# Data Gaps Investigation

Former Mall 99 Dry Cleaners
972 North Pacific Highway
Woodburn, Oregon

*for*
**Khoury Development, LLC**

December 16, 2024

4000 Kruse Way Place
Building 3, Suite 200
Lake Oswego, Oregon 97035
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GeoEngineers

# Data Gaps Investigation

**Former Mall 99 Dry Cleaners**
**972 North Pacific Highway**
**Woodburn, Oregon**

File No. 24986-001-02
December 16, 2024

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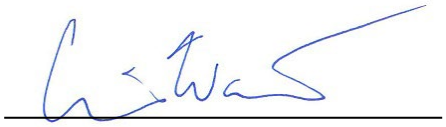

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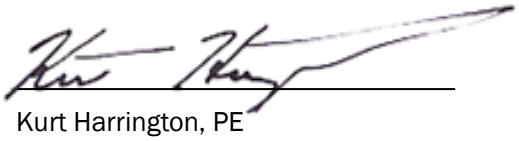

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# 1.0 Introduction

This report presents the results of a Data Gaps Investigation conducted at the former Mall 99 Dry Cleaner (Site) located at 972 North Pacific Highway, Woodburn, Oregon. GeoEngineers, Inc. (GeoEngineers) conducted this Data Gaps Investigation in general accordance with our proposal dated February 28, 2024 and Oregon Department of Environmental Quality (DEQ) approved Data Gap Investigation Work Plan, dated March 6, 2024. The Site location is shown on the Vicinity Map, Figure 1. Site features, sub-slab soil vapor, indoor air and boring/monitoring well locations are illustrated on the Site Plan and Exploration Locations, Figure 2.

# 2.0 Background Summary

GeoEngineers reviewed a Phase I Environmental Site Assessment (ESA) prepared by AEI Consultants (AEI) for the property at 954-1032 North Pacific Highway in Woodburn, Oregon (AEI Consultants 2020). The Phase I ESA identified one recognized environmental condition (REC) indicating that a former tenant (Mall 99 Cleaners) occupied unit 976 North Pacific Highway. However, street addresses have changed over the years and the current unit identified as 972 is the historical location of the Mall 99 Cleaners. Previous records indicated the tenant was limited to a coin operated laundry; however, the California HAZNET database reported one record during the timeframe of operation related to the transport of solvents, including tetrachloroethylene (PCE), which is a common dry-cleaning solvent. The Phase I ESA recommended a Phase II ESA subsurface investigation to evaluate the potential presence of dry-cleaning solvents in the subsurface.

Based on discussions with client representatives on February 11, 2021, GeoEngineers performed a sub-slab soil vapor sampling event inside the unit identified as 972. At the time of this sampling event, PCE was detected at concentrations less than DEQ's commercial vapor intrusion (VI) to indoor Risk-Based Concentrations (RBCsv) (GeoEngineers 2021a). In May 2021, GeoEngineers conducted additional Phase II ESA activities by advancing four soil borings outside the building which were completed as groundwater monitoring wells (MW-1 through MW-4). At the time of this sampling event, PCE was detected at concentrations less than DEQ's volatilization to indoor air RBCsv screening values in soil from MW-1 and MW-3. PCE was detected in groundwater from wells MW-1, MW-3 and MW-4 at concentrations less than DEQ's Groundwater Vapor Intrusion into Buildings RBCwi, Occupational receptor scenario (48,000 micrograms per liter [µg/L]) at the time (GeoEngineers 2021b).

In 2021, a VCP application was submitted to the DEQ and a project manager was subsequently assigned in May of 2022. During the interim period of DEQ review, DEQ adopted new RBCs (June 2023), including a Commercial RBCwi for Groundwater Vapor Intrusion into Buildings (130 and 330 µg/L; Chronic and Acute, respectively) and RBCsv for Soil Vapor intrusion into Buildings (1,600 and 4,000 microgram per cubic meter [µg/$m^3$]; Chronic and Acute, respectively). As a result, the 2021 PCE concentrations in groundwater from wells MW-3 and MW-4 and sub-slab soil vapor from SV-01 and SV-02 exceed one or both of the newly established DEQ RBCs. During a February 16, 2024 meeting, DEQ requested additional assessment of the Site, including four quarters of groundwater monitoring and two rounds of the following: sub-slab soil vapor, indoor air and outdoor air monitoring before considering a No Further Action (NFA) determination which were proposed in the Data Gap Investigation Work Plan (GeoEngineers 2024).

### 2.1 GEOLOGIC SETTING

The Site is located in the eastern Willamette Valley, which is a broad alluvial plain bounded on the west by Tertiary marine sedimentary and volcanic rocks of the Coast Range, and on the east by Tertiary and Quaternary volcanic rocks of the Cascade Range. The geology of the Woodburn area is not mapped at the quadrangle scale. The most recent geologic mapping of the region that includes the subject site is contained in the U.S. Geological Survey (USGS) Professional Paper 1424, Geologic Framework of the Willamette Lowland Aquifer System (Gannett and Caldwell 1998) as underlain by Willamette Silt, Plio-Pleistocene alluvium deposited by glacial outburst ("Missoula") floods. Gannett and Caldwell (1998) note that as much as 130 feet of this unconsolidated silt and fine sand has been encountered in the central portions of the Willamette Valley in the Woodburn area.

Our review of the site geology, together with on-site observations, suggests that the site geology largely conforms to the published mapping. Specifically, fine sand with varying amounts of silt has generally been encountered below 1 to 3 feet of imported fill material in borings completed 18 to 20 feet below ground surface (bgs).

### 2.2 HYDROGEOLOGIC SETTING

Wells within a ¼-mile of the Site, as described in Section 6.4.2, are installed in younger alluvium with static water levels reportedly ranging between 16 and 55 feet bgs. Groundwater monitoring conducted at the Site during this investigation (April – October 2024) encountered static water levels between depths of approximately 8 and 14 feet bgs.

## 3.0 Scope of Services

The Data Gap Investigation scope of services performed by GeoEngineers included the following additional Phase II ESA activities:

1. Updated the Health and Safety Plan for use by GeoEngineers' personnel during the field activities.
2. Coordinated the location of three proposed soil borings to be completed as monitoring wells and five sub-slab soil vapor sampling locations (see Figure 2).
3. Contacted the Utility Notification Center public locating service. A private locating service also was subcontracted to locate potential utilities.
4. Retained a drilling subcontractor to advance three direct-push borings to a depth of up to 18 feet bgs.
5. Monitored the push probe explorations, which were continuously sampled, visually classified and field screened (sheen, photoionization detector [PID] and odor) for potential laboratory analysis. Visual classification of the soil samples was completed in general accordance with ASTM International (ASTM) Test Method D 2488-90, the Standard Practice for Description and Identification of Soils.
6. Collected up to two soil samples per boring using U.S. Environmental Protection Agency (EPA) Method 5035 for potential laboratory analysis based on field screening results and depth to groundwater (samples collected within the vadose zone).
7. Submitted select soil samples, based on field screening results and depth to groundwater, for laboratory analysis of select halogenated volatile organic compounds (HVOCs), including

PCE, trichloroethene (TCE), 1,1-dichloroethylene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride by EPA Method 8260D.

8. Installed 3/4-inch-diameter polyvinyl chloride (PVC) groundwater monitoring wells (labeled MW-5 through MW-7) in the three borings using pre-packed well screens. Well completion depths were 18 feet bgs based on historic groundwater levels. Wells MW-5 through MW-7 were constructed with 10 feet of 10-slot screen that extends over an interval that corresponds to anticipated seasonal water table fluctuations. All wells were completed using flush-mount steel monuments and were installed in accordance with Oregon Water Resources Department (OWRD) regulations.
9. Developed each monitoring well by pumping, surging, bailing or a combination of these methods. Recorded the initial and final depth to water, initial and final well depth, and volume of removed water.
10. Surveyed the relative elevation of each well casing and monument using an engineer's level accurate to 0.01 foot relative to a common datum.
11. Installed five permanent sample points for collecting sub-slab soil vapor samples according to Vapor Pin® Standard Operating Procedure – Installation and Extraction of the Vapor Pin® (Appendix A). Locations SV-01 through SV-03 were previously installed in 2021 as temporary sub-slab soil vapor sampling locations. Permanent sample points were installed adjacent to these patched areas.
12. Disposal of investigation-derived waste (IDW) at an appropriate off-site facility by a subcontracted hazardous waste hauler. Soil cuttings, purge and decontamination water generated during assessment activities were stored on site in labeled steel, 55-gallon drums. Based on the source likely being a former dry cleaner, the IDW is considered an F002-listed waste and required disposal as hazardous waste.

# 4.0 Field Activities

The additional Phase II ESA activities were conducted in general accordance with the DEQ approved Data Gap Investigation Work Plan, dated March 6, 2024. Field activities were performed on April 12, 21, 24, 25 and 29, 2024, using the methods described in Appendix A. Prior to initiating subsurface explorations, the locations were marked in the field and public utility locates were notified. On April 12, 2024, a private utility contractor performed additional utility locates with a GeoEngineers representative and adjusted subsurface exploration locations to avoid any buried utilities. Site features, sub-slab soil vapor, indoor air, boring and well locations are shown on Figure 2.

## 4.1 SUB-SLAB SOIL VAPOR PIN INSTALLATION AND SAMPLING

On April 21, 2024, six soil Vapor Pins® were installed; five locations were used to monitor sub-slab soil vapor quality and one location used to evaluate the pressure differential between the sub-slab and indoor air. Each Vapor Pin® was completed using a silicone gasketed stainless-steel sample port inserted into a 5/8-inch diameter hole drilled through the concrete floor slab. The sample device was tightened to create a seal and then a flush mounted stainless-steel cover was placed over the sample point until the time of sampling. Additional installation details are provided in Appendix A.

On April 25, 2024, one sub-slab soil vapor sample was collected from each Vapor Pin®. Pre-sampling quality control procedures (i.e., shut-in test and purging) were conducted prior to sample collection. The sub-slab samples were collected using laboratory provided evacuated 1-liter Summa canisters

equipped with a flow regulator set to less than or equal to approximately 200 milliliters per minute. The Summa canisters were filled until a vacuum equivalent of approximately 2 to 3 inches of mercury remained in each canister, then the inlet valve was closed and the canister pressure and stop date and stop time were recorded. Additional details for sampling are presented in Appendix A. Sub-slab soil vapor samples were shipped to Eurofins Air Toxics in Folsom, California for analysis of select HVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method TO-15.

## 4.2 INDOOR AND OUTDOOR AIR SAMPLING

### *4.2.1 April 2024 Sampling Event*

On April 25, 2024, while sub-slab soil vapor sample collection was being performed, two indoor air samples and one outdoor air sample were collected using 6-liter evacuated summa canisters equipped with 8-hour flow controllers. The samples were deployed in open areas of the indoor workspace and the outdoor air sample was deployed in the dominant upwind location as observed on the day of sampling. The intake of each sample was placed in the breathing zone between 3 and 5 feet above the ground surface. Air samples were shipped to Eurofins Air Toxics in Folsom, California for analysis of select HVOCS (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method TO-15-SIM.

During the indoor/outdoor air sampling event, soil vapor location SV-6 was monitored using an Omniguard differential pressure recorder. Pressures were recorded on 15-minute intervals and measured in inches of water column (inches WC). Readings ranged from -0.017 to 0.011 inches WC with the readings oscillating above and below zero during each recorded reading (recorder displays the high and low during the 15-minute period). The differential pressure recording did not indicate a significant measurable difference in pressure between the indoor air and sub-slab during the monitoring period. Indoor air temperature was 67 degrees Fahrenheit during the sampling event and were maintained by the building's HVAC system. The barometric pressure ranged from 29.61 to 29.79 with the pressure decreasing throughout the 24-hour period. Barometric pressures for the 3 days preceding sampling ranged from 29.7 to 30.1 and were decreasing during the 3-day period. Outdoor air temperature ranged from 45 to 50 degrees Fahrenheit during the 24-hour period on April 25, 2024.

### *4.2.2 November 2024 Sampling Event*

On November 1, 2024, while sub-slab soil vapor sample collection was being performed, two indoor air samples and one outdoor air sample were collected using 6-liter evacuated summa canisters equipped with 8-hour flow controllers. The samples were deployed in open areas of the indoor workspace and the outdoor air sample was deployed in the dominant upwind location as observed on the day of sampling. The intake of each sample was placed in the breathing zone between 3 and 5 feet above the ground surface. Air samples were shipped to Eurofins Air Toxics in Folsom, California for analysis of select HVOCS (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method TO-15-SIM.

During the indoor/outdoor air sampling event, soil vapor location SV-6 was monitored using an Omniguard differential pressure recorder. Pressures were recorded on 5-minute intervals and measured in inches WC. Readings ranged from -0.017 to 0.010 inches WC with the readings oscillating above and below zero (recorder displays the high and low during the 5-minute period). The differential pressure recording did not indicate a significant measurable difference in pressure between the indoor air and sub-slab during the monitoring period. Indoor air temperature was 72 degrees Fahrenheit during the sampling event and were maintained by the building's HVAC system. The barometric pressure ranged from 29.4 to 29.7 with the

pressure decreasing throughout the 24-hour period on November 1, 2024. Barometric pressures for the 3 days preceding sampling ranged from 29.6 to 29.9 and were decreasing during the 3-day period. Outdoor air temperature ranged from 52 to 56 degrees Fahrenheit during the 24-hour period on November 1, 2024.

## 4.3 ADDITIONAL SOIL EXPLORATIONS

On April 24, 2024, a GeoEngineers representative oversaw advancement of three soil boring explorations (MW-5 through MW-7) using a direct-push track-mounted drill rig operated by Xavier Environmental, LLC (Xavier). Soil borings were advanced to 18 feet bgs and were selected based on previous site use and assumed groundwater flow direction. Soil samples for analysis were collected based on field screening evidence or were collected just above the soil-water interface. Additionally, groundwater monitoring wells were constructed in each boring and groundwater samples were collected from the monitoring wells.

### *4.3.1 Soil Sampling*

Soils encountered in the borings were generally gray base course gravel fill to approximately 1 to 3 feet bgs, underlain by native brown silt with varying of sand and fine sand with varying amounts of silt to the termination of the borings at 18 feet bgs. Wet soil conditions were observed below depths 8 to 9 feet bgs in each boring. A log of soil conditions encountered in each boring is provided in Appendix A (Figures A-2 through A-4).

Soil was field screened using visual observations and headspace vapor measurements using a MiniRae 3000 PID to detect the presence of HVOCs. The soil samples were also checked for an oil sheen using a black pan containing water. PID readings for the samples were less than 1 parts per million (ppm) with minor exceptions in boring MW-5 ranging from 1.7 to 11 ppm. No oil sheens were observed in any of the samples. Additional details regarding field screening procedures are detailed in Appendix A.

Soil samples were transferred to the laboratory-prepared containers and stored in coolers with ice for transport to Apex Laboratories in Tigard, Oregon. A total of six soil samples were analyzed for select HVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method 8260D.

Soil generated during boring and monitoring well installation was drummed, labeled and temporarily stored on site pending waste profiling and off-site disposal.

### *4.3.2 Monitoring Well Construction and Well Development*

A GeoEngineers' field representative observed and documented the installation of MW-5 through MW-7, and maintained a log of the well construction materials, depths of materials and depths of each well. Well construction details are included in Appendix A.

Each monitoring well was constructed using ¾-inch-diameter, schedule 40 PVC well casing and well screens. The wells were constructed with a 10-foot screened interval. Colorado silica sand or equivalent was placed in the annular space surrounding the pre-packed well screens and extended at least 2 feet above the screen. Monitoring wells were screened between approximately 8 to 18 feet bgs and completed with a bentonite seal and a flush-mounted steel monument. A concrete surface seal was placed around the monument at the ground surface and a lockable cap was installed at the top of the PVC well casing.

Wells MW-5 through MW-7 were developed after installation to remove water introduced into the borehole during drilling (if any), to stabilize the filter pack and formation materials surrounding the well screen, and

to restore the natural hydraulic connection between the well screen and the surrounding soil. Wells were developed using a two-stage submersible or peristaltic pump with disposable tubing until the water was relatively free of sediment. Water generated during development was drummed, labeled and temporarily stored on site.

### 4.4 GROUNDWATER MONITORING

Quarterly groundwater monitoring events were performed in April, July, and October 2024. Top of casing elevations were used in conjunction with depth to groundwater measurements to determine the groundwater elevations and flow direction. The flow direction was observed to be relatively flat but trending slightly to the west northwest during both groundwater monitoring events (Groundwater Results, Figure 3 and 4).

Wells MW-1 through MW-7 were purged and sampled on April 29, July 12, and October 31, 2024. A peristaltic pump with disposable tubing was used to purge each monitoring well using low-flow sampling methodology (EPA, 2017). Groundwater quality parameters (temperature, pH, specific conductivity, oxidation-reduction potential, dissolved oxygen and turbidity) were measured during well purging. Groundwater samples were collected after water quality parameters stabilized, or in cases where the well was dewatered, the well was allowed to recharge while other work was performed. Purging and sampling was performed in general conformance with the criteria presented in Appendix A.

Groundwater samples were transferred to laboratory-prepared containers and stored in coolers with ice for transport to Apex Laboratories in Tigard, Oregon. Groundwater samples were analyzed for select HVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) by EPA Method 8260D.

Purge water generated during well development and sampling was drummed, labeled and temporarily stored on site pending waste profiling and off-site disposal.

## 5.0 Results

The following sections summarize the results of sub-slab soil vapor, indoor/outdoor air, soil and groundwater sampling. Laboratory reports are attached in Appendix B. Sample locations are shown on Figure 2.

### 5.1 SUB-SLAB SOIL VAPOR CHEMICAL ANALYTICAL RESULTS

#### *5.1.1 April 2024 Sampling Event*

Five sub-slab soil vapor samples (SV-1 through SV-5) were collected for laboratory analysis. The sub-slab soil vapor sample results are summarized in Table 1 and below:

- TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in the soil vapor samples submitted for analysis.
- PCE was detected at concentrations ranging from 110 to 22,000 µg/m$^3$ in sub-slab soil vapor samples SV-1, SV-2, SV-4 and SV-5.

- The detected concentration of PCE (22,000 µg/m$^3$) in sample SV-1, located in the southwestern portion of unit 972, exceeded the RBCsv for vapor intrusion into buildings pathway for a commercial receptor for chronic (1,600 µg/m$^3$) and acute (4,000 µg/m$^3$).

### 5.1.2 November 2024 Sampling Event

Five sub-slab soil vapor samples (SV-1 through SV-5) were collected for laboratory analysis. The sub-slab soil vapor sample results are summarized in Table 1 and below:

- TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in the soil vapor samples submitted for analysis.
- PCE was detected at concentrations ranging from 26 to 14,000 µg/m$^3$ in sub-slab soil vapor samples SV-1, SV-2, SV-4 and SV-5.
- The detected concentration of PCE (14,000 µg/m$^3$) in sample SV-1, located in the southwestern portion of unit 972, exceeded the RBCsv for vapor intrusion into buildings pathway for a commercial receptor for chronic (1,600 µg/m$^3$) and acute (4,000 µg/m$^3$).

## 5.2 INDOOR AND OUTDOOR AIR CHEMICAL ANALYTICAL RESULTS

### 5.2.1 April Sampling Event

Two indoor air samples (IA-1 and IA-2) and one outdoor air sample (OA-1) were collected for laboratory analysis. The air sample results are summarized in Table 2 and below:

- 1,1-DCE, trans-1,2-DCE and vinyl chloride were not detected in the indoor air samples IA-1 or IA-2.
- PCE and trans-1,2-DCE were detected in the outdoor air sample and were used to adjust the indoor air sample results as appropriate.
- Cis-1,2-DCE, TCE and/or PCE were detected in indoor air samples IA-1 and IA-2. Detected concentrations of PCE in indoor air samples IA-1 and IA-2 were corrected by subtracting the outdoor air sample results. The detected concentrations HVOCs in the indoor air samples were less than the indoor air RBCs for commercial chronic and acute receptors.

### 5.2.2 November Sampling Event

Two indoor air samples (IA-1 and IA-2) and one outdoor air sample (OA-1) were collected for laboratory analysis. The air sample results are summarized in Table 2 and below:

- 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, and vinyl chloride were not detected in the indoor air samples IA-1 or IA-2.
- 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE, TCE, PCE, and vinyl chloride were not detected in the outdoor air sample.
- PCE was detected in indoor air samples IA-1 and IA-2. The detected concentrations HVOCs in the indoor air samples were less than the indoor air RBCs for commercial receptors (chronic and acute).

## 5.3 SOIL CHEMICAL ANALYTICAL RESULTS

Two soil samples were collected from each soil boring (MW-5 through MW-7) based on field screening and the observed soil/water interface. The soil sample depths and results are summarized in Table 3 and below:

- Select HVOCs (PCE, TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride) were not detected in the analyzed soil samples.

## 5.4 GROUNDWATER CHEMICAL ANALYTICAL RESULTS

Groundwater samples were collected from MW-1 through MW-7. The groundwater sample results are summarized in Table 4 and below for each event.

### *5.4.1 April 2024 Groundwater Sampling Event*

- TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in samples collected from wells MW-1 through MW-7.
- PCE was not detected in the samples collected from well MW-5.
- PCE was detected in wells MW-1, MW-2, MW-3, MW4, MW-6 and MW-7 at concentrations ranging from 2.20 µg/L to 855 µg/L.
- The detected concentrations of PCE in well MW-3 (159 µg/L) and MW-4 (855 µg/L) exceeded the RBCs for vapor intrusion into buildings pathway for commercial chronic and acute receptors (130 and 330, respectively).
- The detected concentrations of PCE in wells MW-3, MW-4 and MW-6 exceeded the groundwater ingestion and inhalation pathway for residential receptors (not applicable under current site use scenarios). Well MW-6, which was 15 feet north of the property boundary, had a detected concentration of PCE (14.3 µg/L) slightly exceeding the residential receptor for ingestion and inhalation from tap water (12 µg/L). A well could not be installed closer to the property boundary due to the presence of utilities; however, based on the upgradient location, distance from the property boundary and slight exceedance of the residential standard, it can be assumed that groundwater further upgradient and off the property is unlikely to be impacted exceeding the most restrictive RBCs.

### *5.4.2 July 2024 Groundwater Sampling Event*

- TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in samples collected from wells MW-1 through MW-7.
- PCE was not detected in the samples collected from wells MW-2 and MW-5.
- PCE was detected in wells MW-1, MW-3, MW4, MW-6 and MW-7 at concentrations ranging from 1.20 µg/L to 778 µg/L.
- The detected concentrations of PCE in well MW-3 (778 µg/L) and MW-4 (395 µg/L) exceeded the RBCs for vapor intrusion into buildings pathway for commercial chronic and acute receptors (130 and 330, respectively).
- The detected concentrations of PCE in wells MW-3, MW-4 and MW-6 exceeded residential tap water RBCs (not applicable under current site use scenarios). Well MW-6, which was 15 feet north of the property boundary, had a detected concentration of PCE (18.8 µg/L) slightly exceeding the residential

receptor for ingestion and inhalation from tap water (12 µg/L). As mentioned above, concentrations of PCE in shallow groundwater upgradient and offsite of this location are expected to be below these residential RBCs.

### *5.4.3 October 2024 Groundwater Sampling Event*

- TCE, 1,1-DCE, cis-1,2-DCE, trans-1,2-DCE and vinyl chloride were not detected in samples collected from wells MW-1 through MW-7.
- PCE was not detected in the samples collected from well MW-5.
- PCE was detected in wells MW-1, MW-2, MW-3, MW4, MW-6 and MW-7 at concentrations ranging from 1.02 µg/L to 1,390 µg/L.
- The detected concentrations of PCE in well MW-3 (1,390 µg/L) and MW-4 (184 µg/L) exceeded the RBCs for vapor intrusion into buildings pathway for commercial chronic and/or acute receptors (130 and 330, respectively).
- The detected concentrations of PCE in wells MW-3, MW-4 and MW-6 exceeded residential tap water RBCs (not applicable under current site use scenarios). Well MW-6, which was 15 feet north of the property boundary, had a detected concentration of PCE (20.5 µg/L) slightly exceeding the residential receptor for ingestion and inhalation from tap water (12 µg/L). As mentioned above, concentrations of PCE in shallow groundwater upgradient and offsite of this location are expected to be below these residential RBCs.

## 6.0 Conclusions

As detailed above, GeoEngineers conducted a Data Gap Investigation at the former Mall 99 Dry Cleaner Site located at 972 North Pacific Highway, Woodburn, Oregon in accordance with the DEQ-approved work plan. The Data Gap Investigation included the installation of additional groundwater monitoring wells and sub-slab soil vapor monitoring points, as well as two to three additional rounds of groundwater quality and vapor intrusion monitoring.. The following conclusions were made based on the data collected to date.

- To date, the results of environmental sampling conducted at the Site (March and May of 2021 and April, July, and October/November of 2024) have identified and/or confirmed the presence of select HVOCs in soil vapor, indoor air, outdoor air, soil and/or groundwater near the former dry-cleaning operation in unit 972.
- The results of a previous beneficial land and water use determination (GeoEngineers, 2021b) indicate that DEQ RBCs associated with vapor intrusion into commercial buildings (RBCwi and RBCsv) and/or direct contact by earth workers (RBCwe) are potentially applicable human health exposure scenarios at the Site.
- Regarding the vapor intrusion into commercial buildings exposure scenario, detected concentrations of PCE in some of the sub-slab soil vapor samples beneath unit 972 exceed the current RBCsv screening values (i.e., 1,600 µg/$m^3$ for chronic exposure and 4,000 µg/$m^3$ for acute exposure). However, the results of indoor and outdoor air sampling indicate that unit 972 building occupants are not being adversely impacted. The most recent indoor air sampling event was conducted following

replacement of the air handling units. The results for PCE in indoor air were two orders of magnitude lower than previous sample results and were at or near the laboratory detection limits.

- Detected concentrations of PCE in groundwater exceed current RBCwi screening values (i.e., 130 µg/L for chronic exposure and 330 µg/L for acute exposure) in monitoring wells MW-3 and MW-4 located southeast of unit 972. However, PCE was not detected or detected near the laboratory detection limit in downgradient and cross-gradient wells (MW-2 and MW-5, respectively) indicating that the groundwater plume is relatively localized and confined to the southeastern portion of Site. Additional groundwater monitoring is planned in January 2025 to confirm this finding and to evaluate seasonal fluctuations.
- The Site is devoid of sensitive ecological habitat as it is completely developed with buildings, asphalt-paved parking and drive lanes, and landscaped areas. Subsequently, the Site data has not been compared to ecological screening values.

# 7.0 Limitations

This report has been prepared for use by Khoury Development, LLC and their authorized agents. This report may be provided to regulatory agencies for review. No third parties should place legal reliance on this report. GeoEngineers has performed this Phase II ESA in accordance with the scope and limitations of our proposal dated February 28, 2024.

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. The conclusions and opinions presented in this report are based on our professional knowledge, judgment and experience. No warranty, express or implied, applies to this report.

Please refer to Appendix C, Report Limitations and Guidelines for Use, for additional information pertaining to the use of this report.

# 8.0 References

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# Tables

# Table 1

## Soil Vapor Chemical Analytical Results[1]
## Volatile Organic Compounds
### Former Mall 99 Cleaners
### Woodburn, Oregon

| Sample Location | Sample Identification | Date | PID Screening Result (ppm) | ASTM 1946 (%) | VOCs[2] (µg/m³) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Helium | 1,1-Dichloroethene | cis 1,2 Dichloroethene | trans 1,2 Dichloroethene | Tetrachloroethene | Trichloroethene | Vinyl Chloride |
| **March 2021 Sampling Event** | | | | | | | | | | |
| SV-01 | SV-01 | 3/5/2021 | 11.3 | **0.563** | < 0.793 | < 0.793 | < 0.793 | **7,670** | **5.68** | < 0.511 |
| SV--02 | SV-02 | 3/5/2021 | <10 | **0.109** | < 0.793 | < 0.793 | < 0.793 | **3,590** | < 1.07 | < 0.511 |
| SV-03 | SV-03 | 3/5/2021 | <10 | **0.334** | < 0.793 | < 0.793 | < 0.793 | **48.7** | < 1.07 | < 0.511 |
| **April and November 2024 Sampling Events** | | | | | | | | | | |
| SV-1 | SV-1-042524 | 4/25/2024 | <10 | -- | < 51 | < 51 | < 51 | **22,000** | < 69 | < 33 |
| | SV-1-042524 DUP | 4/25/2024 | <10 | -- | < 52 | < 52 | < 52 | **22,000** | < 70 | < 33 |
| | SV-1-11012024 | 11/1/2024 | <10 | ND | < 29 | < 29 | < 29 | **14,000** | < 40 | < 19 |
| | SV-1-1101224 DUP | 11/1/2024 | <10 | ND | < 29 | < 29 | < 29 | **14,000** | < 40 | < 19 |
| SV-2 | SV-2-042524 | 4/25/2024 | <10 | -- | < 3.5 | < 3.5 | < 3.5 | **370** | < 4.8 | < 2.3 |
| | SV-2-11012024 | 11/1/2024 | <10 | ND | < 4.1 | < 4.1 | < 4.1 | **400** | < 5.5 | < 2.6 |
| SV-3 | SV-3-042524 | 4/25/2024 | <10 | -- | < 4.0 | < 4.0 | < 4.0 | < 6.8 | < 5.4 | < 2.6 |
| | SV-3-11012024 | 11/1/2024 | <10 | ND | < 4.0 | < 4.0 | < 4.0 | < 6.8 | < 5.4 | < 2.6 |
| SV-4 | SV-4-042524 | 4/25/2024 | <10 | -- | < 3.9 | < 3.9 | < 3.9 | **200** | < 5.3 | < 2.5 |
| | SV-4-11012024 | 11/1/2024 | <10 | ND | < 3.9 | < 3.9 | < 3.9 | **40** | < 5.3 | < 2.5 |
| SV-5 | SV-5-042524 | 4/25/2024 | <10 | -- | < 4.0 | < 4.0 | < 4.0 | **110** | < 5.4 | < 2.6 |
| | SV-5-11012024 | 11/1/2024 | <10 | **0.18** | < 4.8 | < 4.8 | < 4.8 | **26** | < 6.4 | < 3.1 |
| **Potentially Applicable DEQ Risk-Based Concentrations[3]** | | | | | | | | | | |
| **Vapor Intrusion into Buildings** | | | | | | | | | | |
| Commercial Chronic | | | | | 29,000 | 5,800 | 5,800 | 1,600 | 100 | 93 |
| Commercial Acute | | | | | 20,000 | NE | 80,000 | 4,000 | 210 | 130,000 |

**Notes:**

[1] Chemical analyses were performed by Pace National Analytical, Mt. Juliet, Tennessee in 2021 and Eurofins Air Toxics, Folsom, California in 2024.

[2] Select Volatile Organic Compounds analyzed by U.S. Environmental Protection Agency (EPA) Method TO-15

[3] Oregon Department of Environmental Quality (DEQ) Risk Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised March 2024

[4] The laboratory recirculated the Summa canisters prior to analyzing helium, but field leak detection did not indicate the potential for breakthrough.

ASTM = ASTM International Standard Practices; µg/m³ = micrograms per cubic meter; -- = Not Analyzed, PID = photoionization detector

VOCs = volatile organic compounds; NE = Not Established; ppm = parts per million; % = percent

<0.200 indicates analyte not detected above the method reporting limit presented.

**Bold** indicates the analyte was detected above laboratory reporting limit.

Gray Shading indicates that the detected analyte concentration was greater than one or more DEQ RBCs soil vapor.

# Table 2

## Air Chemical Analytical Results[1]
## Volatile Organic Compounds
### Former Mall 99 Cleaners
### Woodburn, Oregon

| Sample Location | Sample Identification | Date | VOCs[2] (µg/m$^3$) | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | 1,1-Dichloroethene | cis 1,2 Dichloroethene | trans 1,2 Dichloroethene | Tetrachloroethene | Trichloroethene | Vinyl Chloride |
| **Indoor Air** | | | | | | | | |
| IA-1 | IA-1-042524 | 4/25/2024 | < 0.085 | **0.29** | < 0.85 | **47** | **0.46** | < 0.055 |
| | Corrected[3] | | -- | **--** | -- | **46.06** | **--** | -- |
| | IA-1-11012024 | 11/1/2024 | < 0.053 | < 0.11 | < 0.53 | **0.18** J | < 0.14 | < 0.034 |
| IA-2 | IA-2-042524 | 4/25/2024 | < 0.053 | < 0.11 | < 0.53 | **0.24** | < 0.14 | < 0.034 |
| | Corrected[3] | | -- | -- | -- | < 0.00 | -- | -- |
| | IA-2-11012024 | 11/1/2024 | < 0.052 | < 0.10 | < 0.52 | **0.21** | < 0.14 | < 0.033 |
| **Outdoor Air** | | | | | | | | |
| OA-1 | OA-1-042524 | 4/25/2024 | < 0.052 | < 0.10 | **3.9** | **0.94** | < 0.14 | < 0.033 |
| OA-1 | OA-1-11012024 | 11/1/2024 | < 0.049 | < 0.10 | < 0.49 | < 0.17 | < 0.13 | < 0.032 |
| **Potentially Applicable DEQ Risk-Based Concentrations[3]** | | | | | | | | |
| **Vapor Intrusion into Buildings** | | | | | | | | |
| Commercial Chronic | | | 880 | 180 | 180 | 47 | 3.0 | 2.8 |
| Commercial Acute | | | 600 | NE | 2,400 | 120 | 6.3 | 3,900 |

**Notes:**

[1] Chemical analyses were performed by Eurofins Air Toxics, Folsom, California.

[2] Select Volatile Organic Compounds analyzed by U.S. Environmental Protection Agency (EPA) Method TO-15-SIM

[3] Per guidance the detected concentrations of VOCs in outdoor air were subtracted from the detected concentrations of VOCs in indoor air.

[4] Oregon Department of Environmental Quality (DEQ) Risk Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised March 2024

µg/m$^3$ = micrograms per cubic meter; -- = Not Applicable

VOCs = volatile organic compounds; NE = Not Established

<0.200 indicates analyte not detected above the method reporting limit presented.

**Bold** indicates the analyte was detected above laboratory reporting limit.

# Table 3

## Soil Chemical Analytical Results[1]
## Volatile Organic Compounds
### Former Mall 99 Cleaners
### Woodburn, Oregon

| Sample Location | Sample Identification | Date | Sample Depth (feet bgs) | PID Screening Result (ppm) | Sheen | VOCs[2] (mg/kg) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Tetrachloroethene | Trichloroethene | Vinyl chloride |
| **2021 Sampling Event** | | | | | | | | | | | |
| MW-1 | MW-1 (3-4') | 5/10/2021 | 3 - 4 | 0.7 | NS | < 0.00102 | < 0.00123 | < 0.00175 | **0.0287** | < 0.00098 | < 0.00195 C3 J3 |
| | MW-1 (5-6') | 5/10/2021 | 5 - 6 | 0.4 | NS | < 0.00105 | < 0.00127 | < 0.0018 | **0.00976** | < 0.00101 | < 0.00201 C3 J3 |
| | MW-1 (9-10') | 5/10/2021 | 9 - 10 | 0.2 | NS | < 0.00107 | < 0.0013 | < 0.00184 | **0.0265** | < 0.00103 | < 0.00205 C3 J3 |
| MW-2 | MW-2 (3-4') | 5/11/2021 | 3 - 4 | 0.5 | NS | < 0.00096 | < 0.00116 | < 0.00165 | < 0.00142 | < 0.00093 | < 0.00184 C3 J3 |
| | MW-2 (6-7') | 5/11/2021 | 6 - 7 | 0.1 | NS | < 0.00095 | < 0.00115 | < 0.00163 | < 0.0014 | < 0.00092 | < 0.00182 C3 J3 |
| | MW-2 (10-11') | 5/11/2021 | 10 - 11 | 1.0 | NS | < 0.00097 | < 0.00118 | < 0.00167 | < 0.00143 | < 0.00094 | < 0.00186 C3 J3 |
| MW-3 | MW-3 (2-3') | 5/10/2021 | 2 - 3 | 2.5 | NS | < 0.00098 | < 0.00119 | < 0.00169 | **0.0250** | < 0.00095 | < 0.00188 C3 J3 |
| | MW-3 (5-6') | 5/10/2021 | 5 - 6 | 0.9 | NS | < 0.00102 | < 0.00123 | < 0.00175 | < 0.00151 | < 0.00098 | < 0.00195 C3 J3 |
| | MW-3 (9-10') | 5/10/2021 | 9 - 10 | 0.5 | NS | < 0.00099 | < 0.0012 | < 0.00171 | **0.00423** | < 0.00096 | < 0.0019 C3 J3 |
| MW-4 | MW-4 (4-5') | 5/10/2021 | 4 - 5 | 0.8 | NS | < 0.00104 | < 0.00126 | < 0.00179 | < 0.00154 | < 0.00101 | < 0.002 C3 J3 |
| | MW-4 (7-8') | 5/10/2021 | 7 - 8 | 1.0 | NS | < 0.00104 | < 0.00127 | < 0.00179 | < 0.00154 | < 0.00101 | < 0.002 C3 J3 |
| | MW-4 (9-10') | 5/10/2021 | 9 - 10 | 1.2 | NS | < 0.00095 | < 0.00115 | < 0.00162 | < 0.0014 | < 0.00091 | < 0.00181 C3 J3 |
| **2024 Sampling Event** | | | | | | | | | | | |
| MW-5 | MW-5 (4-5) | 4/24/2024 | 4-5 | <1.0 | NS | < 0.0375 | < 0.0375 | < 0.0375 | < 0.0375 | < 0.0375 | < 0.0375 |
| | MW-5 (7.5-8.5) | 4/24/2024 | 7.5-8.5 | <1.0 | NS | < 0.0392 | < 0.0392 | < 0.0392 | < 0.0392 | < 0.0392 | < 0.0392 |
| MW-6 | MW-6 (4-5) | 4/24/2024 | 4-5 | <1.0 | NS | < 0.0365 | < 0.0365 | < 0.0365 | < 0.0365 | < 0.0365 | < 0.0365 |
| | MW-6 (8.5-9.5) | 4/24/2024 | 8.5-9.5 | <1.0 | NS | < 0.0378 | < 0.0378 | < 0.0378 | < 0.0378 | < 0.0378 | < 0.0378 |
| MW-7 | MW-7 (3-4) | 4/24/2024 | 3-4 | <1.0 | NS | < 0.0342 | < 0.0342 | < 0.0342 | < 0.0342 | < 0.0342 | < 0.0342 |
| | MW-7 (8.5-9.5) | 4/24/2024 | 8.5-9.5 | <1.0 | NS | < 0.0388 | < 0.0388 | < 0.0388 | < 0.0388 | < 0.0388 | < 0.0388 |
| **Potentially Applicable DEQ Risk-Based Concentrations[3]** | | | | | | | | | | | |
| **Soil Ingestion, Dermal Contact and Inhalation** | | | | | | | | | | | |
| Residential (Pathway Not Applicable) | | | | | | 1,800 | 160 | 1,600 | 220 | 6.7 | 0.36 |
| Urban Residential (Pathway Not Applicable) | | | | | | 3,500 | 310 | 3,100 | 540 | 17 | 0.8 |
| Occupational (Pathway Not Applicable) | | | | | | 29,000 | 2,300 | 23,000 | 1,000 | 51 | 4.4 |
| Construction Worker | | | | | | 13,000 | 710 | 7,100 | 1,800 | 130 | 34 |
| Excavation Worker | | | | | | 370,000 | 20,000 | 200,000 | 50,000 | 3,700 | 950 |
| **Soil Volatilization to Outdoor Air** | | | | | | | | | | | |
| Residential (Pathway Not Applicable) | | | | | | NE | NE | NE | NE | 15 | 5.3 |
| Urban Residential (Pathway Not Applicable) | | | | | | NE | NE | NE | NE | 33 | 6.5 |
| Occupational | | | | | | NE | NE | NE | NE | 96 | 89 |
| **Soil Leaching to Groundwater** | | | | | | | | | | | |
| Residential (Pathway Not Applicable) | | | | | | 6.7 | 0.63 | 7 | 0.46 | 0.013 | 0.00057 |
| Urban Residential (Pathway Not Applicable) | | | | | | 25 | 2.4 | 27 | 1.9 | 0.053 | 0.0014 |
| Occupational | | | | | | 32 | 4.5 | 51 | 1.9 | 0.087 | 0.01 |

Notes:

[1] Chemical analyses were performed by Pace Analytical, Mt. Juliet, Tennessee in 2021 and Apex Labs, Tigard, Oregon in 2024.

[2] Volatile organic compounds analysis by EPA 8260D.

[3] Oregon Department of Environmental Quality (DEQ) Risk Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised August 2023.

mg/kg = milligrams per kilogram, bgs = below ground surface; NE = Not Established; ppm = parts per million

C3: The reported concentration is an estimate. The continuing calibration standard associated with this data responded low. Method sensitivity check is acceptable; J3: The associated batch QC was outside the established quality control range for precision.

<0.00102 indicates analyte not detected above the method reporting limit.

**Bold** indicates the analyte was detected above laboratory detection limit (MDL).

# Table 4

## Groundwater Chemical Analytical Results[1]
## Volatile Organic Compounds
### Former Mall 99 Cleaners
### Woodburn, Oregon

| Monitoring Well | Sample Identification | Date | Top of Casing Elevation[3] | Depth to Water | Groundwater Elevation | VOCs[2] (µg/L) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | 1,1-Dichloroethene | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Tetrachloroethene | Trichloroethene | Vinyl Chloride |
| MW-1 | MW-1-051121 | 5/11/2021 | 100.28 | 10.82 | 89.46 | < 0.188 | < 0.126 | < 0.149 | **19.6** | < 0.19 | < 0.234 |
| | MW-1 | 4/29/2024 | | 8.60 | 91.68 | < 0.400 | < 0.400 | < 0.400 | **5.45** | < 0.400 | < 0.200 |
| | MW-1 | 7/12/2024 | | 11.72 | 88.56 | < 0.400 | < 0.400 | < 0.400 | **4.19** | < 0.400 | < 0.200 |
| | MW-1 | 10/31/2024 | | 13.89 | 86.39 | < 0.400 | < 0.400 | < 0.400 | **3.80** | < 0.400 | < 0.200 |
| MW-2 | MW-2-051121 | 5/11/2021 | 100.18 | 10.68 | 89.50 | < 0.188 | < 0.126 | < 0.149 | < 0.3 | < 0.19 | < 0.234 |
| | MW-2 | 4/29/2024 | | 8.77 | 91.41 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.200 |
| | MW-2 | 7/12/2024 | | 11.62 | 88.56 | < 0.400 | < 0.400 | < 0.400 | **1.02** | < 0.400 | < 0.200 |
| | MW-2 | 10/31/2024 | | 13.81 | 86.37 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.200 |
| MW-3 | MW-3-051121 | 5/11/2021 | 100.21 | 10.66 | 89.55 | < 0.188 | < 0.126 | < 0.149 | **1,630** | < 0.19 | < 0.234 |
| | MW-3 | 4/29/2024 | | 8.64 | 91.57 | < 0.800 | < 0.800 | < 0.800 | **159** | < 0.800 | < 0.400 |
| | MW-3 Dup | | | | | < 0.800 | < 0.800 | < 0.800 | **179** | < 0.800 | < 0.400 |
| | MW-3 | 7/12/2024 | | 11.59 | 88.62 | < 0.800 | < 0.800 | < 0.800 | **778** | < 0.800 | < 0.400 |
| | MW-3 | 10/31/2024 | | 13.77 | 86.44 | < 2.00 | < 2.00 | < 2.00 | **1,390** | < 2.00 | < 1.00 |
| | MW-3 DUP | | | | | < 2.00 | < 2.00 | < 2.00 | **1,770** | < 2.00 | < 1.00 |
| MW-4 | MW-4-051121 | 5/11/2021 | 99.84 | 10.28 | 89.56 | < 0.188 | < 0.126 | < 0.149 | **158** | < 0.19 | < 0.234 |
| | MW-4 | 4/29/2024 | | 8.29 | 91.55 | < 0.400 | < 0.400 | < 0.400 | **855** | < 0.400 | < 0.200 |
| | MW-4 | 7/12/2024 | | 11.24 | 88.60 | < 0.800 | < 0.800 | < 0.800 | **384** | < 0.800 | < 0.400 |
| | MW-4 DUP | | | | | < 0.800 | < 0.800 | < 0.800 | **395** | < 0.800 | < 0.400 |
| | MW-4 | 10/31/2024 | | 13.46 | 86.38 | < 0.400 | < 0.400 | < 0.400 | **184** | < 0.400 | < 0.200 |
| MW-5 | MW-5 | 4/29/2024 | 99.90 | 8.24 | 91.66 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.200 |
| | MW-5 | 7/12/2024 | | 11.30 | 88.60 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.200 |
| | MW-5 | 10/31/2024 | | 13.56 | 86.34 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.400 | < 0.200 |
| MW-6 | MW-6 | 4/29/2024 | 100.18 | 8.34 | 91.84 | < 0.400 | < 0.400 | < 0.400 | **14.3** | < 0.400 | < 0.200 |
| | MW-6 | 7/12/2024 | | 11.55 | 88.63 | < 0.400 | < 0.400 | < 0.400 | **15.8** | < 0.400 | < 0.200 |
| | MW-6 | 10/31/2024 | | 13.71 | 86.47 | < 0.400 | < 0.400 | < 0.400 | **20.5** | < 0.400 | < 0.200 |
| MW-7 | MW-7 | 4/29/2024 | 100.74 | 9.22 | 91.52 | < 0.400 | < 0.400 | < 0.400 | **2.20** | < 0.400 | < 0.200 |
| | MW-7 | 7/12/2024 | | 12.09 | 88.65 | < 0.400 | < 0.400 | < 0.400 | **3.44** | < 0.400 | < 0.200 |
| | MW-7 | 10/31/2024 | | 14.32 | 86.42 | < 0.400 | < 0.400 | < 0.400 | **9.39** | < 0.400 | < 0.200 |
| **Potentially Applicable DEQ Risk-Based Concentrations[4]** | | | | | | | | | | | |
| **Groundwater Ingestion and Inhalation from Tap Water** | | | | | | | | | | | |
| Residential (Pathway Not Applicable) | | | | | | 280 | 36 | 360 | 12 | 0.49 | 0.027 |
| Urban Residential (Pathway Not Applicable) | | | | | | 1,100 | 140 | 1,400 | 49 | 2.0 | 0.066 |
| Occupational (Pathway Not Applicable) | | | | | | 1,400 | 260 | 2,600 | 48 | 3.3 | 0.49 |
| **Groundwater Volatilization to Outdoor Air** | | | | | | | | | | | |
| Residential (Pathway Not Applicable) | | | | | | 570,000 | NE | NE | 64,000 | 3,300 | 350 |
| Urban Residential (Pathway Not Applicable) | | | | | | 570,000 | NE | NE | 150,000 | 6,900 | 430 |
| Occupational | | | | | | 2,400,000 | NE | NE | NE | 20,000 | 5,900 |
| **Groundwater Vapor Intrusion into Buildings** | | | | | | | | | | | |
| Commerical Chronic | | | | | | 1,300 | 1,800 | 750 | 130 | 13 | 3.3 |
| Commerical Acute | | | | | | 890 | NE | 10,000 | 330 | 27 | 4,600 |
| **Groundwater in Excavation** | | | | | | | | | | | |
| Construction and Excavation Worker | | | | | | 44,000 | 18,000 | 180,000 | 5,600 | 430 | 960 |

**Notes:**

[1] Chemical analyses were performed by Pace Analytical, Mt. Juliet, Tennessee in 2021 and Apex Labs, Tigard, Oregon in 2024.

[2] Volatile organic compounds analysis by EPA 8260D.

[3] The elevations are referenced to a fixed point with an arbitray surface elevation of 100.00 feet. Wells MW-5 through MW-6 will be surveyed in July 2024.

[4] Oregon Department of Environmental Quality (DEQ) Risk Based Decision Making for the Remediation of Petroleum-Contaminated Sites, revised August 2023 and March 2024 (for vapor intrusion only).

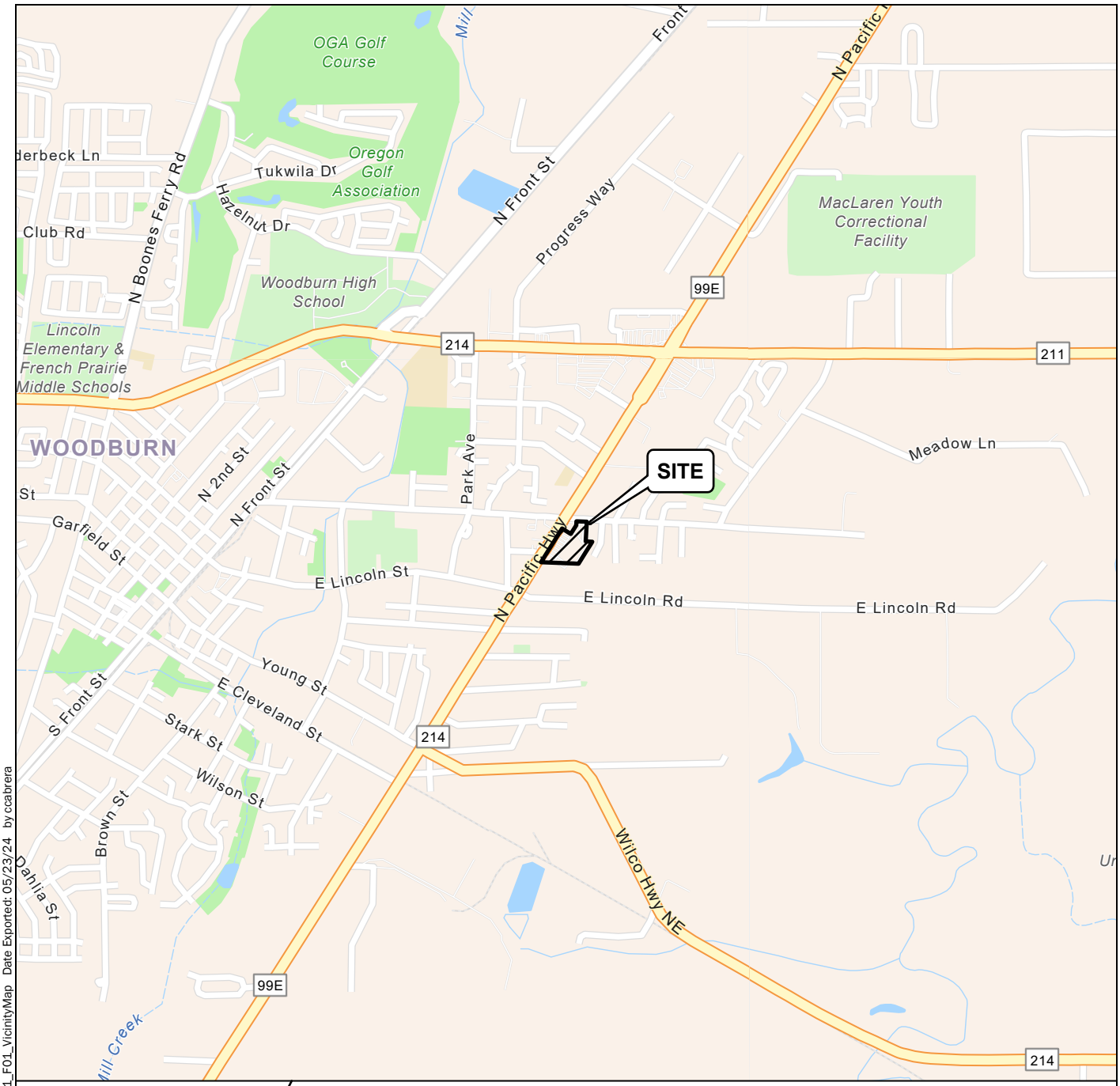
µg/L = micrograms per liter; depth and elevations reported in feet; NE = Not Established

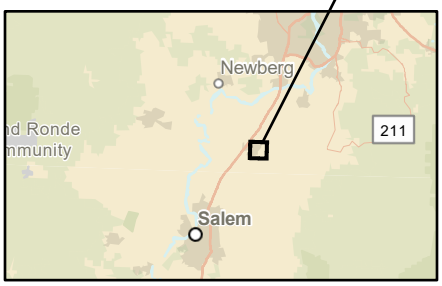
<0.188 indicates analyte not detected above the method reporting limit.

**Bold** indicates the analyte was detected above laboratory detection limit (MDL).

Gray Shading indicates that the detected analyte concentration was greater than one or more DEQ RBCs for groundwater.

# Figures




N
W E
S

2,000 0 2,000

Feet

## Notes:

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

Data Source: ESRI

Projection: NAD 1983 UTM Zone 10N

**Vicinity Map**

Former Mall 99 Cleaners
976 North Pacific Highway
Woodburn, Oregon 97301

GeoEngineers

**Figure 1**

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**Legend**

- MW-1 — Monitoring Well Number
- SV-1 — Sub-Slab Soil Vapor Location
- IA-1/OA-1 — Indoor/Outdoor Air Sample Location
- Approximate Property Boundary

N

0 50

Feet

Notes:

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

Data Source: ESRI Clarity. Streets from Marion County GIS.
Contours generated by Surfer using Kriging Interpolation method,

Projection: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

**Site Plan and Exploration Locations**

Former Mall 99 Cleaners
976 North Pacific Highway
Woodburn, Oregon 97301

GeoEngineers

**Figure 2**

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**Legend**

MW-1
5.45
91.68
Monitoring Well Number with PCE Concentration and Groundwater Elevation (April 2024)

Inferred Groundwater Contour (0.10 foot)

Groundwater Flow Direction

Approximate Property Boundary

Tetrachloroethene (PCE) concentration in micrograms per Liter

Groundwater elevation in feet.

NM = not measured

N

0 80

Feet

Notes:

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

Data Source: ESRI Clarity. Streets from Marion County GIS.
Contours generated by Surfer using Kriging Interpolation method,

Projection: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

**Groundwater Results - April 2024**

Former Mall 99 Cleaners
976 North Pacific Highway
Woodburn, Oregon 97301

GeoEngineers

**Figure 3**

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**Legend**

MW-1
4.19
88.56
Monitoring Well Number with PCE Concentration and Groundwater Elevation (July 2024)

Groundwater Flow Direction

Approximate Property Boundary

Tetrachloroethene (PCE) concentration in micrograms per Liter

Groundwater elevation in feet.

NM = not measured

N

0 80

Feet

Notes:

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

Data Source: ESRI Clarity. Streets from Marion County GIS.
Contours generated by Surfer using Kriging Interpolation method,

Projection: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

**Groundwater Results - July 2024**

Former Mall 99 Cleaners
976 North Pacific Highway
Woodburn, Oregon 97301

GeoEngineers

**Figure 4**

P:\24\24986001\GIS\24986001_Project\24986001_Project.aprx\2498600102_F05_GroundwaterResults - Oct2024 Date Exported: 12/05/24 by ccabrera


**Legend**

MW-1
3.80
86.39

Monitoring Well Number with PCE Concentration and Groundwater Elevation (July 2024)

Groundwater Flow Direction

Approximate Property Boundary

Tetrachloroethene (PCE) concentration in micrograms per Liter

Groundwater elevation in feet.

NM = not measured

N

0 80

Feet

Notes:

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

Data Source: ESRI Clarity. Streets from Marion County GIS.
Contours generated by Surfer using Kriging Interpolation method,

Projection: NAD 1983 HARN StatePlane Oregon North FIPS 3601 Feet Intl

**Groundwater Results - October 2024**

Former Mall 99 Cleaners
976 North Pacific Highway
Woodburn, Oregon 97301

GeoEngineers

**Figure 5**

# Appendices

# Appendix A
## Field Procedures and Boring/Well Construction Logs

# Appendix A
# Field Procedures and Boring/Well Construction Logs

## UNDERGROUND UTILITY LOCATE

Prior to drilling activities, a public utility notification service was contacted to mark the public utilities in the exploration area, rights-of-way and easements. In addition, a private underground utility locate service was contracted (APS Locates) to identify any subsurface utilities and/or potential underground physical hazards at the proposed boring locations.

## SUB-SLAB SOIL VAPOR PROBE INSTALLATION

Sub-slab soil vapor samples will be collected inside the building using Vapor Pin™ sampling devices. The Vapor Pins™ are installed following the manufacturers' standard operating procedures (SOPs).

General installation procedures for the sub-slab sampling device were as follows:

- Check for buried obstacles (pipes, electrical lines, etc.) prior to proceeding. A subcontractor will perform a private utility locate to clear the sub-slab soil vapor sample locations.
- Set up vacuum to collect drill cuttings.
- Drill a 5/8-inch-diameter hole through the slab and approximately 1 inch into the underlying soil to form a void.
- Remove the drill bit, brush the hole with the bottle brush, and remove the loose cuttings with the vacuum.
- Place the lower end of sampling device assembly into the drilled hole. Place the small hole located in the handle of the extraction/installation tool over the sampling device to protect the barb fitting and cap and tapped the sampling device into place using a dead blow hammer. Make sure the extraction/installation tool is aligned parallel to the sampling device to avoid damaging the barb fitting.
- During installation, the silicone sleeve forms a slight bulge between the slab and the sample device shoulder creating a seal. Place a protective cap on sampling device to prevent vapor loss prior to sampling.
- Allow at least 2 hours for the sub-slab soil vapor conditions to equilibrate prior to sampling.

## SUB-SLAB SOIL VAPOR SAMPLING PROCEDURE

The following procedure is followed to collect sub-slab soil vapor samples:

- Connect new fluoropolymer (Teflon®) tubing to the sub-slab soil vapor probe, using the barb fitting on the top of the sampling device.
- Connect the tubing (aboveground) to a sampling manifold.
- Vacuum test the sampling manifold (shut-in test) by briefly introducing a vacuum to the aboveground portion of the sampling train and checking for loss of vacuum. If vacuum loss is observed, connections

and fittings in the sample train are checked and adjusted, then vacuum-tested again. This test is repeated until the sampling train has demonstrated that tightness is achieved.

- The sampling train (aboveground and belowground components) is enshrouded in a helium rich environment and then purged using a graduated syringe. Purge volumes are calculated based on the graduations on the syringe and the volume of the soil vapor probe and sample train.
- The soil vapor sample is obtained using a laboratory provided 1-liter evacuated Summa canister (with approximately 30 inches of mercury vacuum set by the laboratory) with a regulated flow rate of less than or equal to approximately 200 milliliters per minute (mL/min). The canister is filled with soil vapor for approximately 5 minutes or until a vacuum equivalent of approximately 5 inches of mercury remains in the Summa canister, whichever comes first. The initial and final canister vacuums are recorded in the field notebook/report.

## SOIL SAMPLING

Exploratory borings were advanced using a track-mounted, direct-push drill rig operated by Xavier Environmental (Xavier) of Portland, Oregon. Soil samples were obtained continuously from each direct-push exploration using a 5-foot-long, 2-inch-diameter piston sampler lined with acrylic sleeves. The sealed piston sampler allows for the collection of soil samples from discrete depth intervals without interference from overlying soil.

A GeoEngineers representative visually classified the soil encountered in each boring in general accordance with ASTM International (ASTM) Standard Practices Test Method D 2488-17. Boring logs are included in this appendix, as shown in Figures A-1 through A-4.

The sampling equipment was decontaminated before each boring using a Liqui-Nox® solution wash and a distilled water rinse. Soil samples were obtained for field screening and potential chemical analysis from the sampler using new nitrile gloves. A portion of each sample was placed in laboratory-prepared sample jars for potential chemical analysis. The remaining portion of each sample was used for field screening. Samples submitted for chemical analysis are shown on the boring logs (indicated by CA = Chemical Analysis). The soil samples were placed in a cooler with ice for transport to the laboratory. Standard chain-of-custody procedures were followed in transporting the soil samples to the laboratory.

## FIELD SCREENING OF SOIL SAMPLES

Soil samples obtained from the borings were screened in the field for evidence of contamination using: (1) visual examination; (2) sheen screening; and/or (3) or photoionization detector (PID). The results of headspace and sheen screening are included in the boring logs and in Table 1 for soil samples tested by chemical analysis.

Visual screening consists of inspecting the soil for stains indicative of petroleum-related contamination. Visual screening is generally more effective when contamination is related to heavy petroleum hydrocarbons, such as motor oil or hydraulic oil, or when hydrocarbon concentrations are high. Sheen screening and headspace vapor screening are more sensitive methods that have been effective in detecting contamination at concentrations less than regulatory cleanup guidelines. Sheen screening involves placing soil in a pan of water and observing the water surface for signs of sheen. Sheen classifications are as follows:

| | |
|---|---|
| No Sheen (NS) | No visible sheen on water surface. |
| Slight Sheen (SS) | Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly. |
| Moderate Sheen (MS) | Light to heavy sheen, may have some color/iridescence; spread is irregular to flowing; few remaining areas of no sheen on water surface. |
| 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 sample bag. Air is captured in the bag and the bag is shaken to expose the soil to the air trapped in the bag. The probe of a PID is inserted in the bag and the instrument measures the concentration of combustible vapor in the air removed from the sample headspace. The PID measures concentrations in ppm (parts per million) and is calibrated to isobutylene. The PID is designed to quantify combustible gas and organic vapor concentrations up to 15,000 ppm. Field screening results are site-specific and vary with soil type, soil moisture content, temperature and type of contaminant.

## MONITORING WELL CONSTRUCTION, DEVELOPMENT AND SURVEYING

The monitoring wells were constructed in accordance with Oregon Department of Environmental Quality – Groundwater Monitoring Well Drilling, Construction and Decommissioning guidance document. All monitoring well records were submitted in accordance with Oregon DEQ monitoring well construction standards. Monitoring well installations were observed and documented by a GeoEngineers field representative on a monitoring well construction record form.

The monitoring wells were installed using direct-push drilling equipment and were constructed of 2-inch-diameter, Schedule 40 polyvinyl chloride (PVC) casing and 0.01-inch slot width well screens. Well screen depths were based on groundwater conditions observed in the field such that the top of the shallow water table intercepted the well screen. A silica-sand filter pack was installed around the well screen from the base of the well to approximately 2 feet above the top of the well screen. Each well was completed with a bentonite seal and a flush-mount surface monument. A lockable cap was installed in the top of the PVC well casing. A concrete surface seal was placed around the monument at the ground surface.

Each monitoring well was developed to remove water introduced into the well during drilling (if any), to stabilize the filter pack and formation materials surrounding the well screen and restore the hydraulic connection between the well screen and the surrounding soil. Each well was developed using surging and pumping techniques; wells were surged and then pumped until the development water was relatively clear and free from suspended solids. Two to five gallons of water were purged from each monitoring well (MW-1 through MW-4). The total depth of the well was measured and recorded prior to and after development. Development purge water was collected and stored on site in drums.

The locations of the monitoring wells were established in the field using a hand-held iPad with global positioning system (GPS) software, and subsequently surveyed with a laser-level referencing an arbitrary 100-foot point located on site.

## GROUNDWATER MONITORING

### *Depth to Groundwater*

The depths to the groundwater table relative to ground surface were measured using an oil-water interface probe (Heron Dipper-T). The electric indicator was cleaned with a Liqui-Nox® solution wash and a distilled water rinse prior to use in each well.

### *Groundwater Sampling*

Following depth to groundwater measurements, groundwater samples were collected from the installed monitoring wells consistent with the U.S. Environmental Protection Agency's (EPA) low-flow groundwater sampling procedure, as described in EPA (2017) and Puls and Barcelona (1996). Groundwater purging and sampling was performed using a peristaltic pump with new polyethylene tubing connected to a flow-through cell on wells MW-1 through MW-3. During purging activities, water quality parameters, including pH, specific conductivity, oxidation reduction potential, dissolved oxygen (DO), turbidity and temperature were measured using a calibrated multi-parameter meter attached to the flow-through cell. Water quality parameters were recorded on a groundwater sampling form. Groundwater samples were collected after: (1) water quality parameters stabilized; or (2) a maximum purge time of 30 minutes was achieved. During purging and sampling, the purge rate did not exceed approximately 500 milliliters per minute. Water quality parameter stabilization criteria included the following:

- Turbidity: ±10 percent for values greater than 5 nephelometric turbidity units (NTUs)
- Conductivity: ±3 percent
- pH: ±0.1 unit
- Temperature: ±3 percent
- DO: ± 10 percent

Groundwater samples were transferred in the field to laboratory-prepared sample containers and kept cool in an ice-chilled cooler during transport to the testing laboratory. Chain-of-custody procedures were observed from the time of sample collection to delivery to the testing laboratory.

## INVESTIGATIVE WASTE DISPOSAL

Drill cuttings and decontamination/purge water generated during drilling and sampling activities a temporarily stored on site in labeled 55-gallon drums. A subcontractor will dispose of the drums likely to designate as hazardous waste.

## SOIL CLASSIFICATION CHART

| MAJOR DIVISIONS | | | SYMBOLS GRAPH | SYMBOLS LETTER | TYPICAL DESCRIPTIONS |
|---|---|---|---|---|---|
| COARSE GRAINED SOILS | GRAVEL AND GRAVELLY SOILS | CLEAN GRAVELS (LITTLE OR NO FINES) | | GW | WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES |
| | | | | GP | POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES |
| | MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE | GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | GM | SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES |
| | | | | GC | CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES |
| MORE THAN 50% RETAINED ON NO. 200 SIEVE | SAND AND SANDY SOILS | CLEAN SANDS (LITTLE OR NO FINES) | | SW | WELL-GRADED SANDS, GRAVELLY SANDS |
| | | | | SP | POORLY-GRADED SANDS, GRAVELLY SAND |
| | MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE | SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES) | | SM | SILTY SANDS, SAND - SILT MIXTURES |
| | | | | SC | CLAYEY SANDS, SAND - CLAY MIXTURES |
| FINE GRAINED SOILS | SILTS AND CLAYS | LIQUID LIMIT LESS THAN 50 | | ML | INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY |
| | | | | CL | INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS |
| | | | | OL | ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY |
| MORE THAN 50% PASSING NO. 200 SIEVE | SILTS AND CLAYS | LIQUID LIMIT GREATER THAN 50 | | MH | INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS |
| | | | | CH | INORGANIC CLAYS OF HIGH PLASTICITY |
| | | | | OH | ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY |
| HIGHLY ORGANIC SOILS | | | | PT | PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS |

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

### Sampler Symbol Descriptions

- Modified California Sampler (6-inch sleeve) or Dames & Moore
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

## ADDITIONAL MATERIAL SYMBOLS

| SYMBOLS GRAPH | SYMBOLS LETTER | TYPICAL DESCRIPTIONS |
|---|---|---|
| | AC | Asphalt Concrete |
| | CC | Cement Concrete |
| | CR | Crushed Rock/ Quarry Spalls |
| | SOD | Sod/Forest Duff |
| | TS | Topsoil |

### Groundwater Contact

- Measured groundwater level in exploration, well, or piezometer
- Measured free product in well or piezometer

### Graphic Log Contact

- Distinct contact between soil strata
- Approximate contact between soil strata

### Material Description Contact

- Contact between geologic units
- Contact between soil of the same geologic unit

### Laboratory / Field Tests

| | |
|---|---|
| %F | Percent fines |
| %G | Percent gravel |
| AL | Atterberg limits |
| CA | Chemical analysis |
| CP | Laboratory compaction test |
| CS | Consolidation test |
| DD | Dry density |
| DS | Direct shear |
| HA | Hydrometer analysis |
| MC | Moisture content |
| MD | Moisture content and dry density |
| Mohs | Mohs hardness scale |
| OC | Organic content |
| PM | Permeability or hydraulic conductivity |
| PI | Plasticity index |
| PL | Point load test |
| PP | Pocket penetrometer |
| SA | Sieve analysis |
| TX | Triaxial compression |
| UC | Unconfined compression |
| UU | Unconsolidated undrained triaxial compression |
| VS | Vane shear |

### Sheen Classification

| | |
|---|---|
| NS | No Visible Sheen |
| SS | Slight Sheen |
| MS | Moderate Sheen |
| HS | Heavy Sheen |

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

# Key to Exploration Logs

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Figure A-1

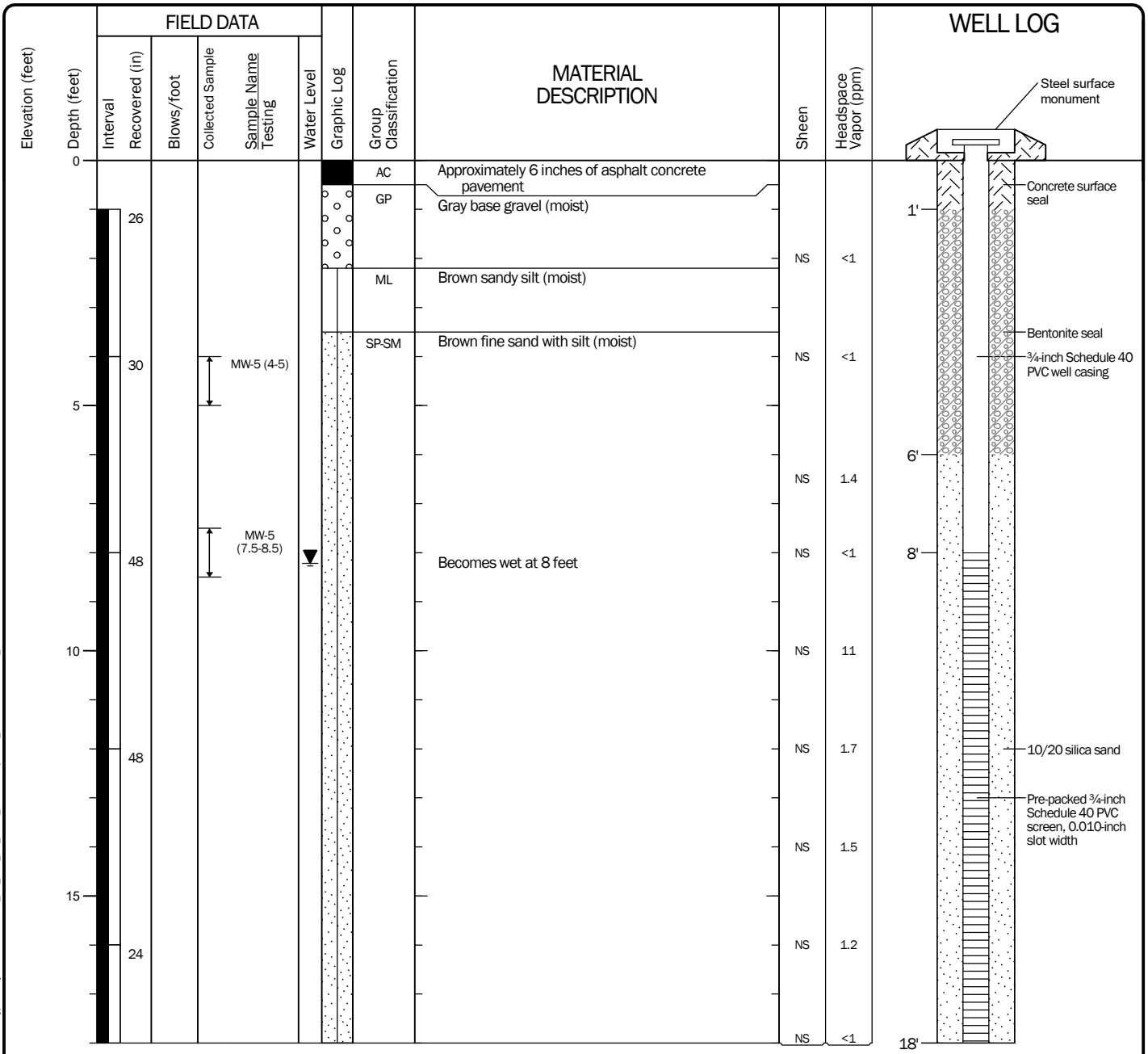
| Drilled | Start | End | Total Depth (ft) | Logged By | Checked By | Driller | Drilling Method |
|---|---|---|---|---|---|---|---|
| | 4/24/2024 | 4/24/2024 | 18 | CEW | CJW | Xavier Environmental | Direct-Push |

| | | | |
|---|---|---|---|
| Hammer Data | N/A | Drilling Equipment | Geoprobe 54LT |
| Surface Elevation (ft) Vertical Datum | Undetermined | Top of Casing Elevation (ft) | Not Measured |
| Latitude Longitude | 45.143703 -122.836655 | Horizontal Datum | Decimal Degrees WGS84 (feet) |

A 2-in well was installed on 4/24/2024 to a depth of 18 ft.

| Groundwater Date Measured | Depth to Water (ft) | Elevation (ft) |
|---|---|---|
| 4/24/2024 | 8.22 | Not Measured |

Notes:




Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

# Log of Monitoring Well MW-5

GeoEngineers

Project: Former Mall 99 Cleaners
Project Location: Woodburn, Oregon
Project Number: 24986-001-02

Figure A-2
Sheet 1 of 1

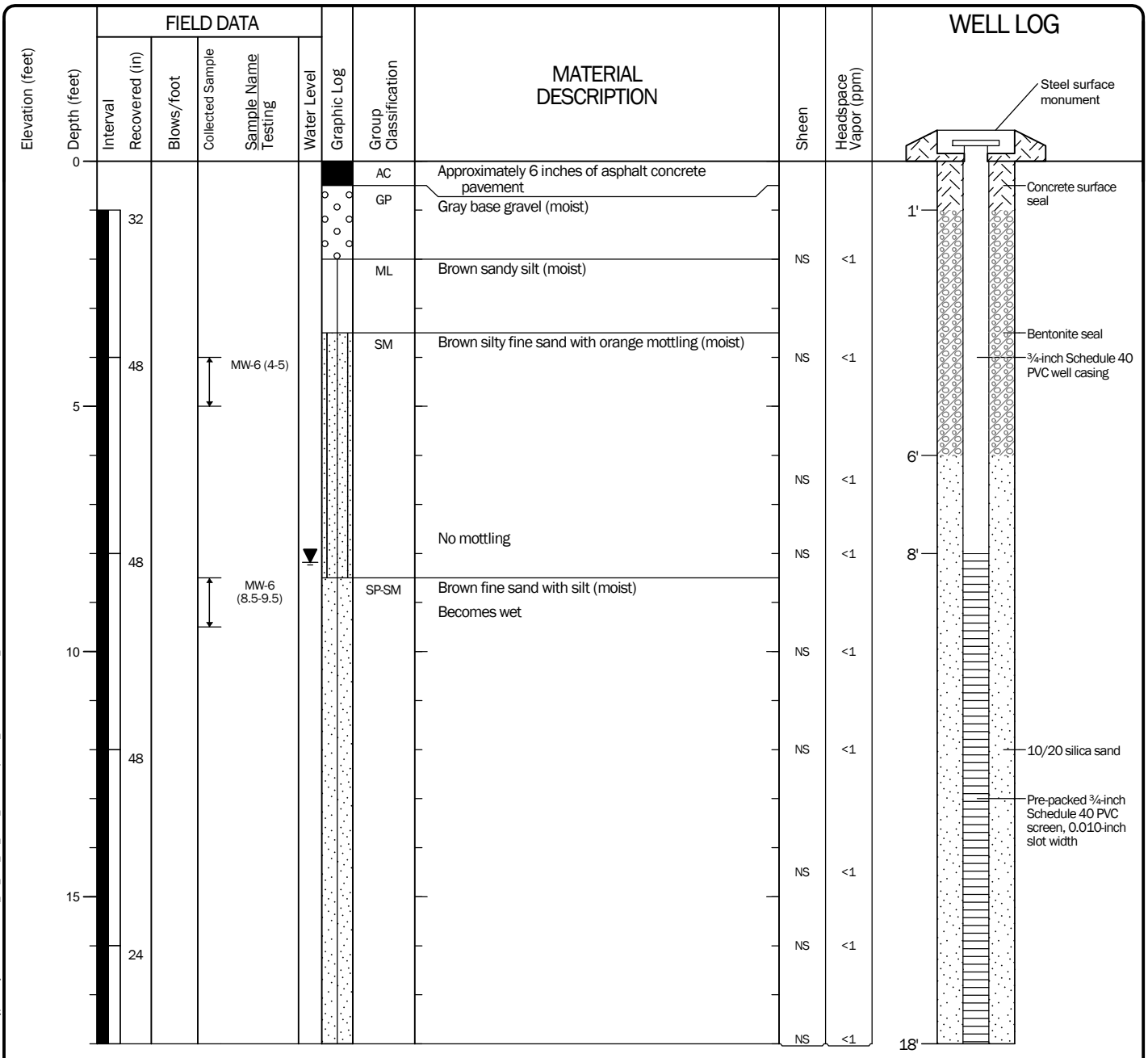
| Drilled | Start | End | Total Depth (ft) | Logged By | Checked By | Driller | Drilling Method |
|---|---|---|---|---|---|---|---|
| | 4/24/2024 | 4/24/2024 | 18 | CEW | CJW | Xavier Environmental | Direct-Push |

| | | | |
|---|---|---|---|
| Hammer Data | N/A | Drilling Equipment | Geoprobe 54LT |
| Surface Elevation (ft) Vertical Datum | Undetermined | Top of Casing Elevation (ft) | Not Measured |
| Latitude Longitude | 45.143667 -122.836214 | Horizontal Datum | Decimal Degrees WGS84 (feet) |

A 2-in well was installed on 4/24/2024 to a depth of 18 ft.

| Groundwater Date Measured | Depth to Water (ft) | Elevation (ft) |
|---|---|---|
| 4/24/2024 | 8.18 | Not Measured |

Notes:




Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

# Log of Monitoring Well MW-6

GeoEngineers

Project: Former Mall 99 Cleaners
Project Location: Woodburn, Oregon
Project Number: 24986-001-02

Figure A-3
Sheet 1 of 1

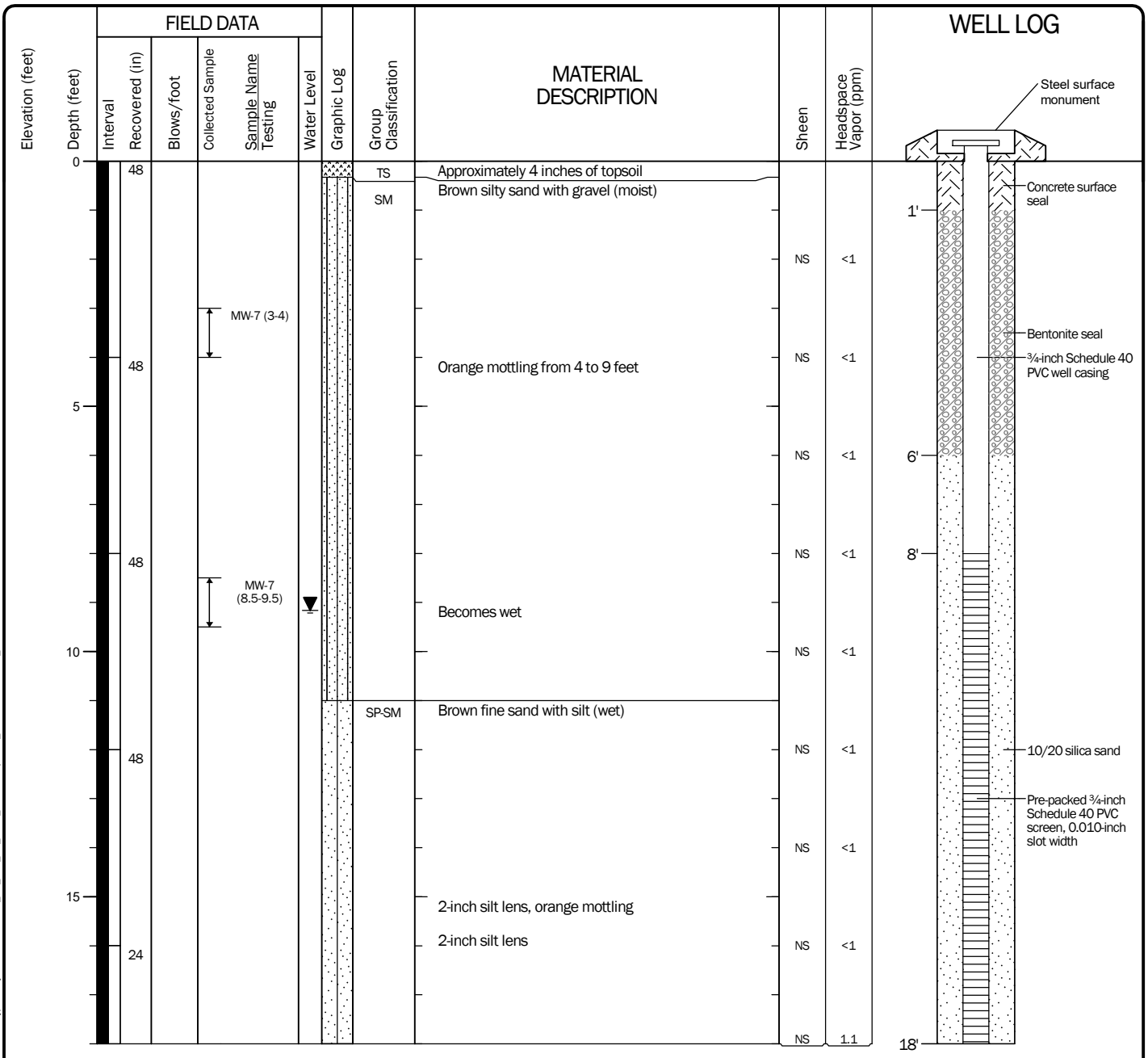
| Drilled | Start | End | Total Depth (ft) | Logged By | Checked By | Driller | Drilling Method |
|---|---|---|---|---|---|---|---|
| | 4/24/2024 | 4/24/2024 | 18 | CEW | CJW | Xavier Environmental | Direct-Push |

| | | | |
|---|---|---|---|
| Hammer Data | N/A | Drilling Equipment | Geoprobe 54LT |
| Surface Elevation (ft) Vertical Datum | Undetermined | Top of Casing Elevation (ft) | Not Measured |
| Latitude Longitude | 45.143898 -122.836366 | Horizontal Datum | Decimal Degrees WGS84 (feet) |

A 2-in well was installed on 4/24/2024 to a depth of 18 ft.

| Groundwater Date Measured | Depth to Water (ft) | Elevation (ft) |
|---|---|---|
| 4/24/2024 | 9.16 | Not Measured |

Notes:




Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on Aerial Imagery. Vertical approximated based on NA.

# Log of Monitoring Well MW-7

GeoEngineers

Project: Former Mall 99 Cleaners
Project Location: Woodburn, Oregon
Project Number: 24986-001-02

Figure A-4
Sheet 1 of 1

# Appendix B
## Laboratory Reports and Quality Assurance/Quality Control Review

# Appendix B
# Laboratory Reports and Quality Assurance/Quality Control Review

## SAMPLE CUSTODY

### *Sample Containers and Storage*

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

### *Field Custody Procedures*

All samples obtained for chemical analysis were transferred into clean sample containers supplied by the project analytical laboratory. Sufficient sample volume was obtained for the laboratory to complete the method-specific QC analyses. Possession of the samples was documented by the chain-of-custody. The chain-of-custody form was signed and dated in the appropriate places by parties involved with a transfer of custody.

### *Field Duplicates*

Field duplicates for soil vapor and water samples were collected at a daily frequency of approximately 10 percent (not less than 1 duplicate per 10 samples). Field duplicates consisted of two samples collected sequentially from one sample location to assess data variability. The field duplicates were analyzed by the same analytical methods used for primary samples. Relative percent differences (RPDs) for field duplicates for samples were calculated to be within 3 to 11 percent, which is within the allowed range of variability.

### *Laboratory Custody Procedures*

Upon receipt of the samples at the laboratory, whether delivered by GeoEngineers personnel or a courier service, the following procedures were followed.

The custody seals were broken, the chain-of-custody form was signed by the laboratory personnel, and the conditions of the samples were recorded on the form. The original chain-of-custody form remains with the laboratory and copies were returned to GeoEngineers.

## LABORATORY QUALITY CONTROL

The laboratory maintains an internal quality assurance program as documented in its laboratory quality assurance manual. The laboratory uses 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 also uses data quality goals for individual chemicals or groups of chemicals based on the long-term performance of the test methods.

Very few flags for matrix spikes and batch QC precision and assurance were noted. For most samples with these flags other QC parameters (spikes, duplicates matrix spikes) were within control limits. As such, this data are considered usable and valid. GeoEngineers reviewed the laboratory reports for qualifiers. Very few flags for matrix spikes, laboratory control sample and batch QC precision and assurance were noted. For most samples with these flags other QC parameters (spikes, duplicates matrix spikes) were within control limits. As such, this data are considered usable and valid.

# Appendix C
## Report Limitations and Guidelines for Use

# Appendix C

# Report Limitations and Guidelines for Use[1]

This appendix provides information to help you manage your risks with respect to the use of this report.

## READ THESE PROVISIONS CLOSELY

Some clients, design professionals and contractors may not recognize that the geoscience practices (geotechnical engineering, geology and environmental science) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. GeoEngineers includes these explanatory "limitations" provisions in our reports to help reduce such risks. Please confer with GeoEngineers if you are unclear how these "Report Limitations and Guidelines for Use" apply to your project or site.

## ENVIRONMENTAL SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES, PERSONS AND PROJECTS

This report has been prepared by GeoEngineers, Inc. (GeoEngineers) for the exclusive use of Khoury Development, LLC, their authorized agents and regulatory agencies. This report is not intended for use by others, and the information contained herein is not applicable to other sites.

GeoEngineers structures our services to meet the specific needs of our clients. For example, an environmental site assessment or remedial action study conducted for a property owner may not fulfill the needs of a prospective purchaser of the same property. Because each environmental study is unique, each environmental report is unique, prepared solely for the specific client and project site. No one except the client should rely on this plan without first conferring with GeoEngineers. This report should not be applied for any purpose or project except the one originally contemplated.

## THIS ENVIRONMENTAL REPORT IS BASED ON A UNIQUE SET OF PROJECT-SPECIFIC FACTORS

This report applies to the Former Mall 99 Cleaners facility located at located at 972 North Pacific Highway, Woodburn, Oregon. GeoEngineers considered a number of unique, project-specific factors when establishing the scope of services for this project and report. Unless GeoEngineers specifically indicates otherwise, do not rely on this report if it was:

- Not prepared for you,
- Not prepared for your project,
- Not prepared for the specific site explored, or

[1] Developed based on material provided by the Geoprofessional Business Association, Professional Firms Practicing in the GeoSciences, www.geoprofessional.org.

- Completed before important project changes were made.

If important changes are made after the date of this remedial action plan, GeoEngineers should be given the opportunity to review our interpretations and recommendations and provide written modifications or confirmation, as appropriate.

## RELIANCE CONDITIONS FOR THIRD PARTIES

No third party may rely on the product of our services unless GeoEngineers agrees in advance, and in writing to such reliance. This is to provide our firm with reasonable protection against open-ended liability claims by third parties with whom there would otherwise be no contractual limits to their actions.

## ENVIRONMENTAL REGULATIONS ARE ALWAYS EVOLVING

Some substances may be present in the site vicinity in quantities or under conditions that may have led, or may lead, to contamination of the subject site, but are not included in current local, state or federal regulatory definitions of hazardous substances or do not otherwise present current potential liability. GeoEngineers cannot be responsible if the standards for appropriate inquiry, or regulatory definitions of hazardous substance, change or if more stringent environmental standards are developed in the future.

## SUBSURFACE CONDITIONS CAN CHANGE

This report is based on conditions that existed at the time our site studies were performed. The findings and conclusions of this report may be affected by the passage of time, by manmade events such as construction on or adjacent to the site, by new releases of hazardous substances, or by natural events such as floods, earthquakes, slope instability or groundwater fluctuations. Always contact GeoEngineers before applying this report to determine if it is still applicable.

## SOIL AND GROUNDWATER END USE

The cleanup levels referenced in this report are site- and situation-specific. The cleanup levels may not be applicable for other sites or for other on-site uses of the affected media (soil and/or groundwater). Note that hazardous substances may be present in some of the site soil and/or groundwater at detectable concentrations that are less than the referenced cleanup levels. GeoEngineers should be contacted prior to the export of soil or groundwater from the subject site or reuse of the affected media on site to evaluate the potential for associated environmental liabilities. We cannot be responsible for potential environmental liability arising out of the transfer of soil and/or groundwater from the subject site to another location or its reuse on site in instances that we were not aware of or could not control.

## BIOLOGICAL POLLUTANTS

GeoEngineers' Scope of Work specifically excludes the investigation, detection, prevention or assessment of the presence of Biological Pollutants. Accordingly, this report does not include any interpretations, recommendations, findings, or conclusions regarding the detecting, assessing, preventing or abating of Biological Pollutants and no conclusions or inferences should be drawn regarding Biological Pollutants, as they may relate to this project. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria and viruses, and/or any of their byproducts.

If Client desires these specialized services, they should be obtained from a consultant who offers services in this specialized field.

## DO NOT REDRAW THE EXPLORATION LOGS

Environmental scientists prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in an environmental report should never be redrawn for inclusion in other design drawings. Only photographic or electronic reproduction is acceptable but recognize that separating logs from the report can elevate risk.

## GEOTECHNICAL, GEOLOGIC AND ENVIRONMENTAL REPORTS SHOULD NOT BE INTERCHANGED

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, a geotechnical engineering or geologic report does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

## MOST ENVIRONMENTAL FINDINGS ARE PROFESSIONAL OPINIONS

Our interpretations of subsurface conditions are based on field observations and chemical analytical data from the sampling locations at the site documented in past reports. Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. GeoEngineers reviewed field and laboratory data and then applied our professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ – sometimes significantly – from those indicated in this report. There is always a potential that areas of contamination exist in portions of the site that were not sampled or tested during this or previous studies. Our remedial action plan, conclusions and interpretations should not be construed as a warranty of the subsurface conditions.