REMEDIAL INVESTIGATION WORK PLAN
FORMER TEMPLE DISTRIBUTING SITE
808 South Columbus Ave.
Goldendale, Washington

October 3, 2017

Prepared for:
Washington State Department of Ecology
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leidos

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REMEDIAL INVESTIGATION WORK PLAN
FORMER TEMPLE DISTRIBUTING SITE

1 INTRODUCTION AND OBJECTIVES

Leidos Inc. (Leidos), prepared this work plan on behalf of Chevron Environmental Management Company (CEMC), Carson Oil Company Inc., Temple Distributing, Temple Family Credit Shelter Trust, and Temple Family Survivor Trust (collectively referred to as PLPs) to perform a Remedial Investigation (RI) at the former Temple Distributing Bulk Fuel Facility located at 808 S. Columbus Avenue in Goldendale, Washington Facility (Figure 1). The PLPs are recipients of an Enforcement Order No. DE 14134, effective April 28, 2017, issued by the Washington State Department of Ecology (Ecology). The Enforcement Order requires the PLPs to complete a draft remedial investigation work plan that includes a Sampling and Analysis Plan (SAP), Quality Assurance Project Plan (QAPP), and a Site Health and Safety Plan (HASP) in accordance with Washington Administrative Code (WAC) 173-340-820. The SAP, QAPP and HASP are included as Appendices A through C respectively.

The results of the RI will be used to determine the full extent of the area where concentrations of constituents of concern (COCs) released from the former Bulk Fuel Facility exceed regulatory cleanup levels. For ease of reference, the tax parcel on which the Facility operated will also be referred to as the Property in this Work Plan.

The objectives of this RI are to address data gaps regarding the nature and extent of petroleum contamination in soil, groundwater, and soil vapor at the Property. The purpose of the RI is to collect sufficient information to evaluate the impact on human health and the environment to enable development and evaluation of technically feasible cleanup alternatives in accordance with WAC 173-340-360 through 173-340-390. The RI will provide sufficient data to refine the conceptual site model for use in evaluating technically feasible cleanup alternatives for selection of a final cleanup action applicable to the Property.

2 PROPERTY DESCRIPTION AND BACKGROUND

2.1 PROPERTY DESCRIPTION

The Property currently consists of Klickitat County Tax Parcel 04162132000100, which is a relatively flat lot approximately 0.85 acres in size. The Property is a vacant parcel containing a warehouse and office building, concrete pads, and underground piping infrastructure. Above-ground pumps and above-ground storage tanks (ASTs) have been removed.

2.2 PROPERTY HISTORY

Chevron U.S.A. Inc.'s (CUSA) predecessor, Standard Oil Company, acquired the Property in 1916. A bulk petroleum fuel distributor (leaded gasoline, diesel, unleaded gasoline) operated from the late 1920s until 1980. In 1980 CUSA sold the property to Edward W. Temple and Joyce I. Temple. In 1994, Edward W. Temple and Joyce I. Temple granted the deed to the property to the Temple Family Trust. The Temple Family Credit Shelter Trust acquired the property in 1997 and operated the bulk facility until 2011. In June 2011 Carson Oil Company, Inc. acquired all above-ground equipment at the property from Temple Distributing, Inc., including tanks, a card reader system, high speed satellite dispensers, transfer pumps, meters, and dispensers.

On February 29, 2012, Carson Oil Company delivered fuel to the facility, and approximately 970 gallons of gasoline was released from an overfilled AST into the bermed unlined containment area. A site investigation conducted in 2012 confirmed that soils and groundwater contained gasoline, diesel, lube oil, benzene, toluene, ethylbenzene, total xylenes, naphthalene and other petroleum constituents in concentrations exceeding Model Toxics Control Act (MTCA) cleanup levels. Carson Oil conducted a limited excavation as an interim action in 2012. This action is detailed in Section 2.5.

2.3 ADJACENT PROPERTIES

The Property is currently bounded by South Columbus Avenue to the west, a gravel city right of way (ROW) to the north, the Department of Social and Health Services to the south, and farm or range land to the east.

Perez Collision Repair/Powers Motors is located to the west across South Columbus Avenue from the former Temple Distributing bulk facility. There is a maintenance/storage building behind the Department of Social and Health Services to the south. There is currently a mobile home court to the north of the Property directly across the ROW.

In addition, the following historical businesses have been documented adjacent to the Property:

- Former Jack's Grocery Cleanup Property, located at 706 S. Columbus Avenue was a small convenience grocery story and gas station located approximately 125 feet north of the Property. Current use is residential.
- Hardie's Car Wash & Detail, located at 703 S. Columbus Avenue. A gas and service station were formerly located on this parcel. More recent businesses have included Auto Express Detail & Lube (2003), Mutt and Jeff Auto Service Center (1999 and 2000), and Auto Spa (1999). It is located approximately 200 feet northwest of the Property.

2.4 LAND USE AND ENVIRONMENTAL SETTING

The Property is located in the south central area of Goldendale within Klickitat County, Washington. The vicinity is characterized by mixed use residential and commercial parcels. The Property is zoned C-2, which allows for commercial businesses. South Columbus Avenue was a former State Highway (No. 8) until the 1970s, when the highway was rerouted. Many of the service stations that were reportedly in this area were closed after the highway was rerouted.

2.4.1 Topography

The ground surface in the Property vicinity slopes gently toward the north and northwest toward the Little Klickitat River. The river is approximately 0.65 mile north northwest of the Property. Ground surface elevations at the Property are approximately 1,642 feet.

2.4.2 Surface Water

Surface water within the vicinity of the Property drains to the west toward Columbus Ave or infiltrates into unpaved soils.

2.4.3 Climate

Goldendale has a borderline Mediterranean/Continental Mediterranean climate (Köppen Csb/Dsb). The rain shadow of the Cascades creates a distinct and visible difference between the arid and dry areas south of the city and the more lush treed areas to the north. This produces a landscape of open bunch-grass prairies dotted with sagebrush containing the occasional juniper tree, while the more sheltered areas consist of ponderosa pine and oak savannahs.

Summer temperatures can reach well over 100°F, while winter, when most of the annual precipitation of around 17 inches occurs, can experience temperatures below 0°F.

2.4.4 Geology

The Geologic Map of the northwest part of the Goldendale 1:100,000 Quadrangle maps the Property as Columbia River Basalts. The map describes the basalts as being gray black and rusty brown weathered, medium- to coarse-grained. The basalts typically have blocky columns or vertical platy joints.

Based on previous reports (Appendix D) the depth to bedrock ranges from 7.2 to 10 feet bgs at the Property. The general stratigraphy of the Property, from the surface down, consists of 0 to 1 feet of fill underlain by 1 to 7 feet of silt/clays underlain by less than 6 inches of weathered basalt underlain by basalt bedrock.

2.5 PREVIOUS INVESTIGATIONS

Previous investigations on the property were conducted following the 2012 fuel release. Investigation and excavation activities were limited to the eastern portion of the property near the location of the 2012 release (Figure 3). Limited subsequent sampling was completed in the ROW to the north and near the former fueling areas in the central property area. The report completed on behalf of Carson Oil by Tim O'Gara is included as Appendix D.

Following the 2012 spill, fourteen soil borings (B-1 through B-14) and four monitoring wells (MW-1 through MW-4) were completed on the property. Soil and groundwater samples were collected at each of these locations, however no collection methodology was included in the O'Gara report pertaining to the one-time grab samples collected from the borings. Results of soil sample analyses indicated that TPH-G and benzene are present at the Property at multiple locations that exceed MTCA Method A cleanup levels. These samples were not analyzed for diesel-range hydrocarbons (TPH-D).

Figure 2 depicts sample locations B-1 through B-14 as well as samples BH-32 through BH-34 and monitoring wells MW-1 through MW-4. Locations where samples exceeded MTCA Method A cleanup levels are depicted in red.

Groundwater samples collected from MW1 through MW-4 indicated that TPH-G exceeded Method A cleanup levels in groundwater samples from MW-2, MW-3, and MW-4. Benzene and toluene were detected in samples from MW-1, MW-2, and MW-3. Contaminant levels were highest at MW-2, the northernmost well, where TPH-G, benzene and toluene all exceeded MTCA Method A cleanup criteria.

In April 2012 soil was excavated at the spill site to the top of the bedrock. Nineteen conformational soil samples collected from the excavation base and sidewalls were analyzed for

gasoline-range hydrocarbons (TPH-G) and benzene, toluene, ethylbenzene and xylenes (BTEX). All of the samples had TPH-G at concentrations that exceed the MTCA Method A cleanup level of 30 mg/kg (when benzene is present). BTEX was also detected in all of the samples.

In 2015 Ecology completed a supplemental assessment of the Columbus Square property located to the north of the Property. As a component of this assessment, soil borings BH-32 through BH-34 (Figure 2) were completed in the right-of-way adjacent to the north property boundary of the Property. Soil samples collected from borings BH-32 and BH-33 exceeded MTCA Method A cleanup levels for TPH-G, and BH-33 exceeded MTCA Method A cleanup levels for naphthalene.

3 TECHNICAL ISSUES FOR THE REMEDIAL INVESTIGATION

This section summarizes the technical issues to be considered for the RI that were identified from previous investigations and the operational history of the Property. These technical issues may be modified as appropriate, based on the results of the RI.

3.1 CONTAMINANTS OF POTENTIAL CONCERN

The proposed preliminary cleanup levels are MTCA Method A cleanup levels for unrestricted land use.

Previous investigations detected concentrations of one or more of the COPCs over the proposed cleanup levels in groundwater and soil at the Property. The COPCs detected above the proposed cleanup levels in previous investigations conducted at the Property include:

- Gasoline-, diesel-, and oil-range hydrocarbons in soil and groundwater;
- Naphthalene in soil and groundwater; and
- BTEX in soil and groundwater.

In addition to these COPC, soil and groundwater samples will be analyzed for additional contaminants as required by MTCA (Table 830.1). These additional analyses are detailed in Sections 5.4 and 5.5.3.

3.2 MEDIA OF CONCERN AND PATHWAYS

Groundwater and soil are the media of concern for the Property. Potential media of concern that will be further evaluated as part of the RI include vapor intrusion to nearby buildings.

Potential pathways for the migration of COCs include:

- Dermal contact and ingestion of soils:
- Leaching from soil to groundwater;
- Lateral and vertical transport in groundwater; and
- Volatilization from soil and/or groundwater to indoor ambient air.

4 KNOWN OR SUSPECTED HUMAN AND ENVIRONMENTAL RECEPTORS

A review of previous data collected on the Property indicates the following potential receptors should be considered in the evaluation of impacts on human health and the environment:

- Workers who contact contaminated soil in the future during construction, if no worker protection controls are in place;
- Humans who inhale contaminated soil particles in the future during remedial action activities, if no protection controls are in place;
- Accidental contact or consumption of groundwater during investigation, remediation, and/or construction work by humans. Drinking water is supplied by the City of Goldendale and the shallow perched groundwater is likely not potable but for this Preliminary Site Conceptual Model groundwater will still be considered a potential source of drinking water; and
- Humans who inhale indoor air contaminated via vapor intrusion by volatilization of contaminated shallow groundwater or shallow soil.

These potential human receptors have been considered in the scope of work. Potential ecological receptors will be evaluated with a terrestrial ecological evaluation (TEE) as part of the RI as well. The CSM will be refined as part of the RI.

5 REMEDIAL INVESTIGATION SCOPE OF WORK

This section provides the approach and scope of work for the RI. The scope of work is designed to fully assess the vertical and lateral extent of impacts on the Property and to provide sufficient information to evaluate and select a technically feasible cleanup alternative.

Forty-one additional borings, six groundwater monitoring wells, and two vapor points will be completed to assess conditions across the Property. Borings will be concentrated near the boundaries of known soil impacts and former bulk fueling infrastructure, such as pump islands and transfer stations.

5.1 PROPOSED ACTIVITIES

The proposed locations for each of the soil borings, groundwater monitoring wells, and soil-vapor sampling probes are shown on Figure 2. The selection rationale is as follows:

- Borings SB-1 through SB-9 are placed to assess the area surrounding the 2012 excavation;
- Borings SB-10 through SB-13 are designed to assess the area near B-12 and the former tank car loading racks;
- Borings B-11 and MW-4 were impacted during the 2012 sampling event, thus indicating that the southern dispenser island slab has impacts extending beneath the northern edge. Borings SB-9, SB-14 through SB-16 will evaluate soil conditions along the remainder of the slab and are designed to delineate the southern lateral limits of soil impacts;

- Borings SB-16 and SB-17 are designed to assess the former 3-stall garage. The former use of this garage is unknown, however if the samples collected indicate impacts in the heavy oil range then additional sampling would need to occur and waste oil constituents would be added at that time;
- Borings SB-17 through SB-20 are designed to delineate the southern lateral limits of soil impacts;
- Borings SB-21 through SB-23 are sited to evaluate conditions near the former card lock and investigate potential sources of the soil impacts discovered in BH-32;
- Boring B-13 indicates that soil impacts extend beneath the northern dispenser slab. SB-24 and SB-25 are placed to evaluate if the impacts extend out beyond the northern edge of the slab and to evaluate conditions near the former card lock and investigate potential sources of the soil impacts discovered in BH-32;
- Borings SB-26 through SB-29 will delineate the lateral extent of soil impacts near BH-32;
- Borings SB-30 through SB-35 are sited to delineate the northern extent of soil impacts;
- Borings SB-36 through SB-41 are co-located with borings B-7, B-12, B-11, B-10, B-14 from the previous investigation to verify contamination and/or rule out additional constituents of concern;
- Monitoring wells MW-5 thru MW-7 will be placed along the northern extent of the ROW and will be used to evaluate downgradient groundwater conditions;
- Monitoring well MW-8 will investigate down-gradient site conditions and potential groundwater impacts from the Property toward the northeast;
- Monitoring well MW-9 will investigate up-gradient site conditions and potential groundwater impacts to the Property from the south. In addition, this groundwater monitoring well will help determine groundwater flow direction across the Property; and
- Vapor Points VP-1 and VP-2 will be installed near the two remaining structures on the Property (the office building in the SW corner of the Property and the warehouse to the northwest) to detect potential soil vapor impacts.

Proposed soil boring locations are subject to change based on the location of existing utilities, access restrictions, worker safety, or other conditions encountered in the field.

The exact location of the piping runs to the former dispensers are not currently known and will be located during the on-property private locate to be conducted.

The underground piping running from the former ASTs to the pumps are covered by concrete. Borings SB-1 and MW-3 are located adjacent the concrete pad. As detailed in the O'Gara report, soil beneath this section of piping is impacted. One additional boring SB-36 will be added adjacent to the north of the concrete pad to better investigate the extent of impacts along that section of piping.

If the piping to the former dispenser islands are identified during the private locate, boring locations near the two concrete pads may be adjusted or additional borings may be added. If this is the case a short memo will be sent to Ecology for approval.

Additional boring locations and potential "step out" borings may be required to fully delineate potential petroleum hydrocarbon impacts. Specifically, additional or replacement locations may be selected in the field based on the results of utility clearances subject to the limitations of access agreements. "Step out" borings may be proposed in the field on-site based on field screening, though our experience is that the most productive "step out" borings off-site are best sited based on laboratory analysis of the samples. If laboratory analysis indicates exceedances of MTCA cleanup levels, particularly in off-property samples, then additional borings will be proposed in a short memo to Ecology.

The data collected during 2012 investigation activities do not include all of the analyses required under MTCA, but are useful for screening TPH concentrations to identify if an area may impacted. The additional samples proposed above will be used to meet MTCA requirements.

5.2 PROPERTY ACCESS

Soil Borings SB-28 through SB-35 as well as monitoring wells MW-5 through MW-7 are located in the city ROW just north of the property. Leidos will obtain street use or public right-of-way access permits from the City of Goldendale to install these sample points.

If the analytical data collected during this phase of the RI indicates that impacts may extend beyond the Property or ROW, an access agreement will then be requested by Leidos and the PLPs prior to conducting any work on private property.

5.3 UTILITY LOCATE

Prior to beginning the RI field work, Leidos will contact the Utilities Underground Location Center to request location of all public utilities in the vicinity of the proposed locations. In addition, Leidos will subcontract with a private utility locating contractor to locate other potential infrastructure and buried objects that would not typically be identified through the public utility locating process.

5.4 SOIL BORINGS

In order to comply with current CEMC requirements for subsurface asset avoidance, each boring will initially be cleared to a depth of at least 8 feet bgs using either an air-vacuum excavation system or stainless steel hand auger to avoid damage to buried utilities or other subsurface infrastructure. From ground surface to 8 feet bgs, all soil samples will be collected knife by a split spoon stainless steel hand-auger. The split spoon auger will minimize the loss of volatiles by allowing the sample to be relatively undisturbed prior to sample collection.

At a minimum, two soil samples will be collected and submitted for laboratory analysis: one from the capillary fringe, and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to sufficient depth to define the vertical extent of petroleum-hydrocarbon impacts, if present. Additional soil samples may also be submitted based on field-screening observations.

For example, the sample producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indication of petroleum-hydrocarbon impact may also be submitted for laboratory analysis

Soil sampling procedures are detailed in the SAP (Appendix A).

5.4.1 Soil Sample Analysis

Selected soil samples collected in soil borings, monitoring well borings, and vapor probe borings will be submitted to Eurofins Lancaster Laboratories for the following analyses:

- TPH-G by ECY 97-602 NWTPH-Gx;
- TPH-D and heavy oil-range hydrocarbons (TPH-HO) by ECY 97-602 NWTPH-Dx,;
- Methyl tertiary butyl ether (MTBE), Ethylene Dibromide (EDB), Ethylene Dichloride (EDC), BTEX, by USEPA 8260B;
- Total lead by USEPA 6010B.
- Naphthalene by USEPA 8270; and
- Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs) by USEPA 8270 SIM.

Duplicate soil samples will be collected at a rate of one per each 20 soil samples and submitted for the above-referenced analyses to ensure quality assurance and quality control (QA/QC). Additional QA/QC samples will include one trip blank to accompany each sample cooler and equipment rinse samples to verify equipment decontamination procedures. Equipment rinse sampling will be performed by collecting laboratory-supplied distilled water that has been used as the final rinse following equipment decontamination procedures. Equipment rinse samples will be collected at a rate of one per sample collection method. Trip blank and equipment rinse QA/QC samples will be submitted for the following analyses:

- TPH-G by ECY 97-602 NWTPH-Gx; and
- BTEX by USEPA 8260B.

5.5 GROUNDWATER MONITORING WELLS

5.5.1 Monitoring Well Installation and Sampling

In order to comply with current CEMC requirements for subsurface asset avoidance, each boring will initially be cleared to a depth of at least 8 feet bgs using an air-vacuum excavation system or similar “soft-dig” method to avoid damage to buried utilities or other subsurface infrastructure. Within this interval, the diameter of the boring is required to be at least 3 inches larger than the largest diameter of tooling to be advanced into the boring. Air-vacuum excavation services will be provided by Cascade Drilling, L.P. (Cascade) of Woodinville, Washington.

A Leidos representative will oversee the borehole clearance process and will collect soil samples from the boring at approximate 1-foot intervals using a stainless steel hand-auger. Samples will be classified and logged in accordance with the Unified Soil Classification System and will be field-screened for the presence of petroleum hydrocarbons by visual and olfactory observations, headspace vapor measurements using a PID, and sheen testing.

Following completion of the borehole clearance procedure, a direct-push drilling rig will be used to advance each boring to the depth necessary to meet the monitoring well objectives at each

location. Within this interval, the drill rig will collect a continuous core sample. The cores will be logged in the field by a Leidos representative and field-screened for the presence of petroleum hydrocarbons.

At a minimum, two soil samples will be collected and submitted for laboratory analysis: one from the capillary fringe, and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to sufficient depth to define the vertical extent of petroleum-hydrocarbon impacts, if present. Additional soil samples may also be submitted based on field-screening observations. For example, the sample producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indication of petroleum-hydrocarbon impact may also be submitted for laboratory analysis.

Monitoring well construction details are presented in the SAP (Appendix A).

5.5.2 Monitoring Well Location and Elevation Survey

Following installation of the new wells, Leidos will subcontract a Washington State licensed land-surveying firm to perform a location and elevation survey of the new monitoring wells. Monitoring well elevation measurements will be made to the nearest 0.01 foot at the ground surface (i.e., top of well-box lid) and at the top of the well casing, relative to the North American Vertical Datum of 1988. Monitoring well location measurements will be made relative to the North American Datum 1983 High Accuracy Reference Network [NAD83(HARN)].

5.5.3 Groundwater Monitoring

Following completion of the monitoring well installation activities, each of the six new monitoring wells will be sampled and added to a quarterly groundwater monitoring program for the Property.

Groundwater monitoring will consist of water level measurements, and groundwater samples will be collected for laboratory analysis. When conditions permit, groundwater samples will be collected using low-flow purging and sampling techniques as detailed in the SAP. Samples will be submitted to Eurofins Lancaster Laboratories for the following analyses:

- TPH-G by ECY 97-602 NWTPH-Gx;
- TPH-D and TPH-HO by ECY 97-602 NWTPH-Dx, without silica gel cleanup;
- BTEX, MTBE, and EDC by USEPA 8260B;
- EDB by USEPA 504.1;
- Naphthalene by USEPA 8270;
- PAHs by USEPA 8270 SIM; and
- Dissolved lead by USEPA 6010B.

Laboratory analytical reporting limits for groundwater sample analyses are presented in Table 1 of the QAPP (Appendix B).

5.6 SOIL VAPOR SAMPLING PROBES

5.6.1 Soil Vapor Sampling Probe Locations

The proposed locations for the two soil-vapor sampling probes are shown on Figure 2. The former office building is upgradient to the known releases and VP-1 is positioned between the impacts and the building. VP-2 (Warehouse) was placed closest to BH-32 which is the closest impacted sample point. It is our opinion that as a screening level sample is sufficient to determine if subslab and indoor air sampling are needed.

The soil vapor sampling probe locations shown on Figure 2 are proposed; actual probe locations may differ based on utilities or conditions encountered in the field.

Vapor probe installation and sampling procedures are detailed in the SAP (Appendix A).

5.6.2 Soil Vapor Sampling Analytical Methods

Soil vapor samples will be submitted to Euronfins Air Toxics for the following analyses:

- BTEX, MTBE; and naphthalene by EPA Method TO-15 (Low Level); and
- Oxygen, carbon dioxide, methane, nitrogen, and helium by American Society for Testing and Materials (ASTM) D1946.

Standard laboratory turn-around time will be requested for each of the above-referenced analytical methods. The canisters will be packaged for shipping and sent to the laboratory under chain of custody protocol. Chain of custody will be maintained and documented at all times, including sealing the shipping container with chain of custody seals.

Soil gas samples will be collected from two soil vapor probes, along with a duplicate and an ambient air sample. In addition, an equipment blank will be collected by collecting a sample of nitrogen through the probe materials prior to installation activities

5.7 INVESTIGATION-DERIVED WASTE

Soil cuttings from hand auger, air knifing, or drilling of soil borings will be contained in 55-gallon Department of Transportation (DOT) approved drums, which will be left on the subject property for temporary storage. Following receipt of laboratory analytical data, the soil will be removed for disposal.

All decontamination and purge water from monitoring well development will be stored in 55-gallon DOT approved waste drums. This waste water will be transported for disposal at a permitted facility by an approved disposal subcontractor.

5.8 ECOLOGICAL IMPACT MONITORING

As part of the RI, the Property will be assessed for risk to terrestrial organisms using criteria described in WAC 173-340-7491. According to MTCA, a Terrestrial Ecological Evaluation (TEE) is conducted for the following reasons:

- To determine if the existence of hazardous substances at a site could harm plants or animals.
- To identify and characterize the existing or potential threats to the plants or animals that may be exposed to hazardous substances in the soil.

- To establish cleanup levels to protect the plants and animals, as well as the ecologically important functions of the soil biota.

Certain circumstances provide a primary exclusion from any further ecological evaluation either because the contaminants have no pathway to harm the plants or animals (e.g., they are under buildings or deep in the ground), or because there is no habitat where plants or animals live near the contamination, or because the contamination does not occur at concentrations higher than occurs naturally in the area. If a site meets any one of these primary exclusions, the ecological evaluation is complete.

If the site does not meet the exclusion criteria described in this section of MTCA, then a Terrestrial Ecological Evaluation (TEE) or simplified TEE will be conducted. These evaluations involve examination of the nature of potential receptors, the toxicity of on-site contaminants to terrestrial organisms, and the presence of exposure pathways.

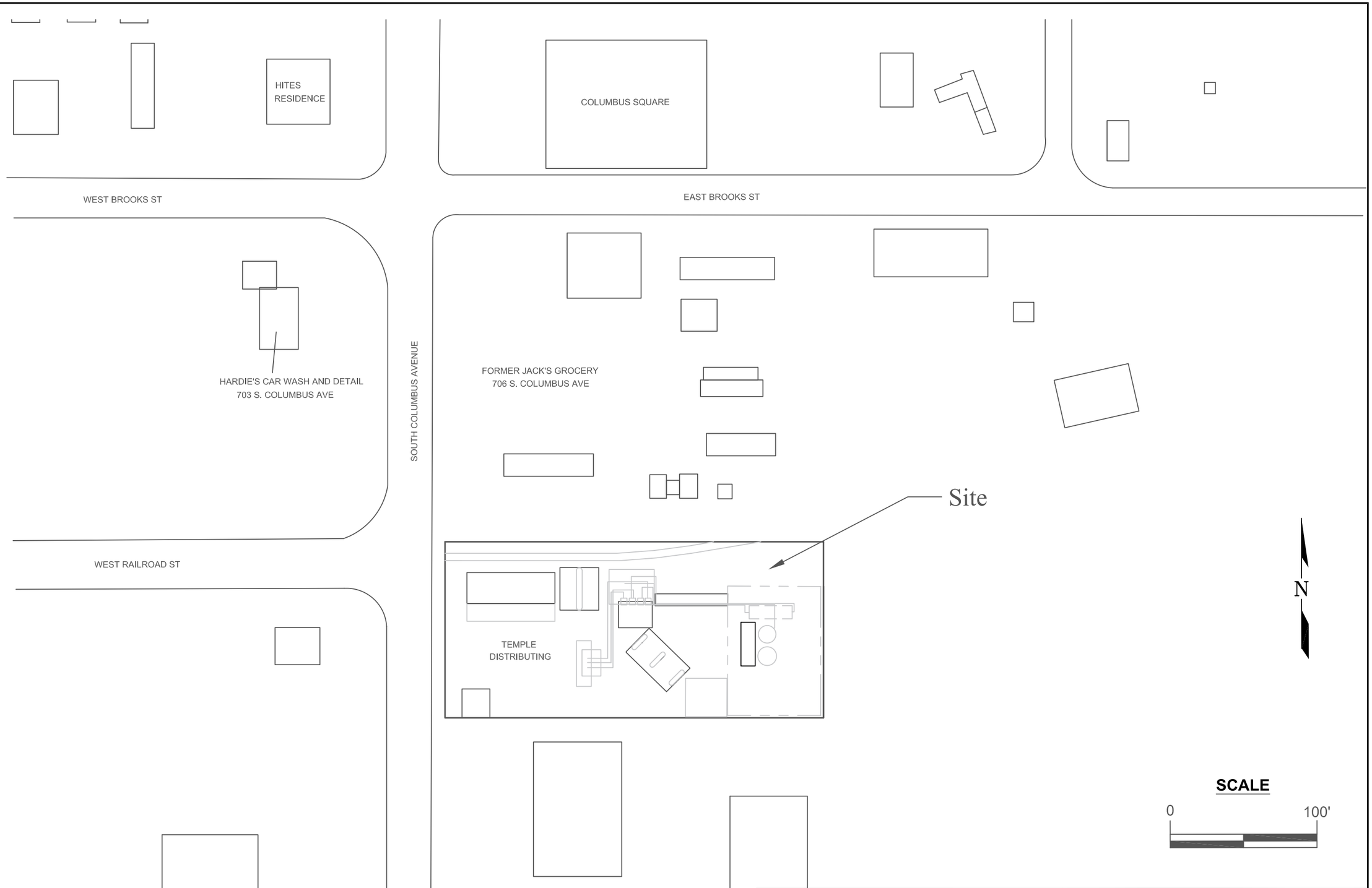
The type of evaluation required, TEE or simplified TEE, is dependent upon four primary concerns about a site in relation to terrestrial ecological receptors, as described in MTCA. If none of the listed situations of concern are applicable to the site, then the site qualifies for a simplified TEE. The purpose of the simplified terrestrial ecological evaluation process is to identify those sites that do not have a substantial potential for posing a threat of significant adverse effects to terrestrial ecological receptors, and thus remove them from further ecological consideration during the remedial investigation and cleanup process. For the remaining sites, the process provides several options, including chemical concentrations that may be used as cleanup levels, and the choice of developing site-specific concentrations using bioassays or conducting a site-specific evaluation. Under MTCA, it is always an option to conduct a site-specific terrestrial ecological evaluation and to develop site-specific cleanup levels.

6 SCHEDULE

The schedule for conducting the RI is presented Section VII of the Enforcement Order. The anticipated schedule for implementation of this investigation is as follows:

1. Initiation and completion of RI Field Investigations – per the Order field activities will be initiated within 60 days following the approval of the Final RI Work Plan and completed within 180 days.
2. Draft RI Report – within 90 days of the completion of the RI activities.
3. Final RI Report- within 60 days after receipt of Ecology comments, subsequent to public comment.

Figures



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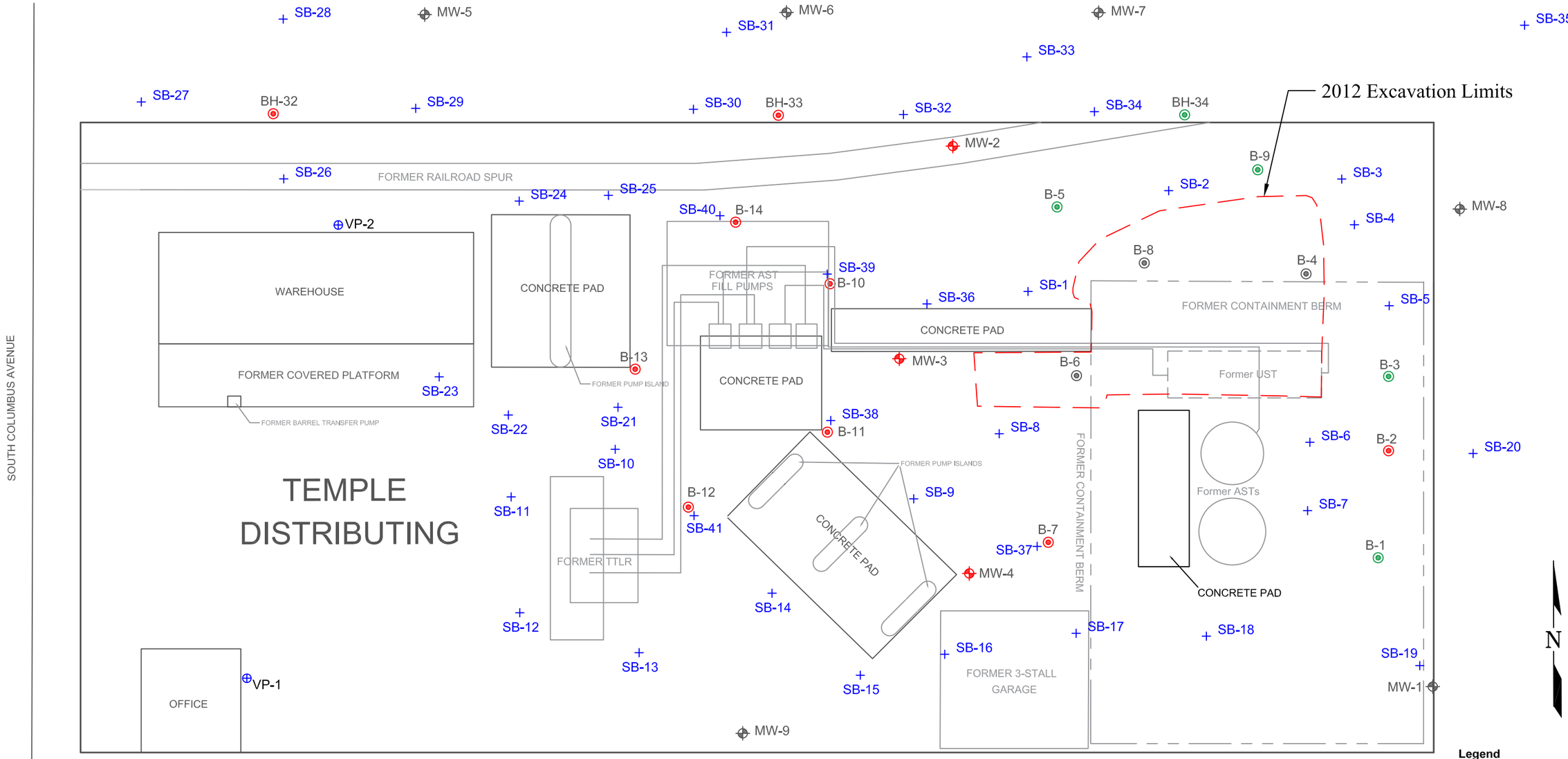
Former Temple Distributing Site 808 S. Columbus Ave. Goldendale, Washington	FIGURE 1 Site Vicinity Map
	DATE: 7/17/2017 | DRAWING: 375289_SiteMap.dwg



SCALE

0 20 40'

Legend

MW-1	⊕	Existing Monitoring Well
B-1	◉	Existing Soil Boring
MW-5	⊕	Proposed Monitoring Well
SB-10	+	Proposed Soil Boring
VP-1	⊕	Proposed Soil Vapor Point
AST		Aboveground Storage Tank
UST		Underground Storage Tank
TTLR		Tank Truck Loading Rack

Note: Sample locations in RED are above MTCA A cleanup levels.
Sample locations in GREEN are below MTCA A cleanup levels.

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Former Temple Distributing Site
808 S. Columbus Ave.
Goldendale, Washington

FIGURE 2
PROPOSED SAMPLE LOCATIONS

DATE: 9/22/2017 | DRAWING: 375289_SiteMap.dwg

Appendix A:
SAP

REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PLAN
FORMER TEMPLE DISTRIBUTING
808 South Columbus Ave.
Goldendale, Washington

October 3, 2017

Prepared for:
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REMEDIAL INVESTIGATION SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

The Sampling and Analysis Plan (SAP) for the former Temple Distributing Bulk Plant Remedial Investigation Work Plan describes specific activities, methods and procedures that will be used during data collection activities associated with the Remedial Investigation Work Plan. Standard operating procedures in this document govern all aspects of field measurement, testing, sample collection, and documentation efforts to ensure that samples collected are representative of conditions in the field, measurements and observations are clearly and concisely documented, and the information obtained is valid.

2.0 PROGRAM OBJECTIVE

The objectives of the SAP are to collect sufficient and valid analytical data to determine compliance with the Remedial Investigation Work Plan. This summary includes descriptions of the overall data quality objectives (DQOs), prioritized data uses, appropriate analytical levels, contaminants of concern, analytical program, and critical samples.

3.0 SAMPLE DESIGNATION

The following section describes designations assigned to each individual component of the Remedial Investigation Work Plan. The sample designation protocols will be adhered to during the sample collection procedures to maintain sample data integrity. The sample number will include the sample location and investigative method. Specific sample information such as location number and depth will be maintained in the field logs.

3.1 SOIL SAMPLE DESIGNATION

Subsurface soil boring samples will be designated with the number corresponding to the boring and the depth at which the sample was collected. Sample names will follow the format:

- SB-1-10.0

QA/QC samples such as method blanks, trip blanks, field blanks, and duplicate samples collected during the Remedial Investigation will be labeled with unique sample identifiers and the date at which the sample was collected. A record of the QA/QC samples collected will be kept in the field notebook along with the chain of custody (COC). The following format will be followed for QA/QC samples.

Equipment Rinsate Blanks

- ER–1-070717

Trip Blanks

- TB–1-070717

Duplicate Samples

- DUP-1-070717

3.2 GROUNDWATER SAMPLE DESIGNATION

Groundwater samples collected from proposed or existing monitoring wells will be labeled according to the monitoring well ID and the date of collection. The date and time of collection will be recorded in the field logbook and on the COC.

- Example: a groundwater sample from monitoring well MW-14 collected on July 7, 2017, will be labeled MW-14-070717.

QA/QC samples collected during groundwater sampling will be labeled in the same manner as QA/QC samples for soil.

4.0 STANDARD OPERATING PROCEDURES AND FIELD INVESTIGATIVE PROGRAM ELEMENTS

This section provides standard operating procedures (SOPs) for tasks to be performed during the Remedial Investigation. SOPs are provided for the following program elements:

- Soil Sampling;
- Decontamination of Equipment;
- Monitoring Well Design, Installation and Construction;
- Development of Groundwater Monitoring Wells;
- Groundwater Sampling;
- Groundwater Elevation Monitoring; and
- Vapor Probe Installation and Sampling.

4.1 SOIL SAMPLING

Appropriate soil sampling procedures will be followed at all times to ensure that representative soil samples are provided for analysis and that the act of sampling does not contribute to further contamination by cross-contamination at a particular site. Care will be taken to quickly collect and preserve soil samples in order to minimize the potential loss of volatile organic compounds. All techniques will be thoroughly documented to ensure future re-creation. The location of each sample will be mapped using a measuring tape or wheel and referenced to a local permanent feature where possible.

In order to avoid possible damage to undetected underground utilities, soil borings will be advanced for the first eight feet with a stainless steel hand-auger and/or air knife. From ground surface to eight feet below ground surface all soil samples will be collected in advance of the air knife by a split spoon stainless steel hand-auger. The split spoon auger will minimize the loss of volatiles by allowing the sample to be relatively undisturbed prior to sample collection.

4.1.1 Sample Frequency

Soil sampling in the upper 8 feet of the boring will be performed using a split spoon stainless steel hand auger at a sampling interval of approximately 1 foot. Below 8 feet, the Geoprobe rig will collect soil samples continuously until the final depth.

Soil samples will be classified in accordance with the Unified Soil Classification System. In addition, each sample will be field screened for the presence of petroleum hydrocarbons by headspace vapor measurements using a photo-ionization detector (PID) and sheen testing.

At a minimum, two soil samples from each boring will be submitted for laboratory analysis: one from the capillary fringe, and the second from the bottom-most sample interval attained in the boring. The bottom-most sample will be used to demonstrate that the sampling effort has advanced to a sufficient depth to define the vertical extent of petroleum-hydrocarbon impacts. Additional soil samples may also be submitted based on field-screening observations. For example, the sample producing the highest PID readings, strongest sheen, or otherwise having the greatest visual or olfactory indication of hydrocarbon impacts may also be submitted for laboratory analysis.

The samples will be examined and the following items will be noted in the boring log:

- Color,
- Moisture content (dry, damp, moist, or wet),
- Lithology (using the Unified Soil Classification system [USCS], or equivalent),
- Geological interpretation, if possible (e.g., fill, topsoil, alluvium, till, etc.),
- Presence of sheen or LNAPL,
- Other indications of contamination (e.g., discoloration), and
- Field screening results (see below).

4.1.2 Field Screening

4.1.2.1.1 Headspace Vapor

Each sample will be field screened to obtain a relative estimate of its volatile organic carbon (VOC) concentration. This field screening will be performed by measuring the concentration of VOCs in the headspace above the sample in a closed container using a field flame-ionization detector (FID) or photoionization detector (PID). The field screening will be performed by placing the soil into a sealed plastic bag (e.g. Ziploc), disaggregating the soil by hand, allowing the sample to equilibrate for at least five minutes, and then opening the bag slightly, inserting the instrument probe, and measuring the VOC concentration in the headspace. If the ambient temperature is below 65ºF, the sample will be warmed (e.g., in a heated vehicle) before the headspace measurement is made.

4.1.2.1.2 Sheen Testing

Sheen testing will be conducted by placing soil in a pan of water and observing the water surface for signs of sheen. Sheens are classified as follows:

• ***Slight Sheen***: Light, colorless, dull sheen. The spread is irregular and dissipates rapidly;

• ***Moderate Sheen***: Light to heavy sheen, may show color/iridescence. The spread is irregular to flowing. Few remaining areas of no sheen are evident on the water surface;

• ***Heavy Sheen***: Heavy sheen with color/iridescence. The spread is rapid and the entire water surface may be covered with sheen.

4.1.3 Soil Chemical Analyses

Selected soil samples will be submitted to Eurofins Lancaster Laboratories Environmental, LLC (Lancaster Laboratories) for the following analyses:

- Gasoline-range hydrocarbons (TPH-G) by ECY 97-602 NWTPH-Gx;
- Diesel-range hydrocarbons (TPH-D) and heavy oil-range hydrocarbons (TPH-HO) by ECY 97-602 NWTPH-Dx,;
- Methyl tertiary butyl ether (MTBE), ethylene dibromide (EDB), ethylene dichloride (EDC), benzene, toluene, ethylbenzene, and total xylenes (BTEX), by USEPA 8260B;
- Total lead by USEPA 6010B.
- Naphthalene by USEPA 8270; and
- Carcinogenic polycyclic aromatic hydrocarbons (cPAHs) by USEPA 8270 SIM.

4.2 DECONTAMINATION OF EQUIPMENT

Field equipment used during drilling soil borings and sampling will be decontaminated prior to use and during sampling to reduce the potential for the introduction of contamination and cross-contamination in accordance with the guidelines and procedures set forth in this document. These procedures are necessary to ensure quality control in decontamination of field equipment and to serve as a means to identify and correct potential errors in sample collection and sample handling procedures.

4.2.1 Equipment and Materials

Equipment and materials that will be used to decontaminate sampling equipment are listed below.

- Distilled Bottled Water
- 5-gallon buckets
- Scrub brush and long handled bottle brush
- Trash receptacle
- Aluminum foil

- Plastic sheeting
- Liquinox (or equivalent)

4.2.2 Procedure

Decontamination of all non-disposable field sampling equipment, field instruments and sample containers will be conducted in a thorough and step-wise manner as described below. New, disposable Nitrile gloves will be worn when handling clean sampling equipment and monitoring well construction materials to ensure that the equipment is not cross-contaminated. Decontamination procedures shall be documented in the field notebook.

4.2.2.1 Exploration and Construction Equipment

Prior to use, between locations, upon arriving at the site and when leaving the site; augers, direct-push rods, well screens, casings and other non-sampling equipment shall be certified clean or decontaminated in accordance with the following procedures:

- Move equipment to designated decontamination area;
- Clean thoroughly (inside and outside) with a high-pressure steam cleaning unit (water at 1,500 psi);
- Allow to air dry; and
- Store in a clean area on plastic sheeting.

4.2.2.2 Sampling Equipment

All non-disposable sampling equipment used for soil and water sampling will be decontaminated between each sample. The decontamination procedure is provided as follows:

- Rinse thoroughly with potable water;
- Scrub with Liquinox and water to remove any visible dirt;
- Rinse thoroughly with potable water; and
- Rinse with distilled water.

Sampling equipment shall be stored in the same manner as non-sampling equipment described above.

4.2.2.3 Sample Containers

Sample containers will be laboratory cleaned and will be supplied by the analytical lab performing the analyses.

The decontamination fluids generated during decontamination procedures will be treated as though they are contaminated and will be contained in 55-gallon drums, marked and

secured until a proper disposal method is developed and implemented based on analytical test results.

4.3 MONITORING WELL DESIGN, INSTALLATION AND CONSTRUCTION

Following the completion of drilling and sampling activities at each of the proposed well location, each boring will be completed as a 2-inch diameter monitoring well in accordance with the Washington Administrative Code (WAC) Minimum Standards for Construction and Maintenance of Wells (Chapter 173-160 WAC).

Wells will be constructed using a 2-inch-diameter PVC casing with 0.020-inch, factory-slotted screen. The screen-interval for the wells are anticipated to be from approximately 4 to 10 feet bgs, but exact depths will depend on the water table at that location. Each well screen will be positioned to straddle the water table during anticipated seasonal fluctuations

4.4 DEVELOPMENT OF GROUNDWATER MONITORING WELLS

The purpose of the development activities is to set the sand pack and to remove fine-grained material from the sand pack and casing. This is done to enable the collection of groundwater samples with a low turbidity**.** Wells will not be developed until at least 24 hours after being installed in order to allow the surface seal to adequately cure. If LNAPL are observed in any new wells, the LNAPL will be removed prior to development. The well will be allowed to stabilize after development for at least 24 hours before being sampled. Existing wells will be redeveloped.

4.4.1 Well Development Procedures

- Record the date and time of arrival, general site conditions and other applicable field observations related to the Property.
- Verify the locations and conditions of the wells. The least contaminated wells (if known) and background wells should be developed first to minimize the potential for cross contamination.
- Check the monitoring instruments by performing one calibration check. Record the results in the field logbook.
- Inspect the well to determine the condition of the surface casings, surface seal and well identification.
- A water level indicator (electronic) will be used to measure depth to water in the well. The total depth of each well will be measured. The measurement will be used to calculate the thickness of the water column (height of standing water in the well). Compare well depth to completion data and report significant differences that may indicate silt buildup in the well.
- Well development will consist of surging for 10 minutes and pumping at least 10 well-casing volumes of ground water from the well using an electric submersible pump until water produced from the well is clear and free of sediment.

4.5 GROUNDWATER SAMPLING

Proper sampling protocol must be followed to ensure that representative samples of groundwater are provided for analysis and that the act of sampling does not contribute to further impact at the site or cross-contamination of samples. Techniques employed shall be thoroughly documented.

The pump (or intake hose) will be placed near the middle or slightly above the middle of the screened interval. The well will be purged at a rate of 100 to 500 ml/min; the goal is to minimize drawdown in the well (ideally less than 10 cm drawdown).

Purge-water temperature, pH, specific conductance, dissolved oxygen, oxidation-reduction (redox) potential, and turbidity will be monitored using an in-line flow cell. Readings will be taken every 3 to 5 minutes.

Purging will cease when the following parameters have stabilized as defined below for three successive readings or when at least three well casing volumes has been purged:

- Temperature: $\pm$ 1 ºC;
- pH: $\pm$ 0.1 units;
- Specific conductance: $\pm$ 10 percent; and
- Dissolved oxygen or turbidity: $\pm$ 10 percent.

To minimize delays in field parameter stabilization and potential bias in analytical testing results, any vents or other potential sources of air bubbles in the pump discharge tubing or in-line flow cell should be identified and sealed off (or otherwise isolated) prior to purging or as soon as possible after purging begins.

If well yield is so low that continuous flow is lost during well purging even at the minimum sustainable purge rate, turn the pump off and allow the well to recover as much as possible (but not longer than 24 hours). If only unfiltered samples will be collected for metals/inorganics, allow the well to recover overnight. Do not attempt to maximize purge volume by lowering the pump to the bottom of the well. After the water level in the well has recovered, collect the required samples with the pump placed near the middle of the screened interval. If using a non-dedicated pump, be sure to minimize disturbance of the water column by lowering the pump slowly into the well.

4.5.1 Groundwater Chemical Analyses

Groundwater samples will be submitted to Eurofins Lancaster Laboratories, LLC (Lancaster Laboratories) for the following analyses:

- TPH-G by ECY 97-602 NWTPH-Gx; and
- TPH-D and TPH-HO by ECY 97-602 NWTPH-Dx, without silica gel cleanup;
- BTEX, MTBE, and EDC by USEPA 8260B;
- EDB by USEPA 504.1;

- Naphthalene by USEPA 8270;
- cPAHs by USEPA 8270 SIM; and
- Dissolved lead by USEPA 6010B.

4.6 GROUNDWATER ELEVATION MONITORING

Accurate groundwater monitoring data is essential to development of a thorough understanding of groundwater flow dynamics and is an integral part of the site hydrogeologic investigation. The evaluation of groundwater movement within and between water-bearing zones requires frequent measurement of groundwater elevations over a period of time to determine whether temporal fluctuations in groundwater elevations and/or flow patterns exist.

The necessary frequency for measuring groundwater elevations depends on factors such as: 1) the goals of the investigation; 2) Site specific conditions; 3) the frequency of groundwater sampling (as water levels are always taken during sampling events) and/or 4) State or Federal regulations and requirements. Several different methods to conduct groundwater elevation monitoring are available. However, the level of accuracy is dependent upon the equipment used as well as accurate measurement and recording of data. Available methods include the use of battery operated electric water level meters and more sophisticated digital-analog, computerized, continuous-recording systems (pressure transducers). All instruments used in the field will be thoroughly decontaminated prior to well entry.

Groundwater elevations will be calculated using depth to water measurements, survey data and groundwater potentiometric maps will be created. Given the shallow uneven basalt layers depths to shallow groundwater may vary across the site. This will be evaluated during the drilling of borings and wells.

5.0 SOIL VAPOR SAMPLING PROBES

Soil vapor probe installation and sampling will meet requirements outlined in Ecology's Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action (Ecology, 2016a).

Soil borings will be advanced to a depth of 5.5 feet bgs using a hand auger. Each soil vapor sampling probe will consist of a shallow probe that will be installed at a depth of approximately 5.25 feet bgs.

Once each soil vapor probe has been advanced to its maximum depth, a soil vapor sampling probe consisting of a 6-inch long, 0.75-inch diameter stainless steel screen with a 0.0057-inch (0.15-millimeter) screen pore size. Each screen will be connected to a length of ¼-inch outside diameter (O.D.) Teflon® tubing via a Swagelok® fitting with a rubber compression ferule. The above-grade end of the soil vapor sampling probe tubing will be fitted with a Swagelok® stainless steel on/off control valve.

Each 6-inch long screen tip will be vertically centered in a 1-foot long interval containing standard sand pack, resulting in 3 inches of sand being above and below the screen. Each

sand pack will be covered with a 1-foot interval of dry granular bentonite, which is then covered with at least 2 feet of hydrated granular bentonite. The dry granular bentonite is emplaced immediately above the sand pack to ensure that hydrated granular bentonite slurry does not flow down to the probe screen and seal it off from the adjacent soil. The remainder of the borehole will be filled with hydrated granular bentonite slurry (mixed at the surface and poured in) to approximately 12 inches bgs. The top portion will be completed with a 1-foot thick cement cap. An 8-inch flush-mounted well box will be installed to protect the tubing line that is set in the cement cap.

5.1 SOIL VAPOR SAMPLE COLLECTION AND ANALYSIS

Once the soil probes are installed and the concrete at each vapor point has fully cured, vapor sampling activities will commence (minimum of 48 hours). Sampling will not be conducted during or immediately after a significant rain event due to the reduced effective diffusion coefficient and decrease in relative vapor saturation in the unsaturated zone. If rain is encountered prior to sampling, the event will be postponed at least 24 hours. Written documentation will be kept of field conditions including temperature, barometric pressure, wind direction and speed, humidity, and surface soil conditions. Records will also be kept of names of field personnel, dates and times of sampling, purge volumes and purge rate, sampling volume, and leak testing description.

Soil vapor samples will be collected in 6-liter Summa air-sampling canisters (Summa canisters), which will be provided by Air Toxics of Folsom, California. Each Summa canister used for sample collection will be individually certified (100-percent certified) to contain less than the reporting limit for each of the target compounds.

Prior to sample collection, the initial vacuum of each Summa canister will be measured to verify that the canister has not leaked or been inadvertently opened prior to the sampling event. The initial vacuum, which should be approximately 29 inches of mercury vacuum, will be recorded on the canister's identification tag and in the project log book.

Following the initial canister vacuum check, the sampling canister will be fitted with a sampling manifold, which will allow the sampling canister to be connected to another Summa canister that will be used for purging the sample collection train. The manifold is also equipped with a filter and a flow restrictor that is calibrated to provide a sampling flow rate of approximately 167 milliliters per minute (mL/min). This flow rate equates to a sampling interval of approximately 30 minutes for a 6-liter Summa canister.

After connecting the sampling manifold and purge canister, a preliminary leak check of the system will be performed. With the inlet to the manifold tightly capped, the purge canister will be opened momentarily and then shut, thereby applying a vacuum to the sampling manifold. Initial vacuum readings will then be recorded from both of the two vacuum gauges on the sampling manifold. After a period of approximately 5 minutes, the vacuum readings of each gauge will be checked again to verify that the initial vacuum levels have been maintained. If the vacuum readings between the initial and final reading differ, the manifold will be reconnected to the canisters and checked again until the system is leak

free. If, after a third attempt, a leak-free connection cannot be maintained, the sampling manifold will be removed from service and not used for sample collection.

Following completion of the preliminary leak check, the sampling manifold will be connected to the soil vapor sampling probe. Teflon® tubing (¼–inch outside diameter) will be used to connect the soil-vapor sampling probe control valve to the inlet of the sampling manifold. Swagelok® fittings with rubber compression ferrules will be used to make connections from the Teflon® tubing to the control valve and sampling manifold inlet.

As a secondary check for leaks or short circuiting, helium will be used as a tracer gas to test for ambient air leakage into the sampling system. To accomplish this, the entire soil-vapor sampling train (soil-vapor sampling probe, sampling manifold, sampling canister, and purge canister) will be contained in a shroud in which a helium-rich environment will be maintained throughout the duration of the sample collection. Laboratory-grade helium will be used as the tracer gas. During the duration of the sampling, the concentration of helium inside the shroud will be monitored using a Mark 9822, or equivalent, helium detector. During sample collection, the sampling technicians will attempt to maintain a concentration of helium of approximately 10 percent by volume in the sampling shroud.

Prior to collecting a soil-vapor sample, each soil-vapor sampling probe will be purged to remove stagnant air from the sample collection train. Purge volume will be based on the volume of air contained within the inner diameter of the soil-vapor sampling probe and all tubing connected to the inlet of the sampling canister. The sand pack volume of the soil-vapor sampling probe will not be included in the purge volume calculation, as it is assumed that the soil-vapor concentration in the sand pack will be in equilibrium with the surrounding soil. Three volumes will be purged from each soil-vapor sampling probe prior to sample collection. Assuming use of ¼-inch O.D. tubing and an approximate combined sampling probe and tubing length of 10 feet, it is estimated that the total purge volume would be equal to approximately 300 milliliters, which would equate to a purge time of approximately 2 minutes at a purge rate of 167 mL/min.

Following completion of the purge cycle, the valve on the sampling canister will be opened to begin sample collection. The start time and initial canister vacuum will be recorded in the project log book. Collection of the sample should require approximately 30 minutes. During this time, the sampling technician will periodically check the canister vacuum to verify that the canister is filling at the expected rate. The sampling technician will also monitor and maintain the concentration of helium leak-detection gas within the sampling shroud. Sample collection will be stopped when the vacuum gauge on the sampling canister indicates that between 3 to 5 inches of mercury vacuum is remaining in the sampling canister. Once sample collection is done, the final canister vacuum will be recorded on the canister ID tag and also in the project log book.

In order to verify sample collection, and laboratory quality assurance and quality control (QA/QC), one equipment blank and one duplicate soil-vapor sample will be collected. The QA/QC equipment blank will be collected by passing laboratory-certified nitrogen through a section of Teflon® tubing, and the sampling manifold, into a 6-liter Summa canister.

The QA/QC duplicate sample will be collected using a duplicate-sampling manifold, which will allow two sample collection canisters to be filled simultaneously in a parallel configuration. Due to the doubling of the sample volume to be collected for a duplicate sample, the sample collection time for this sample will be approximately 60 minutes.

Soil vapor samples will be submitted to Air Toxics for the following analyses:

- BTEX, MTBE; and naphthalene by EPA Method TO-15 (Low Level); and
- Oxygen, carbon dioxide, methane, nitrogen, and helium by American Society for Testing and Materials (ASTM) D1946.

Standard laboratory turn-around time will be requested for each of the above-referenced analytical methods. The canisters will be packaged for shipping and sent to the laboratory under chain of custody protocol. Chain of custody will be maintained and documented at all times, including sealing the shipping container with chain of custody seals.

Soil gas samples will be collected from two soil vapor probes, along with a duplicate and an ambient air sample. In addition, an equipment blank will be collected by collecting a sample of nitrogen through the probe materials prior to installation activities.

5.2 SAMPLING PROCEDURES

Sampling personnel will be equipped with a bound field notebook during performance of Remedial Investigation field activities. All data regarding sample collection will be recorded in this field notebook.

The chain-of-custody (COC) program will be adequate to allow for the tracing, possession and handling of individual samples from the time of field collection through laboratory analysis. The COC form will be used by personnel responsible for ensuring the integrity of the samples and will be maintained in the project files as documentation of sample handling procedures.

5.3 SAMPLE CONTAINER PREPARATION

All containers used in the sampling of soils and groundwater shall be laboratory cleaned as specified in the QAPP. The container type and preservative requirements shall follow the specifications of the QAPP.

5.4 PROCEDURES TO PREVENT CROSS-CONTAMINATION

Personnel collecting soil and groundwater samples will take the following precautions to minimize sample contamination or cross-contamination between samples:

- New nitrile gloves will be used while taking all samples and disposed of after equipment have been decontaminated.
- Sampling personnel will not touch the inside of the sampling container.
- Only equipment that has been properly decontaminated according to the procedures will be used for environmental sample collection.

Immediately following the collection of the sample, the container will be sealed and the sample will be labeled and entered in the field notebook. At this time, the COC form will be completed to note the acquisition of the sample.

The sample will then be placed in a pre-cooled ice chest container and preserved (if necessary) according to the directions of the QAPP.

5.5 SAMPLE IDENTIFICATION AND LABELING

Each sample shall be identified in the logbook and on the sample container label. The label shall be filled out as follows:

- Sampler's initials
- Client ID
- Date – date of sample collection
- Time – time of sample collection
- Source – sample number and matrix (i.e., soil, water)

5.6 FIELD NOTEBOOK

A bound field notebook will be maintained by the sampler to provide a daily record of events. At the beginning of each entry, the following will be recorded:

- Date
- Time
- Meteorological conditions
- Field personnel present
- Level of personal protection
- List of on-site visitors and the level of personal protection
- Initials of the person making the entry

Field notebook entries will be in as much detail as necessary so that essential information is properly documented. All documentation in field notebooks will be in ink. If an error is made, corrections will be made by crossing a line through the error and entering the correct information. Corrections will be dated and initialed. No entries will be obliterated or rendered unreadable.

If sample locations cannot be indicated on field maps, a sample drawing of the location (not to scale) will be included in the notebook to provide an illustration of all sampling points.

The cover of each notebook used will contain:

- Person and organization to whom the book is assigned

- Book number
- Start date
- End date

Entered in the notebook will include at a minimum the following for each sample date:

- Property identification
- Location of sampling points
- Description of sampling points
- References to photographs (if applicable) and brief sketch of sampling points
- Sample identification number
- Number of samples taken
- Time of sample collection
- Reference to sample location map
- Number of QA/QC samples taken and their labeled identifier
- Collector’s name
- Field observations
- Sample distribution (i.e., split samples, analytical lab)
- All field measurements made (e.g., PID readings, etc.)

Daily activities shall be summarized in the field notebook.

Appendix B:
QAPP

QUALITY ASSURANCE PROJECT PLAN

FORMER TEMPLE DISTRIBUTING
808 South Columbus Ave.
Goldendale, Washington

October 3, 2017

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REMEDIAL INVESTIGATION QUALITY ASSURANCE PROJECT PLAN

1.0 PROJECT OBJECTIVES

The following sections document standard practices for project Quality Assurance. Protocols, practices and procedures described here may be above the level of detail required for the scope of the former Chevron Bulk Plant 375289 RI Work Plan. The Data Quality Objective (DQO) is to produce data of known and documented quality. Data generated during the RI will be used to:

- Further characterize the site;
- Determine the nature and extent of the petroleum hydrocarbon-related contamination;
- Collect sufficient data to provide a detailed understanding of site conditions; and
- Acquire sufficient site-specific data to allow for the completion of a Feasibility Study (FS) in compliance with the requirements of WAC 173-340-350.

Laboratory analytical testing for soil and groundwater are detailed in the RI Work Plan.

This Quality Assurance Project Plan (QAPP) has been produced by Leidos Inc. on behalf of Chevron Environmental Management Company (Chevron) and is being submitted to the Washington State Department of Ecology (WDOE) in partial fulfillment of the requirements set forth in Enforcement Order DE 14134.

2.0 PROJECT-SPECIFIC QUALITY ASSURANCE OBJECTIVES

2.1 ACCURACY

Accuracy is a measure of the closeness of an individual measurement or an average of a number of measurements to the true value. Accuracy is calculated in terms of percent recovery (%R) of a known value. The "known" can take the form of USEPA or National Institute of Standards and Technology-traceable standards, laboratory-prepared solutions of target analytes or solutions of surrogate compounds spiked into each sample.

2.2 PRECISION

Precision is the agreement between a set of replicate measurements without assumption of knowledge of the true value. It is a measure of the variability in repeated measurements of the sample compared to the average value. The precision assessment should represent the variability of sampling, sample handling, preservation, storage, and analysis of the sample data. Precision is reported as relative percent difference (RPD), the difference divided by the average of two positive sample results.

The overall precision is a mixture of sampling and laboratory variability. Laboratory and field duplicates analyses are used to determine precision. Laboratory duplicate RPDs provide a measurement of analytical precision and field duplicates RPDs provide a measure of overall precision.

2.3 COMPLETENESS

Completeness is the measure of how the amount of usable (valid) data obtained from a measurement system compares to the expected amount. Completeness is calculated after all

analytical data have been reviewed for usability and is expressed as a decimal or percent usable data.

2.4 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of population, parameter variations at a sampling point, a process condition, or an environmental condition.

Representativeness of the data is addressed qualitatively in the RI Work Plan to assure that rationale of sampling locations is adequate to account for all site variations and the sampling and analytical techniques.

2.5 COMPARABILITY

Comparability expresses the confidence with which one data set can be compared to another data set. All data in the RI should be internally directly comparable. Whenever possible, data produced during the RI should be comparable to other data produced from other similar site investigations using similar techniques and analytical procedures.

3.0 SAMPLING PROCEDURES- DATA QUALITY ASSURANCE

The following quality assurance and quality control procedures will be utilized during this investigation to ensure accurate and reproducible data reflective of actual subsurface conditions.

3.1 MONITORING EQUIPMENT CALIBRATION

The portable photo-ionization detector (PID) used for screening soil vapor headspace will be calibrated at the beginning of each day according to the manufacturer's recommended procedure using a laboratory-certified isobutylene gas standard. The PID may also be calibrated during the course of the day. The water quality meter will be calibrated by the rental company prior to use. The calibration will be noted in the reports.

3.2 DECONTAMINATION PROCEDURES

Equipment that is not directly used for sampling (i.e. drilling steel) will be cleaned between each sampling location using a high-pressure water wash. Soil sampling equipment (e.g. hand augers, spoons and scoops) will be cleaned by washing with non-phosphate detergent (e.g. Alconox, Liquinox) and water, rinsing with clean tap water, and rinsing with de-ionized or distilled water. Water level indicators will be washed with detergent and water and then rinsed with tap water and distilled water before use, between each sampling or measurement location and prior to storage.

Disposable nitrile gloves, bailers, sampling pump tubing, peristaltic pump tubing and any other form of disposable sampling equipment will be discarded after use at each sampling location.

3.3 STORAGE AND DISPOSAL OF RESIDUALS

Residual soil from this investigation will be contained in 55-gallon DOT approved drums, which will remain on-site for temporary storage while awaiting laboratory results. All decontamination and purge water will be stored in 55-gallon DOT approved waste drums. Following receipt of

laboratory analytical data, transportation of all sampling residuals for eventual treatment and disposal will be arranged.

3.4 SAMPLE STORAGE, PACKING, AND SHIPMENT

All soil and groundwater samples will be stored in an ice chest while at the site and during transportation to the laboratory. Samples will be sub-packed by sample location in new Ziploc plastic bags and stored in the dark at approximately 4°C.

4.0 FIELD PROCEDURES

4.1 SAMPLE COLLECTION

The specific methods for sample container size and type, sample preservation requirements and holding times are determined by the contact laboratory chosen for the project (Table 3). The laboratory will provide the sample containers. The Consultant will verify that the laboratory has supplied the proper containers and that they are pre-cleaned and shipped in sealed boxes. Bailers will not be used for sampling.

All samples (with the exception of trip blanks) will be prepared and sealed in the field. Sample collection procedures, locations and protocols will be documented in a bound field notebook.

4.2 CHAIN OF CUSTODY PROCEDURES

This section describes sample identification and chain-of-custody (COC) protocols for this project. The purpose of these protocols is to insure that quality and validity of the samples are maintained through collection, transport, storage and analysis. All sample control and COC protocols will follow USEPA guidance.

4.3 SAMPLE IDENTIFIERS

Sample identifiers will be assigned by the sampling team as described in the site-specific SAP. The unique sample identifier will be clearly written on the sample label affixed to each sample container.

4.4 SAMPLE LABELS

Sample labels will be affixed to each sample container in such a way so as to not obscure any QA/QC lot numbers on the containers. Sample information will be printed clearly on each label. Field identification will be sufficient to enable cross-reference with the project field book.

Sample labels will contain the following information:

- Sample Number,
- Sample Location Number,
- Property Identifier,
- Initials of Samplers, and
- Date and Time of Collection.

For COC purposes, all QA/QC samples will be subject to the exact same custodial procedures and documentation as site samples.

4.5 CUSTODY SEALS

Custody seals will be used on all coolers and sample shipping containers. The number of seals per container is dependent upon the nature of each container. Seals will be signed and dated prior to use. Clear strapping tape will be placed over each seal to ensure that seals are not accidentally broken during shipment.

4.6 COC RECORDS/CUSTODY PROTOCOLS

The COC will be fully completed in the field and signed by the sample collector. The samples will be entered onto the COC as they are collected.

The primary objective of COC protocol is to provide an accurate written record that can trace the possession and handling of a sample from collection to the completion of all required analyses. A sample is in custody if it is in someone's possession, in someone's view, locked up or kept in a secured area that is restricted to authorized personnel only.

4.7 FIELD CUSTODY PROCEDURES

The following guidance will be used to ensure proper control of samples while in the field:

- As few persons as possible will handle samples.
- Coolers or boxes containing cleaned bottles will be sealed with a custody tape seal during transport to the field or while in storage prior to use. Sample bottles from unsealed coolers or boxes, or bottles that appear to have been tampered with will not be used.
- The sample collector is personally responsible for the care and custody of samples collected until they are transferred to another person or dispatched properly under COC rules.
- The sample collector will record sample data in the field logbook.
- The site team leader will determine whether proper custody procedures were followed during the fieldwork and decide if additional samples are required.

When transferring custody (i.e., releasing samples to a shipping agent), the following will apply:

- The coolers in which the samples are packed will be sealed and accompanied by COC records. When transferring samples, the individuals relinquishing and receiving them must sign, date and note the time on the COC record. This record documents sample custody transfer.
- Samples will be dispatched to the laboratory for analysis with separate COC records accompanying each shipment. Shipping containers will be sealed with custody seals for shipment to the laboratory. The method of shipment, name of courier and other pertinent information will be entered in the COC record.
- All shipments will be accompanied by COC records identifying their contents. The original record will accompany the shipment. The other copies will be distributed appropriately to the project manager.
- Sent by common carrier, a bill of lading will be used. Freight bills and bills of lading will be retained as part of the permanent documentation.

5.0 LABORATORY CUSTODY PROCEDURES

The laboratories receiving the samples will receive and document samples in accordance with their respective SOPs.

This section addresses procedures that will be used to identify samples and document the samples' COC. These procedures are necessary to ensure that the quality of the samples is maintained during their collection, transportation, storage and analysis. Procedures for custody, documentation, handling, packaging and shipping environmental samples are described below.

5.1 SAMPLE PACKAGING, HANDLING, AND SHIPPING

The transportation and handling of samples must be accomplished in a manner that not only protects the integrity of the sample, but also prevents any detrimental effects to sample handlers due to the possible hazardous nature of samples. Regulations for packaging, marking, labeling and shipping hazardous materials are promulgated by DOT in the Code of Federal Regulations, 49 CFR 171 through 177 and/or the International Air Transport Association regulations for Dangerous Goods.

5.2 SAMPLE PACKAGING

Samples must be packaged carefully to avoid breakage or contamination and must be shipped to the laboratory at proper temperatures. The following sample package requirements will be followed:

- Sample bottle lids must never be mixed. All sample lids must stay with the original containers.
- All sample bottles will be placed in a plastic bag to minimize leakage in the event a bottle breaks during shipment.
- The environmental samples will be cooled. Ice sealed in plastic bags or artificial icing materials may be used. Ice is not to be used as a substitute for packing materials.
- Approximately 2 inches of inert packing material, such as closed-cell foam or bubble wrap, should be placed in the bottom of all coolers. Any remaining space in the cooler should be filled with inert packing material. Under no circumstances should material, such as sawdust, newspaper, or sand be used.
- The custody record must be placed in a plastic bag and placed inside of the cooler lid. Signed and dated custody seals must be affixed to the sample cooler and must be covered with clear tape.
- Cooler lids must be secured with strapping tape at a minimum of two locations without covering any labels and the cooler drain must be taped shut.
- Completed shipping labels must be attached to the top of the cooler, with "This Side Up" labels.

5.3 SHIPPING CONTAINERS

Shipping containers are to be custody-sealed for shipment as appropriate. The container will be secured with clear tape wrapped around the package at least twice in at least two locations. Custody seals will be affixed in such a way that access to the container can be gained only by cutting the tape and breaking a seal.

- The custody seals will be covered with clear tape.
- Field personnel will make arrangements for transportation of samples to the laboratory. When custody is relinquished to a shipper, field personnel will telephone the laboratory sample custodian, to inform him/her of the expected time of arrival of the sample shipment and to advise him/her of any time constraints on sample analysis.

5.4 MARKING AND LABELING

The marking and labeling for shipping containers should follow the guidance presented below:

- Use abbreviations only where specified.
- The words "This End Up" or "This Side Up" must be clearly printed on the top of the outer package. Upward pointing arrows should be placed on the sides of the package.
- After a shipping container has been sealed, two COC seals are placed on the container, one on the front and one on the back. The seals are protected from accidental damage by placing clear tape over them.

6.0 CALIBRATION PROCEDURES

All instruments and equipment used during sampling and analysis will be operated, calibrated, and maintained according to the manufacturer's guidelines and recommendations and SOPs, as well as criteria set forth in the applicable analytical methodology reference. Operation, calibration, and maintenance will be performed by personnel properly trained in these procedures. Documentation of all routine and special maintenance and calibration information will be maintained in an appropriate logbook or reference file.

7.0 ANALYTICAL PROCEDURES

The analytical methodologies to be used for generation of field analytical data (pH, temperature, conductivity, dissolved oxygen and static water level) are summarized in the Work Plan and the SAP. Field analytical data will be used to augment information generated through laboratory analysis and aid in delineating the groundwater impacts during field investigations. Equipment for monitoring groundwater conditions during well development and purging prior to sampling will meet the specifications of methods specified.

Lancaster Laboratories (Chevron contracted lab) will be responsible for custody procedures once samples are received at the laboratory.

Method-related QA/QC requirements are the responsibility of the project laboratory and should be performed in accordance with the method requirement. Table 1 provides the laboratory analytical methodologies to be used for completing the laboratory analytical tasks defined in the RI Work plan. Method-specific QC requirements are presented in Table 2.

8.0 DATA VALIDATION, REPORTING AND ASSESSMENT

8.1 DATA VALIDATION

All data generated from sampling will be reviewed by comparing calibration, accuracy, and precision to the QC criteria listed in the method description. The validation procedures are generally composed of, but not limited to, the following steps:

- Verifying the correct samples were analyzed and reported in appropriate units.
- Verifying preservation and holding times.
- Verifying that initial and continuing calibrations were performed and met QC criteria.
- Verifying that no analytes were present in the method blanks and that one blank was run every 10 samples.
- Verifying that a duplicate and matrix spike, or matrix spike/matrix spike duplicate (MS/MSD) were run every 20 samples and that QC criteria were met.

8.2 DATA REPORTING

All laboratory data calculations and reductions will be performed as described in the applicable method references. Raw data, including laboratory worksheets, notebooks, sample tracking records, instrument logs, standard and sample preparation logs, calibration data and associated QC records, should be retained by the laboratory for a minimum of 10 years and be available for inspection if necessary. While the laboratory data management system may store records electronically, provision should be made for hard copies as necessary to validate results.

Electronic laboratory data will be submitted to Ecology per Policy 840 and as dictated in the Order

Deliverables by the contract laboratory shall be in standard data reporting format. The report shall include the following:

- Cover sheet listing the sample types received, tests performed, and a case narrative describing problems encountered and identifying any analyses not meeting QC criteria and general comments.
- Chain-of-custody forms and cooler receipt forms;
- Analytical data reported by sample or by test and containing pertinent information (i.e., field identification number, contract laboratory identification number, date of sample collection, receipt, extracted/digested/analyzed, batch number(s), dilution factors, all analytes and their reporting limits, data qualifiers, matrix units, percent of solids for soil samples, and sample description).
- Analytical information for QC sample spikes, laboratory duplicates, initial and continuing calibration verifications of standards and laboratory blanks, standard procedural blanks, LCS, surrogates, laboratory reference materials, ICP interference check samples, and detection limit check samples.
- Copies of any other forms pertinent to the data review process (corrective action forms, validation forms, raw data, etc.)

- The contract laboratory shall maintain on file all the supporting data and documentation for these samples.

8.3 DATA ASSESSMENT

The project data assessment procedures are generally composed of but not limited to the following steps:

- Review the COC and verify that all samples were received and analyzed.
- Review laboratory sample delivery group narrative for potential deficiencies in the data.
- Identify and organize the data according to laboratory data packages.
- Apply appropriate data qualifiers to the data.
- Verify the usability of the qualified data.

The Project Manager conducts a critical review of the comments provided in the summary report to determine if they are sufficient to describe and explain any associated problems with the data. If any data gaps are identified in the summary, the project manager resolves them using professional judgment based on the application of the EPA *Functional Guidelines for Data Validation* or EPA *Functional Guidelines for Inorganic Data Review*.

Data qualifiers will be assigned to the data as identified in the summary report. The data qualifiers or flags are assigned by the consultant in accordance with *EPA Functional Guidelines for Data Validation* or *EPA Functional Guidelines for Inorganic Data Review.*

9.0 INTERNAL QUALITY CONTROL CHECKS

9.1 QA/QC SAMPLING

QC data are necessary to determine precision and accuracy and to demonstrate the absence of interference and/or contamination of sampling equipment glassware and reagents, etc. All field QC samples will be submitted as blind samples to the laboratory. Specific QC requirements for laboratory analyses will be the responsibility of the project laboratory. Field QC will include the following:

- **Trip Blanks** are blank samples prepared to assess ambient transport conditions. The contract laboratory will prepare them. The blanks will be handled like a sample and shipped to the laboratory for analyses. One trip blank will accompany each sample cooler containing water samples.
- **Equipment Rinsate Blanks** are blank samples designed to demonstrate that sampling equipment has been properly prepared and cleaned before field use and that cleaning procedures between samples are sufficient to minimize cross contamination. Rinsate blanks will be collected at a rate of one blank per site, per sampling activity.
- **Field Duplicate** samples consist of a set of two samples collected independently of one another at the same sampling location during the same sampling event. Field duplicates are designed to assess actual field variability as compared to analytical duplicate or MSD analyses which measure laboratory variability. Duplicate samples will be collected at a rate of one for each 20 (soil and groundwater) samples.

- **MS/MSDs** are environmental samples that are spiked, in the laboratory, with a known concentration of a target analyte. The MS/MSDs are used to check sample matrix interferences and evaluate error due to laboratory bias and precision. Additional sample volume will be submitted for water samples. The project laboratory will perform MS/MSD analyses at a rate of one for each 20 samples of a particular matrix.

9.2 PERFORMANCE AND SYSTEM AUDITS

Performance and systems audits include careful evaluation of both field and laboratory QC. Performance and system audits are performed on a regularly scheduled basis during the lifetime of the project to assess the accuracy of the measurement systems.

Performance and system audits may be performed through split sampling in the field and/or by issuing the laboratory periodic blind samples. Audits of field activities can be carried out to evaluate sampling activities such as sample identification, sample control, COC procedures, field documentation and general sampling operations.

9.3 PROJECT ANALYTICAL QA PREVENTATIVE MAINTENANCE

All field instruments and equipment used for analysis will be serviced and maintained only by qualified personnel. All repairs, adjustments and calibrations will be documented in an appropriate logbook or data sheet that will be kept on file. The instrument maintenance logbooks will clearly document the date, a description of the problem, the corrective action taken, the result and who performed the work.

All equipment used in the field is subject to standard preventative maintenance schedules. When in use, equipment is inspected at least twice daily, once before start-up in the morning and again at the end of the work shift prior to overnight storage or return to the equipment supplier. Regular maintenance such as cleaning lenses, replacement of in-line filters and removal of accumulated dust is to be conducted according to manufacturer's recommendations and in-field need, whichever is appropriate. All preventive maintenance performed will be entered in the individual equipment's logbook and the field notebook.

In addition to preventive maintenance procedures, daily calibration checks will be performed at least once a day in the morning prior to use and recorded in the field notebook. Additional calibration checks will be performed as required. All field notebooks will become part of the permanent site file.

9.4 CORRECTIVE ACTION

Corrective actions are procedures that may be implemented on samples that do not meet QA specifications. The need for corrective action will be based on the limits of acceptability as specified in the appropriate sections of this QAPP. Corrective actions will depend on the problem(s) encountered and, in many cases, may have to be defined as the need arises. Persons responsible for initiating actions and procedures for identifying, documenting and reporting corrective actions include the project manager and QA officer.

9.5 QA/QC REPORTS

Serious analytical problems will be reported to the PLPs and Ecology. The time and type of corrective action, if needed, will depend on the severity of the problem and relative overall project

importance. Corrective actions may include altering procedures in the field, conducting an audit, or modifying laboratory protocol.

In addition to the performance and system audit reports provided to the project manager, the final RI report will contain sections that summarize all relevant data quality information collected during the project.

Tables

TABLE 1
Sample Analysis
Former Temple Distributing
808 S Columbus Ave. - Goldendale, Washington

Analyte	Soil Samples		Groundwater Samples
	All Samples	Select Samples[a]	Monitoring Well[b]
TPH-Gx	●	●	●
TPH-Dx	●	●	●
BTEX	●	●	●
Lead		●	●
EDB		●	●
EDC		●	●
MTBE		●	●
cPAHs		●	●
Naphthalenes		●	●
n-Hexane		●	●
PCBs		●	●
Halogenated VOCs		●	●

[a] Select soil samples will be analyzed for these additional analytes. These samples are intended to

[b] These analyses will be performed during the initial round of monitoring well sampling. The analyte list for subsequent rounds may be adjusted based on the results from the initial round.

TABLE 2
Analytical Methods and Detection Limits
Former Temple Distributing
808 S Columbus Ave. - Goldendale, Washington

Analyte	Analytical Method	Soil (mg/kg)			Groundwater (µg/L)		
		Method A Cleanup Level [1]	PQL	Method Detection Limit	Method A Cleanup Level [1]	PQL	Method Detection Limit
TPH-Gx	NWTPH-Gx	30/100	5	1	800	250	50
TPH-Dx (dsl)	NWTPH-Dx	2,000	25	3	500	250	80
TPH-Dx (HO)	NWTPH-Dx	2,000	100	10	500	500	100
Benzene	USEPA 8260	0.03	0.005	0.0005	5	1	0.5
Toluene	USEPA 8260	7	0.005	0.001	1,000	1	0.5
Ethylbenzene	USEPA 8260	6	0.005	0.001	700	1	0.5
Total Xylenes	USEPA 8260	9	0.005	0.001	1,000	1	0.5
Lead	USEPA 6010	250		0.08	15		1.2
EDB	504.1	0.005	0.001	0.001	0.01	0.01	0.01
EDC	USEPA 8260	0.005	0.001	0.001	5	1	0.5
MTBE	USEPA 8260	0.01	0.001	0.001	20	1	0.5
cPAHs	USEPA 8270 SIM	0.1	0.05	0.05	0.1	0.02	0.02
Naphthalenes	USEPA 8270	5	0.05	0.001	160	1	1

NOTES:
mg/kg = Milograms per Kilogram
µg/L = Micrograms per Liter
NA = Not Applicable

[1] = Model Toxics Control Act (MTCA) Method A Cleanup Level

Table 3 - Sample Containers and Holding Times

Former Temple Distributing Facility

Goldendale, Wa

Sample Matrix	Analytical Parameter	Analytical Method	Sample Container	No. Containers	Preservation Requirements	Holding Time
Soil	Gasoline Range TPH	NWTPH-Gx	Method 5035A, 40-mL vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	Diesel and Motor Oil Range TPH	NWTPH-Dx/SW846 Method 3630 (Silica Gel Cleanup)	4 ounce jar	1	4°C ±2°C	14 days for extraction; 40 days for analysis
	BTEX	Method 8021 B	Method 5035A, 40-mL vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	EPH/VPH	NWEPH/NWVPH	4 Ounce Jar/Method 5035A, 40-mL vials	5	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	MTBE, EDC, EDB, Naphthalene	Method 8260	Method 5035A, 40-mL vials	4	4°C ±2°C, Freeze within 48 hours to <-7°C	14 days
	Polychlorinated Biphenyls (PCBs)	Method 8082	4-ounce jar	1	4°C ±2°C	6 months
	Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAHs)	Method 8270	4-ounce jar	1	4°C ±2°C	6 months
	Cadmium, Chromium, Lead, Nickel, Zinc	Method 6020	4-ounce jar	1	4°C ±2°C	6 months
Water	Gasoline Range TPH	Method NWTPH-Gx	40-mL VOA vials	3	4°C ±2°C, HCl pH < 2	14 days
	Diesel and Motor Oil Range TPH	NWTPH-Dx/SW846 Method	500-mL amber glass bottle	1	4°C ±2°C	7 days for extraction,
	VOCs (including MTBE)	Method 8260	40-mL VOA vials	3	4°C ±2°C, 1 with HCl pH < 2, 2 without HCl	14 days for analysis
	EPH/VPH	NWEPH/NWVPH	1000-mL amber/40-mL VOA vials	4	4°C ±2°C, HCl pH < 2	7 days for extraction, 40 days for analysis/14 days for anlaysis
	Lead	Method 6020	500-mL HDPE bottle	1	4°C ±2°C, $HN0_3$ pH < 2 (after field filtration)	28 days

Notes:
HCL = hydrochloric acid
TPH = total petroleum hydrocarbons
VOA = volatile organic analysis
BTEX = benzene, toluene, ethylbenzene, xylenes
MTBE = methyl tert-butyl ether

TABLE 4
Data Quality Objectives and Corrective Actions
Former Temple Distributing
808 S Columbus Ave. - Goldendale, Washington

Analytical Method	Laboratory QC Sample	Frequency	Acceptance Criteria	Corrective Action
Petroleum Hydrocarbons by: NWTPH-Gx and NWTPH-Dx	Method Blank	Every 20 samples or extraction batch, whichever is more frequent.	Less than the LOQ or the associated samples must be greater than 10 times the blank concentration	Reanalyze and/or re-extract associated samples.
	Initial Instrument Calibration	Five-point curve at initiation of analytical sequence and as needed.	%RSD 20% for all analytes or the correlation coefficient (r) 0.995 for each analyte.	Reanalyze associated samples.
	Continuing Calibration Check	CCVs must bracket 10 samples or 12 hours.	%D between the true and the measured values 15%.	Reanalyze samples not bracketed by passing CCVs.
	Surrogates	Every sample.	See current lab control limits for %R.	Reanalyze samples. Re-extract if criteria not met. Consult with Chemistry QA Officer if criteria not met for re-extract.
	Laboratory Control Samples (LCS)	Every 20 samples or extraction batch, whichever is more frequent.	%R 50%-150% NWTPH – use lab control limits WA – 70-130%	Re-extract and reanalyze associated samples. The data can be reported if the LCS recovery is high and the samples are “ND”.
	Matrix Spike and Matrix Spike Duplicate (MS/MSD)	Every 20 samples or extraction batch, whichever is more frequent.	%R 50%-150%; RPD 35% for soils, 20% for waters. NWTPH – use lab control limits for recovery WA – 70-130% recovery NWTPH-Gx – 30% RPD NWTPH-Dx – 30% w, 50% s RPD	Consult with Chemistry QA Officer for corrective action. Evaluate in conjunction with the LCS.
Volatile Organic Compounds by 8260 (25-ml purge)	Method Blank	Every 20 samples or 12-hour sequence, whichever is more frequent.	Less than the LOQ or the associated samples must be greater than 10 times the blank concentration	Reanalyze and/or re-extract associated samples.
	Instrument Tuning using BFB	Every 12 hours	See ion abundance criteria listed in lab SOP.	Retune instrument and recheck.
	Initial Instrument Calibration	Six-point curve at initiation of analytical sequence and as needed.	RF for SPCCs >0.300 for chlorobenzene and 1,1,2,2-tetrachloroethane, and >0.100 for 1,1-dichloroethene and chloromethane %RSD CCCs <30% %RSD £ 15% to use average RF or 1st or 2nd degree curve fit with correlation coefficient (r) or coefficient of determination (r^2) ³ 0.990	Reanalyze associated samples.
	Continuing Calibration Check	CCVs every tune period prior to analysis of samples.	RF for SPCCs >0.300 for chlorobenzene and 1,1,2,2-tetrachloroethane, and >0.100 for 1,1-dichloroethene and chloromethane % drift for CCCs <20%	Reanalyze samples not associated with passing CCVs.
	Internal Standards	Every sample.	See lab SOPs for minimum area counts.	Reanalyze samples
	Surrogates	Every sample.	See current lab control limits for %R.	Reanalyze samples. Consult with Chemistry QA Officer if criteria not met for re-analysis.
	Laboratory Control Samples (LCS)	Every 20 samples or extraction batch, whichever is more frequent.	See current lab control limits for %R.	Reanalyze associated samples. The data can be reported if the LCS recovery is high and the samples are “ND”.
	Matrix Spike and Matrix Spike Duplicate (MS/MSD)	Every 20 samples or extraction batch, whichever is more frequent.	See current lab control limits for %R; RPD £ 30% for soils, 30% for waters.	Consult with Chemistry QA Officer for corrective action. Evaluate in conjunction with the LCS.
Semivolatile Organic Compounds by 8270	Method Blank	Every 20 samples or extraction batch, whichever is more frequent.	Less than the LOQ or the associated samples must be greater than 10 times the blank concentration	Reanalyze and/or re-extract associated samples.
	Initial Instrument Calibration	Six point curve at initiation of analytical sequence and as needed.	%RSD CCCs £ 30%; non-CCCs £ 50% RF for all SPCCs ³ 0.05 %RSD £ 15% to use average RF or use 1st or 2nd degree curve fit with correlation coefficient (r) or coefficient of determination (r^2) ³ 0.990	Reanalyze associated samples.
	Continuing Calibration Check	CCVs every tune period (12 hrs) prior to analysis of samples.	%drift CCCs £ 20%; non-CCCs £ 50% RF for SPCCs ³ 0.05	Reanalyze samples not associated with passing CCVs.
	Surrogates	Every sample.	See current lab control limits for %R.	Reanalyze samples. Re-extract if criteria not met. Consult with Chemistry QA Officer if criteria not met for re-extract.
	Laboratory Control Samples (LCS)	Every 20 samples or extraction batch, whichever is more frequent.	See current lab control limits for %R	Re-extract and reanalyze associated samples. The data can be reported if the LCS recovery is high and the samples are “ND”.
	Matrix Spike and Matrix Spike Duplicate (MS/MSD)	Every 20 samples or extraction batch, whichever is more frequent.	See current lab control limits for %R; RPD £ 30% for soils, 30% for waters.	Consult with Chemistry QA Officer for corrective action. Evaluate in conjunction with the LCS.

Appendix C:
HASP

Goldendale Former Bulk P
Health & Safety Plan

Project Name:	**Goldendale Former Bulk Plant**
Project Location:	**808 S Columbus Ave, Goldendale, Washington**
Chevron Project Manager:	**Eric Roehl**
Business Partner:	**Leidos**
Leidos Project Manager:	**Don Wyll**

HASP

Health & Safety Plan Index

Project Name:	*Goldendale Former Bulk Plant*	**Project Number:**	*375289*
Project Location:	*808 S Columbus Ave, Goldendale, Washington*		
Business Unit:	*MBU*	**Site Safety Officer:**	Andrew Lembrick
Chevron Project Manager:	*Eric Roehl*	**Chevron On Site Supervisor:**	*Eric Roehl*
Business Partner Company Name:	*Leidos*		
Business Partner Project Manager:	*Don Wyll*	**Business Partner On Site Supervisor:**	*Don Wyll*
HASP Development Participants:	*Don Wyll, Aaron Wisher, Chris Fontana*		

Tabs Required For every Project

CEMC HASP Tabs		
Chevron Expectations	Required	
Acceptance	Required	
Project Information	Required	
Roles & Responsibilities	Required	
Emergency Response Information	Required	
Medical Facility Information	Required	
Spill Response Plan	Required	
Site-Specific Required Training	Required	
Planning Phase Hazard Analysis	Required	
General Expectations	Required	
PPE	Required	
Site Constituents of Concern	Required	
Air Monitoring	Required	

Additional Tabs Required Based On Project Scope

CEMC HASP Tabs	Applies to this Project	Explanation MUST be provided if a tab is selected as Not Applicable
Waste Management	X	
Decontamination	X	
Confined Space Entry		This work activiity will not be performed per this scope of work
Electrical		This work activiity will not be performed per this scope of work
Excavation		This work activiity will not be performed per this scope of work
Lifting and Rigging		This work activiity will not be performed per this scope of work
Hot Work		This work activiity will not be performed per this scope of work
Diving		This work activiity will not be performed per this scope of work
Working at Height		This work activiity will not be performed per this scope of work
Isolation Hazardous Energy		This work activiity will not be performed per this scope of work
Materials and Waste Transport		This work activiity will not be performed per this scope of work
T&E Historical, Cultural and Archeological		This work activiity will not be performed per this scope of work
Environmental- Water (NPDES & SWPPP) & Air		This work activiity will not be performed per this scope of work
Pics and Documents		This work activiity will not be performed per this scope of work

Acceptance and Revisions

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Chevron EMC Acceptance				
CEMC PM Final Acceptance	X CEMC Project Manager	Eric Roehl *Name*	 Position	 Date
CEMC HES Review (Optional)	X Signature	 *Name*	 Position	 Date
Leidos Approvals				
Prepared By:	X Signature	 *Name*	 Position	 Date
Approved By:	X Signature	 *Name*	 Position	 Date
Approved By:	X Signature	 *Name*	 Position	 Date
Approved By:	X Signature	 *Name*	 Position	 Date
Sub-Contractor Acceptance				
Accepted By:	X Signature	 *Name*	 Company	 Date
Accepted By:	X Signature	 *Name*	 Company	 Date
Accepted By:	X Signature	 *Name*	 Company	 Date
Accepted By:	X Signature	 *Name*	 Company	 Date
Accepted By:	X Signature	 *Name*	 Company	 Date

Reminder: Some revisions may trigger the need for a formal MOC. Please refer to the EMC MOC Process for further information.

Revisions

Rev No.	Effective Date	Description of Change	Prepared By Name/Position	Reviewed By Name/Position

Chevron Expectations

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with CEMC/OPCO and Leidos polices and procedures.

Chevron Tenets of Operation Policy

The Chevron Tenets are a code of conduct used by employees and contractors as a tool to guide daily decisions. Leaders play an important role in reinforcing behaviors consistent with the Tenets.

The Tenets of Operation are based on two key guiding principles:

Do it safely or not at all

There is always time to do it right.

Tenets of Operation

1. Always operate within design and environmental limits.
2. Always operate in a safe and controlled condition.
3. Always ensure safety devices are in place and functioning.
4. Always follow safe work practices and procedures.
5. Always meet or exceed customers' requirements.
6. Always maintain integrity of dedicated systems.
7. Always comply with all applicable rules and regulations.
8. Always address abnormal conditions.
9. Always follow written procedures for high-risk or unusual situations.
10. Always involve the right people in decisions that affect procedures and equipment.

Chevron Stop Work Authority Policy

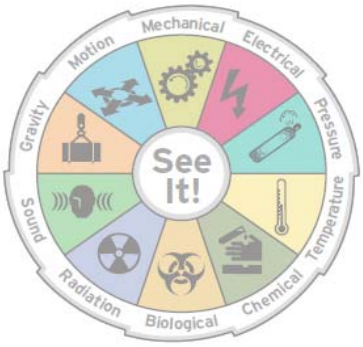
Stop-work authority is an important part of our culture. It establishes the authority and responsibility of any individual employee or contractor – no matter what your position, level or rank – to suspend an individual work task or a group operation when any unsafe or risky condition is deemed to be present. You don't have to be an expert in the area to exercise stop-work authority, nor do you have to be involved with the work in question. And, there is absolutely no repercussion to an individual who exercises stop-work authority.

How to Stop Work

1. When a person identifies a perceived unsafe condition, act, error, omission, or lack of understanding that could result in an undesirable event, they must immediately initiate a stop work intervention with the person(s) potentially at risk.
2. If the affected person(s) are not in immediate risk and the supervisor is readily available, the stop work action should be coordinated through the supervisor. If the supervisor is not readily available or the affected person(s) are at immediate risk, the stop work intervention should be initiated directly with those at risk.
3. Stop work interventions should be initiated in a positive manner by briefly introducing yourself and starting a conversation with, "I am using my stop work authority because…" Using this phrase will clarify the user's intent and set proper expectations.
4. Notify affected personnel and supervision of the stop work issue. If necessary, stop associated work activities, remove person(s) from the area, stabilize the situation, and make the area as safe as possible.
5. Affected parties shall discuss and gain agreement on the stop work issue.
6. If determined and agreed that the task or operation is okay to proceed as is (i.e., the stop work initiator was unaware of certain facts or procedures), the affected persons should thank the initiator for their concern and proceed with the work.
7. If determined and agreed that the stop work issue is valid, then every attempt should be made to resolve the issue to affected persons' satisfaction prior to starting work.
8. If the stop work issue cannot be resolved immediately, work shall be suspended until proper resolution is achieved. When opinions differ regarding the validity of the stop work issue or adequacy of the resolution actions, contact the project manager who will then involve the right personnel to make the final determination.
9. Positive feedback should be given to affected personnel regarding resolution of the stop work issue. Under no circumstances should retribution be directed at any person(s) who exercise in good faith their stop work authority as detailed in this program.

Chevron Preventing Serious Injury & Fatalities Field Guide

To prevent incidents, workers must effectively identify the hazards associated with the tasks they perform. By focusing on the principles of hazard identification, the workforce can quickly understand broad categories of hazards. This tool provides the workforce with a visual aid that helps one focus on hazard recognition, a tool that helps one identify hazards based on energy sources and a simple method to help one complete daily activities and tasks safely and reliably



The Preventing Serious Injury & Fatalities field guide is a quick reference to help personnel involved in high-risk activities to identify and control the significant potential hazards unique to each activity and job.

This field guide supplements but does not replace existing permitting procedures and safe work practices. To keep it brief, not every potential hazard or prevention is listed. Apply appropriate local hazard assessment procedures, along with this guide, to comprehensively assess each job. **Each project MUST have a copy of this field guide on location.**

Project Information

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Project Planed Start Date:	***TBD***
Estimated Project Duration:	***7 days***

Description of Job Scope & Location

Soil Borings and monitoring wells will be completed at the site to address historic activities and conditions across the site. Borings will be concentrated near former bulk fueling infrastructure such as pump islands and transfer stations. Additional borings will be placed to capture the extent of current contamination.The monitoring wells will be developed after installation and sampled. Wells and borings are to be completed using a hand auger and direct push drill rig.

Site History

Chevron U.S.A. Inc.'s (CUSA) predecessor, Standard Oil Company, acquired the Site in 1916. A bulk petroleum fuel distributor (leaded gasoline, diesel, unleaded gasoline) operated from the late 1920s until 1980. In 1980 CUSA sold the property to Edward W. Temple and Joyce I. Temple. In 1994, Edward W. Temple and Joyce I. Temple granted the deed to the property to the Temple Family Trust. The Temple Family Credit Shelter Trust acquired the property in 1997 and operated the bulk facility until 2011. In June 2011 Carson Oil Company, Inc. acquired all above-ground equipment at the property from Temple Distributing, Inc., including tanks, a card reader system, high speed satellite dispensers, transfer pumps, meters, and dispensers.
On February 29, 2012, Carson Oil Company delivered fuel to the facility, and approximately 970 gallons of gasoline was released from an overfilled AST into the bermed unlined containment area. A site investigation conducted in 2012 confirmed that Site soils and groundwater contained gasoline, diesel, lube oil, benzene, toluene, ethylbenzene, total xylenes, naphthalene and other petroleum constituents in concentrations exceeding Model Toxics Control Act (MTCA) cleanup levels. Carson Oil conducted a limited excavation as an interim action in 2012

☐ US HAZWOPER (29 CFR 1910.120 & 29 CFR 1926.65) ☐ CAL OSHA HAZWOPER

Purpose of the HASP

- To convey health and safety information to all parties engaged in the execution of CEMC Projects
- To ensure that all activities are planned and controlled effectively and efficiently
- Ensure all projects managed by CEMC have a HASP that meets or exceeds the requirements of applicable regulatory and corporate requirements
- Identify the health and safety (H&S) hazards and risks and assure that appropriate protective measures have been identified
- Ensure workers, visitors, and onsite personnel review, understand and follow the requirements of the site specific HASP
- Ensure that HAZCOM requirements, where they apply for specific job sites, are referenced in the HASP or attachments

Regulatory Applicability

Organizational Structure

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Chevron

Role	Name of Person in Role	Contact Number	Responsibilities
CEMC PM	Eric Roehl		The PM Team Leader has the responsibility and authority to direct all work scope activities and steward safe work practices.

Leidos

Role	Name of Person in Role	Contact Number	Responsibilities
OE Program Manager	Phillip Albenesius	803-643-2905 803-293-6344	The Leidos Program Manager has the responsibility and authority to manage all sites within the program and steward safe work operations
Division/Program H&S Manager	Chris Fontana	610-594-4305 610-952-1752	The Division/Program Health and Safety Manager has the responsibility and authority to manage the Leidos Health and Safety
Western Region EH&S Manager	Phillip Albenesius	803-643-2905 803-293-6344	The Western Region EH&S Manager has the responsibility and authority to assist the development of site health and safety plans
Project Manager	Don Wyll	425-482-3315 425-275-1172	The Leidos Project Manager has the responsibility and authority to direct all work scope activities and advocate for safe work practices at the subject site.
Field Manager/SHSO	Andrew Lembrick		The field manager has the responsibility and authority to direct onsite activities and develop this HASP and verify compliance.

Sub-Contractor

Role	Name of Person in Role	Contact Number	Sub-Contractor Company Name	Responsibilities
ULS/GeoMarkout President	Mike Benedict	206-384-2857	ULS Services Corp.	The utility locate contractor has the responsibility and authority to find potential subsurface utilities and perform work in a safe and controlled manner.
Cascade Drilling	Kasey Goble	425-485-8908	Cascade Drilling	The drilling contractor has the responsibility for installation of soil borings and monitoring wells and performing work in a safe and controlled manner.

Emergency Response Information

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with CEMC/OPCO and Leidos policies and procedures.

• Stop Work • Address all injuries and incidents immediately • Secure safety of personnel and site
• Follow local emergency response procedures • Chevron Supervisor notifies EMC in accordance with CEMC Notification & Reporting Guide
• Leidos Supervisor follows Leidos's notification protocol

Emergency Contacts & Phone Numbers

	Contact/Name	Phone #
Primary Emergency Contact- *Example 911 or local facility emergency contact number, could be radio call*	**Emergency Response**	**9-1-1**
Leidos Case Management	**Work Care**	**888-449-7787**
Leidos Project Manager	**Don Wyll**	**425-482-3315/425-275-1172**
LEIDOS H&S Manager	**Chris Fontana**	**610-952-1752**
Enter Business Partner Position		
Enter Business Partner Position		
Enter Business Partner Position		
Enter Sub Contractor Position		
Enter Sub Contractor Position		
Other		

Emergency Response

Site address and/or GPS Coordinates	808 S Columbus Ave, Goldendale, WA
Identify the location of the emergency assembly point (muster point)	Between Columbus Ave and the office building in the SW corner of property.
Identify if the facility has an established Emergency Response Plan and list the latest revision date.	N/A
Describe types and frequency of emergency drills.	Emergency Drills will be conducted at the beginning of the field project and weekly thereafter if needed.
Describe type of communication equipment to be provided on-site to assist with emergency response (primary & secondary)	The project site will use cell phones as the primary method of communication for emergencies. Land phone lines are also present in the bulk plant office if an emergency occurs.
Identify where your first aid procedures can be found. *Example: treatment for heat stress, slight abrasions, minor first aids*	Procedures for first aid can be found in the Leidos Health and Safety Policy Manual for the Chevron Program and in the first aid kit.
Describe approximate number of personnel on work site (can enter a range of individuals-general number needed for evacuation purposes)	Approximately 2-5 personnel will be performing work activities at the site.

Medical Facility Information

Driving Directions & Contact Information

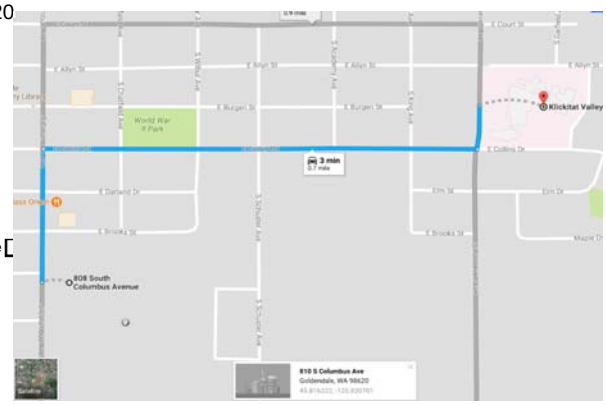
	Contact/Name	Phone #
Primary Emergency Contact- *Example 911 or local facility emergency contact number, could be radio call*	**Emergency Response**	**9-1-1**
MBU Case Management	**Work Care**	**888-449-7787**
MBU Project Manager	**Don Wyll**	**425-482-3315/425-275-1172**

Local Occupational Clinic

Name of Clinic	Klickitat Valley Health	**Phone No:**	(509) 773-4022
Address:	310 S Roosevelt Ave, Goldendale, WA 98620		
Hours of Operation:	24-hrs	**After Hours Phone No:**	(509) 773-4022

Provide Route To Occupational Clinic in Blank Space Below

From 808 S Columbus Ave, Goldendale, WA 98620 (Site), Head north on S Columbus Ave, Turn right onto E Collins St, Turn left onto S Roosevelt Ave, and Arrive at Klickitat Valley Health 310 S Roosevelt Ave, Goldendale, WA 98620



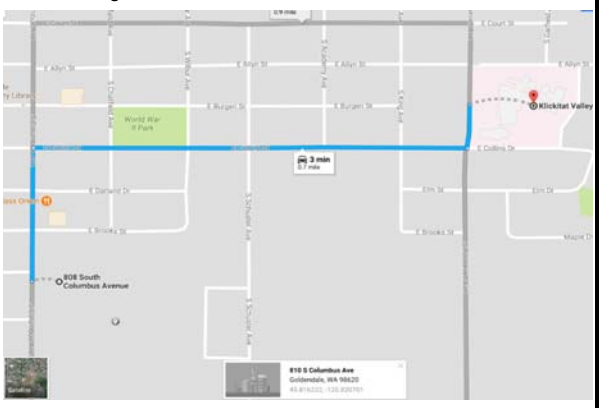
☐ Physical Trauma ☑ Physical Trauma ☑ Chemical Exposure ☐ Chemical Exposure

Local Medical Emergency Facility

Name of Hospital:	Klickitat Valley Health		
Address:	310 S Roosevelt Ave, Goldendale, WA 98620		
Phone No:	(509) 773-4022	**Travel time and distance from site:**	3min - 0.7mi
Type of Service:	Hospital		

Provide Route To Medical Emergency Facility in Blank Space Below

From 808 S Columbus Ave, Goldendale, WA 98620 (Site), Head north on S Columbus Ave, Turn right onto E Collins St, Turn left onto S Roosevelt Ave, and Arrive at Klickitat Valley Health 310 S Roosevelt Ave, Goldendale, WA 98620



Spill Response Plan

If a spill occurs, the primary objective is to protect public and employee safety. Report all quantities of spilled materials according to the CEMC Notification & Reporting Guide . Steps to protect the environment and property by containing and controlling the spill will be taken after resolving safety issues, as determined through a proper hazard assessment.

Refer to SPCC Regulations 40 CFR 112 for additional guidance.

Spill Response Information

Identify and provide contact information for the primary person and/or organization that will provide emergency response for a spill	Andrew Lembrick	Leidos	971-407-2457/503-367-9291
	Name	*Organization*	*Phone Number*
Identify where your spill prevention plan will be located. Describe spill prevention efforts and spill response equipment located on site if this information is not included in a separate plan.	The spill prevention plan will be located in the Leidos Health and Safety Policy Manual for the Chevron Program. Activities performed per this scope of work will not produce any conditions which would generate a spill.		
Identify if a regulatory required Spill Prevention, Control, and Countermeasure (SPCC) Plan is required and where the plan will be maintained.	Does not apply.		

Minimum Site-Specific Training Requirements

This matrix documents the minimum site-specific training required for the scope of the project. In each row, list the site-specific required trainings or certifications. In the column headings, enter the different positions on site. Mark with an X which trainings each position requires.

Minimum Site-Specific Training Matrix

	All individuals	FM/SHSO	Leidos Personnel	Subcontractor Personnel	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here	List Position/Role Here
Site Specific Briefing for visitors and workers	X	X	X	X																		
40 Hour HAZWOPER		X	X	X																		
8 Hour Supervisor		X																				
8 Hour HAZWOPER Refresher		X	X	X																		
Medical Clearance		X	X	X																		
First Aid/ CPR		X																				
Behavior Based Safety Training		X	X	X																		
List Req. Training/Certification																						
List Req. Training/Certification																						
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Planning Phase Hazard Analysis *(High Level)*

Form detail driven by project complexity
(this page is not intended to be as detailed as the JSA/JHA & shall not take the place of the JSA/JHA).

Key Work Activities	List Key Hazards & Concerns *(Note energy source)*	Describe Hazard Control Measures *(Hierarchy of Controls- Elimination, Substitution, Administrative Controls, PPE)*
General Work Activities - Site Walk - Subcontractor Oversight - Well Decommissioning	Slips Trips Falls (Gravity, Motion); Pinch Points (Motion, Pressure); Equipment Noise (Sound); Fitness for Duty; Musculoskelatal injuries (Motion).	Clear work area of unnecessary materials/debris. Do not walk backwards, maintain good 'housekeeping' practices, exercise caution near uneven surfaces; identify and mark pinch/crush points on tools and equipment, inspect tools and equipment; Use proper body mechanics when lifting and moving equipment; discard damaged equipment, use tools and equipment per recommendations of manufacturer; face the line of danger, delineate work zones, wear class 2 or higher, hi viz clothing at all times; discuss or identify potential limitations of personnel prior to starting work; stretch prior to commencing work and take breaks, assess weight of tools and equipment prior to lifting, use proper bending lifting, use a kneeling pad on hard surfaces, request help or assistance when lifting awkward or heavy equipment.
Driving	Untrained or fatigued driver. Vehicle malfunction or crash (Motion, Mechanical), shifting loads(motion, gravity), vehicle crash from improper function of warning devices (Mechanical), Collisions (Motion).	Personnel will inspect vehicles and equipment and secure loads within vehicles prior to travelling to work locations. Personnel will participate in a defensive driving program prior to operating company vehicles. Personnel will ensure that they have had enough rest prior to travelling to/from work locations.
Observation of Soil Boring Well Installation Activities	Contact with overhead structures; Incorrectly functioning drill rig/air-excavation; being struck by equipment; Damage to subsurface utilities or assets; whipping of high pressure hoses and fittings; Exposure to chemicals	Verify that overhead hazards are not present prior to allowing drill rig to be towered up, verify a visual inspection has been performed on the drill rig prior to work activities, Use a spotter, mind your position, and keep out of intended pathways of moving vehicles; Comply with subsurface clearance procedures, Clear boreholes to a depth of eight feet minimum, verify utility locate tickets are in place, verify all lines are marked and markings are in place and not faded; Verify that whip checks are in place. use a portable meter to monitor concentrations of organic vapors, and LEL, Wear splash resistant PPE when handling free phase hydrocarbons

Planning Phase Hazard Analysis *(High Level)*		
Form detail driven by project complexity (this page is not intended to be as detailed as the JSA/JHA & shall not take the place of the JSA/JHA).		

General Expectations

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

The following programs must be in place and but shall be kept separate from the HASP: Business Partner Incident Investigation and Reporting (II&R) Program, Behavior Based Safety (BBS) Program, Drug & Alcohol Policy, Journey Management Plans, Permit to Work Procedure, Management of Change Requirements, Motor Vehicle Safety Program, Job Hazard Analysis, Standard Operating Procedures and Short Service Employee Policy.

	Site Specific Plans
Describe plans for conducting daily safety/debrief meetings.	Daily safety and debriefing meetings will be held on the project site at the beginning of each day and prior to departing the site after work activities have been completed. Safety meetings and attendance will be documented in the field logbook.
Identify where site-specific SOPs will be located on the project site.	Site Specific SOPs will be located in the site specific HASP and in the posession of the field manager/SHSO.
Describe heat illness prevention efforts that will be utilized on the project site.	Heat/cold stress prevention will be implemented by providing cooled or warm drinks, encouraging workers to take routine breaks in shaded/cool or heated areas, and providing measures for emergency heating or cooling when ambient temperatures is above 80 degrees or below 40 degrees.
Identify where Safety Data Sheet (SDS) for all chemicals used on the project location will be located (i.e., hard copy)	Safety Data Sheets (SDS) will be located with the site specific HASP binder in the possession of the Field Manager/SHSO.
If applicable, Describe where information can be found regarding the Medical Surveillance Program. Enter details of site specific medical surveillance requirements.	Details regarding the Medical Surveillance program can be found in the Leidos Health and Safety Policy Manual. All personnel working at the site will be enrolled in a HAZmedical surveillance program through their respective companies prior to accessing the site. The medical surveillance program must be in compliance with 29 CFR 1910.120(b)(4)(ii)(D), 29 CFR 1910.120(f), and other substance-specific medical surveillance requirements found in 29 CFR 1910.1001.1052.
Identify any approved variances for this project and attach approved variance from to the HASP document.	Variances are not required to perform the scope of work detailed in this HASP.
Describe site security control measures.	N/A
Identify when journey management plans required and where will the plans be maintained.	A site specific journey management plan (JMP) will be required for travel to and from the project site and include general hazards, site specific hazards and directions to and from the site. All suppliers and subcontractor companies are required to prepare a site specific JMP
A site-specific traffic plan shall be developed for motor vehicles and heavy equipment used within project sites to address potential motor vehicle hazards within the site operating area. Identify how the plan will be maintained and where will it be located.	A site specific traffic plan will be generated and developed for travel around the project site and include concessions for pedestrian, vehicle and heavy equipment around the site. The site specific traffic plan will be maintained on the project site and modified as site conditions change.
If egress routes for the facility must be blocked or modified, describe measures to assure that adequate, alternate egress routes have been provided and communicated.	Prior to setting up at the project site alternate egress routes will be determined as a contingency plan. All personnel will receive communcation regarding the plan during the preproject planning meeting or at a minimum during the safety tailgate meeting.
If ATVs are to be used on project, provide details on the types.	ATVs will not be used at the subject site.

Project Specific Personal Protective Equipment (PPE)

This matrix documents the Task Specific PPE required for the scope of the project. This does not replace the PPE assessment.

Location of Leidos's PPE Program	

Task Specific Required PPE

	Basic PPE Required for on all EMC Locations	General Work Activities	Technical Oversight of drilling and collection of soil samples	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Enter Tasks requiring PPE Beyond Basic PPE Here	Comments
Head Protection											
Hard Hat	X	X	X								
Hard Hat - Side Impact Protection											
Welding Hood/Shield											
Ear Protection											
Ear Plugs		X	X								
Ear Muffs											
Eye Protection											
Safety Glasses	X	X	X								
Face Shield											
Goggles											
Hand Protection *(Must be High Vis)*											
Heat resistant (leather palm)											
Chemical Resistant - Heavy Duty											
Chemical Resistant - Surgical		X	X								
Silvershield™											
Laceration Resistant Work Gloves	X	X	X								
Laceration Resistant Liners		X	X								
Impact/AntiVibration Gloves											
Foot Protection											
Safety Toe	X	X	X								
Chemical Resistant Covers											
Chemical Resistant Composition											
Metatarsal Cover											
Body Protection (shirts must be long sleeved)											
Fire Resistant Clothing											
Poly-Coated Tyvek Coveralls											
Chemical Resistant Apron (Splash)											
Retro-reflective High Visibility Vest	*	X	X								
Cooling Vest											
Lightning Indicator											
Respiratory Protection											
Air Purifying Respirator - Half-Face											
Air Purifying Respirator - Full-Face											
Cartridge - Organic Vapor											
Cartridge - Particulate											
Cartridge - Acid Gas											
Cartridge - Ammonia											
H2S Escape Respirator											
Biological Protection											
Insect Repellent - DEET											
Insect Repellent - Permethrin											
Poison Ivy Barrier Cream											
Snake Chaps											
Tick Gators											
Fall Protection											
Barriers/Guard Rails											
Restraint Device											
Personal Fall Arrest System											
Water Protection											
Personal Flotation Device											
Waders											
Other											

Site Constituents of Concern-HAZCOM (Right to Know)

Location of Leidos's Hazard Communication Program	Leidos Health and Safety Policy Manual for the Chevron Program

Site Constituents of Concern- HAZCOM (Right to Know)

Hazardous Substance Name	**Characteristics of Substance**	**Route(s) of Entry** *(inhalation, skin contact, ingestion)*	**Exposure Limits** *(as applicable, list 8-hour, short-term, & ceiling limits. Indicate whether OSHA, NIOSH, or ACGIH limit)*	**Exposure Signs & Symptoms**
Bezene	Colorless to light-yellow liquid with an aromatic odor	inhalation, absorption through skin, ingestion, skin/eye contact	NiOSH REL: Carcinogen; TWA 0.1 ppm; short term 1 ppm	Irritation to the eyes, skin nose and respiratory system
Ethyl Benzene	Colorless liquid with an aromatic odor	Inhalation, Ingestion, Skin/ eye contact	Niosh REL: TWA 100 ppm; short term 125 ppm	Irritation to the eyes, skin, and mucous membranes, headache, dermatitis, narcosis, coma
Toluene	Colorless liquid with a sweet, pungent, benzene-like odor	Inhalation, absorption through skin, ingestion, skin/eye contact	Niosh REL: TWA 100 ppm; Short term 150 ppm	Irritation to the eyes and nose; weakness, confusion, euphoria, dizziness, headache, dilated pupils, lacrimation, anxiety, muscle fatigue, insomnia, paresthesia, dermatitis, liver, kidney damage
Xylenes	Colorless liquid with an aromatic odor	inhalation, absorption through skin, ingestion,	Nisoh REL: TWA 100ppm Short Term: 150 ppm	Irritation to the eyes, skin, nose, and throat, dizziness, exitement, drowsiness, incoordination, staggering gait, coreal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis.
Gasoline	Clear liquid with a characteristic odor	Inhalation, absorption through skin, ingestion, skin/eye contact	Niosh REL: Carcinogen	Irritation to eyes, skin, and mucous mebranes, dermatitis, headache, weakness, blurred vision, dizziness, slurred speech, confusion, convulsions, chemical pneumonia, possible liver, kidney damage <carcinogen>

OSHA- *Occupational Safety and Health Administration* ***ACGIH-*** *American Conference of Governmental Industrial Hygienists,* ***NIOSH-*** *National Institute of Occupational Safety and Health*

Site-Specific Air Monitoring Plan

Location of Leidos's Air Monitoring Program	

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Refer to the CEMC/OPCO Gas Testing Standard for Additional Requirements

Air Monitoring Program

Exposure Hazard *(Ex: Benzene,H2S)*	Monitoring Equipment	Monitoring Method/Frequency	Action Level-Exposure Limits (Included sustained duration)	Required Action
Organic Vapors (Undifferentiated)	Photoionization detector	Breathing zone/ 15 minutes or as observed.	>5 parts per million (ppm) for one minute sustained	Stop Work and relocate to a designated assembly point

Hot Work and Confined Space Monitoring

Exposure Hazard	Monitoring Equipment	Monitoring Frequency	Action Level-Exposure Limits (Included sustained duration)	Required Action
Lower Explosive Limit (LEL)	4-gas meter	Work area/15 minutes or observed	>0% LEL. Stop Work and determine source. If above 10% stop work again	Stop work, shut down equipment and relocate personnel to a designated assembly point.

Waste Management

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Waste: The Third-Party Waste Stewardship Process is a Corporate OE Process applicable to all operations under CEMC operational control. It requires that all in-scope wastes sent for third-party management be sent to facilities that have been Selected-For-Use under the conditions of the process.

ALL WASTE WITHIN THE SCOPE OF THE TWS PROCESS MUST GO TO SFU FACILITY

Utilize CEMC's Compliance Assurance Tool Kits. Contact your CEMC Project Manager for access.

Waste Disposal & Waste Handling

All Waste	
Identify who is responsible for overall waste management at the site	*Leidos may collect characterization samples during field operations; however Leidos will not be responsible to determin the regulatory status of waste or recyclable material (sign profiles). GHD, a CEMC 'direct-billed' vendor to CEMC, will arrange for the transportation and disposition of soil and water by CEMC-approved and 'direct-billed' vendors. Leidos will not subcontract for the transportation or disposition of such material. Refer to the attached Waste Management Plan for more information regarding the management of waste.*
Confirm project site is set up in the Waste Module of Essential Suite. List approved Essential Suite entity name or "Not applicable" if OpCo is responsible.	*Chevron site 375289*
Identify Who is responsible for entering waste data in the Waste Module of Essential Suite -or- UBU USO Only-Identify Who is responsible for documenting shipments and submitting them to the project manager for semi-annual waste reporting requirements.	NAWTDesk@chevron.com Ken Yee 925842-3560/714-614-4415
Describe the process for generating and maintaining waste shipment paperwork. (Profile assignment, Manifest, BOL & LDRs)	*If investigative derived waste is generated, Leidos may collect characterization samples during field operations. Waste characterization samples will be submitted to Eurofins Lancaster Labs for analysis. GHD will complete profiling activities and coordinate the generation/maintenance of waste shipping paperwork (profile and manfest) with a Chevron approved disposal facility. GHD will coordinate the disposal of waste at teh subject site on behalf of Chevron EMC and will have a represntative onsite during waste pickup to finalize waste shipping documents and witness removal.*
Identify who is responsible for signing off on the waste shipment paperwork.	*Leidos may collect characterization samples during field operations; however Leidos will not be responsible to determin the regulatory status of waste or recyclable material (sign profiles). GHD, a CEMC 'direct-billed' vendor to CEMC, will arrange for the thrasportation and disposition of soil and water by CEMC-approved and 'direct-billed' vendors. Leidos will not subcontract for the transportation or disposition of such material.*
Identify how recyclable material will be managed.	*Investigative derived waste and expendable solid waste such as (concrete, asphalt, cardboard, paper, plastic etc. will be disposed of by the drilling subcontractor or Leidos personnel at a facililty that accepts such waste. Concrete and asphalt are expected to fill approximately 5-55 gallon drums. Expendable solid waste is anticipated to fill 4, 30 gallon trash bags.*
Hazardous Waste Only	
Identify EPA ID number if required. If so, list the EPA ID number and complete toolkit and submit to EMCCAHD@chevron.com.	

Waste Stream & Associated Analytical

Waste Stream	Haz or Non-Haz (H/N)	Solid, Liquid or Sludge(S/L/Sludge)	DOT or NON-DOT (D/N)	Analytical Results	Storage and Labeling Requirements	Transporter	Receiving Facility *(Selected for Use)*

Waste Management

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Waste: The Third-Party Waste Stewardship Process is a Corporate OE Process applicable to all operations under CEMC operational control. It requires that all in-scope wastes sent for third-party management be sent to facilities that have been Selected-For-Use under the conditions of the process.

ALL WASTE WITHIN THE SCOPE OF THE TWS PROCESS MUST GO TO SFU FACILITY

Utilize CEMC's Compliance Assurance Tool Kits. Contact your CEMC Project Manager for access.

Waste Disposal & Waste Handling

All Waste	
Identify who is responsible for overall waste management at the site	*Leidos may collect characterization samples during field operations; however Leidos will not be responsible to determin the regulatory status of waste or recyclable material (sign profiles). GHD, a CEMC 'direct-billed' vendor to CEMC, will arrange for the transportation and disposition of soil and water by CEMC-approved and 'direct-billed' vendors. Leidos will not subcontract for the transportation or disposition of such material. Refer to the attached Waste Management Plan for more information regarding the management of waste.*
Confirm project site is set up in the Waste Module of Essential Suite. List approved Essential Suite entity name or "Not applicable" if OpCo is responsible.	*Chevron site 375289*
Identify Who is responsible for entering waste data in the Waste Module of Essential Suite -or- UBU USO Only-Identify Who is responsible for documenting shipments and submitting them to the project manager for semi-annual waste reporting requirements.	NAWTDesk@chevron.com Ken Yee 925842-3560/714-614-4415
Identify who performed preliminary assessments/ analytical.	

Decontamination Procedures

This template is intended to capture significant risks and mitigation plans for the project. This template should be used, when applicable, in conjunction with EMC/OPCO and Leidos policies and procedures.

Location of Leidos's Decontamination Procedures	Decontamination procedures are identified in Leidos Health and Safety Policy Manual for the Chevron Program

Decontamination Information

List location and type of project decontamination facilities	The subcontracted drilling company, Cascade Drilling, will be deconning their equipment. An area onsite will be designated and barricaded to complete equipment decontamination.
Describe decontamination procedures for Personnel and PPE	Modified level D PPE per the JSA will be used. Face shields will be used for splash hazards.
Describe decontamination procedures for equipment	Drill casing and rods will be deconned using a pressure washer in a decon pad. Decon. Water generated will be transferred to 55 gallon drums.
Describe decontamination procedures in the event of an emergency.	SWA will be used. Personnel will shut down equipment which may contribute to a release and set up a containment of the area. Site personnel will assemble at assembly point and determine the next course of action.

Site Layout of Decontamination Area(s)

Appendix D:
O'Gara Site Assessment Report

TIM O'GARA, R.G.
CONSULTING HYDROGEOLOGIST

May 4, 2012

Tim Love
Operations Manager
Carson Oil Company
P.O. Box 10948
Portland, OR 97296-0948

Re: Carson – Goldendale Fuel Spill

Tim,

The site is located at 808 South Columbus Avenue in the town of Goldendale, WA. The site has operated as a bulk fuel supplier since 1927 and is paved mostly with gravel.

Early on the morning of April 29, there was a fuel spill at the site. According to reports, up to 970 gallons of unleaded gasoline may have been spilled due to overfilling of one of the above ground tanks. An effort was made to clean up the spill immediately, but there is no record of how much of the fuel percolated into the ground. This report documents the initial response and removal of the fresh gasoline spill. At this time, there is still weathered gasoline and diesel contamination remaining at the site. Figure 1 shows the site location. Figure 2 shows the site layout.

On March 1, 2012, a series of borings were drilled around the tank area to determine how widespread the soil contamination was. A total of 14 boring locations were drilled and sampled. In addition, 12 grab samples were collected from depths ranging from 6-inches to 62 inches below grade from within the bermed area beneath the tank that was overfilled.

Volcanic bedrock was found throughout the site at depths ranging from 7-10 feet below grade also. The water was sitting on top of the bedrock in most of the borings, however no water was found in three of them. It appears that there are preferential pathways that run on top of the bedrock in areas where it is lower. The main soil type at the site is silt to clayey silt, but there were a few borings that detected a sand layer immediately above the basalt bedrock. Boring locations are found on Figure 2. Depth to bedrock in the

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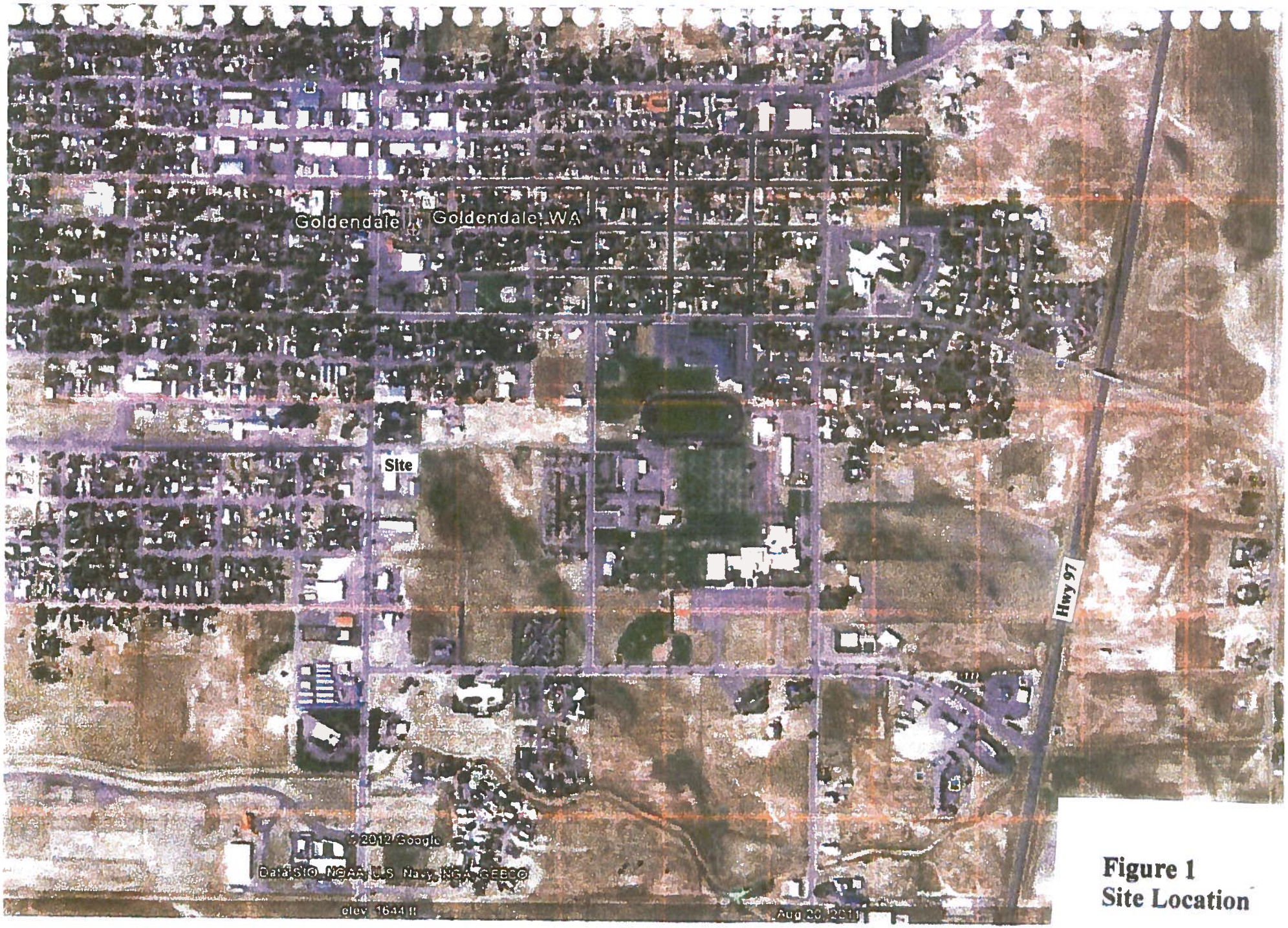


Figure 1
Site Location

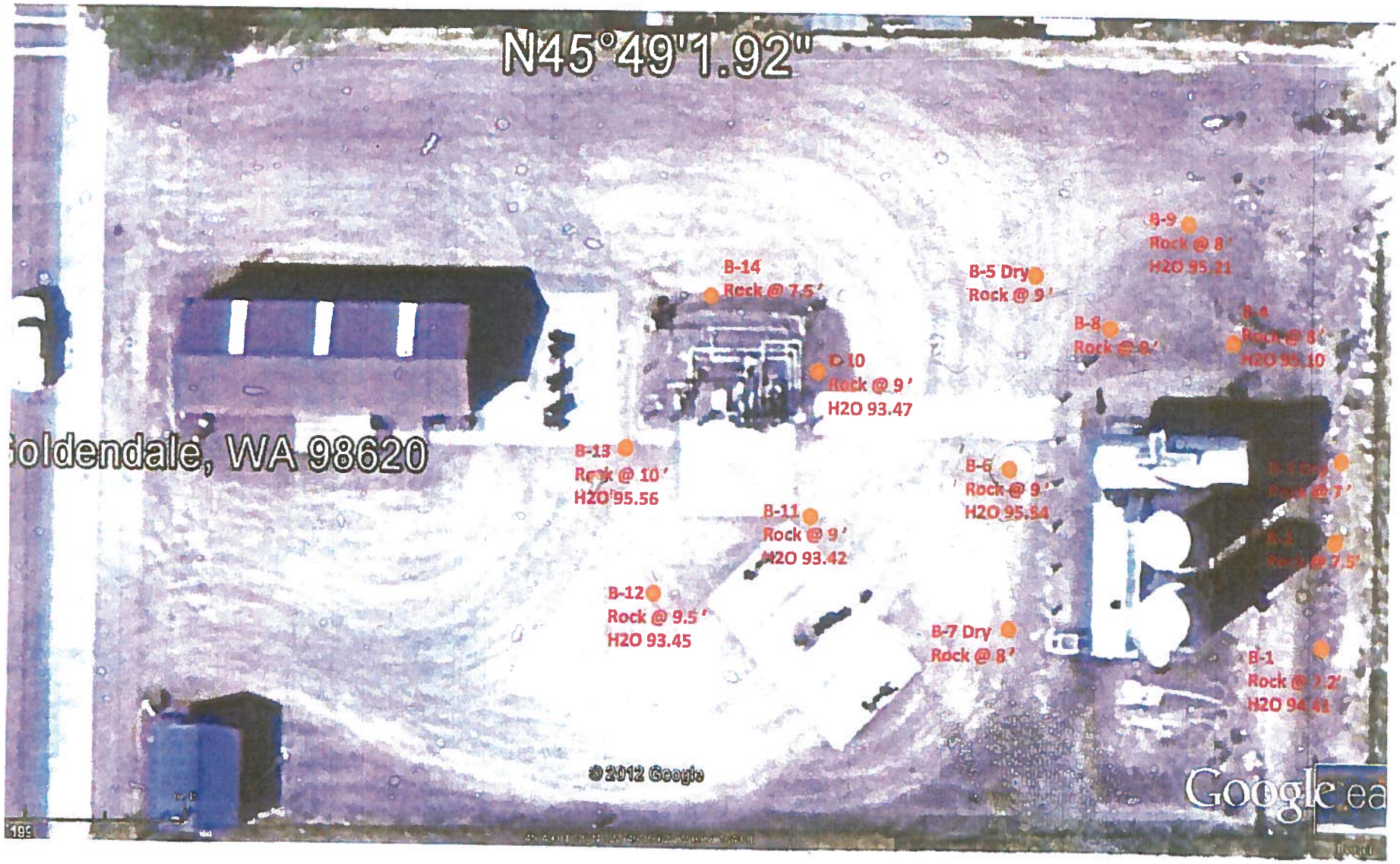


Figure 2
Soil Boring Locations,
Showing Bedrock Depths and
Water levels in open Borings

borings is shown as Table 1. Boring logs for the soil sample location are included in Appendix A.

Soil from the immediate area within the berm was also removed and stored on site for later disposal. During the initial excavation, ground water was detected in the pit at approximately 5-6 feet below grade. Water was pumped from the excavation and stored on site in a 19,000 gallon tank until it could be sampled and disposed of properly.

Because these samples were being collected to determine the lateral extent of the fresh gasoline spill, and not for compliance, soil and water samples that were collected from the excavation were analyzed for gasoline and diesel range hydrocarbons as well as BTEX. Tables 2, 3, and 4 show the sample results. A few of the higher concentration samples were later analyzed for TCLP Lead to determine the proper disposal methodology also.

Table 1
Approximate Depth to bedrock

Location	Depth to bedrock (ft)	Wet?
B-1	7.2	Yes
B-2	7.5	Yes
B-3	7	No
B-4	8	Yes
B-5	9	No
B-6	9	Yes
B-7	8	No
B-8	9	Yes
B-9	8	Yes
B-10	9	Yes
B-11	9	Yes
B-12	9.5	Yes
B-13	10	Yes
B-14	7.5	Yes

Table 2
Soil inside berm area (mg/kg)

Location	Gx	Dx
S- Center 0-6	14200	609
N-Center 0-6	18300	2560
NW 0-6	15600	686
NE 0-6	96.5	675
SE 0-6	34000	1800
SW 0-6	13600	165
S-Center 54"	ND	25.6
S-Center 56"	833	694
NW-36"	4060	3320
NW – 62"	1170	367
N- Center - 58"	2100	2020
N-Center 36"	1120	118
Exc pit Water*	44700 (ug/l)	16100 (mg/l)

* Also have PAHs for exc pit water

Table 3 Boring Samples

Soil Samples (mg/kg)

location	Gx	Dx	Benz	Tol	Ethyl	Xylene
1-5	ND		ND	0.316	ND	ND
2-5	ND		ND	ND	ND	ND
2-7	256		ND	0.543	1.12	2.62
3-5	ND		ND	ND	ND	ND
3-7	ND		ND	ND	ND	ND
4-5	19.9		ND	ND	ND	ND
4-7	ND		ND	ND	ND	ND
5-5	ND		ND	ND	ND	ND
5-8	ND	160	ND	ND	ND	ND
6-5	1330		29.5	155	36.3	176
6-8	36.1	1050	ND	ND	ND	ND
7-5	1380	755	ND	ND	2.52	0.946
7-8	5840	1470	ND	1.14	6.76	3.22
8-5	ND		ND	ND	ND	ND
8-8	ND		ND	ND	ND	ND
9-5	ND		ND	ND	ND	ND
9-7	ND	399	ND	ND	ND	ND
10-5	ND	ND	0.311	0.633	ND	ND
10-9	ND		ND	ND	ND	ND
11-5		909				
11-7	1090	384	0.414	2.89	4.84	6.96
12-5		215				
12-8	36.7	99.9	ND	ND	0.440	ND
13-5		113				
13-9	222	41.3	0.103	2.36	5.35	7.75
14-5		121				
14-7	752	360	0.202	4.31	9.55	13.1

Table 4

Boring Water Samples`

Location	Gx (ug/l)	Dx (mg/l)	Benz (ug/l)	Tol (ug/l)	Ethyl (ug/l)	Xylene (ug/l)
B-1-W	227	ND	0.485	1.17	1.45	1.99
B-2-W	10500		20.7	14.0	615	961
B-4-W	2770	7.96	11.5	9.58	48.9	88.6
B-6-W	127000	8.53	11500	40000	2430	11300
B-8-W	4240	1.24	43.6	5.34	45.9	45.5
B-9-W	288	2.08	2.07	3.26	2.17	2.75
B-10-W		20.7				
B-11-W		294				
B-12-W		169				
B-13-W		36.5				
B-14-W		213				

Complete analytical results are found in Attachment B.

On April 13, 2012, the stockpiled soils from the initial excavation were removed from the site to the Columbia Ridge landfill

Monitoring Well Installation

Four monitoring wells were installed on April 4, 2012. The wells were installed using push probe technology and all had 5 feet of prepacked 0.010 slot screen. Prior to installing the wells, a proposal was given to the Department of Ecology with locations and sampling methodology for the work. Unfortunately, since the site is not in the Voluntary Cleanup Program, Ecology spill response or Toxic Cleanup Program personnel could not comment on the locations.

Without any input from Ecology, the wells were installed using the following rationale:

MW-1 was placed as close as possible to the SE corner of the site. This was done to get background water from the area of the site that was assumed to be least likely to have been contaminated by site activities over the years.

MW-2 was placed in the north central portion of the site. This well was be used to see if the plume is moving to the northwest.

MW-3 was placed between boring B-6 and the fill stand. This well location was chosen because the boring program at this site seems to indicate that there is a preferential pathway for ground water flow in the B-6 area.

The final well, MW-4, was placed south and west of boring B-7. Based on our soil samples, this was assumed to place the well outside of the plume. It is also in a location that would show us if the plume is moving to the southwest. Figure 3 shows the location of the wells. Boring Logs for the wells are included in Appendix A after the soil boring logs.

Remedial Excavation

As mentioned earlier, during the first few days after the initial spill, soil from within the immediate area beneath the overfilled tank was removed and stockpiled on site for later disposal. Prior to disposing of the soil, a landfill permit needed to be issued to assure the proper disposal methods were followed. In discussions with the Waste Management Company that runs the Arlington Landfill, the area around boring B-6 was found to contain too much toluene to allow disposal in the non-haz landfill. An agreement was made to segregate the soils from within 5-feet of boring B-6 in all directions and landfill that soil under a separate manifest so it could be properly treated.

On April 6 and 8, 2012, the remaining soils containing the fresh gasoline were excavated and a series of 19 confirmation samples were collected from the walls and floor of the excavation. Within the excavation area, all soil was removed down to the top of the

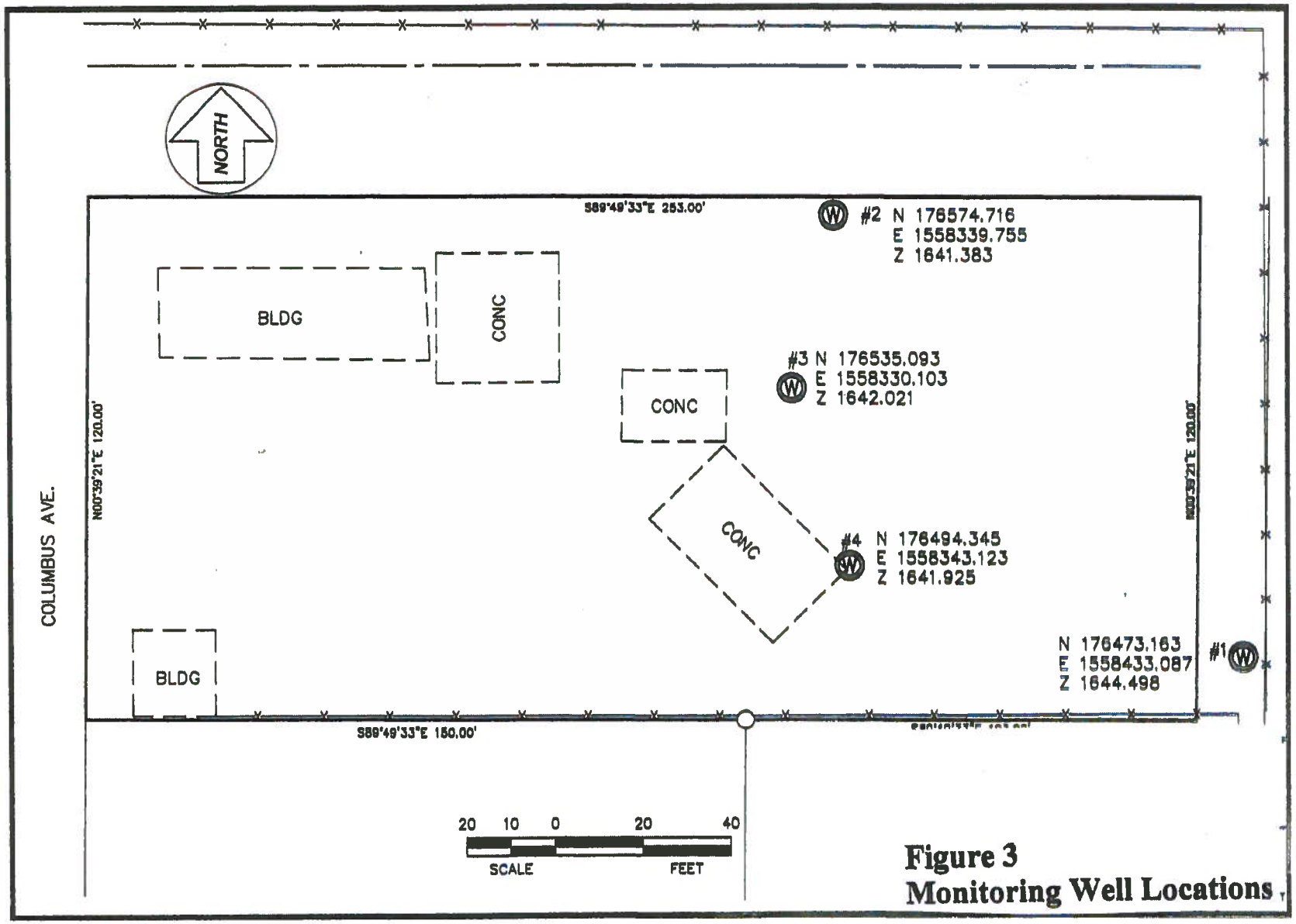


Figure 3
Monitoring Well Locations

basalt bedrock. There was a small area that could not be removed below the pipe run, so samples were collected from the wall in that area to confirm that the soil that was left did not contain fresh gasoline. A total of 389.68 tons of soil was taken off site to the non-haz landfill and an additional 23.94 tons of soil from around B-6 was taken to the hazardous landfill Figure 4 shows the area of excavation in relation to the whole site. Figure 5 is a more detailed drawing showing the locations of all the confirmation samples.

According to Washington Department of Ecology guidance documents, the difference between fresh and weathered gasoline can be determined by the ratio of benzene + toluene divided by the concentration of the ethylbenzene + xylene (B+T)/(E+X). If the result of this is 3 to 5, the gasoline is considered to be fresh. A number of less than 0.5 is considered to be very weathered.

Because the purpose of this work was to remediate the fresh gasoline spill and not to clean up the residual contamination from 85 years of site operations, confirmation samples from the remedial excavation were all tested for gasoline range hydrocarbons and BTEX. The resulting concentrations were all analyzed according to Ecology protocol to determine if any fresh product remained. Table 5 shows the result of the confirmation sampling.

While it is apparent that there is no fresh gasoline remaining in the excavation area, four of the samples were found to be higher than the 0.50 that delineates very weathered gasoline. All four of these samples are bottom samples that were scraped from the top of the bedrock. Since it is difficult to scrape basalt, it is very possible that some of the overlying lightly contaminated soils were also picked up from pockets or low areas in the surface of the rock. The excavation was cleaned as well as possible, but it is impossible to get all soil off a surface that isn't completely flat using an excavator bucket.

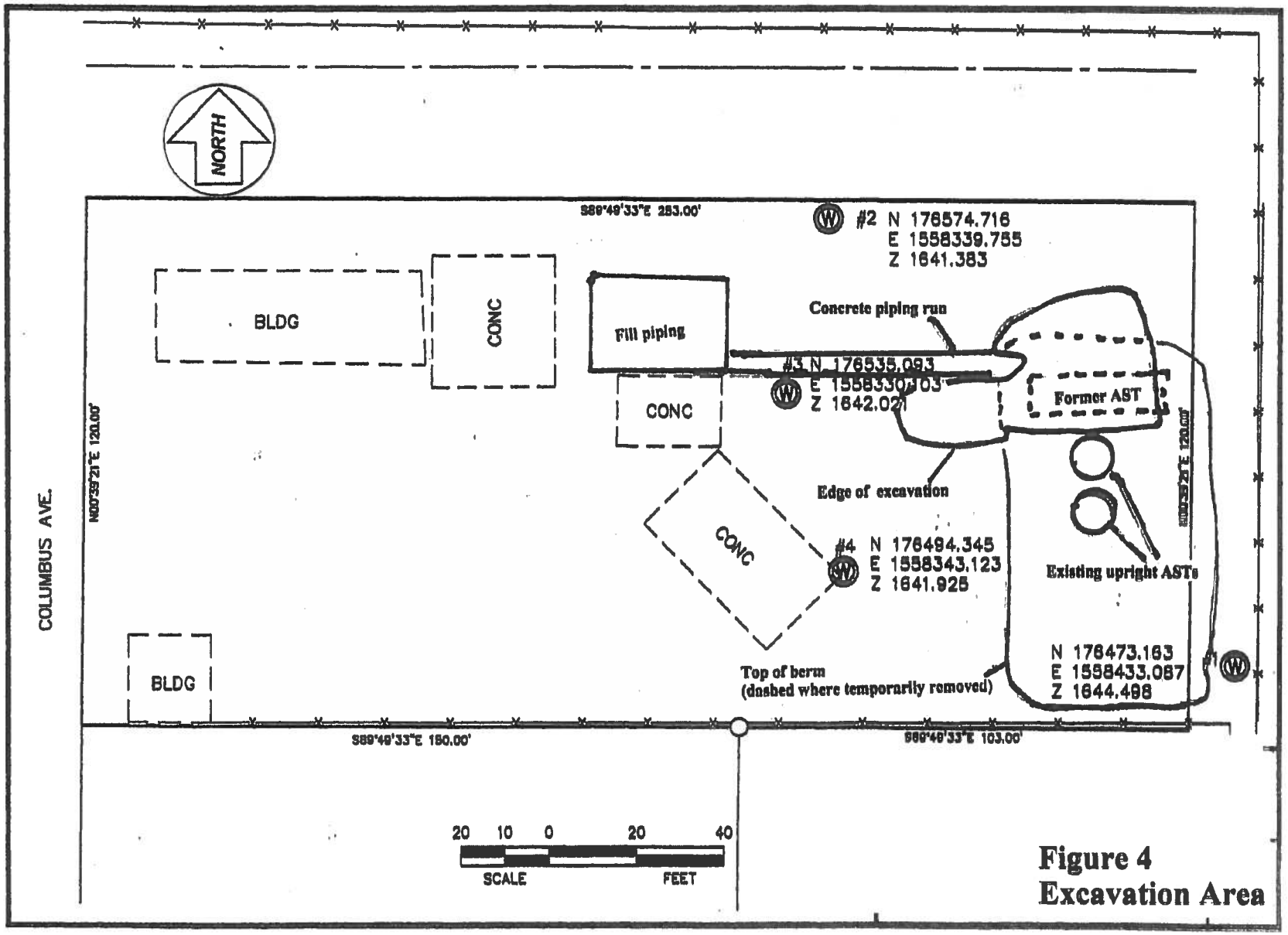


Figure 4
Excavation Area

100/30 0.03 7 6 9

Table 5

Confirmation Sampling Results (mg/kg)

Sample Number	Location/depth	Gx	B	T	E	X	(B+T)/(E+X)
C-1	SE corner @ 4 ft.	346	2.0	2.2	2.0	13	0.29
C-2	East wall @ 3 ft.	1060	6.5	20	30	64	0.28
C-3	East wall @ 3.5 ft.	2190	7.7	26	45	120	0.20
C-4	NE corner @4 ft.	843	4.3	7.1	13	53	0.17
C-5	S. wall @ 3 ft.	1660	3.7	22	27	120	0.17
C-6	N side of pipe run @ 3.5 ft.	1970	27	32	160	160	0.18
C-7	S. wall below berm @4 ft.	2480	36	46	220	240	0.17
C-8	NE Bottom @ 8 ft	3080	13	7.4	12	32	0.46
C-9	SE bottom @7.5 ft	1490	6.6	18	3.9	32	0.68
C-10	Center S. bottom @ 8 ft. @4 ft	1590	7.3	15	25	73	0.22
C-11	NW wall @4 ft	2550	11	33	56	200	0.17
C-12	NW corner @ 3 ft.	2860	9.4	13	48	67	0.19
C-13	Wall by pipe run @ 3.5 ft.	1970	13	27	95	160	0.15
C-14	Bottom beneath berm @ 8 ft.	561	1.6	1.1	1.8	2.7	0.60
C-15	Bottom beneath B-6 @ 8 ft.	1810	4.9	4.1	2.3	9.0	0.79
C-16	S wall at edge of B-6 boring @ 5 ft	766	3.9	13	45	74	0.14
C-17	N wall at edge of B-6 boring @ 5 ft.	1140	8.7	17	70	96	0.15
C-18	W bottom @ 7.5 ft	1290	6.6	3.7	2.0	5.7	1.06
C-19	W wall @ 4 ft.	1220	7.0	22	79	110	0.15

0.03 7 6 9

Monitoring Well Sampling

The wells were sampled on April 20, 2012. Each well was sampled using a peristaltic pump Prior to collecting water samples, the wells were opened and allowed to equilibrate before the water levels were measured. The measuring point on wells had earlier been

surveyed, so the ground water could be determined. Table 6 shows the ground water elevations in the 4 wells. Figure 6 shows the water level in the wells.

Table 6
Ground Water Elevations 4-20-11

Well #	Depth to water (ft.)	Surveyed measuring point elevation (ft. MSL)	Ground water elevation (ft. MSL)
MW-1	6.33	1644.50	1638.17
MW-2	5.60	1641.38	1635.78
MW-3	2.73	1642.02	1639.29
MW-4	2.26	1641.93	1639.67

Based on the widely varying water levels, it appears that the wells are tapping at least two different perched water zones. MW-1, MW-3 and MW-4 are possibly in the same zone, but it appears that MW-2, which is at least 2.5 feet lower than the rest, is tapping a separate perched water body. A ground water direction was determined based on wells 1, 3, and 4. That gradient moves to the northeast.

All of the wells were easily pumped dry after only removing approximately 1.5 well volumes of water. None of them recharged easily either, taking approximately an hour to get enough water in the well casing to fill four 80ml VOA vials for the testing. Well MW-3 seemed to recharge the best, but that was expected because there is a silty sand lens of soil sitting directly on top of the basalt that may provide for a more permeable pathway for water.

During sampling field tests were run for pH, temperature and electrical conductivity. Table 7 shows the initial readings for each well and the readings that were present during pumping after they stabilized.

Table 7
Water Evaluation Parameters

Well	pH	EC	Temp
MW-1 – initial	6.43	457	56.7
MW-1 stabilized	7.01	358	53.4
MW-2 initial	6.96	472	55.3
MW-2 stabilized	7.10	336	57.4
MW-3 initial	7.07	448	54.5
MW-3 stabilized	7.28	460	58.0
MW-4 initial	6.95	318	54.2
MW-4 stabilized	7.80	319	58.8

Because this is a gasoline site, the sample were analyzed for VOCs , including BTEX, MTBE, and EDC, using EPA method 8260B. EDB was analyzed using EPA method 8011. Table 8 shows the sample results.

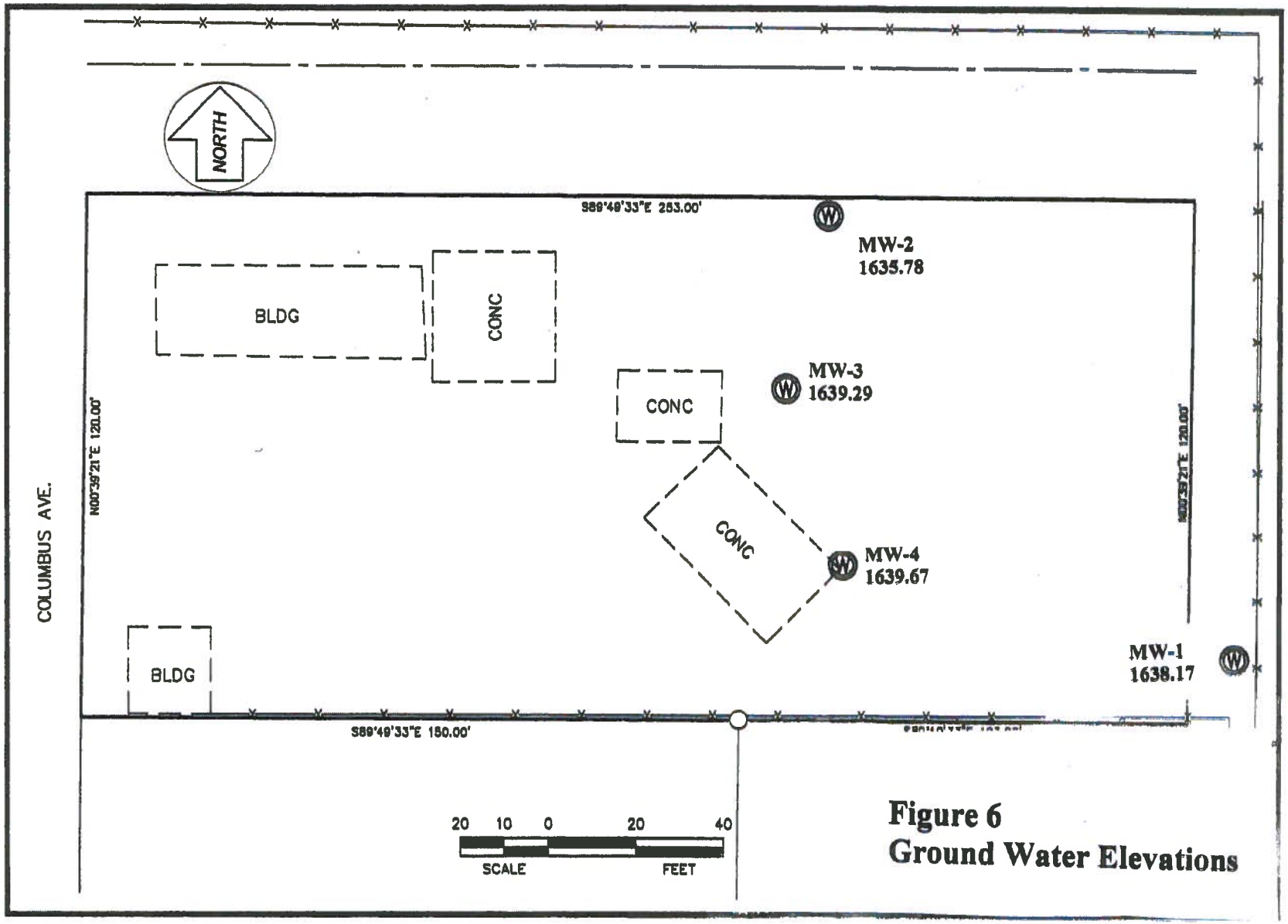


Figure 6
Ground Water Elevations

Table 8
Ground Water sample Results (ug/l)

Chemical	MW-1	MW-2	MW-3	MW-4	Method A Levels
Gasoline Range Hydrocarbons	ND	8,910	5,080	6,000	1,000 (fresh) 800 (weathered)
1,2,4 trimethylbenzene	ND	27.3	125	ND	-
*1,2, dibromoethane (EDB)	ND	ND	ND	ND	0.01
1,2 dicholorethane (EDC)	ND	ND	ND	ND	-
1,3,5 trimethylbenzene	ND	7.79	71.4	ND	-
Benzene	5.38	1,250	4.00	ND	5
Ethylbenzene	ND	72.8	27.0	ND	-
Isopropylbenzene	ND	4.78	30.6	6.76	-
m,p-Xylene	ND	422	9.37	ND	-
MTBE	ND	ND	ND	ND	20
Naphthalene	ND	8.70	66.0	7.19	160
n-Propylbenzene	ND	10.3	124	13.7	-
o-Xylene	ND	351	ND	ND	-
Toluene	9.05	1,800	6.41	ND	1,000

Notes: EDB analysis by EPA Method 8011, all other VOCs by EPA Method 8260
Gasoline Range Hydrocarbons by the NWTPH-Gx Method.

As you can see, if we apply the (B+T)/(E+X) test, the water in monitoring well MW-2 contains fresh gasoline and the others do not. This indicates that the ground water flow from the tank farm is moving to the northwest as expected. Additionally, wells MW-3 and MW-4 were found to contain extremely weathered product. Well MW-1 only contained 5.36 ug/l of benzene and 9.05 ug/l of toluene. This indicates that at one time there may have been a spill in this area, but it is extremely weathered.

After the initial data was receive from the lab, it did not conform to our expectations that well MW-3 was going to be the one with elevated fresh gasoline. Just to make sure that there was no mistake in labeling with the initial sampling, a second set of samples was collected from wells MW-2 and MW-3 on April 30, 2012. This additional sampling confirmed that the fresh gasoline was indeed in well MW-2 and the gasoline in MW-3 was weathered. The resample results are found in Table 9.

Table 9
Resample of MW-2 and MW-3
4-30-12

Chemical	MW-2 (ug/l)	MW-3 (ug/l)	Method A Levels
Gasoline Range Hydrocarbons	14,500	6,180	1,000 (fresh) 800 (weathered)
1,2,4 trimethylbenzene	29.4	67.1	-
*1,2, dibromoethane (EDB)	ND	ND	0.01
1,2 dicholorethane (EDC)	ND	ND	-
1,3,5 trimethylbenzene	14.0	38.1	-
Benzene	829	0.600	5
Ethylbenzene	104	7.75	-
Isopropylbenzene	8.31	13.8	-
m,p-Xylene	221	6.08	-
MTBE	ND	ND	20
Naphthalene	10.2	39.6	160
n-Propylbenzene	17.5	56.8	-
o-Xylene	208	ND	-
Toluene	1,490	ND	1,000

Notes: EDB analysis by EPA Method 8011, all other VOCs by EPA Method 8260
Gasoline Range Hydrocarbons by the NWTPH-Gx Method.

Discussion

Based on the work that has been completed at the site and the confirmation samples, it is evident that the soils containing the fresh gasoline from the recent spill have been removed.

Based on the ground water levels, it appears that there at least two perched water bearing zones at the site. In particular, the water level in MW-2, which was the only well with fresh gasoline in it, was 2.39 feet lower than any other well that was on site. If we plot a ground water gradient using wells MW-1, MW-3, and MW-4, the shallow ground water is moving to the northeast, which is not what we had expected for this site.

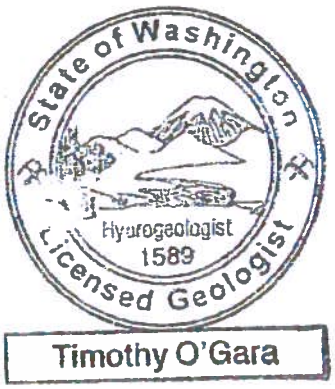
Considering the confirmed contamination in MW-2, it is also odd that, during the soil boring program, the nearest borings (B-5 and B-10) did not have any gasoline detections in the soil samples. Also, boring B-5 was a dry boring.

This leads me to believe that the contamination in MW-2 is not associated with the original spill, but there is a leak from some other buried piping in the area. Because we are dealing with individual perched water zones and not an interconnected aquifer system, we cannot be certain that the ground water in the perched zone that is feeding MW-2 is moving in the same direction as the higher one. If it is, that would lead us to believe that the gasoline in MW-2 is coming either from the fill stand or piping leading to the gasoline dispensers that are located to the west.

While it appears that all of the fresh gasoline from the initial spill has been remediated at this time, further investigation as to the source of the fresh gasoline in MW-2 needs to be completed.

Respectfully Submitted,

Tim O'Gara, LG, LHg
Consulting Hydrogeologist



Appendix A

Boring Logs

And

Monitoring Well Logs

BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By:
Boring Dia:	Inches	Boring Number: B-1	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		CL - Clay, stiff, brown
				10		Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after soil and water sample collection

Site:

Carson - Goldendale

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BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-2	Tim O'Gara LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		CL - Clay, brown
				10		GP - Coarse Sand and Gravel, slight hydrocarbon odor
				15		Basalt
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples

Site:

Carson - Goldendale

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BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-3	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		ML - Silt, tan
				10		GP - Coarse Sand and Gravel
				15		Basalt
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil samples. No water detected in this boring

Site:

Carson - Goldendale

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Project No.:

Page 1

BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-4	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		CL - Silty Clay, tan
				10		GP - Coarse Sand and Gravel
				15		Basalt
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples

Site:

Carson - Goldendale

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Project No.:

Page 1

BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By:
Boring Dia:	Inches	Boring Number: B-5	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				0		ML - Silt, brown, stiff
				5		
						GP - Sand and Gravel, cemented
						Basalt
				10		
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil sample. No water found in this boring.

Site:

Carson - Goldendale

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Project No.:

BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-6	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		CL - Clay, stiff, brown
				10		SP - Medium to fine Sand Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples.

Site:

Carson - Goldendale

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Project No.:

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BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By:
Boring Dia:	Inches	Boring Number: B-7	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				0		CL - Silty Clay, stiff, dark brown
				5		SM - Silty Sand, brown
						Basalt
				10		
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled with bentonite after collecting soil samples. No water found in this boring.

Site:

Carson - Goldendale

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Project No.:

Page 1

BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-8	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		ML - Clayey Silt, tan
				10		SP - Cemented Sand and Gravel
				15		Basalt
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled with bentonite after collecting soil and water samples

Site:

Carson - Goldendale

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Project No.:

Page 1

BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-9	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		ML - Silt, tan
				10		GM - Silty angular Gravel
				15		GP - Cemented Sand and Gravel
				20		Basalt
				25		
				30		
				35		

Completion Notes:

Backfilled with bentonite after collecting soil and water samples

Site:

Carson - Goldendale

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BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-10	Tim O'Gara, LG,LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		SM - Silty very fine Sand
				10		GP - cemented sand and gravel Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled with bentonite after collecting soil and water samples.

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BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By:
Boring Dia:	Inches	Boring Number: B-11	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				0		ML - Silt, black
				5		SP - Partially cemented coarse sand, black
				10		basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples

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BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By: Tim O'Gara, LG, LHg
Boring Dia:	Inches	Boring Number: B-12	

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				0		ML - Silt, black
				5		
						GP - Partially cemented Sand and Gravel
				10		Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

backfilled boring with bentonite after collecting soil and water samples.

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BORING LOG

Drill Rig:		Date Drilled: 3-1-12	Logged By:
Boring Dia:	Inches	Boring Number: B-13	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				0		ML - Silt, dark brown
				5		ML - Silt, black
				10		GP - Partially cemented Gravel with some Sand
						Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples

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BORING LOG

Drill Rig:	Date Drilled: 3-1-12	Logged By:
Boring Dia: Inches	Boring Number: B-14	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
				5		ML - Silt dark brown
				10		SM - Silty Sand GP - Partially cemented Gravel and Sand Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Backfilled boring with bentonite after collecting soil and water samples.

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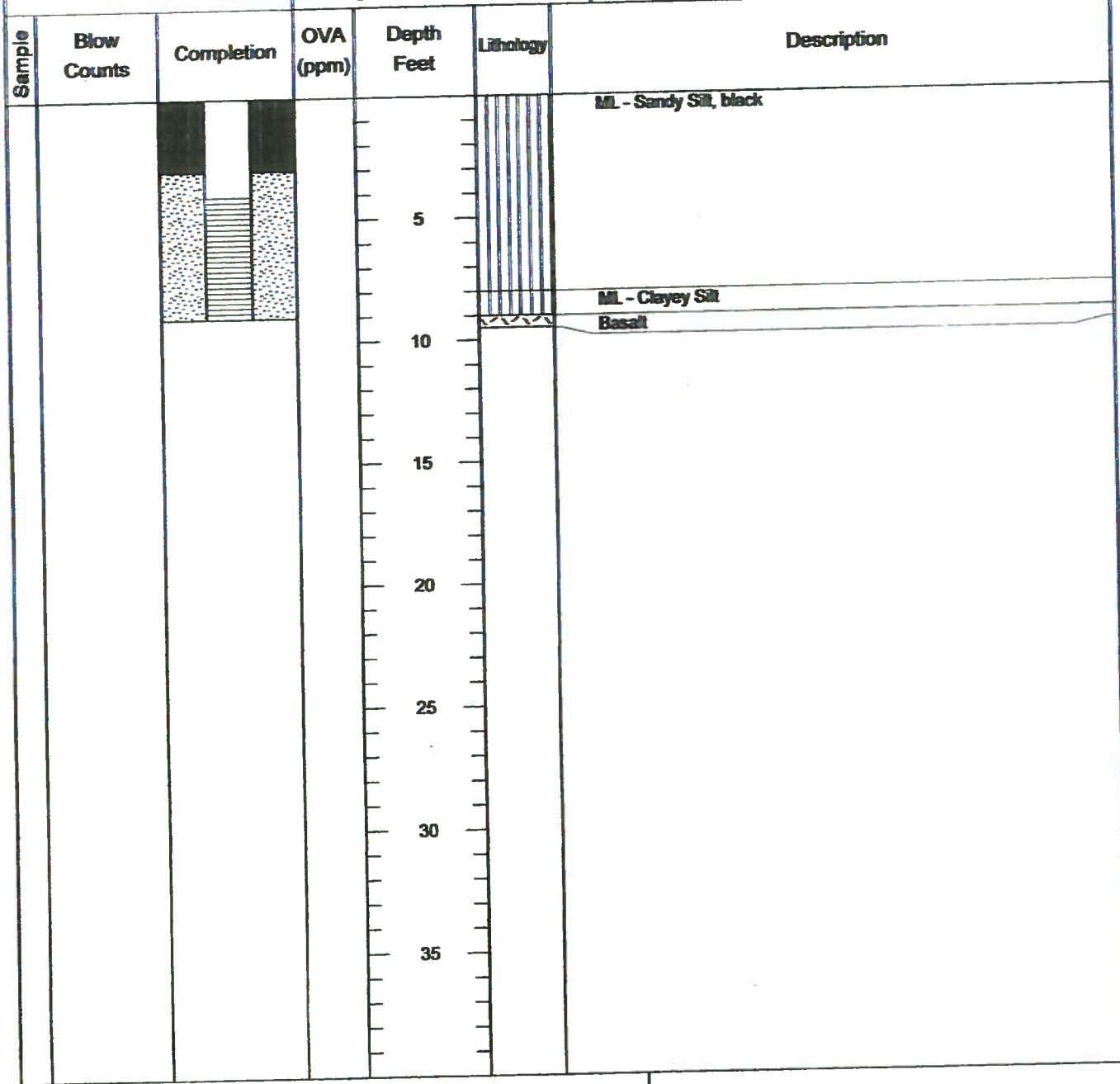
BORING LOG

Drill Rig:		Date Drilled: 4-5-12	Logged By:
Boring Dia:	Inches	Boring Number: MW-1	Tim O'Gara, LG, LHg



Completion Notes:

Flush mount completion.
Well is 2-inch pvc with 5 feet of prepack 0.010 slot screen

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BORING LOG

Drill Rig:		Date Drilled: 4-5-12	Logged By:
Boring Dia:	Inches	Boring Number: MW-2	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
						GP - Gravel fill
						ML - Silt, tan
						SW - Medium Sand, tan
						ML - Clayey Silt, brown
				5		CL - Clay, black
						GP - Gravel and weathered basalt
				10		Basalt
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Flush mount completion

Well is 2-inch pvc with 5 feet of prepacked 0.010 slot screen

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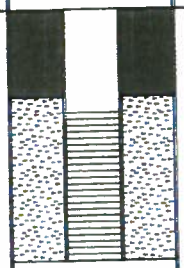
BORING LOG

Drill Rig:		Date Drilled: 4-5-12	Logged By:
Boring Dia:	Inches	Boring Number: MW-3	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
						GP - Gravel fill
						ML - Sandy Silt, black
				5		CL - Clay, black
						SM - Medium Sand with Silt, black
						Basalt
				10		
				15		
				20		
				25		
				30		
				35		



Completion Notes:

Flush mount completion

Well is 2-inch pvc with 0.010 slot prepacked screen

Site:

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BORING LOG

Drill Rig:	Date Drilled: 4-5-12	Logged By:
Boring Dia: Inches	Boring Number: MW-4	Tim O'Gara, LG, LHg

Sample	Blow Counts	Completion	OVA (ppm)	Depth Feet	Lithology	Description
						GP - Gravel fill
						SM - Silty Sand with minor Clay, black
				5		CL - Clay, black
						Basalt
				10		
				15		
				20		
				25		
				30		
				35		

Completion Notes:

Flush mount completion

Well is 2-inch pvc with 0.010 slot prepack screen

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