CLEANUP ACTION PLAN

Seventh Avenue Service

701 South Jackson Street, Seattle, WA 98104 King

County Parcel #5247802725

CSID: 11348, FSID: 99187287

September 20, 2022

Table of Contents

Tables

Figures

Appendices

Executive Summary

This Cleanup Action Plan (CAP) describes the cleanup actions selected by the Washington State Department of Ecology (Ecology) for the Seventh Avenue Service site (Site), generally located at 701 South Jackson Street in Seattle, Washington (Property), and as shown on Figures 1 and 2.

This CAP was prepared by Ecology in collaboration with GeoEngineers, Inc. (GeoEngineers) working on behalf of 701 S Jackson Partners, LLC (South Jackson Partners).

This CAP was prepared in compliance with the Model Toxics Control Act (MTCA), the Revised Code of Washington (RCW) 70A.305, Washington Administrative Code (WAC) chapter 173-340. This CAP describes Ecology's proposed cleanup actions for this Site and sets forth the requirements that the cleanup must meet.

Soil explorations, monitoring well installations, and soil, groundwater, and soil gas sampling were completed at the Site as part of the Remedial Investigation (RI) to characterize the nature and extent of the contamination throughout the Site. A Focused Feasibility Study (FS) was also completed to evaluate potential remedial alternatives for the Site based on proven remedial technologies.

As discussed in the *Remedial Investigation and Feasibility Study (RI/FS;* GeoEngineers, 2022), cleanup is warranted to remove contaminated soil within the Property boundary during planned redevelopment followed by the management of the remaining contaminated soil in the city right-of-way (ROW) by engineering and institutional controls. Ecology's selected cleanup action, as described in this CAP, includes contaminated soil removal, engineering controls, institutional controls, and compliance monitoring.

1.0 INTRODUCTION

This CAP describes the cleanup action selected by Ecology for the Site, generally located at 701 South Jackson Street in Seattle, Washington, as shown on Figure 1.

As established in WAC Chapter 173-340-200, a "Site" is defined by the full vertical and lateral extent of contamination that has resulted from the release of hazardous substances into the environment. For the purposes of this CAP, the Site consists of the Property, and a portion of the 7th Avenue South and South Jackson Street ROWs west and north of the Property

boundaries.

This CAP was prepared in compliance with MTCA RCW 70A.305, and WAC Chapter 173-340. This CAP describes the cleanup actions selected by Ecology for the Site and provides additional information in accordance with WAC 173-340-380(1)(a).

The purpose of the CAP is to identify the selected cleanup actions for the Site and to provide an explanatory document for public review. More specifically, this CAP:

- Describes the Site;
- Summarizes current Site conditions;
- Identifies Site-specific cleanup levels and points of compliance for each hazardous substance and medium of concern for the proposed cleanup action;
- Identifies applicable requirements for the cleanup action selection and overall cleanup objective ;
- Summarizes the cleanup action alternatives considered in the remedy selection process;
- Describes the selected cleanup action for the Site and the rational for selecting this alternative;
- Describes the implementation and sequencing for selected cleanup action;
- Identifies residual contamination remaining on the Site after cleanup and restrictions on future uses and activities at the Site to ensure continued protection of human health and the environment; and
- Discusses compliance monitoring requirements.

2.0 SITE DESCRIPTION

The Property consists of one King County Tax Parcel (#5247802725), comprising 0.31 acres, addressed at 701 South Jackson Street in Seattle, Washington (Figures 1 and 2). The Property is located at the southeast corner of South Jackson Street and 7th Avenue South.

The following is an abbreviated legal description of the Property as provided by the King County Department of Assessments:

MAYNARDS D S PLAT & POR VAC ALLEY ADJ LESS ST
Plat Block: 55
Plat Lot: 1-2

The Site is defined as areas where contamination has come to be located because of releases from the Property. The Site comprises the Property (701 South Jackson Street), and a portion of the 7th Avenue South and South Jackson Street ROWs west and north of the Property boundaries.

2.1. Current Condition

The Property is currently developed with two single-story structures, including a former gasoline station building on the northwest portion and an "L"-shaped automobile repair garage along the east and south Property boundaries, and paved parking and drive areas. A small portion of the existing garage on the southwest corner of the Property is currently used for a storage room for "New Century Tea Gallery". Other part of the existing buildings on Property are currently vacant.

The Property is bounded by South Jackson Street to the north, 7th Avenue South to the west, a mixed-use retail and apartment building (currently vacant) to the south, and a restaurant building (House of Hong) to the east (Figure 2).

The primary topographic gradient at the Site is gently sloped from east to west/southwest. Elevations range from approximately 106 feet above mean sea level (AMSL) (North American Vertical Datum of 1988 [NAVD 88 datum]) near the northeast corner of the Property, to approximately 93 feet AMSL near the southwest corner of the Property.

2.2. Historical Land Use Summary

Since redevelopment following the Jackson Street regrading project in 1927, the Property has been used for automobile repair and fueling services. During redevelopment, the large "L"-shaped building was constructed along the southern and eastern portions of the Property.

As early as 1932, a gasoline service station was added to the northwest portion of the Property until sales of gasoline ceased in the 1970s. Historical reports indicated that Jackson Service Station was the first business to operate on the Property, followed by China

Super Service and Oppenheimer Gas. The former gasoline service station operations included two gasoline underground storage tanks (USTs) and an associated fuel dispenser/pump island, and vehicle service/repair. In 2010, the gasoline USTs associated with the service station were decommissioned and removed from the Property. The locations of the former USTs and pump island are depicted on Figure 3.

Although the current use of the Property is still listed as a "service station," the buildings on Property are largely vacant with the exception of a small portion of the existing garage which is used as a storage room for a retail tea shop (New Century Tea Gallery).

2.3. Potential Future Land Use

South Jackson Partners is planning to purchase and redevelop the Property. Redevelopment plans for the Property include a new eight-story building with affordable housing and ground level commercial retail space. The planned redevelopment includes the demolition and removal of the existing buildings and improvements, Property-line to Property-line excavation of subsurface soils to a depth of approximately 15 to 20 feet below ground surface (bgs), and construction of the new building.

2.4. Groundwater Use Assessment

Seattle Public Utilities provides the potable water supply to the City of Seattle. According to Washington State Department of Health (WDOH), Source Water Assessment Program (SWAP) Mapping Application, there are no designated aquifer recharge or wellhead protection areas within several miles of the Site (WDOH 2022). There are no active water supply wells within a 0.5-mile radius of the Property (Ecology 2022).

3.0 SUMMARY OF SITE CONTAMINATION

This section describes the contamination found at the Site and human health and environmental concerns resulting from this contamination.

Between 1992 and 2022, multiple environmental investigations were performed on the Site to evaluate the nature and extent of the contamination. Detailed summaries of these investigations are presented in the *RI/FS* by GeoEngineers, dated September 19, 2022.

The cumulative soil, groundwater and soil gas analytical results from the environmental investigations are presented in attached Tables 1 through 3. The types and locations of the sampling locations from the environmental investigations are depicted on Figure 3. The UST

removal soil sampling locations are depicted on Figure 4.

The investigation analytical data results for soil are depicted on plan view Figures 5 through 7, and selected analytical data are depicted on cross-section Figures 8 through 10.

A conceptual site model (CSM) was developed for the Site based on historical land use and the results of the investigations performed to date. The CSM includes discussion of the contamination sources, contaminants of concern (COCs), media of concern, investigation results, and potential exposure pathways that could affect human or environmental health. The CSM is used to establish the cleanup standards, and select a cleanup action for the Site.

3.1. Sources of Contamination

The petroleum hydrocarbon contamination in soil is associated with the historical operations of gasoline service stations and repair garage. These petroleum hydrocarbon COCs include gasoline-range petroleum hydrocarbons (GRO), benzene, toluene, ethylbenzene, xylenes (BTEX), and naphthalene. These COCs were confirmed in soil at depths between 5 and 17.5 feet bgs on the western and central portions of the Site, including in the 7th Avenue South and South Jackson Street ROWs.

A second source for soil contamination is the imported fill at the Property. COCs including lead and cPAHs that are present in shallow soil are associated with the imported fill.

3.2. Contaminants of Concern

The COCs for the Site are the potentially hazardous compounds that have been detected in environmental media during the environmental investigations. As part of these investigations, 73 soil samples were collected at 33 locations at depths between 2.5 and 40 feet bgs. Soil COCs with concentrations exceeding soil cleanup levels are summarized in the following Table T1. Soil cleanup levels are further discussed in Section 4.1.

Table T1. Summary of Cleanup Level Exceedances in Soil

Contaminant of Concern	Soil Cleanup Level	Maximum Detected Concentration (mg/kg)	Location and depth of Maximum Detected Concentration/Year	Number of cleanup level Exceedances/ Total Number of Samples Analyzed
GRO	30	24,000	B-1-11 @ 12.5’/2011	17/63
Benzene	0.03	110	B-1-11 @ 12.5’/2011	21/63

Contaminant of Concern	Soil Cleanup Level	Maximum Detected Concentration (mg/kg)	Location and depth of Maximum Detected Concentration/Year	Number of cleanup level Exceedances/ Total Number of Samples Analyzed
Toluene	7	1,700	B-1-11 @ 12.5'/2011	8/63
Ethylbenzene	6	470	B-1-11 @ 12.5'/2011	9/63
Xylenes	9	2,400	B-1-11 @ 12.5'/2011	13/63
Naphthalene	5	12.8	FB-5-17 @12.8'/2019	2/15
Total cPAH TEQ	0.1	0.74	GEI-6 @2.5'/2021	1/18
Lead	250	340	GEI-4 @ 2.5'/2021	1/15

Notes:
mg/kg = milligrams per kilogram
Naphthalene Cleanup level is for total naphthalenes.
TEQ = toxicity equivalency quotient

Based on the above Table T1, COCs for the Site include GRO, BTEX and naphthalene from historical release(s) from former gasoline service station and repair garage operations, and lead and total cPAHs from imported fill material.

3.3. Media of Concern

Soil and soil vapor are the confirmed media of concern for the Site. Although there is the potential for discontinuous shallow perched groundwater to enter the excavation, investigation results did not identify continuous perched water at the Site. In deep groundwater, potential COCs were detected at concentrations below the groundwater cleanup levels (groundwater cleanup levels are further discussed in Section 4.2).

3.4. Subsurface Conditions

3.4.1. Soil Conditions

According to the United States Geological Survey (USGS) Seattle South Quadrangle topographic map, the ground surface of the Site and surrounding area slopes down gently to the southwest toward Elliot Bay (USGS 2011). The underlying soil is identified as pre-Vashon deposits consisting of interbedded sand, gravel, silt, and poorly sorted mixtures that are of

unspecified age and origin (Troost, et al 2005). The pre-Vashon deposits are mapped as glacially deposited and are very dense and hard silt, sand, gravel and till, which have been regraded.

Based on investigations completed at the Site, approximately 2 to 10 feet of fill consisting of silty fine to fine sand with silt containing occasional debris (concrete, plastic, metal and brick debris) is locally present beneath the existing structures and improvements and overlying the native soil. Underlying the fill is interbedded fine sand with silt and clayey silt to a depth of approximately 12 feet bgs. Fine to medium silty sand and sand with trace silt underlies the interbedded silt and clayey silt deposits to an approximate depth of 20 feet bgs. Deposits from approximately 20 feet to the maximum depth explored (76.5 feet bgs) consist of fine sand with varying amounts of silt and clayey silt.

3.4.2. Groundwater Conditions

Moist and/or wet soil interpreted as shallow perched groundwater was observed in five soil borings completed at the Site at depths ranging from 12 to 15 feet and 20 to 26 feet bgs. However, shallow groundwater was not observed in three temporary shallow monitoring wells completed on the northern, eastern and southern portions of the Property. Based on the investigation results, shallow perched groundwater may be present at the Site; however, the occurrence of this unit is likely discontinuous and not widespread.

The deep regional groundwater is present beneath the Site at a depth ranging from approximately 61 to 69 feet bgs (Elevation 31 to 34 feet AMSL), based on the depths to groundwater measured in one deep temporary well on the central portion of the Property, and two deep monitoring wells in the west adjacent ROW. Based on the measured depths to groundwater, proximately of the Site to surrounding surface water bodies (i.e., Puget Sound) and local topography, the inferred regional groundwater flow direction is to the west-southwest.

3.5. Soil Characterization

A total of 73 soil samples were collected throughout the Site at 33 locations at depths between 2.5 and 40 feet bgs. These soil samples were analyzed for GRO, diesel- and heavy oil-range total petroleum hydrocarbons (DRO and HRO), BTEX, naphthalene, other volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), and/or metals. The analysis list is in general accordance with Table 830-1 for petroleum releases (WAC 173-340-900) for gasoline service station and repair service garage.

3.5.1. Petroleum Soil Contamination

The extent of petroleum soil contamination appears to be sufficiently defined for the selection of cleanup standards and cleanup actions at the Site.

The petroleum-contaminated soil is confirmed in the western and central portions of the Property, and extends into the 7th Avenue South and South Jackson Street ROW. The lateral extent of the petroleum-contaminated soil is generally defined. Sampling locations were constrained by utilities within South Jackson Street and 7th Avenue South. No soil sampling could be conducted within the ROW adjacent to the northwest corner of the Property due to utility conflicts. There are some uncertainties regarding the extent of contamination in that area. However, the extent of soil contamination does not appear to extend beyond the centerline of 7th Avenue South to the west and South Jackson Street to the north.

The petroleum-contaminated soil is confirmed on the Property at depths between approximately 5 and 17.5 feet bgs. One soil boring (B-1-11) located on the northern edge of the Property had a benzene concentration exceeding the soil cleanup level at the deepest sampling depth at 17.5 feet bgs, with a relatively low concentration of 0.12 mg/kg. One soil boring (FB-5) on the central portion of the Property had GRO and BTEX concentrations exceeding the soil cleanup levels at a sampling depth of 17 feet bgs, while a deeper soil sample at 25 feet bgs had concentrations below the soil cleanup levels. Therefore, most contamination beneath the Property is expected to be shallower than 17.5 feet bgs, with some areas (e.g. near soil borings B-1-11 and FB-5) slightly deeper than 17.5 ft bgs.

The petroleum-contaminated soil is also confirmed beneath the 7th Avenue South ROW west of the Property boundary, between approximately 5 and 17.5 feet bgs. Two soil borings (B-2-11 and B-3-11) had benzene concentrations exceeding the soil cleanup level at the deepest sampling depth at 17.5 ft bgs, with relative low concentrations of 0.051 and 0.06 mg/kg, respectively. The vertical extent of the soil contamination beneath the 7th Avenue South ROW is defined by two deep soil samples collected at 35 and 40 feet bgs (GEI-11-35.0 and GEI-12-40.0), which contained COC concentrations below the laboratory detection limits.

The approximate lateral and vertical extent of contaminant containing soil, is shown in plan view on Figures 5 through 7 and in cross section on Figures 8 through 10. The preliminary estimated volume of contaminated soil requiring cleanup (i.e., soil with GRO, BTEX, naphthalene, cPAHs and lead at concentrations exceeding soil cleanup levels) is approximately 6,000 in-place cubic yards.

3.5.2. Imported Fill Contamination

Only one exceedance was confirmed for lead or cPAHs in all soil samples collected at the Site. cPAHs exceeded the soil cleanup level at a depth of 2.5 feet bgs at soil boring GEI-6, located at the southeast corner of the Property. Lead exceeded the soil cleanup level at a depth of 2.5 feet bgs at soil boring GEI-4, located near the central-northern Property boundary. Therefore, it appears that the soil contamination associated with imported fill material is present in shallow soil in isolated areas.

3.6. Groundwater Characterization

3.6.1. Shallow Groundwater Occurrence

Shallow perched and discontinuous groundwater (i.e., wet soil) was observed at depths ranging between 12 to 15 feet and 20 to 26 feet bgs during the environmental investigations. Therefore, three temporary monitoring wells were installed at soil boring locations GEI-4, GEI-5 and GEI-7 (Figure 3) to evaluate the occurrence of shallow groundwater and the potential for groundwater seepage into the construction excavation. The temporary wells were positioned along the northern, eastern, and southern Property boundaries to provide spatial coverage and in areas where moist/wet soil was observed during drilling. However, no groundwater was observed in the temporary wells, indicating that the potential for shallow groundwater seepage into the construction excavation is low.

3.6.2. Deep Groundwater Occurrence

Continuous/area-wide groundwater was encountered in one temporary well GEI-1 on the central portion of the Property, and two monitoring wells GEI-11 and GEI-12 in the 7th Avenue South ROW west of the Property (Figure 3).

The depth to groundwater within temporary well GEI-1 was measured at 64.1 feet bgs. The depth to groundwater within the permanent wells ranged between 61.3 and 68.8 feet bgs. These correspond to groundwater elevations ranging from approximately 31.2 to 33.9 AMSL.

Groundwater samples were collected from these three wells one time in 2021 or 2022. Groundwater samples were analyzed for GRO, DRO and HRO, BTEX, naphthalene, PAHs, and metals. The analytical results were either not detected greater than the laboratory reporting limits or detected at concentrations less than the groundwater cleanup levels.

3.7. Soil Vapor Characterization

Three shallow (5 to 10 feet bgs) and three deep (20 to 25 feet bgs) sub-slab soil vapor samples

SSV-1 through SSV-3 (Figure 3) were collected along the western and north Property boundaries to evaluate the potential for vapor intrusion. The analytical data were compared to the soil gas screening levels that are further discussed in Section 4.3.

The concentrations of total petroleum hydrocarbons exceeded the soil gas screening levels in two shallow sub-slab vapor samples (SSV-1 and SSV-2), as well as two deep sub-slab vapor samples (SSV-2 and SSV-3). In addition, the benzene, 1,2-Dibromoethane (EDB) and naphthalene concentrations exceeded the soil gas screening levels in shallow soil in the northern and southwestern portions of the Property (SSV-1 and SSV-3). Therefore, there is a potential risk for vapor intrusion.

3.8. Potential Exposure Pathways and Receptors.

This section discusses the confirmed and potential human health and ecological exposure pathways at the Site.

3.8.1. Direct Contact

Soil with COC concentrations greater than the soil cleanup levels is present at depths ranging from near ground surface to approximately 17.5 feet bgs at the Site. This contaminated soil is covered by the existing building and/or pavement (i.e., asphalt paved parking lot and paved building floors). The contaminated soil within the Property is expected to be removed during Property redevelopment. Following the planned Property redevelopment, soil containing COCs remaining in the ROWs will be beneath paved surfaces to prevent direct exposure. Institutional and engineering controls will be in place to prevent direct contact with the remaining contaminated soil in the ROWs.

Until such time that the soil contamination is removed, or engineering and institutional controls are in place to prevent direct contact, this pathway will be considered complete.

3.8.2. Soil Vapor to Indoor Air

Soil vapor (i.e., the air in the pore space between soil grains in the unsaturated zone) can be impacted by volatilization of BTEX and other VOCs from soil. Depending on type and construction of on-Property structures, there is the potential for soil vapors contained in soil beyond the construction excavation footprint to impact indoor air through vapor intrusion. However, exposure via the soil vapor to indoor air pathway is not considered a high risk under current or future Site conditions for the following reasons:

- The existing building is vacant;

- VOC-impacted soils within the Property boundary will be removed during construction (and post-excavation conditions will be verified through confirmation sampling); and
- Building and vapor barrier construction will limit the ability of soil vapors to enter the proposed building and reach regularly occupied floors (i.e., retail space on the ground floor, moisture and vapor barrier).

3.8.3. Soil to Groundwater

The soil with COCs at concentrations greater than the soil cleanup levels at the Site, which was detected at depths ranging from near ground surface to approximately 17.5 feet bgs, is above (shallower than) where continuous groundwater is located (i.e., approximately 61 to 69 feet bgs). In addition, COCs in soil will be removed to approximately 15 to 20 feet bgs across the footprint of the Property for the planned redevelopment.

3.8.4. Soil to Surface Water (Runoff)

The concrete foundations from current buildings and the pavement surface of the current Site covers the entire footprint of the Property; therefore, soil is not exposed to precipitation or stormwater. As a result, this potential exposure pathway is not complete, and the subsurface soil contamination does not pose a threat to surface water. Following planned redevelopment, soil containing COCs remaining in the ROWs will be beneath paved surfaces to prevent exposure to precipitation and stormwater.

3.8.5. Terrestrial Ecological Evaluation

A terrestrial ecological evaluation (TEE) is required by MTCA unless an exclusion under Washington Administrative Code (WAC) 173-340-7491(1)(a) through (d) applies to the Site. A TEE determines whether a release of hazardous substances to soil may pose a threat to the terrestrial environment, characterizes threats to terrestrial plants or animals, and establishes site-specific cleanup standards for the protection of terrestrial plants and animals.

The Site is in a downtown urban area. The Site qualifies for an exclusion per WAC 173-340-7491(1)(c)(i) because there is less than 1.5 acres of contiguous undeveloped land on the Site or within 500 feet of the Site. In addition, the entire Site is covered with the foundation of the current on-Site building and the associated paved drive and parking areas and will continue to be covered as part of the planned Property-line to Property-line redevelopment.

Based on these exclusions, a TEE is not required and therefore cleanup standards for soil at

the Site do not include terrestrial ecological considerations or criteria.

4.0 CLEANUP STANDARDS

Cleanup standards consist of (1) cleanup levels that are protective of human health and the environment, and (2) the point of compliance at which the cleanup levels must be met.

The following soil, groundwater, and soil gas/air cleanup levels were utilized to determine the extent of contamination at the Site subject to cleanup action under MTCA.

4.1. Soil Cleanup Standards

Soil cleanup levels for the Site are MTCA Method A cleanup levels for unrestricted land uses, or MTCA Method B standard formula values for direct contact or the protection of groundwater for compounds that do not have MTCA Method A cleanup levels. The standard point of compliance for soil based on protection of groundwater is throughout the Site (WAC 173-340-740(6)(b)).

Soil cleanup levels for COCs at the Site are presented in the Table T1 in Section 3.2, and also shown on attached Table 1 with the cumulative soil sample data.

4.2. Groundwater Cleanup Standards

Groundwater cleanup levels for the Site are the MTCA Method A cleanup levels, or MTCA Method B cleanup levels calculated with MTCA Equation 720-1 (for noncarcinogens) and MTCA Equation 720-2 (for carcinogens) for compounds that do not have a MTCA Method A Cleanup level. The standard point of compliance is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the Site.

Cleanup levels for potential COCs in groundwater at the Site are presented in attached Table 2 with Site groundwater data.

4.3. Soil Gas Screening Levels and Air Cleanup Levels

Soil gas screening levels are based on MTCA Method B calculated values considered protective of indoor air. These values are presented in attached Table 3 and vary based on the depth at which the gas sample is collected.

Air cleanup levels are MTCA Method B air cleanup levels established in accordance with WAC 173-340-750(3)(b). The standard point of compliance is in the ambient air throughout the Site.

5.0 FEASIBILITY STUDY SUMMARY

The purpose of the FS was to develop and evaluate remedial alternatives for the Site and to select the most appropriate alternative based on the procedures in WAC 173-340-350. The FS process is briefly summarized below. The detailed analysis is presented in the *RI/FS*.

5.1. MTCA Requirements for Cleanup Selection

The selected cleanup action need to comply with all the applicable cleanup action requirements under MTCA.

Specifically, the MTCA regulation, WAC 173- 340-360(2)(a) provides that a cleanup action must meet the following threshold requirements (WAC 173-340-360(2)(a)):

- Protect human health and the environment;
- Comply with cleanup standards;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring.

MTCA (173-340-360(2)(b) also requires that the cleanup alternative must be further evaluated against the following additional criteria:

- Use permanent solutions to the maximum extent practicable,
- Provide a reasonable restoration time frame, and
- Consider public concerns.

For this Site, the overall cleanup objective is to address the subsurface soil contamination in the area identified in the CSM, and mitigate risks associated with the following potential receptors and exposure routes identified in the CSM:

- Direct contact with contaminated soil.
- Leaching/migration of contaminants from soil to groundwater.
- Contaminant migration from soil via vapor intrusion to indoor air.

5.2. Focused Feasibility Study Summary

A focused FS was conducted and compared four remedial alternatives for addressing soil

contamination at the Site.

- Monitored Natural Attenuation (MNA);
- Contaminated soil removal by remedial excavation;
- In-situ treatment; and
- Engineering and institutional controls.

The alternatives were evaluated relative to MTCA remedy selection criteria, as well as compatibility and implementability with the planned redevelopment of the Site. The cleanup alternatives were developed to be generally consistent with widely used remedial technologies, and were screened on the basis of effectiveness, implementability during Site redevelopment, and cost.

Based on the Focused FS, remedial excavation is the most practical alternative for contamination within the Property boundary. This alternative meets the threshold and other requirements of MTCA, has a relatively short restoration timeframe, and is compatible with Property redevelopment.

Engineering and institutional controls in the form of an Environmental Covenant (EC) is the most practical alternative for contamination that will remain in the 7th Avenue South and South Jackson Street ROWs, after the remedial excavation.

6.0 PREFERRED CLEANUP REMEDY

6.1. Contamination within Property

Soil excavation and appropriate off-Site disposal during building construction was identified as the most effective and permanent remedy to address contaminated soil identified within the Property. This is considered the preferred alternative and is most compatible with the redevelopment plan for the Property that includes Property-line to Property-line soil excavation to a depth of approximately 15 to 20 feet bgs. The depth of the soil excavation will be extended, as warranted, to allow for removal of all contaminated soils from the Property. Over-excavation (deeper than the redevelopment construction depths) may be conducted in limited areas.

6.2. Contamination within Right-of-Way

Engineering and institutional controls in the form of an EC was selected to manage the contamination in 7th Avenue South and South Jackson ROWs, outside of the Propriety boundary and construction limit.

Institutional controls will be implemented to prohibit or limit activities that may interfere with the cleanup integrity or result in exposure to contamination.

Engineering controls will prevent contaminated soil direct contact, infiltration, and leaching, as well as the migration of contaminant vapors into the occupied spaces of the new building. The engineering controls consist of existing and updated paved surfaces, the new building structure, and a vapor barrier that will be installed along the northern, western and southern sidewalls, and potentially the base of the excavation limit. Long-term monitoring and maintenance will be performed to ensure the integrity and effectiveness of the engineering controls.

7.0 DESCRIPTION OF THE CLEANUP ACTION PLAN

This section presents an overview and rational of the Ecology selected cleanup action for the Site.

7.1. Cleanup Action Overview

The following cleanup action will be conducted in conjunction with the planned Site redevelopment, to address the media of concern:

- Excavation and appropriate off-Site disposal of soil with COC concentrations greater than the soil cleanup levels from within the Property boundary, during construction excavation, to meet the soil cleanup standards.
- Mitigate the potential for movement of, or exposure to the remaining contamination in ROWs by engineering and institutional controls.
- Compliance monitoring during the cleanup action.

7.2. Cleanup Action Selection Rationale

Based on the evaluation of remedial alternatives presented in the GeoEngineers' *RI/FS*, this cleanup action was selected because it meets MTCA requirements for a permanent, protective cleanup action and can be implemented concurrent with Property

redevelopment. Components of the selected cleanup action alternative have been implemented at other similar sites and are technically feasible within the redevelopment framework and results in a significant overall reduction in Site contaminant mass. Additionally, the proposed cleanup action does not result in a significant addition of short-term risk beyond what is typical for a large construction project in an urban setting.

The selected cleanup action is expected to comply with applicable MTCA requirements for the following reasons:

- The selected alternative meets the "minimum requirements for cleanup actions" (WAC 173-340-360(2)). Specifically, the alternative: (1) could be completed within a relatively short period of time, (2) meets threshold requirements described in MTCA (e.g., protects human health and the environment, complies with the cleanup standards, complies with state and federal laws and provides for compliance monitoring), (3) is expected to be more effective than other available methods in achieving concentrations that are protective of human health and the environment, (4) is permanent, and (5) considers public concerns.
- Excavation and off-Site disposal of the contaminated soil within the Property boundary is the most permanent and cost-effective cleanup option, is necessary for the planned Property redevelopment and facilitates effective integration of the construction and cleanup action activities at the Site.
- Existing and updated paved surfaces, new building structure, and a vapor barrier will serve as engineering controls to isolate and prevent human exposure to any residual contaminant containing soil remaining in place in the ROWs following redevelopment.
- An EC will serve as an institutional control compliant with the Uniform Environmental Covenants Act to identify the location of and prevent the disturbance of remaining contamination within the ROWs.
- Long-term monitoring and maintenance will ensure that groundwater is in compliance with the cleanup standards and that the function of the engineering controls continue to isolate and prevent human exposure to any residual contamination remaining in place in the ROWs following redevelopment.

7.3. Cleanup Action Components

7.3.1. Contaminated Soil Excavation

The contaminated soil excavation and disposal will be performed concurrent with construction for Property redevelopment. Based on current development plans, soil will be removed from the Property during excavation for the building foundation. The planned area of excavation for the redevelopment will include the entire footprint of the Property. Additionally, shoring will be installed at the Property boundaries to facilitate deep excavation. The construction excavation is planned to extend from property-line to property-line and to comply with City of Seattle requirements. Section 8.0 presents a detailed discussion of the components and sequencing of contaminated soil excavation.

7.3.2. Engineering Controls

A vapor barrier (Geo-Seal or similar product; Appendix A) will be installed along the northern, western and southern sidewalls of the excavation limit. A vapor barrier may also be warranted on a portion of the excavation base if confirmation sampling indicates the presence of COCs at concentrations exceeding the soil cleanup levels.

The vapor barrier, the existing and updates paved surfaces, and the new building structure, constitute engineering controls to prevent contaminated soil direct contact, infiltration, and leaching, as well as the migration of contaminant vapors into the occupied spaces of the new building.

The Engineering controls will be maintained and monitored periodically to ensure their integrity and effectiveness. Specific details long-term monitoring and maintenance of the engineering controls will be described in an Engineering and Institutional Controls Monitoring and Maintenance Plan (EICMMP).

7.3.3. Institutional Controls

The remaining soil in the ROWs with COC concentrations above soil cleanup levels will require an EC to implement institutional controls. Institutional controls will prohibit or limit certain activities that may interfere with the cleanup integrity or result in exposure to contamination. The EC will comply with WAC 173-340-440, RCW 64.70, and any policies or procedures specified by Ecology, and will be approved and signed by Ecology. The EC will also include the EICMMP.

7.3.4. Compliance Monitoring

All cleanup activities require compliance monitoring. Section 9.0 presents a detailed discussion of compliance monitoring on soil, groundwater, and soil vapor/air.

8.0 SOIL CLEANUP ACTION IMPLEMENTATION AND SEQUENCING

The contaminated soil excavation and disposal (soil cleanup action) will be performed concurrent with construction for Property redevelopment. The primary elements of the soil cleanup action include the following:

8.1. Pre-Construction Action

The following actions will be performed before construction activities begin on the Site.

8.1.1. Waste Profile Preparation and Disposal Authorization:

Based on the existing soil analytical data, the Site soil does not designate as Dangerous Waste for disposal purposes, and the former Site operations (gasoline service station and automobile repair services) do not indicate that the soil is a listed waste (WAC 173-303). Therefore, a soil waste disposal profile will be prepared for appropriate disposal of Site soil at one or more appropriately permitted disposal facilities based on the soil chemical data obtained. The waste profile will be reviewed by the facilities and authorization for contaminated soil disposal will be issued for the redevelopment project.

8.1.2. Building and Improvements Demolition:

The buildings and improvements located on the Site will be demolished and removed before shoring installation and construction excavation begins. Environmental evaluation of the building structures for hazardous materials is a standard procedure prior to demolition and is not included in the scope of this document.

8.2. Cleanup Action During Construction

8.2.1. Soil Excavation and Disposal

Soil containing COCs at concentrations greater than soil cleanup levels within the Property boundary will be excavated and disposed at a permitted facility. Based on preliminary estimates, 6,000 in-place cubic yards of contaminated soil is anticipated to be generated during excavation based on the existing chemical data.

8.2.1.1. General Soil Excavation Components

The following general soil excavation components will be implemented during construction:

- Implementation of erosion control and construction safety/security measures.

- Shoring to facilitate the planned construction excavation.
- Remedial excavation of contaminated soil.
- Temporary construction dewatering to capture groundwater seepage in the construction excavation and facilitate soil excavation and construction of foundations. Additionally, stormwater will need to be removed from the excavation for disposal.
- Transportation of excavated contaminated soil and appropriate disposal.
- Transportation of excavated clean soil (soil with no detected concentrations of COCs) for disposal at off-property soil receiving facilities to be agreed upon by the Owner and project team.
- Collection/analysis of confirmation soil samples during excavation to document soil conditions at the lateral and vertical limits of the excavation (i.e., sidewalls and base).

8.2.1.2. Contaminated Soil Excavation

Based on the available data, excavation of contaminated soil is anticipated primarily in the central and western portions of the Site at depths ranging from near ground surface to approximately 17.5 feet bgs. The depth of the soil excavation will be extended to the greatest extent practicable to remove all contaminated soils from the Property. Over-excavation (deeper than the redevelopment construction depths) may be conducted in limited areas. The approximate lateral and vertical extents of the remedial excavation is shown on Figures 5 through 8.

The remedial excavation is anticipated to remove a significate mass of contamination from the Site. However, residual contamination is expected to remain in place within adjacent ROWs. Confirmation soil sampling will be completed at the base and sidewalls of the remedial excavation to document post-cleanup soil conditions.

A Contaminated Media Management Plan (CMMP), which will be prepared under separate cover, will establish the procedures and sequencing for soil excavation, screening, handling, and transport from the Site for appropriate disposal at a permitted facility. The CMMP will provide for appropriate segregation and disposal of material with: (1) contaminant concentrations less than the laboratory reporting limits; (2) contaminant concentrations greater than the laboratory reporting limits but less than the cleanup levels; or (3) contaminant concentrations greater than the cleanup levels. Additionally, the CMMP will provide procedures for verification sampling to document the removal of the contaminated

soil within the footprint of the construction excavation and/or the residual contamination remaining in place.

8.2.1.3. Contaminated Wastewater Management

Wastewater removed from the Site during construction that may contain concentrations of petroleum hydrocarbons, VOCs, PAHs and/or metals will be contained in on-site storage tanks for testing and treatment, as necessary. It is anticipated that this wastewater stream will be discharged directly to the sanitary sewer in accordance with a King County Discharge Authorization. If wastewater samples collected from the temporary storage tanks during construction exceed the County's discharge limits, treatment with technologies such as filtration and granular activated carbon will be completed prior to discharge to the sanitary sewer to meet King County's discharge criteria. Wastewater that may contain contaminants includes:

- Stormwater that accumulates in the excavation and comes in contact with contaminant-containing soil, and
- Shallow perched groundwater that seeps into the excavation.

The CMMP will provide specific details regarding wastewater management and disposal.

8.2.1.4. Contingency Actions

Contingency actions will be conducted in the event that unanticipated soil contamination is discovered, unanticipated USTs or other subsurface objects are encountered, and/or potential contaminated groundwater is encountered during construction.

The CMMP will provide details regarding the contingency actions for contaminated soil excavation.

8.3. Schedule

The schedule for construction of the planned redevelopment and concurrent cleanup is being developed. Excavation activities for the redevelopment are anticipated to be completed within approximately 3 to 4 months of the start date.

8.4. Documentation

The soil cleanup action will be documented in field reports and a MTCA-compliant Cleanup Action Report.

8.4.1. Cleanup Action Report

At the completion of the soil cleanup action, a MTCA-compliant Cleanup Action Report will

be prepared that meets the requirements of WAC 173-340-515(4)(a)-(b) and submitted to Ecology to document the removal of contaminated soil during construction as well as document soil conditions at the final construction excavation limits. The report will include all chemical data generated during the cleanup action and those data will be submitted to Ecology's Environmental Information Management System (EIM) as required by Policy 840.

9.0 COMPLIANCE MONITORING

There are three types of compliance monitoring identified for remedial cleanup actions performed under MTCA (WAC 173-340-410): protection, performance, and confirmation monitoring. A paraphrased definition for each is presented below (WAC 173-340-410[1]).

- **Protection Monitoring**—To evaluate whether human health and the environment are adequately protected during construction and the operation and maintenance period of an interim action or cleanup action.
- **Performance Monitoring**—To document that the interim action or cleanup action has attained cleanup standards.
- **Confirmation Monitoring**—To evaluate the long-term effectiveness of the interim action or cleanup action once cleanup standards or other performance standards have been attained.

9.1. Protection Monitoring

A Site-Specific Health and Safety Plan (HASP) will be prepared for the cleanup action that meets the minimum requirements for such a plan identified in federal (Title 29 of the Code of Federal Regulations) and state regulations (WAC 296). The HASP identifies known Site hazards and monitoring protocols to mitigate these hazards for on-Site workers.

9.2. Performance Monitoring

9.2.1. Soil Performance Monitoring

Soil performance monitoring will be conducted throughout contaminated soil excavation to demonstrate that contaminated soil with the Property boundary is removed. The CMMP will establish the procedures and sequencing for soil performance monitoring. The results of the soil performance monitoring will be documented in a Cleanup Action Report.

9.2.2. Groundwater Performance Monitoring

Two permanent monitoring wells (GEI-11 and GEI-12) are currently present in 7th Avenue

South ROW, west of the Property boundary. These monitoring wells will be protected to the degree possible during the construction. If one or both of these wells need to be decommissioned to facilitate construction, the well(s) will be decommissioned in accordance with WAC 173-160-460. Replacement well(s) will then be installed after construction for performance and compliance monitoring.

In addition, at least one additional monitoring well will be installed in South Jackson Street ROW, north of the Property boundary. Groundwater samples will be collected from the monitoring wells following the completion of the contaminated soil excavation.

Samples will be submitted to an Ecology-accredited analytical laboratory, on a standard turnaround time. Groundwater performance and confirmation samples will be analyzed for GRO, BTEX, naphthalene, or other potential COCs specified by Ecology.

Groundwater samples will be collected on a quarterly basis from each monitoring well, until four consecutive post-cleanup groundwater sampling events are completed with COC concentrations below the established cleanup levels.

Depending on the performance monitoring data, Ecology will determine if additional monitoring wells are needed.

9.3. Confirmation Monitoring

9.3.1. Groundwater Conformation Monitoring

Once the performance groundwater monitoring suggests that the MTCA compliance has been met, groundwater monitoring will continue on an annual basis until the first periodic review as required by the EC.

The specific details regarding groundwater monitoring will be provided in a Groundwater Compliance Monitoring Plan (CMP). The groundwater CMP will be included in the EC.

9.3.2. Soil Vapor or Air Conformation Monitoring

Depending on the soil and groundwater performance monitoring results, Ecology may require additional sub-slab soil gas sampling or indoor air sampling of the new building. If a soil gas sample or indoor air sampling event is required, Ecology will require submission of a Sampling and Analysis Plan (SAP) prior to the sampling event.

9.3.3. Contingency Actions

Contingency actions will be implemented if analytical data indicates COC concentrations in excess of cleanup levels in groundwater samples, or the potential soil gas and indoor air

samples. Contingency actions will also be conducted if the engineering controls are damaged or deteriorated. A Contingency Plan will be included in the EC.

10.0 REFERENCES

- Ecology. 2022. Washington State Department of Ecology Washington State Well Report Viewer.: https://appswr.ecology.wa.gov/wellconstruction/map/WCLSWebMap/default.asp
- WDOH. 2022. Source Water Assessment Program (SWAP) Mapping Application. : https://fortress.wa.gov/doh/swap/index.html
- GeoEngineers, 2022. Remedial Investigation and Feasibility Study. September 19.
- USGS. 2011. Preliminary Geologic Map of the Seattle South 7.5-Minute Series Quadrangle, Washington.
- Troost, et al. 2005. The Geologic Map of Seattle – A Progress Report. USGS Open File Report 2005-1252.

Tables

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	H-1	H-2	H-3	B-1		B-3		B-4	
Sample Identification			H-1-12.5	H-2-7.5	H-3-7.5	B-1-5	B-1-12.5	B-3-10	B-3-12.5	B-4-9	B-4-14
Sampled By			GeoGroup	GeoGroup	GeoGroup	GeoGroup	GeoGroup	GeoGroup	GeoGroup	GeoGroup	GeoGroup
Sample Date			08/03/92	08/03/92	08/03/92	02/01/06	02/01/06	02/01/06	02/01/06	02/02/06	02/02/06
Sample Depth (feet bgs)			12.5	7.5	7.5	5.0	12.5	10.0	12.5	9.0	14.0
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**6,000**	**1.6**	**1,400**	**16**	**12,000**	**1,300**	13 U	10 U	**8,300**
Diesel-Range	2,000	NE	--	--	--	28 U	**560**	30 U	27 U	28 U	**280**
Lube Oil-Range	2,000	NE	--	--	--	57 U	62 U	60 U	54 U	55 U	62 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	**4**	0.05 U	**0.31**	0.020 U	**17**	**1.8**	**0.093**	**0.38**	**15**
Toluene	7	NE	**55**	0.05 U	**1.9**	0.047 U	**7.2**	**4.5**	**0.39**	**0.21**	**35**
Ethylbenzene	6	NE	**66**	0.05 U	**6.2**	0.047 U	**210**	**12**	**0.19**	**0.12**	**100**
Total Xylenes	9	NE	**330**	0.05 U	**16**	**0.061**	**860**	**35.4**	**1.08**	**0.19**	**440**
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	0.057 U	--	1.1 U
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	0.057 U	--	1.1 U
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	0.057 U	--	1.1 U
other VOCs[5]	varies	NE	--	--	--	--	--	--	**Detected**	--	**Detected**
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	--
Barium	16,000	NE	--	--	--	--	--	--	--	--	--
Cadmium	2	1	--	--	--	--	--	--	--	--	--
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	--
Lead	250	24	1.5	2.2	3.8	--	--	--	--	--	--
Mercury	2	0.07	--	--	--	--	--	--	--	--	--
Selenium	400	NE	--	--	--	--	--	--	--	--	--
Silver	400	NE	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	--	--	--	--	--	--	--	--	--
Acenaphthylene	NE	NE	--	--	--	--	--	--	--	--	--
Anthracene	24,000	NE	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	NE	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Chrysene	NE	NE	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Fluoranthene	3,200	NE	--	--	--	--	--	--	--	--	--
Fluorene	3,200	NE	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	--	--	--	--	--	--	--	--	--
Naphthalenes	5	NE	--	--	--	--	--	--	--	--	--
Phenanthrene	NE	NE	--	--	--	--	--	--	--	--	--
Pyrene	2,400	NE	--	--	--	--	--	--	--	--	--
cPAHs TEQ[6]	0.1	NE	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	--	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

Farallon = Farallon Consulting

Landau = Landau Associates

EAI = Environmental Associates, Inc.

GeoGroup = GEO Group Northwest, Inc.

GEI = GeoEngineers Inc.

NA = Not Applicable

NE = Not Established

"--" = not tested

ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	UST-1				UST-2				B-1-11
Sample Identification			UST-1-B-12	UST-1-N-8/W-6	UST-1-S-8/E-8	UST-1-OB	UST-2-B-12	UST-2-OB	UST-2-N-8/W-6	UST-2-S-8/E-8	B-1 S-5
Sampled By			EAI	EAI	EAI	EAI	EAI	EAI	EAI	EAI	Landau
Sample Date			11/02/10	11/02/10	11/02/10	11/02/10	11/02/10	11/02/10	11/02/10	11/02/10	11/11/11
Sample Depth (feet bgs)			12.0	6	8.0	Stockpile	12.0	Stockpile	6	8.0	12.5
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**110**	2 U	**37**	2 U	2 U	2 U	2 U	2 U	**24,000**
Diesel-Range	2,000	NE	--	--	--	--	--	--	--	--	120 U
Lube Oil-Range	2,000	NE	--	--	--	--	--	--	--	--	50 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**110**
Toluene	7	NE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**1,700**
Ethylbenzene	6	NE	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U	**470**
Total Xylenes	9	NE	**0.34**	0.06 U	**1.4**	0.06 U	0.06 U	0.06 U	0.06 U	0.06 U	**2,400**
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	--	--	--	--	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	--
Barium	16,000	NE	--	--	--	--	--	--	--	--	--
Cadmium	2	1	--	--	--	--	--	--	--	--	--
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	--
Lead	250	24	--	--	--	--	--	--	--	--	8.9
Mercury	2	0.07	--	--	--	--	--	--	--	--	--
Selenium	400	NE	--	--	--	--	--	--	--	--	--
Silver	400	NE	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	--	--	--	--	--	--	--	--	--
Acenaphthylene	NE	NE	--	--	--	--	--	--	--	--	--
Anthracene	24,000	NE	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	NE	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Chrysene	NE	NE	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Fluoranthene	3,200	NE	--	--	--	--	--	--	--	--	--
Fluorene	3,200	NE	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	--	--	--	--	--	--	--	--	--
Naphthalenes	5	NE	--	--	--	--	--	--	--	--	--
Phenanthrene	NE	NE	--	--	--	--	--	--	--	--	--
Pyrene	2,400	NE	--	--	--	--	--	--	--	--	--
cPAHs TEQ[6]	0.1	NE	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	--	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

Farallon = Farallon Consulting

Landau = Landau Associates

EAI = Environmental Associates, Inc.

GeoGroup = GEO Group Northwest, Inc.

GEI = GeoEngineers Inc.

NA = Not Applicable

NE = Not Established

"--" = not tested

ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	B-1-11	B-2-11		B-3-11		B-4-11		B-5-11	B-6-11
Sample Identification			B-1 S-7	B-2 S-4	B-2 S-6	B-3 S-4	B-3 S-6	B-4 S-2	B-4 S-6	B-5 S-8	B-6 S-6
Sampled By			Landau	Landau	Landau	Landau	Landau	Landau	Landau	Landau	Landau
Sample Date			11/11/11	11/11/11	11/11/11	11/11/11	11/11/11	11/11/11	11/11/11	11/14/11	11/04/11
Sample Depth (feet bgs)			17.5	12.5	17.5	12.5	17.5	5.0	15.0	20.0	15.0
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**14**	**14**	**11**	**420**	**6.6**	**10**	**26**	3.0 U	3.0 U
Diesel-Range	2,000	NE	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U	25 U
Lube Oil-Range	2,000	NE	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U	50 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	**0.12**	0.044 U	**0.051**	0.024 U	**0.06**	**0.14**	**0.38**	0.030 U	0.030 U
Toluene	7	NE	**0.51**	**0.36**	**0.4**	**1.0**	**0.36**	**0.43**	**1.0**	0.050 U	0.050 U
Ethylbenzene	6	NE	**0.3**	**0.078**	**0.08**	**7.3**	**0.076**	**0.12**	**0.38**	0.050 U	0.050 U
Total Xylenes	9	NE	**1.3**	**0.32**	**0.32**	**32**	**0.39**	**0.58**	**2.2**	0.20 U	0.20 U
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	--	--	--	--	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	--
Barium	16,000	NE	--	--	--	--	--	--	--	--	--
Cadmium	2	1	--	--	--	--	--	--	--	--	--
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	--
Lead	250	24	--	--	--	7.4	--	--	--	--	--
Mercury	2	0.07	--	--	--	--	--	--	--	--	--
Selenium	400	NE	--	--	--	--	--	--	--	--	--
Silver	400	NE	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	--	--	--	--	--	--	--	--	--
Acenaphthylene	NE	NE	--	--	--	--	--	--	--	--	--
Anthracene	24,000	NE	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	NE	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Chrysene	NE	NE	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Fluoranthene	3,200	NE	--	--	--	--	--	--	--	--	--
Fluorene	3,200	NE	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	--	--	--	--	--	--	--	--	--
Naphthalenes	5	NE	--	--	--	--	--	--	--	--	--
Phenanthrene	NE	NE	--	--	--	--	--	--	--	--	--
Pyrene	2,400	NE	--	--	--	--	--	--	--	--	--
cPAHs TEQ[6]	0.1	NE	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	--	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

Farallon = Farallon Consulting

Landau = Landau Associates

EAI = Environmental Associates, Inc.

GeoGroup = GEO Group Northwest, Inc.

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NA = Not Applicable

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U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	B-6-11	FB-3				FB-4			FB-5[2]
Sample Identification			B-6 S-7	FB-3-10.0	FB-3-15.0	FB-3-20.0	FB-3-40.0	FB-4-6.0	FB-4-10.0	FB-4-15.0	FB-5-11.0
Sampled By			Landau	Farallon	Farallon	Farallon	Farallon	Farallon	Farallon	Farallon	Farallon
Sample Date			11/04/11	10/31/19	10/31/19	10/31/19	10/31/19	11/01/19	11/01/19	11/01/19	11/01/19
Sample Depth (feet bgs)			20.0	10.0	15.0	20.0	40.0	6.0	10.0	15.0	4.6
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**4.6**	**1,300**	5.2 U	5.6 U	5.0 U	**86**	**450**	**1,700**	**17**
Diesel-Range	2,000	NE	25 U	980 U	--	--	--	--	--	31 U	33 U
Lube Oil-Range	2,000	NE	50 U	**570**	--	--	--	--	--	61 U	66 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	0.030 U	0.021 U	**0.060**	0.020 U	0.020 U	0.020 U	**0.032**	**1.3**	0.020 U
Toluene	7	NE	0.050 U	**0.17**	0.052 U	0.056 U	0.050 U	0.055 U	0.053 U	**21**	0.071 U
Ethylbenzene	6	NE	**0.078**	**4.6**	**0.29**	0.056 U	0.050 U	**0.12**	**2.2**	**21**	**0.095**
Total Xylenes	9	NE	0.20 U	**11.2**	0.104 U	0.112 U	0.10 U	**0.1**	**2.99**	**129**	**0.087**
1,2 Dibromoethane (EDB)	0.005	NE	--	0.050 U	--	--	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	--	0.050 U	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	0.050 U	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	--	ND	--	--	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	--
Barium	16,000	NE	--	--	--	--	--	--	--	--	--
Cadmium	2	1	--	--	--	--	--	--	--	--	--
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	--
Lead	250	24	--	5.7 U	--	--	--	--	--	--	--
Mercury	2	0.07	--	--	--	--	--	--	--	--	--
Selenium	400	NE	--	--	--	--	--	--	--	--	--
Silver	400	NE	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	--	**0.022**	--	--	--	--	--	--	--
Acenaphthylene	NE	NE	--	**0.0076**	--	--	--	--	--	--	--
Anthracene	24,000	NE	--	**0.025**	--	--	--	--	--	--	--
Benzo[a]anthracene	NE	NE	--	**0.028**	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	NE	--	**0.027**	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	--	**0.028**	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	NE	NE	--	**0.022**	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	--	0.0076 U	--	--	--	--	--	--	--
Chrysene	NE	NE	--	**0.029**	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	--	0.0076 U	--	--	--	--	--	--	--
Fluoranthene	3,200	NE	--	**0.057**	--	--	--	--	--	--	--
Fluorene	3,200	NE	--	**0.03**	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	--	**0.019**	--	--	--	--	--	--	--
Naphthalenes	5	NE	--	**10.5**	--	--	--	--	--	--	--
Phenanthrene	NE	NE	--	**0.098**	--	--	--	--	--	--	--
Pyrene	2,400	NE	--	**0.063**	--	--	--	--	--	--	--
cPAHs TEQ[6]	0.1	NE	--	**0.039**	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	0.057 U	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	0.399 U	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 digress from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

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NA = Not Applicable

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ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	FB-5[2]		FB-6				FB-7		GEI-1
Sample Identification			FB-5-17.0	FB-5-25.0	FB-6-10.0	FB-6-18.0	FB-6-21.0	FB-6-24.0	FB-7-2.5	FB-7-8.0	GEI-1-5.0
Sampled By			Farallon	Farallon	Farallon	Farallon	Farallon	Farallon	Farallon	Farallon	GEI
Sample Date			11/01/19	11/01/19	11/01/19	11/01/19	11/01/19	11/01/19	10/30/19	10/30/19	05/18/21
Sample Depth (feet bgs)			7.2	10.6	10.0	18.0	21.0	24.0	2.5	8.0	5.0
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**4,800**	5.9 U	4.7 U	**28**	6.5 U	5.8 U	5.2 U	5.7 U	5.02 U
Diesel-Range	2,000	NE	**590**	32 U	--	30 U	--	31 U	31 U	31 U	54.4 U
Lube Oil-Range	2,000	NE	57 U	63 U	--	61 U	--	63 U	**170**	**78**	109 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	**1.6**	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.020 U	0.0201 U
Toluene	7	NE	**18**	0.059 U	0.047 U	0.051 U	0.065 U	0.058 U	0.052 U	0.057 U	0.0251 U
Ethylbenzene	6	NE	**89**	0.059 U	0.047 U	**1.2**	0.065 U	0.058 U	0.052 U	0.057 U	0.0301 U
Total Xylenes	9	NE	**420**	0.118 U	0.094 U	**0.55**	0.13 U	**0.068**	0.104 U	0.114 U	0.0502 U
1,2 Dibromoethane (EDB)	0.005	NE	1.1 U	--	--	0.00089 U	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	1.1 U	--	--	0.00089 U	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	ND	--	--	ND	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	1.53
Barium	16,000	NE	--	--	--	--	--	--	--	--	**40.1**
Cadmium	2	1	--	--	--	--	--	--	--	--	0.171 U
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	27.6
Lead	250	24	--	--	--	--	--	--	--	--	1.57
Mercury	2	0.07	--	--	--	--	--	--	--	--	0.264 U
Selenium	400	NE	--	--	--	--	--	--	--	--	**1.01**
Silver	400	NE	--	--	--	--	--	--	--	--	0.129 U
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	**0.025**	--	--	0.0081 U	--	--	--	--	0.0209 U
Acenaphthylene	NE	NE	**0.025**	--	--	0.0081 U	--	--	--	--	0.0209 U
Anthracene	24,000	NE	**0.016**	--	--	0.0081 U	--	--	--	--	0.0419 U
Benzo[a]anthracene	NE	NE	**0.0083**	--	--	0.0081 U	--	--	--	--	0.0209 U
Benzo(a)pyrene	0.1	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0209 U
Benzo(b)fluoranthene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0209 U
Benzo(g,h,i)perylene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0419 U
Benzo(k)fluoranthene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0209 U
Chrysene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0419 U
Dibenzo(a,h)anthracene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0419 U
Fluoranthene	3,200	NE	**0.012**	--	--	0.0081 U	--	--	--	--	0.0419 U
Fluorene	3,200	NE	**0.053**	--	--	0.0081 U	--	--	--	--	0.0209 U
Indeno(1,2,3-cd)pyrene	NE	NE	0.0076 U	--	--	0.0081 U	--	--	--	--	0.0419 U
Naphthalenes	5	NE	**12.8**	--	--	**0.66**	--	--	--	--	0.0209 U
Phenanthrene	NE	NE	**0.078**	--	--	0.0081 U	--	--	--	--	0.0419 U
Pyrene	2,400	NE	**0.019**	--	--	0.0081 U	--	--	--	--	0.0419 U
cPAHs TEQ[6]	0.1	NE	**0.005**	--	--	0.006 U	--	--	--	--	0.016 U
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1221	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1232	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1242	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1248	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1254	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Aroclor 1260	NA	NE	0.057 U	--	--	0.061 U	--	--	--	--	--
Total PCBs	1.0	NE	0.399 U	--	--	0.427 U	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

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NA = Not Applicable

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Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	GEI-1		GEI-2			GEI-3			GEI-4
Sample Identification			GEI-1-12.5	GEI-1-17.5	GEI-2-10.0	GEI-2-15.0	GEI-2-17.5	GEI-3-5.0	GEI-3-15.0	GEI-3-17.5	GEI-4-2.5
Sampled By			GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI
Sample Date			05/18/21	05/18/21	05/19/21	05/19/21	05/19/21	05/19/21	05/19/21	05/19/21	12/29/21
Sample Depth (feet bgs)			12.5	17.5	10.0	15.0	17.5	5.0	15.0	17.5	2.5
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	**57.9**	4.94 U	**1,970**	**361**	5.59 U	4.37 U	**10,500**	5.80 U	5.17 U
Diesel-Range	2,000	NE	51.8 U	53.6 U	--	--	--	--	--	--	58.1 U
Lube Oil-Range	2,000	NE	104 U	107 U	--	--	--	--	--	--	116 U
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	0.0197 U	0.0198 U	0.0207 U	**0.129**	0.0224 U	0.0175 U	**13.2**	0.232 U	0.0207 U
Toluene	7	NE	**0.92**	0.0247 U	**0.347**	**2.21**	0.0279 U	0.0219 U	**97.2**	0.0290 U	0.0310 U
Ethylbenzene	6	NE	**0.124**	0.0297 U	0.0311 U	**0.104**	0.0335 U	0.0262 U	**87.8**	0.0348 U	0.0258 U
Total Xylenes	9	NE	**3.252**	0.0494 U	**0.686**	**1.315**	0.0559 U	0.0437 U	**554**	0.0580 U	0.0517 U
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	--	--	--	--	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	1.60	3.58	--	--	--	--	--	--	**8.35**
Barium	16,000	NE	**32.0**	**36.1**	--	--	--	--	--	--	**0.614**
Cadmium	2	1	0.177 U	0.185 U	--	--	--	--	--	--	0.451
Total Chromium	2,000	48	26.6	27.2	--	--	--	--	--	--	**53.6**
Lead	250	24	1.62	1.64	--	--	--	--	--	--	**340**
Mercury	2	0.07	0.279 U	0.284 U	--	--	--	--	--	--	0.288 U
Selenium	400	NE	**1.07**	**0.805**	--	--	--	--	--	--	**1.33**
Silver	400	NE	0.132 U	0.139 U	--	--	--	--	--	--	**0.165**
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	0.0234 U
Acenaphthylene	NE	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	0.0234 U
Anthracene	24,000	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	0.0234 U
Benzo[a]anthracene	NE	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	**0.0458**
Benzo(a)pyrene	0.1	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	**0.044**
Benzo(b)fluoranthene	NE	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	**0.0453**
Benzo(g,h,i)perylene	NE	NE	0.0389 U	0.0202 U	--	--	--	--	--	--	**0.0538**
Benzo(k)fluoranthene	NE	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	**0.0403**
Chrysene	NE	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	**0.0476**
Dibenzo(a,h)anthracene	NE	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	0.0469 U
Fluoranthene	3,200	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	**0.0458**
Fluorene	3,200	NE	0.0194 U	0.0202 U	--	--	--	--	--	--	0.0234 U
Indeno(1,2,3-cd)pyrene	NE	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	0.0469 U
Naphthalenes	5	NE	**0.0596**	0.0202 U	--	--	--	--	--	--	0.0234 U
Phenanthrene	NE	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	0.0234 U
Pyrene	2,400	NE	0.0389 U	0.0404 U	--	--	--	--	--	--	**0.0792**
cPAHs TEQ[6]	0.1	NE	0.015 U	0.015 U	--	--	--	--	--	--	0.059 U
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	--	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

Farallon = Farallon Consulting

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EAI = Environmental Associates, Inc.

GeoGroup = GEO Group Northwest, Inc.

GEI = GeoEngineers Inc.

NA = Not Applicable

NE = Not Established

"--" = not tested

ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	GEI-4	GEI-5		GEI-6		GEI-7	GEI-7		GEI-8
Sample Identification			GEI-4-12.5	GEI-5-2.5	GEI-5-10.0	GEI-6-2.5	GEI-6-10.0	GEI-7-2.5	GEI-7-7.5	GEI-7-14.0	GEI-8-12.5
Sampled By			GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI
Sample Date			12/29/21	12/29/21	05/19/21	12/29/21	05/19/21	12/29/21	05/19/21	05/19/21	04/04/22
Sample Depth (feet bgs)			12.5	2.5	10.0	2.5	10.0	2.5	7.5	14.0	12.5
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	5.27 U	4.93 U	4.86 U	5.35 U	5.57 U	4.86 U	5.46 U	**1,370**	9.14 U
Diesel-Range	2,000	NE	56.8 U	50.1 U	60.2 U	54.4 U	61 U	57 U	64.7 U	58.5 U	--
Lube Oil-Range	2,000	NE	114 U	100 U	120 U	**689**	122 U	**448**	129 U	117 U	--
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	0.0211 U	0.0197 U	0.0195 U	0.0214 U	0.0223 U	0.0194 U	0.0218 U	**0.15**	0.0365 U
Toluene	7	NE	0.0316 U	0.0296 U	0.0292 U	0.0321 U	0.0334 U	0.0291 U	0.0327 U	**0.177**	0.0548 U
Ethylbenzene	6	NE	0.0263 U	0.0247 U	0.0243 U	0.0267 U	0.0278 U	0.0243 U	0.0273 U	**17.1**	0.0457 U
Total Xylenes	9	NE	0.0527 U	0.0493 U	0.0486 U	0.0535 U	0.0557 U	0.0486 U	0.0546 U	**39.08**	0.0914 U
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	0.0109 U	0.0106 U	--
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	0.0251 U	0.0244 U	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	0.0327 U	0.0318 U	--
other VOCs[5]	varies	NE	--	--	--	--	--	--	ND	**Detected**	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	3.01	**7.52**	1.77	**8.21**	5.7	4.34	5.85	**7.07**	--
Barium	16,000	NE	**86.1**	**185**	**43.7**	**195**	**130**	**160**	**134**	**125**	--
Cadmium	2	1	0.184 U	0.355	0.199 U	0.635	0.21 U	0.255	0.203 U	0.189	--
Total Chromium	2,000	48	39.3	27.4	25.9	38.2	**59.2**	34.5	**64.1**	**52.2**	--
Lead	250	24	3.28	**93.8**	2.04	**243**	4.79	**59.5**	4.82	6.06	--
Mercury	2	0.07	0.286 U	0.267 U	0.281 U	0.295 U	0.32 U	0.287 U	**0.309**	0.294 U	--
Selenium	400	NE	**1.05**	**0.861**	**0.691**	**1.16**	**1.45**	**1**	**1.62**	**1.42**	--
Silver	400	NE	0.138 U	0.130 U	0.149 U	**0.25**	0.158 U	0.14 U	0.152 U	0.141 U	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	0.0232 U	0.0226 U	0.0229 U	**0.0327**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Acenaphthylene	NE	NE	0.0232 U	0.0226 U	0.0229 U	**0.289**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Anthracene	24,000	NE	0.0464 U	0.0451 U	0.0458 U	**0.767**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Benzo[a]anthracene	NE	NE	0.0232 U	0.0226 U	0.0229 U	**1.32**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Benzo(a)pyrene	0.1	NE	0.0232 U	0.0226 U	0.0229 U	**1.12**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Benzo(b)fluoranthene	NE	NE	0.0232 U	0.0226 U	0.0229 U	**0.825**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Benzo(g,h,i)perylene	NE	NE	0.0232 U	0.0226 U	0.0229 U	**0.483**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Benzo(k)fluoranthene	NE	NE	0.0232 U	0.0226 U	0.0229 U	**0.856**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Chrysene	NE	NE	0.0464 U	0.0451 U	0.0458 U	**1.15**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Dibenzo(a,h)anthracene	NE	NE	0.0464 U	0.0451 U	0.0458 U	**0.231**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Fluoranthene	3,200	NE	0.0464 U	0.0451 U	0.0458 U	**2.84**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Fluorene	3,200	NE	0.0232 U	0.0226 U	0.0229 U	**0.251**	0.0256 U	0.0221 U	0.0241 U	0.0249 U	--
Indeno(1,2,3-cd)pyrene	NE	NE	0.0464 U	0.0451 U	0.0458 U	**0.473**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Naphthalenes	5	NE	0.0232 U	0.0226 U	0.0229 U	**0.2537**	0.0256 U	0.0221 U	0.0241 U	**0.556**	22.1 U
Phenanthrene	NE	NE	0.0464 U	0.0451 U	0.0458 U	**2.02**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
Pyrene	2,400	NE	0.0464 U	0.0451 U	0.0458 U	**2.65**	0.0512 U	0.0442 U	0.0482 U	0.0498 U	--
cPAHs TEQ[6]	0.1	NE	0.018 U	0.017 U	0.017 U	**0.74**	0.018 U	0.017 U	0.017 U	0.017 U	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--
Total PCBs	1.0	NE	--	--	--	--	--	--	0.0596 U	0.061 U	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

Farallon = Farallon Consulting

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EAI = Environmental Associates, Inc.

GeoGroup = GEO Group Northwest, Inc.

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NA = Not Applicable

NE = Not Established

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ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 1

Summary of Soil Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	MTCA Cleanup Levels[3]	Natural Background[4]	GEI-8	GEI-9		GEI-10		GEI-11		GEI-12	
Sample Identification			GEI-8-17.0	GEI-9-12.5	GEI-9-17.5	GEI-10-12.5	GEI-10-17.0	GEI-11-15.0	GEI-11-35.0	GEI-12-15.0	GEI-11-40.0
Sampled By			GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI	GEI
Sample Date			04/04/22	04/04/22	04/04/22	04/04/22	04/04/22	04/04/22	04/04/22	04/04/22	04/04/22
Sample Depth (feet bgs)			17.0	12.5	17.5	12.5	17.0	15.0	35.0	15.0	40.0
Petroleum Hydrocarbons by NWPTH-Gx/NWTPH-Dx (mg/kg)											
Gasoline-Range	30	NE	5.74 U	6.5 U	6.25 U	5.64 U	5.76 U	**41.1**	5.88 U	**3,220**	6.05 U
Diesel-Range	2,000	NE	--	--	--	--	--	--	--	--	--
Lube Oil-Range	2,000	NE	--	--	--	--	--	--	--	--	--
Volatile Organic Compounds (VOCs) by EPA 8021/8260 (mg/kg)											
Benzene	0.03	NE	0.0230 U	0.0260 U	0.0250 U	0.0228 U	0.0230 U	**1.42**	0.0235 U	**0.739**	0.0242 U
Toluene	7	NE	0.0348 U	0.0390 U	0.0375 U	0.0328 U	0.0346 U	**0.418**	0.0353 U	0.0403 U	0.0363 U
Ethylbenzene	6	NE	0.0287 U	0.0325 U	0.0312 U	0.0282 U	0.0288 U	**1.03**	0.0294 U	**13**	0.0303 U
Total Xylenes	9	NE	0.0574 U	0.0650 U	0.0625 U	0.0564 U	0.0576 U	**3.482**	0.0588 U	**2.39**	0.0605 U
1,2 Dibromoethane (EDB)	0.005	NE	--	--	--	--	--	--	--	--	--
1,2 Dichloroethane (EDC)	1	NE	--	--	--	--	--	--	--	--	--
Methyl tertiary-butyl ether (MTBE)	0.1	NE	--	--	--	--	--	--	--	--	--
other VOCs[5]	varies	NE	--	--	--	--	--	--	--	--	--
Total Metals by EPA 6000 series (mg/kg)											
Arsenic	20	7	--	--	--	--	--	--	--	--	--
Barium	16,000	NE	--	--	--	--	--	--	--	--	--
Cadmium	2	1	--	--	--	--	--	--	--	--	--
Total Chromium	2,000	48	--	--	--	--	--	--	--	--	--
Lead	250	24	--	--	--	--	--	--	--	--	--
Mercury	2	0.07	--	--	--	--	--	--	--	--	--
Selenium	400	NE	--	--	--	--	--	--	--	--	--
Silver	400	NE	--	--	--	--	--	--	--	--	--
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270D/SIM (mg/kg)											
Acenaphthene	4,800	NE	--	--	--	--	--	--	--	--	--
Acenaphthylene	NE	NE	--	--	--	--	--	--	--	--	--
Anthracene	24,000	NE	--	--	--	--	--	--	--	--	--
Benzo[a]anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(a)pyrene	0.1	NE	--	--	--	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(g,h,i)perylene	NE	NE	--	--	--	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	--	--	--	--	--	--	--	--	--
Chrysene	NE	NE	--	--	--	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	--	--	--	--	--	--	--	--	--
Fluoranthene	3,200	NE	--	--	--	--	--	--	--	--	--
Fluorene	3,200	NE	--	--	--	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	--	--	--	--	--	--	--	--	--
Naphthalenes	5	NE	24.5 U	21.2 U	24.8 U	22.3 U	24.1 U	**571.6**	20.1 U	**4,375**	18.9 U
Phenanthrene	NE	NE	--	--	--	--	--	--	--	--	--
Pyrene	2,400	NE	--	--	--	--	--	--	--	--	--
cPAHs TEQ[6]	0.1	NE	--	--	--	--	--	--	--	--	--
Polychlorinated Biphenyls (PCBs) by EPA 8082 (mg/kg)											
Aroclor 1016	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1221	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1232	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1242	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1248	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1254	NA	NE	--	--	--	--	--	--	--	--	--
Aroclor 1260	NA	NE	--	--	--	--	--	--	--	--	--
Total PCBs	1.0	NE	--	--	--	--	--	--	--	--	--

Notes:

[1] Approximate exploration locations shown on Figure 2.

[2] Boring advanced at an angle of 25 degrees from vertical.

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Soil Cleanup Levels for Unrestricted Land Uses. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] Natural Background soil concentration per Ecology Publication 94-115 (Ecology 1994).

[5] Refer to Appendix B for a full list of compounds analyzed and their results.

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

mg/kg = milligram per kilogram

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GeoGroup = GEO Group Northwest, Inc.

GEI = GeoEngineers Inc.

NA = Not Applicable

NE = Not Established

"--" = not tested

ND = Not Detected

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected at a concentration greater than Natural Background.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA cleanup level.

Table 2

Summary of Groundwater Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	GEI-1	GEI-11	GEI-12	MTCA Cleanup Level[3]
Sample Identification	GEI-1-20210518	GEI-11-W-041122	GEI-12-W-041122	
Sample Date	05/18/21	04/11/22	04/11/22	
Depth To Groundwater (feet bgs)	64.1	61.3	68.8	
Groundwater Elevation[2] (feet NAVD88)	33.9	32.7	31.2	
Petroleum Hydrocarbons by NWTPH-G/Dx (µg/L)				
Gasoline-Range Petroleum Hydrocarbons	**54.6**	**694**	**142**	800/1,000[4]
Diesel-Range Petroleum Hydrocarbons	**176**	117 U	117 U	500
Heavy Oil-Range Petroleum Hydrocarbons	98.2 U	117 U	117 U	500
Volatile Organic Compounds (VOCs) by EPA 8260D (µg/L)				
Benzene	0.440 U	**2.06**	0.440 U	5
Toluene	**0.750**	**9.89**	0.750 U	100
Ethylbenzene	**0.980**	**8.28**	**1.06**	700
Total Xylenes	**3.274**	**48.9**	**1.2**	1,000
Total Metals by EPA 200.8/245.1 (µg/L)				
Arsenic	**6.75**	**2.94**	**2.85**	8[5]
Cadmium	**0.247**	0.200 U	0.200 U	5
Total Chromium	**8.39**	1.00 U	**1.10**	50
Lead	**4.61**	0.500 U	0.500 U	15
Mercury	**0.304**	0.100 U	0.100 U	2
Dissolved Metals by EPA 200.8/245.1 (µg/L)				
Arsenic	**1.23**	**2.95**	**2.91**	5
Cadmium	0.125 U	0.125 U	0.125 U	5
Total Chromium	0.750 U	0.750 U	**0.752**	50
Lead	0.500 U	0.500 U	0.500 U	15
Mercury	0.100 U	0.100 U	0.100 U	2
Polycyclic Aromatic Hydrocarbons (PAHs) by EPA 8270 (µg/L)				
1-Methylnaphthalene	**0.105**	**0.156**	**0.620**	1.5
2-Methylnaphthalene	**0.170**	**0.259**	**0.799**	32
Acenaphthene	0.0994 U	0.099 U	0.0997 U	960
Acenaphthylene	0.0994 U	0.099 U	0.0997 U	NE
Anthracene	0.0994 U	0.099 U	0.0997 U	4,800
Benzo[a]anthracene	0.0994 U	0.099 U	0.0997 U	NE
Benzo(a)pyrene	0.0994 U	0.099 U	0.0997 U	NE
Benzo(b)fluoranthene	0.0994 U	0.099 U	0.0997 U	NE
Benzo(g,h,i)perylene	0.0994 U	0.099 U	0.0997 U	NE
Benzo(k)fluoranthene	0.0994 U	0.099 U	0.0997 U	0.1
Chrysene	0.0994 U	0.099 U	0.0997 U	NE
Dibenzo(a,h)anthracene	0.0994 U	0.099 U	0.0997 U	NE
Fluoranthene	0.0994 U	0.099 U	0.0997 U	640
Fluorene	0.0994 U	0.099 U	0.0997 U	640
Indeno(1,2,3-cd)pyrene	0.0994 U	0.099 U	0.0997 U	NE
Naphthalene	**0.263**	**0.759**	**0.521**	160
Phenanthrene	0.0994 U	0.099 U	0.0997 U	NE
Pyrene	0.0994 U	0.099 U	0.0997 U	480
Total cPAHs TEQ[6]	0.0994 U	0.099 U	0.0997 U	0.1

Notes:

[1] Approximate sample locations are shown on Figures 1 through 3.

[2] Groundwater elevation referenced to the approximate ground surface elevation (North American Vertical Datum 1988 [NAVD88]).

[3] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method A Groundwater Cleanup Levels. MTCA Method B cleanup level used when Method A cleanup level has not been established.

[4] When benzene is present, the gasoline range cleanup level is 800 µg/L. When benzene is not present the gasoline range cleanup level is 1,000 µg/L.

[5] Natural background concentration for Puget Sound groundwater (Ecology 2021).

[6] Total carcinogenic PAHs (cPAHs) calculated using the toxicity equivalency (TEQ) methodology in WAC 173-340-708(8). Non-detections were assigned half the reporting limit for these calculations.

bgs = below ground surface

µg/L = micrograms per liter

MTCA = Model Toxics Cleanup Act

EPA = United States Environmental Protection Agency

U = chemical of concern not detected greater than the laboratory reporting limit shown

-- = not analyzed

NE = not established

- = not analyzed

NE = not established

NA = not applicable

Bold font type indicates the chemical of concern was detected.

Chemical analytical testing by Fremont Analytical of Seattle, Washington.

Table 3

Summary of Sub-Slab Soil Vapor Investigation Chemical Analytical Data

701 South Jackson Street

Seattle, Washington

Sample Location[1]	SSV-1		SSV-2		SSV-3		Shallow Sub-Slab Soil Gas Screening Level[2]	Deep Sub-Slab Soil Gas Screening Level[3]
Sample Identification	SSV-1-S	SSV-1-D	SSV-2-S	SSV-2-D	SSV-3-S	SSV-3-D		
Sampled By	GEI	GEI	GEI	GEI	GEI	GEI		
Sample Date	12/28/21	12/28/21	12/28/21	12/28/21	12/28/21	12/28/21		
Sample Depth (feet bgs)	5 - 10	20 - 25	5 - 10	20 - 25	5 - 10	20 - 25		
Helium by Modified ASTM D-1496								
Helium (percent)	0.4 U	--	0.4 U	**2.04**	0.4 U	0.6 U	NE	NE
Petroleum Hydrocarbons by Modified TO-15 (µg/m^3)								
Aliphatic Hydrocarbons (EC5-8)	**112,000**	--	**18,500**	**>28,600**	**608**	1,180 U	NE	NE
Aliphatic Hydrocarbons (EC9-12)	**7,970**	--	**1,090**	**2,410**	294 U	252 U	NE	NE
Aromatic Hydrocarbons (EC9-10)	**3,590**	--	**409,000**	**>13,200,000**	62.9 U	**2,280,000**	NE	NE
Total Petroleum Hydrocarbons (TPH)	**123,560**	--	**428,590**	**>13,231,010**	**608**	**2,280,000**	4,700	14,000
Volatile Organic Compounds (VOCs) by TO-15 (µg/m^3)								
Benzene	**153**	--	67.8 U	1,360 U	**8.19**	203 U	11	32
Toluene	**957**	--	1,640 U	32,800 U	16.4 U	4,910 U	76,000	230,000
Ethylbenzene	695 U	--	25.6 U	511 U	0.256 U	76.7 U	15,000	46,000
Xylenes	1,232		231 U	4,620 U	2.31 U	693 U	1,500	4,600
(MEK) 2-Butanone	472 U	--	1,740 U	34,700 U	17.4 U	5,210 U	76,000	230,000
1,2-Dibromoethane (EDB)	**17.7**	--	2.29 U	45.9 U	0.0229 U	6.88 U	0.14	0.42
1,2-Dichloroethane (EDC)	16.2 U	--	1,410 U	28,200 U	14.1 U	4,230 U	3.2	9.6
Methyl tert-butyl ether (MTBE)	72.1 U	--	39.7 U	793 U	0.397 U	119 U	320	960
Naphthalene	**99.9**	--	247 U	4,950 U	**2.97**	742 U	2.5	7.4
n-Hexane	**3,120**	--	383 U	7,660 U	3.83 U	1,150 U	11,000	32,000

Notes:

[1] Approximate exploration locations shown on Figure 3.

[2] Washington State Model Toxic Control Act Cleanup Regulation (MTCA) Method B soil gas screening level (lowest of carcinogenic and non-carcinogenic).

[3] Washington State MTCA Method B deep soil gas screening level (lowest of carcinogenic and non-carcinogenic).

bgs = below ground surface

µg/m^3 = micrograms per cubic meter

GEI = GeoEngineers Inc.

NE = Not Established

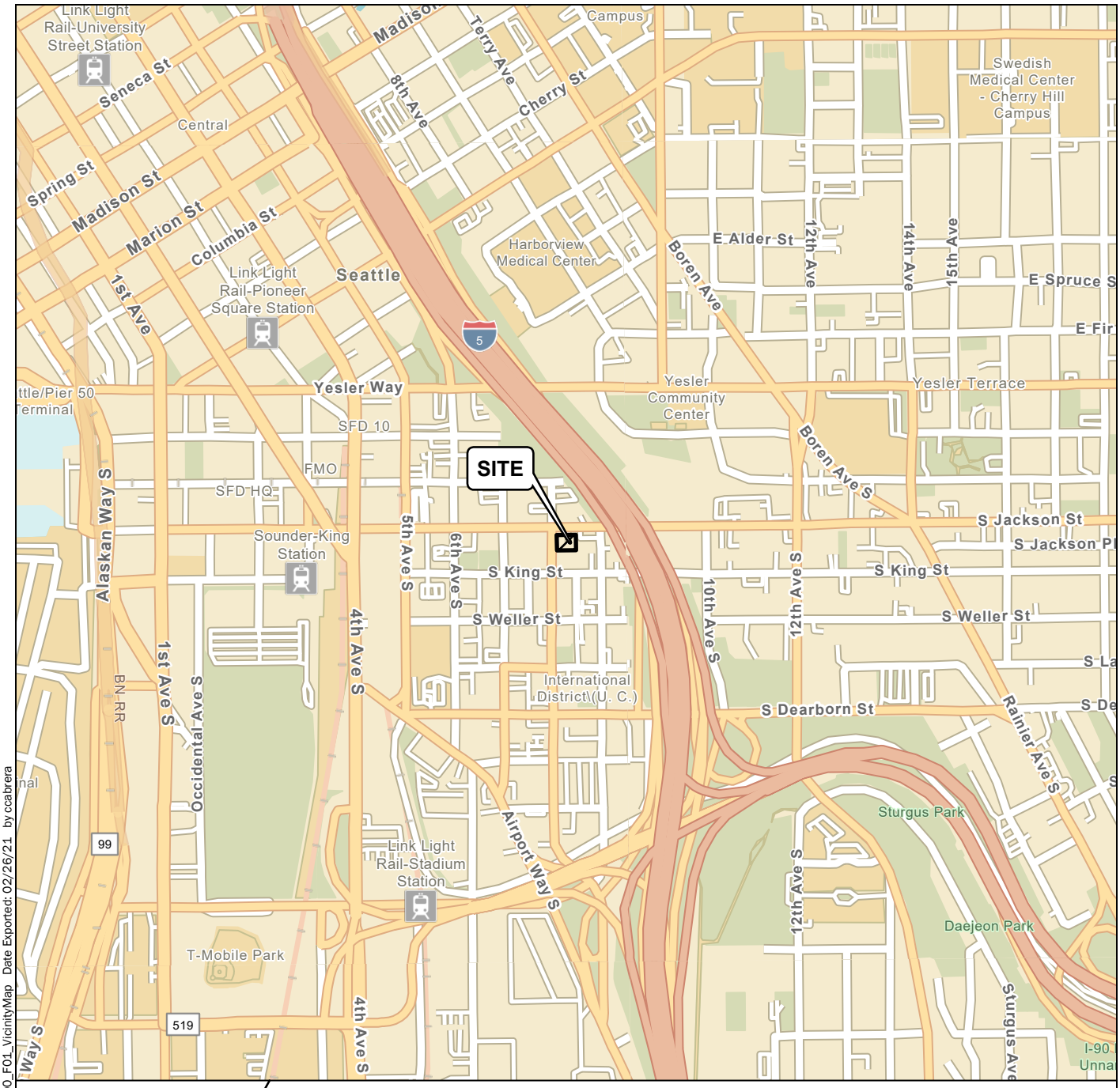
"--" = not tested

U = Analyte not detected above the reported sample quantization limit

Bold indicates analyte was detected.

Yellow shading indicates analyte was detected at a concentration greater than the MTCA screening level.

Figures



1,000 0 1,000

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

701 South Jackson Street
Seattle, Washington

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Figure 1

P:\24\24504001\GIS\24504001_Project\24504001_Project.aprx\2450400100_F01_VicinityMap Date Exported: 02/26/21 by ccabrera

Legend

- Property Boundary
- Parcel Boundary
- Existing Grade Major Contour
- Existing Grade Minor Contour

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: Aerial from Google Earth Pro dated 5/26/2018.
Lidar from Puget Sound Lidar Consortium dated 2016.

Projection: NAD83 Washington State Planes, North Zone, US Foot

N
W E
S

50 0 50
Feet

Site Plan

701 South Jackson Street
Seattle, Washington

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Figure 2

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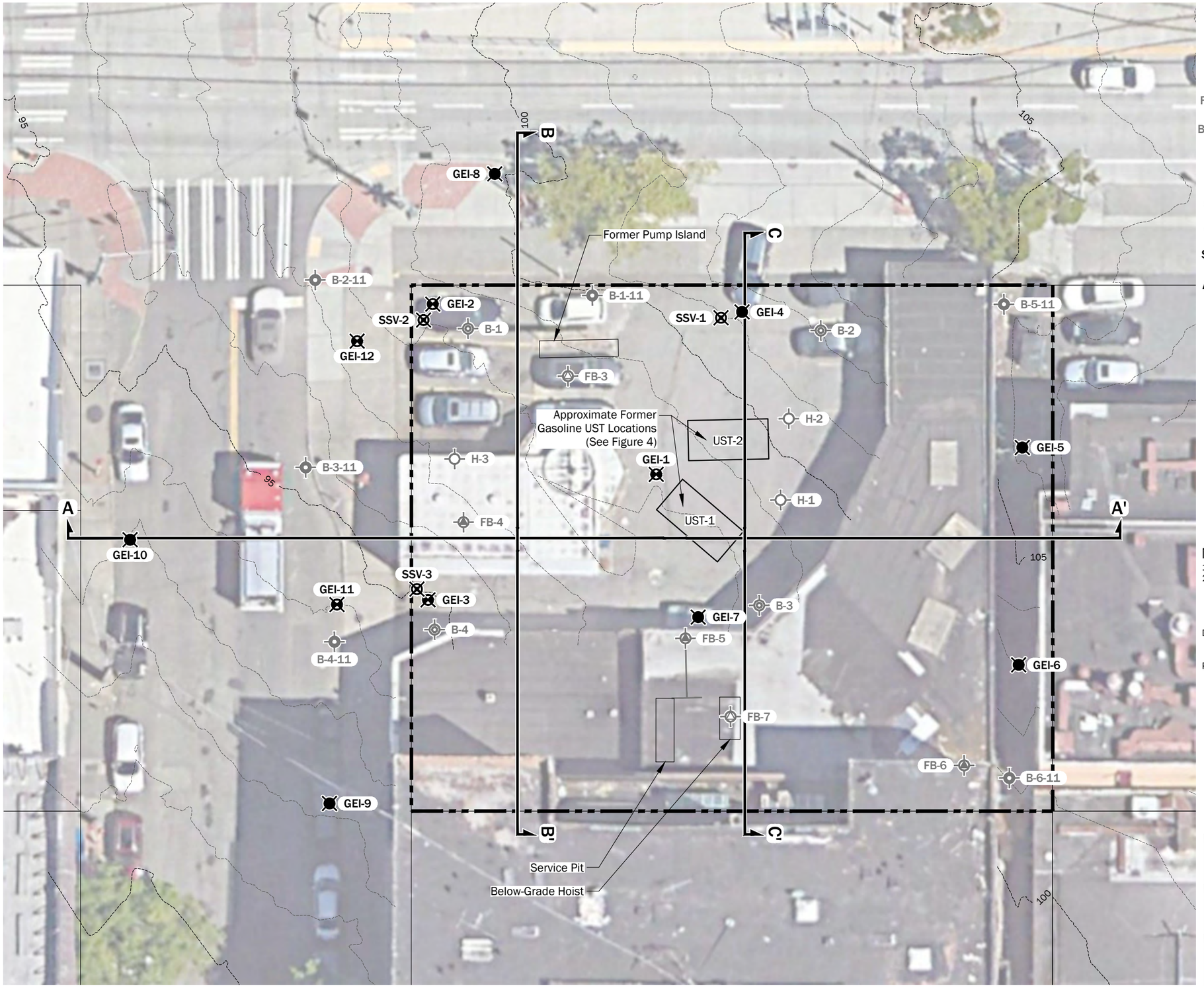

Legend

- FB-3 — Hollow Stem Auger Boring by Farallon Consulting, 2019
- FB-4 — Direct Push Boring by Farallon Consulting, 2019
- FB-5 — Direct Push Boring by Farallon Consulting, 2019 Completed at 25 degrees to horizontal
- B-1-11 — Hollow Stem Auger Boring by Landau Associates, 2011
- B-1 — Hollow Stem Auger Boring by GEO Group Northwest, 2006
- H-1 — Hollow Stem Auger Boring by GEO Group Northwest, 1992
- GEI-1 — Hollow Stem Auger Boring by GeoEngineers, 2021/2022
- GEI-4 — Direct Push Boring by GeoEngineers, 2021/2022
- SSV-1 — Soil Vapor Boring by GeoEngineers, 2021
- A A' — Cross Section Location

Notes:

1. The locations of all features shown are approximate.
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Data Source: Aerial from Google Earth Pro dated 5/26/2018.
Lidar from Puget Sound Lidar Consortium dated 2016.

Projection: NAD83 Washington State Planes, North Zone, US Foot

N W E S

20 0 20
Feet

Environmental Investigation Sampling Locations

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Figure 3

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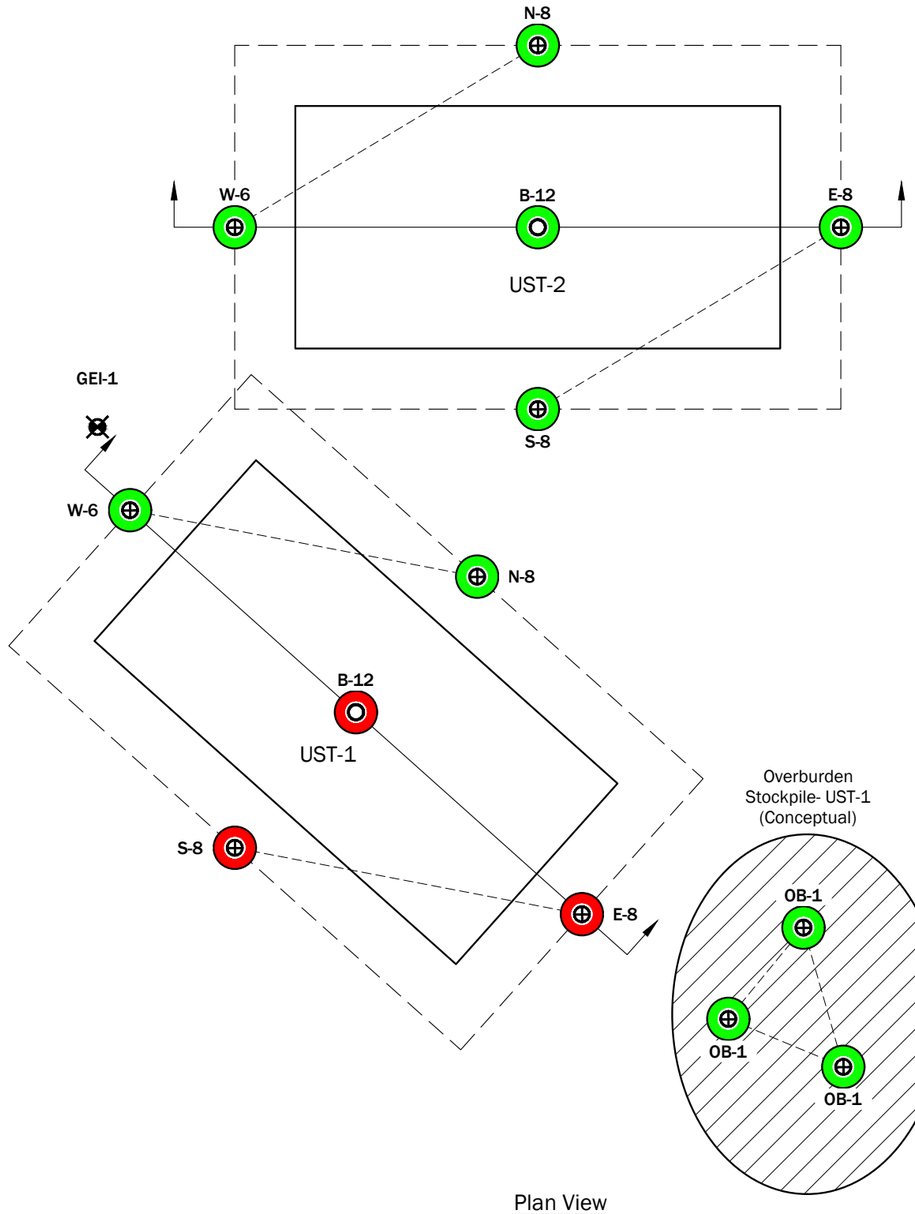
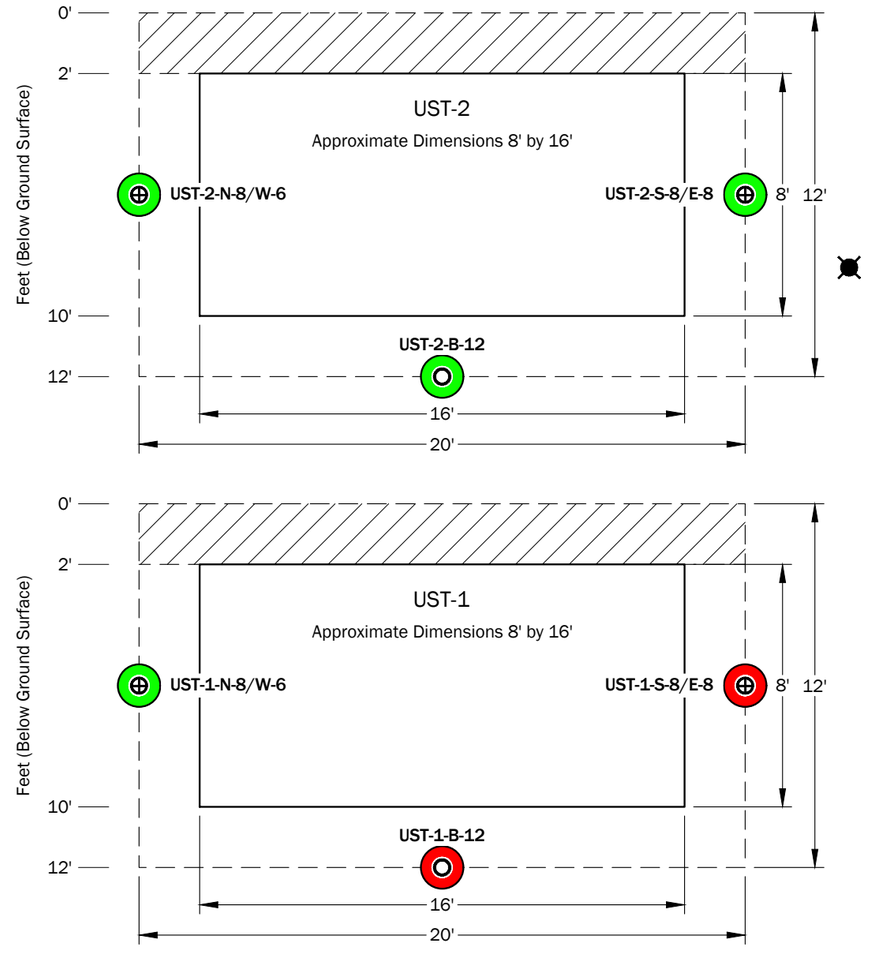
P:\24\24504001\CAD\01\Public Review Draft RI-FS\CAP\24504001_F03_Environmental Investigation Sampling Locations.dwg TAB:F03 Date Exported: 07/07/22 - 21:37 by gregister



Plan View



Profile View

Notes:

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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.
3. Excavation limits inferred from UST Removal and Closure Report In references section "Environmental Associates, Inc. (EAI) 2010. Underground Storage Tank Removal and Soil Testing. 7th Avenue Station, Seattle, Washington. December 16, 2010." in body of report "EAI 2020".

Legend

B-12 Discrete Soil Sample by Environmental Associates, 2010

N-8 Composite Soil Sample by Environmental Associates, 2010

Soil Chemical Analytical Results

Gasoline-range petroleum hydrocarbons and/or BETX were detected at concentrations greater than the MTCA Cleanup Levels

Gasoline-range petroleum hydrocarbons and/or BETX were detected at concentrations less than the MTCA Cleanup Levels

Gasoline-range petroleum hydrocarbons and/or BETX were not detected

BETX= Benzene, Ethylbenzene, Toluene, Xylene

UST Removal and Soil Sample Results

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Figure 4

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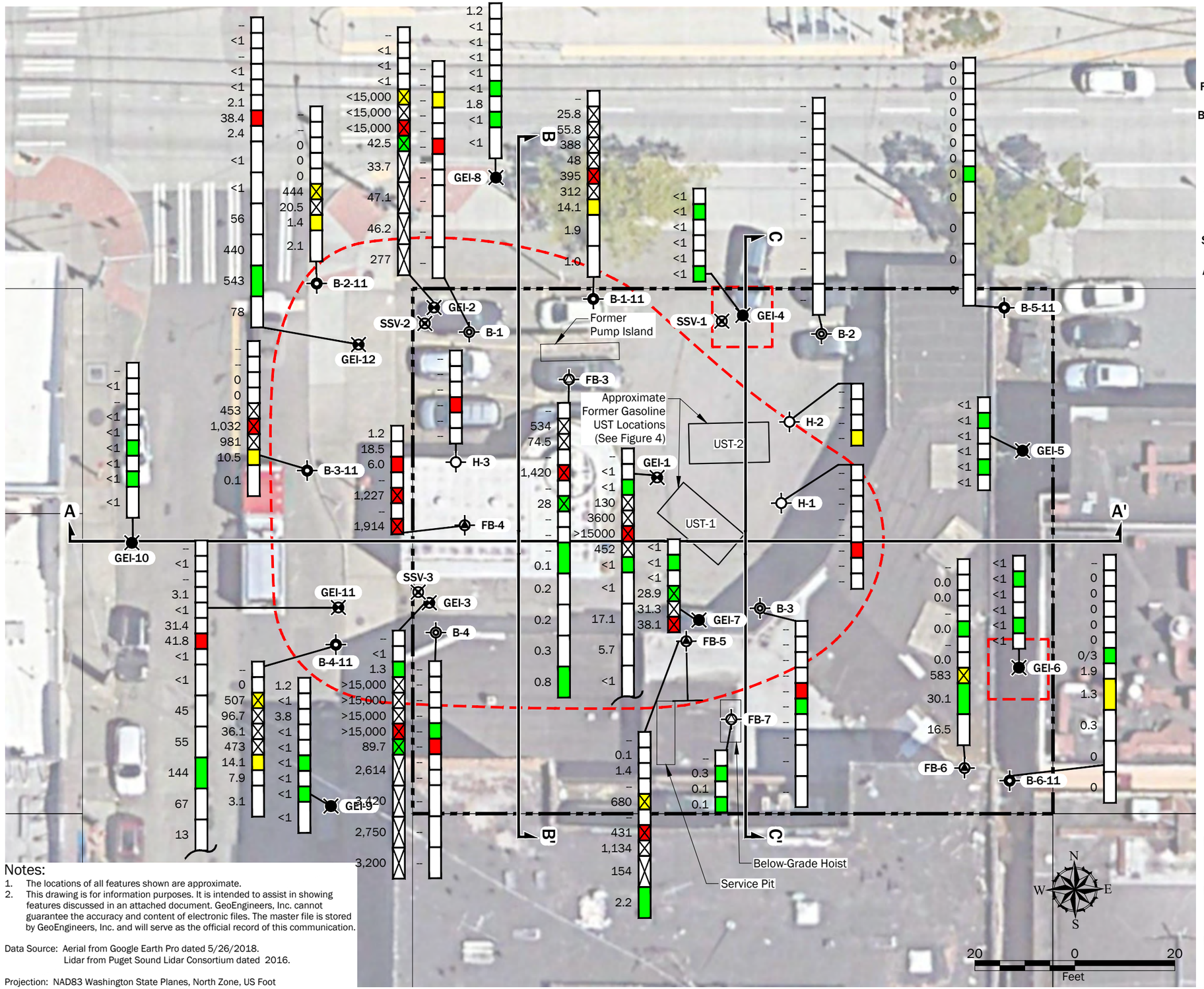
P:\24\24504001\CAD\01\Public Review Draft RI-FS-CAP\24504001_F4_UST Removal and Soil Sample Results.dwg TAB:4 UST Removal and Soil Sample Results Date Exported: 07/07/22 - 17:39 by gregister



Legend

- FB-3 — Hollow Stem Auger Boring by Farallon Consulting, 2019
- FB-4 — Direct Push Boring by Farallon Consulting, 2019
- FB-5 — Direct Push Boring by Farallon Consulting, 2019 Completed at 25 degrees to horizontal
- B-1-11 — Hollow Stem Auger Boring by Landau Associates, 2011
- B-1 — Hollow Stem Auger Boring by GEO Group Northwest, 2006
- H-1 — Hollow Stem Auger Boring by GEO Group Northwest, 1992
- GEI-1 — Hollow Stem Auger Boring by GeoEngineers, 2021/2022
- GEI-4 — Direct Push Boring by GeoEngineers, 2021/2022
- SSV-1 — Soil Vapor Boring by GeoEngineers, 2021
- A A' — Cross Section Location

Depth Interval of Soil Samples (bgs)

25.8	0-2.5 Feet
55.8	2.5-5.0 Feet
388	5.0-7.5 Feet
48	7.5-10.0 Feet
395	10.0-12.5 Feet
312	12.5-15.0 Feet
14.1	15.0-17.5 Feet
2.8	17.5-20 Feet
1.9	20-25 Feet
1.0	25-30 Feet
0.1	30-35 Feet
0.1	35-40 Feet

Photoionization detector (PID) Field Screening Results in parts per million (ppm)

Gasoline-Range Total Petroleum Soil Chemical Analytical Results (mg/kg)

- Not Tested
- Not Detected
- Detected Less than MTCA Method A/B
- Detected Greater than MTCA Method A/B Cleanup Levels
- Elevated Field Screening Indicative of Petroleum Contamination
- Estimated Lateral Extent of Soil with Contaminant Concentrations Greater Than the MTCA Method A/B Cleanup Levels.

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: Aerial from Google Earth Pro dated 5/26/2018.
Lidar from Puget Sound Lidar Consortium dated 2016.

Projection: NAD83 Washington State Planes, North Zone, US Foot

Soil Analytical Results - Gasoline Petroleum

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Figure 5

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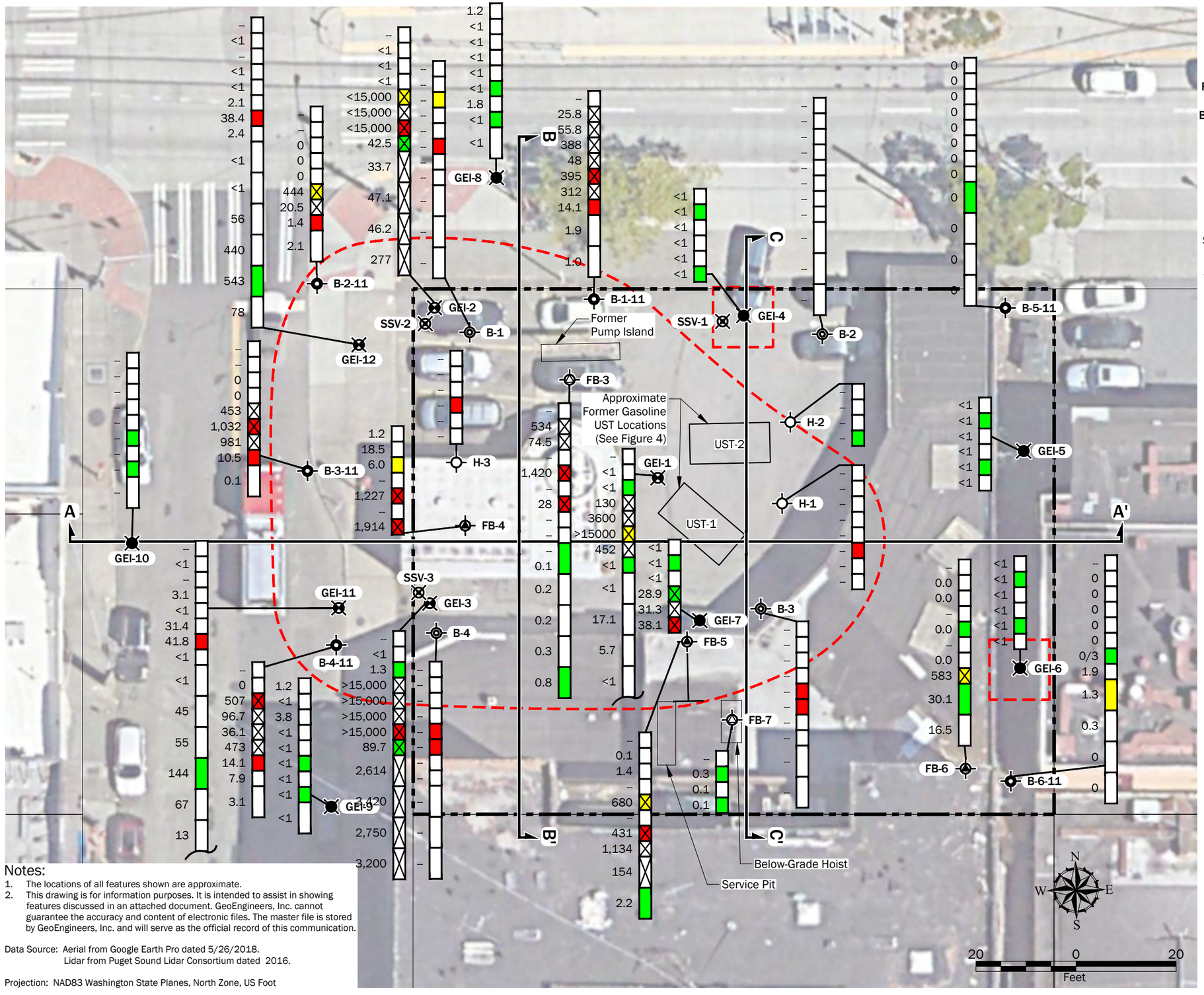
P:\24\24504001\CAD\01\Public Review Draft RI-FS-CAP\24504001101_F05_Soil Analytical Results - Gasoline Petroleum.dwg TAB:F05 Date Exported: 07/08/22 - 11:30 by gregister



Legend

- FB-3 — Hollow Stem Auger Boring by Farallon Consulting, 2019
- FB-4 — Direct Push Boring by Farallon Consulting, 2019
- FB-5 — Direct Push Boring by Farallon Consulting, 2019 Completed at 25 degrees to horizontal
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- B-1 — Hollow Stem Auger Boring by GEO Group Northwest, 2006
- H-1 — Hollow Stem Auger Boring by GEO Group Northwest, 1992
- GEI-1 — Hollow Stem Auger Boring by GeoEngineers, 2021/2022
- GEI-4 — Direct Push Boring by GeoEngineers, 2021/2022
- SSV-1 — Soil Vapor Boring by GeoEngineers, 2021
- A A' — Cross Section Location

Depth Interval of Soil Samples (bgs)

25.8	0-2.5 Feet
55.8	2.5-5.0 Feet
388	5.0-7.5 Feet
48	7.5-10.0 Feet
395	10.0-12.5 Feet
312	12.5-15.0 Feet
14.1	15.0-17.5 Feet
2.8	17.5-20 Feet
1.9	20-25 Feet
1.0	25-30 Feet
0.1	30-35 Feet
0.1	35-40 Feet

Photoionization detector (PID) Field Screening Results in parts per million (ppm)

Gasoline-Range Total Petroleum Soil Chemical Analytical Results (mg/kg)

- Not Tested
- Not Detected
- Detected Less than MTCA Method A/B
- Detected Greater than MTCA Method A/B Cleanup Levels
- Elevated Field Screening Indicative of Petroleum Contamination
- Estimated Lateral Extent of Soil with Contaminant Concentrations Greater Than the MTCA Method A/B Cleanup Levels.

Notes:
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Data Source: Aerial from Google Earth Pro dated 5/26/2018.
Lidar from Puget Sound Lidar Consortium dated 2016.

Projection: NAD83 Washington State Planes, North Zone, US Foot

Soil Analytical Results - BTEX

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Figure 6

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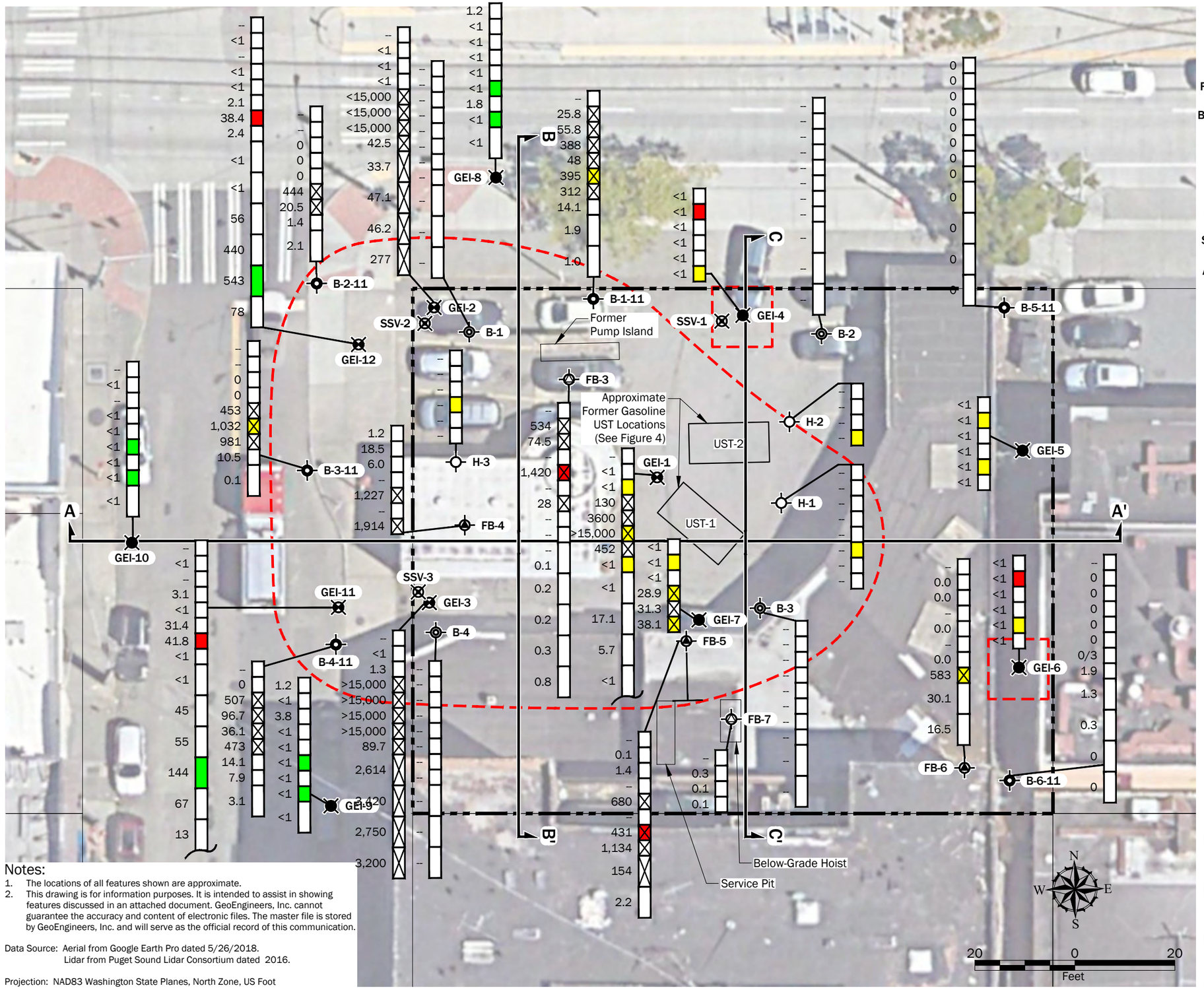
P:\24\24504001\CAD\01\Public Review Draft RI-FS-CAP\24504001_F06_Soil Analytical Results - Benzene.dwg TAB:F06 Date Exported: 07/08/22 - 11:29 by gregister



Legend

- FB-3 — Hollow Stem Auger Boring by Farallon Consulting, 2019
- FB-4 — Direct Push Boring by Farallon Consulting, 2019
- FB-5 — Direct Push Boring by Farallon Consulting, 2019 Completed at 25 degrees to horizontal
- B-1-11 — Hollow Stem Auger Boring by Landau Associates, 2011
- B-1 — Hollow Stem Auger Boring by GEO Group Northwest, 2006
- H-1 — Hollow Stem Auger Boring by GEO Group Northwest, 1992
- GEI-1 — Hollow Stem Auger Boring by GeoEngineers, 2021/2022
- GEI-4 — Direct Push Boring by GeoEngineers, 2021/2022
- SSV-1 — Soil Vapor Boring by GeoEngineers, 2021
- A A' — Cross Section Location

Depth Interval of Soil Samples (bgs)

25.8	0-2.5 Feet
55.8	2.5-5.0 Feet
388	5.0-7.5 Feet
48	7.5-10.0 Feet
395	10.0-12.5 Feet
312	12.5-15.0 Feet
14.1	15.0-17.5 Feet
2.8	17.5-20 Feet
1.9	20-25 Feet
1.0	25-30 Feet
0.1	30-35 Feet
0.1	35-40 Feet

Photoionization detector (PID) Field Screening Results in parts per million (ppm)

Gasoline-Range Total Petroleum Soil Chemical Analytical Results (mg/kg)

- Not Tested
- Not Detected
- Detected Less than MTCA Method A/B
- Detected Greater than MTCA Method A/B Cleanup Levels
- Elevated Field Screening Indicative of Petroleum Contamination
- Estimated Lateral Extent of Soil with Contaminant Concentrations Greater Than the MTCA Method A/B Cleanup Levels.

Notes:
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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: Aerial from Google Earth Pro dated 5/26/2018.
Lidar from Puget Sound Lidar Consortium dated 2016.

Projection: NAD83 Washington State Planes, North Zone, US Foot

Soil Analytical Results - PAHs and Metals

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Figure 7

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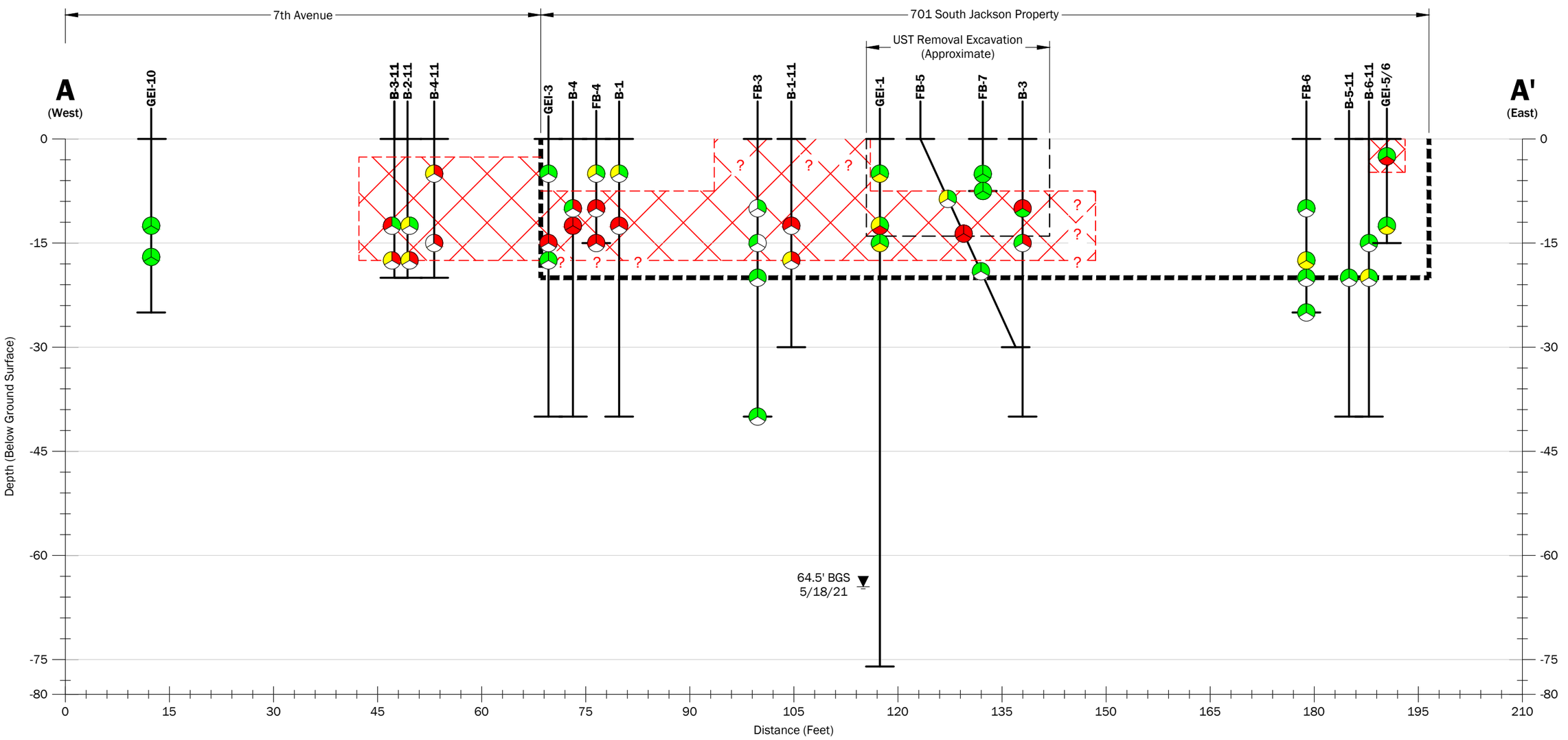
P:\24\24504001\CAD\01\Public Review Draft RI-FS-CAP\24504001_F07_Soil Analytical Results - Naphthalene.dwg TAB:F07 Date Exported: 07/08/22 - 11:29 by gregister



Legend

Soil Chemical Analytical Results (mg/kg)

Gasoline — Benzene

PAHs and Metals

- Contaminants of Concern Not Detected or Detected at Concentration similar to Background Levels
- Contaminants of Concern Detected at Concentrations Less Than MTCA Method A/B Cleanup Levels
- Contaminants of Concern Detected at Concentrations Greater Than the MTCA Method A/B Cleanup Levels

- Approximate Extent of Contaminated Soil Greater than MTCA Cleanup Levels
- Planned Development Extent
- Groundwater Measure Depth

15 0 15
Horizontal Scale in Feet

15 0 15
Vertical Scale in Feet
Vertical Exaggeration: 1X

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Cross Section A-A'

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Figure 8

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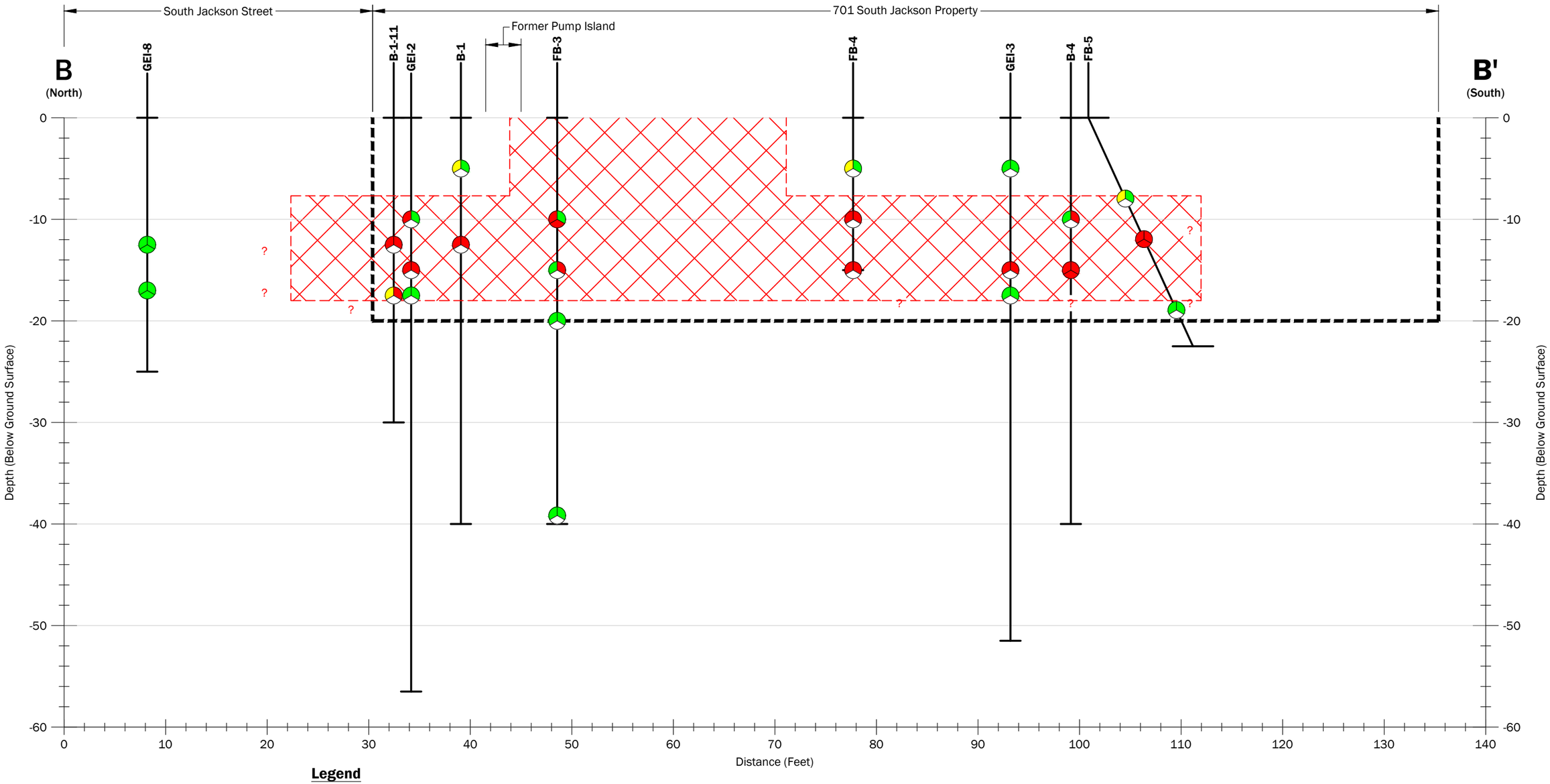
P:\24\24504001\CAD\01\Public Review Draft RI-FS-CAP\24504001_F8_Cross Section A-A'.dwg TAB:8 Cross Section A-A' Date Exported: 07/07/22 - 21:31 by gregister



Legend

Soil Chemical Analytical Results (mg/kg)

Gasoline — Benzene

PAHs and Metals

- Contaminants of Concern Not Detected or Detected at Concentration similar to Background Levels
- Contaminants of Concern Detected at Concentrations Less Than MTCA Method A/B Cleanup Levels
- Contaminants of Concern Detected at Concentrations Greater Than the MTCA Method A/B Cleanup Levels

- Approximate Extent of Contaminated Soil Greater than MTCA Cleanup Levels
- Planned Development Extent
- Groundwater Measure Depth

10 0 10
Horizontal Scale in Feet

10 0 10
Vertical Scale in Feet
Vertical Exaggeration: 1X

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
2. This figure is for informational purposes only. It is intended to assist in the identification of features discussed in a related document. Data were compiled from sources as listed in this figure. The data sources do not guarantee these data are accurate or complete. There may have been updates to the data since the publication of this figure. This figure is a copy of a master document. The hard copy is stored by GeoEngineers, Inc. and will serve as the official document of record.

Cross Section B-B'

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Figure 9

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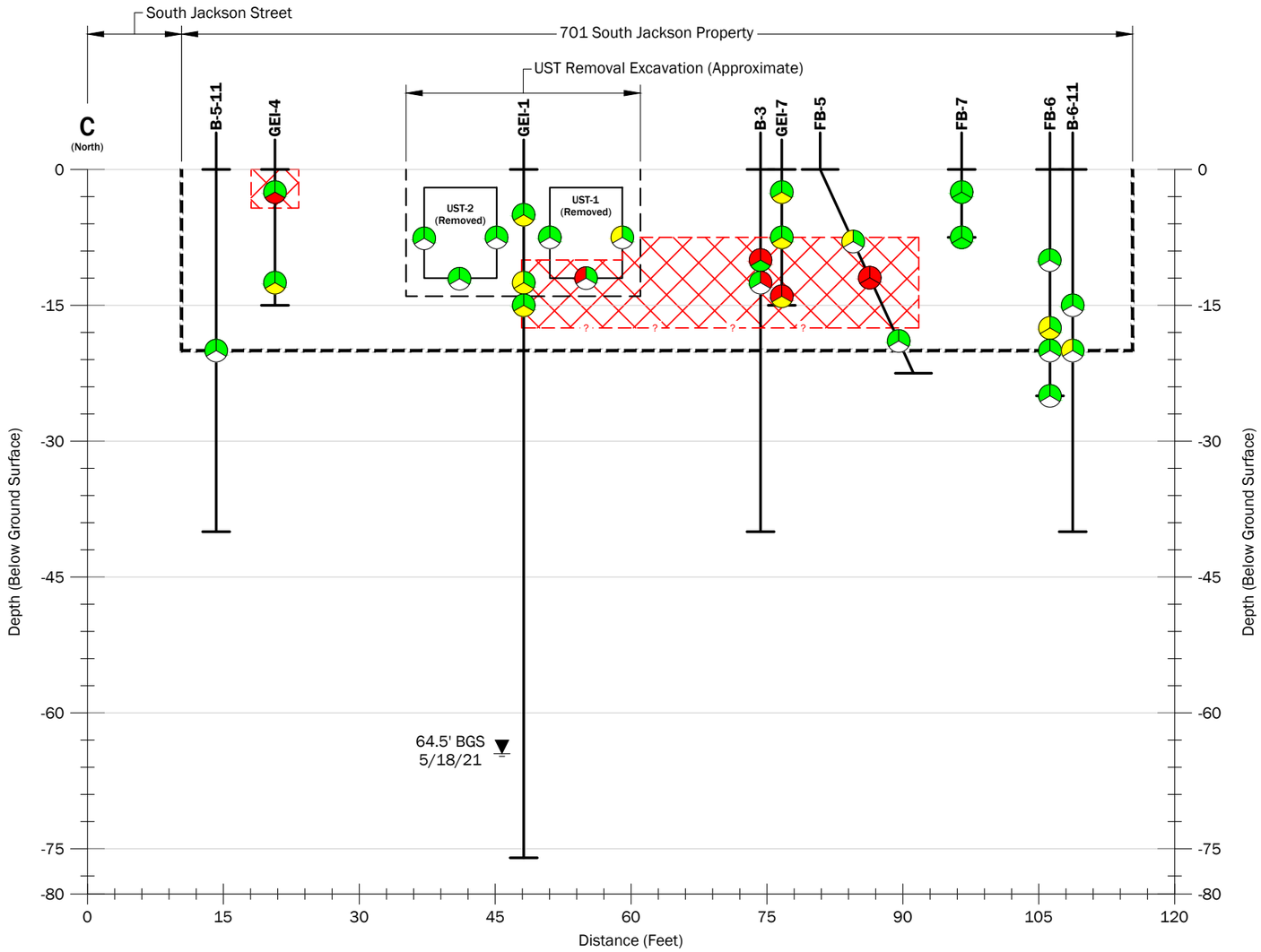
P:\24\24504001\CAD\01\Public Review Draft RI-FS\CAP\24504001_F9_Cross Section B-B'.dwg TAB:9 Cross Section B-B' Date Exported: 07/07/22 - 21:36 by gregister



Legend

Soil Chemical Analytical Results (mg/kg)

Gasoline — Benzene

PAHs and Metals

- Contaminants of Concern Not Detected or Detected at Concentration similar to Background Levels
- Contaminants of Concern Detected at Concentrations Less Than MTCA Method A/B Cleanup Levels
- Contaminants of Concern Detected at Concentrations Greater Than the MTCA Method A/B Cleanup Levels

- Approximate Extent of Contaminated Soil Greater than MTCA Cleanup Levels
- Planned Development Extent
- Groundwater Measure Depth

15 0 15
Horizontal Scale in Feet

15 0 15
Vertical Scale in Feet
Vertical Exaggeration: 1X

Notes:

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.
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Cross Section C-C'

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Figure 10

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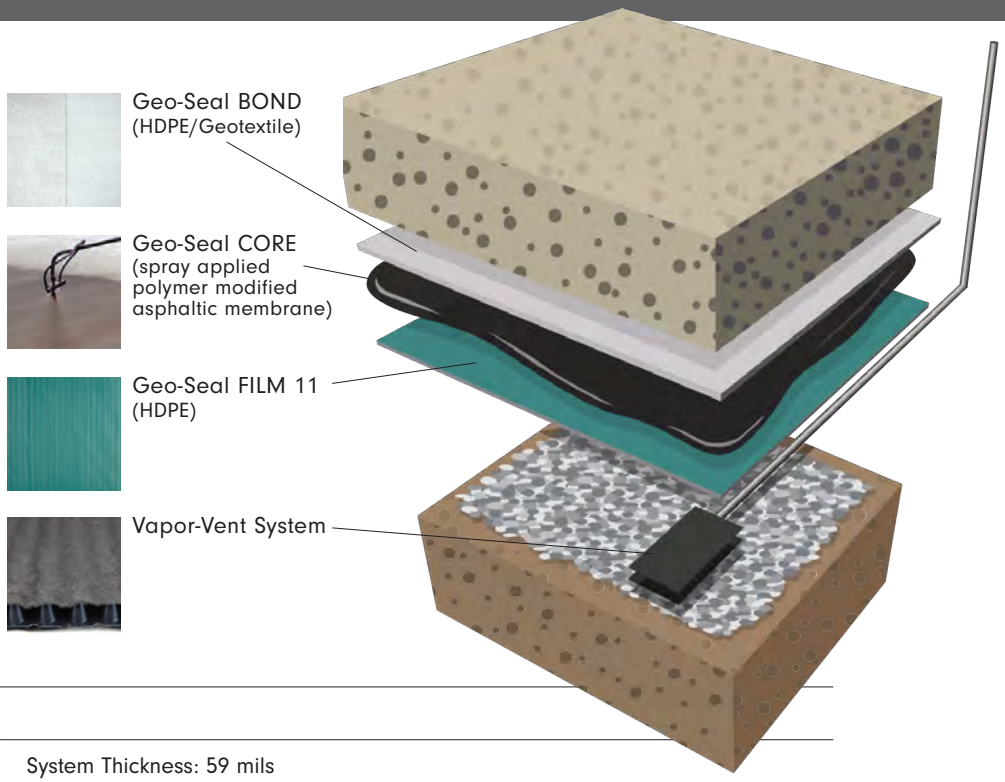
Appendices

Appendix A

Geo-Seal Product Information

Geo-Seal® 60



System: Geo-Seal 60 Vapor Intrusion Barrier			
Application: Underslab Contaminant Vapor Barrier		System Thickness: 59 mils	
	1st Layer	2nd Layer	3rd Layer
Product Name	Geo-Seal FILM 11	Geo-Seal CORE 30 mil	Geo-Seal BOND 18 mil

DESCRIPTION

Geo-Seal® 60 is designed to provide a cost-effective alternative for sites desiring a pre-emptive mitigation solution, but also wish to have a vapor intrusion barrier that is more robust and resistant to construction traffic than simple single sheet membranes. Geo-Seal® consists of three distinct layers, Geo-Seal® FILM 11, Geo-Seal® CORE and Geo-Seal® BOND.

While simple single sheet membranes may be able to provide robust chemical resistance, they often lack the robust seals around penetrations and termination points. They are also more prone to punctures during the construction process.

Geo-Seal® 60 makes the decision easy for those debating whether to employ a simple single sheet membrane or utilize a thicker, more robust barrier to protect human health at similar price points.

BENEFITS

- **Class A:** Class A vapor barrier that alone meets the basic water vapor barrier requirements for new construction.
- **Durable:** Three layers of complementary contaminant vapor barrier materials create a thick and redundant composite system superior to single sheet barrier systems.
- **Chemical Resistant:** Constructed with multiple highly chemical resistant sheets and a polymer-modified asphaltic membrane to form a robust composite barrier.
- **Seamless:** Spray-applied monolithic layer ensures complete sealing of building foundation without mechanical fastening.
- **Bonded:** Mechanically adheres directly to the foundation slab.
- **Single-Source Warranty:** EPRO can be a single point of contact to address building vapor intrusion and waterproofing needs.

LIMITATIONS

- Do not apply below 20°F or to damp, frozen or contaminated surfaces.
- Contact EPRO for waterproofing system recommendations.

SPECIFICATIONS, DRAWINGS, AND TECHNICAL ASSISTANCE

The most current specifications and drawings can be found on www.eproinc.com. For project specific details contact EPRO directly, or your local EPRO representative.

Site conditions, performance goals, and budget determine which system is most appropriate for a given project. For more information regarding product performance, testing, plan review, or general technical assistance, please contact EPRO.

WARRANTY

EPRO provides a wide range of warranty options for Geo-Seal systems. For a project to be eligible for any warranty option beyond a 1-year material warranty, a Geo-Seal Authorized Applicator must be used and the project must be registered and approved by EPRO prior to the commencement of any product application.

Warranty options available for this system include:

- Material warranty
- Longer warranty periods are available. Contact EPRO for more information.

Physical Property	Test Method	Value
Tensile Strength	ASTM D 412	527.7 psi
Elongation	ASTM D 412	45%
Adhesion to Concrete	ASTM D 903	8 lbf/in
Puncture Resistance	ASTM D 1709	310 lbf
Hydrostatic Head Resistance	ASTM D 5385	100 psi (231 ft)
Water Vapor Transmission	ASTM E 96	0.020 perms
PCE Diffusion Rate	Geokinetics	1.16×10^{-17} m^2/sec
Benzene Diffusion Rate	Geokinetics	2.31×10^{-18} m^2/sec
Classification	ASTM E1745	Class A, B & C

Applications:	**Slab On Grade Gas Containment Composite Vapor Intrusion Barrier**
Spec Version:	**EproGS60.VB.v1.4.08.20gs**
Date issued:	**September 22, 2020**
Note:	**This specification may be superseded at any time. Check eproinc.com for the most up to date version of this specification.**

SECTION 02 56 16
GAS CONTAINMENT
SECTION 02 56 19.13
FLUID APPLIED GAS BARRIER

Geo-Seal 60
Composite Vapor Intrusion Barrier
Guide Specification

Slab On Grade

Geo-Seal 60 is designed to provide a cost-effective alternative for sites desiring a pre-emptive mitigation solution, but also wish to have a vapor intrusion barrier that is more robust and resistant to construction traffic than simple single sheet membranes. This guide specification has been prepared according to the principles established in the Manual of Practice published by the Construction Specification Institute.

Note: If areas will be subjected to water and/or hydrostatic conditions, contact EPRO for appropriate system recommendations.

For additional questions, your local EPRO technical representative can be contacted through: EPRO Services, Inc., Wichita KS; 1.800.882.1896; www.eproinc.com.

GEO-SEAL 60 SLAB ON GRADE COMPOSITE VAPOR INTRUSION BARRIER SPECIFICATION
VERSION 1.40

SECTION 02 56 16 – GAS CONTAINMENT
SECTION 02 56 19.13 – FLUID-APPLIED GAS BARRIER

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including general and supplementary conditions, and Division 1 specification section, apply to this section.

1.2 SECTION INCLUDES

A. The installation of materials designed to provide vapor intrusion protection when installed per project specification, this section covers the methane mitigation and vapor intrusion membrane, along with the following:

1. Surface preparation and substrate treatment
2. Auxiliary materials
3. Prefabricated drainage mat (if applicable)
4. Foundation drain (if applicable)

1.3 RELATED SECTIONS

A. Section 02 24 00: Environmental Assessment

B. Section 02 32 00: Geotechnical Investigation

C. Section 03 15 00: Concrete Accessories

D. Section 03 30 00: Cast-in-Place Concrete

E. Section 03 40 00: Precast Concrete

F. Section 07 90 00: Joint Protection

G. Section 31 30 00: Earthwork Methods

H. Section 33 41 00: Subdrainage

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide a vapor mitigation system that prevents the passage of methane gas, contaminant vapors including chlorinated solvents and petroleum hydrocarbons, and complies with the physical requirements as demonstrated by testing performed by an independent testing agency.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's printed technical data, tested physical and performance properties, instructions for evaluating, preparing, and treating substrates, and installation instructions.

B. Shop Drawings: Project specific drawings showing locations and extent of vapor intrusion barrier system, details for overlaps, penetrations, transitions, and termination conditions.

C. Samples: Submit two standard size samples of the each of the following:

1. Individual components of the specified composite vapor intrusion barrier system.

D. Applicator Certification: Submit written confirmation at the time of bid that applicator is currently approved by the membrane manufacturer.

1.6 QUALITY ASSURANCE

A. Applicator Qualifications: System applicator shall be an EPRO Authorized Applicator who is trained to perform work that in accordance with EPRO standards and policies.

B. Manufacturer Qualification: Obtain vapor intrusion barrier materials and system components from a single manufacturer source, EPRO. Manufacturer must have 20 years of experience in the manufacture of vapor intrusion barrier systems.

C. Third Party Inspection: Independent inspection of the composite system installation may be required based on project conditions and desired warranty coverage, or as required based on local building code/government agency jurisdiction. Inspection reports shall be submitted directly to the composite vapor intrusion barrier manufacturer and made available to other parties per the owner’s direction.

D. Pre-Construction Meeting: A meeting shall be held prior to application of the barrier system to assure proper substrate preparation, confirm installation conditions, and any additional project specific requirements. Attendees of the meeting shall include, but are not limited to the following:

1. EPRO authorized applicator
2. Third party inspector
3. General contractor
4. Owner’s representative
5. Architect and Engineer
6. Concrete/Shotcrete contractor
7. Rebar contractor
8. All appropriate related trades

E. Field Sample: Apply vapor intrusion barrier system field sample to 100 ft^2 (9.3 m^2) of each assembly to demonstrate proper application techniques and standard of workmanship.

1. Notify composite membrane system manufacturer representative, architect, certified inspector, and other appropriate parties one week in advance of the dates and times when field sample will be prepared.

2. If architect and certified inspector determines that field sample does not meet requirements; reapply composite membrane system until field sample is approved.

3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed composite membrane system. An undamaged field sample may become part of the completed work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery: Deliver materials to site labeled with manufacturer's name, product brand name, material type, and date of manufacture. Upon the arrival of materials to the jobsite, inspect materials to confirm material has not been damaged during transit.

B. Storage: Proper storage of onsite materials is the responsibility of the certified applicator. Consult product data sheets to confirm storage requirements. Storage area shall be clean, dry, and protected from the elements. If ambient air temperatures are expected to fall below 40°F, precautions will need to be taken to protect any emulsion product from near freezing temperatures. Protect stored materials from direct sunlight.

C. Disposal: Remove and replace any material that cannot be properly applied in accordance with local regulations and specification section 01 74 19.

1.8 PROJECT CONDITIONS

A. Substrate Review: Substrates shall be reviewed and accepted by the certified applicator and independent inspector prior to application.

B. Penetrations: **All plumbing, electrical, mechanical, and structural items to be passing through the composite membrane system shall be properly spaced, positively secured in their proper positions, and appropriately protected prior to system application and throughout the construction phase.** Braided grounding rods are not allowed to pass through the vapor intrusion barrier.

C. Reinforcement Steel and Concrete Forms: Vapor intrusion barrier shall be installed before placement of reinforcing steel. When penetrations post system installation occurs, it is the responsibility of the general contractor to notify the vapor intrusion barrier applicator to immediately make repairs prior to the placement of overburden, this includes the use of solid plastic “VaporStakes” used to secure concrete forms.

D. Clearance: Minimum clearance of 24 inches is required for application of spray applied polymer modified asphalt, ***Geo-Seal CORE***. For areas with less than 24-inch clearance, the product may be applied by hand using ***Geo-Seal CORE Detail***.

E. Overspray: Protect all adjacent areas not receiving the barrier application. Masking is necessary to prevent unwanted overspray from adhering to, or staining, areas not receiving the membrane. Once ***Geo-Seal CORE*** adheres to a surface it is extremely difficult to remove.

F. Weather Limitations: Perform work only when existing and forecast weather conditions are within manufacturer's recommendations.

1. Spray Applied Polymer Modified Asphalt Membrane: Minimum ambient temperature should be 40°F (7°C) and rising. For applications temperatures below 38°F, but greater than +19ºF/-7ºC, special equipment and material handling is required. Substrate shall be clean and free from standing moisture.

2. EPRO applicators reserve the right not to install product when application conditions might be within manufactures acceptance, but ambient conditions may limit a successful application.

1.9 WARRANTY

A. Special Warranty: Submit a written warranty signed by vapor intrusion barrier manufacturer agreeing to replace system materials that do not conform to manufacturer's published specifications or are deemed to be defective. Warranty does not include failure of vapor intrusion barrier due to failure of soil substrate prepared and treated according to requirements or formation of new joints and cracks in the concrete that exceed 1/8 inch (3.175 mm) in width.

1. Warranty Period: 1 years after date of substantial completion. Longer warranty periods are available upon request.

2. Coverage: Manufacturer will guarantee that the material provided is free of defects for the warranty period.

B. Additional Warranty Options: Upgraded warranties are available by contacting the manufacturer. These warranties may have additional requirements and approval must be granted in accordance to the manufacturer's warranty requirements. Additional warranty options include:

1. Standard Labor and Material (Geo-Seal L&M): Manufacturer will provide non-prorated coverage for the warranty term, agreeing to repair or replace material that does not meet requirements or remain vapor tight.

2. Waterproofing Warranties: For below grade project that require vapor intrusion barriers and below grade waterproofing for foundation walls, single source warranties are available from EPRO.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: EPRO Services, Inc. (EPRO), P.O. Box 347; Derby, KS 67037; Tel: (800) 882-1896; www.eproinc.com

B. Basis of Design: Geo-Seal 60 (58 mils) – ***Geo-Seal FILM 11***, ***Geo-Seal CORE*** (30 mils), ***Geo-Seal BOND***

2.2 VAPOR INTRUSION BARRIER MATERIALS

A. The physical properties listed in this section reflect testing on the entire composite system. Physical properties of the individual system composite can be found in Specification Section 2.3.

1. **Geo-Seal 60 Vapor Intrusion Barrier** consists of a 30 mil layer of ***Geo-Seal CORE*** (polymer modified asphaltic membrane) sandwiched between two HDPE geocomposite membranes ***Geo-Seal FILM 11*** layer and ***Geo-Seal BOND*** protection sheet. ***Geo-Seal*** is ideal for moisture protection on sites that may also contain methane gas, contaminated soil, or contaminated groundwater.

PROPERTIES	TEST METHOD	VALUE
Tensile Strength	ASTM D412	527.7 psi
Elongation	ASTM D412	45%
Adhesion to Concrete	ASTM D903	8 lbf/in
Puncture Resistance	ASTM D1709	310 lbf
Water Vapor Transmission	ASTM E96	0.020 perms
PCE Diffusion Rate	Geokinetics	1.16×10^{-17} m^2/sec
Benzene Diffusion Rate	Geokinetics	2.31×10^{-18} m^2/sec
Vapor Barrier Classification	ASTM E1745	A, B & C

2.3 VAPOR INTRUSION BARRIER MATERIALS

A. Polymer Modified Asphalt

1. ***Geo-Seal CORE***: ***Geo-Seal CORE*** is a non-hazardous, low-viscosity, water-based, anionic asphalt emulsion modified with a blend of synthetic polymerized rubbers and proprietary additives. ***Geo-Seal CORE*** is highly stable during transit and when properly stored but becomes highly reactive during the spray application to form a rapidly cured membrane with exceptional bonding, elongation, and hydrophobic characteristics.

PROPERTIES	TEST METHOD	VALUE
Color		Brown to Black
Solvent Content		No Solvents
Shelf Life		6 months
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	4140%
Resistance to Decay	ASTM E 154 Section 13	4% Perm Los
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	0.026 g./sq. ft./hr.
Hydrostatic Water Pressure	ASTM D 751	26 psi
Perm Rating	ASTM E 96 (US Perms)	0.21
Methane Transmission Rate	ASTM D 1434	0
Adhesion to Concrete & Masonry	ASTM C 836 & C 704	20 lbf./inch
Adhesion to HDPE	ASTM C 836	28.363 lbf./inch
Adhesion to Polypropylene Fabric	ASTM C 836	31.19 lbf./inch
Hardness	ASTM C 836	80
Crack Bridging	ASTM C 836-00	No Cracking
Low Temp. Flexibility		No Cracking at -20° C
Packaging: 55 gallon drum, 275 gallon tote, 330 gallon tote		

2. ***Geo-Seal CORE Detail***: ***Geo-Seal CORE Detail*** is single component, medium viscosity, water-based, polymer-modified anionic asphalt emulsion, which exhibits exceptional bonding, elongation and hydrophobic characteristics.

PROPERTIES	TEST METHOD	VALUE
Color		Brown to Black
Solvent Content		No Solvents
Shelf Life		6 months
Tensile Strength	ASTM 412	32 psi
Elongation	ASTM 412	3860%
Resistance to Decay	ASTM E 154 SECTION 13	9% Perm Loss
Accelerated Aging	ASTM G 23	No Effect
Moisture Vapor Transmission	ASTM E 96	0.071 g/sq. ft./hr.
Hydrostatic Water Pressure	ASTM D 751	28 psi
Perm Rating	ASTM E 96 (US Perms)	0.17
Methane Transmission Rate	ASTM D 14334	0
Adhesion to Concrete & Masonry	ASTM C 836	1 lbf/inch
Hardness	ASTM C 836	85
Crack Bridging	ASTM C 836	No Cracking
Low Temp. Flexibility	ASTM C 836-00	No Cracking at -20° C
Packaging: 5 gallon bucket		

B. Base Sheet

1. **Geo-Seal FILM 11**: **Geo-Seal FILM 11** is a base course comprised of an 11 mil HDPE film. The film is cross laminated to a create ridges that enhance the bond between the **Geo-Seal FILM 11** and **Geo-Seal CORE**.

PROPERTIES	TEST METHOD	VALUE
Film Material		HDPE
Film Color		Green
Film Thickness		11 Mil
Classification	ASTM E 1745	Exceeds Class A, B, and C
Tensile Strength	ASTM E 154 (ASTM D 882)	50 lbf/in
Puncture Resistance	ASTM D 1709	2400 grams Method A
Life Expectancy	ASTM E 154-93	Indefinite
Chemical Resistance	ASTM E 154-93	Unaffected
Water Permeance	ASTM E 96	0.020 Perms (US)
Dimensions: 12' x 200'		
Weight: 144 pounds		

C. Geocomposite Protection Course

1. **Geo-Seal BOND: Geo-Seal BOND** is an extremely durable, high strength protection course made from the lamination of HDPE film and nonwoven polypropylene geotextile fabric.

PROPERTIES	TEST METHOD	VALUE
Film Material		HDPE
Film Color		White

Fabric Material		Non-woven Polypropylene
Fabric Color		White
Film Thickness		5 Mil
Composite Thickness		18 Mil
Tensile @ ULT	ASTM D 882	TD 32.0 lbs/in
		MD 37.3 lbs/in
Elongation @ ULT	ASTM D 882	TD 65.3%
		MD 51.0%
Dart Impact	ASTM D 1709	Method A >1070 grams
		Method B 894 grams
Modulus	ASTM D 882	TD 270.6 lbs/in
		MD 295.5 lbs/in
Elmendorf Tear	ASTM D 1922	TD 5,140 grams
		MD 5,260 grams
Puncture-Prop Tear	ASTM D 2582	TD 13,250 grams Sled: 1-lb
		MD 11,290 grams Sled: 1-lb
Beach Puncture Tear	ASTM D 751	TD 165 in-lbs
		MD 160 in-lbs
Water Permeance	ASTM E 96	0.11 perms (US)
Dimensions: 12' x 150'		
Weight: 108 pounds		

2.4 AUXILIARY MATERIALS

A. General: All accessory products shall be provided by the specified vapor intrusion barrier manufacturer. Auxiliary products used in lieu of, or in addition to, the manufactures products must be approved in writing by EPRO prior to installation.

B. Reinforcement Fabric: Manufacturer's polyester fabric, ***Geo-Seal Reinforcement Fabric*** is available in 6 inch, 12 inch, and 40 inch widths.

C. Detailing Material: ***Geo-Seal CORE Detail***, a roller applied, water based, high viscosity, polymer modified asphaltic material.

D. Backer Rod: Closed cell polyethylene foam

E. Termination Bar: ***e.term hd***, or approved alternate

PART 3 - EXECUTION

3.1 EXAMINATION

A. Comply with project documents, manufacturer's product information, including product application and installation guidelines, pre-job punch list, as well as, manufacturer's shipping and storage recommendations.

3.1.2 SURFACE PREPARATION

A. The general contractor shall engage the certified vapor intrusion barrier contractor and certified inspector to ensure surfaces are prepared in accordance with manufacturer's instructions. Unless, explicitly stated in the contract documents, the vapor intrusion barrier contractor is not responsible for surface preparation.

B. Examine all substrates, areas, and conditions under which the composite membrane system will be installed, applicator and inspector must be present. Do not proceed with installation until unsatisfactory conditions have been corrected and surface prepration requirements have been met. If conditions exist that are not addressed in this section, notify inspector and contact EPRO for additional clarification.

C. Soil and Sand Substrates: Native soil and sand substrates shall be uniformly compacted to meet structural and building code requirements. All surfaces shall be free from protrusions and debris that may compromise the membrane system. Free standing water must be removed prior to application.

D. Aggregate Substrates: Aggregate substrates shall be compacted to meet structural and building code requirements and then rolled flat to provide a uniform substrate. ¾ inch minus aggregate with no more than one fractured face is recommended, but other aggregates substrates may be approved by the manufacturer provided they do not create sharp angular protrusions that may compromise the vapor intrusion system.

E. Working Slab: Mud slab, rat slab, or other concrete working slab shall have a uniform plane with a light broom or light trowel finish.

F. Concrete Surfaces: Clean and prepare concrete surface to manufacturer's recommendations. In general, only apply the Geo-Seal CORE material to dry, clean and uniform concrete substrates with a light trowel, light broom, or equivalent finish.

G. Cast-in-Place or Shotcrete Walls: Application to green concrete is acceptable provided the substrate is prepared in accordance with manufacturers specifications and published instructions.

1. Provide clean, dust-free, and dry substrate for vapor intrusion barrier application.

2. Surfaces shall be power washed to remove grease, oil, form release agents, or any other penetrating contaminants from the concrete.

3. Remove all fins, ridges, and other protrusions.

4. Fill honeycomb, aggregate pockets, tie holes, and other voids with hydraulic cement, or rapid-set grout.

3.2 VAPOR INTRUSION BARRIER INSTALLATION

A. General: The underslab vapor intrusion system shall be installed under strict accordance with the manufacturer's guideline and project specifications.

3.2.2 BASE COURSE – GEO-SEAL FILM 11

A. Whenever possible roll out ***Geo-Seal FILM 11*** in the same direction over the substrate. When multiple pours will occur, extend the ***Geo-Seal FILM 11*** a minimum of 2 feet past the pour joint.

B. Overlap ***Geo-Seal FILM 11*** a minimum of 6 inches.

C. At the seam overlap, peel back the top layer of ***Geo-Seal FILM 11*** and apply 60 mils into the overlapping seam, making certain to apply ***Geo-Seal CORE*** to both the top of the bottom sheet and the bottom of the top sheet. Embed the top sheet into the bottom sheet.

D. Visually verify there are no gaps/fish-mouths in seams.

3.2.3 TERMINATION SEQUENCE

A. System Termination: The termination process is appropriate for terminating the membrane onto exterior footings, pile caps, interior footings and grade beams. When terminating the membrane to stem walls or vertical surfaces the same process should be used.

1. Concrete surfaces that are not a light trowel, light broom or equivalent finish, will need to be repaired.

2. Terminations on horizontal and vertical surfaces should extend 6" onto the termination surface. Job specific conditions may prevent a 6" termination. In these conditions exist, contact manufacturer for recommendations.

3. Apply 60 mils of ***Geo-Seal CORE*** to the terminating surface and then embed the ***Geo-Seal FILM 11*** layer by pressing it firmly into the ***Geo-Seal CORE*** layer.

4. Apply 30 mils of ***Geo-Seal CORE*** to the ***Geo-Seal FILM 11*** layer.

5. Apply the ***Geo-Seal BOND*** layer and apply a final 30 mil seal of the ***Geo-Seal CORE*** layer over the edge of the termination. For further clarification, refer to the termination detail provided by manufacturer.

3.2.4 SEALING OF PENETRATIONS

A. Sealing of Standard Pipe Penetrations: Prepare membrane penetrations so they are free of any material that will inhibit a direct bond to the penetration surface: foam, insulation, protective coatings, etc.

1. Trim ***Geo-Seal FILM 11*** to within 1/8 inch of the penetration.

2. Apply ***Geo-Seal CORE Detail*** 3 inches horizontally and 3 inches vertically around the base of the penetration.

3. Embed ***Geo-Seal Reinforcement Fabric*** reinforcement fabric 3 inches horizontally and 3 inches vertically around the base of the penetration.

4. Apply a second layer of ***Geo-Seal CORE Detail*** to reinforcement fabric until the reinforcement fabric is fully saturated. Secure ***Geo-Seal Reinforcement Fabric*** reinforcement fabric to penetration with a cable tie. For further clarification, refer to the termination detail provided by manufacturer.

3.2.5 POLYMER MODIFED ASPHALT MEMBRANE – GEO-SEAL CORE

A. Mask off adjoining surfaces where unwanted ***Geo-Seal CORE*** polymer modified asphalt membrane may be exposed on finished surfaces or impact other construction trades.

B. Commence application of ***Geo-Seal CORE*** polymer modified asphalt when ambient air temperatures are within manufacturer recommendations.

C. Surfaces that will receive the membrane must be clean and free from standing moisture.

D. Start installing ***Geo-Seal CORE*** in presence of approved 3rd party inspector or required city inspector.

E. Apply one application of ***Geo-Seal CORE*** membrane in accordance to manufacturer's instructions in order to obtain a seamless membrane with a minimum dry film thickness of 30 mils (1.5 mm).

F. Apply ***Geo-Seal CORE/Geo-Seal CORE Detail*** in and around penetrations and cavities to ensure the formation of monolithic seal around all penetrations.

G. Apply ***Geo-Seal CORE/Geo-Seal CORE Detail*** to prepared wall terminations and vertical surfaces to heights indicated according to manufacturer's recommendations and details. (if applicable)

H. Verify ***Geo-Seal CORE*** thickness of every 1000 ft^2 (93 m^2), or as required by specifying engineer.

3.2.6 GEOCOMPOSITE PROTECTION COURSE – GEO-SEAL BOND

A. Sweep off any water that has collected on the surface of the ***Geo-Seal CORE*** layer, prior to the placement of the ***Geo-Seal BOND*** layer. Install ***Geo-Seal BOND*** protection course perpendicular to the direction of the ***Geo-Seal BASE***.

B. Overlap ***Geo-Seal BOND*** seams a minimum of 6 inches.

C. Secure the seams of ***Geo-Seal BOND*** by applying 30 mils of ***Geo-Seal CORE*** in-between the seam overlap OR by applying a 30 mil layer of ***Geo-Seal CORE*** on top of the seam overlap, completely covering the seam overlap.

D. To expedite the construction process, the ***Geo-Seal BOND*** layer can be placed over the ***Geo-Seal CORE*** immediately after the spray application is complete, provided the ***Geo-Seal CORE*** mil thickness has been verified and smoke tested.

E. Do not penetrate the membrane system once it has been applied. If the vapor intrusion barrier is penetrated, immediately contact the applicator. Failure to bring the breach of the membrane to the applicators attention and not allowing adequate time to make the necessary repair will result in voidance of warranty.

3.3 FIELD QUALITY CONTROL

A. Smoke Test: Conduct smoke test on all underslab areas upon installation of the ***Geo-Seal FILM 11*** sheet, the sealing of all penetrations, and application of ***Geo-Seal CORE***. All deficient areas shall be noted, marked for repair, and repairs verified. Refer to manufacturer's smoke testing protocol for additional guidance.

1. For projects that will require a Labor and Material warranty, a certified 3rd party inspector is required to inspect and verify the integrity of the membrane

B. Field Inspection: Contact EPRO for independent certification process.

C. Thickness Verification: Use a digital mil reading caliper to measure the thickness of coupon samples. To measure coupon samples correctly, the thickness of the systems ***Geo-Seal FILM 11*** layer must be measured and calibrated in the field when verifying coupon sample thicknesses. Mark coupon sample area for repair. Contact EPRO for coupon sampling protocol.

1. It should be noted that taking too many destructive samples can be detrimental to the membrane. Areas where coupon samples have been removed need to be marked for repair.

D. Take care to prevent contamination and damage during application stages and curing. Machinery, additional trades, or general construction, shall NOT take place over the membrane until inspection is complete and concrete has been placed. The membrane shall always be properly protected when equipment is operated near the membrane.

E. Prevent damage during the placement of reinforcement steel and overburden.

F. Damage Observation: Prior to the placement of concrete a visual inspection to confirm no damage has occurred from construction traffic or during the placement of reinforcement steel is recommended.

3.4 REPAIRS

A. Underslab:

1. Inspect damaged area to determine which system components have been damaged.

2. If the ***Geo-Seal FILM 11*** sheet has not been compromised, patch only the areas that have been damaged by re-installing the damaged materials. The patch should extend 6 inches beyond the damaged area in all directions.

3. If the ***Geo-Seal FILM 11*** sheet has been breached but no additional system components have been installed, install a patch below and above the base sheet that extends 6 inches beyond the damaged area. Area shall be sealed using the specified method for sealing the base sheet.

4. If the damaged area has breached the base sheet and additional components have been installed over the ***Geo-Seal FILM 11*** sheet, the area will require removal of the overlying components to expose the ***Geo-Seal FILM 11*** sheet.

5. If the damage is less than 3 inches, the base sheet will need to be opened up to create a minimum 4-inch diameter circle to allow access

6. Place a minimum 8-inch diameter coupon under the base sheet and seal using the specified method for seaming the base sheet. If heat welding the seam, probe the seam to ensure a uniform seal.

7. Apply a reinforcement detail of ***Geo-Seal CORE Detail*** and reinforcement fabric 6 inches beyond the edge of the repair area.

8. Apply the remaining layers as specified.

9. Refer to manufacturer's detail for further repair clarification.

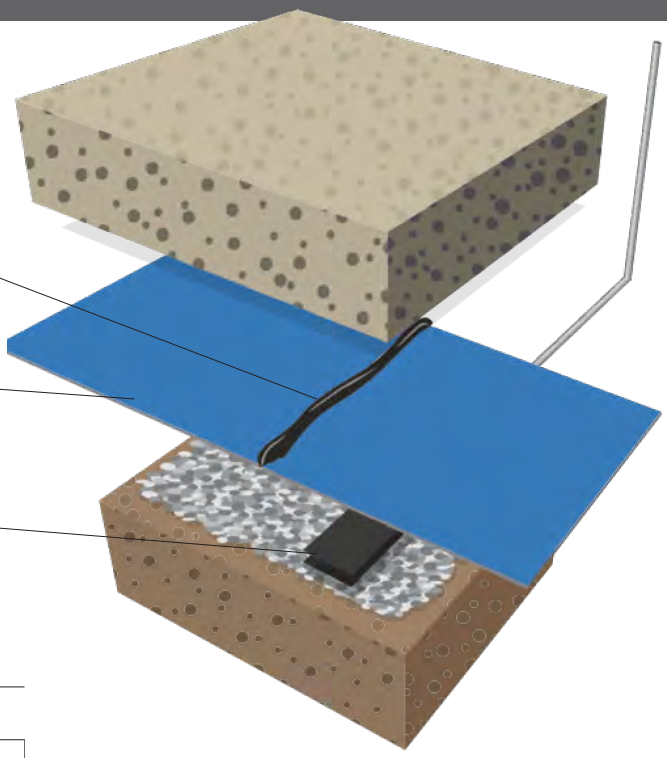
End of Section

Geo-Seal® EV40s

Geo-Seal CORE
(spray applied polymer modified asphaltic membrane)

Geo-Seal EV40
(EVOH/Geotextile)

Vapor-Vent System



System: Geo-Seal EV40s		
Application: Underslab Contaminant Vapor Barrier		System Thickness: 41 mils
	1st Layer	Seaming Materal
Product Name	Geo-Seal EV40	Geo-Seal CORE

DESCRIPTION

Geo-Seal® EV40s is a significant improvement over existing single sheet membranes. Geo-Seal EV40s consists of an EVOH membrane combined with a robust geotextile layer to provide a single sheet vapor intrusion barrier that is chemically-resistant and easy to install, while also providing improved protection during the installation process.

Geo-Seal® EV40s is ideal for lower risk sites where site concentrations are lower than state-specific screening levels, large flat and open areas where fast installation times are required, or where active sub-slab ventilation systems are utilized.

BENEFITS

- **Spray Seams:** Geo-Seal® CORE spray membrane to seal seams, detail penetrations and terminate the membrane to concrete surfaces
- **Not Corrosive:** Will not corrodelike metalized film membranes.
- **EVOH:** EVOH provides enhanced chemical vapor protection and lower permeation rates than thicker HDPE membranes.
- **Single-Source Warranty:** EPRO can be a single point of contact to address building vapor intrusion and waterproofing needs.
- **Class A:** Class A vapor barrier that alone will meet the basic water vapor barrier requirements for new construction.

LIMITATIONS

- Do not apply below 20°F or to damp, frozen or contaminated surfaces.
- Contact EPRO for waterproofing system recommendations.

SPECIFICATIONS, DRAWINGS, AND TECHNICAL ASSISTANCE

The most current specifications and drawings can be found on www.eproinc.com. For project specific details contact EPRO directly, or your local EPRO representative.

Site conditions, performance goals, and budget determine which system is most appropriate for a given project. For more information regarding product performance, testing, plan review, or general technical assistance, please contact EPRO.

WARRANTY

EPRO provides a wide range of warranty options for Geo-Seal systems. For a project to be eligible for any warranty option beyond a 1-year material warranty, a Geo-Seal Authorized Applicator must be used and the project must be registered and approved by EPRO prior to the commencement of any product application.

Warranty options available for this system include:

- Material warranty
- Longer warranty periods are available. Contact EPRO for more information.

Physical Property	Test Method	Value
Film Material		Polyethylene & EVOH
Film Color		White/Blue
Weight		618 g/m^2
Tensile Strength	ASTM D 412	61 psi
Elongation	ASTM D 412	730%
Adhesion to Concrete	ASTM D 903	8 lbf/in
Puncture Resistance	ASTM D 1709	2600 lbf
Hydrostatic Head Resistance	ASTM D 5385	100 psi (231 ft)
Water Vapor Transmission	ASTM E 96	0.033 perms
Water Vapor Permeance	ASTM E 96	0.0098 perms
Methane Gas Permeance	ASTM D1434	3.68 x 10^{-12} m/s
Benzene Gas Permeance	Queens University	1.13 x 10^{-10} m^2/sec
TCE Gas Permeance	Queens University	7.66 x 10^{-11} m^2/sec
PCE Gas Permeance	Queens University	7.22 x 10^{-11} m^2/sec
Classification	ASTM E1745	Class A, B & C