GeoEngineers

September 22, 2009

Oregon Department of Environmental Quality
Western Region Office
750 Front Street, Suite 120
Salem, Oregon 97301-1039

Attention: Mr. Jim Glass

Subject: Interim Removal Action Measure Work Plan
Senz Automotive Service
Yamhill, Oregon
File No. 2787-039-01

GeoEngineers, Inc. is pleased to present this work plan for an interim removal action measure at the Senz Automotive Service facility in Yamhill, Oregon. This work plan has been prepared for the Oregon Department of Environmental Quality (DEQ) under Task Order 58-08-16.

We appreciate the opportunity to be of service to the Oregon DEQ. If you have any questions or concerns, please do not hesitate to contact us.

Yours very truly,

GeoEngineers, Inc.

Chris Breemer, R.G.
Task Order Manager

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c: Steve Campbell, DEQ Headquarters; Katie Robertson, DEQ Eastern Region

Senz Automotive Service
Interim Removal Action Measure
Work Plan
File No. 2787-039-01

September 22, 2009

Prepared for:

Oregon Department of Environmental Quality
Western Region Office
750 Front St., Suite 120
Salem, OR 97301-1039

Attention: Mr. Jim Glass

Prepared by:

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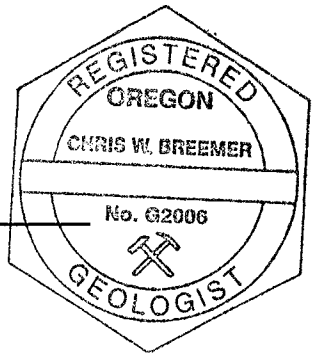

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YAMHILL, OREGON
TASK ORDER 58-08-16

1.0 INTRODUCTION AND PURPOSE

This work plan presents the scope and schedule for conducting an interim removal action measure (IRAM) at the Senz Automotive Service facility in Yamhill, Oregon. The IRAM will include removal of all or a portion of the service station building, excavation and removal of gasoline-contaminated soil, and restoration of excavated areas. The goal of the IRAM is to reduce current and future risks to human health associated with the gasoline-contaminated soil and groundwater. The location of the Senz Automotive Service facility (the subject property) is shown in Figure 1. The layout of the subject property is shown in Figure 2.

This work plan and the proposed IRAM are being funded by Oregon Department of Environmental Quality (DEQ) under a Leaking Underground Storage Tank (LUST) Corrective Action Cooperative Agreement with the U.S. Environmental Protection Agency using funding provided by the American Recovery and Reinvestment Act of 2009. GeoEngineers prepared this work plan for DEQ under Task Order 58-08-16 and in accordance with the Budget and Assumptions Proposal dated July 20, 2009.

1.1 SCOPE OF SERVICES

The scope of services described in this work plan includes the following general activities: 1) demolition of most or all of the service station building; 2) temporary re-location and re-setting an approximately 16,000-gallon compartmentalized gasoline/diesel above ground storage tank (AST); 3) excavation and off-site disposal of approximately 1,500 cubic yards of petroleum-contaminated soil (PCS); 4) backfilling the excavation; and 5) collection of confirmation soil samples to evaluate the magnitude and extent of residual contamination, if any, in the IRAM area. Each of the tasks is discussed in detail later in this work plan. GeoEngineers will manage the IRAM, supervise the field activities, collect representative soil and water samples, and document and report the IRAM. A subcontractor, working on behalf of GeoEngineers, will provide and operate all demolition, excavation, trucking, and construction equipment and personnel.

1.2 WORK PLAN ORGANIZATION

This work plan is organized into the following sections:

Section 2 – Background Summary. This section provides a description of the features and location of the subject property, a summary of historical land use; a description of local geology, hydrogeology and land use at and near the subject property; and a summary of previous environmental investigations conducted at the subject property.

Section 3 – Site Survey Activities. This section describes the scope and results of the following tasks that GeoEngineers completed to prepare for the IRAM: 1) hazardous building materials survey; 2) historical significance determination; and 3) sensitive species and habitat evaluation.

Section 4 – Work Plan Tasks. This section describes scope of the proposed IRAM, including: 1) pre-field activities; 2) AST removal; 3) building demolition; 4) contaminated soil removal and disposal; 5) analytical program and data management; 6) site restoration; and 7) reporting.

Section 5 – Reporting. This section provides an outline of the report that GeoEngineers will prepare after the IRAM is complete.

Section 6 – Limitations. This section presents GeoEngineers' standard limitations associated with conducting the services proposed herein.

Section 7 – References. This section provides a list of the source materials used to prepare this work plan.

Appendix A describes the sampling and analysis procedures for the project

Appendix B presents the health and safety plan (HASP) which was prepared for use by GeoEngineers' field personnel in accordance with Occupational Safety and Health Administration (OSHA) regulations and Title 29 of the Code of Federal Regulations (CFR) 1910.120 and 1926.

2.0 BACKGROUND SUMMARY

2.1 SITE LOCATION AND DESCRIPTION

The Senz Automotive Service facility consists of an approximately 30,800 square foot parcel at 210 South Maple Street in Yamhill, Oregon. The facility is in Yamhill County in the southeast quarter of the northwest quarter of Section 4, Township 3 South, Range 4 West, and Willamette Meridian. Contamination released from the facility has impacted properties to the west and south; however, the scope of the proposed IRAM is limited to the property at 210 South Maple Street (referred to as the "subject property"). Additional remedial activities may be completed in the future at impacted off-site areas.

The subject property is occupied by a service station building, a gasoline dispenser island, a diesel dispenser island, a propane AST and dispenser, and an AST used for storing gasoline and diesel. The east side of the subject property is paved with asphalt-concrete and the west side of the subject property is covered with crushed rock. The subject property slopes to the west and southwest.

The subject property is bounded by First Street on the north and Maple Street (Oregon Highway 47) on the east. A restaurant is located immediately adjacent to the south, a fire station is located immediately adjacent and southwest, and a vacant lot, used for storing fire department materials, is located adjacent to and west of the subject property. Residential properties are located further west and south of the subject property and other commercial facilities are located further north, east, and south of the subject property.

2.2 GEOLOGY AND HYDROGEOLOGY

The following sections describe geological and hydrogeological conditions at the site.

2.2.1 Geology

Soil beneath the subject property generally consists of brown silt with some clay between the surface and approximately 25 to 30 feet below ground surface (bgs). The brown silt and clay is underlain by greenish gray clay and silt at some areas between 30 and at least 34 feet bgs. The silt, sand, and clay that underlie the site are members of the Willamette Silt, according to information presented in Geologic Framework of the Willamette Lowland Aquifer System (USGS, 1998). The Willamette Silt is reportedly underlain by the Willamette Aquifer, a sand and gravel unit, the surface of which is reportedly within 40 to 80 feet of the ground surface.

2.2.2 Hydrogeology

Groundwater is typically encountered beneath the subject property at depths ranging between approximately 3 and 8 feet, based on monitoring well observations. During summer and fall, the season of the proposed IRAM, the depth to groundwater at the facility is in the range of 4 to 6 feet bgs. Groundwater generally flows toward the southwest, which is approximately parallel to the local topographic gradient.

The hydraulic conductivity of shallow soil at the site is relatively low, based on observations of the performance of the groundwater removal system at the site. Therefore, despite the presence of shallow groundwater, the amount of groundwater that will enter the proposed remedial excavation (discussed in Section 4.0) is anticipated to be relatively limited and should be manageable with the on-site groundwater treatment system.

2.3 SUBJECT PROPERTY HISTORY

The subject property has been used as a service station since at least the 1930s (Seminole, 1995a). Gasoline releases were reported at the subject property in 1988 and 2006. In both cases, the releases appear to have originated in the eastern portion of the subject property as a result of leaks from the gasoline piping systems.

Seminole Environmental, Inc. (1995b) removed five USTs from the subject property in July 1995. The decommissioned USTs included a 2,000-gallon gasoline UST, two 1,000-gallon gasoline USTs, one 1,000-gallon diesel UST, and one 500-gallon UST that may have stored white gas. The former UST locations and limits of the remedial excavation are shown in Figure 3.

Confirmation soil samples collected from the base and sidewalls of the tank removal excavation exhibited low to non-detectable concentrations of petroleum hydrocarbons, with the exception of one sample ("NW5W-05-3"), collected near the southeast corner of the service station building, that contained 11,250 milligrams per kilogram (mg/kg) total petroleum hydrocarbons.

The excavated contaminated soil was placed on 6-millimeter plastic sheeting at the west side of the subject property for aeration. Seminole collected samples of the aerated soil in September 1996 that demonstrated that elevated concentrations of petroleum hydrocarbons remained in soil at the northwest portion of the aeration area. In response, Seminole excavated and transported approximately 39.49 tons of soil that contained the highest petroleum concentrations to the Riverbend Landfill in McMinnville, Oregon.

The remaining aerated soil, which contained total petroleum hydrocarbons at concentrations between 260 and 680 mg/kg, was consolidated at the west side of the site and left in place. After consolidating the aerated soil, Seminole (1997) collected five closure samples from native soil beneath the removed plastic sheeting. Two of the closure samples exhibited concentrations of oil and grease (94 and 250 mg/kg) and three of the closure samples did not contain detectable concentrations of petroleum hydrocarbons.

Several phases of investigation were conducted at the subject property and surrounding area between 1988 and 2008 to evaluate the magnitude and extent of contamination in soil and groundwater (L.R. Squier Associates [LRSA], 1989; Seminole, 1997; CJE Consultants and Constructors [CJE], 1996; Landau, 2006; Tim O'Gara, R.G 2007a and 2007b; Xavier Environmental, 2007; and GeoEngineers, 2008 and 2009a).

Landau (2007) observed a fill port for a UST at the north side of the service station building in 2006, during emergency response operations related to the 2006 release. Landau collected a sample of product

from the fill port of the UST and confirmed that the UST contents consisted of waste oil. Mr. John Pitfido (2007), the property owner, excavated and removed the UST in January 2007 and determined that the UST was approximately 100 gallons in volume. Tim O'Gara, R.G. (2009) collected soil samples from locations near the UST excavation and submitted one sample, collected at approximately 4 feet bgs for laboratory analysis of chemicals of interest. The sample ("Waste Oil Tank 4ft") contained hydraulic oil (7,400 mg/kg) and kerosene (871 mg/kg). No analyses were apparently performed for other contaminants of interest (COI), including volatile organic compounds (VOCs), polycyclic aromatic compounds (PAHs), polychlorinated biphenyls (PCBs), or metals. The extent of contamination in the vicinity of the waste oil tank remains undefined.

The highest concentrations of gasoline and associated compounds have been detected along the alignment of a subsurface drain line that formerly discharged from the southwest corner of the service station building (Figure 3). Gasoline-range hydrocarbons and VOCs have also been detected at the fire station property, adjacent to a stormwater pipe to which the drain line discharged, and in the Second Street right-of-way south of the fire station. The locations of the former USTs and exploration locations are shown in Figure 3. The site history is described in more detail in *Site Investigation Work Plan, Yamhill Station, Yamhill, Oregon* (GeoEngineers, 2008).

3.0 SITE SURVEY ACTIVITIES

GeoEngineers completed three tasks to prepare for the IRAM: 1) a hazardous building materials (HBM) survey of the service station building; 2) a historic significance determination for the service station building; and 3) and evaluation for potential impacts of IRAM activities on sensitive species. DEQ consulted with the Confederated Tribes of the Grande Ronde, the Confederated Tribes of the Siletz, and the Oregon State Historic Preservation Office. Each of these tasks is described below.

3.1 HAZARDOUS BUILDING MATERIAL SURVEY

GeoEngineers conducted an HBM survey of the service station building in June 2009 to evaluate for the presence of asbestos-containing materials (ACM) and lead-based paint (LBP). ACM was not identified during the HBM survey. LBP was detected on the north, east, and south sides of the building. The results of the HBM survey were reported in *Hazardous Building Materials Survey, Senz Automotive Service, 210 South Maple Street, Yamhill, Oregon* (GeoEngineers, 2009b). The demolition subcontractor will take appropriate steps to mitigate risks associated with the LBP during the IRAM.

3.2 HISTORIC SIGNIFICANCE DETERMINATION

GeoEngineers conducted a historic building survey in June 2009 to evaluate if the service station building is eligible to be considered a "historic property" under National Register of Historic Places (NRHP) criteria. GeoEngineers concluded that the building is not eligible for listing on the NRHP. The historical building survey is described in detail in *Historic Survey of Senz Automotive Service, 210 South Maple Street, Yamhill, Oregon* (GeoEngineers, 2009c). The Oregon State Historic Preservation Office (SHPO) concurred with GeoEngineers' opinion in a letter dated July 15, 2009.

3.3 SENSITIVE SPECIES EVALUATION

GeoEngineers conducted a sensitive species evaluation in June and July 2009 to assess whether sensitive species or habitats would be impacted by the proposed IRAM. GeoEngineers concluded that no sensitive species or habitats are likely to be impacted by the proposed IRAM. The sensitive species evaluation is described in detail in *Draft Sensitive Species Evaluation, Senz Automotive Service, 210 South Maple Street, Yamhill, Oregon* (GeoEngineers, 2009d).

3.4 HISTORIC AND CULTURAL RESOURCE CONSULTATIONS

DEQ contacted SHPO, the Confederated Tribes of the Siletz, and the Confederated Tribes of the Grand Ronde regarding any potential impacts of the proposed IRAM to historic or cultural resources. SHPO responded that fieldwork could be performed with the following condition: if during project operations any cultural material were encountered, all operations would cease immediately and an archaeologist would be contacted to assess the discovery. The Confederated Tribes of the Grande Ronde reported that they would visit the site during the IRAM to inspect for historic or cultural resources.

4.0 WORK PLAN TASKS

The proposed IRAM will include the following general tasks: 1) pre-field activities; 2) AST removal and re-setting[1]; 3) building demolition; 4) contaminated soil removal and disposal; 5) analytical program and data management, 6) site restoration; and 7) reporting. A detailed description of the scope of services for each IRAM task is presented below.

4.1 PRE-FIELD ACTIVITIES

Several actions are necessary in order to prepare for the IRAM. The proposed pre-field activities are described below:

- GeoEngineers will prepare contractor bid specifications and complete procurement activities for a subcontractor to remove the AST and diesel dispenser island, demolish the building, excavate PCS, restore the site (not including the building), and dispose of contaminated soil.
- The selected demolition/excavation contractor will contact the Oregon Utility Notification Center and request identification of buried subsurface utilities. A private utility locate may also be arranged by the subcontractor if the subcontractor deems it necessary.
- GeoEngineers will coordinate and schedule all field activities with the subcontractors.

4.2 AST REMOVAL AND REPLACEMENT

A 16,000-gallon compartmentalized gasoline/diesel AST is located at the south side of the subject property, adjacent to the service station building. The AST is located on a concrete slab foundation that overlies PCS. A subcontractor will:1) remove and dispose/recycle all residual gasoline and diesel from the AST; 2) drain gasoline and diesel from AST piping; 3) disconnect the piping from the AST; 4) inert and remove the AST from the concrete slab; and 5) temporarily place the AST at an on-site location that is unlikely to interfere with subsequent remedial activities. Following PCS excavation and backfilling, the subcontractor will construct a new concrete slab and the AST will be re-set at its current location. The subcontractor will be required to develop and provide specifications for the construction of the new concrete slab.

The following activities, associated with AST re-location and reinstallation, are not included in the scope of the IRAM and will be conducted independently by Mr. John Pitfido or contractors acting on his behalf:

- Disconnecting and reconnecting all electrical service from the AST.
- Disconnecting and reconnecting the inventory monitoring system.

[1] Following the remedial excavation and backfilling, the AST will be placed on a new concrete foundation that will be constructed at the current location of the AST. A new AST will not be provided.

- Confirm that the AST and all associated systems are installed and functioning in accordance with all relevant rules and laws.
- Replacement of gasoline and diesel in the AST.

The proposed excavation and demolition activities may result in damage to aboveground and/or underground portions of the gasoline/diesel supply system, inventory monitoring system, and/or the electrical system. The property owner will be responsible for testing the entire AST-dispenser system following the IRAM and repairing or replacing equipment as necessary to ensure that the AST-dispenser system is constructed and operating in accordance with applicable regulations and guidance.

Mr. John Pitfido, or contractors acting on his behalf, will be additionally responsible for completing the following tasks prior to building demolition:

- Disconnecting all branch electrical circuits that will be impacted by the demolition activities.
- Removing all hazardous substances from the demolition area and properly storing or disposing of those substances
- Removing all materials, parts, and supplies from the demolition area.
- Salvaging any desired electrical fixtures or other building components.

4.3 BUILDING DEMOLITION

Most of the service station building will be demolished to allow access to PCS that underlies the building. The service station building consists of a single story concrete masonry block (CMB) building with concrete flooring. The western portion of the building, approximately 3,000 square feet, was historically used for automobile service and storage. This area is currently not occupied by a tenant and is mostly vacant. This area includes a small storage area and an employee bathroom, which will be demolished during the IRAM. The eastern portion of the building, approximately 260 square feet, is occupied by an office and a public restroom. The layout of the service station building, including probable and possible excavation areas, are shown on Figure 4.

The goal of the demolition activities is removal of the building, with the exception of the office and public restroom area, to provide access to contaminated soil underneath the building. The office and public restroom will be preserved, if possible, for re-use in the future. GeoEngineers anticipates that it will be possible to preserve the eastern portion of the building unless the demolition of the western portion of the building causes structural defects that require the demolition of the entire building.

A subcontractor will complete the following tasks for the building demolition:

- Obtain all permits necessary for the demolition activities, including a Public Works Permit (for working in the right-of-way north of the service station building).
- Install a temporary chain link fence on the north and east sides of the subject property and integrate the temporary fence into the existing fencing system to prevent unauthorized access to the subject property.
- Disconnect or deactivate all utilities from the building, including electrical, telephone, and water. The electrical service to the on-site water treatment system is separate from the building service and will likely remain intact throughout the IRAM.

- Attempt to avoid damage to the sanitary sewer pipe. If the sanitary sewer pipe is damaged during the IRAM exaction activities, cap the undamaged portions of the pipe. The pipe will be repaired, if necessary, as described in Section 4.6.
- Construct temporary shoring to support the west wall of the east portion of the building (office/public restroom area). Attempt to preserve the structural integrity of the office/public restroom area by detaching the western portion of the building from the eastern portion. The subcontractor will be responsible for providing an engineered design for shoring to support the west wall of the eastern portion of the building (office/restroom area). GeoEngineers anticipates that a small portion of the concrete slab in the west portion of the building will be left in place to support the shoring system.
- Install all necessary temporary erosion and sedimentation control measures prior to demolition, site clearing and earthwork.
- Cut the concrete slab west of the office/public restroom area to separate the west and east portions of the building.
- Demolish the western portion of the building and the underlying concrete slab and foundation. Attempt to salvage rafters, collar ties, posts, and beams. Stockpile the salvaged lumber on-site at a location unlikely to interfere with the remedial activities. The property owner will transport the lumber off-site for re-use. If lumber salvage is not feasible due to extensive connections with other building components, salvaging efforts will be terminated and the lumber will be disposed of off-site.
- Transport all non-salvaged demolition debris to appropriate disposal/recycling facilities.
- Provide a method(s) to control dust generated by all earthwork.
- Install temporary waterproofing measures and building security measures to protect the eastern portion of the building immediately following demolition of the western portion of the building. Maintain the waterproofing and security measures until security fencing is removed from the site.

If demolition activities result in the eastern portion of the building becoming structurally unsound, the contractor will also demolish that portion of the building. A determination regarding the need to demolish the eastern portion of the building will be made by GeoEngineers in coordination with the subcontractor, property owner and DEQ during the IRAM.

The property owner will be responsible for reconstruction and repairs to the western portion of the building, including all associated systems (electrical, plumbing, telephone, cable, etc). The property owner will be responsible for maintaining temporary waterproofing and security systems after the IRAM is complete.

4.3.1 Lead-Based Paint Management during Demolition

LBP is present on the north, east, and south sides of the service station building. The demolition subcontractor will be required to comply with DEQ, Oregon Construction Contractors Board (CCB), Oregon Department of Human Services (DHS), and OSHA requirements governing the abatement of lead hazards during demolition and the disposal of LBP.

The demolition contractor will specifically be required to comply with OSHA's lead standard for the construction industry, 1926.62, Subdivision 3/D, which requires employers to protect employees whose work could expose them to lead hazards. Requirements include an initial exposure assessment of the work area and a written compliance program.

The subcontractor will be required to confirm that the selected landfill accepts LBP in demolition debris.

4.4 PETROLEUM-CONTAMINATED SOIL REMOVAL AND DISPOSAL

The soil excavation activities will include removal of gasoline-contaminated soil at extensive areas of the site and waste oil-contaminated soil in the vicinity of the former waste oil UST. A GeoEngineers field representative will complete the following activities during soil excavation activities: 1) maintain a daily log of excavation activities; 2) record soil and groundwater conditions; 3) collect confirmation soil samples from the base and sidewalls of the excavation; and 4) prepare a scaled site plan showing excavation areas.

The following soil excavation and disposal activities will be performed by a GeoEngineers subcontractor.

1. Excavate apparently uncontaminated overburden soil and stockpile the overburden at a location unlikely to interfere with the remedial activities. GeoEngineers personnel will designate soil as apparently uncontaminated or contaminated, based on field screening observations.
2. Stockpile and/or direct-load PCS into trucks for transport to a licensed disposal facility.
3. Backfill excavated areas with clean imported fill and stockpiled uncontaminated overburden.

Each of the activities listed above are described in more detail below.

4.4.1 Target Cleanup Concentrations

The goal of the IRAM is to reduce current and future risks to human health associated with petroleum-contaminated soil and groundwater. The target soil cleanup levels for the remedial excavation will correspond to DEQ generic risk-based concentrations (RBCs) for occupational receptors, as summarized in Table 1.

It is appropriate to use RBCs for occupational receptors as target cleanup concentrations for the subject property because it is an active service station property and it is reasonably likely to be used for commercial purposes in the future. Target cleanup concentrations for areas south and west of the subject property may vary from the targets established for the subject property, based on current and future land use scenarios.

The target soil cleanup concentrations are intended to be protective of human health under the following exposure scenarios: 1) direct contact, ingestion and inhalation; 2) volatilization to outdoor air; and 3) vapor intrusion to indoor air. The proposed target cleanup concentrations are not considered protective of groundwater; however, leaching to groundwater does not appear to pose a current risk to human health because no drinking water wells have been identified within the locality of facility (GeoEngineers, 2008). Future risks associated with potential use of groundwater near the subject property may be addressed through the implementation of engineering and/or institutional controls.

4.4.2 Excavation Volume

GeoEngineers estimated the extent of petroleum-contaminated soil at the subject property that exceeds the target cleanup levels based on information collected during previous phases of investigation (Seminole Environmental, 1995b, Landau, 2006; and GeoEngineers, 2008). Previous assessment data and information provided by the current property owner indicate that approximately 5,600 square feet of soil in the interval between 2 and 8 feet bgs may contain petroleum hydrocarbons and associated constituents at concentrations exceeding the target cleanup levels. The excavation will probably include the areas in

the vicinity of the AST, the perforated pipe, and the waste oil UST, based on available information. The excavation may also include other portions of the site, including the area between the perforated pipe and the former waste oil UST, near the gasoline and diesel dispensers, areas west and south of the AST, and other areas. For planning purposes, GeoEngineers estimates that 1,500 cubic yards (in-ground volume) of soil will be removed during the IRAM. The probable and potential excavation areas are shown in Figure 4.

4.4.3 Excavation and Management of Presumed Clean Soils

The subcontractor will remove crushed rock from the ground surface prior to initiating remedial excavations. The subcontractor will stockpile the crushed rock in a location unlikely to interfere with the planned remedial activities. The surface crushed rock will be assumed non-contaminated unless field screening data indicates the presence of contaminants. If field screening suggests the presence of contaminants in stockpiled crushed rock, GeoEngineers will collect samples and submit the samples for laboratory analysis as described below.

The subcontractor will excavate apparently clean soil that overlies presumed contaminated soil. The subcontractor will segregate and stockpile apparently clean soil that does not exhibit field evidence of petroleum contamination. GeoEngineers will collect soil samples from the presumed clean soil stockpile(s) at the frequency listed in the following table to evaluate if the soil contains contaminants at concentrations that preclude re-use at the site:

Typical Number of Samples Needed to Adequately Characterize Stockpiled Soil

Cubic Yards of Soil	Minimum Number of Samples for Chemical Analysis
0-100	3
101-500	5
501-1000	7
1001-2000	10
>2000	10 + 1 for each additional 500 cubic yards

GeoEngineers will submit stockpile soil samples to an accredited analytical laboratory for analysis of gasoline-range hydrocarbons by Northwest Method NWTPH-Gx, and diesel- and oil-range hydrocarbons by Northwest Method NWTPH-Dx (with silica gel cleanup). Stockpile soil samples that exhibit concentrations of gasoline, diesel, or oil may be submitted for one or more of the following additional analyses: VOCs[2] by U.S. Environmental Protection Agency (EPA) Method 8260B, lead by EPA 6000 series methods, PAHs by EPA Method 8270C-SIM, PCBs by EPA Method 8082, and Resource Conservation and Recovery Act (RCRA)-8 metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver).

[2] VOC analyses for stockpiled soil removed from gasoline-contaminated areas of the site will be limited to the following gasoline-related compounds that are listed in Risk-Based Decision Making for the Remediation of Petroleum-Contaminated Sites (DEQ, 2003 and updated 2008): benzene, ethylbenzene, toluene, xylenes (BETX), naphthalene, 1,2-dibromoethane, 1,2-dichloroethane, methyl tert-butyl ether iso-propylbenzene, n-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene (the "RBDM VOCs"). VOC analyses performed on soil removed from the vicinity of the waste oil tank will include the standard laboratory list of 60+ compounds.

Laboratory analyses will be performed on a 24-hour turnaround time to minimize subcontractor standby time. If the analytical data indicate that the stockpiled soil does not contain COI or COI are present at concentrations less than DEQ's most stringent generic risk-based concentrations, the soil will be deemed suitable for backfill and placed in remedial excavations. If concentrations exceed screening levels, the soil will be designated contaminated and transported off-site for disposal.

It is difficult to estimate the volume of clean overburden soil that will be excavated and stockpiled. For planning purposes; however, GeoEngineers anticipates that the upper two feet of soil in the proposed excavation area shown on Figure 4, which is approximately 415 cubic yards (in-ground volume), will not be contaminated.

4.4.4 Excavation and Management of Contaminated Soil

Remedial excavations are planned at the two areas shown on Figure 4. These include a large area that underlies much of the footprint of the western portion of the building and a smaller area adjacent to and west of the gasoline dispenser island. The actual extent of excavation will be determined in the field, based on field screening data and laboratory analytical data. If contamination is continuous between the western and eastern excavations, they may be combined into a single excavation. If contamination is discontinuous, GeoEngineers will evaluate the need for remediation near the gasoline dispenser island by completing a test pit in that area (see Section 4.4.9 for a test pit discussion).

The subcontractor will excavate soil using standard earth-moving equipment such as a trackhoe and front loader. The subcontractor will excavate petroleum contaminated soil as follows:

- Excavations will be initiated at the south side of the service station building, in the vicinity of historical explorations in which contamination has been documented.
- GeoEngineers personnel will identify contaminated soil based on field screening methods.
- The subcontractor will excavate contaminated soil and either: 1) direct-load contaminated soil into trucks for transport to an appropriate disposal facility, or 2) stockpile contaminated soil in a location(s) unlikely to interfere with the remedial activities.
- Stockpiled soil will be placed on: 1) a double layer of plastic, 2) soil designated as contaminated (and scheduled for excavation), and/or 3) asphalt concrete. Stockpile locations will be designated prior to the remedial activities by the subcontractor in coordination with GeoEngineers. Stockpiled soil will be bermed and covered to prevent erosion through wind or rainfall run-on and run-off.
- The subcontractor will load stockpiled contaminated soil into trucks for transport to an appropriate disposal facility.
- The subcontractor will complete all excavations in a manner that will minimize groundwater accumulation.
- The horizontal and vertical extent of the excavations will be determined based on laboratory analytical data for samples collected by GeoEngineers personnel at the base and sidewalls of the excavations. The subcontractor will assist GeoEngineers personnel to collect samples, using excavation equipment.
- GeoEngineers will collect confirmation soil samples from selected areas of the excavations when field screening data indicate that the soil at the excavation limits may have met target cleanup goals. GeoEngineers will submit the confirmation samples (discussed in further detail in Section 4.5) for 24-hour laboratory analysis of COI. Upon receipt of the laboratory analytical data,

GeoEngineers will direct the subcontractor to remove additional soil, if necessary to meet cleanup goals, or terminate excavation in the sampled area if the data indicate compliance with the cleanup goals.

- The subcontractor may work at other portions of the site pending receipt of confirmation sample analytical data.
- It is likely that the remedial excavation will intersect the groundwater removal trench system at the west side of the site (see Figure 4). The subcontractor will take measures to avoid introducing soil and sediment to the removal system piping. If portions of the trench system are excavated during the IRAM, the subcontractor will remove the 4-inch-diameter perforated pipe from the ground in the affected areas. The subcontractor will cap the remaining portion(s) of the pipe to prevent the introduction of soil and sediment to the removal system.
- GeoEngineers does not anticipate that the remedial excavation area will include the northwest portion of the site where the groundwater treatment system is currently located. Therefore, it should be unnecessary to move the treatment system.

4.4.5 Loading and Transportation of Excavated PCS

A GeoEngineers field representative will oversee all PCS loading activities. The subcontractor will load and transport the PCS in a manner that does not permit spillage of soil, dispersion while traveling on the highway, or leakage of any free liquids. The subcontractor will be responsible for ensuring that all trucks used for transport of PCS are operated in accordance with Oregon Department of Transportation (ODOT) regulations.

4.4.6 Treatment/Disposal Facility Acceptability

GeoEngineers will supply the subcontractor with soil chemical data collected during previous investigation activities. These data may be sufficient for profiling the gasoline-contaminated soil for acceptance at an appropriate treatment/disposal facility. GeoEngineers will collect a sample of gasoline-contaminated soil on the first day of excavation activities and submit the sample for 24-hour laboratory analysis of gasoline-range hydrocarbons by Northwest Method NWTPH-Gx, diesel- and oil-range hydrocarbons by Northwest Method NWTPH-Dx, VOCs by EPA Method 8260B, and lead by EPA Method 6010 or 6020 if requested by the subcontractor and if necessary for soil profiling. The laboratory data will be provided to the subcontractor.

A separate disposal permit will be required for waste oil-contaminated soil. During the first day that waste oil-contaminated soil is encountered, GeoEngineers will collect and submit a soil sample for 24-hour analysis of gasoline-range hydrocarbons by Northwest Method NWTPH-Gx, diesel- and oil-range hydrocarbons by Northwest Method NWTPH-Dx (with silica gel cleanup), VOCs by EPA Method 8260B, PAHs by EPA Method 8270C-SIM, PCBs by EPA Method 8082, and RCRA-8 metals by EPA 6000/7000 series methods. The data will be provided to the subcontractor to prepare a waste profile.

The subcontractor will stockpile soil, if necessary, pending receipt of laboratory analytical data for waste profiling purposes and pending receipt of disposal permits from the receiving facilities.

4.4.7 Groundwater Management

Groundwater intrusion to excavations is anticipated to be limited, assuming the excavation activities are completed prior to onset of the rainy season (typically October – May). If groundwater is encountered in the excavations, the groundwater will be assumed to be contaminated. If groundwater enters the excavations and it is necessary to remove the groundwater, it will be managed as follows:

- The subcontractor will pump groundwater and free product (if any) from the excavations to a temporary 2,000 to 4,000-gallon storage tank that the subcontractor will install adjacent to the existing water treatment system.
- The subcontractor will provide and install all hoses, connections, pumps, fittings, and electrical systems to safely transfer the fluids from the temporary storage tank to the water treatment system. The subcontractor may use the electrical service that energizes the water treatment system to transfer fluids from the temporary AST to the system.
- GeoEngineers will operate the existing treatment system to treat fluids that are provided to the system by the subcontractor.
- GeoEngineers will collect a sample from the first treated effluent that discharges from the treatment system (the "initial sample") and submit the sample for 24-hour analysis of constituents of interest (gasoline-, diesel-, and oil-range hydrocarbons; benzene, ethylbenzene, toluene, and xylenes [BETX]; and lead). No water will be discharged from the treatment system to the municipal storm sewer prior to receipt of analytical data for the initial sample collected from the effluent.
- If data from the initial sample indicate that the system is effectively treating the water, GeoEngineers will operate the treatment system to discharge effluent directly to the municipal stormwater system in accordance with the existing National Pollution Discharge Elimination System (NPDES) 1500-A permit for the site and with the authorization of the City of Yamhill.
- GeoEngineers will collect effluent samples on a daily basis from the treatment system throughout the duration of the IRAM. All of the effluent samples will be submitted for 24-hour analyses of the compounds listed above.
- GeoEngineers will prepare and submit appropriate NPDES discharge monitoring reports to DEQ.
- If the treatment system fails to treat water to meet discharge benchmarks, the water will be stored in the temporary tank pending modifications to the treatment system or pending transport to an off-site treatment facility. GeoEngineers will coordinate with DEQ to select an appropriate alternative treatment method if the existing on-site treatment system is ineffective.

4.4.8 Protection of Groundwater Monitoring Wells

Three groundwater monitoring wells are located in the vicinity of the proposed excavation area. All monitoring wells will be marked with orange paint prior to excavation activities. The subcontractor will attempt to avoid damage to the monitoring wells; however, it is possible that one or more wells will be destroyed. If well(s) are destroyed, the subcontractor will over-excavate the well to remove as much of the well casing and other well materials as possible. GeoEngineers will submit a letter to the Oregon Water Resources Department documenting which well(s), if any, are destroyed. GeoEngineers will coordinate with DEQ following completion of the IRAM to determine if destroyed wells (if any) should be replaced.

4.4.9 Test Pit Explorations

The subcontractor will excavate as many as six test pits, at the direction of GeoEngineers, to obtain additional information regarding the magnitude and extent of contamination at the subject property. The test pits will be excavated using a backhoe or trackhoe to a maximum depth of ten feet bgs. Visibly contaminated soil that is removed from test pits will be managed as described in Section 4.4.4 and 4.4.5. Apparently clean soil that is removed from test pits will be managed as described in Section 4.4.3. Test pits will be backfilled as described in Section 4.6.

GeoEngineers will collect one to two soil samples from each test pit and submit the samples for laboratory analysis of gasoline-range hydrocarbons by Northwest Method NWTPH-Gx and/or diesel- and oil-range hydrocarbons by Northwest Method NWTPH-Dx. A subset of test pit samples (approximately 20 percent) that exhibit concentrations of gasoline-range hydrocarbons will be submitted for additional analysis of RBDM VOCs using EPA Method 8260B and lead using EPA Method 6010 or 6020. A subset of test pit samples (approximately 20 percent) that exhibit concentrations of diesel- and/or oil-range hydrocarbons will be submitted for analysis of VOCs using EPA Method 8260B, PAHs using EPA Method 8270C-SIM, PCBs using EPA Method 8082, and leachable metals (cadmium, chromium, and lead) using EPA Method 1311/6020.

4.4.10 Historical and Cultural Resources

If any historical or cultural materials are encountered during excavation activities, all operations will cease immediately and an archaeologist will be contacted to assess the discovery.

4.5 CONFIRMATION SAMPLING AND ANALYTICAL PROGRAM

GeoEngineers will collect confirmation soil samples from the boundaries of the remedial excavation and submit the samples to a subcontracted chemical analytical laboratory to evaluate the concentrations of COI in residual soil. Samples will be collected at the interface between contaminated soil that apparently contains contamination at concentrations exceeding the cleanup goals and soil that exhibits little to no field evidence of contamination. If confirmation samples indicate that residual soil contains unacceptable concentrations of contaminants, additional contaminated soil will be removed and residual soil will be re-sampled and analyzed for COI.

GeoEngineers will use photoionization detector (PID) data and visual observations as the primary methods for estimating when residual soil meets cleanup goals. Elevated PID readings, sheen, and/or the presence of free product in soil will be considered sufficient data to designate soil as contaminated.

PID data are site-, chemical-, and soil-specific and are not sufficient to demonstrate compliance with cleanup goals. GeoEngineers will attempt to establish a correlation between PID and contaminant concentrations in site soil to improve the value of PID data for screening purposes. GeoEngineers will collect four soil samples that exhibit a range of contamination during the first day of excavations. GeoEngineers will measure the concentrations of VOCs in the samples using a PID and submit portions of the samples to a laboratory for 24-hour analysis of gasoline-range hydrocarbons and RBCA VOCs. GeoEngineers will evaluate whether the laboratory data and PID data significantly correlate. If there is significant correlation, GeoEngineers will rely on the PID data, and confirmation lab data to establish the boundaries of the remedial excavation. Field screening procedures that GeoEngineers will use to identify contaminated soil in the field are described in detail in Appendix A.

All field sampling and laboratory analytical testing will be completed in accordance with DEQ's "*Quality Assurance Project Plan*" (QAPP) for the DEQ underground Storage Tank (UST) Program dated January 2002. Key aspects of the QAPP are included in the sampling and analysis plan (Appendix A).

4.5.1 Confirmation Samples At Remedial Excavations

Confirmation soil samples will be collected at the following frequency: 1) at least one sample for every 625 square feet of excavation base; and 2) at least one sample for every 25 linear feet of sidewall that exceeds 2 feet in height. Additional samples will be collected if preferential pathways or other anomalous areas of contamination are identified. The frequency of sampling intervals may be altered in coordination with DEQ.

Confirmation soil samples will be submitted for analysis of gasoline-range hydrocarbons using Northwest method NWTPH-Gx. Approximately 20 percent of the samples that exhibit concentrations of gasoline-range hydrocarbons will be submitted for analysis of RBDM VOCs using EPA Method 8260B and lead using EPA Method 6010 or 6020. Confirmation samples collected in the vicinity of the former waste oil UST will also be analyzed for diesel- and oil-range hydrocarbons. A subset of samples that exhibit diesel- and/or oil-range hydrocarbons will also be analyzed for VOCs using EPA Method 8260B, PAHs using EPA Method 8270C-SIM, PCBs using EPA Method 8082, and leachable metals (cadmium, chromium, and lead) using EPA Method 1311/6020.

4.5.2 Confirmation Samples at Dispenser Island

If the diesel and/or gasoline dispenser islands are removed during the IRAM, confirmation samples will be collected in the vicinity of the dispenser island in accordance with the DEQ guidelines presented in OAR 340-122-0340. GeoEngineers will collect: 1) a minimum of two soil samples beneath each removed dispenser island; and 2) samples at 20-linear-foot intervals below product piping that is removed during the IRAM.

Samples collected beneath dispenser islands and product piping will be submitted for laboratory analysis of gasoline-, diesel-, and oil-range hydrocarbons by Northwest Methods NWTPH-Gx and NWTPH-Dx, respectively. A subset of dispenser island samples that exhibit gasoline-, diesel- and/or oil-range hydrocarbons will also be analyzed for VOCs using EPA Method 8260B, PAHs using EPA Method 8270C-SIM, PCBs using EPA Method 8082, and/or leachable metals (cadmium, chromium, and lead) using EPA Method 1311/6020.

4.5.3 Groundwater Sampling In Excavations

GeoEngineers will not collect groundwater samples from the excavation if groundwater is encountered because groundwater conditions at the site have been assessed using the groundwater monitoring well network and through sampling from temporary direct-push explorations.

4.5.4 Data Quality Objectives

Consistent with EPA and DEQ risk assessment methodology, the quality assurance goal will be to generate analytical data that are sufficient for risk assessment purposes and capable of calculating risk below the 1×10^{-6} risk level. The laboratory method reporting limit (MRL) goals for the project will correspond to the most stringent generic RBCs for residential exposure scenarios.

4.5.5 Data Management

Upon receipt of the final laboratory data, a data quality review will be completed for all data, and the data will be entered into a comprehensive analytical database. The dataset will be organized in a manner that will facilitate risk screening and statistical manipulation, and allow it to be exported to other data platforms if requested by DEQ.

4.6 SITE RESTORATION

The subject property will be restored when sufficient contaminated soil has been removed to meet cleanup targets or at the direction of DEQ. The subcontractor will perform the following restoration activities:

- Backfill excavations using clean imported fill and non-contaminated overburden. Imported fill shall consist of pit run and ¾-inch minus surfacing rock or other material approved by

GeoEngineers. The subcontractor will submit specifications for all backfill material for GeoEngineers for approval prior to placement of backfill.

- The subcontractor will place backfill in the excavations in the following order: 1) place 12 to 18-inches of pit run at the base of excavations that terminate in wet or moist soil, 2) place a maximum of two feet of stockpiled overburden soil, if available, (in 12-inch lifts) above the pit run, 3) place pit run and/or ¾-inch minus crushed rock to within 6 inches of the final grade, and 4) place a minimum 6-inch layer of ¾-inch minus surfacing rock over all excavation areas.
- Compact the backfill material to ensure that the fill material is compacted to greater than or equal to 92 percent of the maximum dry density as determined by ASTM Test Method D 1557, below three feet bgs. Compact backfill between the surface and three feet bgs to greater than or equal to 95 percent of the maximum dry density, as determined by ASTM Test Method D 1557. GeoEngineers' will conduct compaction testing. The subcontractor will be responsible for providing Proctors for the imported backfill material. GeoEngineers will provide a proctor for stockpiled clean overburden.
- If it is not possible to achieve the compaction specifications with the non-contaminated overburden, the subcontractor will transport the overburden off-site for disposal or re-use at an appropriate facility.
- Backfill test pits using pit run and crushed rock. Compaction testing will not be conducted at location of test pits.
- Spread stockpiled crushed rock (removed during the initial stage of remediation – see Section 4.4.3) over the excavation area. Grade work areas to form a continuous smooth surface with surrounding areas unaffected by the remedial activities.
- Clean dust, soil, and debris from paved areas of the subject property and adjacent streets that are affected by the remedial activities.
- Reconnect electric, telephone, sanitary sewer, and water services to the remaining portion of the building. Restore electrical service to the existing meter. The building electrical system will not be energized. A licensed electrician, working on behalf of the property owner, at the owner's expense, will be responsible for energizing the building after the IRAM is complete. Neither GeoEngineers nor our subcontractor will provide any services related to the repair or replacement of systems necessary specifically for the operation of the AST, including, but not limited to, electrical, inventory control, or gasoline/diesel storage or transfer. Neither GeoEngineers nor our subcontractor will perform any services related to rebuilding or repairing utilities at or inside of the building, other than connecting services to the building. The property owner will be responsible, at owner's expense, for obtaining all permits and performing all work required to repair and reconstruct the building and utility systems, other than those services explicitly listed herein.
- Remove all of the subcontractor's equipment and all debris from the subject property (not including salvaged wood). The existing groundwater removal and treatment system will be left in place.
- Temporary shoring, installed to support the west wall of the east portion of the structure (office/bathroom), will be left in place for future removal by the property owner.

5.0 REPORTING

GeoEngineers will prepare an IRAM report after completing the field activities and receiving the laboratory analytical data. The IRAM report will include a summary of the field activities, building

demolition activities, PCS removal and disposal, scale weigh tickets, analytical data, a comparison of chemical analytical data to applicable DEQ risk-based screening criteria, and recommendations for future work, if necessary.

We anticipate that the report will be approximately 15 pages, excluding attachments, tables, and figures. The report will initially be prepared in draft form, allowing revisions by DEQ, if necessary. Upon receipt of comments on the draft report, we will issue the report in its final form. The IRAM report outline is as follows:

- Introduction and Background
- Purpose, Objectives and Scope of Work
- Subsurface Conditions
- Building Demolition
- PCS Removal
- Sampling Results
  - Methodology
  - Chemical Analytical
  - Nature and Extent of Contamination
- Risk Screening
- Summary, Conclusions and Recommendations

The report will also include appendices that present the following material:

- Field Procedures
- Laboratory Analytical Reports and Quality Assurance (QA) Summary

6.0 LIMITATIONS

We have prepared this plan for use by the DEQ, their authorized agents and regulatory agencies. This plan is not intended for use by others, and the information contained herein is not applicable to other sites.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted environmental science practices in this area at the time this report was prepared. No warranty or other conditions express or implied should be understood.

Any electronic form, facsimile or hard copy of the original document (email, text, table, and/or figure), if provided, and any attachments are only a copy of the original document. The original document is stored by GeoEngineers, Incorporated.

7.0 REFERENCES

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TABLE 1
INTERIM REMOVAL ACTION MEASURE TARGET CLEANUP CONCENTRATIONS
TASK ORDER NO. 58-08-16
SENZ AUTOMOTIVE SERVICE
YAMHILL, OREGON

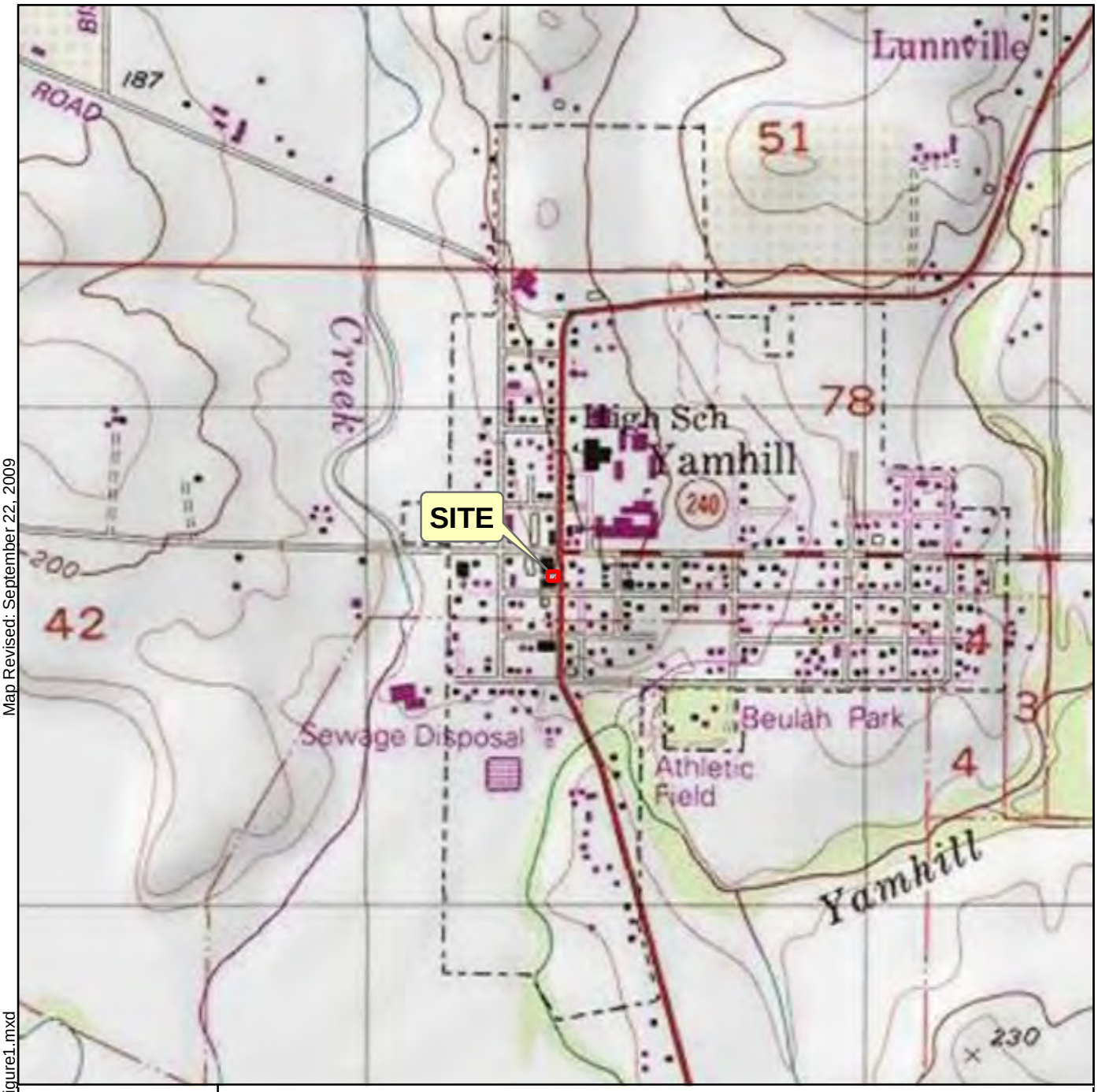
Compound	Target Cleanup Concentration[1]	Generic Risk-Based Concentrations for Soil (mg/kg)				
		Soil Ingestion, Dermal Contact, and Inhalation			Volatilization to Outdoor Air	Vapor Intrusion into Buildings
		Occupational	Construction Worker	Excavation Worker	Occupational	Occupational
Petroleum Mixtures (Northwest Methods NWTPH-Gx and NWTPH-Dx)						
Gasoline-Range Hydrocarbons	13,000	22,000	13,000	NE	80,000	NE
Diesel-Range Hydrocarbons	23,000	70,000	23,000	NE	NE	NE
Volatile Organic Compounds (EPA Method 8260B)						
Benzene	1.2	34	340	9,400	48	1.2
EDB (1,2-dibromoethane)	0.14	0.68	8.1	230	0.65	0.14
EDC (1,2-dichloroethane)	0.56	15	180	5,000	14	0.56
MTBE (methyl t-butyl ether)	70	1,000	10,000	NE	1,400	70
Naphthalene	22	22	540	15,000	26	93
Propylbenzene, iso-	24,000	51,000	24,000	NE	NE	NE
Propylbenzene, n-	2,300	4,900	2,300	65,000	NE	NE
Toluene	24,000	77,000	24,000	NE	NE	NE
Trimethylbenzene, 1,2,4-	790	1,500	1,400	40,000	790	840
Trimethylbenzene, 1,3,5-	140	1,500	1,400	40,000	NE	140
Xylenes	19,000	24,000	19,000	NE	NE	NE
Metals (EPA Method 6010/6020)						
Lead	800	800	800	800	NE	NE
Polycyclic Aromatic Hydrocarbons (EPA Method 8270C-SIM)						
Acenaphthene	16,000	41,000	16,000	NE	NE	NE
Acrylonitrile	0.89	3.6	35	970	5.5	0.89
Anthracene	90,000	NE	90,000	NE	NE	NE
Benz[a]anthracene	2.7	2.7	21	590	NE	NE
Benzo[a]pyrene	0.27	0.27	2.1	59	NE	NE
Benzo[b]fluoranthene	2.7	2.7	21	590	NE	NE
Benzo[k]fluoranthene	27	27	210	5,900	NE	NE
Dibenz[a,h]anthracene	0.27	0.27	2.1	59	NE	NE
Fluoranthene	8,900	29,000	8,900	NE	NE	NE
Fluorene	12,000	35,000	12,000	NE	NE	NE
Indeno[1,2,3-cd]pyrene	2.7	2.7	21	590	NE	NE
Naphthalene	22	22	540	15,000	26	93
Polychlorinated biphenyls (PCBs)	0.98	0.98	7.6	210	NE	NE
Pyrene	6,700	21,000	6,700	NE	NE	NE
Halogenated Volatile Organic Compounds (EPA Method 8260B)						
Dichloroethene, 1,1-	640	26,000	12,000	NE	NE	640
Dichloroethene, cis-1,2-	110	4,900	2,300	65,000	NE	110
Dichloroethene, trans-1,2-	190	8,900	4,500	NE	NE	190
Trichloroethane, 1,1,1-	8,500	27,000	8,500	NE	NE	NE
Trichloroethene	0.094	3.4	41	1,100	3.3	0.094
Tetrachloroethene (PCE)	1.5	5.1	40	1,100	62	1.5
Trichloroethene	0.094	3.4	41	1,100	3.3	0.094
Vinyl chloride	2	3.9	30	830	85	2.1
Polychlorinated Biphenyls (EPA Method 8082)						
Polychlorinated biphenyls	0.98	0.98	7.6	210	NE	NE

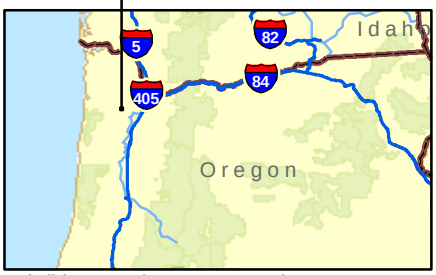
Notes:

[1]The target cleanup concentration is the minimum of the listed generic risk-based concentrations.

NE = Not established

mg/kg = milligrams per kilogram





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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. can not 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.
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US Topographic Map from National Geographic Services
(March 2008 - ArcWeb Extension)
ESRI Data & Maps, Street Maps 2008
Transverse Mercator, Zone 10 N North, North American Datum 1983
North arrow oriented to grid north

Vicinity Map

210 South Maple Street
Yamhill, Oregon

GeoEngineers

Figure 1

Map Revised: September 22, 2009

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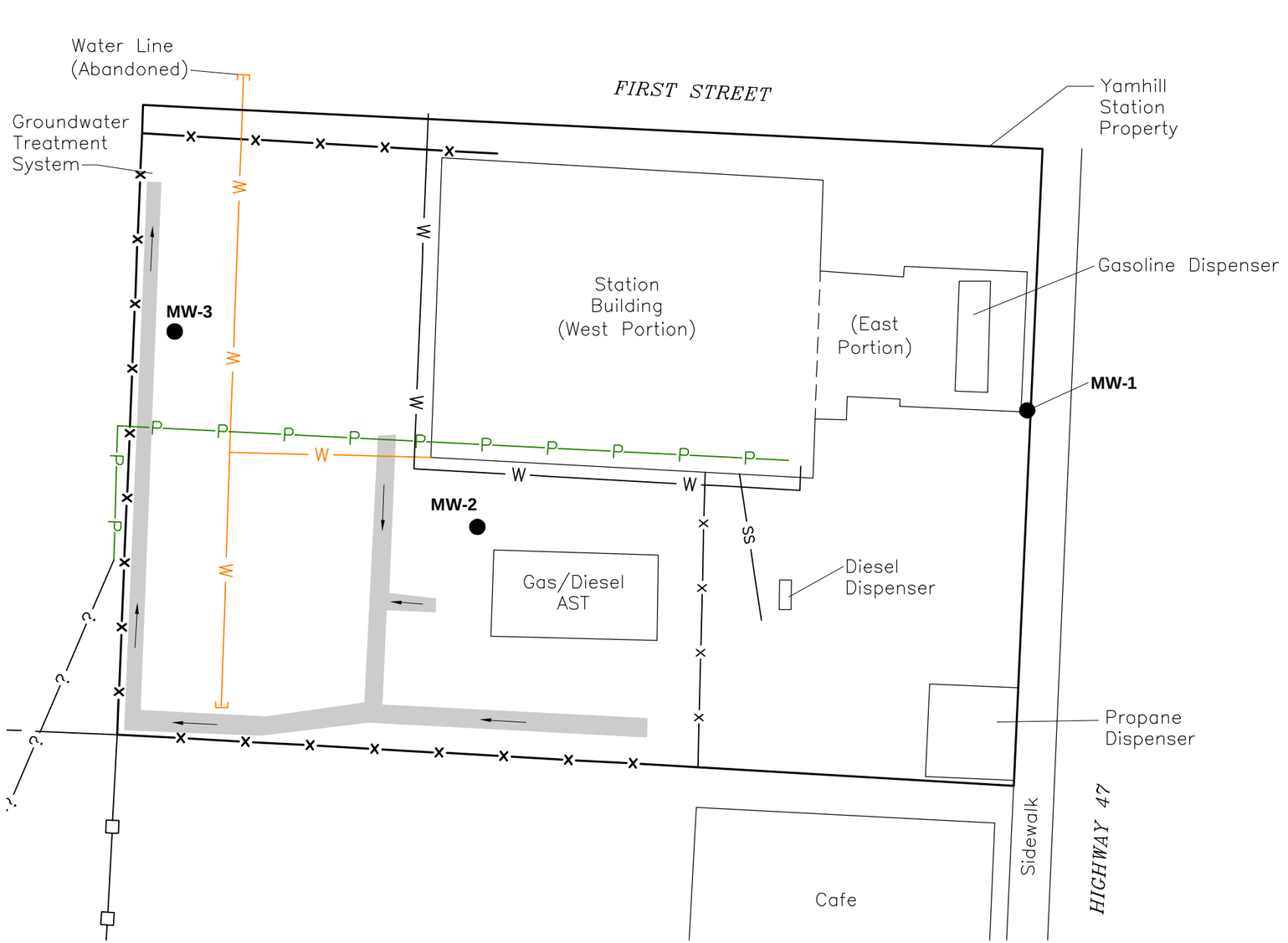

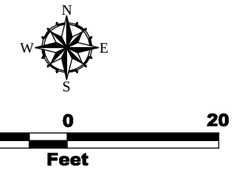

Legend

- MW-1 ● Monitoring Well
- Remediation Trench (with Flow Direction)
- SS Sanitary Sewer
- W Water Supply
- W Abandoned Water Line
- P P P Perforated/Clay Pipe Partially (Removed)
- Property Boundary
- ? ? Possible Location of Stormwater Pipe

Notes:
1. The locations of all features shown are approximate.
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Reference: Base drawing was a sketch provided by GeoEngineers field staff.

Site Layout

Yamhill Station Site Investigation
Yamhill, Oregon

GeoEngineers

Figure 2

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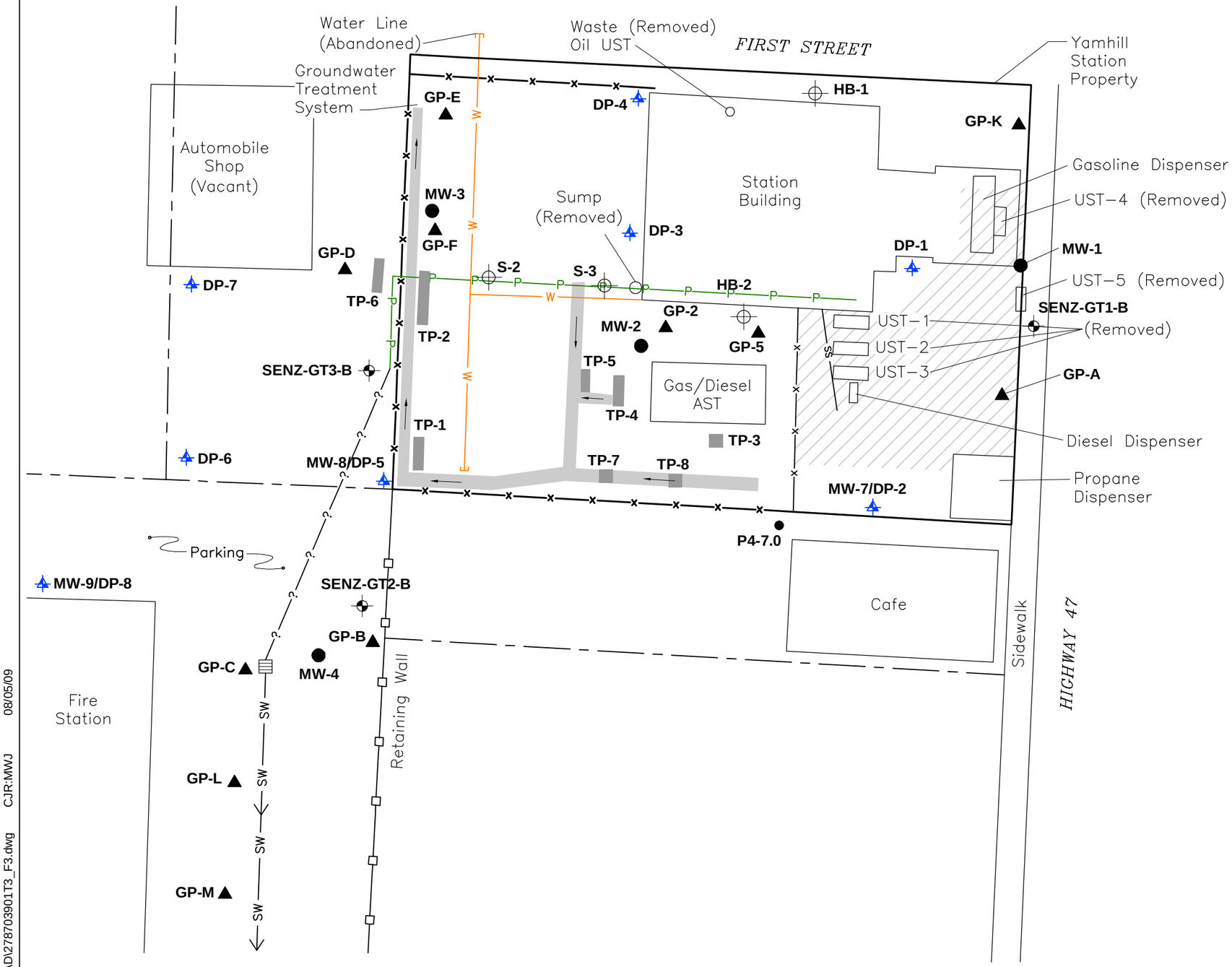

Legend

- Direct-Push Exploration (CJE, 1996)
- DP-1 — Direct-Push Exploration (GeoEngineers, 2008)
- MW-1 — Monitoring Well
- GP-A — Direct-Push Exploration (Tim O'Gara, 2007)
- S-3 — Soil Sample
- Catch Basin
- Test Pit Location
- Remediation Trench (with Flow Direction)
- 1995 Remedial Excavation Area
- SW — Storm Sewer
- SS — Sanitary Sewer
- W — Water Supply
- W — Abandoned Water Line
- P — Perforated/Clay Pipe (Removed)
- Property Boundary
- ? — Possible Location of Stormwater Pipe

Notes:
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Reference: Base drawing was a sketch provided by GeoEngineers field staff.

Site Layout with Exploration Locations

Yamhill Station Site Investigation
Yamhill, Oregon

GeoEngineers

Figure 3

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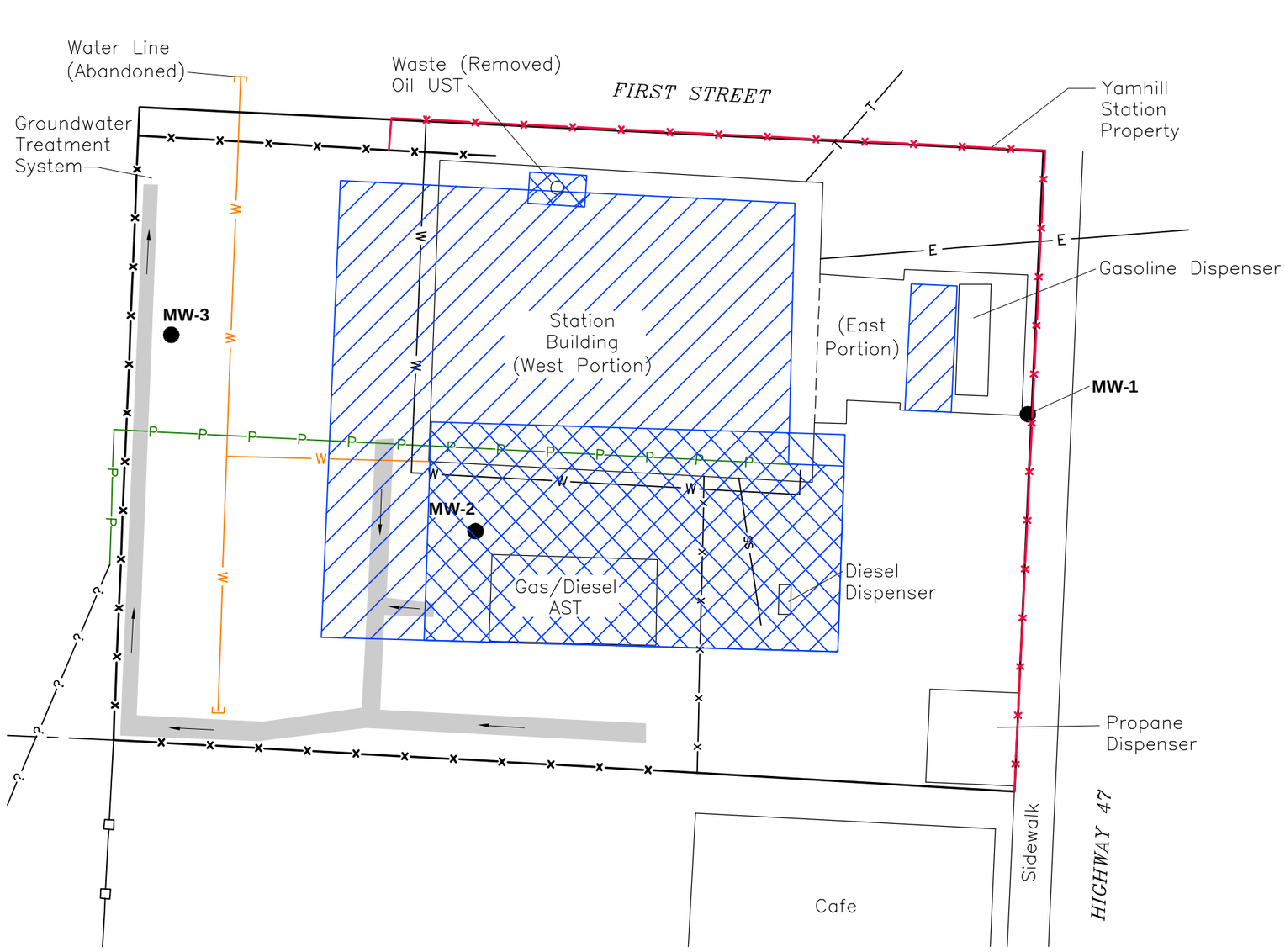

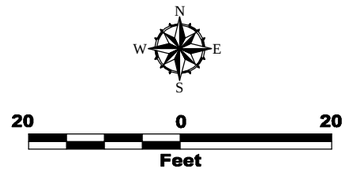

Legend:

- MW-1 ● Monitoring Well
- Remediation Trench (with Flow Direction)
- W Water Supply
- W Abandoned Water Line
- P P Perforated/Clay Pipe (Removed)
- Property Boundary
- ? ? Possible Location of Stormwater Pipe
- Temporary Fence
- E Electric (Overhead)
- T T Telephone (Overhead)
- Probable Excavation Area
- Possible Excavation Area

Notes:
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Reference: Base drawing was a sketch provided by GeoEngineers field staff.

Site Layout with Assumed Excavation

Yamhill Station Site Investigation
Yamhill, Oregon

GeoEngineers

Figure 4

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APPENDIX A

SAMPLING AND ANALYSIS PLAN

GENERAL

This SAP describes the field procedures, field quality assurance/quality control (QA/QC) protocol, and the chemical testing program to be implemented during the IRAM. The field activities will include the following activities:

- Collection of soil samples from open excavations.
- Collection of soil samples from stockpiles.
- Field screening soil samples.
- Decontamination procedures.

Laboratory methods proposed for the project and QA/QC procedures are also discussed in this appendix.

COLLECTION OF SOIL SAMPLES FROM OPEN EXCAVATIONS

GeoEngineers will collect soil samples at the interface between visibly contaminated soil and apparently uncontaminated soil. Confirmation soil samples will be collected at the following frequency: 1) at least one sample for every 625 square feet of excavation base; and 2) at least one sample for every 25 linear feet of sidewall that exceeds 2 feet in height.

Soil samples will be field-screened for the presence of petroleum hydrocarbons using visual, headspace vapor, and sheen testing methods. Field screening methods are discussed later in this SAP. Field screening procedures that GeoEngineers will use to identify contaminated soil in the field are described in detail in Appendix A.

If confirmation samples indicate that residual soil contains unacceptable concentrations of gasoline or associated compounds, 6 to 12 inches of additional contaminated soil will be removed and residual soil will be re-sampled and analyzed for COI.

GeoEngineers will collect soil samples from excavation base and sidewall areas from within the excavation if the excavation can be entered safely. GeoEngineers will collect soil samples from the excavation using the excavator bucket if the excavation cannot be entered safely. GeoEngineers will collect soil samples with a clean, stainless steel trowel or new nitrile gloves and the samples will be transferred directly into labeled, laboratory-prepared sample jars.

Samples will be placed in a cooler with ice and delivered to the analytical laboratory within laboratory-specified holding times. Standard chain-of-custody procedures will be observed during transport of the samples to the laboratory.

COLLECTION OF SOIL SAMPLES FROM STOCKPILES

GeoEngineers will collect composite samples from stockpiled soil that is presumed clean for chemical analysis. Stockpile soil samples will be collected at the frequency outlined in Section 4.4.4. Each stockpile soil sample will consist of one 4-point composite sample. A stainless steel trowel will be used to penetrate at least 1 foot into the stockpile. Sub-samples for non-volatile analysis will be transferred

into a stainless steel bowl for compositing. For volatiles analysis, subsamples will be placed directly into the glass jar, leaving no headspace, without mixing.

FIELD SCREENING SOIL SAMPLES

GeoEngineers will perform field screening tests on selected soil samples obtained from the explorations. Field screening results will be used to aid in the selection of soil samples for chemical analysis. Screening methods will include: 1) visual examination; 2) water sheen screening and 3) headspace vapor screening using a PID. The PID will be calibrated daily, and a calibration log will be maintained for the full duration of the field projects.

Visual screening consists of inspecting the soil for discoloration indicative of the presence of petroleum 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 may produce a slight sheen;
- Moderate Sheen (MS) — Light to heavy sheen; may 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 may be covered with sheen.

Headspace vapor screening involves placing a soil sample in a plastic bag. Air is captured in the bag, and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted into the bag, and the PID measures VOC vapor concentrations in parts per million (ppm). The MiniRAE PID is calibrated to isobutylene. The PID is designed to quantify VOC vapor concentrations in the range between 10 ppm and 2,000 ppm with an accuracy of approximately 10 percent of the reading and between 2,000 ppm and 10,000 ppm with an accuracy of approximately 20 percent of the reading.

Field screening results are site-and sample-specific. The results may vary with temperature, soil moisture content, soil type, and type of contaminant.

DECONTAMINATION PROCEDURES

The objective of the decontamination procedure is to minimize the potential for cross-contamination between samples. Sampling or measurement equipment will be decontaminated in accordance with the following procedures before each sampling attempt or measurement.

- Brush equipment with a wire brush, if necessary, to remove large particulate matter.
- Rinse with potable tap water.
- Wash with non-phosphate detergent solution (Liquinox and potable tap water).
- Rinse with potable tap water.
- Rinse with distilled water.

HANDLING OF REMEDIATION-DERIVED WASTE

IDW anticipated to be generated during the remedial activities includes PCS and groundwater. Excavated soil that exhibits evidence of petroleum contamination will be segregated and managed in a manner that minimizes the potential for release to the environment. Petroleum-contaminated soil, pending transport for disposal, will be stockpiled in a lined, bermed area, and kept covered when inactive. Water that is removed from the excavations will be treated in the on-site treatment system. Disposable items, such as gloves and protective overalls, paper towels, etc., will be placed in plastic bags after use and deposited in trash receptacles for disposal.

LABORATORY ANALYTICAL PLAN

Laboratory analyses will be conducted in accordance with OAR 340-122-0218 and 340-122-0240. Method Reporting Limit (MRL) goals will be equivalent to the target cleanup concentrations listed in Table 1 or the standard laboratory MRLs, whichever is lower.

The following methods will be utilized for soil:

- Gasoline-range hydrocarbons using method NWTPH-Gx.
- Volatile Organic Compounds (VOCs) using EPA Method 8260B.
- Total lead using EPA Method 6010 or 6020.

Samples of contaminated soil that is excavated from the vicinity of the former waste oil UST (north of the service station building), will be submitted for one or more of the following additional analyses:

- Diesel- and heavy oil-range hydrocarbons using method NWTPH-Dx (with silica gel cleanup).
- VOCs using EPA Method 8260B.
- Polycyclic aromatic hydrocarbons (PAHs) using EPA Method 8270C-SIM.
- Polychlorinated biphenyls (PCBs) using EPA method 8082.
- Arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver by EPA 6000/7000 series methods.
- Leachable cadmium, chromium, and lead using EPA Methods 1311/6010 or 6020.

If groundwater and/or free product are removed from excavations, the fluids will be treated in the on-site water treatment system. The following analytical methods will be used to confirm that treated water meets the NPDES 1500-A permit discharge requirements:

- Gasoline-range hydrocarbons in soil using method NWTPH-Gx.
- Diesel-and oil-range hydrocarbons using method NWTPH-Dx.
- Benzene, ethylbenzene, toluene, and xylenes using EPA Method 8260B.
- Total lead using EPA 6000 series methods.

FIELD QUALITY ASSURANCE PROCEDURES

SAMPLE CUSTODY

Sample Containers and Storage

All samples obtained for chemical analysis will be transferred in the field to laboratory-prepared sample containers and kept cool during transport to the testing laboratory. The sample containers will be filled completely to eliminate headspace in the container. Chain-of-custody procedures will be observed during transport of the samples to the testing laboratory.

Field Custody Procedures

All samples obtained for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory, as previously described. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses. Sample labeling and handling procedures will be followed as previously described. Possession of the samples will be documented by the chain-of-custody. Proper sample handling procedures, including security and integrity of the samples, will be the responsibility of the individual/company identified on the chain-of-custody. The chain-of-custody form will be signed and dated in the appropriate places by parties involved with a transfer of custody.

Field Duplicates

Field duplicates will be collected at a frequency of 5 percent (not less than 1 duplicate per 20 samples). Regardless of the number of samples collected, at least one duplicate should be collected for each media sampled and each analytical method used. Field duplicates will consist of two samples collected sequentially from one sample location to assess data variability. The field duplicates will be analyzed by the same analytical methods used for primary samples. Relative percent differences (RPDs) for field duplicates will be calculated to assess the data precision and accuracy and potential variability caused by sample handling.

Field Rinsate Blank

Equipment rinsate blanks will be collected daily. The analytical results of the rinsate blanks will be reviewed to evaluate the adequacy of the equipment decontamination procedures and the possibility of cross-contamination caused by sampling equipment. The equipment rinsate samples will be collected from the distilled water used to rinse sampling equipment after decontamination. The rinsate blanks will be analyzed for each of the parameters analyzed.

Trip Blanks

Trip blanks will accompany the soil and groundwater samples to the project laboratory. These blanks will be prepared by the analytical laboratory with carbon-free water. One trip blank will be submitted and analyzed for each cooler submitted to the analytical laboratory where VOC analysis is requested. Trip blanks will only be analyzed for VOCs.

Laboratory Custody Procedures

Upon receipt of the samples at the laboratory, whether delivered by GeoEngineers personnel or a courier service, the following procedures will be followed. The custody seals will be broken, the chain-of-custody form will be signed by the laboratory personnel, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party.

LABORATORY QUALITY CONTROL

The selected laboratory will maintain an internal quality assurance program as documented in its laboratory quality assurance manual. The laboratory will use a combination of blanks, surrogate recoveries, duplicates, matrix spike recoveries, matrix spike duplicate recoveries, blank spike recoveries and blank spike duplicate recoveries to evaluate the analytical results. The laboratory will also use data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods. QA/QC requirements outlined in DEQ's *Quality Assurance Project Plan*" (QAPP) for the DEQ underground Storage Tank (UST) Program dated January 2002 will be included as minimum requirements in the laboratory bid process and subcontract.

GEOENGINEERS, INC.
SITE HEALTH AND SAFETY PLAN CHECKLIST
SENZ AUTOMOTIVE SERVICE INTERIM REMOVAL ACTION MEASURE
2787-039-01

This checklist is to be used in conjunction with the GeoEngineers Safety Program Manual. Together, the program and this checklist constitute the site safety plan for this site. This plan is to be used by GeoEngineers personnel on this 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.

1 GENERAL PROJECT INFORMATION

Project Name:	Senz Automotive Service IRAM
Project Number:	2787-039-01
Type of Project:	Interim Removal Action Measure
Start/Completion:	September – October 2009
Subcontractors:	Excavation contractor

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 C-3 shall be signed by the subcontractor.

2 SCOPE OF WORK

The general scope of work is as follows:

1. ***Complete direct-push explorations, install groundwater and soil gas monitoring points; collect soil, groundwater, and soil gas samples.***

3 PERSONNEL/CONTACT INFORMATION PHONE NUMBERS

TITLE	NAME	TELEPHONE NUMBERS
Site Safety and Health Supervisor	Amber Roesler	503-679-3656
Project Manager	Chris Breemer	503-351-6544
Health and Safety Program Manager	Wayne Adams	253 383-4940
Field Engineer/Geologist	Amber Roesler	503-679-3656
Client	Oregon Department of Environmental Quality – Jim Glass	(503) 229-5585
Current Owner	John Pitfido	-- 503-310-8715

Site Safety and Health Supervisor -- The individual present at a hazardous waste site responsible to the employer and who has the authority and knowledge necessary to establish the site-specific health and safety plan and verify compliance with applicable safety and health requirements.

4 EMERGENCY INFORMATION

Hospital Name and Address:

(541) 676-9133

Providence Newberg Medical Center
1001 Providence Drive
Newberg, Oregon 97132

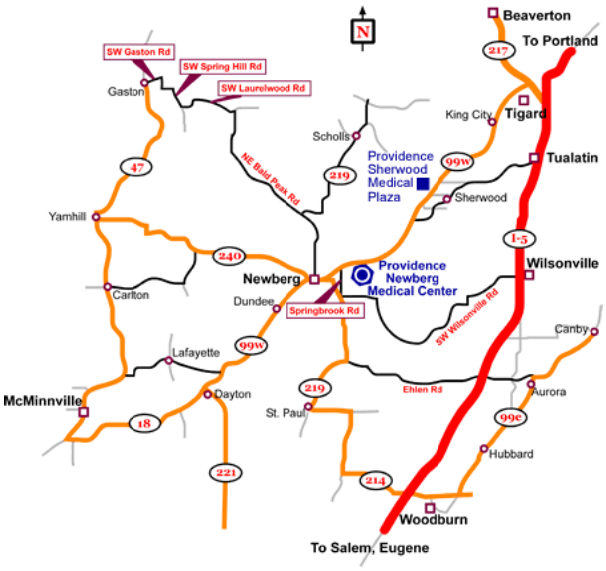
Phone Numbers (Hospital ER): 911
Starting from: Yamhill, OR
Arriving at: 1001 Providence Drive, Newberg, OR
Distance:
Route to Hospital Map:

Route summary

- Total distance: 13.8 mi
- Estimated time: 24 Minutes

Driving Directions

- Drive East on SR-240 [E Main St] 11.5 mi
- Turn LEFT (East) onto SR-99W [E 1st St] 0.3 mi
- Keep STRAIGHT onto SR-219 [SR-99W] 0.5 mi
- Keep STRAIGHT onto SR-99W [Pacific Hwy W] 1.4 mi
- Turn RIGHT (South) onto Providence Drive 0.1 mi
- Arrive Providence Medical Center



Ambulance: 9-1-1
Poison Control: (800) 732-6985
Police: 9-1-1
Fire: 9-1-1
Location of Nearest Telephone: Cell phones are carried by field personnel.
Nearest Fire Extinguisher: Located in the GEI vehicle on site.
Nearest First-Aid Kit: Located in the GEI vehicle on site.

4.1 Standard Emergency Procedures

1. Get help -
   - send another worker to phone 911 (if necessary)
   - as soon as feasible, notify GeoEngineers' project manager
2. Reduce risk to injured person -
   - turn off equipment
   - move person from injury location (if possible)
   - keep person warm

- perform CPR (if necessary)

3. Transport injured person to medical treatment facility (if necessary) -
   - by ambulance (if necessary) or GeoEngineers vehicle
   - stay with person at medical facility
   - keep GeoEngineers manager apprised of situation and notify human resources manager of situation

5 PERSONNEL TRAINING RECORDS

Name of Employee	Level of Training (24/ 40 hr)	Date of Last Training	HAZWOPER Supervisor Training	First Aid/ CPR	Respirator Fit Test
Amber Roesler	40 hr	7/31/09		3/10/09	3/11/09

6 KNOWN (OR ANTICIPATED) HAZARDS

Note: A hazard assessment will be completed at every site prior to beginning field activities. Updates will be included in the daily log. This list is a summary of hazards listed on the form.

6.1 Physical Hazards

	Drill rigs and Concrete Coring, including working inside a warehouse
X	Backhoe
X	Trackhoe
X	Crane
X	Front End Loader
X	Excavations/trenching (1:1 slopes for Type B soil)
	Shored/braced excavation if greater than 4 feet of depth
X	Overhead hazards/power lines
X	Tripping/puncture hazards (debris on-site, steep slopes or pits)
X	Unusual traffic hazard – Street traffic

6.2 Physical Hazard Mitigation Measures or Procedures

- Work areas will be marked with reflective cones, barricades and/or caution tape. Personnel will wear blaze orange vests for increased visibility by vehicle and equipment operators.
- Field personnel will be aware constantly of the location and motion of heavy equipment. A safe distance will be maintained 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 it is safe to do so.

- 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.
- Personnel entry into unshored or unsloped excavations deeper than 4 feet is not allowed. Any trenching and shoring requirements will follow guidelines established in WAC 296-155, the Washington State Construction standards or OSHA 1926.651 Excavation Requirements. In the event that a worker is required to enter an excavation deeper than 4 feet, a trench box or other acceptable shoring will be employed or the side walls of the excavation will be sloped according to the soil type and guidelines as outlined in OSHA/WISHA regulations. If the shoring/sloping deviates from that outlined in the WAC, it will be designed and stamped by a PE. Prior to entry, personnel will conduct air monitoring as described later in this plan. All hazardous encumbrances and excavated material will be stockpiled at least 2 feet from the edge of a trench or open pit. If concentrations of volatile gases accumulate within an open trench or excavation, the means of entering shall adhere to confined space entry and air monitoring procedures outlined under the air monitoring recommendations in this plan and the GeoEngineers Safety Program Manual.
- 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, the Site Safety and Health Supervisor will implement appropriate fall protection measures in accordance with OSHA/WISHA regulations and the GEI Safety Program manual.

Engineering controls:

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

6.3 Chemical Hazards (potentially present at site)

Petroleum Hydrocarbons:

X	Naphthalene's or paraffin's
X	Aromatic hydrocarbons (benzene, ethylbenzene, toluene, xylenes [BETX])
X	Gasoline
	Diesel fuel
	Waste oil
	Other petroleum fuels (list) _____

6.4 Hazards from Other Organic Compounds (present or potentially present at site)

	Chlorinated hydrocarbons (Polychlorinated biphenyls) and PCE. Breakdown products of PCE have not been detected at the site.
	PAHs (polycyclic aromatic hydrocarbons)
	Pesticides/Herbicides
	Polychlorinated biphenyls

6.5 Metals (Potentially present at site)

X	Lead
	Copper
	Chromium
	Zinc
	Other metals

Known chemical characteristics (maximum/average concentrations for routine monitoring):	**Soil Chemistry (mg/kg)**	**Water Chemistry (µg/L)**

Summary of Petroleum Hazards

Compound/ Description	Exposure Limits/IDLH[b]	Exposure Routes	Toxic Characteristics[d]
Gasoline (Unleaded)—clear liquid with a characteristic odor	PEL 300 ppm TLV 300 ppm STEL 500 ppm	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Benzene	OSHA PEL 1 ppm Short term: 5 ppm ACGIH PEL 0.5 ppm	Inhalation, skin absorption, ingestion, skin and/or eye contact	Irritated eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; anorexia, lassitude (weakness, exhaustion); dermatitis; bone marrow depression; [potential occupational carcinogen]
Diesel Fuel—liquid with a characteristic odor	None established by OSHA, but ACGIH has adopted 100 mg/m^3 for a TWA (as total hydrocarbons)	Ingestion, inhalation, skin absorption, skin and eye contact	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Mineral based crankcase oil – may contain metals, gas, antifreeze and PAHs	It depends on the contaminants	Ingestion, inhalation, skin absorption, skin and eye contact	It depends on the contaminants.

6.6 Chemical Hazard Mitigation Measures or Procedures

Air monitoring will be conducted for flammable vapors and for establishing the level of respiratory protection.

- Half face combination organic vapor/HEPA or P100 cartridge respirators will be available on site to be used as necessary. P100 cartridges are to be used only if PID measurements are below the site action limit. P100 cartridges are used for protection against dust, metals and asbestos, while

the combination organic vapor/HEPA cartridges are protective against both dust and vapor. Ensure that the PID or TLV will detect the chemicals of concern on site.

- Level D PPE will be worn at all times on 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. Individual PELs or action limits are not expected to be exceeded given the planned activities. If there are waste oil contaminants in the soil and conditions are damp, airborne dust is not likely to be an issue. If conditions are dry and dust is visible during site activities, personnel will use P100 cartridges on their respirators.

Summary of Metals Hazards

Compound/ Description	Exposure Limits/IDLH[b]	Exposure Routes	Toxic Characteristics[d]
Lead (and inorganic compounds as lead)	PEL 0.05 mg/m^3 TLV 0.05 mg/m^3 REL 0.05 mg/m^3 IDLH 100 mg/m^3	Inhalation, ingestion, skin and/or eye contact	Lassitude (weakness, exhaustion), insomnia, facial pallor, anorexia, weight loss, malnutrition, constipation, abdominal pain, colic, anemia, gingival lead line, tremor, wrist and ankle paralysis, encephalopathy, kidney disease, irritated eyes, hypotension

AIR MONITORING PLAN Dust/ Metals

The contaminants listed above present the greatest risk to site personnel through inhalation and ingestion of soil particles. If excavation activities generate visible dust, the SSO will be notified immediately to assess the need for air monitoring and lab analysis for inhalable and respirable particulates.

6.7 Biological Hazards

_____	Poison Ivy or other vegetation	_____
_____	Insects or snakes	_____
_____	Used hypodermic needs or other infectious hazards	**Do not pick up or contact**
_____	Others	_____

6.8 Biological Hazard Mitigation Measures or Procedures

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

Additional Hazards _____

6.9 Additional Hazards (Update in Daily Log)

Include evaluation of:

- *Physical Hazards* (excavations and shoring, equipment, traffic, tripping, heat stress, cold stress and others)

- *Chemical Hazards* (odors, spills, free product, airborne particulates and others present)
- *Biological Hazards* (snakes, spiders, other animals, discarded needles, poison ivy and others present)

7 LIST OF FIELD ACTIVITIES

Check the activities to be completed during the project

X	Site reconnaissance
	Exploratory borings
X	Construction monitoring
X	Surveying
X	Test pit exploration
	Monitor well installation
	Monitor well development
X	Soil sample collection
X	Field screening of soil samples
X	Vapor measurements
	Groundwater sampling
	Groundwater depth and free product measurement
	Product sample collection
X	Soil stockpile testing
X	Remedial excavation
	Underground storage tank (UST) removal monitoring
	Remediation system monitoring
	Recovery of free product

8 SITE DESCRIPTION (ATTACH ANY ADDITIONAL SITE PLAN DETAILS AND CHEMICAL ANALYSES)

8.1 Site History: Fill in written description here

Address/Location: 210 South Maple Street, Yamhill, Oregon

Site topography: Generally flat

Predominant wind direction: Unknown

Site drainage:

	Municipal drain
X	Surface water drainage – If so, direction of flow Assumed southwest
	Engineered site drains
	Other

Utility check complete:	To be completed prior to field activities – see documentation Utility Checklist
Traffic or vehicle access control plans:	NA
Site access control (exclusion zone) defined by:	Yellow caution tape

X Fence
____ Survey tape
____ Traffic cones
____ Other (traffic control barriers as required by the city)

Hot zone/exclusion zone (Define): **20-foot radius of drilling equipment and sample locations**

Contamination reduction zone (Define): ***Decontamination will be set up and area will be delineated***

8.2 Personal Protective Equipment

Personal Protective Equipment (PPE). Minimum level of protective equipment for these sites is Level D. After the initial and/or daily hazard assessment has been completed, select the appropriate protective gear (PPE) to preserve worker safety. Task-specific levels of PPE shall be reviewed with field personnel during the pre-work briefing conducted prior to the start of site operations.

Check applicable personal protection gear to be used:

X Hardhat (if overhead hazards, or client requests)
X Steel-toed boots (if crushing hazards are a potential or if client requests)
X Safety glasses (if dust, particles, or other hazards are present or client requests)
X Hearing protection (if it is difficult to carry on a conversation 3 feet away)
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 shall use Saranex if liquids are handled or splash may be an issue)
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)

Limitations of Protective Clothing

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

GeoEngineers has developed a written respiratory protection program in compliance with OSHA requirements contained in 29 CFR 1910.134. Site personnel shall be trained on the proper use, maintenance, and limitations of respirators. Site personnel that are required to wear respiratory protection shall be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134. Site personnel that 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.

Respirator Cartridges

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 certified and approved by NIOSH. 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. At a minimum, cartridges should be changed a minimum of once daily.

Respirator Inspection and Cleaning

The Site Safety and Health Supervisor shall periodically (i.e., 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.

Respirators shall be hygienically cleaned as often as necessary to maintain the equipment in a sanitary condition. At a minimum, respirators shall be cleaned at the end of each work shift. Respirator cleaning procedures shall include an initial soap/water cleaning, a water rinse, a sanitizing soaking, and a final water rinse. One capful of bleach per one gallon of water can be used to create the sanitizing soak solution. When not in use, respirators shall be stored to protect against damage, hazardous chemicals, sunlight, dust, excessive temperatures, and excessive moisture. In addition, respirators shall be stored to prevent deformation of the face piece and exhalation valve.

Facial Hair and Corrective Lenses

Site personnel with facial hair that interferes with the sealing surface of a respirator shall not be permitted to wear respiratory protection or work in areas where respiratory protection is required. Normal eyeglasses cannot be worn under full-face respirators because the temple bars interfere with the sealing surface of the respirator. Site personnel requiring corrective lenses will be provided with spectacle inserts designed for use with full-face respirators. Contact lenses should not be worn with respiratory protection.

9 AIR MONITORING PLAN

Work upwind if at all possible.

Check instrumentation to be used:

_____ TLV Monitor (flammability only, for methane and petroleum vapors)
__X__ PID (Photoionization Detector)
_____ Other (i.e., detector tubes): _____

Check monitoring frequency/locations: and type (specify: work space, borehole, breathing zone):

__X__ **15 minutes - Continuous during soil disturbance activities or handling samples**
_____ 15 minutes
_____ 30 minutes
_____ Hourly (in breathing zone during excavations, drilling, sampling)

Additional personal air monitoring for specific chemical exposure:

Action levels:

- 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 it will be used in and allow at least a 10-minute warm-up prior to zeroing. Do not zero in a contaminated area. The PID can be tuned to read chemicals specifically if there are not multiple contaminants on site. It can be tuned to detect one chemical with response factor entered into the equipment, but the PID picks up all volatile organic compounds (VOCs) present. Ionization potential (IP) of chemical has to be less than lamp (11.7/ 10.6eV) and PID does not detect methane. The ppm readout on the instrument is relative to the IP of isobutylene (calibration gas), so conversion must be made in order to estimate ppm of the chemical on-site.
- 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 ppm above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C PPE or move to a noncontaminated area.
- If the workspace will be monitored using a TLV Sniffer, the TLV Sniffer is not consistently reliable in measuring vapor concentrations less than 400 ppm. Therefore, the TLV Sniffer should be used only as a warning indicator of high vapor concentrations. A PID is the preferred instrument and will be used if work with gasoline-contaminated soil is conducted.
- If the TLV Sniffer indicates greater than 1,000 ppm at the borehole or 600 ppm in the breathing zone, flammability may be a problem as well as indicating a health hazard. Stop work, move to a noncontaminated area and stabilize the situation. Continue work with caution, monitoring every 15 minutes.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed ½ the TLV. Because of the variety of chemicals, the PID will not indicate exposure to a specific PEL and is therefore not a preferred tool for determining worker exposure to chemicals. If odors are detected, then employees will upgrade to respirator with Organic Vapor cartridges and will contact the Health and Safety Program Manager for other sampling options.

Air Monitoring Action Levels

Contaminant	Activity	Monitoring Device	Frequency of Monitoring Breathing Zone	Action Level	Action
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	Background to 5 parts per million (ppm) in breathing zone	Use Level D or Modified Level D PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes and in event of odors	5 to 25 ppm in breathing zone	Upgrade to Level C PPE
Organic Vapors	Environmental Remedial Actions	PID	Start of shift; prior to excavation entry; every 30 to 60 minutes	> 25 ppm in breathing zone	Stop work and evacuate the area. Contact Certified Industrial Hygienist (CIH) for guidance.
Combustible Atmosphere	Environmental Remedial Actions	PID/TLV	Start of shift; prior to excavation entry; every 30 to 60 minutes	<10% LEL or <1000 ppm	Depends on contaminant. The PEL is usually exceeded before the LEL.
Combustible Atmosphere	Environmental Remedial Actions	PID/TLV Or 4 gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	>10% LEL or >1000 ppm	Stop work and evacuate the site. Contact CIH for guidance.
Oxygen Deficient/Enriched Atmosphere	Environmental Remedial Actions Confined Spaces	Oxygen meter Or 4 gas meter	Start of shift; prior to excavation entry; every 30 to 60 minutes	>19.5<23.5%	Continue work if inside range. If outside range, exit area and contact CIH.

10 DECONTAMINATION PROCEDURES

Decontamination consists of removing outer protective tyvek clothing and washing soiled boots and gloves using bucket and brush provided on-site in the contamination reduction zone. Inner gloves will then be removed, and respirator, hands and face will be washed in either a portable wash station or a bathroom facility in the support zone. Employees will perform decontamination procedures and wash prior to eating, drinking or leaving the site. ***Used PPE to be placed in on-site drum.***

Specify other site specific decontamination procedures:

_____

_____

11 WASTE DISPOSAL OR STORAGE

PPE disposal (specify): Dumpster at GeoEngineers Portland office.

Soil cuttings/decontamination water:

_____ On-site, in borings (soil) or on ground surface (water)

_____ Secured (list method) Drums

_____ Other (describe destination, responsible parties): _____

12 DOCUMENTATION EXPECTED TO BE COMPLETED

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

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

Required forms:

Field Log
Health and Safety Plan acknowledgment by GEI employees (Form C-2)
Contractors Health and Safety Plan Disclaimer (Form C-3)
Conditional forms available at GeoEngineers office: Accident Report (Form C-4)

13 APPROVALS

1. Plan Prepared _____ _____
   Signature Date

2. Plan Approval _____ _____
   PM Signature Date

3. Health & Safety Officer Wayne Adams _____
   Health & Safety Program Manager Date

FORM C-1
HEALTH AND SAFETY MEETING
SENZ AUTOMOTIVE SERVICE
2787-039-01

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; and
- 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 and Health Supervisor.

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

Date	Topics	Attendee	Company Name	Employee Initials

FORM C-2
SITE SAFETY PLAN – GEOENGINEERS' EMPLOYEE ACKNOWLEDGMENT
SENZ AUTOMOTIVE SERVICE
2787-039-01

(All GeoEngineers' site workers complete this form, which should remain attached to the safety plan checklist and filed with other project documentation).

I, _____, do hereby verify that a copy of the current Safety Plan has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge a full understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures. I understand that I will be informed immediately of any changes that would affect site personnel safety.

Signed _____ Date _____

Range of Dates From: _____
To: _____

Signed _____ Date _____

Range of Dates From: _____
To: _____

Signed _____ Date _____

Range of Dates From: _____
To: _____

Signed _____ Date _____

Range of Dates From: _____
To: _____

Signed _____ Date _____

FORM C-3
SUBCONTRACTOR AND SITE VISITOR SITE SAFETY FORM
SENZ AUTOMOTIVE SERVICE
2787-039-01

I, _____, verify that a copy of the current site Safety Plan has been provided by GeoEngineers to inform me of the hazardous substances on site and to provide safety procedures and protocols that will be used by GeoEngineers' staff at the site. By signing below, I agree that the safety of my employees is the responsibility of the undersigned company.

Signed _____ Date _____

Firm: _____

Signed _____ Date _____

Firm: _____

Signed _____ Date _____

Firm: _____

Signed _____ Date _____

Firm: _____

Signed _____ Date _____

Firm: _____

Signed _____ Date _____

Firm: _____