STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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April 4, 2022

Janet Pope
Lynnwood Public Facilities District
3815 196th St SW Suite 136
Lynnwood, WA 98036

Re: Opinion on Proposed Cleanup of the following Site:

- **Name:** Alderwood Laundry & Dry Cleaners
- **Address:** 3815 196th Street SW, Lynnwood, WA98036
- **Facility/Site No.:** 17078
- **VCP No.:** NW3066
- **Cleanup Site ID No.:** 12845

Dear Janet Pope:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your proposed independent cleanup of the Alderwood Laundary & Dry Cleaners facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70A.305 RCW.

Issue Presented and Opinion

Upon completion of the proposed cleanup, will further remedial action likely be necessary to clean up contamination at the Site?

NO. Ecology has determined that, upon completion of your proposed cleanup, no further remedial action will likely be necessary to clean up contamination at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70A.305 RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided as follows.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following releases:

- Tetrachloroethylene (PCE), trichloroethylene (TCE), 1,1-dichloroethylene (1,1-DCE), cis-1,2-dichloroethylene (cis-1,2-DCE), trans-1,2-dichloroethylene (trans-1,2-DCE), and vinyl chloride into the soil, groundwater, and air.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. GeoEngineers, *Final Draft Cleanup Action Plan, Former Alderwood Laundry and Dry Cleaners, 3815 196th Street SW, Lynnwood, Washington, VCP NW3066.* December 22, 2021.
2. GeoEngineers, *Final Feasibility Study, Former Alderwood Laundry and Dry Cleaners 3815 - 196th Street SW, Lynnwood, Washington, VCP NW3066.* November 10, 2021.
3. GeoEngineers, *2021 Remedial Investigation Addendum, Alderwood Laundry and Dry Cleaners 3815 196th Street SW, Lynnwood, Washington, VCP NW3066.* August 6, 2021.
4. GeoEngineers, *Preliminary Summary of May 2021 Biochemical Injection Pilot Study, Former Alderwood Laundry and Dry Cleaner, 3815 196th Street SW, Lynnwood, Washington, VCP Number NW3066.* June 7, 2021.
5. Ecology, *Re: Opinion pursuant to WAC 173-340-515(5) on Remedial Action for the following Hazardous Waste Site*. September 4, 2020.
6. GeoEngineers, *WES Building Vapor Intrusion Evaluation – February 2020, Alderwood Laundry and Dry Cleaner Site*, April 29, 2020.
7. Ecology, *Re: Opinion pursuant to WAC 173-340-515(5) on Remedial Action for the following Hazardous Waste Site*. December 31, 2019.

8. GeoEngineers, *Soil Vapor Intrusion Evaluation Work Plan –WES Building Associated with Alderwood Laundry and Dry Cleaner Site*, November 23, 2018.
9. Ecology, *Further Action Opinion, Alderwood Laundry and Dry Cleaners*, June 4, 2018.
10. GeoEngineers, *Remedial Investigation Report, Alderwood Laundry and Dry Cleaners*, report dated March 7, 2018
11. Ecology, *Further Action Opinion, Alderwood Laundry and Dry Cleaners*, January 2, 2018.
12. GeoEngineers, *Draft Remedial Investigation Report – Alderwood Laundry and Dry Cleaners*, July 12, 2017.

A number of these documents are accessible in electronic form from the Site webpage[1]. The complete records are stored in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. Visit our Public Records Request page[2], to submit a public records request or get more information about the process. If you require assistance with this process, you may contact the Public Records Officer at publicrecordsofficer@ecy.wa.gov or 360-407-6040.

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that, upon completion of your proposed cleanup, **no further remedial action** will likely be necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards and select a cleanup action. The Site is described below and in detail in **Enclosure A.**

Site characterization activities prior to 2020 have been described in Ecology's opinion letter dated June 4, 2018.

Additional environmental investigations performed in 2020 through 2021 are summarized below.

[1] https://apps.ecology.wa.gov/cleanupsearch/site/12845
[2] https://ecology.wa.gov/Footer/Public-records-requests

In July 2018, eight soil samples were collected after a building (occupied by Veterinary Clinic) was demolished within the Lynnwood Public Facilities District Property (PFD Property (Figure 2); PCE was detected in all the samples, exceeding the MTCA Method A cleanup level (MTCA A CUL) for soil, ranging from 0.06 to 0.4 milligram per kilogram (mg/kg). TCE and cis-1,2-DCE were only detected in one sample but below their respective MTCA A CULs (Figure 3).

In March 2019, GeoEngineers conducted a round of vapor intrusion evaluation for a building situated within the Washington Energy Services Property (WES Property), which is immediately west of the PFD Property.

- PCE was detected in nine out of ten sub-slab soil vapors samples (SSV-1 thourgh SSV-10; Figure 4), while the PCE concentrations in four of these samples exceeded the screening level for commercial buildings of 1,700 micrograms per cubic meter (µg/m^3). Other halogenated volatile organic compounds (HVOCs) were either not detected or detected at levels below MTCA Method B screening levels for residential and commercial buildings.
- TCE and PCE were detected in the indoor air sample collected from the office space of the WES Building. The concentrations exceeded their MTCA Method B Cleanup Levels (MTCA B CULs), but did not exceed their MTCA B CULs for commercial buildings, or the Short-term commercial worker indoor air action level established for TCE[3].
- PCE and its breakdown products were under their laboratory detection limits in the outdoor air samples.

In May 2019 GeoEngineer also conducted additional field work to further delineate the extent of groundwater contamination:

- Two soil borings (MW-16&-17) were advanced within the WES Property to a total depth of 50 feet (ft) below ground surface (bgs). PCE concentrations were above its MTCA A CUL in several samples from 15 to 45 ft bgs and from 10 to 35 ft bgs, respectively (Figures 2&3). TCE, and cis- and trans-1,2-DCE were detected in some samples but below their CULs (MTCA A or MTCA B in the absence of MTCA A).
- A grab groundwater sample was collected at MW-17 from the depth of 17 ft bgs, where perched groundwater was encountered (Figure 5). PCE was detected at 35.6 micrograms per liter (µg/L), which is above its MTCA A CUL for groundwater of 5 µg/L.

[3] Implementation Memorandum No.22, Ecology Publication No. 18-09-047.

- The two soil boreholes were completed as monitoring wells MW-16 and MW-17. PCE concentrations in MW-16 and MW-17 were 93.1 µg/L and 339 µg/L, respectively, while TCE concentration was slightly above its MTCA A CUL at MW-17 (Figure 5).

In February 2020, GeoEngineers conducted another round of vapor intrusion evaluation for the WES Building, in response to the comments Ecology provided in the VCP opinion letter dated Dec 31, 2019. Three additional indoor air samples, along with one ambient air sample, were collected. The PCE concentrations in all three indoor air samples were less than the MTCA B CULs for unrestricted use, while in one indoor air sample the TCE concentration was greater than the MTCA B CUL for unrestricted use but less than the MTCA B CUL for commercial buildings and the TCE short-term commercial worker indoor air action level (Figure 4).

In September 2021, GeoEngineer conducted additional fieldwork to fill the remaining data gap:

- GeoEngineers drilled a deep boring (MW-3-Deep) to the depth of 60 ft bgs in order to characterize the deeper aquifer at the Site.
    - In the soil: PCE decreased from a level greater than MTC A CUL at the depth of 15 ft bgs, to less than the MTCA A CUL at 50 ft bgs, and then to non-detect at 58 ft bgs. TCE was below the MTCA A CUL in the sample at 15 ft bgs and not-detect at the two deeper samples (Figures 2&3).
    - In the groundwater: The PCE concentration was less than the MTCA A CUL in the 60 ft bgs grab groundwater sample. TCE was below the MTCA A CUL in all three grab groundwater samples at 40, 50, and 60 ft bgs (Figure 5).
- Soil samples were collected from underneath the strip mall sub-slab (< 0.5 ft bgs) at three locations within the former Alderwood Laundry and Dry Cleaner (ALDC) footprint.
    - PCE was detected at levels above its MTCA cleanup level in the two soil samples collected beneath the western portion of the former ALDC.
- Physiochemical parameters and geochemical indicators were analyzed to inform the selection of remediation technology.
- A total number of seven sub-slab soil vapor samples were collected beneath the floor of the strip mall. PCE and TCE concentrations exceed their MTCA B screening levels for protection of commercial workers in four and one location, respectively (Figure 4).

- GeoEngineers also performed a round of groundwater sampling from all Site monitoring wells.
    - PCE concentrations in the groundwater samples from the wells near the source area, including MW-2, -3, -6 through -8, -15 through -17, and EMRI-MW-1, were similar with the previous monitoring results. The highest PCE concentration was 235 ug/L at MW-17 (Figure 5).
    - TCE and other PCE breakdown products were either not detected or detected at relatively low levels.

Exposure Pathways:

Soil-Direct Contact:

This pathway is *complete*. Although the Site is currently paved and covered by buildings, construction and utility workers could be in contact with soil contaminated by PCE and/or TCE at the levels of concern.

Soil-Leaching:

This pathway is *complete*. The analytical data collected to date indicate the presence of PCE and TCE soil concentrations above the levels for the protection of groundwater as drink water.

Groundwater:

The pathway is *complete*. Ground water monitoring results indicate that concentrations of PCE and TCE are above their respective MTCA Method A CULs for groundwater.

Surface Water:

The pathway is *incomplete*. No surface water features are located within the immediate vicinity of the Site.

Indoor Air:

The pathway is *complete*. TCE was detected above MTCA B CUL for unrestricted use in one indoor air sample from the WES Building. PCE and TCE were found at concentrations exceeding MTCA Method B screening levels in sub-slab soil vapor samples at several locations within the Site buildings.

Ecological:

This pathway is *incomplete*. GeoEngineers completed a simplified terrestrial ecological evaluation, concluding no further evaluation is necessary.

2. Establishment of cleanup standards.

Ecology determined the cleanup levels you established for the Site meet the substantive requirement of MTCA.

For groundwater:

Substance	**Cleanup Level** µg/L	**Basis**
PCE	5	MTCA Method A[4]
TCE	5	
1,1- DCE	400	MTCA Method B Non-caner (CLARC)[5]
cis-1,2- DCE	16	
Trans-1,2- DCE	160	
VC	0.2	MTCA Method A

For soil:

Substance	**Cleanup Level** mg/kg	**Basis**
PCE	0.05	MTCA Method A
TCE	0.03	
1,1- DCE	0.046	MTCA Method B Protection of Groundwater Vadose Zone
cis-1,2- DCE	0.078	

[4] Model Toxics Control Act Regulation and Stature (WAC 173-340-900) Tables 720-1 & 740-1.
[5] CLARC: Cleanup Levels and Risk Calculation https://fortress.wa.gov/ecy/ezshare/tcp/CLARC/CLARC_Master.PDF

Substance	Cleanup Level mg/kg	Basis
Trans-1,2- DCE	0.52	(CLARC)
VC	0.0017	MTCA Method A

For indoor air:

Substance	Cleanup Level $\mu g/m^3$	Basis
PCE	9.6	MTCA Method B (CLARC)
TCE	0.33	MTCA Method B (CLARC)
1,1- DCE	91.4	
Trans-1,2- DCE	18	
VC	0.28	

Ecology determined the points of compliance you established for the Site meet the substantive requirement of MTCA.

Media	WAC	Point of Compliance
Soil	173-340-740 (6)(d)	*"…the point of compliance is throughout the soil column."*
Groundwater	173-340-720(8)(b)	*"The standard point of compliance for groundwater based on use as a source of drinking water is throughoutthe Site from the top of the saturated zone to the lowest depth which could be affected by the Site."*

Media	WAC	Point of Compliance
Air	173-340-750(6)	*"The point of compliance is ambient air throughout the Site"*

3. Selection of cleanup action.

Ecology has determined the cleanup action you proposed in the *Final Draft Cleanup Action Plan (DCAP)* dated December 22, 2022, for the Site meets the substantive requirements of MTCA.

As depicted in Figure 6, the following remedies are proposed to remediate the Site groundwater, soil, and potentially the sub-slab soil vapor and indoor air that are impacted by PCE and its degradation products:

- Excavate and dispose of contaminated soil in the vicinity of the former ALDC location down to 6 ft bgs during the future strip mall demolition. A vapor barrier/delineator may be placed at the base of excavation;
- Remediate HVOC-impacted groundwater and soil using in-situ enhanced bioremediation and biochemical treatment. The following reagents will be introduced into the subsurface through injection points (Figure 6):
    - 3-d Microemulsion®, which provides a controlled release of organic acids to stimulate reductive dechlorination;
    - Bio-Dechlor INOCULUM®, which contains microbes capable of dechlorinate chlorinated ethenes;
    - Chemical Reducing Solution®, an iron-based reagent that facilitates chemical reduction of chlorinated ethenes.

  Injection depth intervals would target both the shallow perched water-bearing zone and the deeper water-bearing zone.
- Contain the residual contamination with asphalt and concrete pavement and buildings;
- Prepare and file environmental covenants for parcels (potentially including the WES Property) affected by the Site to restrict access to the residual contamination, and establish maintenance requirements for the paved surfaces that will act as physical barriers.

Compliance monitoring is proposed as follows:

- Protection monitoring during implementation of the cleanup action;
- Performance monitoring including:
    - Collecting soil samples from the base and sidewalls of the excavation, with the objective of achieving compliance with the soil cleanup levels laterally;
    - Collecting groundwater samples within the treatment area and downgradient under the WES building on a quarterly basis for up to one year following initial reagent injection, then on a semi-annual basis.
- Confirmation monitoring including:
    - Following implementation of the institutional controls, collect groundwater samples from the existing network of monitoring wells (MW-1, MW-4 through MW14, MW-16, and MW-17), replacement monitoring wells MW2A and MW3A, and new wells within the WES building footprint to verify plume stability and attenuation;
    - Collect indoor/outdoor air samples and/or sub-slab soil vapor samples to evaluate the potential of vapor intrusion.

See Ecology's comments below:

1. Given that PCE and TCE were found above MTCA Method B screening levels in sub-slab soil vapor samples at several locations, evaluating the indoor air in the strip mall building is warranted. Implement mitigation measures, if deemed necessary, to prevent the occupants from being exposed to harmful indoor air.
2. Upon completion of the in-situ treatment, in addition to groundwater monitoring, collect a sufficient number of soil samples to indicate the final soil conditions;
3. Submit draft compliance monitoring plan for Ecology's review;
4. Submit draft environmental covenants for Ecology's review. Indoor air as well as groundwater monitoring plans need to be included as appendices in the environmental covenants.

Limitations of the Opinion

1. **Opinion does not settle liability with the state.**

   Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion does not:

   - Resolve or alter a person's liability to the state
   - Protect liable persons from contribution claims by third parties.

   To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70A.305.040(4).

2. **Opinion does not constitute a determination of substantial equivalence.**

   To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you proposed will be substantially equivalent. Courts make that determination. *See* RCW 70A.305.080 and WAC 173-340-545.

3. **Opinion is limited to proposed cleanup.**

   This letter does not provide an opinion on whether further remedial action will actually be necessary at the Site upon completion of your proposed cleanup. To obtain such an opinion, you must submit a report to Ecology upon completion of your cleanup and request an opinion under the Voluntary Cleanup Program (VCP).

4. **State is immune from liability.**

   The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70A.305.170.

Contact Information

Thank you for choosing to clean up the Site under the Voluntary Cleanup Program (VCP). As you conduct your cleanup, please do not hesitate to request additional services. We look forward to working with you.

For more information about the VCP and the cleanup process, please visit our webpage[6]. If you have any questions about this opinion, please contact me by phone at 360-407-7239 or e-mail at same461@ecy.wa.gov.

Sincerely,

Sam Meng, PhD, PE
HQ Toxics Cleanup Program

SM: AF

Enclosures (1): A – Description and Diagrams of the Site

cc: Ali Furmall, Ecology
Amy Hargrove, Ecology

[6] https://www.ecy.wa.gov/vcp

Enclosure A

Description and Diagrams of the Site

Site Description

Site:
The Site is located at 3815 196th Street Southwest in Lynwood, Washington (Figure 1). It is comprised of four Snohomish County Tax Parcels: 372600400602, 372600401603, and 372600401604, owned by the Lynnwood PFD (PFD Property), and their west-adjacent Parcel 372600401701, owned by Washington Energy Services (WES Property), totaling 15.5 acres.

Property Historical and Current Use:
The PFD property was initially developed for residential use in the late 1940s. In the early 1960s, the residences were removed and commercial buildings were constructed.

There was a building on Parcel 372600401604, which was built in 1967 and occupied by a veterinary clinic before it was demolished in 2018. Parcels 372600401604 and 372600401603, are currently paved and used as parking space. An office/retail building, built in 1963, with a strip mall at the southern end is located along the west margin of Parcel 372600401602. The strip mall spaces are currently occupied by, from north to south, Tropical Tan, Carniceria Grocery, and Bamboo Tree Restaurant. Between 1963 and 1982, a laundry and dry-cleaning business (Alderwood Laundry and Dry Cleaners; ALDC) operated in the southernmost tenant space of the strip mall building.

By the mid-1970s, two additional retail buildings were added to the northern and eastern portions of Parcel 72600401602, while Lynnwood Convention Center was constructed in 2004, which occupies the southeastern portion, after an automobile muffler repair shop was removed.

The WES Property is developed with a commercial office and warehouse building used by WES for heating/cooling/plumbing services.

Surface/Storm Water System:
The nearest surface water body is a small storm water retention pond located approximately 800 feet east of the Site. Storm water is collected in storm drains located southwest and south of the former ALDC tenant space.

Soils and Geology:
Site soils consist of a shallow fill layer extending from the ground surface to depth ranging between approximately 3 and 6 bgs. The fill layer consists of silty sand with occasional gravel, and is underlain by glacial till. A weathered glacial till layer (may represent reworked native soil/fill) is generally encountered within the upper 8 to 15 ft of the till layer. The glacial till extends to approximately 40 to 58 ft bgs. A significant silt/confining layer was encountered at approx. 58 ft bgs when MW-3-Deep was installed. Sand-rich beds within the glacial till were encountered at approx. 35 to 40 ft bgs.

Groundwater:

A shallow perched water-bearing zone was encountered in the eastern half of the Site near the former ALDC at approximate depths ranging between 8 and 21 ft bgs. A deeper water-bearing zone is found at depths ranging from 35 to 58 ft bgs.

Within the deeper water-bearing zone, groundwater flows to the west/southwest, with a horizontal hydraulic gradient of 0.0005 feet per foot (ft/ft). The calculated linear groundwater velocity ranges between 0.0026 and 0.0029 feet per day.

Source of Contamination & Contamination Extent:

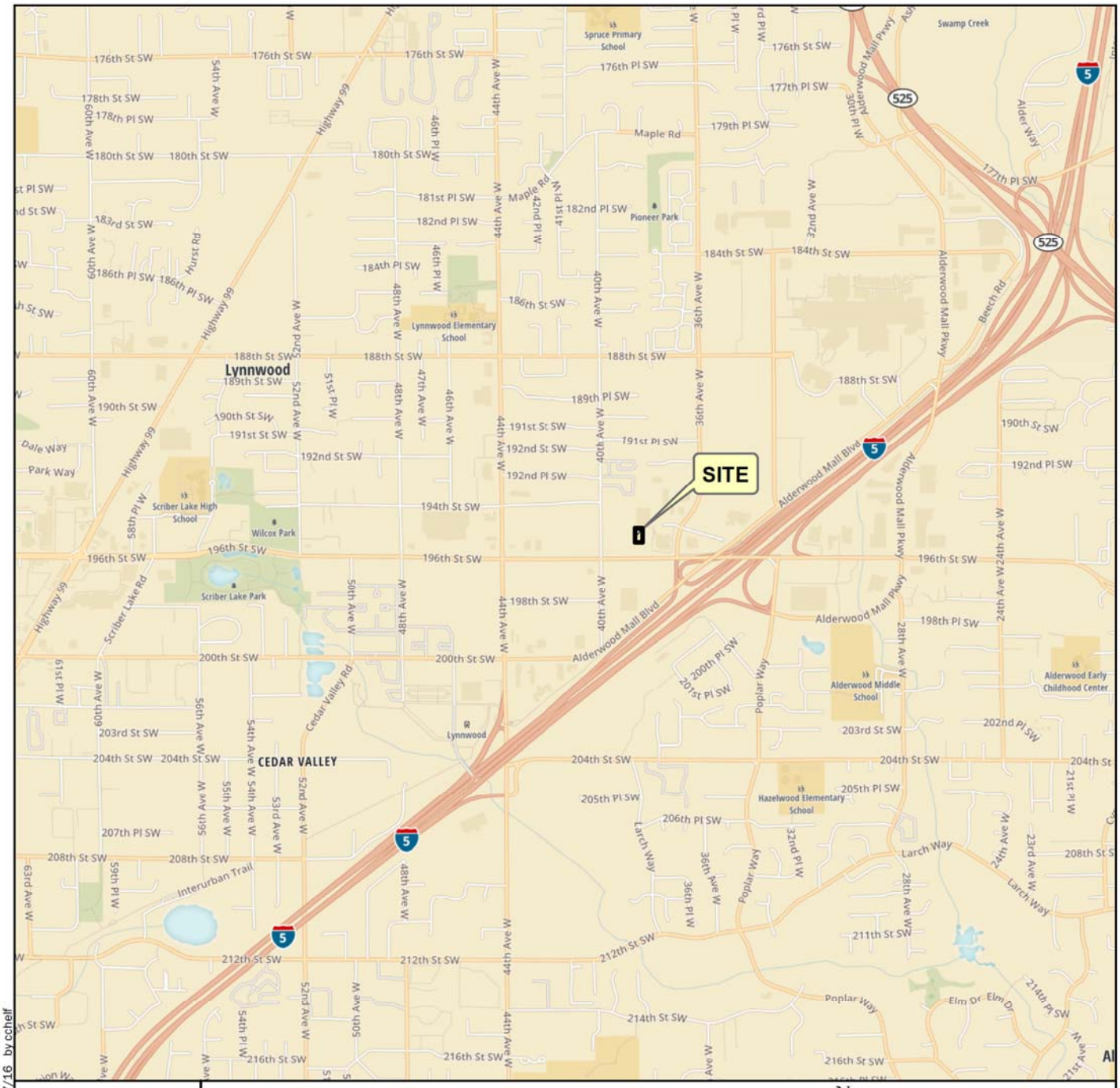
The contamination of PCE, and it degradation products, was determined to originate from the former ALDC, operated in the southernmost tenant space of the strip mall building between 1963 and 1982. The release reportedly associates with leaky dry cleaning equipment and underground piping, inappropriate disposal of spent dry cleaning solvents, stormwater runoff contacting spent solvent residues and flowing into the storm drain in the southwest portion of the PFD property.

PCE concentrations detected in Site soil samples range from 0.026 mg/kg to a maximum of 0.88 mg/kg at the depth of 15 ft bgs, which was from beneath the former ALDC tenant space. The PCE concentrations in exceedance of its MTCA A CUL were encountered between 4 and 45 ft bgs. TCE, cis-1,2-DCE, and trans-1,2-DCE were also detected but at levels below their CULs.

In the groundwater, the highest PCE and TCE concentrations both occurred at MW-7, 389 and 7 ug/L respectively, which is to the downgradient of the former ALDC. The PCE and TCE plumes both have extended beneath the west-adjacent WES Building, but not been detected beyond the western boundary of the WES Building.

Several rounds of vapor intrusion assessment have been conducted. TCE was determined above MTCA B CUL for unrestricted use in one indoor air sample from the WES building. PCE and TCE were found exceeding MTCA Method B screening levels for commercial buildings in sub-slab soil vapor samples at several locations in the Site buildings.

Site Diagrams



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: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 10N

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Vicinity Map

Alderwood Laundry and Dry Cleaners
3815 196th St SW
Lynnwood, Washington

GeoEngineers

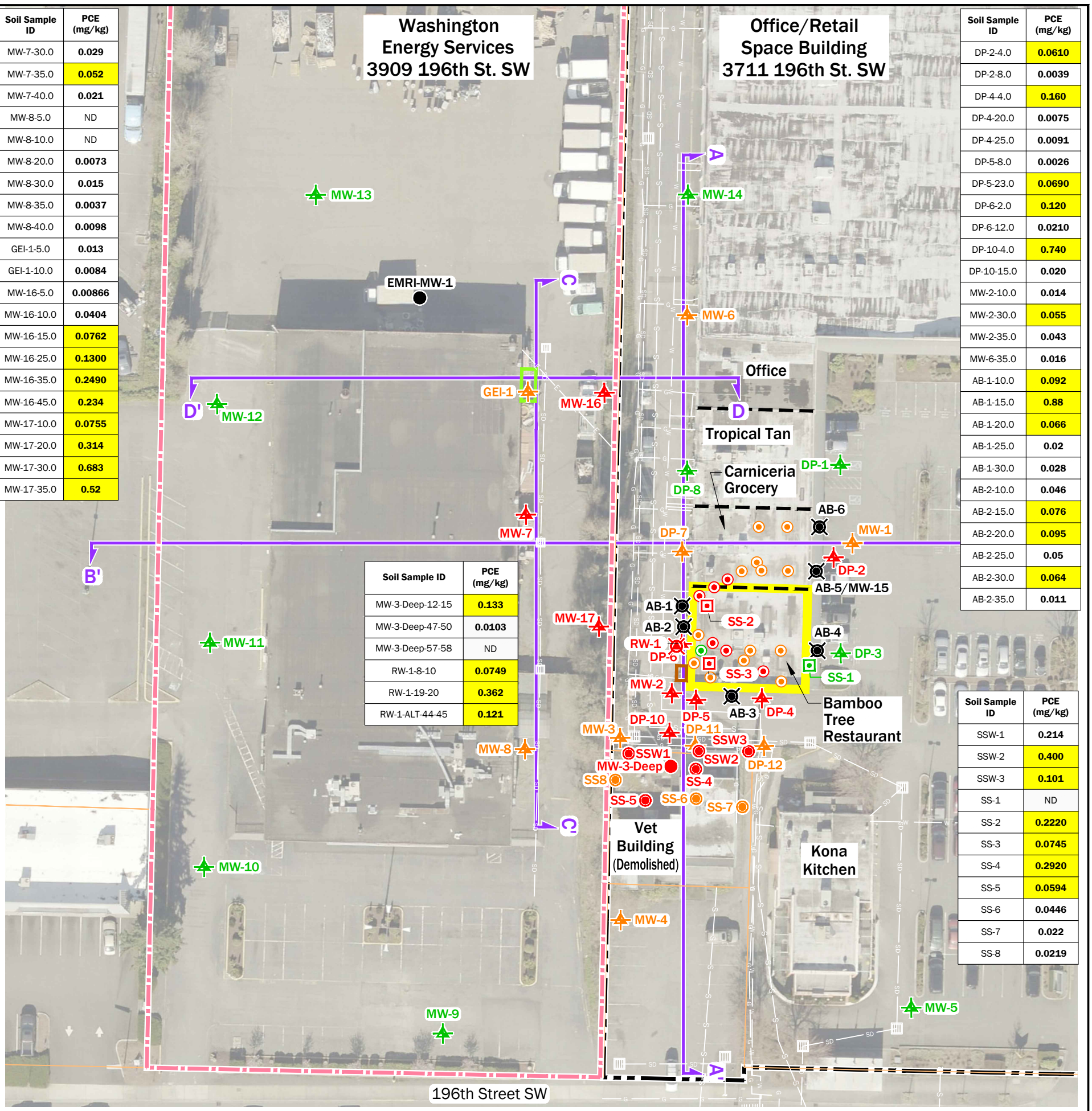
Figure 1

Soil Sample ID	PCE (mg/kg)
MW-7-30.0	0.029
MW-7-35.0	0.052
MW-7-40.0	0.021
MW-8-5.0	ND
MW-8-10.0	ND
MW-8-20.0	0.0073
MW-8-30.0	0.015
MW-8-35.0	0.0037
MW-8-40.0	0.0098
GEI-1-5.0	0.013
GEI-1-10.0	0.0084
MW-16-5.0	0.00866
MW-16-10.0	0.0404
MW-16-15.0	0.0762
MW-16-25.0	0.1300
MW-16-35.0	0.2490
MW-16-45.0	0.234
MW-17-10.0	0.0755
MW-17-20.0	0.314
MW-17-30.0	0.683
MW-17-35.0	0.52

Soil Sample ID	PCE (mg/kg)
DP-2-4.0	0.0610
DP-2-8.0	0.0039
DP-4-4.0	0.160
DP-4-20.0	0.0075
DP-4-25.0	0.0091
DP-5-8.0	0.0026
DP-5-23.0	0.0690
DP-6-2.0	0.120
DP-6-12.0	0.0210
DP-10-4.0	0.740
DP-10-15.0	0.020
MW-2-10.0	0.014
MW-2-30.0	0.055
MW-2-35.0	0.043
MW-6-35.0	0.016
AB-1-10.0	0.092
AB-1-15.0	0.88
AB-1-20.0	0.066
AB-1-25.0	0.02
AB-1-30.0	0.028
AB-2-10.0	0.046
AB-2-15.0	0.076
AB-2-20.0	0.095
AB-2-25.0	0.05
AB-2-30.0	0.064
AB-2-35.0	0.011

Soil Sample ID	PCE (mg/kg)
MW-3-Deep-12-15	0.133
MW-3-Deep-47-50	0.0103
MW-3-Deep-57-58	ND
RW-1-8-10	0.0749
RW-1-19-20	0.362
RW-1-ALT-44-45	0.121

Soil Sample ID	PCE (mg/kg)
SSW-1	0.214
SSW-2	0.400
SSW-3	0.101
SS-1	ND
SS-2	0.2220
SS-3	0.0745
SS-4	0.2920
SS-5	0.0594
SS-6	0.0446
SS-7	0.022
SS-8	0.0219



Legend

- DP-6/MW-2 — Exploration - MTCA Method A Cleanup Levels Exceedance for PCE/TCE in Soil
- DP-7/MW-4 — Exploration - HVOCs detected less than MTCA Method A Cleanup Levels in Soil
- DP-1/MW-9 — Exploration - HVOCs Not Detected
- AB-1 — Angled Boring by GeoEngineers, Inc.
- EMRI-MW-1 — Groundwater Monitoring Well by EMRI (1999)
- Soil Sample with PCE detection greater than MTCA Method A Cleanup Level
- Soil Sample with HVOC detections less than MTCA Method A or B Cleanup Levels
- Soil Sample with HVOCs Not Detected
- SSW1 — Confirmation Soil Sample
- MW-3-Deep — Deep Groundwater Assessment Boring with PCE/TCE detection greater than MTCA Method A Cleanup Level
- RW-1 — Pilot Study Injection Well with PCE/TCE detection greater than MTCA Method A Cleanup Level
- SS-2 — Sub Slab Soil Data April 2021 with PCE detection greater than MTCA Method A Cleanup Level
- SS-1 — Sub Slab Soil Data April 2021 with HVOCs Not Detected

- Lynnwood Public Facilities District Property Boundary
- West Adjoining Property Boundary
- Parcel Boundary
- Approximate Footprint of Former Alderwood Laundry & Dry Cleaners
- Backfilled Waste Oil UST Excavation
- Existing Concrete Grease Trap
- Existing Catch Basin
- Existing Storm Drain
- Existing Gas Line
- Existing Sewer Line
- Existing Water Line
- Electric Utility
- A — A' Cross Section Location

Data Box Explanation:

PCE	Tetrachloroethylene
TCE	Trichloroethylene
ND	Not Detected
MTCA	Model Toxics Control Act
HVOC	Halogenated Volatile Organic Compounds
mg/kg	milligrams per kilogram
0.160	Shading indicates concentration greater than MTCA

DP-4-4.0 — Sample Identification; Sample Depth in feet below ground surface

N W E S

50 0 50
Feet

Notes:

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

Data Source: Aerial from King County dated 2015. Vertical Datum: NAVD 88. Projection: NAD83 Washington State Planes, North Zone, US Foot.

Soil Chemical Analytical Data in PCE

Former Alderwood Laundry and Dry Cleaners
3815 196th Street SW, Lynnwood, Washington

GeoEngineers

Figure 2

P:\17\17787001\CAD\15\RI Addendum\17787001115_RI Addedum_F03A_F03B_Soil Chemical Analytical Data in PCE and TCE.dwg TAB:F03A Date Exported: 06/11/21 - 13:23 by syi

Soil Sample ID	TCE (mg/kg)
MW-7-30.0	ND
MW-7-35.0	ND
MW-7-40.0	ND
MW-8-5.0	ND
MW-8-10.0	ND
MW-8-20.0	ND
MW-8-30.0	ND
MW-8-35.0	ND
MW-8-40.0	ND
GEI-1-5.0	ND
GEI-1-10.0	ND
MW-16-5.0	ND
MW-16-10.0	ND
MW-16-15.0	ND
MW-16-25.0	ND
MW-16-35.0	**0.00156**
MW-16-45.0	**0.00165**
MW-17-10.0	ND
MW-17-20.0	ND
MW-17-30.0	ND
MW-17-35.0	**0.00767**

Soil Sample ID	TCE (mg/kg)
DP-2-4.0	ND
DP-2-8.0	ND
DP-4-4.0	**0.0023**
DP-4-20.0	ND
DP-4-25.0	ND
DP-5-8.0	ND
DP-5-23.0	**0.0047**
DP-6-2.0	**0.0017**
DP-6-12.0	ND
DP-10-4.0	**0.0056**
DP-10-15.0	**0.0012**
MW-2-10.0	**0.0017**
MW-2-30.0	**0.0027**
MW-2-35.0	**0.0024**
MW-6-35.0	ND
AB-1-10.0	**0.001**
AB-1-15.0	**0.0046**
AB-1-20.0	**0.00092**
AB-1-25.0	ND
AB-1-30.0	ND
AB-2-10.0	**0.00098**
AB-2-15.0	**0.0027**
AB-2-20.0	**0.0034**
AB-2-25.0	**0.0018**
AB-2-30.0	**0.0022**
AB-2-35.0	ND

Soil Sample ID	TCE (mg/kg)
MW-3-Deep-12-15	**0.00357**
MW-3-Deep-47-50	ND
MW-3-Deep-57-58	ND
RW-1-8-10	**0.00843**
RW-1-19-20	**0.00817**
RW-1-ALT-44-45	**0.00461**

Soil Sample ID	TCE (mg/kg)
SSW-1	**0.00295**
SSW-2	ND
SSW-3	ND
SS-1	ND
SS-2	ND
SS-3	ND
SS-4	**0.0079**
SS-5	ND
SS-6	ND
SS-7	ND
SS-8	ND

Legend

- DP-6/MW-2 — Exploration - MTCA Method A Cleanup Levels Exceedance for PCE/TCE in Soil
- DP-7/MW-4 — Exploration - HVOCs detected less than MTCA Method A Cleanup Levels in Soil
- DP-1/MW-9 — Exploration - HVOCs Not Detected
- AB-1 — Angled Boring by GeoEngineers, Inc.
- EMRI-MW-1 — Groundwater Monitoring Well by EMRI (1999)
- Soil Sample with PCE detection greater than MTCA Method A Cleanup Level
- Soil Sample with HVOC detections less than MTCA Method A or B Cleanup Levels
- Soil Sample with HVOCs Not Detected
- SSW1 — Confirmation Soil Sample
- MW-3-Deep — Deep Groundwater Assessment Boring with PCE/TCE detection greater than MTCA Method A Cleanup Level
- RW-1 — Pilot Study Injection Well with PCE/TCE detection greater than MTCA Method A Cleanup Level
- SS-2 — Sub Slab Soil Data April 2021 with PCE detection greater than MTCA Method A Cleanup Level
- SS-1 — Sub Slab Soil Data April 2021 with HVOCs Not Detected

- Lynnwood Public Facilities District Property Boundary
- West Adjoining Property Boundary
- Parcel Boundary
- Approximate Footprint of Former Alderwood Laundry & Dry Cleaners
- Backfilled Waste Oil UST Excavation
- Existing Concrete Grease Trap
- Existing Catch Basin
- Existing Storm Drain
- Existing Gas Line
- Existing Sewer Line
- Existing Water Line
- Electric Utility
- A — A' Cross Section Location

Data Box Explanation:

PCE	Tetrachloroethylene
TCE	Trichloroethylene
ND	Not Detected
MTCA	Model Toxics Control Act
HVOC	Halogenated Volatile Organic Compounds
mg/kg	milligrams per kilogram
0.160	Shading indicates concentration greater than MTCA

DP-4-4.0 — Sample Identification; Sample Depth in feet below ground surface

N W E S

50 0 50
Feet

Notes:

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Data Source: Aerial from King County dated 2015. Vertical Datum: NAVD 88. Projection: NAD83 Washington State Planes, North Zone, US Foot.

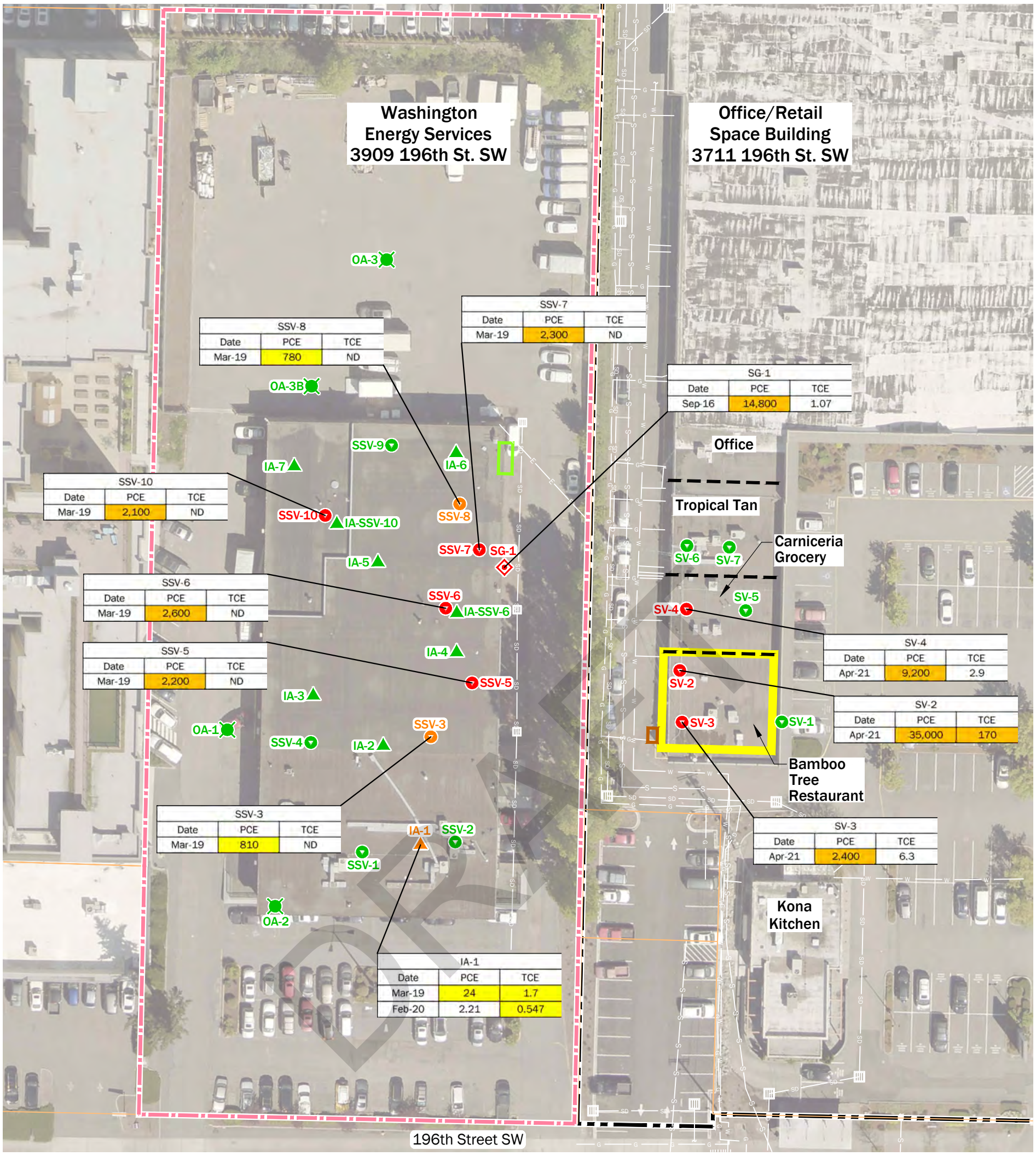
Soil Chemical Analytical Data in TCE

Former Alderwood Laundry and Dry Cleaners
3815 196th Street SW, Lynnwood, Washington

GeoEngineers

Figure 3

P:\17\17787001\CAD\15\RI Addendum\1778700115_RI Addedum_F03A_F03B_Soil Chemical Analytical Data in PCE and TCE.dwg TAB:F03B Date Exported: 06/11/21 - 13:23 by syi



Legend

- SSV-5: Exceedance of the MTCA Soil Gas Screening Level or Indoor Air Cleanup Level for Commercial Workers
- SSV-8: Exceedance of the MTCA Soil Gas Screening Level or Indoor Air Cleanup Level
- SSV-1: No Exceedance of the MTCA Soil Gas Screening Level or Indoor Air Cleanup Level
- SG-1: Soil Vapor Sample Location
- SSV-8: Sub-Slab Soil Gas Sample Location
- IA-1: Indoor Air Vapor Sample Location
- OA-1: Outdoor Air Vapor Sample Location

- Lynnwood Public Facilities District Property Boundary
- West Adjoining Property Boundary
- Parcel Boundary
- Approximate Footprint of Former Alderwood Laundry & Dry Cleaners
- Backfilled Waste Oil UST Excavation
- Existing Concrete Grease Trap
- Existing Catch Basin
- Existing Storm Drain
- Existing Gas Line
- Existing Sewer Line
- Existing Water Line
- Electric Utility

Data Box Explanation:

PCE	Tetrachloroethylene
TCE	Trichloroethylene
ND	Not Detected
MTCA	Model Toxics Control Act
HVOC	Halogenated Volatile Organic Compounds
ug/m^3	microgram per cubic meter
810	Shading Indicates Concentration Greater Than MTCA Soil Gas Screening Level or Indoor Air Cleanup Level
35,000	Shading Indicates Concentration Greater Than MTCA Soil Gas Screening Level or Indoor Air Cleanup Level for Commercial Workers

N W E S

50 0 50
Feet

Soil Vapor Chemical Analytical Data

Former Alderwood Laundry and Dry Cleaners
Lynnwood, Washington

GeoEngineers

Figure 4

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 King County dated 2019 and street centerlines. Vertical Datum: NAVD 88. Projection: NAD83 Washington State Planes, North Zone, US Foot.

P:\17\17787001\CAD\15\Draft Feasibility Study\17787001115_FS_F10_Vapor RI Data.dwg TAB:F10 Date Exported: 05/27/21 - 20:33 by syi

Washington Energy Services
3909 196th St. SW

Office/Retail Space Building
3711 196th St. SW

Solvents Not Detected

Solvents Not Detected

EMRI-MW-1		
Date	PCE	TCE
Feb-17	15	ND
Aug-17	19.5	ND
Nov-17	18.0	ND
Feb-18	32.2	ND
May-18	34.6	ND
Nov-19	27.2	ND
Apr-21	37.8	ND

MW-16		
Date	PCE	TCE
May-19	93.1	0.638
Nov-19	90.2	ND
Apr-21	109	1.54

MW-6		
Date	PCE	TCE
Feb-17	33	ND
Aug-17	32.9	ND
Nov-17	35.2	ND
Feb-18	38.8	ND
May-18	35.0	ND
Nov-19	26.6	ND
Apr-21	20.5	0.051

MW-15		
Date	PCE	TCE
Feb-17	78	2.6
Aug-17	55.4	1.77
Nov-17	65.9	1.92
Feb-18	83.2	1.52
May-18	75.0	1.76
Nov-19	26.9	0.650
Apr-21	44.1	1.47
Oct-21	41.5	0.98

MW-12		
Date	PCE	TCE
Feb-17	ND	ND
Aug-17	ND	ND
Nov-17	ND	ND
Feb-18	ND	ND
May-18	ND	ND
Nov-19	ND	ND
Apr-21	0.112	ND

MW-7		
Date	PCE	TCE
Feb-17	230	4.0
Aug-17	309	6.11
Nov-17	296	4.88
Feb-18	321	3.59
May-18	389	7.00
Nov-19	258	4.13
Apr-21	267	5.69

MW-1		
Date	PCE	TCE
Feb-17	ND	ND
Aug-17	3.23	ND
Nov-17	3.24	ND
Feb-18	2.03	ND
May-18	5.60	ND
Nov-19	0.630	ND
Apr-21	1.73	ND

MW-17 Pearched		
Date	PCE	TCE
May-19	35.6	1.80
MW-17 Deep		
May-19	339	6.09
Nov-19	201	4.04
Apr-21	235	6.36
Oct-21	162	4.30

MW-3		
Date	PCE	TCE
Feb-17	84	2.9
Aug-17	192	8.96
Nov-17	129	4.43
Feb-18	119	2.47
May-18	129	4.60
Nov-19	74.3	2.61
Apr-21	107	5.12
Oct-21	74	3.15

RW-1		
Date	PCE	TCE
Apr-21	35.4	1.58

MW-2		
Date	PCE	TCE
Feb-17	210	7.7
Aug-17	196	6.60
Nov-17	222	8.03
Feb-18	192	4.26
May-18	307	9.54
Nov-19	218	8.25
Apr-21	73.3	2.64
Sep-21	99	4.65

MW-3-Deep-40' Grab		
Date	PCE	TCE
Apr-21	20.1	0.914
MW-3-Deep-50' Grab		
Apr-21	12.3	0.520
MW-3-Deep-60' Grab		
Apr-21	2.57	0.110
MW-3-Deep		
Apr-21	0.183	<0.0400

MW-8		
Date	PCE	TCE
Feb-17	47	2.2
Aug-17	46.3	3.00
Nov-17	35.9	3.25
Feb-18	50.7	2.35
May-18	57.2	4.12
Nov-19	62.9	5.26
Apr-21	94.0	6.15
Sep-21	98.7	7.23

MW-4		
Date	PCE	TCE
Feb-17	10	1.3
Aug-17	11.8	2.47
Nov-17	17.1	1.88
Feb-18	16.6	1.13
May-18	14.0	1.62
Nov-19	Not Sampled	
Apr-21	Not Sampled	

MW-9		
Date	PCE	TCE
Feb-17	0.25	ND
Aug-17	0.224	ND
Nov-17	0.424	ND
Feb-18	0.334	ND
May-18	ND	ND
Nov-19	0.748	ND
Apr-21	2.37	0.493

MW-5		
Date	PCE	TCE
Feb-17	1.2	ND
Aug-17	0.815	ND
Nov-17	0.867	ND
Feb-18	0.753	ND
May-18	1.05	ND
Nov-19	0.722	ND
Apr-21	0.287	ND

Solvents Not Detected

Solvents Not Detected

Solvents Not Detected

Not Sampled (Dry)

MW-13 MW-14 EMRI-MW-1 MW-6 MW-16 MW-12 D' MW-7 MW-1 MW-15 MW-17 MW-11 RW-1 MW-2 MW-8 MW-3 MW-3-Deep MW-10 MW-4 MW-9 MW-5 ZZA-MW-3 ZZA-MW-2

A A' B B' C C' D D'

Office
Tropical Tan
Carniceria Grocery
Bamboo Tree Restaurant
Kona Kitchen

196th Street SW

Legend

- MW-2: Groundwater Sample with MTCA Method A Cleanup Level Exceedance for PCE/TCE
- MW-1: Groundwater Sample with PCE/TCE less than MTCA Method A Cleanup Levels
- MW-9: Groundwater Sample - Solvents Not Detected
- MTCA: Model Toxics Control Act
- HVOC: Halogenated Volatile Organic Compounds
- Extent PCE > 5 ug/L in Groundwater
- Lynnwood Public Facilities District Property Boundary
- West Adjoining Property Boundary
- Parcel Boundary
- Approximate Footprint of Former Alderwood Laundry & Dry Cleaners
- Existing Concrete Grease Trap
- MW-3-Deep: Deep Groundwater Assessment Boring with PCE/TCE detection greater than MTCA Method A Cleanup Level
- RW-1: Pilot Study Injection Well with PCE/TCE detection greater than MTCA Method A Cleanup Level
- A A': Cross Section Location
- Existing Catch Basin
- Existing Storm Drain
- Existing Gas Line
- Existing Sewer Line
- Existing Water Line
- Electric Utility

Data Box Explanation:

- PCE: Tetrachloroethylene
- TCE: Trichloroethylene
- ND: Not Detected
- ug/L: micrograms per liter

Data boxes are provided for monitoring wells with detections of PCE/TCE.

Shading indicates concentration greater than MTCA.

All concentrations are in micrograms per liter.

N W E S

50 0 50
Feet

Notes:

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Data Source: Aerial from King County dated 2019 and street centerlines.. Vertical Datum: NAVD 88. Projection: NAD83 Washington State Planes, North Zone, US Foot.

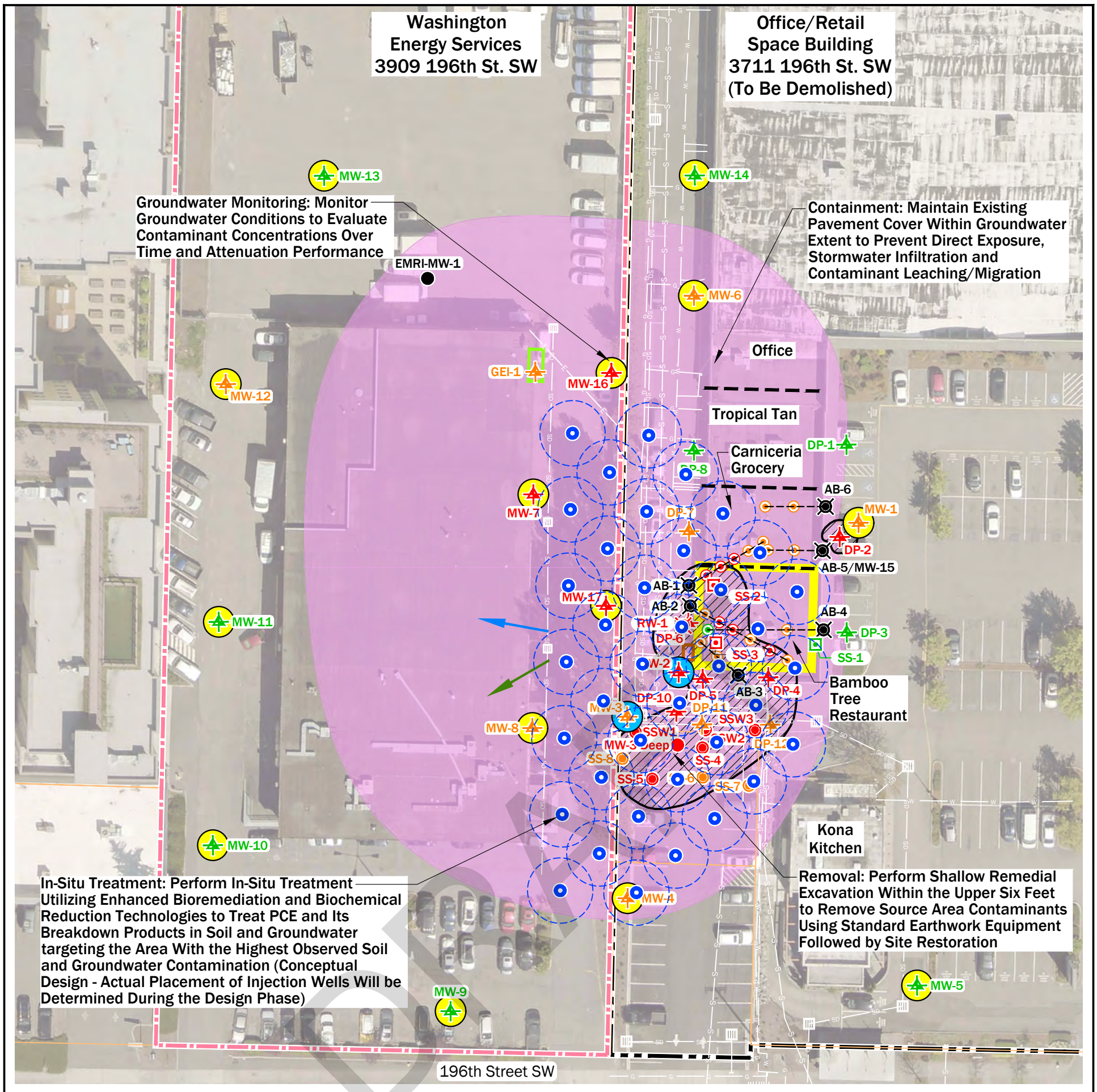
Groundwater Chemical Analytical Data As of October 2021 (Last Sampled)

Former Alderwood Laundry and Dry Cleaners
Lynnwood, Washington

GeoEngineers

Figure 5

P:\17\17787001\CAD\15\Draft Feasibility Study\17787001115_FS_F05_Groundwater Chemical Analytical Data.dwg TAB:F05 Date Exported: 05/28/21 - 15:35 by syi



Legend

- DP-6/MW-2 — Exploration - MTCA Method A Cleanup Levels Exceedance for PCE/TCE in Soil
- DP-7/MW-4 — Exploration - HVOCs detected less than MTCA Method A Cleanup Levels in Soil
- DP-1/MW-9 — Exploration - HVOCs Not Detected
- AB-1 — Angled Boring by GeoEngineers, Inc.
- EMRI-MW-1 — Groundwater Monitoring Well by EMRI (1999)
- Soil Sample with PCE detection greater than MTCA Method A Cleanup Level
- Soil Sample with HVOC detections less than MTCA Method A or B Cleanup Levels
- Soil Sample with HVOCs Not Detected
- SSW1 — Confirmation Soil Sample
- MW-3-Deep — Deep Groundwater Assessment Boring with PCE/TCE detection greater than MTCA Method A Cleanup Level
- RW-1 — Pilot Study Injection Well with PCE/TCE detection greater than MTCA Method A Cleanup Level
- SS-2 — Sub Slab Soil Data April 2021 with PCE detection greater than MTCA Method A Cleanup Level
- SS-1 — Sub Slab Soil Data April 2021 with HVOCs Not Detected

- Lynnwood Public Facilities District Property Boundary
- West Adjoining Property Boundary
- Parcel Boundary
- Approximate Footprint of Former Alderwood Laundry & Dry Cleaners
- Backfilled Waste Oil UST Excavation
- Existing Concrete Grease Trap
- Existing Catch Basin
- Existing Storm Drain
- Existing Gas Line
- Existing Sewer Line
- Existing Water Line
- Electric Utility

- Extent PCE > 5 ug/L in Groundwater
- Proposed Soil Excavation Area
- Proposed Performance/Compliance Monitoring Well
- Proposed Replacement Performance/Compliance Monitoring Well
- Proposed In-Situ Injection Point
- Estimated Zone of Influence
- Inferred Groundwater Flow Direction (Wet Season)
- Inferred Groundwater Flow Direction (Dry Season)

N W E S

50 0 50
Feet

Alternative 2 - Source Removal with Capping and In-Situ Enhanced Bioremediation/ Biochemical Reduction

Former Alderwood Laundry and Dry Cleaners
Lynnwood, Washington

GeoEngineers

Figure 6

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Data Source: Aerial from King County dated 2019 and street centerlines. Vertical Datum: NAVD 88. Projection: NAD83 Washington State Planes, North Zone, US Foot.

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