# Work Plan

Ellensburg City West 8th Street ROW
Site Assessment
Ellensburg, Washington

*for*
**Washington State Department of Ecology**

April 22, 2021

GeoEngineers
Earth Science + Technology

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# Site Assessment
# Ellensburg, Washington

**File No. 0504-169-00**

**April 22, 2021**

Prepared for:

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## 1.0 INTRODUCTION

This Work Plan presents the scope of work and approach to conduct a soil and, if encountered, groundwater assessment at the Ellensburg City West 8th Street ROW site (herein designated the site) located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington, as shown in Figure 1, Vicinity Map. Based on recent aerial imagery, the site is adjacent to the Ward Rugh Inc. commercial building and is occupied by asphalt concrete pavement (ACP). What appears to be an above ground storage tank (AST) is present northwest of the adjacent Ward Rugh Inc. commercial building.

This Work Plan has been prepared by GeoEngineers for the State of Washington Department of Ecology (Ecology) under Ecology Master Contract No. C1900044, work assignment number GEI029. The purpose of this assessment is to characterize soil and groundwater contaminants and define the extent of documented heavy oil-range petroleum hydrocarbon (ORPH) contamination observed in an exploratory trench excavated during a 1994 site investigation. Data generated from this assessment will support a no further action (NFA) determination or planning potential remedial actions within the defined project area to address ecological and human health risks associated with historical contamination.

A sampling plan, with a description of field assessment procedures is provided in Appendix A; the Quality Assurance Project Plan (QAPP) and the Health and Safety Plan (HASP) are presented as Appendices B and C, respectively. The Work Plan is organized as follows:

- Site Description and Background – Section 2.0
- Field Investigation Activities – Section 3.0
- Schedule – Section 4.0
- References – Section 5.0

## 2.0 SITE DESCRIPTION AND BACKGROUND

The site is located on the 700 block of West University Way (formerly West 8th Street) in Ellensburg, Washington. The site is bound by a commercial trucking yard to the west, commercial parking lot and building to the north, North Wenas Street to the east and the Ward Rugh Inc. commercial property to the south.

In 1994, Petroleum contaminated soil (PCS) was encountered at the site during assessment and remediation of a 2,000-gallon underground storage tank (UST) at the adjacent Ward Rugh site. It is our understanding that soil samples were collected from an exploratory trench excavated at the site and analyzed for total petroleum hydrocarbons (TPH). The PCS identified on the site was characterized as heavy oil-range petroleum hydrocarbons (ORPH) and is assumed not to be related to the gasoline release at the Ward Rugh site.

Based on our review of site documents and our experience in the general area of the site, groundwater is likely to occur at depths ranging from approximately 8 to 10 feet below ground surface (bgs) and likely flows to the southwest. Subsurface soil is anticipated to consist of gravel with various amounts of silt, sand and cobbles.

To investigate the potential extent of PCS and potential impacts to groundwater, we plan to advance direct-push soil borings, install temporary well sampling points, collect soil and groundwater samples from the borings and submit the samples for laboratory chemical analyses of gasoline- and diesel-range petroleum hydrocarbons (GRPH and DRPH, respectively), ORPH and benzene, toluene, ethylbenzene, and xylenes (BTEX). Temporary well points will be installed, and groundwater samples will only be collected if observed field conditions indicate the potential for groundwater contamination.

## 3.0 FIELD INVESTIGATION ACTIVITIES

The tasks described below reflect the proposed field activities. The specific tasks conducted at the site may change in response to conditions encountered in the field or as additional information is obtained. Adjustments to the tasks listed will be mutually agreed upon by Ecology and GeoEngineers and authorized prior to implementation.

Field investigation activities will include the following:

- Coordinate underground utility locating using the State of Washington Utility Notification and Utilities Plus, LLC (Utilities Plus) for private utility locating. Per state regulations, GeoEngineers will mobilize to/from the site from Spokane, Washington to mark the proposed boring locations prior to initiating the locate request.
- Complete the City of Ellensburg right-of-way (ROW) permit.
- Mobilize to/from the site from Spokane, Washington to conduct the sampling event.
- Conduct 1 day of subsurface assessment using direct-push drilling techniques. The number, location and depth of the borings will depend on field conditions (such as field screening evidence of contamination, accessibility, soil conditions and depth to groundwater). In general, the borings will be advanced near the location of the exploratory trench with documented PCS. Borings will be stepped out from these initial boring points as evidence of contamination is encountered and upon Ecology concurrence. Proposed exploration locations are shown on Figure 2, Site Plan. Soil samples will be collected from 5-foot intervals using a continuous core sampler for field screening and potential chemical analysis. Borings will be advanced to a depth of 15 bgs (three drilling runs) or a minimum of 2 feet below the groundwater interface, whichever is shallower. Soil samples will be collected per procedures outlined in Appendix A for direct push sampling.
- Observe, field screen and document subsurface soil conditions using a qualified field engineer or geologist. Field screening will consist of visual observation, water sheen testing and headspace vapor measurements using a photoionization detector (PID).
- If groundwater is encountered, then the boring will be advanced a minimum of 2 feet below the groundwater interface and a temporary groundwater sampling point will be installed to collect a grab groundwater sample. A minimum of one duplicate groundwater sample will also be collected per each temporary groundwater sampling point. Grab groundwater samples will be collected per procedures outlined in Appendix A.
- Backfill borings with bentonite clay and surface completed with gravel, asphalt or concrete patch to match the existing ground surface.

- Submit a minimum of one soil sample and one grab groundwater sample (if groundwater is encountered) from each boring to a qualified laboratory for chemical analysis. The soil sample with the greatest field screening indication of potential contamination or the closest sample collected above the groundwater interface, if present, will be submitted for analysis. Samples will be submitted for analysis under a standard turnaround time of 10 business days and standard chain-of-custody record. Soil and groundwater samples submitted from the site will be analyzed for the following potential contaminants:
    - GRPH using Northwest Method NWTPH-Gx;
    - DRPH and ORPH using Northwest Method NWTPH-Dx; and
    - BTEX using Environmental Protection Agency (EPA) Method 8260D.
- Submit a minimum of one trip blank for soil and one for water (if groundwater is encountered) for analysis of GRPH and BTEX.
- Drum and label investigation-derived waste (IDW). A qualified contractor will be retained to profile and transport the IDW for disposal at a permitted facility if contaminants greater than the respective Model Toxics Control Ave (MTCA) Method A cleanup levels are detected in the soil and groundwater samples analyzed by the laboratory. We assume IDW will be nonhazardous if the IDW requires off-site disposal.
- Compare soil and groundwater laboratory analytical reports to MTCA Method A cleanup levels.
- Prepare a site assessment report that provides field and laboratory data, comparison of the analytical results to MTCA and recommendations, as needed. The report will include field procedures, tables, figures and historical site information, as appropriate.
- Enter laboratory analytical data results into Ecology's Environmental Information Management (EIM) database.

## 4.0 SCHEDULE

The fieldwork will be conducted in May 2021 and completed in 1 day. We expect to receive laboratory analytical reports within 2 weeks after submitting the samples to the laboratory. Our report will be completed within a month following receipt of the laboratory analytical reports.

## 5.0 REFERENCES

Hart Crowser. Work Plan, Ward Rugh Groundwater Quality Investigation, 710 W. University Way Ellensburg, Washington. November 8, 2017.

PLSA Engineering & Surveying. Site Assessment Report on Petroleum Release City of Ellensburg West Eighth Avenue Right-Of-Way, Ellensburg, Washington. Jon No. 91052 March 1991.

FIGURES

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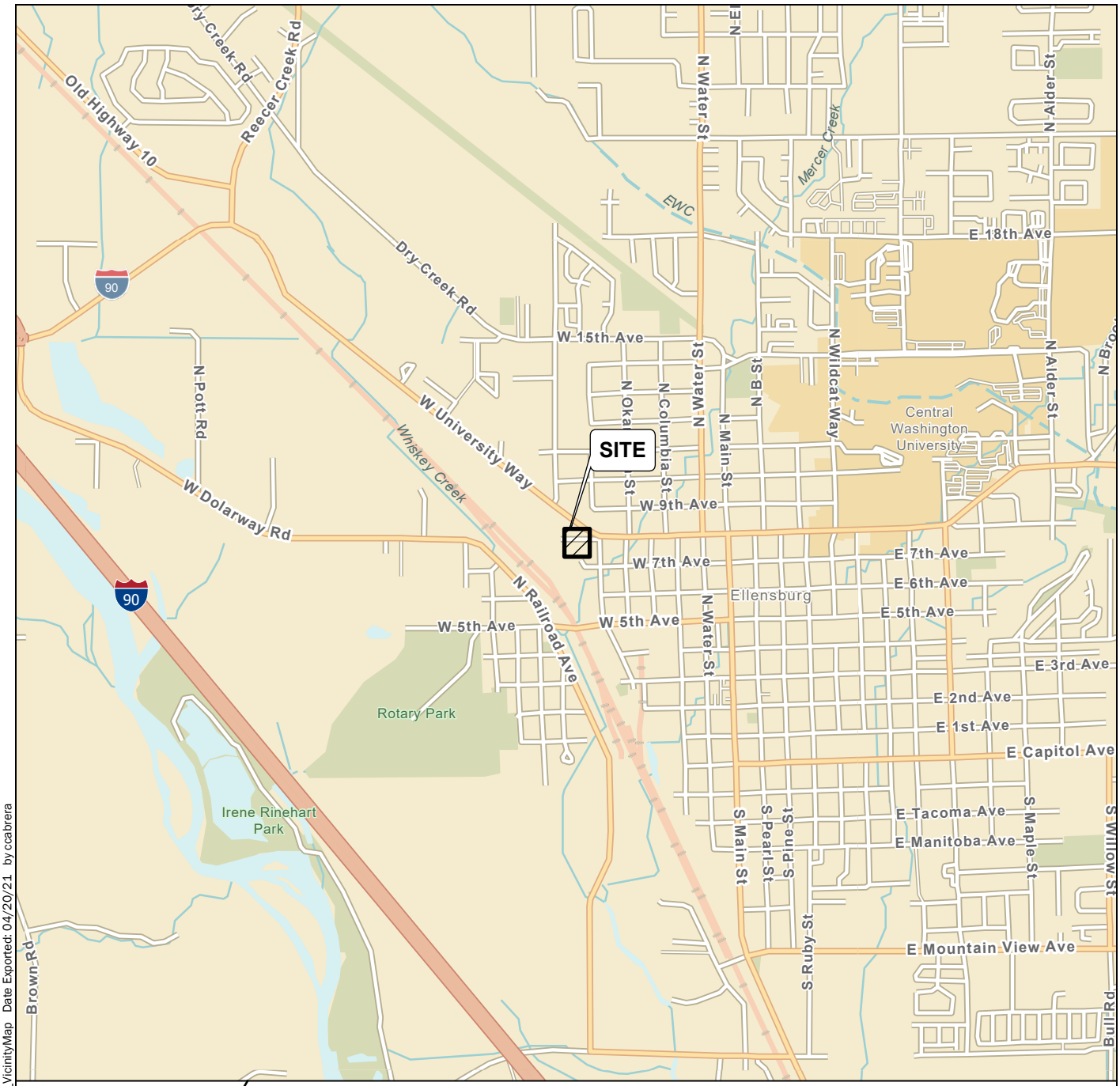


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Feet

## Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: ESRI

Projection: NAD 1983 StatePlane Washington South FIPS 4602 Feet

**Vicinity Map**

Ellensburg City West 8th Street ROW
Ellensburg, Washington

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**Figure 1**

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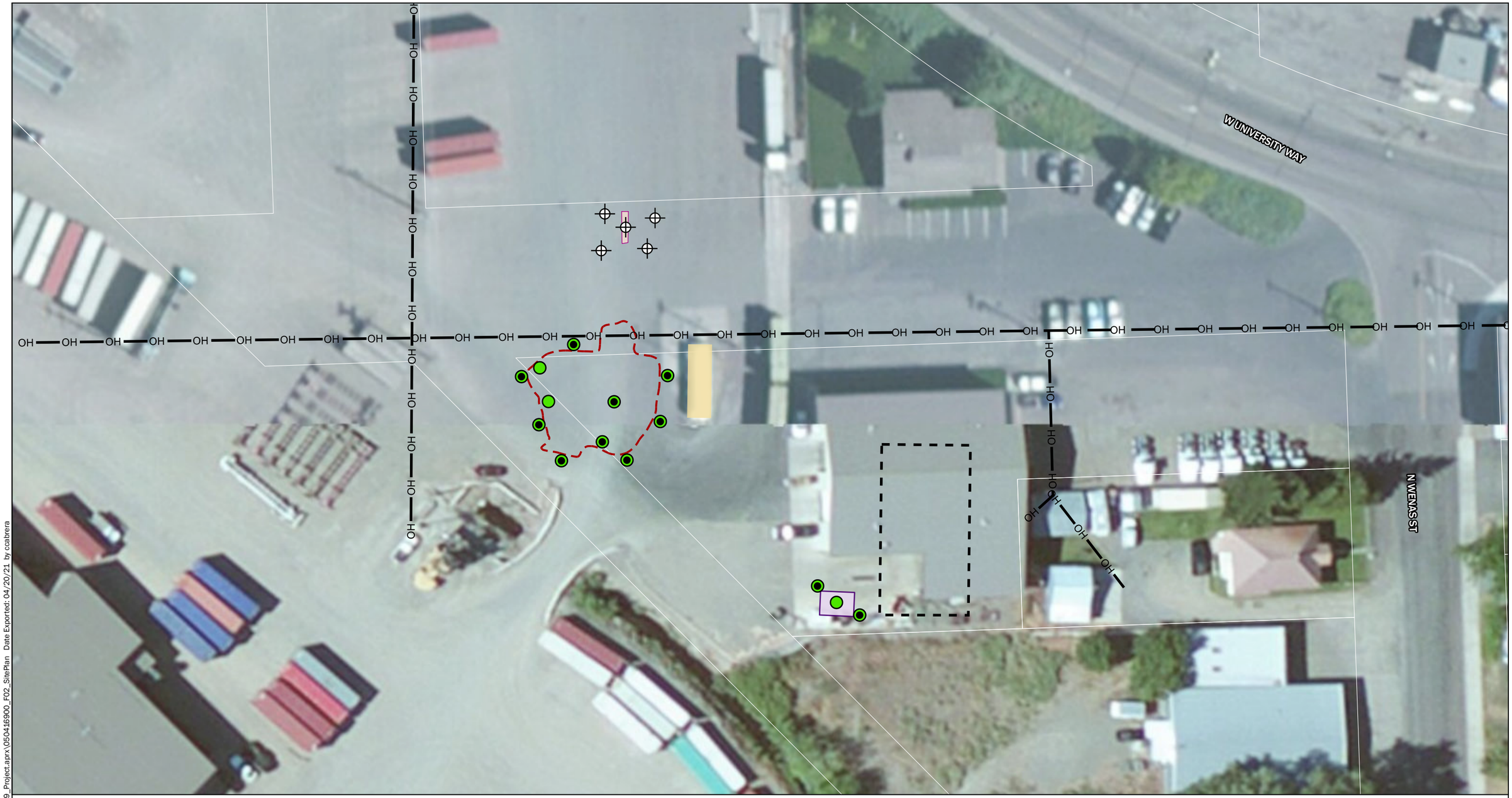


Proposed Exploration Location

Historical Soil Sample Location with Results Less Than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)

Historical Groundwater Sample Location With Results Less than MTCA Method A Criteria (PLSA Engineering & Surveying 1991)

OH Overhead Power

Above Ground Storage Tank (AST)

Approximate Shop Building Location

Approximate 1991 Exploratory Trench Location

Approximate 1991 Fuel Tank Basin Excavation Location

Waste Oil Tank Basin

Data Source: ESRI Clarity.
Parcels and roads from Kittitas County GIS.

N W E S

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Feet

# Site Plan

Ellensburg City West 8th Street ROW
Ellensburg, Washington

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Figure 2

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Legend

APPENDICES

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# APPENDIX A
## Field Assessment Procedures

# APPENDIX A
# FIELD ASSESSMENT PROCEDURES

## STANDARD PROCEDURES

This section contains standard procedures for field data collection that are anticipated during the site assessment at the Ellensburg City West 8th Street ROW site in Ellensburg, Washington including the following:

- Collecting soil samples from direct-push soil borings;
- Groundwater sampling (if encountered);
- Field screening methods;
- Decontamination procedures;
- Handling of investigation-derived waste (IDW);
- Sample location control;
- Field measurement and observation documentation; and
- Sample identification.

### Collecting Soil Samples from Soil Borings

Drilling will be conducted by a State of Washington licensed driller and supervised by a trained GeoEngineers field engineer or geologist. Soil samples will be collected continuously during drilling (direct-push) using 5-foot acrylic slip-sleeve samplers.

Each boring will be monitored by a GeoEngineers field representative to observe and classify the soil encountered and prepare a detailed log of each boring. Soil encountered in the borings will be classified in the field in general accordance with ASTM International (ASTM) D2488-17, the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).

Soil samples from each sampling interval will be field screened for the presence of contaminants using the procedures described below to determine which sample will be submitted for chemical analysis. Based on field indicators, a minimum of one soil sample from each boring exhibiting the greatest level of contamination, as indicated by field screening, will be submitted for laboratory analysis. Additional samples may be submitted based on field screening results and as approved by the Washington State Department of Ecology (Ecology).

Soil selected for analysis will be removed from the sampler using a new or decontaminated soil knife, clean nitrile gloves, transferred into a laboratory-prepared container, labeled with a waterproof pen, and placed on “blue ice” or wet ice in a clean, plastic-lined cooler. Each sample will be documented on a boring log and chain-of-custody (COC) and will include sample name, sample collection date and time, sample type, sample depth (relative to ground surface), requested analyses and sampler name. Soil samples for volatile organic compound (VOC) analyses (e.g., benzene, toluene, ethylbenzene and xylenes [BTEX]) will be collected consistent with Environmental Protection Agency (EPA) Method 5035A (EPA 2002) and preserved in accordance with Ecology Implementation Memorandum 5 (Ecology 2004) and EPA (1998).

Sampling equipment will be decontaminated between each sampling attempt as described in the Decontamination Procedures Section. The sample coolers will be delivered to the analytical laboratory under standard COC procedures described in the Quality Assurance Project Plan (QAPP) (Appendix B).

## Groundwater Sampling

Groundwater (if encountered) will be collected as a grab sample from the direct-push soil borings.

### Groundwater Grab Sampling

If groundwater is encountered in the soil borings, grab samples will be collected and analyzed in the field as described below. Depth to groundwater relative to the top of the drill casing will be measured to the nearest 0.01 foot using an electronic water-level indicator as with sampling from a monitoring well (see previous Depth to Groundwater Section) and recorded in the field notes. The water level-indicator will be decontaminated with Liquinox® solution wash and a distilled water rinse prior to use in each boring.

Following depth to groundwater measurement, a groundwater sample will be collected from the open boring consistent with the EPA's low-flow groundwater sampling procedure, as described in EPA (2017) and Puls and Barcelona (1996). Dedicated tubing and a peristaltic pump will be used for groundwater purging and sampling. Each boring will be purged for approximately 15 minutes before collecting the sample. During purging activities, water quality parameters, including pH, temperature, conductivity, dissolved oxygen (DO), oxidation reduction potential (ORP) and turbidity, will be measured using a multi-parameter meter equipped with a flow-through cell.

Samples will not be collected from the boring if it has measurable free product. Field water quality measurements and depth-to-water measurements will be recorded on a Well Purging-Field Water Quality Measurement Form. Groundwater samples will be transferred in the field to laboratory-prepared sample containers and kept cool during transport to the testing laboratory. COC procedures will be observed from the time of sample collection to delivery to the testing laboratory consistent with the QAPP.

## Field Screening Methods

Field screening methods will be used to select samples for laboratory chemical analysis.

A GeoEngineers field representative will perform visual and physical field screening tests on soil samples and record the observations on the field boring log and in the field notebook. Field screening results will be used to aid in the selection of soil samples for laboratory chemical analysis. The sample from each boring showing the highest likelihood of petroleum contamination, based on field screening, will be selected for laboratory analysis. The remaining samples may be submitted to the laboratory and held, pending the results of the samples submitted for analysis.

Screening methods will include (1) visual examination; (2) water-sheen screening; and (3) headspace vapor screening using a photo-ionization detector (PID). Visual screening consists of inspecting the soil for discoloration indicative of the presence of petroleum-impacted material in the sample.

Water-sheen screening involves placing soil in water and observing the water surface for signs of sheen. Sheen classifications are as follows:

- **No Sheen (NS)** No visible sheen on the water surface;
- **Slight Sheen (SS)** Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. Natural organic matter in the soil might produce a slight sheen;
- **Moderate Sheen (MS)** Light to heavy sheen; might have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on water surface; and
- **Heavy Sheen (HS)** Heavy sheen with color/iridescence; spread is rapid; entire water surface might be covered with sheen.

Water sheen testing equipment will be disposable or decontaminated before field screening each sample using a Liquinox® soap solution with a water rinse. Used testing equipment and/or decontamination water will be stored on-site in a labeled Washington State Department of Transportation (DOT)-approved drum pending disposal with other IDW.

Headspace vapor screening involves placing a soil sample into a sealed plastic bag and measuring the airspace VOC vapor concentrations in parts per million (ppm) with a PID. Once a soil sample is placed in a sealed plastic bag with air space, the bag is shaken to expose the soil to the air trapped in the bag. The probe of the PID, calibrated to isobutylene following the manufacturer's instructions, is inserted into a small opening in the bag seal and the VOC concentration is measured. The PID typically is designed to quantify VOC vapor concentrations in the range between 1 and 2,000 ppm with an accuracy of ±10 percent of the reading, and between 2,000 and 5,000 ppm with an accuracy of ±20 percent of the reading.

### Decontamination Procedures

The objective of the decontamination procedures described herein is to minimize the potential for cross-contamination between sample locations. A designated decontamination area will be established for decontamination of drilling equipment and reusable sampling equipment. Drilling equipment will be cleaned by water jetting using high-pressure/low-volume cleaning equipment.

Sampling equipment will be decontaminated in accordance with the following procedures before each sampling attempt or measurement.

1. Brush equipment with a nylon brush to remove large particulate matter.
2. Rinse with potable tap water.
3. Wash with non-phosphate detergent solution (Liquinox® and potable tap water).
4. Rinse with potable tap water.
5. Rinse with distilled water.

### Handling of IDW

IDW, which consists mainly of drill cuttings and decontamination/purge water, typically will be placed in DOT-approved 55-gallon drums. Each drum will be labeled with the project name, general contents and date. The drummed IDW will be stored on site at a location approved by the site owner pending analysis and disposal.

Disposable items, such as sample tubing, disposable bailers, bailer line, gloves and protective overalls, paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

### Sample Location Control

Horizontal sample control will be maintained throughout the project. Horizontal control will be established using measuring tapes or a hand-held global positioning system (GPS) meter accurate to approximately ±15 lateral feet. Boring locations also will be established by measuring their distance relative to permanent site features.

### Sample Handling and Custody Requirements

Samples will be handled in accordance with the QAPP (Appendix B). A complete discussion of the sample identification and custody procedures is provided in the QAPP.

### Field Measurements and Observations Documentation

Field measurements and observations will be recorded in a project field notebook. Daily logs will be dated and pages will be consecutively numbered. Entries will be recorded directly and legibly in the daily log and signed and dated by the person conducting the work. If changes are made, the changes will not obscure the previous entry, and the changes will be signed and dated. At a minimum, the following data will be recorded in the log book:

- Purpose and location of investigation;
- Location of activity;
- Site or sampling area sketch showing sample locations and distances to fixed reference points;
- Date and time of sampling;
- Type of sample (matrix);
- Designation as a discrete or composite sample;
- Sample identification number (should match with what is on jar and COC);
- Soil sample top and bottom depth (below ground surface [bgs]);
- Sample preservation (if any);
- Sampling equipment used;
- Field measurements and screening observations (e.g., odor, color, staining, sheens, etc.);
- Field conditions that are pertinent to the integrity of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, sample disturbance, etc.);
- Relevant comments regarding field activities; and
- Shipping arrangements (including overnight air bill number, if applicable) and receiving laboratory.

Information will be recorded in the log book with enough detail so that field activities can be reconstructed without reliance on personnel memory. In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling:

- Team members and their responsibilities;
- Time of arrival/entry on site and time of site departure;
- Other personnel present at the site;
- Summary of pertinent meetings or discussions with regulatory agency or contractor personnel;
- Deviations from sampling plans, site safety plans and QAPP procedures;
- Changes in personnel and responsibilities with reasons for the changes;
- Levels of safety protection; and
- Calibration readings for any equipment used and equipment model and serial number.

### Sample Identification

Sample identification is important to provide concise data management and to quickly determine sample location and date when comparing multiple samples. Soil samples for each site will adhere to the following general format:

**Site Number - Location ID (Depth)**

Site numbers are established by Ecology's work assignment number in the format GEIxxx. For example, a soil sample collected at the Ellensburg City West 8th Street ROW (work assignment No. GEI029) at boring location B1 at a depth interval of 5 to 6 feet shall be labeled as GEI029-B1(5-6).

Grab groundwater samples will have the following general format:

**Site Number-Location ID-Date**

For example, groundwater sampled from boring location B1 at the Ellensburg City West 8th Street ROW on May 1, 2021 will be labeled as GEI029-B1-050121.

Groundwater sampled from wells will be labelled similarly, with the well number replacing the location number. Following the example above, groundwater sampled from MW-01 will be labelled as GEI029-MW01-050121.

## REFERENCES

ASTM D2488. 2017. Standard Practice for Description and Identification of Soils (Visual-Manual Procedures).

Puls, R. W. and M.J. Barcelona. 1996. "Low-flow (Minimal Drawdown) Ground-water Sampling Procedures." EPA Ground Water Issue. April. p.1-9.

U.S. Environmental Protection Agency. 2017. Region 1, "Low Stress (Low-Flow) Purging and Sampling Procedure for the Collection of Ground Water Samples from Monitoring Wells." EPA SOP No. GW4, Revision No. 4., September 19, 2017.

U.S. Environmental Protection Agency. 1998. "Test Methods for Evaluating Solid Waste Physical/Chemical Methods (SW_846)." Revision 5, April.

U.S. Environmental Protection Agency. 2002. Method 5035A (SW-846). Closed-System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples. Draft Revision 1. Washington, D.C. July 2002.

U.S. Environmental Protection Agency. 2007. Method 6200 (SW-846). Field Portable X-Ray Fluorescence Spectrometry for the Determination of Elemental Concentrations in soil and Sediment. Washington, D.C. February 2007.

Washington State Department of Ecology. 2004. "Collecting and Preparing Soil Samples for VOC Analysis."

# APPENDIX B
## Quality Assurance Project Plan

# APPENDIX B
# QUALITY ASSURANCE PROJECT PLAN

This Quality Assurance Project Plan (QAPP) was developed to guide laboratory analyses for soil and groundwater samples collected as part of the assessment conducted for the Washington State Department of Ecology (Ecology) under Ecology Contract C1900044, individual work assignment GEI029. The QAPP presents the objectives, procedures, organization, functional activities and specific Quality Assurance (QA) and Quality Control (QC) activities designed to achieve data quality goals established for the projects. This QAPP is based on Ecology guidelines (Ecology 2016) and the Environmental Protection Agency (EPA) Requirements for Quality Assurance Project Plans (EPA 2001) and related guidelines (EPA 2002).

Throughout the projects, environmental measurements will be conducted to produce data that are scientifically valid, of known and acceptable quality and meet established objectives. QA/QC procedures will be implemented so that precision, accuracy, representativeness, completeness and comparability (PARCC) of data generated meet the specified data quality objectives to the extent possible.

## PROJECT ORGANIZATION AND RESPONSIBILITY

Descriptions of the responsibilities, lines of authority and communication for the key positions to QA/QC are provided below. This organization facilitates the efficient production of project work, allows for an independent quality review and permits resolution of QA issues before submittal.

### Project Leadership and Management

The Project Manager's (PM) duties consist of providing concise technical work statements for project tasks, selecting project team members, determining subcontractor participation, establishing budgets and schedules, adhering to budgets and schedules, providing technical oversight, and providing overall production and review of project deliverables. Jedidiah R. Sugalski, Professional Engineer (PE) is the PM for activities at the site. The Principal-in-Charge, Bruce Williams, is responsible to Ecology for fulfilling contractual and administrative control of the project.

### Field Coordinator

The Field Coordinator is responsible for the daily management of activities in the field. Specific responsibilities include the following:

- Provides technical direction to the field staff.
- Develops schedules and allocates resources for field tasks.
- Coordinates data collection activities to be consistent with information requirements.
- Supervises the compilation of field data and laboratory analytical results.
- Assures that data are correctly and completely reported.
- Implements and oversees field sampling in accordance with project plans.
- Supervises field personnel.
- Coordinates work with on-site subcontractors.

- Schedules sample shipment, if necessary, with the analytical laboratory.
- Monitors that appropriate sampling, testing and measurement procedures are followed.
- Coordinates the transfer of field data, sample tracking forms, and logbooks to the PM for data reduction and validation.
- Participates in QA corrective actions, as required.

The Field Coordinator for each work assignment will be drawn from our pool of experienced staff since fieldwork will be conducted concurrently at multiple sites. Staff that will serve as Field Coordinator could include Joshua Lee, Bryce Hanson, or Justin Orr.

### QA Leader

The GeoEngineers QA Leader is under the direction of Jedidiah Sugalski and Bruce Williams, who are responsible for the project's overall QA. The QA Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. Denell Warren is the QA Leader. The QA Leader has the following responsibilities:

- Serves as the official contact for laboratory data QA concerns.
- Responds to laboratory data, QA needs, resolves issues, and answers requests for guidance and assistance.
- Reviews the implementation of the QAPP and the adequacy of the data generated from a quality perspective.
- Maintains the authority to implement corrective actions, as necessary.
- Reviews and approves the laboratory QA Plan.
- Evaluates the laboratory's final QA report for any condition that adversely impacts data generation.
- Ensures that appropriate sampling, testing and analysis procedures are followed and that correct QC checks are implemented.
- Monitors subcontractor compliance with data quality requirements.

### Laboratory Management

The Ecology-accredited subcontracted laboratory (Eurofins TestAmerica Laboratories, Inc. [TestAmerica] of Spokane Valley, Washington) conducting sample analyses for this project is required to obtain approval from the QA Leader before the initiation of sample analysis to assure that the laboratory QA plan complies with the project QA objectives. The Laboratory's QA Coordinator (Randee Arrington) administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensures implementation of the QA Plan.
- Serves as the laboratory point of contact.
- Activates corrective action for out-of-control events.
- Issues the final laboratory QA/QC report.
- Administers QA sample analysis.

- Complies with the specifications established in the project plans as related to laboratory services.
- Participates in QA audits and compliance inspections.

## DATA QUALITY OBJECTIVES

The QA objective for technical data is to collect environmental monitoring data of known, acceptable and documentable quality. The QA objectives established for the project are:

- Implement the procedures outlined herein for field sampling, sample custody, equipment operation and calibration, laboratory analysis, and data reporting that will facilitate consistency and thoroughness of data generated.
- Achieve the acceptable level of confidence and quality required so that data generated are scientifically valid and of known and documented quality. This will be performed by establishing criteria for PARCC, and by testing data against these criteria.

The sampling design, field procedures, laboratory procedures and QC procedures are set up to provide high-quality data for use in this project. Specific data quality factors that may affect data usability include quantitative factors (precision, bias, accuracy, completeness and reporting limits) and qualitative factors (representativeness and comparability). The measurement quality objectives (MQO) associated with these data quality factors are summarized in Tables B-1 (soil) and B-2 (groundwater) and are discussed below.

### Analytes and Matrices of Concern

Samples of soil and/or groundwater will be collected from up to 10 direct-push explorations during the assessment. Tables B-3 (soil) and B-4 (groundwater) summarize the analyses to be performed at the site for soil and groundwater, respectively.

### Detection Limits

Analytical methods have quantitative limitations at a given statistical level of confidence that are often expressed as the method detection limit (MDL). Individual instruments often can detect but not accurately quantify compounds at concentrations lower than the MDL, referred to as the instrument detection limit (IDL). Although results reported near the MDL or IDL provide insight to site conditions, QA dictates that analytical methods achieve a consistently reliable level of detection known as the practical quantitation limit (PQL). The contract laboratory will provide numerical results for all analytes and report them as detected above the PQL or undetected at the PQL.

Achieving a stated detection limit for a given analyte is helpful in providing statistically useful data. Intended data uses, such as comparison to numerical criteria or risk assessments, typically dictate specific project target reporting limits (TRLs) necessary to fulfill stated objectives. The PQL for contaminants of potential concern (COPCs) at the site is presented in Tables B-1 and B-2 for soil and groundwater, respectively. These reporting limits were obtained from TestAmerica, the Ecology-accredited lab that will be analyzing the samples. Other criteria include State of Washington (WAC 173-201) water quality criteria and federal ambient water quality criteria (AWQC). The analytical methods and processes selected will provide PQLs less than the TRLs under ideal conditions. However, the reporting limits in Tables B-1 through B-2 are considered targets because several factors may influence final detection limits. First, moisture and other

physical conditions of soil affect detection limits. Second, analytical procedures may require sample dilutions or other practices to accurately quantify a particular analyte at concentrations above the range of the instrument. The effect is that other analytes could be reported as undetected but at a value much higher than a specified TRL. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries and careful interpretation is required to correctly characterize site conditions.

### Precision

Precision is the measure of mutual agreement among replicate or duplicate measurements of an analyte from the same sample and applies to field duplicate or split samples, replicate analyses and duplicate spiked environmental samples (matrix spike duplicates). The closer the measured values are to each other, the more precise the measurement process. Precision error may affect data usefulness. Good precision is indicative of relative consistency and comparability between different samples. Precision will be expressed as the relative percent difference (RPD) for spike sample comparisons of various matrices and field duplicate comparisons for water samples. This value is calculated by:

$$RPD\,(\%) = \frac{|\,D_1 - D_2\,|}{(\,D_1 + D_2\,)/2}\;X\;100,$$

Where

$D_1$ = Concentration of analyte in sample.
$D_2$ = Concentration of analyte in duplicate sample.

The calculation applies to split samples, replicate analyses, duplicate spiked environmental samples (matrix spike duplicates) and laboratory control duplicates. The RPD will be calculated for samples and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (EPA 2017a,b) that address criteria exceedances and courses of action. Relative percent difference goals for this effort are 30 percent in groundwater and 40 percent in soil for all analyses, unless the duplicate sample values are within 5 times the reporting limit. In this case, the absolute difference is used instead of the RPD. The absolute difference control limit is equal to the lowest reporting limit of the two samples for water and two times the lowest reporting limit of the two samples for soil.

### Accuracy

Accuracy is a measure of bias in the analytic process. The closer the measurement value is to the true value, the greater the accuracy. This measure is defined as the difference between the reported value versus the actual value and is often measured with the addition of a known compound to a sample. The amount of known compound reported in the sample, or percent recovery, assists in determining the performance of the analytical system in correctly quantifying the compounds of interest. Since most environmental data collected represent one point spatially and temporally rather than an average of values, accuracy plays a greater role than precision in assessing the results. In general, if the percent recovery is low, non-detect results may indicate that compounds of interest are not present when in fact, these compounds are present. Detected compounds may be biased low or reported at a value less than actual environmental conditions. The reverse is true when recoveries are high. Non-detect values are considered accurate while detected results may be higher than the true value.

Accuracy will be expressed as the percent recovery of a surrogate compound (also known as "system monitoring compound"), a matrix spike (MS) result, or from a standard reference material where:

$$Recovery\,(\%) = \frac{Sample\ Result}{Spike\ Amount}\ X\ 100$$

Persons performing the evaluation must review one or more pertinent documents (EPA 2017a,b) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, MS and laboratory control spikes (LCS) are found in Tables B-1 and B-2 of this QAPP.

### Representativeness, Completeness and Comparability

Representativeness expresses the degree to which data accurately and precisely represent the actual site conditions. The determination of the representativeness of the data will be performed by completing the following:

- Comparing actual sampling procedures to those delineated within the Work Plan and this QAPP.
- Comparing analytical results of field duplicates to determine the variations in the analytical results.
- Invalidating non-representative data or identifying data to be classified as questionable or qualitative. Only representative data will be used in subsequent data reduction, validation and reporting activities.

Completeness establishes whether a sufficient amount of valid measurements were obtained to meet project objectives. The number of samples and results expected establishes the comparative basis for completeness. Completeness goals are 90 percent useable data for samples/analyses planned. If the completeness goal is not achieved, an evaluation will be made to determine if the data are adequate to meet study objectives.

Comparability expresses the confidence with which one set of data can be compared to another. Although numeric goals do not exist for comparability, a statement on comparability will be prepared to determine overall usefulness of data sets, following the determination of both precision and accuracy.

### Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. For many methods, holding times may be extended by sample preservation techniques in the field. If a sample exceeds a holding time, then the results may be biased low. For example, if the extraction holding time for volatile analysis of soil sample is exceeded, then the possibility exists that some of the organic constituents have volatilized from the sample or degraded. Results for that analysis will be qualified as estimated to indicate that the reported results may be lower than actual site conditions. Holding times are presented in Tables B-3 and B-4.

### Blanks

According to the *National Functional Guidelines for Organic Data Review* (EPA 2017b), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks and equipment blanks)." Trip blanks are

placed with samples during shipment; method blanks are created during sample preparation and follow samples throughout the analysis process.

Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Data Review* and professional judgment.

## SAMPLE COLLECTION, HANDLING AND CUSTODY

Sampling procedures are provided in Section 3 and Appendix A of this Work Plan.

### Sampling Equipment Decontamination

Sampling equipment decontamination procedures are described in Appendix A of the Work Plan.

### Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Soil and groundwater samples obtained during this study will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Tables B-3 and B-4.

Sample containers will be labeled with the following information at the time of collection:

- Project name and number;
- Sample name, which will include a reference to depth if appropriate; and
- Date and time of collection.

The sample collection activities will be noted in the field log books. The Field Coordinator will monitor consistency between the Work Plan, sample containers/labels, field log books and the chain-of-custody (COC).

### Sample Storage

Samples will be placed in a cooler with “blue ice” or double-bagged “wet ice” immediately after they are collected. The objective of the cold storage will be to attain a sample temperature of 4 degrees Celsius. Holding times will be observed during sample storage. Holding times for the project analyses are summarized in Tables B-3 and B-4.

### Sample Shipment

The samples will be transported and delivered to the analytical laboratory in the coolers. Field personnel will transport and hand-deliver samples that are being submitted to a local laboratory for analysis. Samples that are being submitted from a remote location for analysis will be transported by a commercial express mailing service on an overnight basis or returning field personnel. The Field Coordinator will monitor that the shipping container (cooler) has been properly secured using clear packing tape and custody seals.

Measures will be implemented to minimize the potential for sample breakage, which includes packaging materials and placing sample bottles in the cooler in a manner intended to minimize damage. Sample

bottles will be wrapped with bubble wrap or other protective material before being place in coolers. Trip blanks will be included in coolers with groundwater samples.

### Chain-of-Custody Records

Field personnel are responsible for the security of samples from the time the samples are taken until the samples have been received by the shipper or laboratory. A COC form will be completed at the end of each field day for samples being shipped to the laboratory. Information to be included on the COC form includes:

- Project name and number.
- Sample identification number.
- Date and time of sampling.
- Sample matrix (soil, water, etc.) and number of containers from each sampling point, including preservatives used.
- Depth of subsurface soil sample.
- Analyses to be performed.
- Names of sampling personnel and transfer of custody acknowledgment spaces.
- Shipping information including shipping container number.

The original COC record will be signed by a member of the field team and bear a unique tracking number. Field personnel shall retain carbon copies and place the original and remaining copies in a sealed plastic bag, placed within the cooler or taped to the inside lid of the cooler before sealing the container for shipment. This record will accompany the samples during transit by carrier to the laboratory.

### Laboratory Custody Procedures

The laboratory will follow their standard operating procedures (SOPs) to document sample handling from time of receipt (sample log-in) to reporting. Documentation will include at a minimum, the analyst's name or initial, time and date.

## CALIBRATION PROCEDURES

### Field Instrumentation

Equipment and instrumentation calibration facilitate accurate and reliable field measurements. Field and laboratory equipment used on the project will be calibrated and adjusted in general accordance with the manufacturer's recommendations. Methods and intervals of calibration and maintenance will be based on the type of equipment, stability characteristics, required accuracy, intended use and environmental conditions. The basic calibration frequencies are described below.

The photoionization detector (PID) used for vapor measurements will be calibrated daily, if required (based on the model used), for site safety monitoring purposes in general accordance with the manufacturer's specifications. If daily calibration is not required for a specific PID model, calibration of the PID will be checked to make sure it is up to date. The calibration results will be recorded in the field logbook.

### Laboratory Instrumentation

For analytical chemistry, calibration procedures will be performed in general accordance with the methods cited and laboratory SOPs. Calibration documentation will be retained at the laboratory and readily available for a period of 6 months.

## DATA REPORTING AND LABORATORY DELIVERABLES

Laboratories will report data in formatted hardcopy and digital form. Analytical laboratory measurements will be recorded in standard formats that display, at a minimum, the field sample identification, the laboratory identification, reporting units, qualifiers, analytical method, analyte tested, analytical result, extraction and analysis dates, and detection limit (PQL only). Each sample delivery group will be accompanied by sample receipt forms and a case narrative identifying data quality issues. Laboratory electronic data deliverable (EDD) formats will be established by GeoEngineers, Inc., with the contract laboratory. Final results will be sent to the PM.

Chromatograms will be provided for samples analyzed by Northwest Methods NWTPH-Gx. The laboratory will assure the full heights of all peaks appear on the chromatograms and the same horizontal time scale is used to allow for comparisons to other chromatograms.

## INTERNAL QC

Table B-5 summarizes the types and frequency of QC samples to be collected during the site characterization, including both field QC and laboratory QC samples.

### Field QC

Field QC samples serve as a control and check mechanism to monitor the consistency of sampling methods and the influence of off-site factors on environmental samples. Off-site factors include airborne volatile organic compounds (VOCs) and potable water used in drilling activities.

#### Field Duplicates

In addition to replicate analyses performed in the laboratory, field duplicates also serve as measures for precision. Under ideal field conditions, field duplicates (referred to as splits), are created when a volume of the sample matrix is thoroughly mixed, placed in separate containers and identified as different samples. Analysis of duplicates test both the precision and consistency of laboratory analytical procedures and methods, and the consistency of the sampling techniques used by field personnel.

One field duplicate will be collected during each groundwater sampling event, including groundwater samples collected from direct-push borings. The duplicate sample will be analyzed for the COPCs specified for the given well.

#### Trip Blanks

Trip blanks will accompany soil and groundwater sample containers submitted for VOC analyses during shipment and sampling periods. Trip blanks will be analyzed on a one per cooler basis.

## Laboratory QC

Laboratory QC procedures will be evaluated through a formal data validation process. The analytical laboratory will follow standard method procedures that include specified QC monitoring requirements. These requirements will vary by method but generally include:

- Method blanks
- Internal standards
- Calibrations
- MS/matrix spike duplicates (MSD)
- LCS/laboratory control spike duplicates (LCSD)
- Laboratory replicates or duplicates
- Surrogate spikes

### Laboratory Blanks

Laboratory procedures employ the use of several types of blanks but the most commonly used blank for QA/QC assessments are method blanks. Method blanks are laboratory QC samples that consist of either a soil-like material having undergone a contaminant destruction process or high-performance liquid-chromatography (HPLC) water. Method blanks are extracted and analyzed with each batch of environmental samples undergoing analysis. Method blanks are particularly useful during volatiles analysis since VOCs can be transported in the laboratory through the vapor phase. If a substance is found in the method blank, then one (or more) of the following occurred:

- Measurement apparatus or containers were not properly cleaned and contained contaminants.
- Reagents used in the process were contaminated with a substance(s) of interest.
- Contaminated analytical equipment was not properly cleaned.
- Volatile substances in the air with high solubility or affinities toward the sample matrix contaminated the samples during preparation or analysis.

It is difficult to determine which of the above scenarios took place if blank contamination occurs. However, it is assumed that the conditions that affected the blanks also likely affected the project samples. Given method blank results, validation rules assist in determining which substances in samples are considered "real," and which ones are attributable to the analytical process. Furthermore, the guidelines state, ". . . there may be instances where little or no contamination was present in the associated blank, but qualification of the sample is deemed necessary. Contamination introduced through dilution water is one example."

### Calibrations

Several types of calibrations are used, depending on the method, to determine whether the methodology is 'in control' by verifying the linearity of the calibration curve and to assure that the sample results reflect accurate and precise measurements. The main calibrations used are initial calibrations, daily calibrations and continuing calibration verification.

### MS/MSD

MS/MSD samples are used to assess influences or interferences caused by the physical or chemical properties of the sample itself. For example, extreme pH affects the results of semivolatile organic compounds (SVOCs), or the presence of a compound may interfere with accurate quantitation of another analyte. MS/MSD data is reviewed in combination with other QC monitoring data to determine matrix effects. In some cases, matrix affects cannot be determined due to dilution and/or high levels of related substances in the sample. A MS is evaluated by spiking a known amount of one or more of the target analytes ideally at a concentration of 5 to 10 times higher than the sample result. A percent recovery is calculated by subtracting the sample result from the spike result, dividing by the spiked amount and multiplying by 100.

The samples for the MS and MSD analyses should be collected from a boring or sampling location that is believed to exhibit low-level contamination. A sample from an area of low-level contamination is needed because the objective of MS/MSD analyses is to determine the presence of matrix interferences, which can best be achieved with low levels of contaminants. Additional sample volume will be collected for these analyses. This MS/MSD sample will be a composite to achieve a level of representativeness and reproducibility in the data.

### LCS/LCSD

Also known as blanks spikes, LCSs are similar to MSs in that a known amount of one or more of the target analytes are spiked into a prepared media and a percent recovery of the spiked substances are calculated. The primary difference between a MS and LCS is that the LCS media is considered "clean" or contaminant free. For example, HPLC water is typically used for LCS water analyses. The purpose of an LCS is to help assess the overall accuracy and precision of the analytical process including sample preparation, instrument performance and analyst performance. LCS data must be reviewed in context with other controls to determine if out-of-control events occur.

### Laboratory Replicates/Duplicates

Laboratories often utilize MS/MSDs, LCS/LCSDs and/or replicates to assess precision. Replicates are a second analysis of a field-collected environmental sample. Replicates can be split at varying stages of the sample preparation and analysis process, but most commonly occur as a second analysis on the extracted media.

### Surrogate Spikes

The purposes of using a surrogate are to verify the accuracy of the instrument being used and extraction procedures. Surrogates are substances similar to, but not one of, the target analytes. A known concentration of surrogate is added to the sample and passed through the instrument, noting the surrogate recovery. Each surrogate used has an acceptable range of percent recovery. If a surrogate recovery is low, sample results may be biased low and depending on the recovery value, a possibility of false negatives may exist. Conversely, when recoveries are above the specified range of acceptance a possibility of false positives exist, although non-detected results are considered accurate.

## DATA REDUCTION AND ASSESSMENT PROCEDURES

### Data Reduction

Data reduction involves the conversion or transcription of field and analytical data to a useable format. The laboratory personnel will reduce the analytical data for review by the QA Leader and PM.

### Field Measurement Evaluation

Field data will be reviewed at the end of each day by following the QC checks outlined below and procedures in the Work Plan. Field data documentation will be checked against the applicable criteria as follows:

- Sample collection information.
- Field instrumentation and calibration.
- Sample collection protocol.
- Sample containers, preservation and volume.
- Field QC samples collected at the frequency specified.
- Sample documentation and COC protocols.
- Sample shipment.

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. The final report will contain what effects, if any, an incident has on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

### Field QC Evaluation

A field QC evaluation will be conducted by reviewing field log books and daily reports, discussing field activities with staff and reviewing field QC samples (trip blanks and field duplicates). Trip blanks will be evaluated using the same criteria as method blanks.

Precision for field duplicate soil will not be evaluated because even a well-mixed sample is not entirely homogenous due to sampling procedures, soil conditions and contaminant transport mechanisms. Grab groundwater duplicate samples are also highly variable because of sampling procedures and borehole conditions and are therefore not reliable measures of precision.

### Laboratory Data QC Evaluation

The laboratory data assessment will consist of a formal review of the following QC parameters:

- Holding times
- Method blanks
- MS/MSD
- LCS/LCSD
- Surrogate spikes
- Replicates

In addition to these QC mechanisms, other documentation such as cooler receipt forms and case narratives will be reviewed to fully evaluate laboratory QA/QC.

## REFERENCES


U.S. Environmental Protection Agency). 2001. EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. EPA/240/B-01/003. Office of Environmental Information, Washington, D.C. March 2001.

U.S. Environmental Protection Agency). 2002. Guidance for Quality Assurance Project Plans. EPA QA/G-5. EPA/240/R-02/009. Office of Environmental Information, Washington, D.C. December 2002.

U.S. Environmental Protection Agency. 2017a. National Functional Guidelines for Inorganic Superfund Methods Data Review. 540-R-2017-001. Office of Superfund Remediation and Technology Innovation. Washington, D.C. January 2017.

U.S. Environmental Protection Agency. 2017b. National Functional Guidelines for Organic Superfund Methods Data Review. Office of Superfund Remediation and Technology Innovation. Washington, D.C. 540-R-2017-002. January 2017.

Washington State Department of Ecology. 2016. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Publication No. 04-03-030. July 2004 (revised December 2016).

# Table B-1

## Soil Measurement Quality Objective and Target Reporting Limits

### Ellensburg City West 8th Street ROW

### Ellensburg, Washington

| | | | | LCS/LCSD | | | MS/MSD | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Method | MDL (mg/kg) | PQL (mg/kg) | Lower | Upper | RPD | Lower | Upper | RPD | MTCA Cleanup Level (mg/kg) |
| **VOCs (BTEX)** | | | | | | | | | | |
| Benzene | EPA 8260D | 0.0100 | 0.02 | 76 | 129 | 25 | 76 | 129 | 25 | 0.03 |
| Ethylbenzene | EPA 8260D | 0.0162 | 0.1 | 77 | 126 | 25 | 77 | 126 | 25 | 6 |
| Toluene | EPA 8260D | 0.0133 | 0.1 | 77 | 131 | 25 | 77 | 131 | 25 | 7 |
| m, p-Xylene | EPA 8260D | 0.0287 | 0.4 | 78 | 130 | 23 | 78 | 130 | 23 | -- |
| o-Xylene | EPA 8260D | 0.0230 | 0.2 | 77 | 129 | 25 | 77 | 129 | 25 | -- |
| Xylene (Total) | EPA 8260D | Derived as sum of m, o, and p isomers | | | | | | | | 9 |
| **TPH** | | | | | | | | | | |
| Gasoline Range Organics | NWTPH-Gx | 1.80 | 5 | 74 | 124 | 20 | 50 | 133 | 20 | 30/100[1] |
| Diesel Range Organics | NWTPH-Dx | 4.19 | 10 | 50 | 150 | 25 | 70.1 | 139 | 25 | 2,000 |
| Heavy Oil Range Organics | NWTPH-Dx | 5 | 25 | 50 | 150 | 25 | 50 | 150 | 25 | 2,000 |

**Notes:**

[1]Model Toxics Control Act (MTCA) Method A cleanup level for gasoline-range petroleum hydrocarbons is 100 mg/kg if benzene is not detected and the total concentrations of ethylbenzene, toluene and xylenes are less than 1 percent of the gasoline mixture; otherwise, the cleanup level is 30 mg/kg.

Practical quantitation limits (PQLs) based on information provided by Eurofins TestAmerica Laboratories.

mg/kg = milligrams per kilogram; NE = Not established;

MDL = method detection limit; LCS = laboratory control spike; LCSD = laboratory control spike duplicate; MS = matrix spike; MSD = matrix spike duplicate; RPD = relative percent difference;

EPA = Environmental Protection Agency; VOCs = volatile organic compounds; TPH = total petroleum hydrocarbons

BTEX = benzene, toluene, ethylbenzene and xylenes

# Table B-2

## Groundwater Measurement Quality Objective and Target Reporting Limits

### Ellensburg City West 8th Street ROW

### Ellensburg, Washington

| | | | | LCS/LCSD | | | MS/MSD | | | DUP | MTCA Cleanup Level (µg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte | Method | MDL (µg/L) | PQL (µg/L) | Lower | Upper | RPD | Lower | Upper | RPD | RPD | |
| **VOCs (BTEX)** | | | | | | | | | | | |
| Benzene | EPA 8260D | 0.093 | 0.4 | 80 | 126 | 18 | 80 | 126 | 18 | -- | 5 |
| Ethylbenzene | EPA 8260D | 0.198 | 1 | 80 | 128 | 18 | 80 | 128 | 18 | -- | 700 |
| Toluene | EPA 8260D | 0.312 | 1 | 80 | 129 | 18 | 80 | 129 | 18 | -- | 1,000 |
| m-Xylene (coelute) p-Xylene | EPA 8260D | 0.280 | 2 | 80 | 127 | 18 | 80 | 127 | 18 | -- | -- |
| o-Xylene | EPA 8260D | 0.162 | 1 | 80 | 126 | 17 | 80 | 126 | 17 | -- | -- |
| Xylene (Total) | EPA 8260D | Derived as sum of m, o and p isomers | | | | | | | | | 1,000 |
| **TPH** | | | | | | | | | | | |
| Gasoline Range Organics | NWTPH-Gx | 70.4 | 150 | 80 | 120 | 20 | 56 | 126 | 20 | 35 | 1,000/800[1] |
| Diesel Range Organics | NWTPH-Dx | 240 | 110 | 50 | 150 | 25 | 54.5 | 136 | 32.5 | 25 | 500 |
| Heavy Oil Range Organics | NWTPH-Dx | 300 | 120 | 50 | 150 | 25 | 50 | 150 | 25 | 25 | 500 |

**Notes:**

[1]Model Toxics Control Act (MTCA) Method A cleanup level for gasoline-range petroleum hydrocarbons is 1,000 µg/L if benzene is not detected and the total concentrations of ethylbenzene, toluene and xylenes are less than 1 percent of the gasoline mixture; otherwise the cleanup level is 800 µg/L.

Practical quantitation limits (PQLs) based on information provided by Eurofins TestAmerica Laboratories.

µg/L = micrograms per liter; -- = Not established; DUP = duplicate; MCL = maximum contaminant level

MDL = method detection limit; LCS = laboratory control spike; LCSD = laboratory control spike duplicate; MS = matrix spike; MSD = matrix spike duplicate; RPD = relative percent difference; EPA = Environmental Protection Agency; VOCs = volatile organic compounds; TPH = total petroleum hydrocarbons; BTEX = benzene, toluene, ethylbenzene and xylenes

# Table B-3

## Soil Test Methods, Sample Containers, Preservation and Holding Time[1]

### Ellensburg City West 8th Street ROW

### Ellensburg, Washington

| Analysis | Matrix | Method | Minimum Sample Size | Sample Containers | Sample Preservation | Holding Times |
|---|---|---|---|---|---|---|
| VOCs (BTEX) | Soil | EPA 8260D | 30 g | 2 pre-weighed 40 mL VOA vials preserved with MeOH; 4 oz jar (for dry-weight correction) | MeOH; <Cool 6°C | 14 days from collection to analysis |
| GRPH | Soil | NWTPH-Gx | 30 g | 2 pre-weighed 40 mL VOA vials preserved with MeOH; 4 oz jar (for dry-weight correction) | MeOH; Cool <6°C | 14 days from collection to analysis |
| DRPH/ORPH | Soil | NWTPH-Dx | 30 g | 4 or 8 oz glass wide-mouth with Teflon™-lined lid | Cool <6°C | 14 days from collection to extraction and 40 days from extraction to analysis |

**Notes:**

[1]Holding times are based on elapsed time from date of collection.

VOCs = volatile organic compounds; MeOH = Methanol; VOA = volatile organic analysis

g = gram; mL = milliliters; C = Celsius

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons

EPA = Environmental Protection Agency; BTEX = benzene, toluene, ethylbenzene and xylenes

# Table B-4

## Water Test Methods, Sample Containers, Preservation and Holding Time[1]

### Ellensburg City West 8th Street ROW

### Ellensburg, Washington

| Analysis | Matrix | Method | Minimum Sample Size | Sample Containers | Sample Preservation | Holding Times |
|---|---|---|---|---|---|---|
| VOCs (BTEX) | Water | EPA 8260D | 120ml | 3 - 40 mL VOA | HCL pH<2, Cool <6°C | 14 days from collection to analysis |
| GRPH | Water | NWTPH-Gx | 80ml | 3 - 40 mL VOA | HCL pH<2, Cool <6°C | 14 days from collection to analysis |
| DRPH/ORPH | Water | NWTPH-Dx | 250 ml | 1 - 250 mL amber glass with Teflon™- lined cap | HCl pH<2; Cool <6°C | 14 days from collection to extraction and 40 days from extraction to analysis |

**Notes:**

[1]Holding times are based on elapsed time from date of collection.

VOC = volatile organic compound; VOA = volatile organic analysis; HCl = hydrochloric acid;

g = gram; mL = milliliters; C = Celsius

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons;

BTEX = benzene, toluene, ethylbenzene and xylenes

# Table B-5

## Quality Control Samples Type and Frequency

### Ellensburg City West 8th Street ROW

### Ellensburg, Washington

| Parameter | Field QC | | Laboratory QC | | | |
|---|---|---|---|---|---|---|
| | Field Duplicate | Trip Blanks | Method Blanks | LCS | MS / MSD | Lab Duplicates |
| VOCs (BTEX) | 1 per groundwater event | 1 per soil event and 1 per water event | 1/batch | 1/batch | 1/batch | 1/batch |
| GRPH | 1 per groundwater event | 1 per soil event and 1 per water event | 1/batch | 1/batch | 1/batch | 1/batch |
| DRPH/ORPH | 1 per groundwater event | None | 1/batch | 1/batch | 1/batch | 1/batch |

Notes:

No more than 20 field samples can be contained in one batch.

VOCs = volatile organic compounds; PAHs = polycyclic aromatic hydrocarbons;

GRPH = gasoline-range petroleum hydrocarbons; DRPH = diesel-range petroleum hydrocarbons; ORPH = oil-range petroleum hydrocarbons

LCS = Laboratory control sample; MS = Matrix spike sample; MSD = Matrix spike duplicate sample; BTEX = benzene, toluene, ethylbenzene and xylenes

# APPENDIX C
## Health and Safety Plan

## APPENDIX C
## HEALTH AND SAFETY PLAN
## ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
## CENTRAL REGION
## MASTER CONTRACT C1900044. GEI029

### GENERAL PROJECT INFORMATION

**This Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers Safety Program Manual.** Together, the written safety programs and this HASP constitute the site safety plan for this site. This plan is to be used by GeoEngineers personnel on this site and must be available on site. If the work entails potential exposures to other substances or unusual situations, additional safety and health information will be included, and the plan will be approved by the GeoEngineers Health and Safety Manager. All plans are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Program Manual.

**TABLE C-1. GENERAL PROJECT INFORMATION**

| **Project Name:** | **Ellensburg City West 8th Street ROW, Ellensburg, Washington** |
|---|---|
| Project Number: | 0504-169-00 |
| Type of Project: | Direct-Push Site Assessment |
| Project Address: | 710 West 8th Street, Ellensburg, WA 98926 |
| Start/Completion: | April 2021/December 2021 |
| Subcontractors: | Cascade Drilling – direct-push drilling<br>Eurofins TestAmerica, Inc. – laboratory analyses<br>TBD – IDW disposal<br>Utilities Plus, Inc. – private utility locating |

*Liability Clause - This Site Safety Plan is intended for use by GeoEngineers Employees only. It does not extend to the other contractors or subcontractors working on this site. If requested by subcontractors, this site safety plan may be used as a minimum guideline for those entities to develop safety plans or procedures for their own staff to work under. In this case, Form 3 shall be signed by the subcontractor.*

All personnel participating in this project must receive initial health and safety orientation (Form 1). Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety and Health Supervisor.

The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

**TABLE C-2 ORGANIZATION CHART**

| Chain of Command | Title | Name | Telephone Numbers |
|---|---|---|---|
| 1 | Principal-in-Charge | Bruce Williams | O: 509.363.2814<br>C: 509.954.6614 |
| 2 | Project Manager | Jedidiah R. Sugalski | O: 509.209.2830<br>C: 509.991.4471 |
| 3 | Site Safety and Health Officer (SSO); will vary by site | Bryce Hanson | O: 509.209.2818<br>C: 360.269.3237 |
| | | Joshua Lee | O: 509.209.2832<br>C: 406.239.7810 |
| | | Justin Orr | O: 509.209.3125<br>C: 406.890.1310 |
| 4 | Health and Safety Program Manager (HSM) | Mary Lou Sullivan | O: 253.722.2425<br>C: 360.633.9821 |
| 5 | Field Engineer/Geologist; will vary by site | Bryce Hanson/Joshua Lee/ /Justin Orr | See SSO contact info above |
| 6 | Subcontractor(s) | Environmental West (driller)<br>Utilities Plus, LLC (utility locate)<br>Eurofins TestAmerica (chemical analysis)<br>TDB (IDW) | O: 509.534.2740<br>O: 509.945.9840<br>O: 509.924.9200<br>TBD |
| 7 | Current Owner (c/o Ecology Project Manager) | Jill Scheffer | O: 509.454.7834<br>C: 509.571-4162 |

## Functional Responsibility

### Project Manager (PM), Jedidiah R. Sugalski

A PM is assigned to manage the activities of various projects and is responsible to the principal-in-charge of the project. The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or she is also responsible for assuring that appropriate HASPs complying with this manual are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. PMs shall also see that their project budgets consider health and safety costs. The PM shall keep the HSM informed of the project's health- and safety-related matters as necessary. The PM shall designate the project Site Safety Officer (SSO) and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the SSO when appropriate.

### Site Safety and Health Supervisor

The SSO will have the on-site responsibility and authority to modify and stop work or remove personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation. The SSO is First Aid and CPR qualified and has current Hazardous Waste Operations and Emergency Response (HAZWOPER) training. The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct daily safety meetings, perform air monitoring as required, conduct site safety inspections as required, coordinate emergency medical care, and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced fieldwork experience and shall be familiar with health and safety requirements specific to the project. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed.

Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring compliance with its guidelines by staff.
- Being sure that all GeoEngineers field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Setting up work zones, markers, signs and security systems, if necessary.
- Performing or supervising air quality measurements. Communicating information on these measurements to GeoEngineers field staff and subcontractor personnel.
- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with all health and safety practices in the field.
- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities. If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, notify/consult with the PM. Consult with the PM and the HSM regarding new or unanticipated site conditions, including emergency response activities. If field monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the HSM must be notified, and corrective action taken.
- Documenting all site accidents, illnesses and unsafe activities or conditions, and reporting them to the PM and the HSM.
- Directing decontamination operations of equipment and personnel.

### Field Employees

All employees working on site that have the potential of coming in contact with hazardous substances or physical hazards are responsible for participating in the health and safety program and complying with the site-specific health and safety plans. These employees are required to:

- Participate and be familiar with the health and safety program as described in this manual.
- Notify the SSO that when there is need to stop work to address an unsafe situation.

- Comply with the HASP and acknowledge understanding of the plan.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to incidents or accidents that could result in physical injury or exposure to hazardous materials.
- Participate in health and safety training, including initial 40-hour Occupational Safety and Health Administration (OSHA) course, annual 8-hour HAZWOPER refresher, and First Aid/cardiopulmonary resuscitation (CPR) training.
- Participate in the medical surveillance program if applicable.
- Schedule and take a respirator fit test annually.
- Any field employee working on site may stop work if the employee believes the work is unsafe.

### Contractors under GeoEngineers Supervision

Contractors working on the site under GeoEngineers supervision or direct control that have the potential of coming in contact with hazardous substances or physical hazards shall have their own health and safety program that is in line with the site-specific health and safety plan.

### Health and Safety Manager, Mary Lou Sullivan

GeoEngineers' Health and Safety Program Manager (HSM) is responsible for implementing and promoting employee participation in the program. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons, and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

**TABLE C-3. FIELD PERSONNEL TRAINING RECORDS**

| Name of Employee On-Site | Level of HAZWOPER Training (24-/40-hour) | Date of 40-Hour/8-Hour Refresher Training | First Aid/ Cardiopulmonary Resuscitation (CPR) |
|---|---|---|---|
| Joshua Lee | 40-hr (Supervisor) | 1/22/2021 | 1/28/2020 |
| Bryce Hanson | 40-hr | 3/31/2021 | 2/3/2021 |
| Justin Orr | 40-hr | 1/13/2021 | 11/12/2020 |

## SITE DESCRIPTION, MAP AND FIELD ACTIVITIES

The project description and a map of the site layout are provided as part of the work plan on Figures 1 and 2. Work zones will be established around the drill rig, backhoe, excavator, borings, and monitoring wells, if applicable, at each site. In general, work zones will be within a 10-foot radius of an investigation activity.

**TABLE C-4. LIST OF FIELD ACTIVITIES**

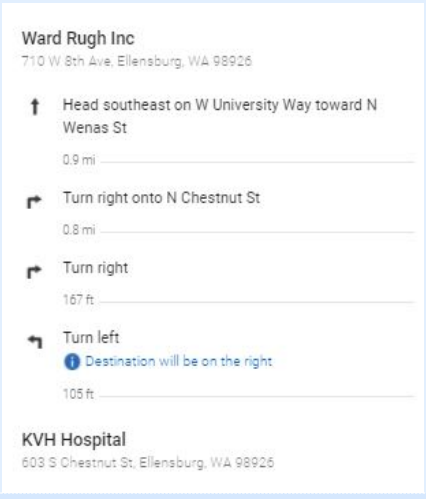
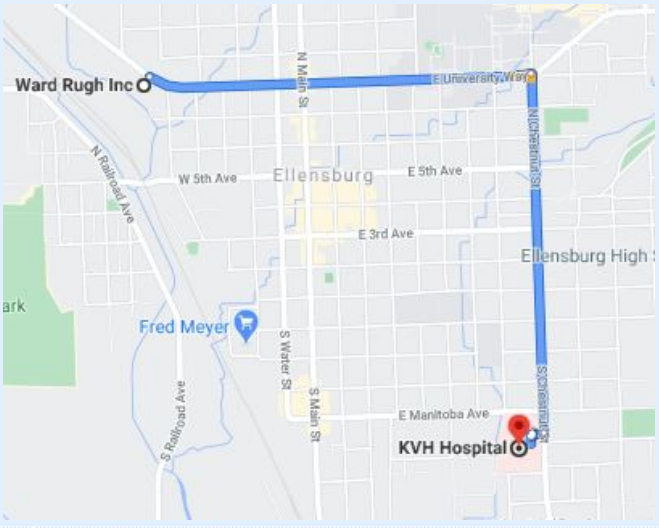
| Check the Activities to be Completed during the Project | |
|---|---|
| X | Site reconnaissance |
| X | Direct-Push exploration |
| | Test Pit exploration |

| Check the Activities to be Completed during the Project | |
|---|---|
| | Soil Vapor Extraction (SVE) system operation |
| X | Soil sample collection |
| X | Groundwater Sampling |
| X | Field screening of contaminated media |
| X | Soil Vapor measurements |
| X | Groundwater depth and free product measurement (if any) |
| | Soil stockpile testing |
| | Remedial excavation |
| | Monitoring well installation |
| | Monitoring well development |

## EMERGENCY INFORMATION

In the case on an emergency requiring medical treatment, the location of the nearest hospital and route is provided in Table C-5. Other emergency procedures are described in the following section.

**TABLE C-5. EMERGENCY INFORMATION**

| | |
|---|---|
| **Hospital Name and Address:** | **KVD Hospital**<br>603 S Chestnut St<br>Ellensburg, Washington 98926 |
| **Phone Numbers (Hospital ER):** | 509.962.9841 or 911 |
| **Distance:** | 1.8 mile |
| **Route to Hospital:** |  <br>  |
| **Ambulance:** | 911 |
| **Poison Control:** | 800.222.1222 |
| **Police:** | 911 |
| **Fire:** | 911 |

| | |
|---|---|
| **Location of Nearest Telephone:** | Cell phones are carried by field personnel. |
| **Nearest Fire Extinguisher:** | Located in the GeoEngineers' vehicle on site. |
| **Nearest First-Aid Kit:** | Located in the GeoEngineers' vehicle on site. |

### Standard Emergency Procedures

1. Get help
    a. Send another worker to phone 911 (if necessary)
    b. As soon as feasible, notify GeoEngineers' project manager
2. Reduce risk to injured person
    c. Turn off equipment
    d. Move person from injury location (if possible)
    e. Keep person warm
    f. Perform CPR (if necessary)
3. Transport injured person to medical treatment facility (if necessary)
    g. By ambulance (if necessary) or GeoEngineers vehicle
    h. Stay with person at medical facility
    i. Keep GeoEngineers manager apprised of situation and notify human resources manager of situation

## HAZARD ANALYSIS

A hazard analysis has been completed as part of preparation of this HASP. The hazard analysis was performed taking into account the known and potential hazards at the site and surrounding areas, as wells as the planned work activities. The results of the hazard analysis are presented in this section. The hazard assessment will be evaluated each day before beginning work. Updates will be made as necessary and documented in the Job Hazard Analyses (JHA) Form 3 or daily field log.

### Physical Hazards

The following are known applicable physical hazards.

**TABLE C-6. PHYSICAL HAZARDS**

| | |
|---|---|
| X | Drill rigs |
| | Backhoes |
| X | Overhead hazards/powerlines |
| X | Tripping/puncture hazards |
| X | Snow, rain, ice, freezing temperatures |
| X | Heat/Cold, Humidity |
| X | Utilities/utility locate |

| | |
|---|---|
| X | Contaminated soil |
| X | Contaminated groundwater |
| X | Unusual traffic hazard – Street traffic |
| X | Loud noise |
| | Excavators |
| | Front End Loader/Forklifts |
| | Excavations/trenching (1:1.5 slopes for Type C soil if entering the excavation) |
| | Shored/braced excavation if greater than 4 feet of depth |

- Utility checklist will be completed as required for the location to prevent drilling or digging into utilities. Note: These procedures should be added to the standard GeoEngineers utility checklist.
- Lifting hazards: use proper techniques, mechanical devices, where appropriate.
- Terrain obstacles: terrain could be soft and activities will be conducted to minimize lawn damage and the potential for vehicles to get stuck.
- Personnel will wear high-visibility vests for increased visibility by vehicle and equipment operators.
- Field personnel will be aware at all times of the location and motion of heavy equipment in the area of work to ensure a safe distance between personnel and the equipment. Personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. Personnel will approach operating heavy equipment only when they are certain the operator has indicated that it is safe to do so through hand signal or other acceptable means.
- Heavy equipment and/or vehicles are not anticipated.
- Heavy equipment and/or vehicles used on this site will not work within 20 feet of overhead utility lines without first ensuring that the lines are not energized. This distance may be reduced to 10 feet, depending on the client and the use of a safety watch. Note: If it is later determined that overhead lines are a hazard on this job site, a copy the overhead lines safety section from the HASP Supplemental document shall be attached.
- Don't operate equipment around overhead power lines unless you are authorized and trained to do so. If an object (scaffolds, crane, etc.) must be moved in the area of overhead power lines, appoint a competent worker whose sole responsibility is to observe the clearance between the power lines and the object. Warn others if the minimum distance is not maintained.
- Never touch an overhead line if it has been brought down by machinery or has fallen. Never assume lines are dead. When a machine is in contact with an overhead line, DO NOT allow anyone to come near or touch the machine. Stay away from the machine and summon outside assistance. Never touch a person who is in contact with a live power line.
- If you are in a vehicle that is in contact with an overhead power line, DON'T LEAVE THE VEHICLE. As long as you stay inside and avoid touching metal on the vehicle, you may avoid an electrical hazard. If you need to get out to summon help or because of fire, jump out without touching any wires or the machine, keep your feet together, and hop to safety.

- Personnel will avoid tripping hazards, steep slopes, pit and other hazardous encumbrances. If it becomes necessary to work within 6 feet of the edge of a pit, slope, pier or other potentially hazardous area, appropriate fall protection measures will be implemented by the Site Safety and Health Supervisor in accordance with Occupational Safety and Health Administration (OSHA)/Division of Occupational Safety and Health (DOSH) regulations and the GeoEngineers *Safety Program manual*.
- Excessive levels of noise (exceeding 85 decibels [dBA]) are anticipated. Personnel potentially exposed will wear ear plugs or muffs with a noise reduction rating of at least 25 dBA whenever it becomes difficult to carry on a conversation 6 feet away from a co-worker or whenever noise levels become bothersome. (Increasing the distance from the source will decrease the noise level noticeably.)
- Cold stress control measures will be implemented according to the GeoEngineers Health and Safety Program to prevent frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature). Heated break areas and warm beverages shall be available during periods of cold weather.
- Heat stress control measures required for this site will be implemented according to GeoEngineers Health and Safety Program with water provided on site.

**TABLE C-7. ENGINEERING CONTROLS**

| | |
|---|---|
| | Trench shoring (1:1 slope for Type B Soils) |
| X | Locate work spaces upwind/wind direction monitoring |
| X | Other soil covers (as needed) |
| | Other (specify _____ |

## Chemical Hazards

This section includes all chemical hazards that have been identified to date at the site.

**TABLE C-8 CHEMICALS POTENTIAL CHEMICAL HAZARDS AT THE SITE**

| Compound/ Description | OSHA PEL Exposure Limits | NIOSH/ACGIH TLV Exposure Limits/IDLH | Exposure Routes | Toxic Characteristics |
|---|---|---|---|---|
| Gasoline | 300ppm (TWA)<br>500 ppm (STEL) | 300-ppm 8-hour TWA and a 500-ppm 15-minute STEL | Ingestion, inhalation, skin absorption, skin and eye contact | Irritated eyes, skin, mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache; dermatitis. |
| Diesel fuel | None established by OSHA | ACGIH:<br>100 mg/m$^3$ (as total hydrocarbons) | Inhalation, absorption, skin and eye contact | Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis |

| Compound/ Description | OSHA PEL Exposure Limits | NIOSH/ACGIH TLV Exposure Limits/IDLH | Exposure Routes | Toxic Characteristics |
|---|---|---|---|---|
| Benzene | 1 ppm (TWA)<br>5 ppm (STEL) | NIOSH REL:<br>0.1 ppm (TWA) Ca<br>1 ppm (STEL)<br>500 ppm (IDLH)<br>ACGIH TLV:<br>0.5 ppm (TWA)<br>2.5 ppm (STEL) | Inhalation, absorption | Irritation of eyes, skin, nose, respiratory system, dizziness, headache, nausea, staggered gait, anorexia, exhaustion, dermatitis, bone marrow depression (leukemia). |
| Toluene | 200 ppm (TWA)<br>300 ppm (C) | ACGIH:<br>20 ppm (TWA);<br>NIOSH:<br>100 ppm (REL)<br>500 ppm (IDLH) | Inhalation, absorption | Irritation to eyes, nose, exhaustion, confusion, dizziness, headaches, dilated pupils, euphoria, anxiety, teary eyes, muscle fatigue, insomnia, paresthesia, dermatitis, liver and kidney damage. |
| Ethylbenzene | 100 ppm (TWA) | ACGIH:<br>20 ppm (TWA)<br>NIOSH:<br>100 ppm (REL)<br>800 ppm (IDLH) | Inhalation, absorption | Irritation to eyes, skin, respiratory system, burning of skin, dermatitis. |
| Xylenes | 100 ppm (TWA) | ACGIH:<br>100 ppm (TWA)<br>150 ppm (ST)<br>NIOSH:<br>100 ppm (REL)<br>900 ppm (IDLH) | Inhalation, absorption | Irritation to eyes, skin, nose, throat, dizziness, excitement, drowsiness, incoordination, staggering gait, corneal vacuolization, anorexia, nausea, vomiting, abdominal pain, dermatitis. |
| Naphthalene | 10 ppm (TWA) | ACGIH:<br>10 ppm (TWA)<br>NIOSH:<br>10 ppm (REL)<br>250 ppm (IDLH) | Inhalation, absorption, | Upper respiratory tract irritation, cataracts, hemolytic anemia |

Notes:

REL = NIOSH Recommended Exposure Limit.
NIOSH = National Institute for Occupational Safety and Health
$mg/m^3$ = micrograms per cubic meter
STEL = short-term exposure limit
PEL = permissible exposure limit
C = Ceiling
ACGIH = American Conference of Governmental Industrial Hygienists
TLV-TWA = Threshold limit value- time weighted average for no more than 8 hours (ACGIH)
IDLH = Immediately dangerous to life or health if exposed for more than 30 minutes (NIOSH)

### Gasoline

Gasoline is a known animal carcinogen, but unknown relevance to humans. Benzene, a gasoline component is a known human carcinogen. Exposure can produce a wide range of health effects depending on the amount and timing of exposure. Exposure may irritate the eyes, skin, respiratory tract and may also affect the central nervous system.

### Diesel Fuel

Diesel fuels are similar to fuel oils used for heating (fuel oils no. 1, no. 2 and no. 4). All fuel oils consist of complex mixtures of aliphatic and aromatic hydrocarbons. Diesel fuels predominantly contain a mixture of C10 through C19 hydrocarbons, which include approximately 64 percent aliphatic hydrocarbons, 1 to 2 percent olefinic hydrocarbons, and 35 percent aromatic hydrocarbons. Workers may be exposed to fuel oils through their skin without adequate protection, such as gloves, boots, coveralls, or other protective clothing. Breathing diesel fuel vapors for a long time may damage your kidneys, increase your blood pressure, or lower your blood's ability to clot. Constant skin contact (for example, washing) with diesel fuel may also damage your kidneys. The International Agency for Research on Cancer (IARC) has determined that residual (heavy) fuel oils and marine diesel fuel are possibly carcinogenic to humans (Group 2B classification).

Residue from aged diesel fuel can irritate the skin, if left in contact for too long. Degraded fuel can irritate the skin and mucous membranes, if contact is made. Exercising good personal hygiene and cleaning off PPE post-work and prior to re-donning safety equipment will minimize potential contact. More on Total Petroleum Hydrocarbons health effects in the Agency for Toxic Substances and Disease Registry (ATSDR) Toxicological Profile document here: https://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=424&tid=75

### Benzene

Benzene is a central nervous system depressant. Symptoms include headache, nausea, tremors, and fatigue, but these typically do not occur until exposure concentrations are in excess of 150 ppm. There is significant evidence that chronic exposures are carcinogenic causing a progressively malignant disease of the blood-forming organs. Contact with liquid benzene may cause blistering and dermatitis. In addition, benzene can be absorbed through unprotected skin and eye and mucous membranes. Benzene vapors can cause transient eye irritation. The mean air odor threshold for benzene is 34 ppm. Benzene's ionization potential (IP) is 9.25 eV and its vapor pressure is 75 mm Hg. Benzene has an ACGIG A1 designation, a Confirmed Human Carcinogen (leukemia). It also has a skin notation, indicating the potentially significant contribution to the overall exposure by the cutaneous route; including mucous membranes and the eyes, by contact with vapors, liquids and solids.

### Ethylbenzene

Ethylbenzene is a highly flammable, colorless liquid and VOC with an odor similar to that of gasoline. It is commonly used in the production of polystyrene, a highly used plastic material. Exposure primarily comes through off-gas vapor. Low amounts of ethylbenzene exposure are not considered immediately harmful, however longer-term toxicity and carcinogenicity is still under study. Common symptoms of exposure include eye and mucous membrane irritation, respiratory irritation, and dermatitis. OSHA, ACGIH and NIOSH currently have a PEL of 100 ppm for ethylbenzene. Ethylbenzene is considered an ACGIH A3 carcinogen, which is a confirmed animal carcinogen.

### Toluene

Toluene is a colorless, water-insoluble liquid and VOC used commonly in paint thinners, contact cement and some glues. Toluene residue can off-gas, and inhalation of low to moderate levels of toluene can cause confusion, tiredness, weakness, memory loss, and other harmful effects. The odor of toluene gas is similar to that of paint thinner. OSHA has prescribed a PEL of 200 ppm while ACGIH has a lower PEL of 20 ppm. While ACGIH considers toluene an A4 carcinogen, Not Classified as a Human Carcinogen, the chemical's known adverse effect on hearing is currently being investigated further.

### Xylene

Xylene is a colorless, flammable liquid and VOC commonly used in the petrochemical industry as well as being used in commercial gasoline and aircraft fuels. It has a sweet odor. Xylene exposure can irritate the eyes, nose, skin, and throat as well as cause headaches, dizziness, and confusion. Both OSHA and WA-DOSH prescribe a PEL of 100 ppm for xylene. It is an ACGIH A4 carcinogen; Not Classified as a Human Carcinogen.

### Naphthalene

Naphthalene is a colorless to brown solid VOC with a distinctive smell of mothballs, one of its primary uses. Naphthalene is also used as a household fumigant, and precursor chemical to many other industrial substances. Naphthalene exposure has numerous negative health effects associated with its exposure. Including fatigue, lack of appetite, confusion, nausea, vomiting, diarrhea, blood in the urine, and jaundice. OSHA and NIOSH have regulated a PEL of 10 ppm. Naphthalene is considered an ACGIH A3 carcinogen, which is a confirmed animal carcinogen.

## Biological Hazards

Site personnel shall avoid contact with or exposures to potential biological hazards encountered.

**TABLE C-9. BIOLOGICAL HAZARDS AND PROCEDURES**

| Y/N | Hazard | Procedures |
|---|---|---|
| N | Poison Ivy or other vegetation | Avoid contact |
| Y | Insects or snakes | Avoid contact |
| Y | COVID-19 | Refer to COVID-specific JHA |

Site personnel shall avoid contact with or exposures to potential biological hazards encountered. Follow JHA specific to COVID-19 required protocols.

## Additional Hazards (Update in Daily Log)

Include evaluation of:

- Physical Hazards (equipment, traffic, tripping, heat stress, cold stress and others)
- Chemical Hazards (odors, spills, free product, airborne particulates and others present)
- Biological Hazards (COVID-19, snakes, spiders, other animals, poison ivy and others present)

## AIR MONITORING PLAN

An air monitoring plan has been prepared as part of development of this HASP. The air monitoring plan is based on the results of the chemical exposure assessment and the known and potential inhalation hazards on site. The air monitoring plan addresses steps necessary to limit worker exposure. Non-occupational exposures are not addressed in this plan.

Work upwind if at all possible.

**Check Instrumentation to be Used**

☐ Multi-Gas Detector (may include oxygen, carbon monoxide, hydrogen sulfide, lower explosive limit)

☐ Dust Monitor

☒ Other (photoionization detector [PID])

**Check Monitoring Frequency/Locations and Type (Specify: Work Space, Borehole, Breathing Zone):**

☐ Continuous during soil disturbance activities or handling samples (Work Space)

☐ 15 minutes

☐ 30 minutes

☒ Hourly (Breathing Zone)

### Additional Personal Air Monitoring for Specific Chemical Exposure

#### Action Levels for Volatile Organic Chemicals

- The workspace will be monitored using a photoionization detector (PID). These instruments must be properly maintained, calibrated and charged (refer to the instrument manuals for details). Zero this meter in the same relative humidity as the area in which it will be used and allow at least a 10-minute warm-up prior to zeroing. Do not zero in a contaminated area.
- An initial vapor measurement survey of the site should be conducted to detect "hot spots" if contaminated soil is exposed at the surface. Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 parts per million (ppm) above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C personal protective equipment (PPE) or move to a non-contaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed one-half the threshold limit value (TLV). Because of the variety of chemicals, the PID will not indicate exposure to a specific PEL. Table C-8.

**TABLE C-10. AIR MONITORING ACTION LEVELS**

| Contaminant | Activity | Monitoring Device | Frequency of Monitoring Breathing Zone | Action Level | Action |
|---|---|---|---|---|---|
| Organic Vapors | Drilling and sampling | PID | Start of shift; every 60 minutes and in event of odors | Background to 5 ppm in breathing zone | Use Level D or Modified Level D PPE |

| Contaminant | Activity | Monitoring Device | Frequency of Monitoring Breathing Zone | Action Level | Action |
|---|---|---|---|---|---|
| Organic Vapors | Drilling and sampling | PID | Start of shift; every 60 minutes and in event of odors | 5 to 50 ppm in breathing zone | Upgrade to Level C PPE |
| Organic Vapors | Drilling and sampling | PID | Start of shift; every 60 minutes and in event of odors | > 50 ppm in breathing zone | Stop work and evacuate the area. Contact Health and Safety Program Manager for guidance. |
| Combustible Atmosphere | Drilling and sampling | PID | Start of shift; every 60 minutes and in event of odors | >1,000 ppm | Stop work and evacuate the site. Contact Health and Safety Program Manager for guidance. |

## SITE CONTROL PLAN

Work zones will be considered to be within 50 feet of the drill rig, backhoe, or other equipment. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach. All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see the Emergency Information section above.

### Traffic or Vehicle Access Control Plans

Survey tape and traffic cones will be used to cordon off any areas on site where borings will be conducted or monitoring wells will be developed and sampled in order to restrict public vehicular and pedestrian access. When working in city right-of-way on arterial roads, a traffic control plan is provided, and traffic control equipment shall be deployed in accordance with the plan.

### Site Work Zones

An exclusion zone, contamination reduction zone, and support zone should be established around working areas. Personnel leaving the facility or on break should exit the exclusion zone through the contamination reduction zone. The contamination reduction zone, at a minimum, should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands at the Facility before eating or leaving the facility.

Hot zone/exclusion zone: *Within 10 feet of borings or excavations*

| Method of Delineation / Excluding Non-Site Personnel | |
|---|---|
| | Fence |
| X | Traffic Cones |
| X | Other Road Work Signs |

### Buddy System

Personnel on site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on site, a buddy system can be arranged with subcontractor/ contractor personnel.

### Site Communication Plan

Positive communications (within sight and hearing distance or via radio) should be maintained between pairs on site, with the pair remaining in proximity to assist each other in case of emergencies. The team should prearrange hand signals or other emergency signals for communication when voice communication becomes impaired (including cases of lack of radios or radio breakdown) and an agreed upon location for an emergency assembly area.

In instances where communication cannot be maintained, you should consider suspending work until it can be restored. If this is not an option, the following are some examples for communication:

- Hand gripping throat: Out of air, can't breathe.
- Gripping partner's wrist or placing both hands around waist: Leave area immediately, no debate.
- Hands on top of head: Need assistance.
- Thumbs up: Okay, I'm all right; or I understand.
- Thumbs down: No, negative.

### Emergency Action

In the event of an emergency, employees with convene in a designated area Identified on the Job Hazard Analyses Form (JHA) Form 3. Employees should communicate with others working on site and the PM to determine the Emergency Action Plan for each site. All personnel from GeoEngineers and subcontractor(s) should be made aware of the Emergency Action for the site at each morning's safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.). For medical assistance, see the Emergency Information section above.

### Decontamination Procedures

Decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone; and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and respirator, hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking or leaving the site.

### Waste Disposal or Storage

Used PPE is to be placed in a plastic bag and disposed of as municipal waste.

**Drill Cutting/Excavated Sediment Disposal or Storage:**

☒ On site in DOT approved steel drums, pending analysis and further action

☐ Secured (list method):

☐ Other (describe destination, responsible parties):

## PERSONAL PROTECTIVE EQUIPMENT

After the initial and/or daily hazard assessment has been completed the appropriate personal protective equipment (PPE) will be selected to ensure worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted before the start of site operations.

Site activities include handling and sampling solid subsurface material (material may potentially be saturated with contaminated materials and groundwater). Depth-to-groundwater measurements will be performed as well. Site hazards include potential exposure to hazardous materials, and physical hazards such as trips/falls, heavy equipment, and contaminant exposure.

Air monitoring will be conducted to determine the level of respiratory protection.

- Level D PPE, unless a higher level of protection is required, will be worn at all times on the site. Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc.
- Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

| Check Applicable Personal Protection Equipment to be Used | |
|---|---|
| X | Hardhat |
| X | Steel-toed boots |
| X | Safety glasses |
| X | Hearing protection |
| X | Rubber boots (if wet conditions) |
| **Gloves (specify)** | |
| X | Nitrile |
| | Latex |
| | Liners |
| | Leather |
| | Other (specify) _____ |
| **Protective clothing** | |
| | Tyvek (if dry conditions are encountered, Tyvek is sufficient) |
| | Saranex (personnel will use Saranex if liquids are handled or splash may be an issue) |

| Check Applicable Personal Protection Equipment to be Used | |
|---|---|
| X | Cotton |
| X | Rain gear (as needed) |
| X | Layered warm clothing (as needed) |
| **Inhalation hazard protection** | |
| X | Level D |
| | Level C (respirators with organic vapor filters / P100 filters) |

### Personal Protective Clothing Inspections

PPE clothing ensembles designated for use during site activities shall be selected to provide protection against known or anticipated hazards. However, no protective garment, glove or boot is entirely chemical-resistant, nor does any PPE provide protection against all types of hazards. To obtain optimum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE. This training shall include the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

### Respirator Selection, Use and Maintenance

If respirators are required, site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134. Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used. Respirators will be stored in a protective container.

### Respirator Cartridges

If the action levels identified in the Air Monitoring Action Levels Table in Table C-10, are exceeded, site personnel should don respiratory protection appropriate for the known or suspected chemical of concern. For the identified field activities, use of a respirator is not anticipated. If PID readings trigger the action levels in Table C-10, stop work and a respirator must be obtained from a GeoEngineers office if air concentration remains above the action levels. For most sites, a half-face or full-face air purifying respirator with a NIOSH-approved organic vapor/HEPA P100 combination cartridge (Level C), will be appropriate for the known or suspected chemicals of concern. Monitoring frequency should be continuous while using Level C respiratory protection. The SSO closely monitor personnel using respiratory protection, including observing for signs of fatigue or respiratory distress, the potential for cartridge breakthrough or increased resistance to inhalation, and the need for changes in the level of respiratory protection based on air

monitoring. The frequency and duration of breaks should be increased for personnel working in respiratory protection. If at any time on-site air monitoring indicates Level B respiratory protection is warranted, personnel should leave the exclusion zone and consult with the HSM.

If site personnel are required to wear air-purifying respirators, the appropriate cartridges shall be selected to protect personnel from known or anticipated site contaminants. The respirator/cartridge combination shall be approved and NIOSH-certified. A cartridge change-out schedule shall be developed based on known site contaminants, anticipated contaminant concentrations and data supplied by the cartridge manufacturer related to the absorption capacity of the cartridge for specific contaminants. Site personnel shall be made aware of the cartridge change-out schedule prior to the initiation of site activities. Site personnel shall also be instructed to change respirator cartridges if they detect increased resistance during inhalation or detect vapor breakthrough by smell, taste or feel, although breakthrough is not an acceptable method of determining the change-out schedule.

### Respirator Inspection and Cleaning

The Site Safety Officer shall periodically (weekly) inspect respirators at the project site. Site personnel shall inspect respirators prior to each use in accordance with the manufacturer's instructions. In addition, site personnel wearing a tight-fitting respirator shall perform a positive and negative pressure user seal check each time the respirator is donned, to ensure proper fit and function. User seal checks shall be performed in accordance with the GeoEngineers respiratory protection program or the respirator manufacturer's instructions.

## ADDITIONAL ELEMENTS

### Cold Stress Prevention

Working in cold environments presents many hazards to site personnel and can result in frost nip (superficial freezing of the skin), frost bite (deep tissue freezing), or hypothermia (lowering of the core body temperature).

The combination of wind and cold temperatures increases the degree of cold stress experienced by site personnel. Site personnel shall be trained on the signs and symptoms of cold-related illnesses, how the human body adapts to cold environments, and how to prevent the onset of cold-related illnesses. Heated break areas and warm beverages shall be provided during periods of cold weather.

### Heat Stress Prevention

Keep workers hydrated in a hot outdoor environment requires more water be provided than at other times of the year. When employee exposure is at or above an applicable temperature listed in the Heat Stress table below, Project Managers will ensure that:

- A sufficient quantity of drinking water is readily accessible to employees at all times.
- All employees have the opportunity to drink at least 1 quart of drinking water per hour.

**HEAT STRESS**

| Type of Clothing | Outdoor Temperature Action Levels |
|---|---|
| Nonbreathing clothes including vapor barrier clothing or PPE such as chemical resistant suits | 52° |
| Double-layer woven clothes including coveralls, jackets and sweatshirts | 77° |
| All other clothing | 89° |

### Emergency Response

Indicate what site-specific procedures you will implement.

- Personnel on site should use the "buddy system" (pairs).
- Visual contact should be maintained between "pairs" on site, with the team remaining in proximity to assist each other in case of emergencies.
- If any member of the field crew experiences any adverse exposure symptoms while on site, the entire field crew should immediately halt work and act according to the instructions provided by the SSO.
- Wind indicators visible to all on-site personnel should be provided by the SSO to indicate possible routes for upwind escape. Alternatively, the SSO may ask on-site personnel to observe the wind direction periodically during site activities.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM, and reevaluation of the hazard and the level of protection required.
- If an accident occurs, the Site Safety Officer and the injured person are to complete, within 24 hours, an Accident Report (Form 4) for submittal to the PM, the HSPM, and HR. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

## MISCELLANEOUS

### Personnel Medical Surveillance

GeoEngineers employees are not in a medical surveillance program because they do not fall into the category of "Employees Covered" in OSHA 1910.120(f)(2), which states that a medical surveillance program is required for the following employees:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.
4. Members of HAZMAT teams.

### Spill Containment Plans (Drum and Container Handling)

Based upon the most recent aerial imagery, the site appears to be generally flat to gently sloping down to the southwest where asphalt pavement meets the creek embankment. In the occurrence of a spill, materials would likely drain as surface runoff to the southwest and eventually into the vegetative creek drainage. No engineered site drains were observed.

### Sampling, Managing and Handling Drums and Containers

Drums and containers used during the investigation shall meet the appropriate Department of Transportation (DOT), OSHA and U.S. Environmental Protection Agency (EPA) regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container movement. When practicable, drums and containers shall be inspected and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupturing may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred. Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

### Entry Procedures for Tanks or Vaults (Confined Spaces)

GeoEngineers employees shall not enter confined spaces to perform work unless they have been properly trained and with hands-on experience in the use of retrieval equipment. If a project requires confined space entry, please include a copy of the confined space permit and include the training documentation in this HASP.

Trenches greater than 4 feet in depth with the potential for buildup of a hazardous atmosphere are considered confined spaces.

### Sanitation

Sanitary facilities are not available on site. The Ward Rugh facility is the closest bathroom. Soap and water will be available in GeoEngineers vehicle.

### Lighting

Work is anticipated to be performed during daylight hours. Work may extend slightly into the evening provided adequate lighting is used (e.g., portable flood lights).

## DOCUMENTATION TO BE COMPLETED FOR HAZWOPER PROJECTS

- Daily Field Log
- FORM 1—Health and Safety Pre-Entry Briefing and Acknowledgment of Site Health and Safety Plan for use by employees, subcontractors and visitors
- FORM 2—Safety Meeting Record
- FORM 3—Job Hazard Analyses (JHA) Form
- FORM 4—Accident/Exposure Report Form

NOTE: The Field Log is to contain the following information:

- Updates on hazard assessments, field decisions, conversations with subcontractors, client or other parties, etc.;
- Air monitoring/calibration results, including: personnel, locations monitored, activity at the time of monitoring, etc.;
- Actions taken;
- Action level for upgrading PPE and rationale; and
- Meteorological conditions (temperature, wind direction, wind speed, humidity, rain, snow, etc.).

## APPROVALS

| | | | |
|---|---|---|---|
| 1. | Plan Preparation | Bryce K. Hanson | 4/22/2021<br>Date |
| 2. | Plan Approval | Jedidiah R. Sugalski<br>PM Signature | 4/22/2021<br>Date |
| 3. | Health & Safety Officer | Mary Lou Sullivan<br>Health & Safety Program Manager | 4/22/2021<br>Date |

**FORM 1**
**HEALTH AND SAFETY PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT OF THE SITE HEALTH AND SAFETY PLAN FOR GEOENGINEERS' EMPLOYEES, SUBCONTRACTORS AND VISITORS**
**ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT**
**FILE NO. 0504-169-00**

Inform employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances they're likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct briefings for employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started.
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed.
- Make sure all employees working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks.
- Update all information to reflect current sight activities and hazards.
- All personnel participating in this project must receive initial health and safety orientation. Thereafter, brief tailgate safety meetings will be held as deemed necessary by the Site Safety Officer.
- The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards.

(All of GeoEngineers' Site workers shall complete this form, which should remain attached to the HASP and be filed with other project documentation). Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

I hereby verify that a copy of the current HASP has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

**Print Name** **Signature** **Date**

_____

_____

_____

**FORM 2**
**SAFETY MEETING RECORD**
**ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT**
**FILE NO. 0504-169-00**

Safety meetings should include a discussion of emergency response, site communications and site hazards.

- Use in conjunction with the HASP and Job Hazard Analyses (JHA) Form 3 to help identify hazards.

**Date:** _____ **Site Safety Officer (SSO):**_____

**Topics:** _____

**Attendees:**

| **Print Name** | **Signature:** |
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## FORM 3
## JOB HAZARD ANALYSES (JHA) FORM
## ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT
## FILE NO. 0504-169-00

This form can be used for analyses of daily hazards where there are multiple tasks and ongoing projects and for record keeping purposes. Make copies as needed.

| **Project:** Site Investigation<br>**File No:** 0504-169-00 | **Date:**<br>4/20/2021 | **Site Location:**<br>710 West 8th Street Ellensburg, WA 98926 |
|---|---|---|

| **Development Team:** | **Position/Title:** | **Reviewed by:** | **Position/Title:** |
|---|---|---|---|
| JR Sugalski | Senior Environmental Engineer | Name | Position |
| Name | Position | Name | Position |

**Minimum Required Protective Equipment:** (see critical actions for task-specific requirements)

| **PPE** | **Equipment** | **Tools** | **Actions** |
|---|---|---|---|
| ☒ Hard Hat | ☐ Safety Beacons | ☒ Cell/Satellite Phone | ☒ Stay Visible |
| ☒ High Visibility Vest | ☒ Safety Cones | ☐ Digital Camera | ☒ Equipment Inspection |
| ☒ Safety Shoes/Waders | ☒ First Aid Kit | ☐ iPad | ☒ Work in Pairs |
| ☒ Gloves | ☒ Fire Extinguisher | ☐ | ☒ Safety Control/Traffic Plan |
| ☒ Safety Glasses | ☒ Eye Wash/ Drinking Water | ☐ | ☐ |

| **Job Steps** | **Potential Hazards** | **Critical Actions to Mitigate Hazards** |
|---|---|---|
| **Pre-Job Activities** | Example: Unfamiliar locations, congestion, unpaved roads, Mechanical Failure, Flat Tires Vehicle Fire, Exhaust Leaks, Vehicle Collision, Internal Projectiles | ■ Inspect the vehicle before departure:<br>▪ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage.<br>▪ Check lights, wipers, fluid levels, and seat belts.<br>■ Study the area maps, photos and use GPS and compass skills.<br>■ Identify the safest spot to park field vehicles. |
| **Familiarize crew with the task and location of site** | Crew does not notify site owner / manager.<br>Unaware of the job site hazards and steps to prevent injury.<br>Appropriate personnel protective equipment not worn.<br><br>Other Hazards | ■ Example: Conduct a tailgate safety meeting discussing the jobs, the hazards and actions that will be taken to prevent injury.<br>■ Discuss "Stop Work Authority" as it applies to each site member.<br>■ Discuss appropriate PPE including high visibility clothing such as reflective vest.<br>■ Notify attendant and/or site owner/manager of work activities and location.<br>■ Discuss appropriate PPE including high visibility clothing such as reflective vest.<br>■ Set up exclusion zone surrounding work area. |

| | | |
|---|---|---|
| **Driving to work site location (Highway Driving)** | Unfamiliar road, Mechanical Failure, Flat Tires, Vehicle Fire, Vehicle Collision.<br><br>Other Hazards | ■ Inspect the vehicle before departure:<br>○ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage.<br>○ Check lights, wipers, fluid levels, and seat belts.<br>■ Study the area maps, photos and use GPS and compass skills.<br>■ Use only vehicles appropriate for the work needs and the driving conditions expected.<br>■ Ensure the vehicle has a complete and current first aid kit and fire extinguisher.<br>■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment.<br>■ Use parking brake, and don't leave vehicle unattended while it is running.<br>■ Ensure vehicle has fuel to get to and from your destinations.<br>■ Inform your Project Manager of your destination and estimated time of return.<br>■ Carry extra food, water, and clothing.<br>■ Drive defensively. |
| **Driving on Unimproved Roads**<br><br>**(Off-Highway Driving)** | Encountering Other Vehicles on Narrow<br><br>Unfamiliar Road,<br><br>Narrow, Rough Roads, Animal / Object Collision,<br><br>Running / Skidding Off Road, Icy / Muddy Roads<br><br>Flying Debris (Rocks, etc.), Poor Visibility<br><br>Backing, Run-Away Vehicle, Roadway Obstacles<br><br>Project Manager unaware of location. | ■ Stay on the main roadway. Pull over on firm ground and avoid soft shoulders, if a stop is necessary.<br>■ Drive on maintained trails when possible.<br>■ Drive with care in tall brush and grass. Watch for wildlife, fallen trees, rocks, and other obstacles.<br>■ Slow down, especially on corners. Maintain a safe speed at all times.<br>■ Follow from a safe distance.<br>■ Know when and how to use 4WD.<br>■ Use only vehicles appropriate to the road conditions. Learn these conditions before you go.<br>■ Pull over to allow larger vehicles (i.e.: trucks and trailers) to pass from either direction.<br>■ Don't travel the road at all if there is high potential for vehicle damage.<br>■ Park so that backing up will not be necessary.<br>■ Use a spotter or get out to check behind vehicle. |

| | | |
|---|---|---|
| | | ■ Use ground guide to walk the path on questionable roadways.<br>■ When removing debris from the roadway, use care, lift properly, and use proper equipment and PPE.<br>■ When descending a long grade, use lower gears to control speed rather than brakes.<br>■ Keep vehicle well ventilated by opening a window at least 6 inches, when idling or heating for a period.<br>■ Keep all windows clear of snow, ice, mud, and anything else obstructing the driver's view.<br>■ Keep vehicle windows clean, inside and out, and washer fluid full. Replace damaged or worn wipers. |
| **Traveling on Foot** | Falls, Foot Injuries, and Stress and Impact Injuries<br>Forest Fires<br>Lightning<br>Personal Safety | ■ Identify and use safe travel routes. Do not exceed physical abilities or equipment design.<br>■ Use pack equipment properly. Carry weight on hips, not back.<br>■ Warm up and stretch the appropriate muscle groups before and after hitting the trail.<br>■ Test and use secure footing. Move cautiously and deliberately. Never run.<br>■ In heavy undergrowth, particularly off-trail, slow down and watch carefully.<br>■ Carry tools on the downhill side.<br>■ Wear safety-toed boots with good, non-skid soles that are tall enough to support ankles.<br>■ Know basic first aid. Completion of a basic first aid course is required.<br>■ Use footwear appropriate to the terrain and load being carried.<br>■ Know how to fall. Roll, protect the head and neck, and do not extend arms to break the fall.<br>■ Wear fire retardant clothing<br>■ Refer to GeoEngineers Personal Safety Program - Never you're your personal safety. Leave the area and contact your Project Manager.<br>■ Travel on maintained trails when possible. |
| | Biological Hazards | ■ Discuss applicable hazard mitigation measures - Insects, Snakes, Wildlife, Vegetation |

| | | |
|---|---|---|
| **Slope Evaluation** | Slips, Trips and Falls | ■ Travel on maintained trails when possible.<br>■ Take extra precautions when encountering steep, loose, wet trail conditions.<br>■ Always carry tools on your downhill side.<br>■ Use a rope for stability if needed / tie off to trees / have throw rope with on-shore buddy.<br>■ Take slow deliberate steps as conditions dictate.<br>■ Use a flashlight after dark.<br>■ Travel after dark only in an emergency.<br>■ Wear appropriate footwear for conditions. |
| **Communication** | Additional Hazards, i.e., No communication in case of emergency | ■ Verify cell phone is working.<br>■ Maintain communication with Project Manager throughout job task.<br>■ Verify location and contact numbers for emergency medical assistance or 911. |
| | Additional Hazards, i.e., Emergency | ■ **Dial 911**<br>■ Hospital Route (Attached Fall Protection Plan) |
| **Required Control Measures:** (check the box when complete) | | |
| ☐ Perform a pre-work vehicle inspection (First Aid kit, fire extinguisher). | | |
| ☐ Drive defensively looking out for the other guy. | | |
| ☐ Conduct a pre-work safety meeting. | | |
| ☐ Use a Safety Watch to monitor equipment Minimum Approach Distance (MAD) and to keep personnel clear if needed. | | |
| ☐ Wear Personal Protective Equipment (PPE). | | |
| ☐ Ensure training is current (First Aid, defensive driving, etc.). | | |
| ☐ Conduct Task Safety Assessments throughout the job. | | |
| **Additional Comments:** | | |
| | | |

## DAILY HAZARD ASSESSMENT RECORD OF SAFETY MEETINGS

**Signature** **Date** **Signature** **Date**

_____

_____

_____

_____

**FORM 4**
**ACCIDENT/EXPOSURE REPORT FORM**
**ELLENSBURG CITY WEST 8TH STREET ROW SITE ASSESSMENT**
**FILE NO. 0504-169-00**

To (Supervisor): _____ From (Employee): _____

Telephone (with area code): _____

Name of injured or ill employee: _____

Date of accident: Time of accident: Exact location of accident:

_____

Narrative description of: **accident**/**exposure** (circle one):

_____

_____

_____

_____

_____

Medical attention given on site:

_____

_____

_____

_____

Nature of illness or injury and part of body involved: Lost Time? Yes ☐ No ☐

_____

_____

**Probably Disability (check one):**

| Fatal | Lost work day with days away from work | Lost work day with days of restricted activity | No lost work day | First Aid only |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ |

Corrective action taken by reporting unit and corrective action that remains to be taken (by whom and when):

_____

_____

Employee Signature: Date:

Name of Supervisor:

## ATTACHMENT A
## COVID-19 SUPPLEMENTARY JHA

GeoEngineers

| **Project Name:** **File No:** | **Date:** | **Site Location:** |
|---|---|---|

**Application:**

This COVID-19 supplementary JHA is designed to meet the requirements of GeoEngineers' Field Safety During COVID-19 protocols and the COVID-19 Response Plan as well as the recommendations provided by the Centers for Disease Control and Prevention (CDC) and other applicable state or federal agencies.

**PPE/Supplies/Actions Equipment:** (select those applicable to this jobsite )

| **PPE** | **Supplies** | **Tools** | **Actions** |
|---|---|---|---|
| ☐ Eye Protection | ☐ Hand Washing Soap | ☐ Cell Phone/Satellite | ☐ Maximize Social Distance (≥6ft) |
| ☐ Gloves | ☐ Hand Washing Water Supply | ☐ Scanning Thermometer | ☐ Meeting Location Planning |
| ☐ Cloth Face Covering | ☐ Hand Sanitizer | ☐ Water Basin | ☐ Hand Washing |
| ☐ N95 Mask | ☐ Sanitizing Wipes | | ☐ High Touch Surface Sanitation |
| ☐ Disposable Coveralls | | | |

| **Job Steps** | **Potential Hazard** | **Critical Actions to Mitigate Hazard** |
|---|---|---|
| Mobilization to worksite | Transmission of COVID-19 Virus | ■ Pack hand sanitizer and wipes for use during all modes of business travel.<br>■ Assign hand sanitizer to vehicle when able.<br>■ Sanitize "high touch" areas: keys, steering wheels, dash controls, door handles, mirror adjustments, shifter, blinkers, head rests, etc.<br>■ Re-Fueling: Use sampling gloves or wash hands after using the pump at a gas station.<br>When possible, do this before you get back into the vehicle.<br>■ Intra-Site Transportation: Maintain social distancing on transport skiffs or multi- passenger ATVs. Request multiple trips if overcrowded. Keep your field PPE on during travel. |

| | | |
|---|---|---|
| Pre-work Safety Meetings | Transmission of COVID-19 Virus | ■ Review site maps, photos and routes prior to site arrival to anticipate present staffing or public density areas.<br>■ Conduct a tailgate safety meeting in location that can accommodate greater than 6 feet social distancing.<br>■ Keep group sizes as small as possible (≤ 10 people or smaller depending on individual state guidance).<br>■ Meeting attendance should be verbally announced and recorded by a single representative to avoid contact with shared supplies/ equipment/computers/work surfaces.<br>■ Use verbal greetings. Do not shake hands, hug, fist bump, or high five.<br>■ Wear face coverings if social distances cannot be maintained.<br>■ Use own supply of pens, notebooks and similar field supplies. |
| Site Operations | Transmission of COVID-19 Virus | ■ Maximize social distances to the greatest extent feasible.<br>■ If tasks or locations require sharing workspaces in proximity to others with less than 6 feet separation, wear a face covering.<br>■ Sanitize shared tools or equipment.<br>■ Use own vehicle as site office rather than shared spaces.<br>■ Wash ungloved hands after contacting shared surfaces.<br>■ Sanitize personal items regularly (cell phone, water bottle, clipboards, notebooks).<br>■ Set up exclusion zones surrounding public interface areas if less than 6 feet separation.<br>■ Wear face covering if traveling off site for lunch/coffee/supplies and recommended social distances cannot be maintained.<br>■ Leave job site if experiencing onset of COVID-19 symptoms. |
| Positive or Assumed Positive COVID-19 Result at Job Site | Transmission of COVID-19 Virus | ■ Contact your manager as soon as information is received of a positive or assumed positive result on the jobsite.<br>■ Determine if you have had close and prolonged personal proximity to the individual.<br>■ Based on proximity, you may be asked to remove yourself from the worksite.<br>■ Your manager will provide guidance for how to proceed safely following worksite withdrawal. |
| **Additional Comments:** | | |

# Daily JHA Record of Safety Meetings

Name of Attendees Date

Signature of Individual Verifying the Above Date

GeoEngineers