 to 1
Loose	5 to 10	Soft	2 to 4
Medium dense	11 to 30	Medium stiff	5 to 8
Dense	31 to 50	Stiff	9 to 15
Very dense	>50	Very stiff	16 to 30
		Hard	>30

Moisture

Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

USCS Soil Classification Chart (ASTM D 2487)

Major Divisions			Symbols: Graph	Symbols: USCS	Typical Descriptions
Coarse Grained Soils: More than 50% of Material Retained on No. 200 Sieve	Gravel and Gravelly Soils: More than 50% of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels (<5% fines)		GW	Well-Graded Gravel; Well-Graded Gravel with Sand
				GP	Poorly Graded Gravel; Poorly Graded Gravel with Sand
		Gravels (5-12% fines)		GW-GM	Well-Graded Gravel with Silt; Well-Graded Gravel with Silt and Sand
				GW-GC	Well-Graded Gravel with Clay; Well-Graded Gravel with Clay and Sand
				GP-GM	Poorly Graded Gravel with Silt; Poorly Graded Gravel with Silt and Sand
				GP-GC	Poorly Graded Gravel with Clay; Poorly Graded Gravel with Clay and Sand
		Gravels with Fines (>12% fines)		GM	Silty Gravel; Silty Gravel with Sand
				GC	Clayey Gravel; Clayey Gravel with Sand
	Sand and Sandy Soils: More than 50% of Coarse Fraction Passing No. 4 Sieve	Sands with few Fines (<5% fines)		SW	Well-Graded Sand; Well-Graded Sand with Gravel
				SP	Poorly Graded Sand; Poorly Graded Sand with Gravel
		Sands (5-12% fines)		SW-SM	Well-Graded Sand with Silt Well-Graded Sand with Silt and Gravel
				SW-SC	Well-Graded Sand with Clay; Well-Graded Sand with Clay and Gravel
				SP-SM	Poorly Graded Sand with Silt; Poorly Graded Sand with Silt and Gravel
				SP-SC	Poorly Graded Sand with Clay; Poorly Graded Sand with Clay and Gravel
		Sands with Fines (>12% fines)		SM	Silty Sand; Silty Sand with Gravel
				SC	Clayey Sand; Clayey Sand with Gravel
Fine Grained Soils: More than 50% of Material Passing No. 200 Sieve	Silts			ML	Silt; Silt with Sand or Gravel; Sandy or Gravelly Silt
				MH	Elastic Silt; Elastic Silt with Sand or Gravel; Sandy or Gravelly Elastic Silt
	Silty Clay (based on Atterberg Limits)			CL-ML	Silty Clay; Silty Clay with Sand or Gravel; Gravelly or Sandy Silty Clay
	Clays			CL	Lean Clay; Lean Clay with Sand or Gravel; Sandy or Gravelly Lean Clay
				CH	Fat Clay; Fat Clay with Sand or Gravel; Sandy or Gravelly Fat Clay
	Organics			OL/OH	Organic Soil; Organic Soil with Sand or Gravel; Sandy or Gravelly Organic Soil
Highly Organic (>50% organic material)				PT	Peat - Decomposing Vegetation - Fibrous to Amorphous Texture

Minor Constituents

	Estimated Percentage
Sand, Gravel	
Trace	<5
Few	5 - 15
Cobbles, Boulders	
Trace	<5
Few	5 - 10
Little	15 - 25
Some	30 - 45

Soil Test Symbols

%F	Percent Passing No. 200 Sieve
AL	Atterberg Limits (%)
	Liquid Limit (LL)
	Water Content (WC)
	Plastic Limit (PL)
CA	Chemical Analysis
CAUC	Consolidated Anisotropic Undrained Compression
CAUE	Consolidated Anisotropic Undrained Extension
CBR	California Bearing Ratio
CIDC	Consolidated Drained Isotropic Triaxial Compression
CIUC	Consolidated Isotropic Undrained Compression
CK0DC	Consolidated Drained k0 Triaxial Compression
CK0DSS	Consolidated k0 Undrained Direct Simple Shear
CK0UC	Consolidated k0 Undrained Compression
CK0UE	Consolidated k0 Undrained Extension
CRSCN	Constant Rate of Strain Consolidation
DSS	Direct Simple Shear
DT	In Situ Density
GS	Grain Size Classification
HYD	Hydrometer
ILCN	Incremental Load Consolidation
K0CN	k0 Consolidation
kc	Constant Head Permeability
kf	Falling Head Permeability
MD	Moisture Density Relationship
OC	Organic Content
OT	Tests by Others
P	Pressuremeter
PID	Photoionization Detector Reading
PP	Pocket Penetrometer
SG	Specific Gravity
TRS	Torsional Ring Shear
TV	Torvane
UC	Unconfined Compression
UUC	Unconsolidated Undrained Triaxial Compression
VS	Vane Shear
WC	Water Content (%)

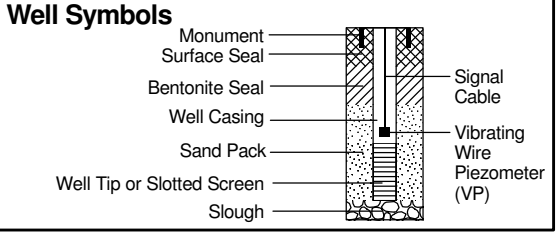
Groundwater Indicators

- Groundwater Level on Date or At Time of Drilling (ATD)
- Groundwater Level on Date Measured in Piezometer
- Groundwater Seepage (Test Pits)

Sample Symbols

- 1.5" I.D. Split Spoon
- 3.25" O.D. Split Spoon
- Modified California Sampler
- Core Run
- Sonic Core
- Thin-walled Sampler
- Grab
- Cuttings

Well Symbols



HARTCROWSER

Project: Coldeen Property
Location: Vashon, WA
Project No.: 19500-08

Key to Exploration Logs

Figure **A-1**
Sheet **1 of 1**

KEY TO EXP LOGS (SOIL ONLY) - J:\GINT\HC_LIBRARY.GLB - 4/26/19 14:25 - L:\NOTEBOOKS\1950008_COLDEEN_PROPERTY_SITE_CHARACTERIZATION\FIELD DATA\PERM_GINT FILES\1950008-BL.GPJ - kzl

Date Started: 4/22/19	Date Completed: 4/22/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464511 Long: -122.492573 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222.6619 feet ()		Hammer Type:	
Comments:		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 20 feet	Depth to Groundwater: Not Identified

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Depth (feet)
220	0							Topsoil	0
			12	S-1	1.4	NS		SILTY SAND (SM), trace gravel, (medium dense), moist, red-brown.	
			30	S-2	1.5	NS		SANDY SILT (ML), (very soft), wet, gray-brown, frequent iron oxide staining.	
	5							SILTY SAND (SM), (dense), moist, gray-brown, frequent iron oxide staining.	5
			30	S-3	4.2	NS		SANDY SILT WITH GRAVEL (ML), (soft), wet, red-brown.	
215								Becomes (stiff to hard), gray-brown, moist, frequent seams of uniformly graded sand, frequent silt partings, frequent iron oxide staining.	
			30	S-4	2.6	NS			
	10								10
			30	S-5	2.6	NS		SILT WITH SAND (ML), trace gravel, (very stiff to hard), moist, gray-brown, frequent partings of silt, occasional seams of uniformly graded sand, occasional iron oxide staining.	
210			30	S-6	1.6	NS		Becomes gray.	
	15							LEAN CLAY (CL), (hard), moist to wet, gray, frequent silt partings, occasional fine sand seams.	15
			30	S-7	3.3	NS			
205								Frequent iron oxide staining.	
			30	S-8	2.8	NS			
	20							Bottom of Borehole at 20.0 feet.	20
200									

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **HC-1**	Figure **A-2** Sheet **1 of 1**

Date Started: 4/22/19	Date Completed: 4/22/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464464 Long: -122.492571 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222.7227 feet ()		Hammer Type:	
Comments: Perched GW at 4.5 and 10 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 14 feet	Depth to Groundwater: 4.5 feet

Elevation (feet)	Depth (feet)	Sample Type	Sample Length (inches)	Sample Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
	0							Topsoil		0
			30	S-1	2.0	NS		SANDY SILT (ML), trace gravel, (soft), moist, red-brown. [FILL]		
220			30	S-2	2.6	NS		Becomes (stiff), gray-brown, wet, frequent iron oxide staining.	ATD	
	5							SILTY SAND (SM), (medium dense), wet, gray-brown.		5
			30	S-3	1.4	NS		POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), (medium dense), wet, gray to gray-brown.		
215			30	S-4	0.6	NS		SILTY SAND WITH GRAVEL (SM), (very dense), moist, brown.		
	10							POORLY GRADED SAND WITH SILT (SP-SM), few gravel, wet, gray, interbedded with silt seams.	ATD	10
			30	S-5	2.0	NS				
210			18	S-6	0.6	NS		SILTY SAND WITH GRAVEL (SM), (very dense), moist, gray, frequent pockets of clay.		
								Refusal at 14.0 feet.		
	15									15
205										
	20									20
200										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **HC-2**	Figure **A-3** Sheet **1 of 1**

Date Started: 4/22/19	Date Completed: 4/22/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464492 Long: -122.492557 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222.7 feet (NAVD 88)		Hammer Type:	
Comments:		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 14.5 feet	Depth to Groundwater: Not Identified

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Depth (feet)
220	0							SILTY SAND WITH GRAVEL (SM), (medium dense), moist, brown. [FILL]	0
			18	S-1	1.1	NS		SANDY SILT (ML), few gravel, (very soft), wet, red-brown, frequent iron oxide staining, slag fragments. [FILL]	
			30	S-2	1.7	NS			
215	5		30	S-3	118.9	SS		SILTY SAND WITH GRAVEL (SM), (dense), wet, gray to brown, frequent layers of uniformly graded sand.	5
			30	S-4	2.7	NS		Becomes (very dense).	
210	10		30	S-5	1.3	NS		Becomes gray, moist.	10
			24	S-6	1.5	NS			
205	15							Refusal at 14.5 feet.	15
200	20								20

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

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HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **HC-3**	Figure **A-4** Sheet **1 of 1**

Date Started: 4/22/19	Date Completed: 4/22/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464491 Long: -122.492594 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222.3998 feet ()		Hammer Type:	
Comments: Perched GW at 5.5 and 11 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 15 feet	Depth to Groundwater: 5.5 feet

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
220	0							ORGANIC SOIL (OL), (medium stiff), moist to wet, black, occasional silty sand seams, wood and leaf debris.		0
			18	S-1	1.7	NS				
			30	S-2	2.6	NS				
	5							SANDY SILT (ML), trace gravel, (hard), wet, petroleum-like odor.	ATD	5
215			30	S-3	549.9	MS				
			30	S-4	140.2	NS		SILTY SAND WITH GRAVEL (SM), (very dense), moist, gray-brown, frequent iron oxide staining.		
	10								ATD	10
210			30	S-5	380.5	MS		SILTY SAND (SM), (medium dense), wet, gray-brown interbedded with gray-green and dark brown, strong petroleum-like odor.		
								SANDY SILT WITH GRAVEL (ML), (hard), moist, gray.		
			30	S-6	1.9	NS				
	15							Refusal at 15.0 feet.		15
205										
	20									20
200										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **HC-4**	Figure **A-5** Sheet **1 of 1**

Date Started: 4/24/19	Date Completed: 4/24/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464492 Long: -122.492530 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222.9 feet (NAVD 88)		Hammer Type:	
Comments: Perched GW at 2 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 15 feet	Depth to Groundwater: 2 feet

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
222	0							Crushed Gravel.		0
								CLAYEY SAND WITH GRAVEL (SC), (medium dense), moist to wet, light brown, frequent iron oxide staining.		
			18	S-1	1.4	NS			ATD	
			30	S-2	1.1	NS				
217	5							SILTY SAND WITH GRAVEL (SM), (dense), wet, light brown, frequent layers of uniformly graded sand, frequent layers of silt.		5
			30	S-3	1.1	NS				
			30	S-4	1.3	NS				
212	10		30	S-5	1.2	NS				10
			30	S-6	1.0	NS		Becomes (very dense), gray, moist.		
207	15							Refusal at 15.0 feet.		15
	20									20
202										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **HC-5**	Figure **A-6** Sheet **1 of 1**

Date Started: 4/24/19 Date Completed: 4/24/19
Logged by: C. Kroskie Checked by: M. Goodman
Location: Lat: 47.464511 Long: -122.492925 (WGS 84)
Ground Surface Elevation: 218.1458 feet ()
Comments: Perched GW at 5.5 feet.

Drilling Contractor/Crew: ESN Northwest
Drilling Method: Push Probe
Rig Model/Type:
Hammer Type:
Hammer Weight (pounds): Hammer Drop Height (inches):
Measured Hammer Efficiency (%): NA
Hole Diameter: Casing Diameter: NA
Total Depth: 15 feet Depth to Groundwater: 5.5 feet

Elevation (feet)	Depth (feet)	Sample Type	Sample Length (inches)	Sample Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
	0							Topsoil		0
			12	S-1	1.3	NS		SILTY SAND WITH GRAVEL (SM), (medium dense), moist, red-brown, rootlets.		
215			30	S-2	1.9	NS		SANDY SILT WITH GRAVEL (ML), (stiff), moist, gray-brown.		
	5		30	S-3	0.9	NS		SILTY SAND WITH GRAVEL (SM), (dense), wet, brown, frequent seams of uniformly graded sand, occasional layer of silty gravel.	ATD	5
210			30	S-4	1.8	NS		SILT (ML), (hard), wet, brown to light brown.		
	10		30	S-5	1.0	NS		SILTY SAND WITH GRAVEL (SM), (very dense), moist, brown.		10
205			30	S-6	0.6	NS		SANDY SILT (ML), (hard), moist, brown to light brown, frequent pockets of silt and clay, frequent seams of uniformly graded sand.		
	15							Refusal at 15.0 feet.		15
200										
	20									20
195										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER

Project: Coldeen Property
Location: Vashon, WA
Project No.: 19500-08

Push Probe Log
HC-7

Figure **A-7**
Sheet **1 of 1**

Date Started: 10/22/19	Date Completed: 10/22/19
Logged by: B. Dozier	Checked by: M. Goodman
Location: Lat: 47.464486 Long: -122.492601 (WGS 84)	
Ground Surface Elevation: 222.2904 feet ()	
Comments: Boring drilled at 50° angle from vertical. Depths are measured along the axis of the boring. Soil vapor sample collected at 1 foot bgs.	
Drilling Contractor/Crew: Cascade Drilling, L.P. / James Goble	
Drilling Method: Hand Auger	
Rig Model/Type: Hand Auger	
Hammer Type:	
Hammer Weight (pounds):	Hammer Drop Height (inches):
Measured Hammer Efficiency (%): NA	
Hole Diameter:	Casing Diameter: NA
Total Depth: 6 feet	Depth to Groundwater: 5 feet

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
220.0	0.0							SANDY SILT WITH GRAVEL (ML), moist, red-brown.		0.0
	2.5		6	S-1	0.6	NS				2.5
217.5	5.0		6	S-2	1.3	NS		SANDY LEAN CLAY WITH GRAVEL (CL), wet, gray-brown.	ATD	5.0
			6	S-3	75.7	MS		LEAN CLAY WITH GRAVEL (CL), wet, gray, strong petroleum-like odor.		
								Bottom of Borehole at 6.0 feet.		
215.0	7.5									7.5
212.5										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER

Project: Coldeen Property
Location: Vashon, WA
Project No.: 19500-08

Hand-Auger Log
HC-8

Figure **A-8**
Sheet **1 of 1**

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Date Started: 10/22/19	Date Completed: 10/22/19	Drilling Contractor/Crew: Cascade Drilling, L.P. / James Goble	
Logged by: B. Dozier	Checked by: M. Goodman	Drilling Method: Hand Auger	
Location: Lat: 47.464489 Long: -122.492602 (WGS 84)		Rig Model/Type: Hand Auger	
Ground Surface Elevation: 222.3029 feet ()		Hammer Type:	
Comments:		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter: NA
		Total Depth: 4.5 feet	Depth to Groundwater: 3.5 feet

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Depth (feet)
220.0	0.0							SANDY SILT WITH GRAVEL (ML), moist, red-brown.		0.0
	2.5		6	S-1	0.9	NS				2.5
			6	S-2	159.7	SS		SANDY LEAN CLAY WITH GRAVEL (CL), wet, gray, strong petroleum-like odor.	ATD	
			6	S-3	412.2	MS				
217.5	5.0							Refusal at 4.5 feet.		5.0
215.0	7.5									7.5
212.5										

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER

Project: Coldeen Property
Location: Vashon, WA
Project No.: 19500-08

Hand-Auger Log
HC-9

Figure **A-9**
Sheet **1 of 1**

HC BORING LOG - J:\GINT\HC_LIBRARY.GLB - 1/13/20 11:56 - L:\NOTEBOOKS\1950008_COLDEEN_PROPERTY_SITE_CHARACTERIZATION\FIELD DATA\PERM_GINT FILES\1950008-PP.GPJ - kzl

Date Started: 4/23/19	Date Completed: 4/23/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464481 Long: -122.492573 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 222 feet (NAVD 88)		Hammer Type:	
Comments: Well Tag ID: BLC-429 Perched GW at 4 and 11 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter:
		Total Depth: 14.5 feet	Depth to Groundwater: 4 feet

Elevation (feet)	Depth (feet)	Sample Data: Type	Length (inches)	Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Well Construction	Depth (feet)
220	0							ORGANIC SOIL (OL), (medium stiff), moist, dark brown.	4/29/2019 ATD 4/22/2019 ATD		0
			12	S-1	1.3	SS					
			30	S-2	0.8	SS					
	5							SILT WITH SAND (ML), (very soft), wet, brown, frequent iron oxide staining.			5
215			30	S-3	397.5	MS					
								Becomes gray. Strong petroleum-like odor.			
			30	S-4	2.0	NS		SILTY SAND WITH GRAVEL (SM), (very dense), moist, gray to brown.			
	10										10
210			30	S-5	988.2	MS		Becomes (loose), gray, wet. Strong petroleum-like odor.			
			24	S-6	2.2	NS		SANDY SILT WITH GRAVEL (ML), (stiff to hard), moist, gray.			
								Refusal at 14.5 feet.			
	15										15
205											
	20										20
200											

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER

Project: Coldeen Property
Location: Vashon, WA
Project No.: 19500-08

Push Probe Log
MW-1

Figure **A-10**
Sheet **1 of 1**

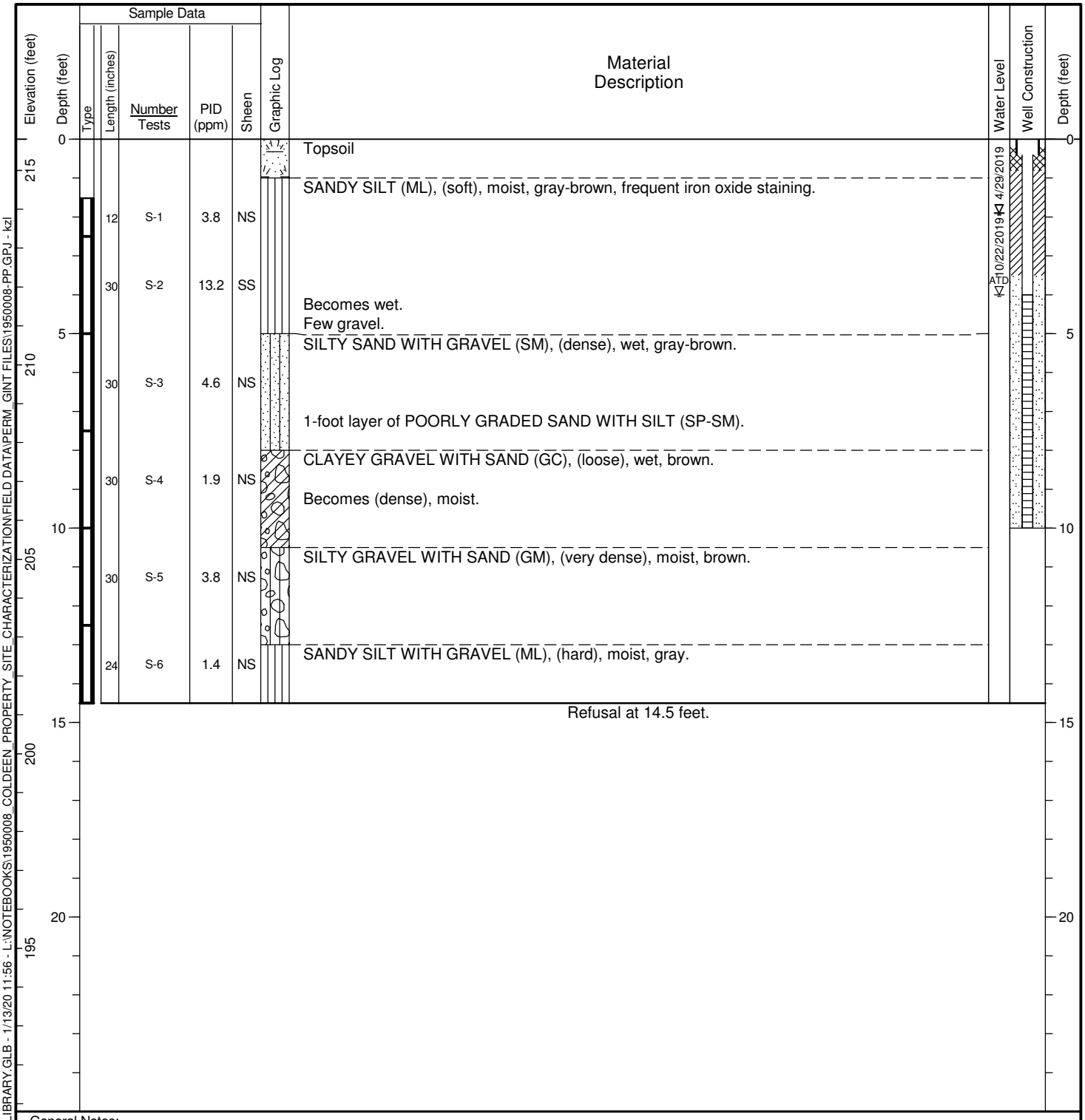
Date Started: 4/24/19	Date Completed: 4/24/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464646 Long: -122.492674 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 220.4 feet (NAVD 88)		Hammer Type:	
Comments: Well Tag ID: BLC-446 Perched GW at 5.5 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter:
		Total Depth: 15 feet	Depth to Groundwater: 5.5 feet

Elevation (feet)	Depth (feet)	Sample Type	Sample Length (inches)	Sample Number / Tests	PID (ppm)	Sheen	Graphic Log	Material Description	Water Level	Well Construction	Depth (feet)
220	0							SILTY SAND WITH GRAVEL (SM), (loose), moist, red-brown, scattered organics (roots).			0
			12	S-1	0.9	NS					
			30	S-2	1.4	NS					
215	5							CLAYEY SAND WITH GRAVEL (SC), (medium dense), wet, gray-brown, frequent iron oxide staining.	4/29/2019 ATD 10/22/2019		5
			30	S-3	1.3	NS					
								SILT WITH SAND (ML), trace gravel, (hard), moist, gray-brown, occasional layers of silty sand.			
			30	S-4	1.6	NS					
210	10							SILTY SAND WITH GRAVEL (SM), (very dense), moist, gray-brown.			10
			30	S-5		NS					
								SILT (ML), trace gravel, (hard), moist, light brown, frequent seams to layers of uniformly graded sand, occasional iron oxide staining.			
			30	S-6	0.7	NS					
205	15							Refusal at 15.0 feet.			15
200	20										20

General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **MW-2**	Figure **A-11** Sheet **1 of 1**

Date Started: 4/23/19	Date Completed: 4/23/19	Drilling Contractor/Crew: ESN Northwest	
Logged by: C. Kroskie	Checked by: M. Goodman	Drilling Method: Push Probe	
Location: Lat: 47.464530 Long: -122.493048 (WGS 84)		Rig Model/Type:	
Ground Surface Elevation: 215.8 feet (NAVD 88)		Hammer Type:	
Comments: Well Tag ID: BLC-447 Perched GW at 4 feet.		Hammer Weight (pounds):	Hammer Drop Height (inches):
		Measured Hammer Efficiency (%): NA	
		Hole Diameter:	Casing Diameter:
		Total Depth: 14.5 feet	Depth to Groundwater: 4 feet



General Notes:
1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Material stratum lines are interpretive and actual changes may be gradual. Solid lines indicate distinct contacts and dashed lines indicate gradual or approximate contacts.
3. USCS designations are based on visual-manual identification (ASTM D 2488), unless otherwise supported by laboratory testing (ASTM D 2487).
4. Groundwater level, if indicated, is at time of drilling/excavation (ATD) or for date specified. Level may vary with time.
5. Location and ground surface elevations are approximate.

HARTCROWSER	Project: Coldeen Property Location: Vashon, WA Project No.: 19500-08	Push Probe Log **MW-3**	Figure **A-12** Sheet **1 of 1**

APPENDIX B
Chemical Data Quality Review and Laboratory Reports

APPENDIX B
CHEMICAL DATA QUALITY REVIEW AND LABORATORY REPORTS

Chemical Data Quality Review

On April 22, 23, and 24, 2019, 59 soil samples were collected and submitted to OnSite Environmental Inc. (OnSite) of Redmond, Washington, for analysis. Results were reported as OnSite Reference Numbers 1904-261, 1904-277, and 1904-301.

On April 29, 2019, five groundwater samples were collected and submitted to OnSite of Redmond, Washington, for analysis. Results were reported as OnSite Reference Number 1904-320.

On October 22, 2019, six soil samples and four groundwater samples were collected and submitted to OnSite of Redmond, Washington, for analysis. Results were reported as OnSite Reference Number 1910-304.

On October 22 and 23, 2019, three air samples (one soil vapor, one indoor air, and one ambient air) were collected and submitted to Fremont Analytical, Inc. (Fremont) of Seattle, Washington, for analysis. Results were reported as Fremont Work Order Number 1910429.

Selected soil samples were analyzed for one or more of:

- Gasoline-range total petroleum hydrocarbons (TPH) by Washington State Department of Ecology (Ecology) Method NWTPH-Gx;
- Benzene, toluene, ethylbenzene, and xylenes (BTEX) by Environmental Protection Agency (EPA) Method 8021B;
- Total lead by EPA Method 6010D; and
- Percent moisture.

Selected groundwater samples were analyzed for one or more of:

- Gasoline-range TPH by Ecology Method NWTPH-Gx;
- BTEX by EPA Method 8021B;
- 1,2-Dibromoethane (EDB) by EPA Method 8011;
- Total and dissolved lead by EPA Method 200.8; and
- Volatile organic compounds (VOCs) by EPA Method 8260C.

Selected air samples were analyzed for one or more of:

- Helium by GC/TCD;
- Major gases (oxygen, carbon dioxide, and methane) by EPA Method 3C;
- Petroleum fractionation by EPA Method TO-15; and
- VOCs by EPA Method TO-15.

The laboratory performed ongoing quality assurance/quality control (QA/QC) reviews. Hart Crowser reviewed a summary report to check that they met data quality objectives for the project.

The following criteria were evaluated during the standard data quality review process:

- Holding times,
- Reporting limits (RLs),
- Method blanks,
- Spike blank/spike blank duplicate (SB/SBD) also known as laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries,
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries,
- Laboratory duplicate relative percent difference (RPD), and
- Surrogate recoveries.

All of the data were acceptable for use with qualification. The complete laboratory reports are at the end of this appendix. The data review is summarized below.

Sample Receiving Notes

No sample receiving discrepancies were noted by the laboratory. Discrepancies from the chains of custody (COCs) are:

1904-261. Fourteen samples were placed on hold and not analyzed. Several samples were added for analysis after submittal to the laboratory. No sample results were qualified due to these discrepancies.

1904-277. Six samples were placed on hold and not analyzed. Several samples were added for analysis after submittal to the laboratory. No sample results were qualified due to these discrepancies.

1904-301. Twelve samples were placed on hold and not analyzed. No sample results were qualified due to these discrepancies.

1904-320. One sample was placed on hold and not analyzed. No sample results were qualified due to these discrepancies.

1910-304. Three samples were placed on hold and not analyzed. No sample results were qualified due to these discrepancies.

Soil Results

Gasoline-Range TPH by NWTPH-Gx

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. SB and SBD recoveries and associated RPDs were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

BTEX by EPA Method 8021B

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. SB and SBD recoveries and associated RPDs were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs. The method states that there should be one MS for each analytical batch. There were no MSs analyzed with the batches in laboratory reports 1904-261, 1904-277, 1904-301, and 1910-304. Analytical results were not affected, and no samples were qualified.

The data are acceptable for use without qualification.

Total Lead by EPA Method 6010D

Holding times and reporting limits were acceptable. No method blank contamination was detected. SB recoveries were within laboratory control limits. MS and MSD recoveries and associated RPDs were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

Percent Moisture

Holding times and reporting limits were acceptable.

The data are acceptable for use without qualification.

Groundwater Results

Gasoline-Range TPH by NWTPH-Gx

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. The laboratory duplicate RPDs either were within laboratory control limits or were not applicable because the sample and/or duplicate were below RLs. The field duplicate RPDs either were within laboratory control limits or were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

EDB by EPA Method 8011

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. SB and SBD recoveries and associated RPDs were within laboratory control limits. The field duplicate RPDs were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

VOCs by EPA Method 8260C

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. SB and SBD recoveries and associated RPDs were within laboratory control limits. The field duplicate RPDs were within laboratory control limits. The method states that there should be one MS for each analytical batch. There was no MS analyzed with the batch in laboratory report 1904-320. Analytical results were not affected, and no samples were qualified.

The data are acceptable for use without qualification.

Total and Dissolved Lead by EPA Method 200.8

Holding times and reporting limits were acceptable. No method blank contamination was detected. SB recoveries were within laboratory control limits. MS and MSD recoveries and associated RPDs were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs. The field duplicate RPDs were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

BTEX by EPA Method 8021B

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. SB and SBD recoveries and associated RPDs were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs. The field duplicate RPDs were not applicable because the sample and/or duplicate were below RLs. The method states that there should be one MS for each analytical batch. There was no MS analyzed with the batch in laboratory report 1910-304. Analytical results were not affected, and no samples were qualified.

The data are acceptable for use without qualification.

Air Results

Helium by GC/TCD

Holding times and reporting limits were acceptable. No method blank contamination was detected. LCS recoveries were within laboratory control limits. The laboratory duplicate RPDs were not applicable because the sample and/or duplicate were below RLs.

The data are acceptable for use without qualification.

Major Gases (Oxygen, Carbon Dioxide, and Methane) by EPA Method 3C

LCS recoveries were within laboratory control limits. The laboratory duplicate RPDs were within laboratory control limits.

Holding times were acceptable except the holding times for carbon dioxide, methane, and oxygen in the laboratory duplicate were qualified by the lab as H due to holding times for preparation or analysis being exceeded. The laboratory duplicate was a batch sample, sample results were not affected, and no samples were qualified.

The results for oxygen, carbon dioxide, and methane in SV-1 were flagged by the lab as D due to dilution being required with a dilution factor of 2. The D flags were removed.

The reporting limits were acceptable except the reporting limit for methane in SV-1 was twice the reporting limit goal in the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) due to dilution. There is no MTCA Method B screening level for methane, and no samples were qualified.

The result for oxygen in SV-1 exceeded the ambient oxygen concentration of 21%. In a follow-up email, the laboratory noted there was a possibility of ambient air contamination into the sample during dilution. The result for oxygen in SV-1 was qualified as estimated (J).

The data are acceptable for use with qualification.

Petroleum Fractionation by EPA Method TO-15

Holding times were acceptable. No method blank contamination was detected. LCS recoveries were within laboratory control limits.

The laboratory duplicate RPDs were within laboratory control limits. The results for air-phase hydrocarbon (APH) petroleum fractions C5-C8 aliphatics and C9-C12 aliphatics in two laboratory duplicates were flagged by the laboratory as E due to the results being an estimated value because they exceeded the linear working range of the instrument. The laboratory duplicates were batch samples; sample results were not affected, and no samples were qualified.

Surrogate recoveries were within laboratory control limits except one of one surrogate recoveries in the laboratory duplicate exceeded laboratory control limits and was flagged by the laboratory as S due to the outlying surrogate recovery observed. The laboratory noted a duplicate analysis was performed with similar results indicating a possible matrix effect. The surrogate recovery exceedance was in a laboratory duplicate that was a batch sample; sample results were not affected, and no samples were qualified.

Reporting limits were acceptable except the reporting limit for APH petroleum fractions C9-C10 aromatics in SV-1 was ten times the reporting limit goal in the SAP/QAPP due to elevated concentrations in the other APH petroleum fractions. There is no MTCA Method B screening level for APH petroleum fractions C9-C10 aromatics, and no samples were qualified.

The data are acceptable for use without qualification.

VOCs by EPA Method TO-15

Holding times and reporting limits were acceptable. No method blank contamination was detected. Surrogate recoveries were within laboratory control limits. LCS and LCSD recoveries and associated RPDs were within laboratory control limits. No laboratory duplicate was analyzed, though the SAP/QAPP required one laboratory duplicate analysis for every 20 or fewer samples. An LCSD was analyzed instead of a laboratory duplicate; sample results were not affected, and no samples were qualified.

The data are acceptable for use without qualification.

Laboratory Reports

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

May 3, 2019

Marissa Goodman
Hart Crowser, Inc.
3131 Elliott Ave., Suite 600
Seattle, WA 98121

Re: Analytical Data for Project 1950008
Laboratory Reference No. 1904-261

Dear Marissa:

Enclosed are the analytical results and associated quality control data for samples submitted on April 23, 2019.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

Case Narrative

Samples were collected on April 22, 2019 and received by the laboratory on April 23, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC4-S3-7.5**					
Laboratory ID:	04-261-03					
Benzene	**0.33**	0.021	EPA 8021B	4-29-19	4-30-19	
Toluene	**3.3**	0.11	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**16**	1.1	EPA 8021B	4-29-19	5-1-19	
m,p-Xylene	**35**	1.1	EPA 8021B	4-29-19	5-1-19	
o-Xylene	**4.0**	0.11	EPA 8021B	4-29-19	4-30-19	
Gasoline	**6700**	210	NWTPH-Gx	4-29-19	5-2-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*73*	*57-129*				
Client ID:	**HC4-S5-12.5**					
Laboratory ID:	04-261-05					
Benzene	**0.056**	0.023	EPA 8021B	4-29-19	4-30-19	
Toluene	**0.39**	0.12	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**3.2**	0.12	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**7.0**	0.12	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.12	EPA 8021B	4-29-19	4-30-19	
Gasoline	**2400**	58	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*82*	*57-129*				
Client ID:	**HC4-S6-15**					
Laboratory ID:	04-261-06					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.2	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*105*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC1-S2-5**					
Laboratory ID:	04-261-08					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.066	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.066	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.066	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.066	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	6.6	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*100*	*57-129*				
Client ID:	**HC1-S3-7.5**					
Laboratory ID:	04-261-09					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.7	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*100*	*57-129*				
Client ID:	**HC1-S5-12.5**					
Laboratory ID:	04-261-11					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.054	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.054	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.054	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.054	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.4	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*96*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC2-S2-5**					
Laboratory ID:	04-261-16					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.1	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*57-129*				
Client ID:	**HC2-S3-7.5**					
Laboratory ID:	04-261-17					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.069	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.069	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.069	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.069	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	6.9	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*57-129*				
Client ID:	**HC2-S5-12.5**					
Laboratory ID:	04-261-19					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	5-1-19	
Toluene	**ND**	0.056	EPA 8021B	4-29-19	5-1-19	
Ethyl Benzene	**ND**	0.056	EPA 8021B	4-29-19	5-1-19	
m,p-Xylene	**ND**	0.056	EPA 8021B	4-29-19	5-1-19	
o-Xylene	**ND**	0.056	EPA 8021B	4-29-19	5-1-19	
Gasoline	**ND**	5.6	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*87*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC3-S3-7.5**					
Laboratory ID:	04-261-23					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**0.077**	0.052	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**0.064**	0.052	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**0.48**	0.052	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Gasoline	**270**	10	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*92*	*57-129*				
Client ID:	**HC3-S4-10**					
Laboratory ID:	04-261-24					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	5-1-19	
Toluene	**ND**	0.048	EPA 8021B	4-29-19	5-1-19	
Ethyl Benzene	**ND**	0.048	EPA 8021B	4-29-19	5-1-19	
m,p-Xylene	**ND**	0.048	EPA 8021B	4-29-19	5-1-19	
o-Xylene	**ND**	0.048	EPA 8021B	4-29-19	5-1-19	
Gasoline	**ND**	4.8	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*57-129*				
Client ID:	**HC3-S5-12.5**					
Laboratory ID:	04-261-25					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.053	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.053	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.053	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.053	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.3	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*89*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
METHOD BLANK QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0429S1					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-29-19	
Toluene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
o-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Gasoline	**ND**	5.0	NWTPH-Gx	4-29-19	4-29-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*57-129*				
Laboratory ID:	MB0429S2					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-29-19	
Toluene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
o-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Gasoline	**ND**	5.0	NWTPH-Gx	4-29-19	4-29-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*114*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-270-01										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*94*	*95*	*57-129*			
Laboratory ID:	04-270-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*95*	*95*	*57-129*			
SPIKE BLANKS											
Laboratory ID:	SB0429S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.938**	**0.941**	1.00	1.00		**94**	**94**	69-111	0	10	
Toluene	**0.979**	**0.982**	1.00	1.00		**98**	**98**	70-114	0	11	
Ethyl Benzene	**0.977**	**0.981**	1.00	1.00		**98**	**98**	70-115	0	10	
m,p-Xylene	**0.959**	**0.968**	1.00	1.00		**96**	**97**	72-115	1	10	
o-Xylene	**0.985**	**0.998**	1.00	1.00		**99**	**100**	71-115	1	11	
Surrogate:											
Fluorobenzene						*87*	*88*	*57-129*			

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

TOTAL LEAD
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC4-S3-7.5**					
Laboratory ID:	04-261-03					
Lead	**ND**	5.8	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC4-S5-12.5**					
Laboratory ID:	04-261-05					
Lead	**10**	6.0	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC4-S6-15**					
Laboratory ID:	04-261-06					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC1-S2-5**					
Laboratory ID:	04-261-08					
Lead	**ND**	6.0	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC1-S3-7.5**					
Laboratory ID:	04-261-09					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC1-S5-12.5**					
Laboratory ID:	04-261-11					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC2-S2-5**					
Laboratory ID:	04-261-16					
Lead	**ND**	5.8	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC2-S3-7.5**					
Laboratory ID:	04-261-17					
Lead	**ND**	6.2	EPA 6010D	5-2-19	5-2-19	

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

TOTAL LEAD
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC2-S5-12.5**					
Laboratory ID:	04-261-19					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC3-S3-7.5**					
Laboratory ID:	04-261-23					
Lead	**ND**	5.7	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC3-S4-10**					
Laboratory ID:	04-261-24					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC3-S5-12.5**					
Laboratory ID:	04-261-25					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

TOTAL LEAD
EPA 6010D
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0502SM1					
Lead	**ND**	5.0	EPA 6010D	5-2-19	5-2-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-261-17										
	ORIG	DUP									
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-261-17										
	MS	MSD	MS	MSD		MS	MSD				
Lead	**230**	**233**	250	250	ND	**92**	**93**	75-125	1	20	
SPIKE BLANK											
Laboratory ID:	SB0502SM1										
Lead	**237**		250		N/A	**95**		80-120			

Date of Report: May 3, 2019
Samples Submitted: April 23, 2019
Laboratory Reference: 1904-261
Project: 1950008

% MOISTURE

Date Analyzed: 5-2-19

Client ID	Lab ID	% Moisture
HC4-S3-7.5	04-261-03	13
HC4-S5-12.5	04-261-05	17
HC4-S6-15	04-261-06	10
HC1-S2-5	04-261-08	16
HC1-S3-7.5	04-261-09	15
HC1-S5-12.5	04-261-11	11
HC2-S2-5	04-261-16	14
HC2-S3-7.5	04-261-17	19
HC2-S5-12.5	04-261-19	11
HC3-S3-7.5	04-261-23	13
HC3-S4-10	04-261-24	11
HC3-S5-12.5	04-261-25	10

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kraskie

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

Laboratory Number: 04-261

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A		TOTAL LEAD			% Moisture
1	HC4-S1-2.5	4/22	1323	soil	5																						
2	HC4-S2-5		1325																								
3	HC4-S3-7.5		1335				X																	X			X
4	HC4-S4-10		1337																								
5	HC4-S5-12.5		1353				X																	X			X
6	HC4-S6-15		1355				X																	X			X
7	HC1-S1-2.5		844																								
8	HC1-S2-5		846				X																	X			X
9	HC1-S3-7.5		901				X																	X			X
10	HC1-S4-10	↓	903	↓	↓																						

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/23/19	0845
Received	[signature]	ALPHA	4/23/19	10:40
Relinquished	[signature]	ALPHA	4/23/19	12:18
Received	[signature]	ONE	4/23/19	1218
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Hold - will email analyses~~
☒ Added 4/25/19. D3 (STA)

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 19500.08
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kroskie

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

Laboratory Number: 04-261

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A		TOTAL LEAD			% Moisture
11	HC1-S5-12.5	4/22	923	soil	5		X																	X			X
12	HC1-S6-15		925																								
13	HC1-S7-17.5		936																								
14	HC1-S8-20		938																								
15	HC2-S1-2.5		1159																								
16	HC2-S2-5		1203				X																	X			X
17	HC2-S3-7.5		1215				X																	X			X
18	HC2-S4-10		1217																								
19	HC2-S5-12.5		1237				X																	X			X
20	HC2-S6-15		1239																								

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/23/19	0845
Received	[signature]	ACPHA	4/23/19	10:40
Relinquished	[signature]	ACPHA	4/23/19	12:12
Received	[signature]	OSE	4/23/19	1218
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Hold - will email analyses~~
DJ

Data Package: Standard ☒ Level III ☐ Level IV ☐

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kroskie

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

Laboratory Number: 04-261

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A		TOTAL LEAD			% Moisture
21	HC3-S1-2.5	4/22	1037	soil	5																						
22	HC3-S2-5	↓	1039	↓	↓																						
23	HC3-S3-7.5		1050				X																	X			X
24	HC3-S4-10		1052				X																	X			X
25	HC3-S5-12.5		1103				X																	X			X
26	HC3-S6-15		1105																								

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/23/19	0845
Received	[signature]	AGAT	4/23/19	10:40
Relinquished	[signature]	AGAT	4/23/19	12:18
Received	[signature]	OBE	4/23/19	1218
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Hold - will email analyses~~
D7

Data Package: Standard ☒ Level III ☐ Level IV ☐

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

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

May 3, 2019

Marissa Goodman
Hart Crowser, Inc.
3131 Elliott Ave., Suite 600
Seattle, WA 98121

Re: Analytical Data for Project 1950008
Laboratory Reference No. 1904-277

Dear Marissa:

Enclosed are the analytical results and associated quality control data for samples submitted on April 24, 2019.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

Case Narrative

Samples were collected on April 23, 2019 and received by the laboratory on April 24, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW3-S2-5**					
Laboratory ID:	04-277-02					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.059	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.059	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.059	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.059	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.9	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*57-129*				
Client ID:	**MW3-S3-7.5**					
Laboratory ID:	04-277-03					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.5	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*91*	*57-129*				
Client ID:	**MW3-S5-12.5**					
Laboratory ID:	04-277-05					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.2	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*90*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW1-S3-7.5**					
Laboratory ID:	04-277-09					
Benzene	**ND**	0.028	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.14	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**0.75**	0.14	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**1.3**	0.14	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.14	EPA 8021B	4-29-19	4-30-19	
Gasoline	**500**	14	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*77*	*57-129*				
Client ID:	**MW1-S5-12.5**					
Laboratory ID:	04-277-11					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.049	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**0.12**	0.049	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**0.63**	0.049	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.049	EPA 8021B	4-29-19	4-30-19	
Gasoline	**310**	9.8	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*80*	*57-129*				
Client ID:	**MW1-S6-15**					
Laboratory ID:	04-277-12					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	5-1-19	
Toluene	**ND**	0.054	EPA 8021B	4-29-19	5-1-19	
Ethyl Benzene	**ND**	0.054	EPA 8021B	4-29-19	5-1-19	
m,p-Xylene	**ND**	0.054	EPA 8021B	4-29-19	5-1-19	
o-Xylene	**ND**	0.054	EPA 8021B	4-29-19	5-1-19	
Gasoline	**ND**	5.4	NWTPH-Gx	4-29-19	5-1-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*88*	*57-129*				

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0429S3					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-29-19	
Toluene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
o-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Gasoline	**ND**	5.0	NWTPH-Gx	4-29-19	4-29-19	
Surrogate:	*Percent Recovery*	*Control Limits*				
Fluorobenzene	*98*	*57-129*				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-270-03										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						*93*	*92*	*57-129*			
SPIKE BLANKS											
Laboratory ID:	SB0429S2										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.954**	**0.942**	1.00	1.00		**95**	**94**	69-111	1	10	
Toluene	**0.993**	**0.980**	1.00	1.00		**99**	**98**	70-114	1	11	
Ethyl Benzene	**0.989**	**0.976**	1.00	1.00		**99**	**98**	70-115	1	10	
m,p-Xylene	**0.976**	**0.962**	1.00	1.00		**98**	**96**	72-115	1	10	
o-Xylene	**1.00**	**0.991**	1.00	1.00		**100**	**99**	71-115	1	11	
Surrogate:											
Fluorobenzene						*89*	*88*	*57-129*			

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

TOTAL LEAD
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW3-S2-5**					
Laboratory ID:	04-277-02					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW3-S3-7.5**					
Laboratory ID:	04-277-03					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW3-S5-12.5**					
Laboratory ID:	04-277-05					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW1-S3-7.5**					
Laboratory ID:	04-277-09					
Lead	**18**	6.5	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW1-S5-12.5**					
Laboratory ID:	04-277-11					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW1-S6-15**					
Laboratory ID:	04-277-12					
Lead	**ND**	5.5	EPA 6010D	5-2-19	5-2-19	

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

TOTAL LEAD
EPA 6010D
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0502SM1					
Lead	**ND**	5.0	EPA 6010D	5-2-19	5-2-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-261-17										
	ORIG	DUP									
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-261-17										
	MS	MSD	MS	MSD		MS	MSD				
Lead	**230**	**233**	250	250	ND	**92**	**93**	75-125	1	20	
SPIKE BLANK											
Laboratory ID:	SB0502SM1										
Lead	**237**		250		N/A	**95**		80-120			

Date of Report: May 3, 2019
Samples Submitted: April 24, 2019
Laboratory Reference: 1904-277
Project: 1950008

% MOISTURE

Date Analyzed: 5-2-19

Client ID	Lab ID	% Moisture
MW3-S2-5	04-277-02	15
MW3-S3-7.5	04-277-03	15
MW3-S5-12.5	04-277-05	11
MW1-S3-7.5	04-277-09	23
MW1-S5-12.5	04-277-11	16
MW1-S6-15	04-277-12	9

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kroskie

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

Laboratory Number: 04-277

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A		TOTAL LEAD			% Moisture
1	MW3-S1-2.5	4/23	1133	Soil	5																						
2	MW3-S2-5		1135				X																	X			X
3	MW3-S3-7.5		1147				X																	X			X
4	MW3-S4-10		1149																								
5	MW3-S5-12.5		1203				X																	X			X
6	MW3-S6-15		1205																								
7	MW1-S1-2.5		815																								
8	MW1-S2-5		817																								
9	MW1-S3-7.5		829				X																	X			X
10	MW1-S4-10	↓	831	↓	↓																						

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/24/19	0700
Received	[signature]	Speedy	4-24-19	0905
Relinquished	[signature]	Speedy	4-24-19	1013
Received	[signature]	OSE	4/24/19	1013
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Hold will email analyses~~
X Added 4/25/19. DB (STA)

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 1958008
Project Name: Colleen
Project Manager: M. Goodman
Sampled by: C. Kroskie

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

Laboratory Number: 04-277

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A		TOTAL LEAD			% Moisture
11	MW1-S5-12.5	4/23	849	soil	5		X																	X			X
12	MW1-S6-15	↓	851	↓	↓		X																	X			X

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/24/19	0700
Received	[signature]	Speedy	4-24-19	0905
Relinquished	[signature]	Speedy	4-24-19	1013
Received	[signature]	ORE	4/24/19	1013
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions
~~Hold - will email analyses~~

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

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

May 3, 2019

Marissa Goodman
Hart Crowser, Inc.
3131 Elliott Ave., Suite 600
Seattle, WA 98121

Re: Analytical Data for Project 1950008
Laboratory Reference No. 1904-301

Dear Marissa:

Enclosed are the analytical results and associated quality control data for samples submitted on April 25, 2019.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

Case Narrative

Samples were collected on April 24, 2019 and received by the laboratory on April 25, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW2-S2-5**					
Laboratory ID:	04-301-05					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	6.3	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***89***	***57-129***				
Client ID:	**MW2-S3-7.5**					
Laboratory ID:	04-301-06					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.055	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.5	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***90***	***57-129***				
Client ID:	**MW2-S5-12.5**					
Laboratory ID:	04-301-08					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.060	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.060	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.060	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.060	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	6.0	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***93***	***57-129***				

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC7-S2-5**					
Laboratory ID:	04-301-11					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.2	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***88***	***57-129***				
Client ID:	**HC7-S3-7.5**					
Laboratory ID:	04-301-12					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.046	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.046	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.046	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.046	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	4.6	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***88***	***57-129***				
Client ID:	**HC7-S5-12.5**					
Laboratory ID:	04-301-14					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.063	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	6.3	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***87***	***57-129***				

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC5-S2-5**					
Laboratory ID:	04-301-17					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.057	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.7	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***88***	***57-129***				
Client ID:	**HC5-S3-7.5**					
Laboratory ID:	04-301-18					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.051	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.1	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***85***	***57-129***				
Client ID:	**HC5-S5-12.5**					
Laboratory ID:	04-301-20					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-30-19	
Toluene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Ethyl Benzene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
m,p-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
o-Xylene	**ND**	0.052	EPA 8021B	4-29-19	4-30-19	
Gasoline	**ND**	5.2	NWTPH-Gx	4-29-19	4-30-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***88***	***57-129***				

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0429S4					
Benzene	**ND**	0.020	EPA 8021B	4-29-19	4-29-19	
Toluene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Ethyl Benzene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
m,p-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
o-Xylene	**ND**	0.050	EPA 8021B	4-29-19	4-29-19	
Gasoline	**ND**	5.0	NWTPH-Gx	4-29-19	4-29-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***95***	***57-129***				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-270-08										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						***93***	***94***	***57-129***			
SPIKE BLANKS											
Laboratory ID:	SB0429S2										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.954**	**0.942**	1.00	1.00		**95**	**94**	69-111	1	10	
Toluene	**0.993**	**0.980**	1.00	1.00		**99**	**98**	70-114	1	11	
Ethyl Benzene	**0.989**	**0.976**	1.00	1.00		**99**	**98**	70-115	1	10	
m,p-Xylene	**0.976**	**0.962**	1.00	1.00		**98**	**96**	72-115	1	10	
o-Xylene	**1.00**	**0.991**	1.00	1.00		**100**	**99**	71-115	1	11	
Surrogate:											
Fluorobenzene						***89***	***88***	***57-129***			

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

TOTAL LEAD
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW2-S2-5**					
Laboratory ID:	04-301-05					
Lead	**24**	6.2	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW2-S3-7.5**					
Laboratory ID:	04-301-06					
Lead	**ND**	6.1	EPA 6010D	5-2-19	5-2-19	
Client ID:	**MW2-S5-12.5**					
Laboratory ID:	04-301-08					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC7-S2-5**					
Laboratory ID:	04-301-11					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC7-S3-7.5**					
Laboratory ID:	04-301-12					
Lead	**ND**	5.5	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC7-S5-12.5**					
Laboratory ID:	04-301-14					
Lead	**ND**	5.9	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC5-S2-5**					
Laboratory ID:	04-301-17					
Lead	**ND**	5.8	EPA 6010D	5-2-19	5-2-19	
Client ID:	**HC5-S3-7.5**					
Laboratory ID:	04-301-18					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

TOTAL LEAD
EPA 6010D

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC5-S5-12.5**					
Laboratory ID:	04-301-20					
Lead	**ND**	5.6	EPA 6010D	5-2-19	5-2-19	

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

TOTAL LEAD
EPA 6010D
QUALITY CONTROL

Matrix: Soil
Units: mg/Kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0502SM2					
Lead	**ND**	5.0	EPA 6010D	5-2-19	5-2-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-301-14										
	ORIG	DUP									
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-301-14										
	MS	MSD	MS	MSD		MS	MSD				
Lead	**228**	**224**	250	250	ND	**91**	**90**	75-125	2	20	
SPIKE BLANK											
Laboratory ID:	SB0502SM2										
Lead	**238**		250		N/A	**95**		80-120			

Date of Report: May 3, 2019
Samples Submitted: April 25, 2019
Laboratory Reference: 1904-301
Project: 1950008

% MOISTURE

Date Analyzed: 5-2-19

Client ID	Lab ID	% Moisture
MW2-S2-5	04-301-05	19
MW2-S3-7.5	04-301-06	18
MW2-S5-12.5	04-301-08	16
HC7-S2-5	04-301-11	10
HC7-S3-7.5	04-301-12	10
HC7-S5-12.5	04-301-14	15
HC5-S2-5	04-301-17	14
HC5-S3-7.5	04-301-18	11
HC5-S5-12.5	04-301-20	11

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

Page 1 of 3

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

Company: Hart Crowser
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kroskie

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

Laboratory Number: 04-301

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Pb				% Moisture
1	IDW1	4/24	1234	Soil	5																						
2	IDW2		1237																								
3	IDW3		1239																								
4	MW2-S1-2.5		922																								
5	MW2-S2-5		925				X																X				X
6	MW2-S3-7.5		931				X																X				↓
7	MW2-S4-10		934																								
8	MW2-S5-12.5		949				X																X				X
9	MW2-S6-15		951																								
10	HC7-S1-2.5	↓	817	↓	↓																						

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/25/19	1000
Received	Eileen Clark	Alpha	4/25/19	11:00
Relinquished	Eileen Clark	Alpha	4/25/19	1:20
Received	[signature]	QSE	4/25/19	1320
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☒ Level III ☐ Level IV ☐

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

Chain of Custody

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

Company: Hart Crowser
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Krostic

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

Laboratory Number: 04-301

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A	Pb				% Moisture
11	HC7-S2-5	4/24	819	soil	5		X																X				X
12	HC7-S3-7.5		826				X																X				↓
13	HC7-S4-10		828																								
14	HC7-S5-12.5		844				X																X				X
15	HC7-S6-15		846																								
16	HC5-S1-2.5		1102																								
17	HC5-S2-5		1105				X																X				X
18	HC5-S3-7.5		1117				X																X				↓
19	HC5-S4-10		1120																								
20	HC5-S5-12.5	↓	1135	↓	↓		X																X				X

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/25/19	1000
Received	Eileen Clark	Alpha	4/25/19	11:00
Relinquished	Eileen Clark	Alpha	4/25/19	1150
Received	[signature]	CORE	4/25/19	1320
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☒ Level III ☐ Level IV ☐

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

Chain of Custody

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Company: Hart Crowser
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Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: C. Kroskie

Turnaround Request (in working days)

(Check One)

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

Laboratory Number: 04-301

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A					% Moisture
21	HCS-S6-15	4/24	1139	Soil	5																						

	Signature	Company	Date	Time
Relinquished	[signature]	Hart Crowser	4/25/19	1000
Received	Eileen Clark	Alpha	4/25/19	11:00
Relinquished	Eileen Clark	Alpha	4/25/19	1:20
Received	[signature]	ONE	4/25/19	1320
Relinquished				
Received				
Reviewed/Date		Reviewed/Date		

Comments/Special Instructions

Data Package: Standard ☒ Level III ☐ Level IV ☐

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

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

May 7, 2019

Marissa Goodman
Hart Crowser, Inc.
3131 Elliott Ave., Suite 600
Seattle, WA 98121

Re: Analytical Data for Project 1950008
Laboratory Reference No. 1904-320

Dear Marissa:

Enclosed are the analytical results and associated quality control data for samples submitted on April 29, 2019.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

Case Narrative

Samples were collected on April 29, 2019 and received by the laboratory on April 29, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

DISSOLVED LEAD
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	04-320-01					
Lead	**ND**	1.0	EPA 200.8		4-30-19	
Client ID:	**MW-100**					
Laboratory ID:	04-320-02					
Lead	**ND**	1.0	EPA 200.8		4-30-19	
Client ID:	**MW-2**					
Laboratory ID:	04-320-03					
Lead	**ND**	1.0	EPA 200.8		4-30-19	
Client ID:	**MW-3**					
Laboratory ID:	04-320-04					
Lead	**ND**	1.0	EPA 200.8		4-30-19	

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

DISSOLVED LEAD
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0430D1					
Lead	**ND**	1.0	EPA 200.8		4-30-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-308-16										
	ORIG	DUP									
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-308-16										
	MS	MSD	MS	MSD		MS	MSD				
Lead	**78.2**	**73.4**	80.0	80.0	ND	**98**	**92**	75-125	6	20	
SPIKE BLANK											
Laboratory ID:	SB0430D1										
Lead	**81.4**		80.0		N/A	**102**		85-115			

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

TOTAL LEAD
EPA 200.8

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	04-320-01					
Lead	**ND**	1.1	EPA 200.8	4-30-19	4-30-19	
Client ID:	**MW-100**					
Laboratory ID:	04-320-02					
Lead	**ND**	1.1	EPA 200.8	4-30-19	4-30-19	
Client ID:	**MW-2**					
Laboratory ID:	04-320-03					
Lead	**ND**	1.1	EPA 200.8	4-30-19	4-30-19	
Client ID:	**MW-3**					
Laboratory ID:	04-320-04					
Lead	**ND**	1.1	EPA 200.8	4-30-19	4-30-19	

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

TOTAL LEAD
EPA 200.8
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0430WM1					
Lead	**ND**	1.1	EPA 200.8	4-30-19	4-30-19	

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-308-15										
	ORIG	DUP									
Lead	**ND**	**ND**	NA	NA		NA		NA	NA	20	
MATRIX SPIKES											
Laboratory ID:	04-308-15										
	MS	MSD	MS	MSD		MS	MSD				
Lead	**109**	**112**	111	111	ND	**98**	**101**	75-125	2	20	
SPIKE BLANK											
Laboratory ID:	SB0430WM1										
Lead	**113**		111		N/A	**102**		85-115			

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

GASOLINE RANGE ORGANICS
NWTPH-Gx

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	04-320-01					
Gasoline	**3500**	100	NWTPH-Gx	5-3-19	5-3-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***104***	***59-122***				
Client ID:	**MW-100**					
Laboratory ID:	04-320-02					
Gasoline	**3100**	100	NWTPH-Gx	5-3-19	5-3-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***103***	***59-122***				
Client ID:	**MW-2**					
Laboratory ID:	04-320-03					
Gasoline	**ND**	100	NWTPH-Gx	5-3-19	5-3-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***95***	***59-122***				
Client ID:	**MW-3**					
Laboratory ID:	04-320-04					
Gasoline	**ND**	100	NWTPH-Gx	5-3-19	5-3-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***88***	***59-122***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

GASOLINE RANGE ORGANICS
NWTPH-Gx
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0503W1					
Gasoline	**ND**	100	NWTPH-Gx	5-3-19	5-3-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***94***	***59-122***				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	04-320-01										
	ORIG	DUP									
Gasoline	**3500**	**3280**	NA	NA		NA		NA	6	30	
Surrogate:											
Fluorobenzene						***104***	***102***	***59-122***			

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	04-320-01					
Methyl t-Butyl Ether	ND	0.40	EPA 8260C	5-1-19	5-1-19	
Benzene	0.47	0.40	EPA 8260C	5-1-19	5-1-19	
1,2-Dichloroethane	ND	0.40	EPA 8260C	5-1-19	5-1-19	
Toluene	8.3	2.0	EPA 8260C	5-1-19	5-1-19	
Ethylbenzene	82	0.40	EPA 8260C	5-1-19	5-1-19	
m,p-Xylene	130	0.80	EPA 8260C	5-1-19	5-1-19	
o-Xylene	35	0.40	EPA 8260C	5-1-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***99***	***75-127***				
Toluene-d8	***102***	***80-127***				
4-Bromofluorobenzene	***106***	***78-125***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-100**					
Laboratory ID:	04-320-02					
Methyl t-Butyl Ether	ND	0.40	EPA 8260C	5-1-19	5-1-19	
Benzene	0.40	0.40	EPA 8260C	5-1-19	5-1-19	
1,2-Dichloroethane	ND	0.40	EPA 8260C	5-1-19	5-1-19	
Toluene	7.3	2.0	EPA 8260C	5-1-19	5-1-19	
Ethylbenzene	69	0.40	EPA 8260C	5-1-19	5-1-19	
m,p-Xylene	110	0.80	EPA 8260C	5-1-19	5-1-19	
o-Xylene	30	0.40	EPA 8260C	5-1-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***96***	***75-127***				
Toluene-d8	***103***	***80-127***				
4-Bromofluorobenzene	***106***	***78-125***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-2**					
Laboratory ID:	04-320-03					
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Benzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
1,2-Dichloroethane	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Toluene	ND	1.0	EPA 8260C	5-1-19	5-1-19	
Ethylbenzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
m,p-Xylene	ND	0.40	EPA 8260C	5-1-19	5-1-19	
o-Xylene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***95***	***75-127***				
Toluene-d8	***98***	***80-127***				
4-Bromofluorobenzene	***102***	***78-125***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3**					
Laboratory ID:	04-320-04					
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Benzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
1,2-Dichloroethane	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Toluene	ND	1.0	EPA 8260C	5-1-19	5-1-19	
Ethylbenzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
m,p-Xylene	ND	0.40	EPA 8260C	5-1-19	5-1-19	
o-Xylene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***99***	***75-127***				
Toluene-d8	***103***	***80-127***				
4-Bromofluorobenzene	***107***	***78-125***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C
METHOD BLANK QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Laboratory ID:	MB0501W1					
Methyl t-Butyl Ether	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Benzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
1,2-Dichloroethane	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Toluene	ND	1.0	EPA 8260C	5-1-19	5-1-19	
Ethylbenzene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
m,p-Xylene	ND	0.40	EPA 8260C	5-1-19	5-1-19	
o-Xylene	ND	0.20	EPA 8260C	5-1-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Dibromofluoromethane	***102***	***75-127***				
Toluene-d8	***102***	***80-127***				
4-Bromofluorobenzene	***107***	***78-125***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

VOLATILE ORGANICS EPA 8260C
SB/SBD QUALITY CONTROL

Matrix: Water
Units: ug/L

Analyte	Result		Spike Level		Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS										
Laboratory ID:	SB0501W1									
	SB	SBD	SB	SBD	SB	SBD				
1,1-Dichloroethene	**10.8**	**9.57**	10.0	10.0	108	96	63-130	12	17	
Benzene	**10.3**	**9.30**	10.0	10.0	103	93	76-125	10	19	
Trichloroethene	**10.7**	**9.84**	10.0	10.0	107	98	76-121	8	18	
Toluene	**9.80**	**9.19**	10.0	10.0	98	92	80-124	6	18	
Chlorobenzene	**10.3**	**9.61**	10.0	10.0	103	96	75-120	7	19	
Surrogate:										
Dibromofluoromethane					***98***	***97***	***75-127***			
Toluene-d8					***96***	***97***	***80-127***			
4-Bromofluorobenzene					***102***	***104***	***78-125***			

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

1,2-DIBROMOETHANE (EDB)
EPA 8011

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1**					
Laboratory ID:	04-320-01					
EDB	**ND**	0.0097	EPA 8011	4-30-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
TCMX	***103***	***25-143***				
Client ID:	**MW-100**					
Laboratory ID:	04-320-02					
EDB	**ND**	0.0098	EPA 8011	4-30-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
TCMX	***121***	***25-143***				
Client ID:	**MW-2**					
Laboratory ID:	04-320-03					
EDB	**ND**	0.0096	EPA 8011	4-30-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
TCMX	***97***	***25-143***				
Client ID:	**MW-3**					
Laboratory ID:	04-320-04					
EDB	**ND**	0.0097	EPA 8011	4-30-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
TCMX	***104***	***25-143***				

Date of Report: May 7, 2019
Samples Submitted: April 29, 2019
Laboratory Reference: 1904-320
Project: 1950008

1,2-DIBROMOETHANE (EDB)
EPA 8011
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB0430W1					
EDB	**ND**	0.010	EPA 8011	4-30-19	5-1-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
TCMX	***118***	***25-143***				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
SPIKE BLANKS											
Laboratory ID:	SB0430W1										
	SB	SBD	SB	SBD		SB	SBD				
EDB	**0.0798**	**0.0750**	0.100	0.100	N/A	**80**	**75**	57-124	6	15	
Surrogate:											
TCMX						***96***	***106***	***25-143***			

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Sample Custody Record

Samples Shipped to: OnSite

HARTCROWSER

Hart Crowser, Inc.
3131 Elliott Avenue, Suite 600
Seattle, Washington 98121
Office: 206.324.9530 • Fax 206.328.5581

JOB 19500056 LAB NUMBER 04-320

PROJECT NAME Coldeen

HART CROWSER CONTACT M. Goodmen

209-312-0424

SAMPLED BY: B. Doezer

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	Dissolved lead	Total lead	NWTPH-Gx/BTEX/MTBE	8011 EDB/EDC	HOLD	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
1	MW-1	gw sample	4/29/19	0933	H_2O	X	X	X	X		9	
2	MW-100	"	4/29/19	1003	H_2O	X	X	X	X		9	
3	MW-2	"	4/29/19	1217	H_2O	X	X	X	X		9	
4	MW-3	"	4/29/19	1107	H_2O	X	X	X	X		9	
5	IDW	H_2O sample	4/29/19	1250	H_2O					X	9	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	4/29/19	SIGNATURE	4/29/19
PRINT NAME B. Doezer	TIME	PRINT NAME	TIME
COMPANY Hartcrowser	1530	COMPANY	1530

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

45 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS:
☐YES ☐NO ☐N/A
GOOD CONDITION
☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND
☐COURIER ☐OVERNIGHT

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐48 HOURS ☒STANDARD
☐72 HOURS OTHER 5 day - MTBE, EDB, EDC

White to Lab Yellow to Project Manager Pink to Sample Custodian

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

October 31, 2019

Marissa Goodman
Hart Crowser, Inc.
3131 Elliott Ave., Suite 600
Seattle, WA 98121

Re: Analytical Data for Project 1950008
Laboratory Reference No. 1910-304

Dear Marissa:

Enclosed are the analytical results and associated quality control data for samples submitted on October 23, 2019.

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

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

Sincerely,

David Baumeister
Project Manager

Enclosures

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

Case Narrative

Samples were collected on October 22, 2019 and received by the laboratory on October 23, 2019. They were maintained at the laboratory at a temperature of 2°C to 6°C.

Please note that any and all soil sample results are reported on a dry-weight basis, unless otherwise noted below.

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

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**HC8-S3-6.0**					
Laboratory ID:	10-304-03					
Benzene	**ND**	0.020	EPA 8021B	10-26-19	10-26-19	
Toluene	**ND**	0.056	EPA 8021B	10-26-19	10-26-19	
Ethyl Benzene	**ND**	0.056	EPA 8021B	10-26-19	10-26-19	
m,p-Xylene	**0.062**	0.056	EPA 8021B	10-26-19	10-26-19	
o-Xylene	**ND**	0.056	EPA 8021B	10-26-19	10-26-19	
Gasoline	**6.7**	5.6	NWTPH-Gx	10-26-19	10-26-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***85***	***58-129***				
Client ID:	**HC9-S2-3.5**					
Laboratory ID:	10-304-05					
Benzene	**ND**	0.020	EPA 8021B	10-26-19	10-26-19	
Toluene	**ND**	0.047	EPA 8021B	10-26-19	10-26-19	
Ethyl Benzene	**ND**	0.047	EPA 8021B	10-26-19	10-26-19	
m,p-Xylene	**ND**	0.047	EPA 8021B	10-26-19	10-26-19	
o-Xylene	**ND**	0.047	EPA 8021B	10-26-19	10-26-19	
Gasoline	**11**	4.7	NWTPH-Gx	10-26-19	10-26-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***84***	***58-129***				
Client ID:	**HC9-S3-4.5**					
Laboratory ID:	10-304-06					
Benzene	**ND**	0.022	EPA 8021B	10-26-19	10-26-19	
Toluene	**0.32**	0.11	EPA 8021B	10-26-19	10-26-19	
Ethyl Benzene	**5.4**	0.11	EPA 8021B	10-26-19	10-26-19	
m,p-Xylene	**5.4**	0.11	EPA 8021B	10-26-19	10-26-19	
o-Xylene	**0.20**	0.11	EPA 8021B	10-26-19	10-26-19	
Gasoline	**1100**	11	NWTPH-Gx	10-26-19	10-26-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***84***	***58-129***				

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Soil
Units: mg/kg (ppm)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1026S2					
Benzene	**ND**	0.020	EPA 8021B	10-26-19	10-26-19	
Toluene	**ND**	0.050	EPA 8021B	10-26-19	10-26-19	
Ethyl Benzene	**ND**	0.050	EPA 8021B	10-26-19	10-26-19	
m,p-Xylene	**ND**	0.050	EPA 8021B	10-26-19	10-26-19	
o-Xylene	**ND**	0.050	EPA 8021B	10-26-19	10-26-19	
Gasoline	**ND**	5.0	NWTPH-Gx	10-26-19	10-26-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***81***	***58-129***				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	10-300-02										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						***88***	***88***	***58-129***			
SPIKE BLANKS											
Laboratory ID:	SB1026S1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**0.835**	**0.901**	1.00	1.00		**84**	**90**	69-109	8	10	
Toluene	**0.883**	**0.950**	1.00	1.00		**88**	**95**	67-112	7	10	
Ethyl Benzene	**0.889**	**0.953**	1.00	1.00		**89**	**95**	67-113	7	10	
m,p-Xylene	**0.908**	**0.974**	1.00	1.00		**91**	**97**	66-114	7	11	
o-Xylene	**0.918**	**0.978**	1.00	1.00		**92**	**98**	68-112	6	11	
Surrogate:											
Fluorobenzene						***79***	***83***	***58-129***			

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-1-GW**					
Laboratory ID:	10-304-07					
Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Toluene	**8.5**	1.0	EPA 8021B	10-24-19	10-24-19	
Ethyl Benzene	**75**	1.0	EPA 8021B	10-24-19	10-24-19	
m,p-Xylene	**83**	5.0	EPA 8021B	10-24-19	10-24-19	
o-Xylene	**35**	1.0	EPA 8021B	10-24-19	10-24-19	
Gasoline	**3100**	100	NWTPH-Gx	10-24-19	10-24-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***101***	***59-122***				
Client ID:	**MW-2-GW**					
Laboratory ID:	10-304-08					
Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Toluene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Ethyl Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
m,p-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
o-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Gasoline	**ND**	100	NWTPH-Gx	10-24-19	10-24-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***94***	***59-122***				
Client ID:	**MW-200-GW**					
Laboratory ID:	10-304-09					
Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Toluene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Ethyl Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
m,p-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
o-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Gasoline	**ND**	100	NWTPH-Gx	10-24-19	10-24-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***94***	***59-122***				

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
Client ID:	**MW-3-GW**					
Laboratory ID:	10-304-10					
Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Toluene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Ethyl Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
m,p-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
o-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Gasoline	**ND**	100	NWTPH-Gx	10-24-19	10-24-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***95***	***59-122***				

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

GASOLINE RANGE ORGANICS/BTEX
NWTPH-Gx/EPA 8021B
QUALITY CONTROL

Matrix: Water
Units: ug/L (ppb)

Analyte	Result	PQL	Method	Date Prepared	Date Analyzed	Flags
METHOD BLANK						
Laboratory ID:	MB1024W2					
Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Toluene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Ethyl Benzene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
m,p-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
o-Xylene	**ND**	1.0	EPA 8021B	10-24-19	10-24-19	
Gasoline	**ND**	100	NWTPH-Gx	10-24-19	10-24-19	
Surrogate:	***Percent Recovery***	***Control Limits***				
Fluorobenzene	***95***	***59-122***				

Analyte	Result		Spike Level		Source Result	Percent Recovery		Recovery Limits	RPD	RPD Limit	Flags
DUPLICATE											
Laboratory ID:	10-304-08										
	ORIG	DUP									
Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Toluene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Ethyl Benzene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
m,p-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
o-Xylene	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Gasoline	**ND**	**ND**	NA	NA		NA		NA	NA	30	
Surrogate:											
Fluorobenzene						***94***	***94***	***59-122***			
SPIKE BLANKS											
Laboratory ID:	SB1024W1										
	SB	SBD	SB	SBD		SB	SBD				
Benzene	**52.3**	**53.5**	50.0	50.0		**105**	**107**	76-120	2	11	
Toluene	**51.8**	**53.6**	50.0	50.0		**104**	**107**	80-116	3	12	
Ethyl Benzene	**51.7**	**53.5**	50.0	50.0		**103**	**107**	80-116	3	12	
m,p-Xylene	**52.1**	**53.7**	50.0	50.0		**104**	**107**	76-117	3	12	
o-Xylene	**52.0**	**53.3**	50.0	50.0		**104**	**107**	79-114	2	11	
Surrogate:											
Fluorobenzene						***102***	***100***	***59-122***			

Date of Report: October 31, 2019
Samples Submitted: October 23, 2019
Laboratory Reference: 1910-304
Project: 1950008

% MOISTURE

Client ID	Lab ID	% Moisture	Date Analyzed
HC8-S3-6.0	10-304-03	**18**	10-28-19
HC9-S2-3.5	10-304-05	**15**	10-28-19
HC9-S3-4.5	10-304-06	**17**	10-28-19

OnSite Environmental Inc.

Data Qualifiers and Abbreviations

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

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

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

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

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

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

I - Compound recovery is outside of the control limits.

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

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

L - The RPD is outside of the control limits.

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

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

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

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

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

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

Q - Surrogate recovery is outside of the control limits.

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

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

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

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

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

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

X - Sample extract treated with a mercury cleanup procedure.

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

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

Z -

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

Chain of Custody

Page 1 of 1

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

Company: HC
Project Number: 1950008
Project Name: Coldeen
Project Manager: M. Goodman
Sampled by: B. Dozier

Turnaround Request (in working days)

(Check One)

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

Laboratory Number: 10-304

Lab ID	Sample Identification	Date Sampled	Time Sampled	Matrix	Number of Containers	NWTPH-HCID	NWTPH-Gx/BTEX	NWTPH-Gx	NWTPH-Dx (☐ Acid / SG Clean-up)	Volatiles 8260C	Halogenated Volatiles 8260C	EDB EPA 8011 (Waters Only)	Semivolatiles 8270D/SIM (with low-level PAHs)	PAHs 8270D/SIM (low-level)	PCBs 8082A	Organochlorine Pesticides 8081B	Organophosphorus Pesticides 8270D/SIM	Chlorinated Acid Herbicides 8151A	Total RCRA Metals	Total MTCA Metals	TCLP Metals	HEM (oil and grease) 1664A					% Moisture
1	HC8-S1-2.5	10/22/19	0840	Soil	2																						
2	HC8-S2-5.0	"	0845	"	2																						
3	HC8-S3-6.0	"	0915	"	2		X																				X
4	HC9-S1-2.5	"	1030	"	2																						
5	HC9-S2-3.5	"	1040	"	2		X																				X
6	HC9-S3-4.5	"	1050	"	2		X																				X
7	MW-1-GW	10/22/19	1330	H_2O	3		X																				
8	MW-2-GW	"	1430	"	3		X																				
9	MW-200-GW	"	1500	"	3		X																				
10	MW-3-GW	"	1530	"	3		X																				

	Signature	Company	Date	Time	Comments/Special Instructions
Relinquished	[signature]	HC	10/23/19	0915	
Received	[signature]	[signature]	10-23-19	09:55	
Relinquished	[signature]	[signature]	10-23-19	10:55	KFM
Received	[signature]	OH	10/23/19	1055	
Relinquished					
Received					Data Package: Standard ☐ Level III ☐ Level IV ☐
Reviewed/Date		Reviewed/Date			Chromatograms with final report ☐ Electronic Data Deliverables (EDDs) ☐

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Hart Crowser, Inc.
Marissa Goodman
3131 Elliott Avenue, Suite 600
Seattle, WA 98121

RE: Coldeen
Work Order Number: 1910429

October 31, 2019

Attention Marissa Goodman:

Fremont Analytical, Inc. received 3 sample(s) on 10/23/2019 for the analyses presented in the following report.

Helium by GC/TCD
Major Gases by EPA Method 3C
Petroleum Fractionation by EPA Method TO-15
Volatile Organic Compounds by EPA Method TO-15

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

Date: *11/25/2019*

CLIENT: Hart Crowser, Inc.
Project: Coldeen
Work Order: 1910429

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
1910429-001	SV-1	10/22/2019 10:14 AM	10/23/2019 1:04 PM
1910429-002	UA-1	10/23/2019 11:23 AM	10/23/2019 1:04 PM
1910429-003	IA-1	10/23/2019 11:18 AM	10/23/2019 1:04 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **1910429**
Date: **10/31/2019**

CLIENT: Hart Crowser, Inc.
Project: Coldeen

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Air samples are reported in ppbv and ug/m3. Major gases are reported as % ratio of the Major Gases analyzed (Carbon dioxide, Carbon Monoxide, Methane, Nitrogen, Oxygen and Hydrogen).

The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Standard temperature and pressure assumes 24.45 = (25C and 1 atm).

11/6/19: Revision 1 includes sample ID correction.
11/25/19: Revision 2 reports Helium to the LOD.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20%RSD, <20% Drift or minimum RRF)
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Analytical Report

Work Order: **1910429**
Date Reported: **10/31/2019**

Client: Hart Crowser, Inc.
Collection Date: 10/22/2019 10:14:00 AM
Project: Coldeen
Lab ID: 1910429-001
Matrix: Air
Client Sample ID: **SV-1**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Helium by GC/TCD				Batch ID: R54936		Analyst: WC
Helium	ND	50.0	LOD	ppt	1	10/29/2019 4:05:00 PM

NOTES:
LOD - Analyte reported to Limit of Detection (LOD)
ppt = parts per thousand

Major Gases by EPA Method 3C				Batch ID: R54931		Analyst: WC
Carbon Dioxide	0.514	0.100	D	%	2	10/29/2019 2:54:00 PM
Methane	ND	0.100	D	%	2	10/29/2019 2:54:00 PM
Oxygen	24.4	0.100	D	%	2	10/29/2019 2:54:00 PM

Client: **Hart Crowser, Inc.**
WorkOrder: 1910429
Project: Coldeen

Client Sample ID: SV-1
Lab ID: 1910429-001A
Sample Type: Summa Canister

Date Sampled: 10/22/2019
Date Received: 10/23/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15	**(ppbv)**	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	1,190	4,520	75.0	285		EPA-TO-15	10/29/2019	IH
Aliphatic Hydrocarbon (EC9-12)	175	1,030	75.0	442		EPA-TO-15	10/29/2019	IH
Aromatic Hydrocarbon (EC9-10)	<62.5	<314	62.5	314		EPA-TO-15	10/29/2019	IH
Surr: 4-Bromofluorobenzene	98.0 %Rec	--	70-130	--		EPA-TO-15	10/29/2019	IH
Volatile Organic Compounds by EPA Method TO-15	**(ppbv)**	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Benzene	0.402	1.28	0.0895	0.286		EPA-TO-15	10/23/2019	IH
Ethylbenzene	1.91	8.30	0.400	1.74		EPA-TO-15	10/23/2019	IH
m,p-Xylene	2.02	8.77	0.800	3.47		EPA-TO-15	10/23/2019	IH
Naphthalene	0.750	3.93	0.100	0.524		EPA-TO-15	10/23/2019	IH
o-Xylene	0.755	3.28	0.400	1.74		EPA-TO-15	10/23/2019	IH
Toluene	3.30	12.4	0.400	1.51		EPA-TO-15	10/23/2019	IH
Surr: 4-Bromofluorobenzene	103 %Rec	--	70-130	--		EPA-TO-15	10/23/2019	IH

Client: **Hart Crowser, Inc.**
WorkOrder: 1910429
Project: Coldeen

Client Sample ID: UA-1
Lab ID: 1910429-002A
Sample Type: Summa Canister

Date Sampled: 10/23/2019
Date Received: 10/23/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15	**(ppbv)**	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	24.1	91.6	1.88	7.13		EPA-TO-15	10/28/2019	IH
Aliphatic Hydrocarbon (EC9-12)	12.5	73.8	1.88	11.0		EPA-TO-15	10/28/2019	IH
Aromatic Hydrocarbon (EC9-10)	<1.56	<7.86	1.56	7.86		EPA-TO-15	10/28/2019	IH
Surr: 4-Bromofluorobenzene	103 %Rec	--	70-130	--		EPA-TO-15	10/28/2019	IH
Volatile Organic Compounds by EPA Method TO-15	**(ppbv)**	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Benzene	0.190	0.608	0.0224	0.0715		EPA-TO-15	10/31/2019	IH
Ethylbenzene	0.125	0.543	0.100	0.434		EPA-TO-15	10/31/2019	IH
m,p-Xylene	0.279	1.21	0.200	0.868		EPA-TO-15	10/31/2019	IH
Naphthalene	0.163	0.852	0.0250	0.131		EPA-TO-15	10/31/2019	IH
o-Xylene	0.149	0.645	0.100	0.434		EPA-TO-15	10/31/2019	IH
Toluene	0.573	2.16	0.100	0.377		EPA-TO-15	10/31/2019	IH
Surr: 4-Bromofluorobenzene	108 %Rec	--	70-130	--		EPA-TO-15	10/31/2019	IH

Client: **Hart Crowser, Inc.**
WorkOrder: 1910429
Project: Coldeen

Client Sample ID: IA-1
Lab ID: 1910429-003A
Sample Type: Summa Canister

Date Sampled: 10/23/2019
Date Received: 10/23/2019

Analyte	Concentration		Reporting Limit		Qual	Method	Date/Analyst	
Petroleum Fractionation by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Aliphatic Hydrocarbon (EC5-8)	100	382	7.50	28.5		EPA-TO-15	10/30/2019	IH
Aliphatic Hydrocarbon (EC9-12)	42.0	247	7.50	44.2		EPA-TO-15	10/30/2019	IH
Aromatic Hydrocarbon (EC9-10)	<1.56	<7.86	1.56	7.86		EPA-TO-15	10/28/2019	IH
Surr: 4-Bromofluorobenzene	109 %Rec	--	70-130	--		EPA-TO-15	10/28/2019	IH
Volatile Organic Compounds by EPA Method TO-15								
	(ppbv)	**(ug/m³)**	**(ppbv)**	**(ug/m³)**				
Benzene	0.186	0.593	0.0224	0.0715		EPA-TO-15	10/31/2019	IH
Ethylbenzene	<0.100	<0.434	0.100	0.434		EPA-TO-15	10/31/2019	IH
m,p-Xylene	0.296	1.29	0.200	0.868		EPA-TO-15	10/31/2019	IH
Naphthalene	0.411	2.16	0.0250	0.131		EPA-TO-15	10/31/2019	IH
o-Xylene	0.116	0.505	0.100	0.434		EPA-TO-15	10/31/2019	IH
Toluene	0.844	3.18	0.100	0.377		EPA-TO-15	10/31/2019	IH
Surr: 4-Bromofluorobenzene	117 %Rec	--	70-130	--		EPA-TO-15	10/31/2019	IH

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Petroleum Fractionation by EPA Method TO-15

Sample ID: **LCS-R54926** SampType: **LCS** Units: **ppbv** Prep Date: **10/28/2019** RunNo: **54926**
Client ID: **LCSW** Batch ID: **R54926** Analysis Date: **10/28/2019** SeqNo: **1090359**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	13.0	7.50	12.00	0	108	70	130				
Aliphatic Hydrocarbon (EC9-12)	13.4	7.50	12.00	0	112	70	130				
Aromatic Hydrocarbon (EC9-10)	11.9	6.25	10.00	0	119	70	130				
Surr: 4-Bromofluorobenzene	3.85		4.000		96.2	70	130				

Sample ID: **MB-R54926** SampType: **MBLK** Units: **ppbv** Prep Date: **10/28/2019** RunNo: **54926**
Client ID: **MBLKW** Batch ID: **R54926** Analysis Date: **10/28/2019** SeqNo: **1090360**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	ND	1.88									
Aliphatic Hydrocarbon (EC9-12)	ND	1.88									
Aromatic Hydrocarbon (EC9-10)	ND	1.56									
Surr: 4-Bromofluorobenzene	0.937		1.000		93.7	70	130				

Sample ID: **1910412-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **10/28/2019** RunNo: **54926**
Client ID: **BATCH** Batch ID: **R54926** Analysis Date: **10/28/2019** SeqNo: **1090364**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	44,800	75.0						42,420	5.50	30	E
Aliphatic Hydrocarbon (EC9-12)	6,620	75.0						6,477	2.22	30	E
Aromatic Hydrocarbon (EC9-10)	151	62.5						150.5	0.433	30	
Surr: 4-Bromofluorobenzene	57.5		40.00		144	70	130		0		S

NOTES:
S - Outlying surrogate recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.
E - Estimated value. The amount exceeds the linear working range of the instrument.

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Petroleum Fractionation by EPA Method TO-15

Sample ID: **LCS-R54947** SampType: **LCS** Units: **ppbv** Prep Date: **10/29/2019** RunNo: **54947**
Client ID: **LCSW** Batch ID: **R54947** Analysis Date: **10/29/2019** SeqNo: **1090788**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	13.3	7.50	12.00	0	111	70	130				
Aliphatic Hydrocarbon (EC9-12)	13.4	7.50	12.00	0	111	70	130				
Surr: 4-Bromofluorobenzene	3.96		4.000		98.9	70	130				

Sample ID: **MB-R54947** SampType: **MBLK** Units: **ppbv** Prep Date: **10/29/2019** RunNo: **54947**
Client ID: **MBLKW** Batch ID: **R54947** Analysis Date: **10/29/2019** SeqNo: **1090806**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	ND	7.50									
Aliphatic Hydrocarbon (EC9-12)	ND	7.50									
Surr: 4-Bromofluorobenzene	3.74		4.000		93.6	70	130				

Sample ID: **1910476-001AREP** SampType: **REP** Units: **ppbv** Prep Date: **10/29/2019** RunNo: **54947**
Client ID: **BATCH** Batch ID: **R54947** Analysis Date: **10/29/2019** SeqNo: **1090808**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aliphatic Hydrocarbon (EC5-8)	3,240	75.0						3,331	2.72	30	E
Aliphatic Hydrocarbon (EC9-12)	1,690	75.0						1,730	2.35	30	E
Surr: 4-Bromofluorobenzene	39.8		40.00		99.6	70	130		0		

NOTES:
E - Estimated value. The amount exceeds the linear working range of the instrument.

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Helium by GC/TCD

Sample ID: **LCS-R54936**	SampType: **LCS**			Units: **ppt**		Prep Date: **10/29/2019**		RunNo: **54936**		
Client ID: **LCSW**	Batch ID: **R54936**					Analysis Date: **10/29/2019**		SeqNo: **1090537**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Helium	115	100	100.0	0	115	80	120				

Sample ID: **MB-R54936**	SampType: **MBLK**			Units: **ppt**		Prep Date: **10/29/2019**		RunNo: **54936**		
Client ID: **MBLKW**	Batch ID: **R54936**					Analysis Date: **10/29/2019**		SeqNo: **1090538**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Helium	ND	100									

Sample ID: **1910429-001AREP**	SampType: **REP**			Units: **ppt**		Prep Date: **10/29/2019**		RunNo: **54936**		
Client ID: **SV-1**	Batch ID: **R54936**					Analysis Date: **10/29/2019**		SeqNo: **1090531**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Helium	ND	100						0		30	

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Major Gases by EPA Method 3C

Sample ID: **LCS-R54931** SampType: **LCS** Units: **%** Prep Date: **10/29/2019** RunNo: **54931**
Client ID: **LCSW** Batch ID: **R54931** Analysis Date: **10/29/2019** SeqNo: **1090455**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon Dioxide	101	0.0500	100.0	0	101	70	130				
Methane	101	0.0500	100.0	0	101	70	130				
Oxygen	106	0.0500	100.0	0	106	70	130				

Sample ID: **1910479-001AREP** SampType: **REP** Units: **%** Prep Date: **10/29/2019** RunNo: **54931**
Client ID: **BATCH** Batch ID: **R54931** Analysis Date: **10/29/2019** SeqNo: **1090451**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Carbon Dioxide	41.4	0.0500						41.46	0.0229	30	H
Methane	57.1	0.0500						57.03	0.0676	30	H
Oxygen	0.421	0.0500						0.4124	2.18	30	H

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCS-R54973** SampType: **LCS** Units: **ppbv** Prep Date: **10/23/2019** RunNo: **54973**
Client ID: **LCSW** Batch ID: **R54973** Analysis Date: **10/23/2019** SeqNo: **1091392**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	2.25	0.0895	2.000	0	112	70	130				
Toluene	2.32	0.400	2.000	0	116	70	130				
Ethylbenzene	2.18	0.400	2.000	0	109	70	130				
m,p-Xylene	4.44	0.800	4.000	0	111	70	130				
o-Xylene	2.27	0.400	2.000	0	114	70	130				
Surr: 4-Bromofluorobenzene	3.91		4.000		97.8	70	130				

Sample ID: **MB-R54973** SampType: **MBLK** Units: **ppbv** Prep Date: **10/23/2019** RunNo: **54973**
Client ID: **MBLKW** Batch ID: **R54973** Analysis Date: **10/23/2019** SeqNo: **1091393**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0224									
Toluene	ND	0.100									
Ethylbenzene	ND	0.100									
m,p-Xylene	ND	0.200									
o-Xylene	ND	0.100									
Surr: 4-Bromofluorobenzene	0.892		1.000		89.2	70	130				

Sample ID: **LCS-R54984** SampType: **LCS** Units: **ppbv** Prep Date: **10/31/2019** RunNo: **54984**
Client ID: **LCSW** Batch ID: **R54984** Analysis Date: **10/31/2019** SeqNo: **1091832**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	1.93	0.0895	2.000	0	96.7	70	130				
Toluene	1.98	0.400	2.000	0	99.0	70	130				
Ethylbenzene	1.90	0.400	2.000	0	94.8	70	130				
m,p-Xylene	3.76	0.800	4.000	0	94.1	70	130				
o-Xylene	1.86	0.400	2.000	0	92.9	70	130				
Naphthalene	1.90	0.100	2.000	0	94.8	70	130				
Surr: 4-Bromofluorobenzene	3.95		4.000		98.7	70	130				

Work Order: 1910429
CLIENT: Hart Crowser, Inc.
Project: Coldeen

QC SUMMARY REPORT

Volatile Organic Compounds by EPA Method TO-15

Sample ID: **LCSD-R54984** SampType: **LCSD** Units: **ppbv** Prep Date: **10/31/2019** RunNo: **54984**
Client ID: **LCSW02** Batch ID: **R54984** Analysis Date: **10/31/2019** SeqNo: **1091833**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	2.11	0.0895	2.000	0	105	70	130	1.933	8.74	30	
Toluene	2.03	0.400	2.000	0	102	70	130	1.980	2.63	30	
Ethylbenzene	1.97	0.400	2.000	0	98.4	70	130	1.895	3.75	30	
m,p-Xylene	4.11	0.800	4.000	0	103	70	130	3.763	8.85	30	
o-Xylene	2.04	0.400	2.000	0	102	70	130	1.857	9.46	30	
Naphthalene	1.90	0.100	2.000	0	95.1	70	130	1.897	0.270	30	
Surr: 4-Bromofluorobenzene	3.84		4.000		96.1	70	130		0		

Sample ID: **MB-R54984** SampType: **MBLK** Units: **ppbv** Prep Date: **10/31/2019** RunNo: **54984**
Client ID: **MBLKW** Batch ID: **R54984** Analysis Date: **10/31/2019** SeqNo: **1091834**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzene	ND	0.0224									
Toluene	ND	0.100									
Ethylbenzene	ND	0.100									
m,p-Xylene	ND	0.200									
o-Xylene	ND	0.100									
Naphthalene	ND	0.0250									
Surr: 4-Bromofluorobenzene	0.875		1.000		87.5	70	130				

Sample Log-In Check List

Client Name:	**HART**	Work Order Number:	**1910429**
Logged by:	**Clare Griggs**	Date Received:	**10/23/2019 1:04:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes ☑	No ☐	Not Present ☐
2.	How was the sample delivered?	Client		

Log In

3.	Coolers are present?	Yes ☐	No ☑	NA ☐
		Air Samples		
4.	Shipping container/cooler in good condition?	Yes ☑	No ☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes ☐	No ☐	Not Required ☑
6.	Was an attempt made to cool the samples?	Yes ☐	No ☐	NA ☑
7.	Were all items received at a temperature of >0°C to 10.0°C *	Yes ☐	No ☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes ☑	No ☐	
9.	Sufficient sample volume for indicated test(s)?	Yes ☑	No ☐	
10.	Are samples properly preserved?	Yes ☑	No ☐	
11.	Was preservative added to bottles?	Yes ☐	No ☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes ☐	No ☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes ☑	No ☐	
14.	Does paperwork match bottle labels?	Yes ☑	No ☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes ☑	No ☐	
16.	Is it clear what analyses were requested?	Yes ☑	No ☐	
17.	Were all holding times able to be met?	Yes ☑	No ☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes ☐	No ☐	NA ☑

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Air Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 10/23/19 Page: 1 of: 1

Laboratory Project No (Internal): 1910429

Special Remarks:

Project Name: Colleen

Project No: 1950008

Location: Vashon, WA

Collected by: Dorlet

Reports to (PM): Goodman

Air samples are disposed of one week after report is submitted to client unless otherwise requested. ☐ OK to Dispose ☐ Hold (fees may apply)

Email (PM): Marissa.Goodman@hartcrowser.com

Client: Hart Crowser

Address: 3131 Elliott Ave, Suite 600

City, State, Zip: Seattle, WA 98121

Telephone: 206.324.9530

Fax:

	Sample Name	Canister / Flow Reg Serial #	Sample Date & Time	Sample Type (Matrix) *	Container Type **	Fill Time / Flow Rate	Internal: Initial Evacuation Pressure (mtorr)	Field Initial Sample Pressure (" Hg)	Field Final Sample Pressure (" Hg)	Analysis: VOCs TO15 SCAN	VOCs TO15 SCAN LL	VOCs TO15 SIM	Siloxanes TO15	Sulfur TO15	Sulfur Ext. TO15	APH TO15	Helium	Major Gases 3C	Comments	Internal: Final Pressure ("Hg)
1	SV-1	5020	10/22/19	Soil vapor	1L	10 min	10mtorr	-30	-3	X						X	X	X	only BTEX + Napthalene + only Oxygen, CO2, Methane	-2
		FID	10:14				9/14/2019	10/22/19	10/22/19											
2	VA-1	12666	~~10/23/19~~ BD				10mtorr	30	11											
		FRS-01	~~1123~~ BD	SCIT	6L	24 hour	10/9/2019	10/22/19	10/23/19		X					X			only BTEX + Napthalene	-8
3	IA-1	17241	10/23/19	SCIT	6L	24 hour	10mtorr	30	12											
		FRS-25	11:18				10/9/2019	10/22/19	10/23/19		X					X			only BTEX + Napthalene	-12
4																				
5																				

* Matrix Codes: AA = Ambient Air IA = Indoor Air L = Landfill S = Subslab / Soil Gas

** Container Codes: BV = 1 Liter Bottle Vac 6L = 6L Canister 1L = 1L Canister CYL = High Pressure Cylinder F = Filter S = Sorbent Tube TB = Tedlar Bag

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x	10/23/19 13:04	x	10/23/19 13:04
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-Around Time:

- ☒ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

APPENDIX C
Investigative-Derived Waste Manifests

DEC 20 '19 AM12:49

***24 HOUR EMERGENCY RESPONSE, CALL (877) 577-2669 ***

Stericycle®
Environmental Solutions

page 1/2

SHIPPING PAPER

Lading Manifest: 675302-19

	DELIVERY DATE / JOB # 3819930
SHIPPER / CUSTOMER: Washington State Dept of Ecolo gy	POINT OF CONTACT: Diane Escobido
ADDRESS: 15631 Westside Highway SW	PHONE #: (425)649-7000
CITY, STATE, ZIP: VASHON WA 98070	
CARRIER / TRANSPORTER: CASCADE DRILLING	PHONE #: (425)485-8908
CONSIGNEE / FACILITY: BURLINGTON ENVIRONMENTAL, LLC.	POINT OF CONTACT
ADDRESS: 1701 East Alexander Avenue	PHONE #: (253)627-7568
CITY, STATE, ZIP: TACOMA , WA 98421	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM
A	MATERIAL NOT REGULATED BY DOT (NON-HAZARDOUS)	3	DM	2106	P
B	MATERIAL NOT REGULATED BY DOT (NON-HAZARDOUS)	1	DM	400	P
C	MATERIAL NOT REGULATED BY DOT (NON-HAZARDOUS)	1	DM	150	P
D					

2656

Special Handling Instruction and Additional Information:

a) 1614312-00 - NON-HAZARDOUS WASTE SOLID (SOIL) - LF07 (1) b) 1614308-00 - NON-HAZARDOUS WASTE LIQUID (WATER) - WAT05 (2) c) 1614308-00 - NON-HAZARDOUS WASTE LIQUID (WATER) - WAT05 (3)

Placards Provided YES_____ NO_____

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

		MONTH	DAY	YEAR
(SHIPPER) PRINT OR TYPE NAME: X Nikk Jachim on behalf of shipper	SIGNATURE: X	12	17	19
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME: X Nikk Jachim	SIGNATURE: X	12	17	19
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME: X Lahmoun Saian	SIGNATURE: X	12	19	19

CONSIGNEE

Stericycle®
Environmental Solutions

page 2/2

SHIPPING PAPER

675302-15

	DELIVERY DATE	JOB #
		38/4430

SHIPPER / CUSTOMER	POINT OF CONTACT
ADDRESS	PHONE #
CITY, STATE, ZIP	
CARRIER / TRANSPORTER Stericycle Specialty Waste Solutions, Inc.	PHONE # (612) 285-9865
CONSIGNEE / FACILITY	POINT OF CONTACT
ADDRESS	PHONE #
CITY, STATE, ZIP	

HM	US DOT Description *(Including Proper Shipping Name, Hazard Class, and ID Number)*	Containers No.	Containers Type	Total Quantity	UOM
A					
B					
C	TRANS ONLY				
D					

Special Handling Instruction and Additional Information:

Placards Provided YES_____ NO_____

SHIPPER'S CERTIFICATION: "I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packaged, marked and labelled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations." I also certify that all times listed above are true and correct.

		MONTH	DAY	YEAR
(SHIPPER) PRINT OR TYPE NAME X	SIGNATURE X			
(CARRIER/TRANSPORTER) PRINT OR TYPE NAME X Christine Santos	SIGNATURE X	12	17	19
(CONSIGNEE/FACILITY) PRINT OR TYPE NAME X	SIGNATURE X			

CONSIGNEE

Generator's Waste Profile 1614312-00

Printed: 12/11/2019

Stericycle®
Environmental Solutions

Status: Pending

Starts: 2019-12-04
Expires: 2020-12-02

A. Generator Site Information

Washington State Dept of Ecolo
15631 Westside Highway SW
VASHON, WA 98070
Phone: (425)649-7000
Contact: Diane Escobido

EPA#: EXE
SIC Codes: 44711

B. Customer Address

CASCADE DRILLING LP
PO Box 1184
WOODINVILLE, WA 98072
Phone: (425) 485-8908
Fax: (425) 951-1194

C. Waste Information

MSDS: No | Analysis: Yes | Sample: No

Waste Name: NON-HAZARDOUS WASTE SOLID (SOIL)

Process: INVESTIGATION DERIVED WASTE FROM DRILLING ACTIVITIES AT A GAS STATION.

Unused Commercial Product: No | Spill Residue: No

D. Physical Characteristics of Waste

Layers		Phys States	Colors				
Single Phased	**Top**	Solid	Brown	Spec Grav:	1.2	PH Range:	4-10
	Middle	N/A		Free Liq %:	No	Flash Test:	Not Tested
	Bottom	N/A				Flash Range:	N/A
				Odor:	None	None	
% Ash:	0	% Halogens:	N/A	% Water:	0	Viscosity:	High
Pumpable:	No	BTU:	N/A	Benzene PPM:	0		

E. Chemical Composition of Waste

PCBs: No | Cyanides: No | Phenolics: No | Sulfides: No | TOC: <1% | VOC: >500PPM

Dioxins: No | Herbicides: No | Pesticides: 0 | Ammonia: No

Volatile Organic Compounds: >500PPM | Total Organic Carbons: <1%

Chemicals:	Min	Max	Unit
Soil	95	100	%
Asphalt, Gravel	0	5	%
Gasoline	0	6700	ppm
Lead	0	24	ppm
Benzene	0	0.33	ppm
Ethylbenzene	0	16	ppm
Toluene	0	3.3	ppm
Xylene	0	35	ppm

F. Metals

Metals Method: Generator Knowledge

Arsenic (As)	<5 ppm	Barium (Ba)	<100 ppm
Cadmium (Cd)	<1 ppm	Chromium (Cr)	<5 ppm
Lead (Pb)	<5 ppm	Mercury TCLP	<0.2 ppm
Mercury Total	<260 ppm	Selenium (Se)	<1 ppm
Silver (Ag)	<5 ppm	Nickel (Ni)	134 ppm
Thallium (Ti)	120 ppm	Zinc (Zn)	<0 ppm
Copper (Cu)	<0 ppm		

G. Regulated Organics

Organic Code	Min Reg TCLP	Total

H. Other Characteristics of Waste

Ign. Solid? No	Oxidizer? No	Sulfide Reactive No	Other Reactive? No
Shock Sensitive? No	Water Reactive? No	Cyanide Reactive No	Universal Waste? No
Radioactive? No	Explosive? N/A	Asbestos? N/A	Water > 10%? No

Medical? No

I. Use EPA/State Waste Identification

Form Code:	W301	TSCA:	No	SubpartCC:	No		
DW/EHW:	DW	Source Code:	G45	Debris:	No	CERCLA:	No

EPA Regulated? No State Regulated? No Contains Regulated Organics? Yes

EPA Codes:
State Codes:
UHC Codes:
Texas Codes:

J. Shipping Information

Container Type: DM Qty to Ship Now: 3 Projected Volume: 150 One time

DOT Shipping Name: MATERIAL NOT REGULATED BY DOT (NON-HAZARDOUS)
NOS:
Hazard Class:
SubHazard Class:

Additional Description:

K. Special Handling Information

MAIL MANIFEST TO Attn: Diane Escobedo, Washington State Department of Ecology, Toxics Cleanup Program, Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008
Waste Category:

GENERATOR CERTIFICATION

I hereby represent and warrant that I have personally examined and am familiar with the information contained and submitted on this waste profile and all attached documents. Based on my inquiry and personal knowledge of those individuals responsible for supplying or obtaining the information, the information contained herein is true, accurate, and complete to the best of my knowledge and belief. Furthermore, no material fact has been omitted as to make this misleading. I understand that others may rely on this representation and warranty in the handling and processing of the waste material described herein. By signing this waste profile, I am certifying that I am authorized to sign such documentation on behalf of the generator.

Burlington Environmental, LLC maintains the appropriate permits for and will accept the dangerous waste the generator is shipping as required by WAC 173-303-290(8).

Diane Escobedo Site Manager 12/13/19

Signature Printed Name Title Date

Generator's Waste Profile 1614308-00

Printed: 12/12/2019

Stericycle®
Environmental Solutions

Status: Pending

Starts: 2019-12-04
Expires: 2020-12-02

A. Generator Site Information

Washington State Dept of Ecolo
15631 Westside Highway SW
VASHON, WA 98070
Phone: (425)649-7000
Contact: Diane Escobido

EPA#: EXE
SIC Codes: 44711

B. Customer Address

CASCADE DRILLING LP
PO Box 1184
WOODINVILLE, WA 98072
Phone: (425) 485-8908
Fax: (425) 951-1194

C. Waste Information

MSDS: No | Analysis: Yes | Sample: No

Waste Name: NON-HAZARDOUS WASTE LIQUID (WATER)

Process: INVESTIGATION DERIVED WASTE FROM A GAS STATION.

Unused Commercial Product: No | Spill Residue: No

D. Physical Characteristics of Waste

Layers		Phys States	Colors				
Single Phased	Top	Liquid	Brown	Spec Grav:	1.0	PH Range:	4-10
	Middle	N/A		Free Liq %:	100	Flash Test:	Not Tested
	Bottom	N/A				Flash Range:	N/A
				Odor:	None	None	
% Ash:	0	% Halogens:	N/A	% Water:	100	Viscosity:	Low
Pumpable:	Yes	BTU:	N/A	Benzene PPM:	0		

E. Chemical Composition of Waste

PCBs: No | Cyanides: No | Phenolics: No | Sulfides: No | TOC: <1% | VOC: <500PPM

Dioxins: No | Herbicides: No | Pesticides: 0 | Ammonia: No

Volatile Organic Compounds: <500PPM | Total Organic Carbons: <1%

Chemicals:	Min	Max	Unit
Water	95	100	%
Sediment	0	5	%
Benzene	0	0.47	ppb
Gasoline	0	3.5	ppm

F. Metals

Metals Method: Generator Knowledge

Arsenic (As)	<5 ppm	Barium (Ba)	<100 ppm
Cadmium (Cd)	<1 ppm	Chromium (Cr)	<5 ppm
Lead (Pb)	<5 ppm	Mercury TCLP	<0.2 ppm
Mercury Total	<260 ppm	Selenium (Se)	<1 ppm
Silver (Ag)	<5 ppm	Nickel (Ni)	134 ppm
Thallium (Ti)	120 ppm	Zinc (Zn)	<0 ppm
Copper (Cu)	<0 ppm		

G. Regulated Organics

Organic Code	Min Reg TCLP	Total

H. Other Characteristics of Waste

Ign. Solid? No	Oxidizer? No	Sulfide Reactive No	Other Reactive? No
Shock Sensitive? No	Water Reactive? No	Cyanide Reactive No	Universal Waste? No
Radioactive? No	Explosive? N/A	Asbestos? N/A	Water > 10%? Yes
Medical? No			

I. Use EPA/State Waste Identification

Form Code: W113 | TSCA: No | SubpartCC: No

DW/EHW: DW | Source Code: G45 | Debris: No | CERCLA: No

EPA Regulated? No | State Regulated? No | Contains Regulated Organics? Yes

EPA Codes:
State Codes:
UHC Codes:
Texas Codes:

J. Shipping Information

Container Type: DM | Qty to Ship Now: 2 | Projected Volume: 100 One time

DOT Shipping Name: MATERIAL NOT REGULATED BY DOT (NON-HAZARDOUS)
NOS:
Hazard Class:
SubHazard Class:

Additional Description:

K. Special Handling Information

Mail manifest to:Attn: Diane Escobedo, Washington State Department of Ecology, Toxics Cleanup Program, Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008
Waste Category:

GENERATOR CERTIFICATION

I hereby represent and warrant that I have personally examined and am familiar with the information contained and submitted on this waste profile and all attached documents. Based on my inquiry and personal knowledge of those individuals responsible for supplying or obtaining the information, the information contained herein is true, accurate, and complete to the best of my knowledge and belief. Furthermore, no material fact has been omitted as to make this misleading. I understand that others may rely on this representation and warranty in the handling and processing of the waste material described herein. By signing this waste profile, I am certifying that I am authorized to sign such documentation on behalf of the generator.

I certify that I have reviewed and am familiar with the information in the application submitted for approval. I believe the information provided herein conforms to the facilities approved waste analysis plan and operating permits.

In accordance with 40 CFR 264.12(b), Republic Environmental Systems (Pennsylvania), LLC has the appropriate permits for, and will accept the waste the generator is shipping as described in this profile


Diane Escobedo Site Manager 12/13/19

Signature | Printed Name | Title | Date

CASCADE
DRILLING | TECHNICAL SERVICES

Designation of Authorized Representative for Non-hazardous Waste Disposal Services

I hereby authorize Cascade Drilling or its designee to act as my authorized representative, to prepare and sign the documents required for transportation and disposal of non-hazardous waste generated at Washington State Dept of Ecology property located at 15631 Westside Hwy SW, Vashon, WA 98070. Services include signing the Bill of Lading/Manifest for shipments of non-hazardous waste. This authorization shall continue until June 30, 2020.

I hereby certify that I have authority to execute this letter designating Cascade Drilling to act as my authorized representative for this matter. I understand that Washington State Dept of Ecology remains liable under Federal and State waste regulations as the generator of the waste material.

Signature: _____ Title: Site Manager

Printed Name: Diane Escobedo Date: 12/13/19

2972075/1/CKP/054956-0011