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STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
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February 23, 2016

Ms. Danelle MacEwen
City of Olympia
PO Box 1967
Olympia, Washington 98507-1967

Re: No Further Action at a Property associated with a Site:

- **Property Address:** 318 State Ave NE, Olympia, Washington 98501
- **Facility/Site No.:** 3024394
- **Cleanup Site ID:** 2010
- **VCP Project No.:** SW1013

Dear Ms. MacEwen:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of a Property associated with the 318 State Ave NE Olympia facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issues Presented and Opinion

1. Is further remedial action necessary at the Property to clean up contamination associated with the Site?

   NO. Ecology has determined that no further remedial action is necessary at the Property to clean up contamination associated with the Site.

   This opinion is dependent on the continued performance and effectiveness of the post-cleanup controls and monitoring specified below.

2. Is further remedial action still necessary elsewhere at the Site?

   YES. Ecology has determined that further remedial action is still necessary elsewhere at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively "substantive requirements of MTCA"). The analysis is provided below.

Description of the Property and the Site

This opinion applies only to the Property and the Site described below. This opinion does not apply to any other sites that may affect the Property. Any such sites, if known, are identified separately below.

1. Description of the Property.

The Property includes the following tax parcel in Thurston County, which were affected by the Site and addressed by your cleanup:

- 78503200500.

Enclosure A includes a legal description of the Property. **Enclosure B** includes a diagram of the Site that illustrates the location of the Property within the Site.

2. Description of the Site.

The Site is defined by the nature and extent of contamination associated with the following releases:

- Volatile organic compounds (VOCs) and chlorinated solvents into the Soil and Groundwater.
- Metals into the Soil and Groundwater.
- Polycyclic aromatic hydrocarbons (PAHs) into the Soil.

Those releases have affected more than one parcel of real property, including the parcel identified above.

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

3. Identification of Other Sites that may affect the Property.

Please note a parcel of real property can be affected by multiple sites. At this time, Ecology has no information that the Property is affected by other sites.

Basis for the Opinion

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

1. GeoEngineers, Inc. (GeoEngineers), **Groundwater Monitoring Plan, Southeast Portion of 318 State NE Avenue Property, Olympia, Washington,** dated October 1, 2015.
2. GeoEngineers, **Focused Feasibility Study, Southeast Portion of 318 State NE Avenue Property, Olympia, Washington,** dated August 26, 2015.
3. GeoEngineers, **Groundwater Compliance Monitoring Data Summary Report – August 2014, 318 State NE Avenue Property, Olympia, Washington,** dated August 26, 2015.
4. GeoEngineers, **Remedial Action Construction Report, 318 State NE Avenue Property, Olympia, Washington,** dated August 26, 2015.
5. GeoEngineers, **Final Draft Remedial Investigation, 318 State Avenue NE Property, Olympia, Washington,** dated February 19, 2009.

Those documents are kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

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

Analysis of the Cleanup

1. Cleanup of the Property located within the Site.

Ecology has concluded that **no further remedial action** is necessary at the Property to clean up contamination associated with the Site. That conclusion is based on the following analysis:

a. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards for the Site and select a cleanup for the Property. The Site is described above and in **Enclosure B**.

The 318 State Ave NE Olympia facility (Site) is located at 318 State Ave NE, Olympia, Washington (see Figure 1). The Site has been used since the 1890's and has been developed for several uses, including use as a foundry and machine shop, automotive repair facility, and material testing laboratory. By 1923, the Washington State Department of Transportation (WSDOT) owned the Site and in 1936, fire

destroyed some of the buildings, which were subsequently rebuilt and expanded into the WSDOT testing laboratory. The Property is owned by the City of Olympia (City).

Between 2006 and 2008, GeoEngineers conducted a Site characterization of the Property. Numerous soil borings were advanced on the Site and 16 monitoring wells (MW-01 through MW-16) were installed. Soil samples were collected from all borings and monitoring wells. Exceedances of MTCA Method A Soil Cleanup Levels (CULs) for Unrestrictive Land Uses were found for metals, PAHs, and VOCs. The soils were also tested for petroleum hydrocarbons, polychlorinated biphenyls, and semivolatile organic compounds and were either not detected or not detected above their respective MTCA Method A CUL.

By October 2009, the Property characterization had been completed and GeoEngineers conducted a Remedial Cleanup Action on the Property. Excavation and removal of soil from Contaminated Soil Zone 1 (CSZ 1) was expected to remove chlorinated solvents, metals, PAHs, and other VOCs (see Figure 2). During the excavation, a previously unknown underground storage tank was found and removed. Laboratory analytical results from confirmation soil samples indicated the metals, chlorinated solvents, PAHs, and VOCs had been removed from the soil (see Table 1).

In a smaller pit (CSZ 2) soil was excavated to remove benzene and lead contamination from that area (see Figure 2). Laboratory analytical results on confirmation soil samples indicated the benzene and lead had been removed from the soil (see Table 1).

From May 2010 until August 2014, only vinyl chloride (VC) groundwater concentrations were indicated to be above its applicable MTCA Method A Groundwater CUL of 0.029 micrograms per liter (µg/l). No VC groundwater concentrations above its MTCA CUL had been identified within the former VC source area (MW-17) and Ecology agreed to a suspension of sampling in that well. GeoEngineers proposed that there was no beneficial use of groundwater as potable. Ecology reviewed and agreed with the proposal and determined the next applicable beneficial use was the protection of marine organisms and marine waters. No other VOCs or PAHs were detected from Property groundwater samples above their respective MTCA Method A or Method B CULs. Total arsenic detections above the MTCA Method A CULs were later demonstrated to be acceptable based on a statistical demonstration approved by Ecology.

In June 2015, the City entered into negotiations with the Low Income Housing Institute (LIHI) to purchase the southeast quadrant of the Property. The parcel was

subdivided and became known as Parcel C (see Exhibit B). Ecology requested a groundwater sample and a soil vapor evaluation along the northern boundary of Parcel C. Four soil vapor samples were collected in the northwest quadrant of Parcel C and a reconnaissance groundwater sample along the northern border of Parcel C. Both the groundwater and soil vapor samples exceeded their applicable CULs.

Ecology reviewed the analytical data and proposal from the City to develop low income housing and obtain a No Further Action Opinion for Parcel C. Ecology determined development could proceed on Parcel C as long as institutional and engineered controls were instituted. The City and LIHI developed plans for those controls and Ecology reviewed and approved those controls as described in the Environmental Covenant for Parcel C (see Enclosure B). The City, at Ecology's request, also installed MW-19 along the northern border of Parcel C to further monitor the natural attenuation of the VC plume. The City has secured funding to further delineate the VC contamination and develop additional remedial actions on the remaining City-owned parcels and beyond on properties to the north.

Based on the information provided Ecology has determined that Parcel B has met the substantive requirements of MTCA. Ecology is providing this No Further Action Opinion for the Property.

b. Establishment of cleanup standards for the Site.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

Soil: Per WAC 173-340-740, for soil cleanup levels based on protection from vapors, the point of compliance shall be established in the soils throughout the site from the ground surface to the uppermost ground water saturated zone.

Soil: Per WAC 173-340-740, for soil cleanup levels based on human exposure via direct contact or other exposure pathways where contact with the soil is required to complete the pathway, the point of compliance shall be established in the soils throughout the site from the ground surface to 15 feet below the ground surface. This depth represents a reasonable estimate of the depth of soil that could be excavated and distributed at the soil surface as a result of site development activities.

Groundwater: Per WAC 173-340-720, for sites where the groundwater is classified as nonpotable, the cleanup action includes institutional controls complying with WAC 173-340-440 that will prevent the use of contaminated groundwater for drinking water purposes at any point between the source of

hazardous substances and the point(s) of entry of ground water into the surface water. The point of compliance is the point or points where the groundwater cleanup levels must be attained for the site to be in compliance with the cleanup standards. The standard point of compliance shall be established 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.

Air: Per WAC 173-340-750, Cleanup levels established under this section shall be attained in the ambient air throughout the site.

Method A and Method B CULs will be used for the affect media at the Property.

The applicable MTCA Method A or Method B Soil CULs will be:

Chemical	CUL	Method
PCE	0.05 mg/kg	A
TCE	0.03 mg/kg	A
cis-l,2-DCE	160 mg/kg	B
trans-l,2-DCE	1,600 mg/kg	B
VC	67 mg/kg	B

The applicable MTCA Method A or MTCA Method B Surface Water CULs based on ambient water quality criteria will be:

Chemical	CUL	Method
PCE	8.85 µg/L	B
TCE	7 µg/L	B
cis-l,2-DCE	NE[1]	
trans-l,2-DCE	4,000 µg/L	B
VC	1.6 µg/L	B

The applicable MTCA Method B Air CULs will be:

Chemical	CUL	Method
PCE	10 µg/m³	B
TCE	0.37 µg/m³	B
cis-l,2-DCE	NE	
trans-l,2-DCE	27.4 µg/m³	B
VC	0.28 µg/m³	B

[1] Not Established

Ecology has determined these CULs are protective of human health and the environment. Where residual contamination concentration remains above the applicable CULs the institutional and engineered controls will be instituted to protect human health and the environment.

Action and location-specific requirements.

Please note that other requirements apply to the cleanup based on the type of the action or location of the Property. Those requirements are specified in GeoEngineers *Groundwater Monitoring Plan* for the Southeast Portion of the 318 State NE Avenue Property, Olympia, Washington, dated October 1, 2015. The environmental covenant also stipulates that a vapor barrier must be used to prevent the potential for vapor intrusion into the building and the building must have the indoor air tested to confirm safe air levels prior to building occupancy. These activities are detail in the Enclosure B.

c. Selection of cleanup for the Property.

Ecology has determined the cleanup you selected for the Property meets the substantive requirements of MTCA. The cleanup meets the minimum cleanup requirements and does not exacerbate conditions or preclude reasonable cleanup alternatives elsewhere at the Site.

Excavation and source removal was selected as the best remedial alternative for the soil. For residual groundwater contamination, natural attenuation was selected and analytical data indicates the process has fluctuated but remain stable. The VC concentrations are expected to reduce over the next five to ten years through natural attenuation. Residual soil vapor remains in the Site soil under the northwest corner of on Parcel C. Those concentrations are expected to decrease in a five-year time frame. A soil vapor barrier and passive sub-slab ventilation system are required to be in place prior to building construction and development.

d. Cleanup of the Property.

Ecology has determined the cleanup you performed meets the applicable Site cleanup standards within the Property. This determination is dependent on the continued performance and effectiveness of the post-cleanup controls and monitoring specified below.

In October 2009, approximately 6,500 tons of contaminated soil was excavated and removed from the southeast corner of the original property (see Figure 2). There were two excavations on the Property and the large excavation was approximately 140 feet

by 120 feet by 9 feet deep (CSZ 1)[2]. The second excavation was approximately 25 feet by 25 feet by 4 feet deep (CSZ 2). Since the excavation (CSZ 1), groundwater and soil vapor concentrations of VC have fluctuated; however, those concentrations have not consistently remained below the applicable CUL. Additional remediation is planned for the remaining parcels to further reduce the VC groundwater and soil vapor concentrations on Parcel C.

An Environmental Covenant has been recorded for Parcel C to address and mitigate residual VC exceedances in groundwater and soil vapor. Groundwater has been restricted to dewatering and monitoring uses only at Parcel C. The soil vapor exceedances are addressed by using a vapor barrier and passive ventilation system under any new construction.

The institutional and engineering controls are further described in the Environmental Covenant in Enclosure B.

2. **Cleanup of the Site as a whole.**

Ecology has concluded that **further remedial action** under MTCA is still necessary elsewhere at the Site. In other words, while your cleanup constitutes the final action for the Property, it constitutes only an **"interim action"** for the Site as a whole.

Post-Cleanup Controls and Monitoring

Post-cleanup controls and monitoring are remedial actions performed after the cleanup to maintain compliance with cleanup standards. This opinion is dependent on the continued performance and effectiveness of the following:

1. **Compliance with institutional controls.**
Institutional controls prohibit or limit activities that may interfere with the integrity of engineered controls or result in exposure to hazardous substances. The following institutional controls are necessary at the Property:

- **Groundwater use:** The groundwater beneath the Property remains contaminated and must not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted from the Property for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.
- **Monitoring:** A groundwater monitoring well (MW-19) is located on the City's

[2] CSZ 1 roughly matches the foot print of Parcel C described in the Environmental Covenant.

adjacent property to the north of the Property's boundary to be used by the City to monitor the natural attenuation of contaminants in groundwater after completion of the remedial action.

To implement those controls, an Environmental Covenant has been recorded on the following parcel of real property in Thurston County:

- 78503200500.

Ecology approved the recorded Covenant. A copy of the Covenant is included in **Enclosure B**.

2. Operation and maintenance of engineered controls.

Engineered controls prevent or limit movement of, or exposure to, hazardous substances. The following engineered controls are necessary at the Property:

- Installation of a passive sub-slab vapor-mitigation system.
- Installation of a sub-slab vapor barrier.
- Indoor air will be collected and analyzed after the structure's exterior envelope is completed and prior to occupancy.

Ecology has approved the operation and maintenance plan you submitted for these engineered controls. A copy of the plan is included in **Enclosure B**.

3. Performance of confirmational monitoring.

Confirmational monitoring is necessary at the Property to confirm the long-term effectiveness of the cleanup. The monitoring data will be used by Ecology during periodic reviews of post-cleanup conditions. Ecology has approved the monitoring plan you submitted. A copy of the plan is included in **Enclosure B**.

Periodic Review of Post-Cleanup Conditions

Ecology will conduct periodic reviews of post-cleanup conditions at the Property to ensure that they remain protective of human health and the environment. If Ecology determines, based on a periodic review, that further remedial action is necessary at the Property, then Ecology will withdraw this opinion.

Listing of the Site

Based on this opinion, Ecology will update the status of remedial action at the Site on our database of hazardous waste sites. However, because further remedial action is still necessary elsewhere at the Site, we will not remove the Site from our lists of hazardous waste sites. Furthermore, the Property will remain listed as part of the Site because the cleanup of the Property does not change the boundaries of the Site.

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**:

- Change the boundaries of the Site.
- 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 70.105D.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 performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. 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 70.105D.030(1)(i).

Contact Information

Thank you for cleaning up your Property under the Voluntary Cleanup Program (VCP). We look forward to working with you to clean up the remainder of the Site.

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me at (360) 407-7404.

Sincerely,

Eugene Radcliff, L.G.
VCP Site Manager
SWRO Toxics Cleanup Program

GER: knf

Enclosures (5): A – Description and Diagram of the Site

Figure 1	Vicinity Map
Figure 2	Limits of Remedial Excavations and Confirmation Sample Locations
Exhibit B	Property Map
Table 1	Summary of Groundwater Compliance Monitoring Parameters
Table 2	Summary of Analytical Results for Confirmation Soil Samples

B – Environmental Covenant

By Certified Mail: 91 7108 2133 3939 7039 4419

cc: Ms. Robin Amadon, Low Income Housing Institute
Mr. Nick Acklam, Ecology
Ms. Carol Johnston, Ecology
Ms. Dolores Mitchell, Ecology

Enclosure A

Description and Diagrams of the Site

Enclosure A
Property Description, Figures and Tables

Media of Concern: Soil, Soil Vapor, and Groundwater

The Former WA State Vacant Property (Site) is located at 318 State Avenue NE in Olympia, Thurston County, Washington (see Figure 1). The Site is also known as *318 State Avenue NE Olympia,* which contains the parcel where the former materials testing laboratory was located. The former structures have been removed. The Site is currently undeveloped. Full Site delineation property is progressing and off-Property delineation work is being scoped by the consultant and the City of Olympia (City).

The Site is within a quarter-mile west of East Bay on Budd Inlet with marine aquatic life being the most likely vulnerable receptors. The Site is approximately 12 feet above sea level and is bordered on the east by Adams Street and a vacant lot; on the south by State Street and a commercial property with associated parking; on the west by Franklin Street and the Olympia Intercity Transit Terminal; and on the north by two commercial properties. The Thurston County Assessor's office notes the Former WA State Vacant Property has an assigned tax parcel number of 78503200500 (Parcel C) and the parcel was part of the larger Site[3]. The original parcel (78503200400) was subdivided into smaller parcels in June 2015. Parcel C (Property) is to be transferred to the Low Income Housing Institute. This parcel is owned by the City and future planned uses of the parcel include additional development.

Brief Legal Description:

Parcel C of Boundary Line Adjustment No. 15-0050-OL, as recorded June 17, 2015, under
Auditor's File No. 4450222

Formerly known as:

Lots 5 and 6, the South 3.00 feet of Lots 3 and 4, Block 32, Sylvester's Plat of Olympia, as recorded in Volume 1 of Plats at page 14, records of Thurston County, Washington. TOGETHERWITH: the vacated east-west alley adjoining said Lots. EXCEPT THEREFROM: the north-south alley adjoining said Lots 3 and 6, as vacated by City of Olympia Ordinance No. 1775, dated June 5, 1923 and City of Olympia Ordinance No. 1221, dated October 22, 1912.

In Thurston County, Washington

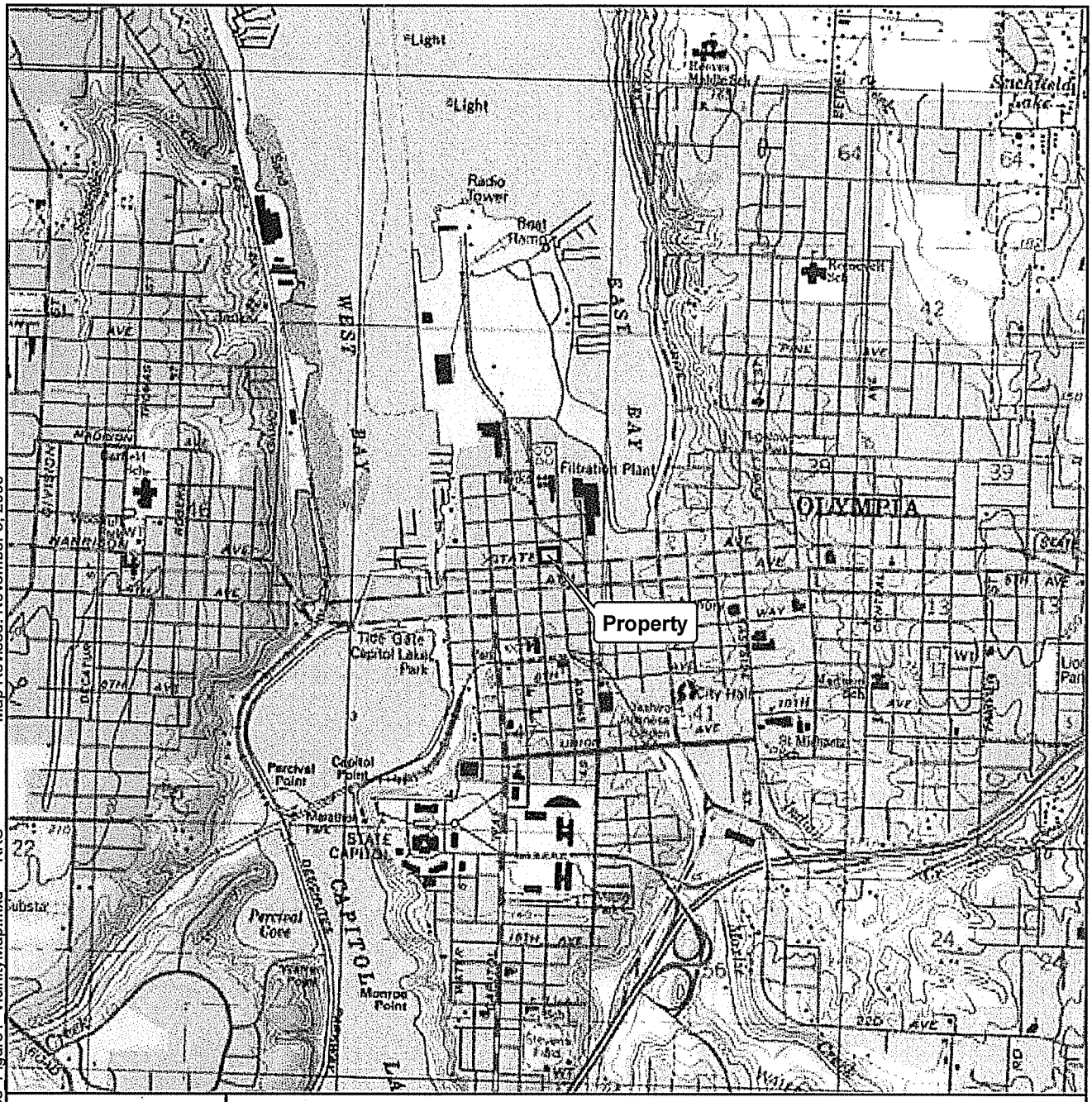
Use Code: 67 Service - Governmental

[3] http://www.geodata.org/website/cadastral/resultsparcel.asp?parcel=78503200500

The Site has been used since the 1890's and has been developed for several uses, including use as a foundry and machine shop, automotive repair facility, and material testing laboratory. By 1923, the Washington State Department of Transportation owned the Site and in 1936, fire destroyed some of the buildings, which were subsequently rebuilt, expanding the testing laboratory.

The Property is underlain by Vashon advance outwash deposits consisting of fine to medium grained sands with lesser deposits of silts and clays. The eastern portion of the Property has been identified as a former shoreline of Budd Inlet; it was filled in around 1911 with dredge fill material to extend the peninsula. The Property is approximately 850 feet west southwest of West Bay approximately 15 feet east of East Bay. The soils on the Property were characterized down to 12 feet below ground surface (bgs).

The groundwater gradient has consistently dipped to the north and the depth to groundwater ranges from 6-8 feet bgs. On-Property groundwater is not expected to be a future source of potable groundwater.



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: 2008 Shaded Relief from ESRI, 2008 Topographic Maps from National Geographic Society
Projection: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
Datum: D_North_American_1983

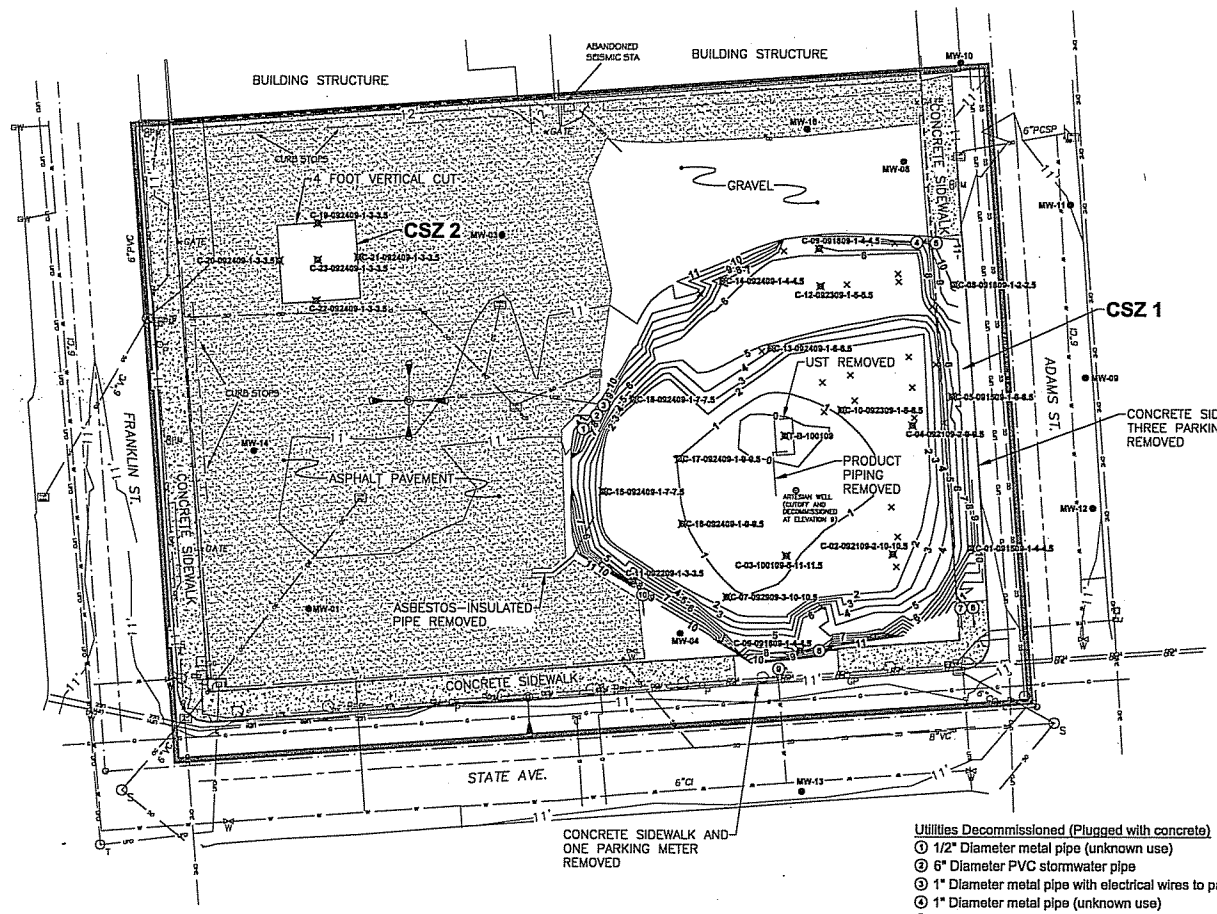
Vicinity Map

318 State Avenue NE
Olympia, Washington

GeoEngineers

Figure 1

Office: TAC Path: \\P:\0041504905\GIS\MXDs\041504905_Figure1_VicinityMap.mxd KKS Map Revised: November 5, 2009



Legend

- Remedial Excavation Confirmation Soil Sample Location
- Wood Piling
- Monitoring Well Location and Designation
- Topographic Elevation Contour
- Water Meter
- Water Valve
- Existing Decommissioned Artesian Well Casing
- Sanitary Sewer Manhole
- Sanitary Sewer Clean Out
- Storm Drain Manhole
- Catch Basin
- Tree
- Overhead Light
- Parking Meter
- J-Box
- Power Pole
- Banner Pole
- Fire Hydrant
- Underground Traffic Control
- Overhead Communications
- Overhead Electrical
- Waterline
- Sanitary Sewer
- Underground Fiber Optic
- Storm Line
- Underground Phone
- Underground Electrical
- Underground Gas
- Chainlink Fence
- Survey Monument and Monument Line
- Street Striping Line
- Property Line
- Limits of Work
- Existing Concrete Sidewalk
- Existing Asphalt Pavement

SITE PLAN NOTE:
1. LIMITS OF WORK SHOWN ARE APPROXIMATE.

Utilities Decommissioned (Plugged with concrete)
1. 1/2" Diameter metal pipe (unknown use)
2. 6" Diameter PVC stormwater pipe
3. 1" Diameter metal pipe with electrical wires to parking lot overhead light
4. 1" Diameter metal pipe (unknown use)
5. 4 1/2" Diameter concrete sewer pipe
6. 1/2" Diameter metal pipe (unknown use)
7. 2" Diameter PVC fiber optic conduit
8. 4 1/2" Diameter concrete sewer pipe
9. 2" Diameter metal water pipe
10. 2" Diameter metal pipe (unknown use)

N W E S

0 20 40
Scale in 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.
3. Horizontal Datum = NAD83 Washington State Planes, South Zone, US Foot. Vertical Datum = NGVD 29 MSL.

Reference: Drawing provided by City of Olympia.

Revision	Description	Date	By	Chk	Rev.

DESIGNED: GRL
DRAWN: SCY
CHECKED: NER
DATE: 11/20/09
SCALE: AS NOTED

GeoEngineers
1101 S. Fawcett Avenue, Suite 200
Tacoma, WA 98402
Telephone (253) 383-4940
Fax (253) 383-4923

318 State Avenue NE
Olympia, Washington

Limits of Remedial Excavations and Confirmation Sample Locations

Project No. 0415-049-05
Drawing No. Figure 2

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PM: HWNER
OFFICE:ACAD

Exhibit B

PROPERTY MAP

The Property subject to the Environmental Covenant is Parcel C on Record of Survey-Boundary Line Adjustment No. 15-0050-0L, City of Olympia, filed June 17, 2015 under Auditors File Number 4450222.

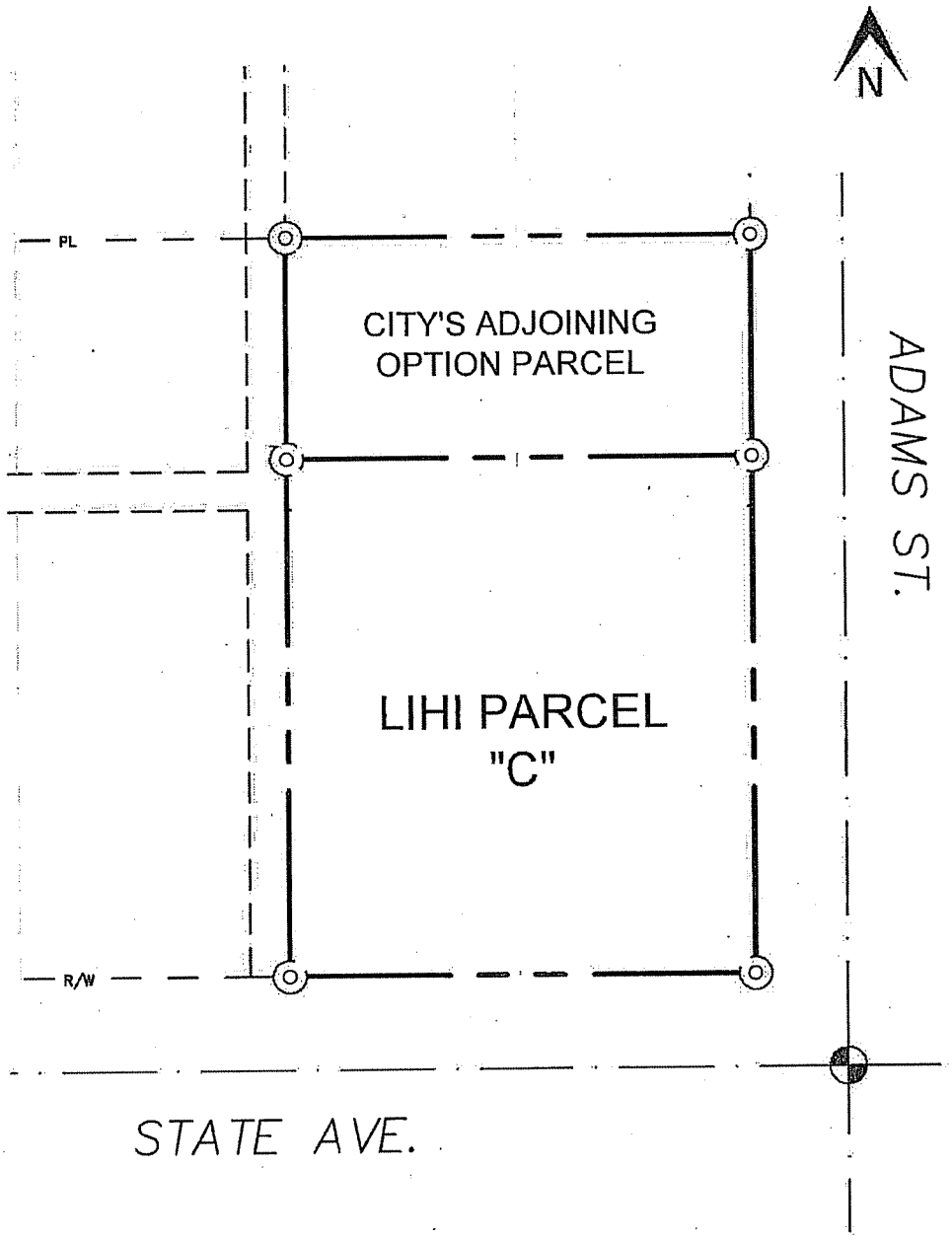

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR CONFIRMATION SOIL SAMPLES COLLECTED AT THE LIMITS OF EXCAVATION
318 STATE AVENUE
OLYMPIA, WASHINGTON

Analyte	MTCA Method A Cleanup Level	MTCA Method B Cleanup Level	C-1[1] C-01-091509-1-4-4.5 4-4.5 9/15/2009	C-2 C-02-092109-2-10-10.5 10-10.5 9/21/2009	C-3 C-03-092909-4-10-10.5 10-10.5 9/29/2009	C-4 C-04-092109-2-9-9.5 9-9.5 9/21/2009	C-5 C-05-091509-1-6-6.5 6-6.5 9/15/2009	C-6 C-06-0901809-1-4-4.5 4-4.5 9/18/2009	C-7 C-07-092909-3-10-10.5 10-10.5 9/29/2009	C-8 C-08-0901809-1-2-2.5 2-2.5 9/18/2009
Metals (mg/kg)										
Arsenic[4]	20	0.67	3.1 U	**8.1**	**4.7**[2]	**16**	3.1 U	3.2 U	**4.8**	2.9 U
Lead	250	NE	1.5 U	1.7 U	1.8 U	1.8 U	1.6 U	**11** J	1.8 U	1.5 U
Chlorinated Solvents and Benzene (µg/kg)										
Benzene	30	18,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,1,1-Trichloroethane	2,000	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,1,2,2-Tetrachloroethane	NE	5,000	2.1 U	1.7 U	2.3 U	1.9 U	2.1 U	1.6 U	2.1 U	2 U
1,1,2-Trichloroethane	NE	18,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,1-Dichloroethane	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,1-Dichloroethene	NE	NE	5.2 U	4.3 U	5.8 U	4.6 U	5.3 U	4.1 U	5.2 U	5 U
1,2-Dichlorobenzene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,2-Dichloroethane	NE	11,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,2-Dichloropropane	NE	15,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,3-Dichlorobenzene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
1,4-Dichlorobenzene	NE	42,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Bromoform	NE	130,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Bromomethane	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Carbon Tetrachloride	NE	7,700	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Chlorobenzene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Chloroethane	NE	350,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Chloroform	NE	160,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Chloromethane	NE	77,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Cis-1,2-Dichloroethene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Cis-1,3-Dichloropropene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Dibromochloromethane	NE	12,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Dichlorobromomethane	NE	16,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Methylene Chloride	20	130,000	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Tetrachloroethene	50	1,900	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Trans-1,2-Dichloroethene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Trans-1,3-Dichloropropene	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Trichloroethene	30	2,500	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Trichlorofluoromethane (CFC-11)	NE	NE	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Vinyl Chloride	NE	670	1 U	0.86 U	1.2 U	0.93 U	1.1 U	0.82 U	1 U	1 U
Additional UST Confirmation Analytes (µg/kg)										
Ethylbenzene	6,000	8,300,000	–	–	–	–	–	–	–	–
Toluene	7,000	6,400,000	–	–	–	–	–	–	–	–
Xylenes	9,000	16,000,000	–	–	–	–	–	–	–	–
Ethylene Dibromide	5	12	–	–	–	–	–	–	–	–
Methyl t-butyl ether	100	560,000	–	–	–	–	–	–	–	–
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)										
Benzo(a)pyrene	100	140	5.2 U	5.4 U	6.2 U	5.7 U	**14**	5.7 U	6.1 U	5 U
Benzo(a)anthracene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	**8**	5.7 U	6.1 U	5 U
Benzo(b)fluoranthene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	**11**	5.7 U	6.1 U	5 U
Benzo(k)fluoranthene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	5.1 U	5.7 U	6.1 U	5 U
Dibenzo(a,h)anthracene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	5.1 U	5.7 U	6.1 U	5 U
Indeno(1,2,3-cd)pyrene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	**9.2**	5.7 U	6.1 U	5 U
Chrysene	NE	NE	5.2 U	5.4 U	6.2 U	5.7 U	**7.9**	5.7 U	6.1 U	5 U
cPAH Toxic Equivalency[5]	100	NE	5.2 U	5.4 U	6.2 U	5.7 U	**25.2**	5.7 U	6.1 U	6 U

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR CONFIRMATION SOIL SAMPLES COLLECTED AT THE LIMITS OF EXCAVATION
318 STATE AVENUE
OLYMPIA, WASHINGTON

Analyte	MTCA Method A Cleanup Level	MTCA Method B Cleanup Level	C-9 C-09-0901809-1-4-4.5 4-4.5 9/18/2009	C-10 C-10-092309-1-8-8.5 8-8.5 9/23/2009	C-10 DUP-02-092309 8-8.5 9/23/09	C-11 C-11-092209-1-3-3.5 3-3.5 9/22/2009	C-12 C-12-092309-1-5-5.5 5-5.5 9/23/2009	C-13 C-13-092409-1-6-6.5 6-6.5 9/24/2009	C-14 C-14-092409-1-4-4.5 4-4.5 9/24/2009	C-15 C-15-092409-1-7-7.5 7-7.5 9/24/2009	C-16 C-16-092409-1-9-9.5 9-9.5 9/24/2009
Metals (mg/kg)											
Arsenic[4]	20	0.67	3.3 U	3.5 U	3.6 U	3.1 U	3.2 U	3.7 U	3.1 U	**17**	**10**
Lead	250	NE	1.7 U	1.7 U	1.8 U	**3.5**	1.6 U	1.8 U	1.6 U	**28**	**4.6**
Chlorinated Solvents and Benzene (µg/kg)											
Benzene	30	18,000	1 U	**1.2**	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,1,1-Trichloroethane	2,000	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,1,2,2-Tetrachloroethane	NE	5,000	2.1 U	2.2 U	2.2 U	2.4 U	2.1 U	2.1 U	2.3 U	2.6 U	1.9 U
1,1,2-Trichloroethane	NE	18,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,1-Dichloroethane	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,1-Dichloroethene	NE	NE	5.2 U	5.4 U	5.6 U	6 U	5.3 U	5.3 U	5.7 U	6.4 U	4.7 U
1,2-Dichlorobenzene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,2-Dichloroethane	NE	11,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,2-Dichloropropane	NE	15,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,3-Dichlorobenzene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
1,4-Dichlorobenzene	NE	42,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Bromoform	NE	130,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Bromomethane	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Carbon Tetrachloride	NE	7,700	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Chlorobenzene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Chloroethane	NE	350,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Chloroform	NE	160,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Chloromethane	NE	77,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Cis-1,2-Dichloroethene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	**1.2**	1.1 U	1.3 U	0.94 U
Cis-1,3-Dichloropropene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Dibromochloromethane	NE	12,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Dichlorobromomethane	NE	16,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Methylene Chloride	20	130,000	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Tetrachloroethene	50	1,900	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Trans-1,2-Dichloroethene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Trans-1,3-Dichloropropene	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Trichloroethene	30	2,500	**1.1**	1.1 U	**1.6**	**6.4**	**1.3**	1.1 U	1.1 U	**3.5**	0.94 U
Trichlorofluoromethane (CFC-11)	NE	NE	1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U	1.3 U	0.94 U
Vinyl Chloride	NE	670	1 U	**1.7**	**2.7**	1.2 U	1.1 U	**3.5**	1.1 U	1.3 U	0.94 U
Additional UST Confirmation Analytes (µg/kg)											
Ethylbenzene	6,000	8,300,000	–	–	–	–	–	1.1 U	–	–	–
Toluene	7,000	6,400,000	–	–	–	–	–	1.1 U	–	–	–
Xylenes	9,000	16,000,000	–	–	–	–	–	2.1 U	–	–	–
Ethylene Dibromide	5	12	–	–	–	–	–	1.1 U	–	–	–
Methyl t-butyl ether	100	560,000	–	–	–	–	–	1.1 U	–	–	–
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)											
Benzo(a)pyrene	100	140	5.9 U	6 U	6 U	5.4 U	**36**	6.1 U	5.3 U	**27**	7.2 U
Benzo(a)anthracene	NE	NE	5.9 U	6 U	6 U	5.4 U	**33**	6.1 U	5.3 U	**22**	7.2 U
Benzo(b)fluoranthene	NE	NE	5.9 U	6 U	**6.7**	5.4 U	**54**	6.1 U	5.3 U	**35**	7.2 U
Benzo(k)fluoranthene	NE	NE	5.9 U	6 U	6 U	5.4 U	**15**	6.1 U	5.3 U	**16**	7.2 U
Dibenzo(a,h)anthracene	NE	NE	5.9 U	6 U	6 U	5.4 U	**6.9**	6.1 U	5.3 U	7.9 U	7.2 U
Indeno(1,2,3-cd)pyrene	NE	NE	5.9 U	6 U	6 U	5.4 U	**22**	6.1 U	5.3 U	**16**	7.2 U
Chrysene	NE	NE	5.9 U	6 U	**8.5**	5.4 U	**42**	6.1 U	5.3 U	**32**	7.2 U
cPAH Toxic Equivalency[5]	100	NE	5.9 U	6 U	**0.76**	5.4 U	**55.7**	6.1 U	5.3 U	**36.2**	7.2 U

TABLE 1
SUMMARY OF ANALYTICAL RESULTS FOR CONFIRMATION SOIL SAMPLES COLLECTED AT THE LIMITS OF EXCAVATION
318 STATE AVENUE
OLYMPIA, WASHINGTON

Analyte	MTCA Method A Cleanup Level	MTCA Method B Cleanup Level	C-17 C-17-092409-1-9-9.5 9-9.5 9/24/2009	C-18 C-18-092409-1-7-7.5 7-7.5 9/24/2009	T-B T-B-092909 10-10.5 9/29/2009	C-19 C-19-092409-1-3-3.5 3-3.5 9/24/2009	C-20 C-20-092409-1-3-3.5 3-3.5 9/24/2009	C-21 C-21-092409-1-3-3.5 3-3.5 9/24/2009	C-22 C-22-092409-1-3-3.5 3-3.5 9/24/2009	C-23 C-23-092409-1-5-5.5 5-5.5 9/24/2009	C-23 DUP-03-092409-1-6-6.5 6-6.5 9/24/2009
Metals (mg/kg)											
Arsenic[4]	20	0.67	**18**	**4.2**	3.3 U[3]	--	--	--	--	--	--
Lead	250	NE	**7.5**	**26**	1.9 U	1.5 U	1.4 U	1.5 U	1.4 U	**13 J**	**66 J**
Chlorinated Solvents and Benzene (µg/kg)											
Benzene	30	18,000	1.6 U	1.1 U	1.2 U	1.1 U	1 U	1.1 U	0.89 U	0.99 U	1.1 U
1,1,1-Trichloroethane	2,000	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,1,2,2-Tetrachloroethane	NE	5,000	3.2 U	2.2 U	2.4 U	--	--	--	--	--	--
1,1,2-Trichloroethane	NE	18,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,1-Dichloroethane	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,1-Dichloroethene	NE	NE	8 U	5.4 U	5.9 U	--	--	--	--	--	--
1,2-Dichlorobenzene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,2-Dichloroethane	NE	11,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,2-Dichloropropane	NE	15,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,3-Dichlorobenzene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
1,4-Dichlorobenzene	NE	42,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Bromoform	NE	130,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Bromomethane	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Carbon Tetrachloride	NE	7,700	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Chlorobenzene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Chloroethane	NE	350,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Chloroform	NE	160,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Chloromethane	NE	77,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Cis-1,2-Dichloroethene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Cis-1,3-Dichloropropene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Dibromochloromethane	NE	12,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Dichlorobromomethane	NE	16,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Methylene Chloride	20	130,000	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Tetrachloroethene	50	1,900	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Trans-1,2-Dichloroethene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Trans-1,3-Dichloropropene	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Trichloroethene	30	2,500	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Trichlorofluoromethane (CFC-11)	NE	NE	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Vinyl Chloride	NE	670	1.6 U	1.1 U	1.2 U	--	--	--	--	--	--
Additional UST Confirmation Analytes (µg/kg)											
Ethylbenzene	6,000	8,300,000	--	--	1.2 U	--	--	--	--	--	--
Toluene	7,000	6,400,000	--	--	**1.2**	--	--	--	--	--	--
Xylenes	9,000	16,000,000	--	--	**5.4**	--	--	--	--	--	--
Ethylene Dibromide	5	12	--	--	0.91 U	--	--	--	--	--	--
Methyl t-butyl ether	100	560,000	--	--	1.2 U	--	--	--	--	--	--
Carcinogenic Polycyclic Aromatic Hydrocarbons (µg/kg)											
Benzo(a)pyrene	100	140	8.2 U	**6.5**	6.3 U	--	--	--	--	--	--
Benzo(a)anthracene	NE	NE	8.2 U	5.4 U	6.3 U	--	--	--	--	--	--
Benzo(b)fluoranthene	NE	NE	8.2 U	**8.3**	6.3 U	--	--	--	--	--	--
Benzo(k)fluoranthene	NE	NE	8.2 U	5.4 U	6.3 U	--	--	--	--	--	--
Dibenzo(a,h)anthracene	NE	NE	8.2 U	5.4 U	6.3 U	--	--	--	--	--	--
Indeno(1,2,3-cd)pyrene	NE	NE	8.2 U	5.4 U	6.3 U	--	--	--	--	--	--
Chrysene	NE	NE	8.2 U	**9.2**	6.3 U	--	--	--	--	--	--
cPAH Toxic Equivalency[5]	100	NE	8.2 U	7.4	6.3 U	--	--	--	--	--	--

TABLE 1
SUMMARY OF ANALYTICAL DATA IN SOIL
318 STATE AVENUE
OLYMPIA, WASHINGTON

Notes:

[1] The information provided for each sample above the analytical results are the Station name, sample name, sample depth (feet bgs) and date of collection.

[2] The arsenic result shown is for sample C-03-100109-5-11-11.5, which was collected after an approximate 1-foot overexcavation of the general area of station C-03 and T-B. The area was overexcavated because the arsenic results were greater than MTCA Method A cleanup levels in sample C-03-092909-4-10-10.5. However, other chemicals of concern were either not detected or were detected at concentrations less than MTCA Method A Cleanup levels in sample C-03-092909-4-10-10.5.

[3] The arsenic result shown is for sample T-B-100109 which was collected after an approximate 1-foot overexcavation of the general area of station C-03 and T-B. The area was overexcavated because arsenic results were greater than MTCA Method A cleanup levels in Sample T-B-092909. However, other chemicals of concern were either not detected or were detected at concentrations less than MTCA Method A Cleanup levels in sample T-B-092909.

[4] Arsenic concentrations are compared to the Method A cleanup level, which is the background arsenic concentration for soil in the State of Washington.

[5] Total Toxicity Equivalency Concentration (TEC) based on WAC 173-340-900 Table 708-2.

mg/kg = milligram per kilogram

ug/kg = microgram per kilogram

NE = Not Established

-- = Analysis not performed as the analytes identified were specifically performed for evaluation of soil in the former underground storage area.

U = Not detected at the indicated reporting limit

J = The reported concentration is an estimate

Bolding indicates the analyte was detected

TABLE 1

SUMMARY OF GROUNDWATER COMPLIANCE MONITORING PARAMETERS[1] - AUGUST 2014

318 STATE AVENUE NE
OLYMPIA, WASHINGTON

			Volatile Organic Compounds							Total Metals
		Analyte	Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Vinyl Chloride	Benzene	Arsenic
		Unit	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(mg/l)
		MTCA Method A Cleanup Level	5	5	4,000,000 [2]	800,000 [2]	1,600,000 [2]	0.2	5	0.005
Location	Sample ID	Sample Date								
MW-13 [11]	MW13-052510-W	05/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA	0.0041 J
	MW13-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.058 J
	MW13-112210-W	11/22/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0004 UJ
	MW13-022211-W	02/22/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0012
MW-04 [11]	MW4-052510-W	05/25/10	0.1 U	0.28	0.1 U	0.11	0.1 U	0.12	NA	0.0045 J
	MW4-082410-W	08/24/10	0.1 U	0.14	0.1 U	0.14	0.1 U	0.074	0.1 U	0.0051 J
	MW4-112210-W	11/22/10	0.1 U	0.34	0.1 U	0.1 U	0.1 U	0.065	0.1 U	0.00067 J
	MW4-022211-W	02/22/11	0.1 U	0.25	0.1 U	0.1 U	0.1 U	0.053	0.1 U	0.0023
MW-17 [14]	MW17-052410-W	05/24/10	0.1 UJ	0.26 J	0.1 UJ	0.1 UJ	0.1 UJ	0.084 J	0.17 J	0.0031 J
	MW17-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.11	0.1 U	0.025	0.1 U	0.002 UJ
	MW17-112210-W	11/22/10	0.1 U	0.22	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0016 J
	MW17-022211-W	02/22/11	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0012
	MW17-052511-W	05/25/11	0.1	0.21	0.1 U	0.1 U	0.1 U	0.02	NA [12]	NA [12]
	MW17-082411-W	08/24/11	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW17-112911-W	11/29/11	0.1 U	0.12	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW17-022812-W	02/28/12	0.1 U	0.10	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW17-082312-W	08/23/12	0.1 U	0.14	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW17-022813-W	02/28/13	0.1 U	0.1U	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW17-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.020 U	NA [12]	NA [12]
MW-09 [11]	MW9-052510-W	05/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA	0.0016 J
	MW9-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.002 UJ
	MW9-112210-W	11/22/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0004 UJ
	MW9-022211-W	02/22/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.00059
MW-03 [14]	MW3-052410-W	05/24/10	0.1 U	0.48	0.1 U	0.14	0.1 U	0.48	0.1 U	0.002 J
	MW3-082510-W	08/25/10	0.1 U	0.26	0.1 U	0.11	0.1 U	0.12	0.1 U	0.002 UJ
	MW3-112410-W	11/24/10	0.1 U	1.3	0.1 U	0.28	0.1 U	1.1	0.1 U	0.0004 UJ
	MW3-022311-W	02/23/11	0.1 U	1.6	0.1 U	0.59	0.1 U	0.92	0.1 U	0.0010
	MW3-052511-W	05/25/11	0.1 U	1.5	0.1 U	0.6	0.15	0.83	NA [12]	NA [12]
	DUP-052511-W [7]	05/25/11	0.1 U	1.2	0.1 U	0.36	0.12	0.69	NA [12]	NA [12]
	MW3-082411-W	08/24/11	0.1 U	0.64 J	0.1 U	0.31	0.11	0.37 J	NA [12]	NA [12]
	DUP-082411-W [8]	08/24/11	0.1 U	0.49 J	0.1 U	0.23	0.1 U	0.27 J	NA [12]	NA [12]
	MW3-112911-W	11/29/11	0.1 U	2.6	0.1 U	0.39	0.11	0.45	NA [12]	NA [12]
	DUP-112911-W [9]	11/29/11	0.1 U	2.7	0.1 U	0.41	0.10	0.52	NA [12]	NA [12]
	MW3-022812-W	02/28/12	0.1 U	0.99	0.1 U	0.63	0.18	1.4	NA [12]	NA [12]
	DUP-022812-W [10]	02/28/12	0.1 U	1.3	0.1 U	0.84	0.19	1.9	NA [12]	NA [12]
	MW3-082312-W	08/23/12	0.1 U	0.11	0.1 U	0.36	0.3	0.27	NA [12]	NA [12]
	DUP-082312-W [13]	08/23/12	0.1 U	0.11	0.1 U	0.34	0.33	0.26	NA [12]	NA [12]
	MW3-022813-W	02/28/13	0.1 U	0.70	0.1 U	0.34	0.14	0.72	NA [12]	NA [12]
	DUP-022813-W [15]	02/28/13	0.1 U	0.68	0.1 U	0.32	0.12	0.69	NA [12]	NA [12]
	MW03-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.24	0.28	0.15	NA [12]	NA [12]
	DUP01-82213-W [16]	08/22/13	0.1 U	0.1 U	0.1 U	0.23	0.32	0.16	NA [12]	NA [12]
	MW3-140227-W	02/27/14	0.1 U	2.5	0.10 U	0.75	0.12	0.79	NA [12]	NA [12]
	MW03-140825-W	08/25/14	0.1 U	0.1 U	0.1 U	0.35	0.36	0.25	NA [12]	NA [12]

			Volatile Organic Compounds							Total Metals
		Analyte	Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Vinyl Chloride	Benzene	Arsenic
		Unit	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(mg/l)
		MTCA Method A Cleanup Level	5	5	4,000,000 [2]	800,000 [2]	1,600,000 [2]	0.2	5	0.005
MW-08 [14]	MW8-052410-W	05/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.21	0.1 U	0.0027 J
	DUP-1-052410-W [3]	05/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.23	0.1 U	0.0027 J
	MW8-082510-W	08/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.29	0.1 U	0.0045 J
	DUP-1-082510-W [4]	08/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.29	0.1 U	0.0045 J
	MW8-112410-W	11/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.066	0.1 U	0.0004 UJ
	MW8-022311-W	02/23/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0019
	MW8-052511-W	05/25/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.04	NA [12]	NA [12]
	MW8-082411-W	08/24/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.21	NA [12]	NA [12]
	MW08-112911-W	11/29/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW08-022812-W	02/28/12	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW08-082312-W	08/23/12	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.13	NA [12]	NA [12]
	MW08-022813-W	02/28/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02U	NA [12]	NA [12]
	MW8-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10	NA [12]	NA [12]
MW-16 [14]	MW16-052410-W	05/24/10	0.1 U	0.44	0.1 U	0.2	0.18	0.76	0.1 U	0.0019 J
	MW16-082510-W	08/25/10	0.1 U	0.46	0.1 U	0.32	0.34	1.0	0.12	0.002 UJ
	MW16-112410-W	11/24/10	0.1 U	0.49	0.1 U	0.17	0.19	0.33	0.1 U	0.0013 J
	DUP-1-112410-W [5]	11/24/10	0.1 U	0.50	0.1 U	0.16	0.21	0.38	0.1 U	0.0004 UJ
	MW16-022311-W	02/23/11	0.1 U	0.42	0.1 U	0.13	0.13	0.22	0.1 U	0.0014
	DUP-1-022311-W [6]	02/23/11	0.1 U	0.43	0.1 U	0.11	0.15	0.23	0.1 U	0.0015
	MW16-052511-W	05/25/11	0.1 U	0.47	0.1 U	0.1 U	0.16	0.18	NA [12]	NA [12]
	MW16-082411-W	08/24/11	0.1 U	0.41	0.1 U	0.26	0.24	0.70	NA [12]	NA [12]
	MW16-112911-W	11/29/11	0.1 U	0.35	0.1 U	0.10	0.12	0.15	NA [12]	NA [12]
	MW16-022812-W	02/28/12	0.1 U	0.40	0.1 U	0.1 U	0.13	0.17	NA [12]	NA [12]
	MW16-082312-W	08/23/12	0.1 U	0.52	0.1 U	0.21	0.2	0.47	NA [12]	NA [12]
	MW16-022813-W	02/28/13	0.1 U	0.28	0.1 U	0.1 U	0.1 U	0.086	NA [12]	NA [12]
	MW16-82213-W	08/22/13	0.1 U	0.26	0.1 U	0.22	0.13	0.44	NA [12]	NA [12]
	MW16-140227-W	02/27/14	0.1 U	0.24	0.1 U	0.1 U	0.1 U	0.093	NA [12]	NA [12]
	DUP01-140227-W [17]	02/27/14	0.1 U	0.26	0.1 U	0.1 U	0.1 U	0.090	NA [12]	NA [12]
	MW16-140825-W	08/25/14	0.1 U	0.37	0.1 U	0.25	0.18	0.52	NA [12]	NA [12]
	DUP01-140825-W [18]	08/25/14	0.1 U	0.36	0.1 U	0.25	0.19	0.51	NA [12]	NA [12]
MW-18 [14]	MW18-052410-W	05/24/10	0.1 U	0.62	0.1 U	0.28	0.16	2.3	0.2	0.0038 J
	MW18-082510-W	08/25/10	0.1 U	0.25	0.1 U	0.22	0.13	1.9	0.19	0.0028 J
	MW18-112410-W	11/24/10	0.1 U	0.81	0.1 U	0.34	0.23	1.7	0.11	0.0032 J
	MW18-022311-W	02/23/11	0.1 U	0.72	0.1 U	0.3	0.16	0.9	0.1 U	0.0045
	MW18-052511-W	05/25/11	0.1 U	0.63	0.1 U	0.21	0.14	1.2	NA [12]	NA [12]
	MW18-082411-W	08/24/11	0.1 U	0.4	0.1 U	0.39	0.24	2.3	NA [12]	NA [12]
	MW18-112911-W	11/29/11	0.1 U	0.57	0.1 U	0.30	0.15	0.86	NA [12]	NA [12]
	MW18-022812-W	02/28/12	0.1 U	0.49	0.1 U	0.20	0.16	1.20	NA [12]	NA [12]
	MW18-082312-W	08/23/12	0.1 U	0.62	0.1 U	0.43	0.29	2.7	NA [12]	NA [12]
	MW18-022813-W	02/28/13	0.1 U	0.34	0.1 U	0.1U	0.1U	0.15	NA [12]	NA [12]
	MW18-82213-W	08/22/13	0.1 U	0.61	0.1 U	0.45	0.28	2.1	NA [12]	NA [12]
	MW18-140227-W	02/27/14	0.1 U	0.57	0.1 U	0.26	0.26	1.3	NA [12]	NA [12]
	MW18-140825-W	08/25/14	0.1 U	0.48	0.1 U	0.51	0.43	2.7	NA [12]	NA [12]

Notes:

[1] The parameters presented are the groundwater compliance monitoring parameters specified in the Groundwater Compliance Monitoring Plan (GeoEngineers 2010) and benzene as requested by Ecology in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated July 19, 2010. Analysis for benzene and arsenic were discontinued as benzene was never detected at a concentration greater than cleanup levels and arsenic concentrations are less than cleanup levels and appear to be associated with regional conditions. Ecology concurrence for discontinuing benzene and arsenic analysis was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 16, 2011.

[2] A MTCA Method A groundwater cleanup level has not been established; therefore, the MTCA Method B groundwater cleanup level has been provided.

[3] Sample DUP-1-052410-W is a field duplicate of sample MW8-052410-W.

[4] Sample DUP-1-082510-W is a field duplicate of sample MW8-082510-W.

[5] Sample DUP-1-112410-W is a field duplicate of sample MW16-112410-W.

[6] Sample DUP-1-022311-W is a field duplicate of sample MW16-022311-W.

[7] Sample DUP-052511-W is a field duplicate of sample MW3-052511-W.

[8] Sample DUP-082411-W is a field duplicate of sample MW3-082411-W.

[9] Sample DUP-112911-W is a field duplicate of sample MW3-112911-W.

[10] Sample DUP-022812-W is a field duplicate of sample MW3-022812-W.

[11] Groundwater sampling and analysis at this monitoring well location is no longer a part of the compliance monitoring program. Therefore, groundwater samples were not collected during the current monitoring event. Concurrence for discontinuing sampling and analysis at this monitoring well location was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 16, 2011.

[12] See Footnote 1.

[13] Sample DUP-082312-W is a field duplicate of sample MW3-082312-W.

[14] Groundwater sampling and analysis frequency at this monitoring well location has been reduced from quarterly monitoring to semi-annual monitoring. Concurrence for reducing the sampling and analysis frequency at this monitoring well location was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 8, 2012.

[15] Sample DUP-022813-W is a field duplicate of sample MW3-022813-W.

[16] Sample DUP01-82213-W is a field duplicate of sample MW03-82213-W.

[17] Sample DUP01-140227-W is a field duplicate of sample MW16-140227-W.

[18] Sample DUP01-140825-W is a field duplicate of sample MW16-140825-W.

MTCA = Model Toxics Control Act

µg/l = microgram per liter

U = The analyte was not detected at a concentration greater than the identified reporting limit

UJ = The analyte was not detected at a concentration greater than the identified reporting limit and the reporting limit concentration is estimated

NA = Not analyzed

mg/l = milligram per liter

J = The analyte concentration is estimated

NC = Not Collected

Bold indicates analyte was detected

Green shading indicates sample results for the current monitoring event.

Gray shading indicates concentration is greater than cleanup level

Enclosure B

Environmental Covenant

After Recording Return
Original Signed Covenant to:
Eugene Radcliff
Toxics Cleanup Program
Department of Ecology
PO Box 47600
Olympia, WA 98504-7600

Environmental Covenant

Grantors: Low Income Housing Institute (LIHI), its successors or assigns, and City of Olympia (the City), its successors or assigns
Grantee: State of Washington, Department of Ecology (hereafter "Ecology")
Brief Legal Description:

Parcel C of Boundary Line Adjustment No. 15-0050-OL, as recorded June 17, 2015, under Auditor's File No. 4450222

Formerly known as:

Lots 5 and 6, the South 3.00 feet of Lots 3 and 4, Block 32, Sylvester's Plat of Olympia, as recorded in Volume 1 of Plats at page 14, records of Thurston County, Washington. TOGETHER WITH: the vacated east-west alley adjoining said Lots. EXCEPT THEREFROM: the north-south alley adjoining said Lots 3 and 6, as vacated by City of Olympia Ordinance No. 1775, dated June 5, 1923 and City of Olympia Ordinance No. 1221, dated October 22, 1912. Also known as 318 State Avenue, Olympia, Washington.

Tax Parcel No.: 78503200500

4487784 **Pages: 17**
02/18/2016 03:37 PM Covenant
Thurston County Washington
CITY OF OLYMPIA, P W SURVEY & MAPPING

RECITALS

a. This document is an environmental (restrictive) covenant (hereafter "Covenant") executed pursuant to the Model Toxics Control Act ("MTCA"), Chapter 70.105D RCW, and Uniform Environmental Covenants Act ("UECA"), Chapter 64.70 RCW.

b. The Property that is the subject of this Covenant is part of a site commonly known as **Facility Site ID: 3024394.** The Property is legally described in Exhibit A, and illustrated in Exhibit B, both of which are attached (hereafter referred to as the "Property"). If there are differences between these two Exhibits, the legal description in Exhibit A shall prevail.

The Property was the	**Principal Contaminants Present**
Groundwater	**Tetrachloroethene (PCE) and trichloroethene (TCE) and associated degradation products including cis-1,2-dichloroethene (cis-1,2-DCE), trans 1,2 dichloroethene (trans-1,2 DCE) and vinyl chloride** (VC).
Soil Vapor	**PCE, TCE, and associated degradation products including cis-1,2-DCE, trans-1,2 DCE and** VC.

c. It is the purpose of this Covenant to restrict certain activities and uses of the Property to protect human health and the environment and the integrity of remedial actions conducted at the site or adjacent thereto. Records describing the extent of residual contamination and remedial actions conducted are available through Ecology. This includes the following documents: Final Draft Remedial Investigation, 318 State Avenue NE Property, Olympia, Washington, February 19, 2009 (GeoEngineers 2009); Remedial Action Construction Report, 318 State Avenue, Olympia, Washington, January 5, 2010 (GeoEngineers 2010); Focused Feasibility Study, Southeast Portion of the 318 State Avenue, Olympia, Washington, August 25, 2015 (GeoEngineers 2015); and Groundwater Monitoring Plan, Southeast Portion of the 318 State Avenue, Olympia, Washington, October 1, 2015 (GeoEngineers 2015).

d. This Covenant grants Ecology certain rights under UECA and as specified in this Covenant. As a Holder of this Covenant under UECA, Ecology has an interest in real property, however, this is not an ownership interest which equates to liability under MTCA or the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9601 *et seq.* The rights of Ecology as an "agency" under UECA, other than its' right as a holder, are not an interest in real property.

COVENANT

LIHI, its successors and assigns, as Grantor and fee simple owner of the Property hereby grants to the Washington State Department of Ecology, and its successors and assignees, the following covenants. The City of Olympia, its successors and assigns, as Grantor and the owner of adjacent property with monitoring well (referred to as MW-19) used for monitoring groundwater from the Property as identified in the Groundwater Monitoring Plan, Southeast

Portion of the 318 State Avenue, Olympia, Washington, October 1, 2015 (GeoEngineers 2015), said adjacent property referenced in Recitals, and legally described in Exhibit C and illustrated in Exhibit D, both of which are attached. If there are differences between these two Exhibits, the legal description in Exhibit C shall prevail. The City of Olympia is responsible for implementing and conducting the work in the Groundwater Monitoring Plan as regards the monitoring well (MW-19) on the adjacent property. Further, the City of Olympia, its successors and assigns, hereby grants to the Washington State Department of Ecology, and its successors and assignees, the following covenants specific to the monitoring well (referred to as MW-19) on the City's adjacent property. Furthermore, it is the intent of the Grantors that such covenants shall supersede any prior interests the Grantors have in the properties and run with the land and be binding on all current and future owners of any portion of, or interest in, the Property or the City's adjacent property.

Section 1. General Restrictions and Requirements.

The following general restrictions and requirements shall apply to the Property and the City's adjacent property:

a. Interference with Remedial Action. The Grantors shall not engage in any activity on the Property or adjacent property that may impact or interfere with the remedial action and any operation, maintenance, inspection or monitoring of that remedial action without prior written approval from Ecology. Accordingly, Ecology expressly consents to LIHI's development of the multi-family housing project on the Property.

b. Protection of Human Health and the Environment. The Grantors shall not engage in any activity on the Property or adjacent property that may threaten continued protection of human health or the environment without prior written approval from Ecology. This includes, but is not limited to, any activity that results in the release of residual contamination remaining on the Property or adjacent property or that exacerbates or creates a new exposure to residual contamination remaining on the Property or adjacent property.

c. Continued Compliance Required. Grantors shall not convey any interest in any portion of the Property or adjacent property without providing for the continued adequate and complete operation, maintenance and monitoring of remedial actions and continued compliance with this Covenant.

d. Leases. Grantors shall restrict any lease for any portion of the Property or adjacent property to uses and activities consistent with this Covenant and notify all lessees of the restrictions on the use of the Property or adjacent property.

e. Preservation of Reference Monuments. Each Grantor shall make a good faith effort to preserve any reference monuments and boundary markers located on their parcel(s) used to define the areal extent of coverage of this Covenant. Should a monument or marker be damaged or destroyed, the Grantor with ownership shall have it replaced by a licensed professional surveyor within thirty (30) days of discovery of the damage or destruction.

Section 2. Specific Prohibitions and Requirements.

In addition to the general restrictions in Section 1 of this Covenant, the following additional specific restrictions and requirements shall apply to the Property.

a. Vapor controls. The residual contamination on the Property includes volatile chemicals that may generate harmful vapors. As such, the following restrictions shall apply on the Property to minimize the potential for exposure to these vapors:

1. Any building or other enclosed structure constructed on the Property shall be constructed with a vapor-control system installed to prevent the migration of vapors into the building or structure. Vapor-Control System, as described and illustrated in Exhibit E attached hereto, to consist of:

    a. Installation of subslab perforated piping. This piping can be completed as a passive or active vapor-mitigation system at a later time if needed. If a system is installed, it shall be checked for operational effectiveness on an annual basis for a period of five years as set forth in Exhibit F, attached hereto.

    b. Installation of a subslab vapor barrier (Raven Industries VaporBlock Plus 20 or equal). Installation of barrier will be observed, documented, and compared to the manufacturer's installation guidelines and specifications and Ecology's recommendations contained in Exhibit E.

    c. Indoor air will be collected and analyzed after the structure's exterior envelope is completed.

b. Groundwater use. The groundwater beneath the Property remains contaminated and shall not be extracted for any purpose other than temporary construction dewatering, investigation, monitoring or remediation. Drilling of a well for any water supply purpose is strictly prohibited. Groundwater extracted from the Property for any purpose shall be considered potentially contaminated and any discharge of this water shall be done in accordance with state and federal law.

c. Monitoring. A groundwater monitoring well (MW-19) is located on the City's adjacent property to the north of the Property's boundary to be used by the City of Olympia to monitor the natural attenuation of contaminants in groundwater after completing of the remedial action. The groundwater monitoring plan for MW-19 (GeoEngineers 2015) is provided in Exhibit G attached hereto. The City of Olympia and LIHI shall maintain clear access to the monitoring well (MW-19), and to best of their abilities, protect it from damage. The City of Olympia and/or LIHI shall report to Ecology within forty-eight (48) hours of the discovery of any damage to the monitoring well (MW-19). Unless Ecology approves of an alternative plan in writing, either LIHI or the City of Olympia, whoever may be responsible for the damage to the monitoring well, shall promptly repair the damage and submit a report documenting this work to Ecology within thirty (30) days of completing the repairs. The City of Olympia shall be responsible for the groundwater testing and monitoring from the monitoring well (MW-19) on its adjacent property, as provided in Exhibit G.

Section 3. Access.

a. The Grantors shall maintain clear access to all remedial action components necessary to construct, operate, inspect, monitor and maintain the remedial action.

b. The Grantors freely and voluntarily grant Ecology and its authorized representatives, upon reasonable notice, the right to enter the Property and the City's adjacent property at reasonable times to evaluate the effectiveness of this Covenant and associated remedial actions, and enforce compliance with this Covenant and those actions, including the right to take samples, inspect any remedial actions conducted on the Property or adjacent property, and to inspect related records.

c. No right of access or use by a third party to any portion of the Property or the City's adjacent property is conveyed by this instrument.

Section 4. Notice Requirements.

a. Conveyance of Any Interest. The Grantors, when conveying any interest in any part of the Property or the City's adjacent property, including but not limited to title, easement, leases, and security or other interests, must:

i. Provide written notice to Ecology of the intended conveyance at least thirty (30) days in advance of the conveyance.

ii. Include in the conveying document a notice in substantially the following form, as well as a complete copy of this Covenant:

NOTICE: THIS PROPERTY IS SUBJECT TO AN ENVIRONMENTAL COVENANT GRANTED TO THE WASHINGTON STATE DEPARTMENT OF ECOLOGY ON [INSERT DATE:]AND RECORDED WITH THE THURSTON COUNTY AUDITOR UNDER RECORDING NUMBER [INSERT RECORDING NUMBER:]. USES AND ACTIVITIES ON THIS PROPERTY MUST COMPLY WITH THAT COVENANT, A COMPLETE COPY OF WHICH IS ATTACHED TO THIS DOCUMENT.

iii. Unless otherwise agreed to in writing by Ecology, provide Ecology with a complete copy of the executed document within thirty (30) days of the date of execution of such document.

b. Reporting Violations. Should the Grantors become aware of any violation of this Covenant, Grantors shall promptly report such violation in writing to Ecology.

c. Emergencies. For any emergency or significant change in site conditions due to Acts of Nature (for example, flood or fire) resulting in a violation of this Covenant, the Grantors are authorized to respond to such an event in accordance with state and federal law. The Grantors must notify Ecology in writing of the event and response actions planned or taken as soon as practical but no later than within 24 hours of the discovery of the event.

d. Notification procedure. Any required written notice, approval, reporting or other communication shall be personally delivered or sent by first class mail to the following persons. Any change in this contact information shall be submitted in writing to all parties to this Covenant. Upon mutual agreement of the parties to this Covenant, an alternative to personal delivery or first class mail, such as e-mail or other electronic means may be used for these communications.

Sharon Lee, Executive Director Low Income Housing Institute 2407 1st Avenue Seattle, WA 98121-1311 (206) 443-9935 ext. 111 sharonl@LIHI.org Steven R. Hall, City Manager City of Olympia P.O. Box 1967 Olympia, Washington 98507-1967 (360) 753-8447 shall@ci.olympia.wa.us	Environmental Covenants Coordinator Washington State Department of Ecology Toxics Cleanup Program P.O. Box 47600 Olympia, WA 98504-7600 (360) 407-6000 ToxicsCleanupProgramHQ@ecy.wa.gov

Section 5. Modification or Termination.

a. Grantors must provide written notice and obtain approval from Ecology at least sixty (60) days in advance of any proposed activity or use of the Property or adjacent property in a manner that is inconsistent with this Covenant. For any proposal that is inconsistent with this Covenant and permanently modifies an activity or use restriction at the site:

i. Ecology must issue a public notice and provide an opportunity for the public to comment on the proposal; and

ii. If Ecology approves of the proposal, the Covenant must be amended to reflect the change before the activity or use can proceed.

b. If the conditions at the site requiring a Covenant have changed or no longer exist, then the Grantors may submit a request to Ecology that this Covenant be amended or terminated. Any amendment or termination of this Covenant must follow the procedures in MTCA and UECA and any rules promulgated under these chapters.

Section 6. Enforcement and Construction.

a. This Covenant is being freely and voluntarily granted by the Grantors.

b. Within ten (10) days of execution of this Covenant, Grantors shall provide Ecology with an original signed Covenant and proof of recording and a copy of the Covenant and proof of recording to others required by RCW 64.70.070.

c. Ecology shall be entitled to enforce the terms of this Covenant by resort to specific performance or legal process. All remedies available in this Covenant shall be in addition to any

and all remedies at law or in equity, including MTCA and UECA. Enforcement of the terms of this Covenant shall be at the discretion of Ecology, and any forbearance, delay or omission to exercise its rights under this Covenant in the event of a breach of any term of this Covenant is not a waiver by Ecology of that term or of any subsequent breach of that term, or any other term in this Covenant, or of any rights of Ecology under this Covenant.

d. The Grantors shall be responsible for all costs associated with implementation of this Covenant. Furthermore, the Grantors, upon request by Ecology, shall be obligated to pay for Ecology's costs to process a request for any modification or termination of this Covenant and any approval required by this Covenant.

e. This Covenant shall be liberally construed to meet the intent of MTCA and UECA.

f. The provisions of this Covenant shall be severable. If any provision in this Covenant or its application to any person or circumstance is held invalid, the remainder of this Covenant or its application to any person or circumstance is not affected and shall continue in full force and effect as though such void provision had not been contained herein.

g. A heading used at the beginning of any section or paragraph or exhibit of this Covenant may be used to aid in the interpretation of that section or paragraph or exhibit but does not override the specific requirements in that section or paragraph.

The undersigned Grantor warrants she represents the non-profit corporation that holds the title **to the Property** and has authority to execute this Covenant.

EXECUTED this 12th day of FEBRUARY, 2016.

Signature: Robin Amadon

Print Name: ROBIN AMADON

Title: HOUSING DEVELOPMENT DIRECTOR

REPRESENTATIVE ACKNOWLEDGEMENT

STATE OF WASHINGTON
COUNTY OF King

On this 12th day of February, 2016, I certify that Robin Amadon personally appeared before me, acknowledged that she signed this instrument, on oath stated that she was authorized to execute this instrument, and acknowledged it as the Housing Development Director of the Low Income Housing Institute (LIHI), a Washington non-profit corporation, to be the free and voluntary act and deed of such party for the uses and purposes mentioned in the instrument.

Brad Reuling
Notary Public in and for the State of Washington
Residing at Seattle, WA
My appointment expires 10-19-19
x BRAD REULING

The undersigned Grantor warrants he is the City Manager for the municipal corporation that holds the title **to the adjacent property where a monitoring well (MW-19) is located for monitoring the Property** and has authority to execute this Covenant.

EXECUTED this 16th day of February, 2016.

Signature: _____

Print Name: Steven R Hall

Title: City Manager

REPRESENTATIVE ACKNOWLEDGEMENT

STATE OF WASHINGTON
COUNTY OF THURSTON

On this 16th day of February, 2016, I certify that STEVEN R. HALL personally appeared before me, acknowledged that he signed this instrument, on oath stated that he was authorized to execute this instrument, and acknowledged it as the City Manager of the City of Olympia, a Washington municipal corporation, to be the free and voluntary act and deed of such party for the uses and purposes mentioned in the instrument.

Notary Public
State of Washington
DANELLE R MAC EWEN
MY COMMISSION EXPIRES
April 30, 2017

Danelle R MacEwen

Notary Public in and for the State of Washington
Residing at Olympia
My appointment expires 4/30/2017

The Department of Ecology hereby accepts the status as GRANTEE and HOLDER of the above Environmental Covenant.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Rebecca S. Lawson

By: Rebecca S. Lawson, P.E., LHG
Title: Section Manager, Toxics Cleanup Program, Southwest Regional Office
Dated: 2/17/2016

STATE ACKNOWLEDGMENT

STATE OF WASHINGTON
COUNTY OF Thurston

On this 17 day of February, 2016, I certify that Rebecca S. Lawson personally appeared before me, acknowledged that **he/she** is the TCP Section Manager, SW Reg. Office of the state agency that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed, for the uses and purposes therein mentioned, and on oath stated that **he/she** was authorized to execute said instrument for said state agency.

VALERIE L. PEARSON
NOTARY PUBLIC
STATE OF WASHINGTON
COMMISSION EXPIRES
MARCH 28, 2016

Valerie L Pearson
Notary Public in and for the State of Washington
Residing at Lacey, Washington
My appointment expires 02-17-2016

Exhibit A

PROPERTY LEGAL DESCRIPTION

Parcel C of Boundary Line Adjustment No. 15-0050-OL, as recorded June 17, 2015, under Auditor's File No. 4450222

Formerly known as:

LOTS 5 AND 6, THE SOUTH 3.00 FEET OF LOTS 3 AND 4, BLOCK 32, SYLVESTER'S PLAT OF OLYMPIA, AS RECORDED IN VOLUME 1 OF PLATS AT PAGE 14, RECORDS OF THURSTON COUNTY, WASHINGTQN. TOGETHER WITH: THE VACATED EAST-WEST ALLEY ADJOINING SAID LOTS. EXCEPT THEREFROM: THE NORTH-SOUTH ALLEY ADJOINING SAID LOTS 3 AND 6, AS VACATED BY CITY OF OLYMPIA ORDINANCE NO. 1775, DATED JUNE 5, 1923 AND CITY OF OLYMPIA ORDINANCE NO. 1221, DATED OCTOBER 22, 1912.

Also known as 318 State Avenue, Olympia, Washington.

Exhibit B

PROPERTY MAP

The Property subject to the Environmental Covenant is Parcel C on Record of Survey-Boundary Line Adjustment No. 15-0050-0L, City of Olympia, filed June 17, 2015 under Auditors File Number 4450222.

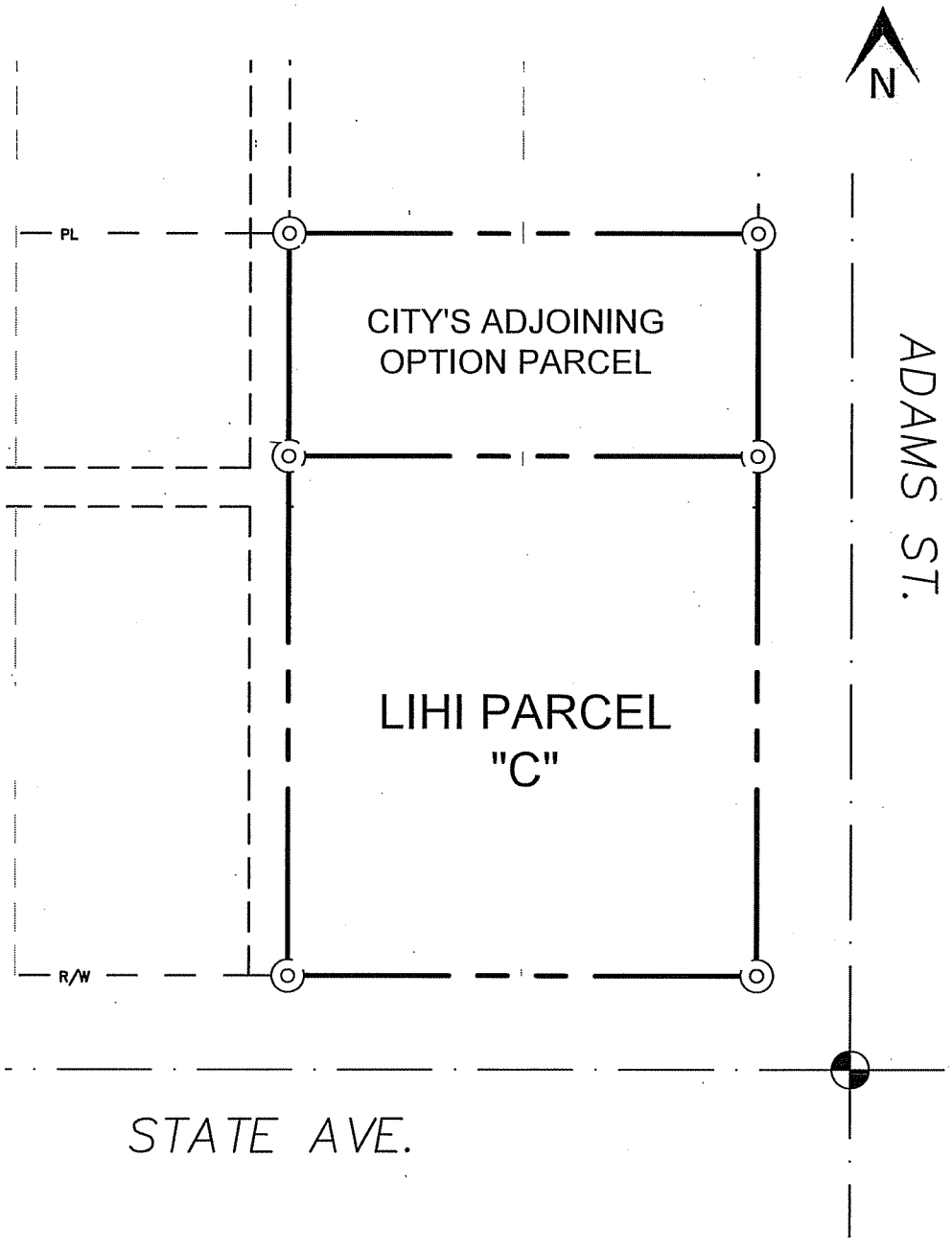

Exhibit C

Adjacent Property Legal Description

The South half of Lots 3 and 4, Block 32, Sylvester's Plat of Olympia, as recorded in Volume 1 of Plats at page 14, records of Thurston County, Washington. EXCEPT THEREFROM: the South 3.00 feet of said Lots 3 and 4, the east-west alley adjoining said Lots, as vacated by City of Olympia Ordinance No. 1221, dated October 22, 1912, the north-south alley adjoining said Lot 3, as vacated by City of Olympia Ordinance No. 1775, dated June 5, 1923.

Containing 6,840 square feet, more or less.

Exhibit D

Location of MW-19 on 'City's Adjoining Option Parcel'

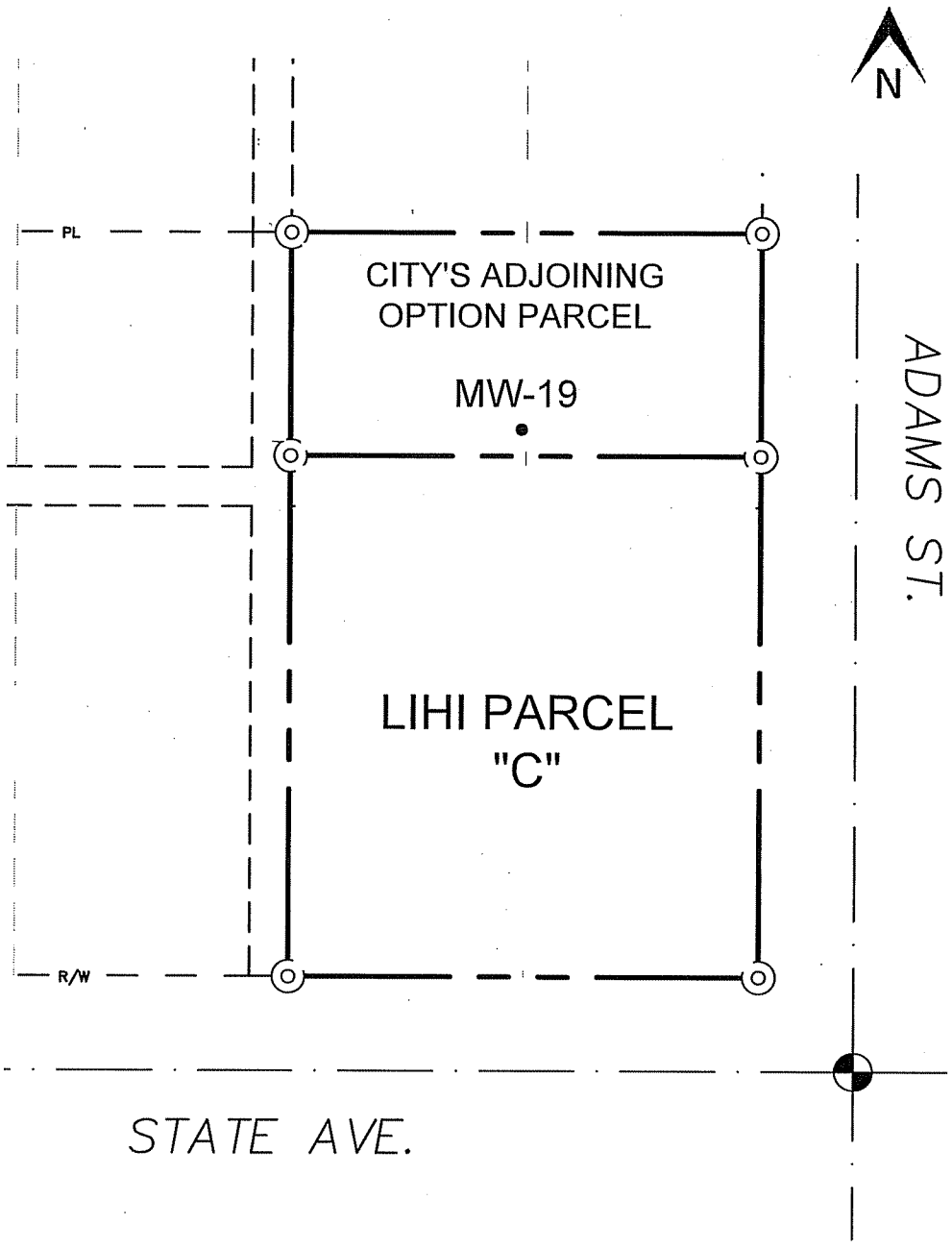

Exhibit E
DEPARTMENT OF ECOLOGY
Toxics Cleanup Program

Exhibit E is a memorandum dated January 27, 2016 from Eugene Radcliff to Jason Landskron regarding Engineering Review – Subslab Conceptual Schematic – 318 State Ave NE, Olympia Site, Olympia, WA FSID 3024394.

The document is not recorded with the Thurston County Auditor; however, it is agreed to in its entirety between the parties to this covenant and is on file with the Department of Ecology. The document is kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

Exhibit E
DEPARTMENT OF ECOLOGY
Toxics Cleanup Program

January 27, 2016

TO: Eugene Radcliff, LHG, TCP/SWRO

FROM: Jason Landskron, P.E., TCP/SWRO

SUBJECT: Engineering Review – Subslab Conceptual Schematic – 318 State Ave NE Olympia Site, Olympia, WA. FSID 3024394.

I have reviewed the subslab conceptual schematic memo[1] submitted by G-Logics, Inc. dated December 30, 2015. In their memo, G-Logics proposes subslab vapor intrusion mitigation controls into the construction of a new four-story residential structure located at 318 State Ave NE in Olympia, WA. These controls were initially evaluated in a Focused Feasibility Study[2] dated August 26, 2015 and are a part of the ongoing cleanup of the property.

An independent remedial action was completed at the property in 2009 in which approximately 6,800 cubic yards of soil contaminated with chlorinated solvents, benzene, polycyclic aromatic hydrocarbons, arsenic, and lead were excavated and transported to an approved facility. Conformation samples were collected post-excavation. All samples were less than the MTCA Method A and Method B soil cleanup levels for unrestricted land use in the southeast portion of the property where the new residential building will be constructed. Soil gas sampling was performed in April 2015 and elevated concentrations of tetrachloroethene, trichloroethene, vinyl chloride, and cis-1,2-dichloroethene were discovered prompting the need for a mitigation plan prior to the building construction.

G-Logics proposes the use of a subslab vapor barrier combined with a passive soil-vapor collection system to mitigate the potential indoor air exposure pathway for the proposed residential building. The passive soil gas collection system can easily be converted to an active system as needed to maintain indoor air quality due to vapor intrusion. **Based upon my review, the proposed subslab vapor barrier combined with the passive vapor mitigation system presented in G-Logics' memo, are both appropriate and will suffice in mitigating the potential for residual vapor phase contaminants from entering the new residential building.** Note that this review only pertains to the documentation provided or available from the product manufacture's website and does not make any recommendation as to the specific remediation approach or technologies. Further, this review does not constitute approval of the proposed alternatives for this construction project.

The proposed vapor barrier product, VaporBlock Plus 20 by Raven Industries, is a multilayer barrier constructed of polyethylene and ethylene vinyl alcohol resins. The barrier is highly resistant to weathering and degradation from the contaminants currently present on the property. If installed per the manufacturer's instructions, vapor permeance through the product has been ASTM tested to exceed $1.7x10^{-10}$ m^2/day*atm, a value greater than most commercial vapor barrier products (ASTM D 1434, methane).

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[1] G-Logics Inc. 2015. *Technical Assistance, Vapor-Mitigation Piping, Olympia Commons, 318 State Avenue NE, Olympia, WA.* December 30, 2015.
[2] GeoEngineers. 2015. *Focused Feasibility Study. Southeast Portion of the 318 State Avenue NE Property Olympia, Washington.* August 26, 2015.

The proposed passive subslab vapor collection system, provided to me as a preliminary or conceptual-design phase, consists of three sublab collection loops which roughly covers the footprint of the building. The loops are constructed of 4-inch perforated high density polyethylene pipes which will penetrate the concrete foot slab of the building as risers. These risers will manifold into a single pipe and discharge to the atmosphere 24 inches above the roofline and terminate at a wind turbine cap. The purpose of the collection system is to capture and remove any contaminated vapors within the sublab capillary break materials which could accumulate over time. If indoor air quality is impacted or contaminant vapor concentrations beneath the slab become excessive, the passive system can be converted to an active system by incorporating a regenerative blower between the piping manifold and discharge point. The blower would impose a negative pressure gradient under the building, depressurizing the capillary break and provide active vapor removal.

Additional comment are as follows:

- I recommend the PLP incorporate into their design and construction specifications the requirement for the placement of a non-woven geotextile directly under the vapor barrier. Installation of the geotextile is highly regarded as an industry standard during the installation of vapor barrier in new construction where contaminated vapors are a perceived risk. The purpose of the geotextile is precautionary as it provides a cushioning layer during the vapor barrier installation and subsequent concrete pour to help prevent against accidental rips and tears in the liner which may not be evident during inspection. The installation guidelines for the VaporBlock Plus product (attached, see Section 1.1) also recommend this approach. (see attached vapor system riser schematic markup)

- Similar to the previous recommendation, a non-woven geotextile should be installed below the capillary break material. This is an industry standard for subslab vapor mitigation systems and serves to protect the integrity of the capillary break material from being mixed with the finer-grained backfill/native soil underneath. Without this geotextile layer, fine grain particles will enter the capillary break aggregate and reduce the matrix porosity and thus the ability of vapors to move laterally throughout the subslab portion of the building foot print. The impact of the materials mixing will worsen over time. (see attached vapor system riser schematic markup)

- I recommend the installation of an additional air sample port on the discharge pipe of the passive system schematic post-manifold. (see attached vapor system riser schematic markup)

- The VaporBlock Plus 20 product must be installed in accordance with ASTM E 1643 and per the manufacturer's instructions/guidelines. All product seams and joints must overlap a minimum of 12 inches and sealed with the manufacturer's specified 2-sided Raven Butyl Tape and the overlap must be sealed with the specified VaporBond Plus Tape centered on the overlap seam. Any slab penetrations must also be sealed per these specifications.

- Discharging contaminated vapors to air may be subjected to review and permitting by the Olympic Region Clean Air Agency (ORCAA) per Chapter 70.94 RCW. I recommend

the PLP contact ORCAA to determine if a notice of intent or air discharge permit is required for this vapor mitigation system based on the elevated levels of contaminants observed in prior monitoring events and modeled discharged concentrations.

If you have any questions, please email me at jala461@ecy.wa.gov or call me at (360) 407-6388.

Attachments:
-VarporBlock Plus installation Guidelines
-Vapor System Riser Schematic (Ecology markup)

cc: Richelle Perez, TCP/SWRO

VaporBlock® Plus™

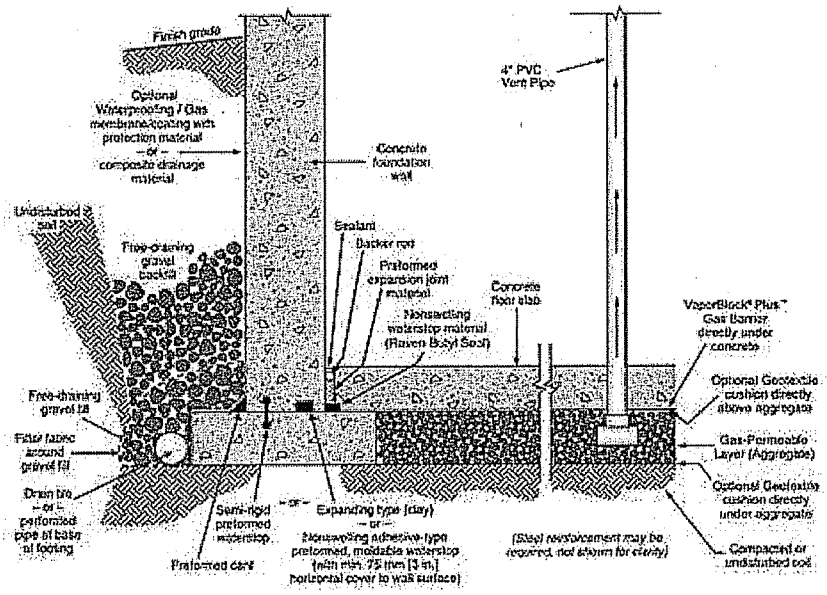
UNDERSLAB VAPOR RETARDER / GAS BARRIER

INSTALLATION GUIDELINES

Please Note: *Read these instructions thoroughly before installation to ensure proper use of* ***VaporBlock® Plus™****. ASTM E 1465, ASTM E 2121 and, ASTM E 1643 also provide valuable information regarding the installation of vapor / gas barriers. When installing this product, contractors shall conform to all applicable local, state and federal regulations and laws pertaining to residential and commercial building construction.*

- **When VaporBlock Plus gas barrier is used as part of an active control system for radon or other gas, a ventilation system will be required.**
- **If designed as a passive system, it is recommended to install a ventilation system that could be converted to an active system if needed.**

Materials List:
VaporBlock® Plus™ Vapor / Gas Barrier
VaporBond Plus 4" Foil Seaming Tape
Butyl Seal 2-Sided Tape
VaporBoot Plus Pipe Boots 12/Box (recommended)
VaporBoot Tape (optional)



Elements of a moisture/gas-resistant floor system. General illustration only.
(Note: This example shows multiple options for waterstop placement.

VAPORBLOCK® PLUS™ PLACEMENT

1.1. Level and tamp or roll granular base as specified. A base for a gas-reduction system may require a 4" to 6" gas permeable layer of clean coarse aggregate as specified by your architectural or structural drawings after installation of the recommended gas collection system. In this situation, a cushion layer consisting of a non-woven geotextile fabric placed directly under **VaporBlock® Plus™** will help protect the barrier from damage due to possible sharp coarse aggregate.

1.2. Unroll **VaporBlock Plus** running the longest dimension parallel with the direction of the pour and pull open all folds to full width. (Fig. 1)

1.3. Lap **VaporBlock Plus** over the footings and seal with Raven Butyl Seal tape at the footing-wall connection. Prime concrete surfaces and assure they are dry and clean prior to applying Raven Butyl Seal Tape. Apply even and firm pressure with a rubber roller. Overlap joints a minimum of 6" and seal overlap with Raven VaporBond Tape. When used as a gas

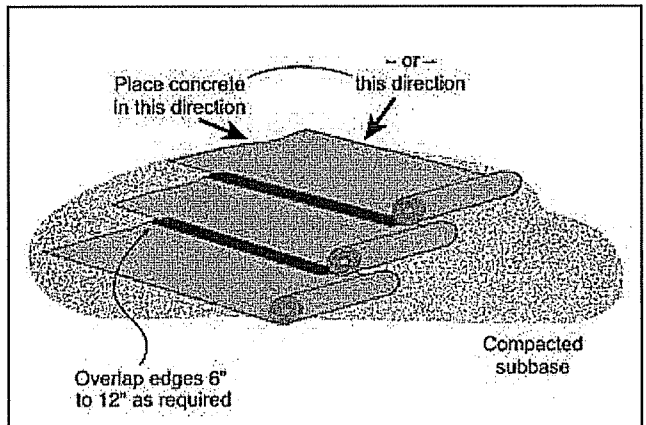


Fig. 1: VaporBlock Plus Overlaping Roll-out Method

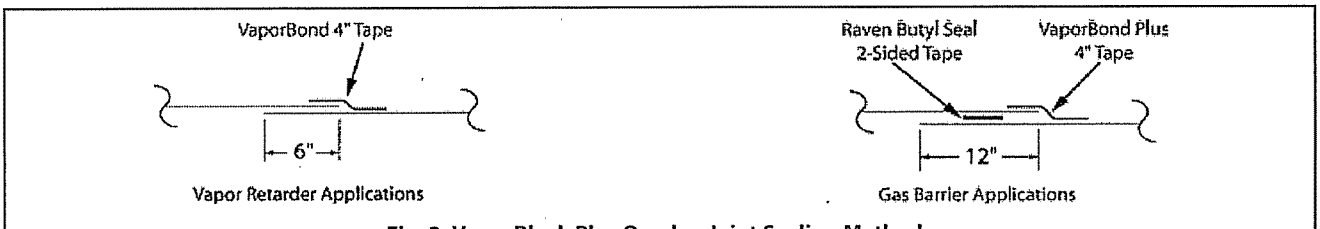


Fig. 2: VaporBlock Plus Overlap Joint Sealing Methods

SINGLE PENETRATION PIPE BOOT INSTALLATION

barrier, overlap joints a minimum of 12" and seal in-between overlap with 2-sided Raven Butyl Seal Tape. Then seal with VaporBond Plus Tape centered on the overlap seam. (Fig. 2)

1.4. Seal around all plumbing, conduit, support columns or other penetrations that come through the **VaporBlock Plus** membrane. Pipes four inches or smaller can be sealed with Raven VaporBoot Plus preformed pipe boots. VaporBoot Plus preformed pipe boots are formed in steps for 1", 2", 3" and 4" PVC pipe or IPS size and are sold in units of 12 per box (Fig. 3 & 5).

Pipe boots may also be fabricated from excess **VaporBlock Plus** membrane (Fig. 4 & 6) and sealed with VaporBoot Tape or VaporBond Plus Tape (sold separately).

Reminder Note: All holes or penetrations through the membrane will need a patch cut to a minimum of 12" from the opening in all directions.

To fabricate pipe boots from **VaporBlock Plus** excess material (see Fig. 4 & 6 for A-F):

A) Cut a square large enough to overlap 12" in all directions.

B) Mark where to cut opening on the center of the square and cut four to eight slices about 3/8" less than the diameter of the pipe.

C) Force the square over the pipe leaving the tightly stretched cut area around the bottom of the pipe with approximately a 1/2" of the boot material running vertically up the pipe. *(no more than a 1/2" of stretched boot material is recommended)*

D) Once boot is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in between the two layers. Secure boot down firmly over the membrane taking care not to have any large folds or creases.

E) Use VaporBoot Tape or VaporBond Plus Tape to secure the boot to the pipe.

VaporBoot Tape (option) – fold tape in half lengthwise, remove half of the release liner and wrap around the pipe allowing 1" extra for overlap sealing. Peel off the second half of the release liner and work the tape outward gradually forming a complete seal.

VaporBond Plus Tape (option) - Tape completely around pipe overlapping the to get a tight seal against the pipe.

F) Complete the process by taping over the boot perimeter edge with VaporBond Plus Tape to create a monolithic membrane between the surface of the slab and gas/ moisture sources below and at the slab perimeter. (Fig. 4 & 6)

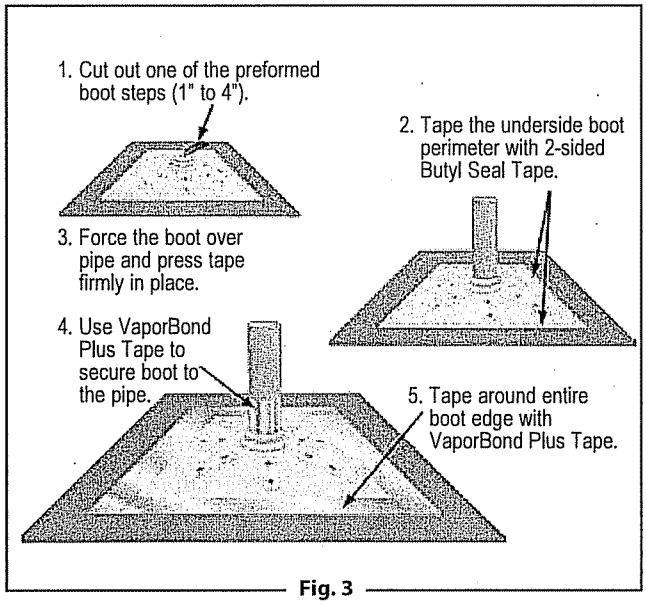


Fig. 3

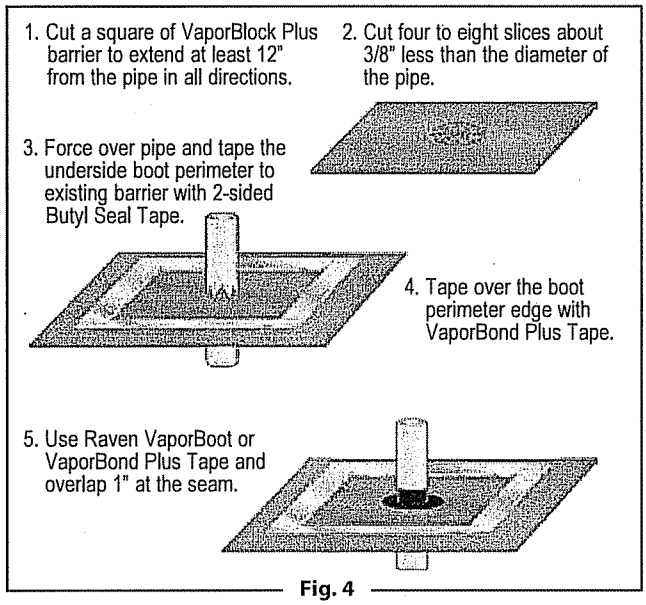


Fig. 4

Original figure #4 diagram is reprinted with permission by the Portland Cement Association.
Reference: Kanare, Howard M., Concrete Floors and Moisture, EB119, Portland Cement Association, Skokie, Illinois, and National Ready Mixed Concrete Association, Silver Spring, Maryland, USA, 2008, 176 pages.

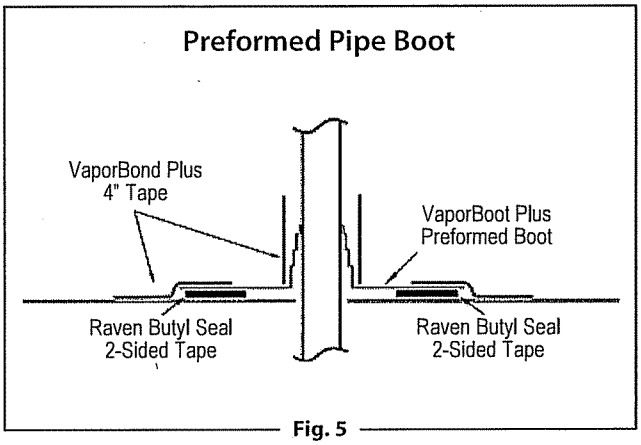


Fig. 5

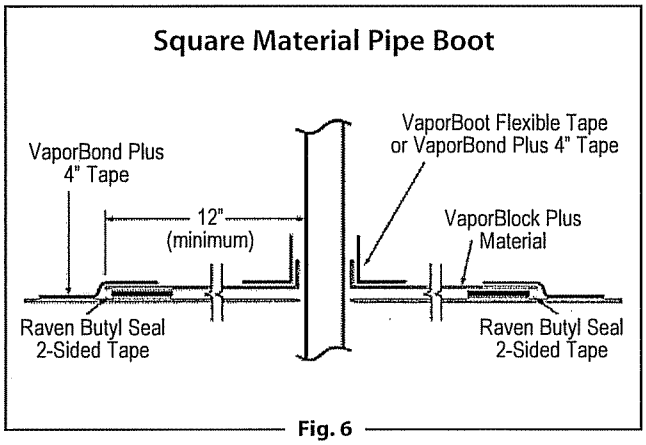


Fig. 6

MULTIPLE PENETRATION PIPE BOOT INSTALLATION

1.5. For side-by-side multiple penetrations;

A) Cut a patch large enough to overlap 12" in all directions (Fig. 7) of penetrations.

B) Mark where to cut openings and cut four to eight slices about 3/8" less than the diameter of the penetration for each.

C) Slide patch material over penetration to achieve a tight fit.

D) Once patch is positioned, seal the perimeter to the membrane by applying 2-sided Raven Butyl Seal Tape in-between the two layers. (Fig. 8)

E) After applying Raven Butyl Seal Tape between the patch and membrane, tape around each of the penetrations and the patch with VaporBond Plus 4" foil tape. (Fig. 9) For additional protection apply an acceptable polyurethane elastomeric sealant around the penetrations. (Fig. 10)

1.6. Holes or openings through **VaporBlock Plus** are to be repaired by cutting a piece of **VaporBlock Plus** 12" larger in all directions from the opening. Seal the patch to the barrier with 2-sided Raven Butyl Seal Tape and seal the edges of the patch with VaporBond Plus Tape.

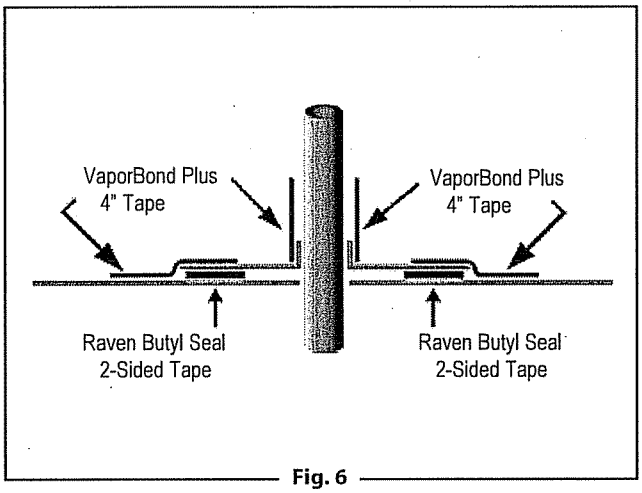


Fig. 6

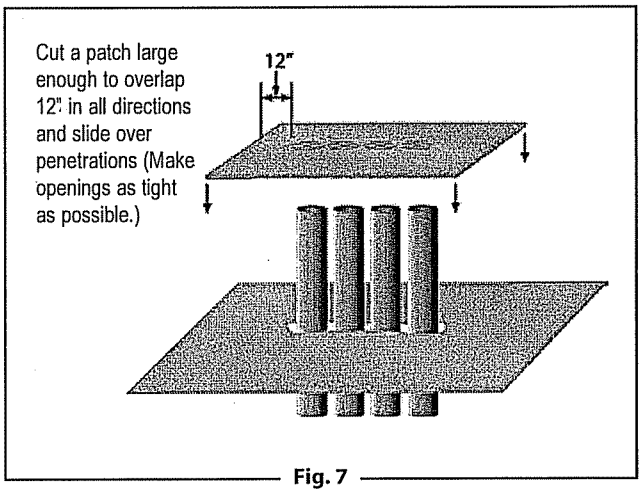


Fig. 7

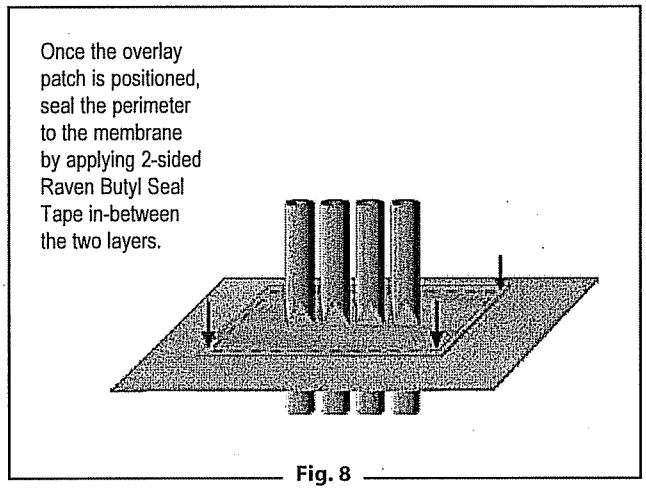


Fig. 8

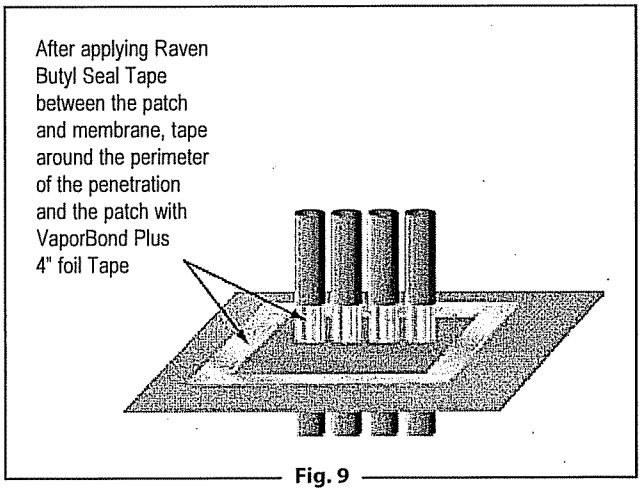


Fig. 9

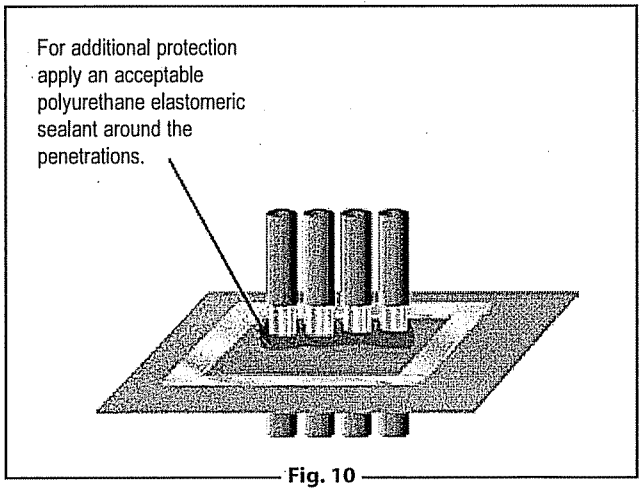


Fig. 10

VAPORBLOCK® PLUS™ PROTECTION

2.1. When installing reinforcing steel and utilities, in addition to the placement of concrete, take precaution to protect **VaporBlock Plus**. Carelessness during installation can damage the most puncture–resistant membrane. Sheets of plywood cushioned with geotextile fabric temporarily placed on **VaporBlock Plus** provide for additional protection in high traffic areas including concrete buggies.

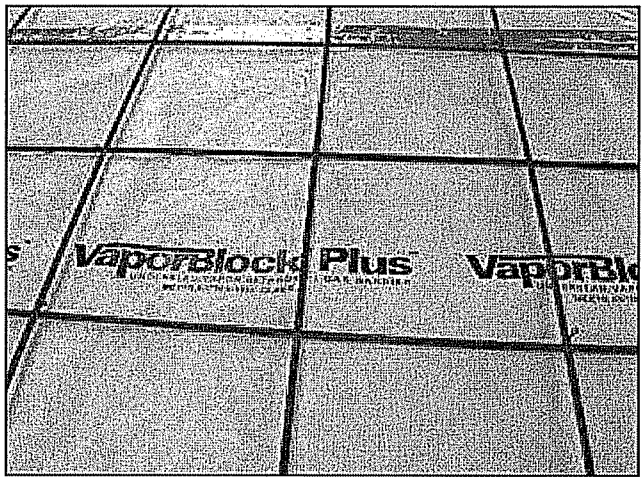
2.2. Use only brick-type or chair-type reinforcing bar supports to protect **VaporBlock Plus** from puncture.

2.3. Avoid driving stakes through **VaporBlock Plus**. If this cannot be avoided, each individual hole must be repaired per section 1.6.

2.4. If a cushion or blotter layer is required in the design between **VaporBlock Plus** and the slab, additional care should be given if sharp crushed rock is used. Washed rock will provide less chance of damage during placement. Care must be taken to protect blotter layer from precipitation before concrete is placed.

VaporBlock® Plus™ Gas & Moisture Barrier can be identified on site as gold/white in color printed in black ink with the following logo and classification listing:

VaporBlock® Plus™
UNDERSLAB VAPOR RETARDER / GAS BARRIER
MEETS ASTM E-1745 CLASS A



VaporBlock® Plus™
Gas & Moisture Barrier

ISO 9001:2008
CERTIFIED MANAGEMENT SYSTEM

Note: To the best of our knowledge, these are typical installation procedures and are intended as guidelines only. Architectural or structural drawings must be reviewed and followed as well as on a project basis. NO WARRANTIES ARE MADE AS TO THE FITNESS FOR A SPECIFIC USE OR MERCHANTABILITY OF PRODUCTS OR GUIDELINES REFERRED TO, no guarantee of satisfactory results from reliance upon contained information or recommendations and we disclaim all liability for resulting loss or damage.

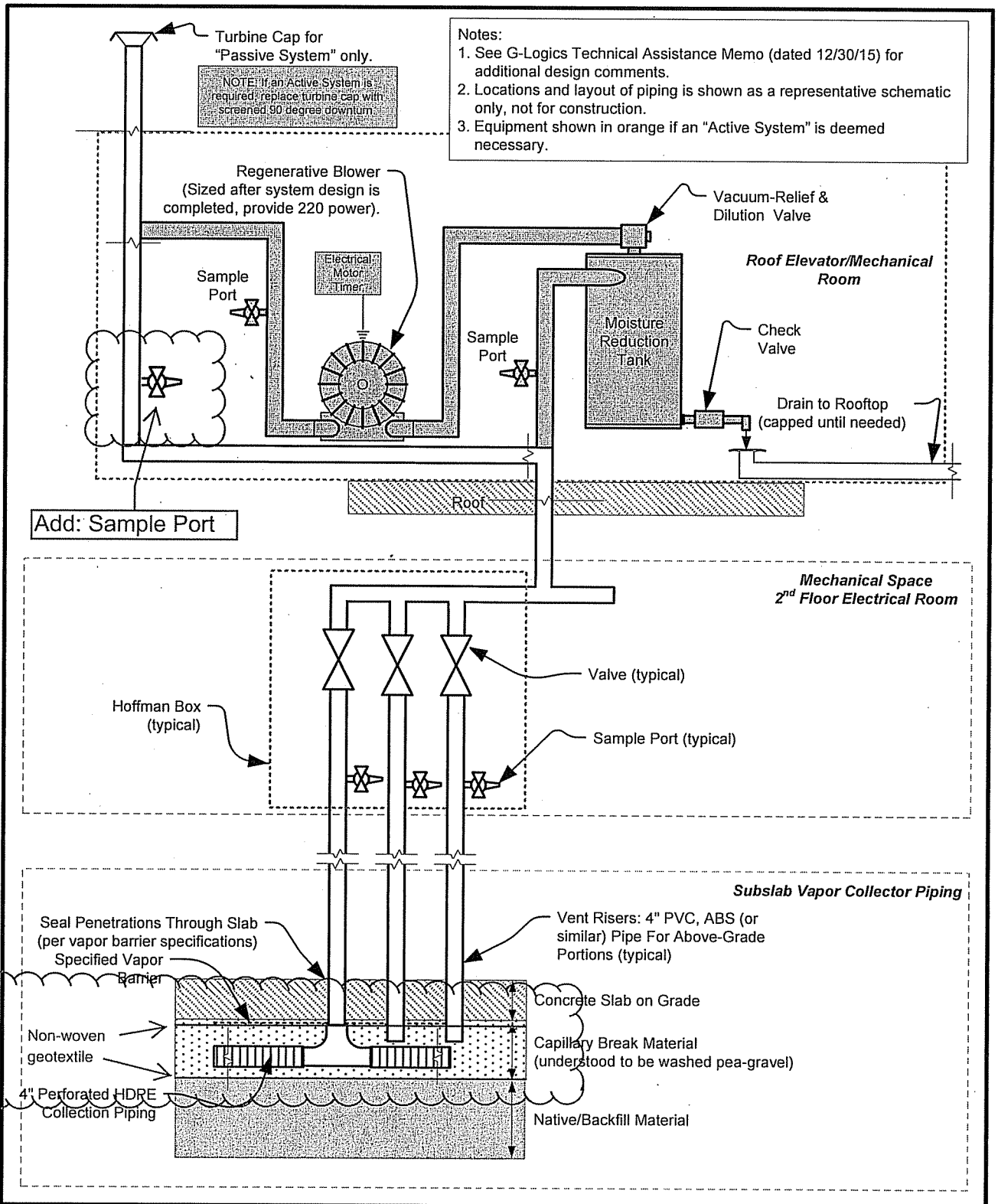
RAVEN INDUSTRIES
Engineered Films Division
P.O. Box 5107
Sioux Falls, SD 57117-5107
Ph: (605) 335-0174 • Fx: (605) 331-0333
Toll Free: 800-635-3456
Email: efdsales@ravenind.com
www.VaporBlockPlus.com

8/13 EFD 1127

Exhibit F

G-Logics will inspect the perforated piping system and JRS will inspect the vapor barrier during and after installation and before concrete placement.

Perforated piping system will be installed as per attached letter from the Department of Ecology dated 1/27/2016, (see Exhibit E).



Project File: 01-1050-A-FB Riser Schematic.vsd

g-logics

Vapor System Riser Schematic

LIHI, Olympia Commons

Olympia, Washington

Figure B

Exhibit G
Groundwater Monitoring Plan
GeoEngineers
October 1, 2015

Exhibit G is the Groundwater Monitoring Plan for the Southeast Portion of the 318 State NE Avenue Property dated October 1, 2015 and submitted to Department of Ecology by GeoEngineers on behalf of the City of Olympia.

The document is not recorded with the Thurston County Auditor; however, it is agreed to in its entirety between the parties as an Exhibit to this covenant and is on file with the Department of Ecology. The document is kept in the Central Files of the Southwest Regional Office of Ecology (SWRO) for review by appointment only. You can make an appointment by calling the SWRO resource contact at (360) 407-6365.

Exhibit G

Groundwater Monitoring Plan

Southeast Portion of the
318 State NE Avenue Property
Olympia, Washington

for
City of Olympia

October 1, 2015

GeoEngineers
Earth Science + Technology

Groundwater Monitoring Plan

Southeast Portion of the
318 State NE Avenue Property
Olympia, Washington

for
City of Olympia

October 1, 2015

GeoEngineers

1101 South Fawcett Avenue, Suite 200
Tacoma, Washington 98402
253.383.4940

Groundwater Monitoring Plan

Southeast Portion of the 318 State Avenue NE Property Olympia, Washington

File No. 0415-049-07

October 1, 2010

Prepared for:

City of Olympia
P.O. Box 1967
Olympia, Washington 98507-1967

Attention: Danelle MacEwen

Prepared by:

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1.0 INTRODUCTION

This report presents the Groundwater Monitoring Plan for groundwater from the southeast portion of the 318 State Avenue NE property located in Olympia, Washington. The 318 State Avenue NE property is an approximately 1.1-acre property owned by the City of Olympia (City). The City is planning to sell the approximately 0.4 acre southeast portion of the 318 State Avenue NE property to the Low Income Housing Institute (LIHI) for redevelopment. This Groundwater Monitoring Plan has been prepared to meet one of the Washington State Department of Ecology's (Ecology's) requirements to establish an Environmental Covenant and obtain a No Further Action (NFA) letter for the southeast portion of the property to support the redevelopment. A vicinity map for the property is presented on Figure 1 and the 318 State Avenue NE property and southeast portion of the property proposed for redevelopment are shown on Figure 2.

This Groundwater Monitoring Plan describes the methodology and procedures for performing groundwater monitoring to assess compliance with Model Toxic Control Act (MTCA) cleanup and screening levels for groundwater from the southeast portion of the 318 State Avenue NE property. This Groundwater Monitoring Plan specifically describes the procedures for sampling and analysis of groundwater to monitor the concentrations of chlorinated organic solvents and associated degradation products present in groundwater from southeast portion and the methodology for identifying the schedule of sampling and analysis to be performed based on the results of the groundwater monitoring.

The following sections, Section 2.0, describes the southeast portion of the 318 State Avenue NE property and Section 3.0 provides background on remedial actions for soil as well as groundwater monitoring performed after remedial actions were completed. The methodology and procedures for groundwater monitoring including sampling and analysis are presented in Section 4.0. A description of the methodology for identifying the monitoring schedule and for reporting are provided in Sections 5.0 and 6.0, respectively. Tables presenting the results of previous analyses of samples collected from the 318 State Avenue NE property are presented in Appendix A. The boring/well log for the monitoring well to be used to monitor groundwater from the southeast portion of the property is provided in Appendix B. A Quality Assurance Project Plan (QAPP) is included as Appendix C and a Health and Safety Plan (HASP) for groundwater monitoring is included as Appendix D.

2.0 PROPERTY LOCATION AND DESCRIPTION

The 318 State Avenue NE property is approximately 1.1 acres in size and is located within the City of Olympia, Thurston County, Washington (Figure 1). The 318 State Avenue NE property is bounded on the south by State Avenue NE, on the east by Adams Street NE, on the west by Franklin Street NE and on the north by commercial buildings that are bounded by Olympia Avenue NE (Figure 2). The southeast portion of the property is approximately 0.4 acres in size and is bounded by State Avenue NE, Adams Street NE and the 318 State Avenue NE property. Approximate limits of the southeast portion of the property planned for redevelopment are identified on Figure 2. The southeast portion of the property was made into a separate parcel in March 2015 and has the tax parcel number of 78503200500.

The property is relatively flat, with ground surface elevations ranging from approximately Elevation 11 to Elevation 12 feet National Geodetic Vertical Datum (NGVD). The western half of the 318 State Avenue NE property is paved with asphalt and the eastern half, including the majority of the southeast portion of the property that is planned for redevelopment, is exposed soil and gravel.

3.0 PROPERTY BACKGROUND

3.1. Property History

The history of the 318 State Avenue NE property is described in the RI Report (GeoEngineers, 2009) and summarized in this section.

The property was undeveloped until at least 1888. The western portion of the property was part of the shoreline of Budd Inlet and the eastern portion of the property was part of the submerged marine or intertidal area of Budd Inlet. Filling of the property and surrounding area with material dredged from the Port of Olympia area began in the late 1800s. After the initial filling of the property, various property users occupied the eastern half of the property, including Olympia Foundry and Machinery Company, Pioneer Iron Works and Capital City Iron Works.

The property was purchased by the State of Washington Highway Commission (the precursor to the Washington State Department of Transportation or WSDOT) in March 1923, for use as a soils testing and materials laboratory. Various automotive/truck sheds, machine/automotive shops and a materials testing laboratory were located throughout the property.

A fire burned and damaged buildings and equipment at the property in 1936. The WSDOT facility was rebuilt and the automotive/truck sheds were replaced with a smaller automotive service facility and an office and testing laboratory. In 1968, the automotive facility structures and operations were removed and the office and testing laboratory building was renovated to accommodate a traffic data collections and analysis office. This office was demolished and removed from the property in 2007.

The City purchased the 318 State Avenue NE property in 2008 in support of their general plans to revitalize downtown Olympia and support use of the public transportation originating at the Olympia Transit Center located on the block to the west of the property. The City is currently planning to sell the southeastern portion of the property to the LIHI for redevelopment. The LIHI is planning to construct a multistory, low income residential housing structure. Redevelopment for the remaining portions of the property is currently not planned, but as identified in the RI Report, it may include mixed use residential and commercial and/or a parking garage.

3.2. Prior Remedial Action for Soil

The City completed an independent remedial action for soil at the property between September and October 2009. The remedial action was completed based on the findings of investigations completed by WSDOT and the City at the property between 2005 and 2009 (GeoEngineers, 2009).

The remedial action consisted of removal and permitted off-site disposal of soil containing chlorinated solvents, benzene, carcinogenic polycyclic aromatic hydrocarbons (cPAHs), arsenic, and lead at concentrations greater than MTCA soil cleanup levels. Approximately 6,800 cubic yards of contaminated soil were excavated from two areas (Contaminated Soil Zone [CSZ] 1 and CSZ 2) at the property. The approximate locations of CSZ 1 and CSZ 2 are shown on Figure 2.

The remedial excavation at CSZ 1 measured approximately 140 feet long by 135 feet wide and ranged in depth from approximately 5.5 to 11.5 feet deep. The majority of the CSZ 1 excavation was located within the southeastern portion of the property that is planned for redevelopment. The remedial excavation at

CSZ 2 measured approximately 25 feet long by 25 feet wide by 4 feet deep and was located in the northwestern portion of the 318 State Avenue NE property.

Contaminated soil removed from CSZ 1 and CSZ 2 was transported off site for disposal at a Subtitle D landfill. Chemical concentrations in confirmation soil samples collected at the limits of the excavation were below the MTCA soil cleanup levels. The remedial excavations were backfilled with clean import materials. Additional details of the remedial action are presented in the Remedial Action Construction Report (GeoEngineers, 2010a).

3.3. Groundwater Compliance Monitoring

3.3.1 Post-Remedial Action Groundwater Compliance Monitoring

Groundwater monitoring has been performed at the 318 State Avenue NE property in accordance with a Groundwater Compliance Monitoring Plan (GeoEngineers 2010b) since the completion of the remedial action for soil in 2009 to evaluate the concentrations and natural attenuation of chlorinated solvents. Two years of quarterly groundwater monitoring activities were completed between May 2010 and February 2012 and semi-annual groundwater monitoring activities have been performed at the property since August 2012. The results of groundwater compliance monitoring performed in February 2015, which includes a tabulated summary of all of the groundwater compliance monitoring results for the property, is provided in Table A-1 of Appendix A. Groundwater monitoring analysis is being completed for chlorinated solvents including tetrachloroethene (PCE) and trichloroethene (TCE) and associated degradation products including 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride (VC). The cleanup levels identified in the RI Report (GeoEngineers, 2009) are used for comparison to concentrations presented in Table A-1 provided in Appendix A and is the basis for the following description of groundwater compliance monitoring results.

Groundwater compliance monitoring performed between May 2010 and August 2013 included collection and analysis of groundwater from monitoring well MW-17 located within the southeast portion of the property (Figure 2). Sampling and analysis of groundwater from MW-17 was performed during 12 monitoring events. Chlorinated compounds were either not detected or were detected at concentrations less than groundwater cleanup levels during all 12 events. No chlorinated solvents or degradation products were detected in the groundwater samples collected from MW-17 during the last two monitoring events (Table A-1). Groundwater compliance monitoring at MW-17 was discontinued based on the results.

Groundwater compliance monitoring performed between May 2010 and February 2011 included collection and analysis of groundwater from well MW-04 located on the southeast boundary of the property, well MW–13 located south of the property and well MW-09 located east of the property (Figure 2). Sampling and analysis of groundwater from MW-04, MW-13 and MW-09 was performed during four monitoring events. Chlorinated compounds were either not detected or were detected at concentrations less than groundwater cleanup levels during all four events. Groundwater compliance monitoring at MW-04, MW-13 and MW-09 was discontinued based on the results (Table A-1).

Groundwater compliance monitoring performed between May 2010 and August 2013 also included collection and analysis of groundwater from monitoring well MW-08 located within the northeast portion of the property (Figure 2). Sampling and analysis of groundwater from MW-08 was performed during 12 monitoring events. Only VC was detected in the samples collected from MW-08. The concentration of VC initially exceeded the cleanup level but decreased to a concentration below cleanup level. VC was either

not detected or detected at a concentration less than the cleanup level during five consecutive monitoring events (Table A-1). Groundwater compliance monitoring at MW-08 was discontinued based on the results.

Groundwater compliance monitoring between May 2010 and February 2015 has included collection and analysis of groundwater from three wells (i.e., MW-03, MW-16 and MW-18) located on the northern portion of the 318 State Avenue NE property adjacent to CSZ 1 (Figure 2) and the area to be redeveloped (i.e., southeast portion of the property). Sampling and analysis of groundwater from MW-03, MW-16 and MW-18 was performed during 14 monitoring events. VC has been detected at concentrations greater than the MTCA groundwater cleanup level in MW-03, MW-16 and MW-18. All other chlorinated compounds and degradation products were either not detected or were detected at concentrations less than groundwater cleanup levels during all 14 events (Table A-1).

3.3.2 Temporary Groundwater Monitoring on Southeast Portion of Property

In April 2015, a temporary monitoring well (i.e., TW-1) was installed and sampled at the request of Ecology to support evaluation of groundwater on the northern portion of the area to be redeveloped (Figure 2). Temporary monitoring well TW-1 was located adjacent to monitoring wells MW-03, MW-16 and MW-18. The groundwater sample from TW-1 was analyzed for chlorinated solvents and associated degradation products. The results of the groundwater sample obtained from TW-1 are presented in the Supplemental Site Investigation Report (GeoEngineers, 2015).

VC was the only chlorinated compound detected in the groundwater sample collected from temporary monitoring well TW-1 (Table A-2 in Appendix A). Chlorinated degradation compounds of PCE and TCE include DCE and VC where DCE is the initial and VC is the final chlorinated degradation compound in the degradation chain. Because only VC contamination was observed in TW-1, the results are indicative that the source of contamination at TW-1 is groundwater migration from areas with residual concentrations of PCE, TCE and DCE such as monitoring well MW-03.

The results for groundwater from TW-1 were compared to MTCA groundwater cleanup levels protective of the highest beneficial use for groundwater. Ecology does not consider groundwater at the property as a likely potable water source (Ecology, 2015). Therefore, the highest beneficial use for groundwater is as marine surface water. The results were also compared to the MTCA Method B groundwater screening level protective of soil vapor intrusion provided in Ecology's Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State (Ecology, 2009) as updated in April 2015 to revise the soil gas screening levels provided in Appendix B of the guidance document (Ecology, 2015). The cleanup and screening levels are presented in Table A-2 in Appendix A.

The detected concentration of VC was greater than the groundwater cleanup level based on protection of surface water. The detected concentration of VC was also greater than the groundwater screening level based on protection of indoor air (Table A-2).

3.3.2 Monitoring of Groundwater from the Southeast Portion of Property

In July 2015, a permanent monitoring well (i.e., MW-19) was installed and sampled to meet one of Ecology's requirements to establish an Environmental Covenant and obtain an NFA letter for the southeast portion of the property to support the redevelopment (Figure 2). Monitoring well MW-19 was located adjacent to northern boundary of the southeast portion of the property (i.e., within 5 feet north of the boundary) to characterize groundwater from the southeast portion of the property. Groundwater gradients measured

during groundwater monitoring performed at the 318 State Avenue property indicate that groundwater generally flows north-northwest through north-northeast. Therefore, MW-19 is located immediately downgradient of the southeast portion of the property.

Monitoring well MW-19 was constructed by a licensed drilling contractor in accordance with Washington Administrative Code (WAC) 173-160, Minimum Standards for Construction and Maintenance of Wells. Upon completion of the soil boring, and prior to well installation, the water level within the boring was measured to help select an appropriate well design. The well screen was placed across the water table (i.e., across the interface between the saturated and unsaturated zones) similar to all other monitoring wells installed on the property to allow for monitoring of seasonally influenced water level fluctuations. The boring log for MW-19 is provided in Appendix B. Following completion of the monitoring well, the well was sufficiently developed prior to conducting groundwater monitoring activities.

Low-flow/low-turbidity sampling techniques were used to collect the sample from MW-19 to minimize the suspension of sediment in the groundwater sample. Measurements of electrical conductivity, dissolved oxygen, pH, salinity, total dissolved solids, turbidity, oxidation-reduction potential and temperature were collected using water quality instruments prior to sample collection. Groundwater samples for laboratory analysis were collected once water quality parameters had stabilized. Ferrous iron was measured in the field using a field test kit provided by the analytical laboratory. Groundwater samples for laboratory analysis were collected in laboratory-prepared containers, placed into a cooler with ice and logged on the chain-of-custody in accordance with quality assurance procedures. The groundwater sample from MW-19 was submitted to Test America Laboratory in Fife, Washington and was analyzed for chlorinated solvents and associated degradation products and sulfate. Ferrous iron was measured in the field using a field test kit provided by the analytical laboratory. The results for chlorinated compounds from analysis of the groundwater sample obtained from MW-19 are presented in Table 1. The results for water quality and geochemical parameters are presented in Table 2.

TCE and VC were the only chlorinated compounds detected in the groundwater sample collected from monitoring well MW-19 (Table 1). The results for groundwater from MW-19 are compared to MTCA groundwater cleanup levels protective of the highest beneficial use for groundwater as marine surface water and are also compared to the MTCA Method B groundwater screening level protective of soil vapor intrusion provided in Ecology's Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State (Ecology, 2009) as updated in April 2015 (Ecology, 2015). The detected concentration of TCE was less than the cleanup level for protection of marine surface water and the screening level for soil vapor intrusion. The detected concentration of VC was also less than groundwater cleanup level based on protection of surface water. The detected concentration of VC was greater than groundwater screening level soil vapor intrusion (Table 1).

4.0 GROUNDWATER MONITORING APPROACH

4.1. Introduction

Monitoring will be performed to characterize groundwater from the southeast portion of the property. Groundwater monitoring will include the following:

- Groundwater sampling at monitoring well location MW-19.

- Analysis for chlorinated solvents and associated degradation products.
- Monitoring water quality parameters including pH, conductivity, total dissolved solids, turbidity, and temperature.
- Monitoring and analysis of geochemical parameters including redox potential, dissolved oxygen, sulfate and iron.

The following sections provide a description of the components of groundwater monitoring for groundwater from the southeast portion of the property.

4.2. Groundwater Monitoring Location

The groundwater compliance monitoring location, MW-19, was selected based on the following:

- Location relative to the area to be redeveloped;
- Information concerning groundwater gradients; and
- The results of previous groundwater sampling and analysis at the 318 State Avenue NE property and southeast portion of the property.

The groundwater compliance monitoring location is shown on Figure 2.

Monitoring well MW-19 is located north and downgradient of southeast portion of the property. Groundwater gradients measured during groundwater monitoring performed at the 318 State Avenue NE property indicate that groundwater flows generally north-northwest through north-northeast.

Chlorinated solvents and degradation products have not been detected at concentrations greater than cleanup levels in groundwater from monitoring wells MW-13, MW-04 and MW-17 located upgradient of MW-19. However, VC was detected at a concentration greater than the MTCA cleanup level for protection of marine surface water and screening level for groundwater protective of soil vapor pathway in temporary monitoring well TW-1 located upgradient of MW-19 (Table A-2). Additionally, VC has been detected at concentrations greater than the MTCA cleanup levels in groundwater from monitoring wells MW-03, MW-16 and MW-18 during previous sampling events (Table A-1).

4.3. Monitoring Well Sampling and Analysis

The water level will be measured in MW-19 at the beginning of each groundwater monitoring event. The groundwater level will be measured to the nearest 0.01 foot using an electric water level indicator. The water level will be measured relative to the top of the north side of the casing rim.

Groundwater samples will be obtained using low-flow/low-turbidity sampling techniques to minimize the suspension of sediment in the samples. Groundwater samples will be obtained from MW-19 using a dedicated submersible pump and disposable polyethylene tubing. Groundwater will be pumped at an approximate 0.5 liter per minute rate.

A water quality measuring system with a flow-through cell will be used to monitor the following parameters during purging: conductivity, dissolved oxygen, pH, salinity, total dissolved solids, oxidation-reduction potential and temperature. A Hach turbidimeter and a Hach field test kit will be used to measure turbidity and ferrous iron, respectively. It will be assumed that ambient groundwater conditions will have been

reached once the parameters measured by the water quality monitoring instruments vary by less than 10 percent on three consecutive measurements. The stabilized field measurements will be documented on field forms. If all field parameters do not stabilize after five well volumes of water have been removed, samples will be collected.

Following well purging, the flow through cell will be disconnected and groundwater samples will be collected in laboratory-prepared containers. Samples will be labeled, placed into a cooler with ice and logged on the chain-of-custody. Sample handling procedures including labeling, container and preservation requirements and holding times as well as decontamination procedures are described in the QAPP provided in Appendix C.

The laboratory analyses that will be performed on groundwater samples will include the following:

- Chlorinated solvents and associated degradation products including PCE, TCE, 1,1-DCE, Cis-DCE, Trans-DCE and VC by Environmental Protection Agency (EPA) Method 8260; and
- Sulfate by EPA Method 300.0.

Analyses will be performed by TestAmerica Laboratory in Fife, Washington.

Purge water removed from the monitoring well and decontamination water generated during all sampling activities will be stored in labeled and sealed 55-gallon drums. The drums will be temporarily stored at a secure location pending receipt of analytical results and off-site disposal at a permitted facility.

Incidental waste generated during sampling activities includes items such as gloves, paper towels and similar expended and discarded field supplies. These materials are considered *de minimis* and will be disposed of in a local trash receptacle or county disposal facility.

5.0 SCHEDULE OF GROUNDWATER MONITORING

Monitoring of groundwater from the southeast portion of the property will initially be performed quarterly for one year. Monitoring location MW-19 was installed and the initial round of quarterly monitoring was performed at MW-19 in July 2015 as described in Section 3.3.2. Three additional quarters of groundwater monitoring will be performed in October 2015 and January and April 2016. The monitoring data for groundwater from the southeast portion of the property will be reviewed to evaluate the following:

- The concentrations of chlorinated solvents and degradation products in comparison to the MTCA cleanup levels for protection of marine surface water and the groundwater screening levels protective of soil vapor intrusion;
- The seasonality of chlorinated solvent and/or degradation product concentrations; and
- The temporal concentration trends.

The monitoring schedule will then be evaluated and selected based on the results of the quarterly and subsequent monitoring events. The monitoring schedule that is selected will be one of the following:

- Quarterly monitoring;

- Semi-annual monitoring; or
- Annual monitoring.

Considerations taken into account in selecting the monitoring schedule will include the following:

- Concentrations in comparison to cleanup and screening levels.
- Number of monitoring events with the concentrations less than the cleanup and screening levels.
- Identification of the seasonality of chlorinated solvents and/or degradation products.
- Identification of a temporal trends in chlorinated solvents and/or degradation products.

Note that monitoring will be discontinued if the chlorinated compound and degradation product concentrations are less than the cleanup and screening levels for four consecutive monitoring events.

Selection of the monitoring schedule will documented in the reports prepared to present the results of monitoring.

6.0 REPORTING

The results of groundwater monitoring activities will be presented in groundwater monitoring reports. Initially, a Groundwater Monitoring Report will be prepared upon completion of the initial four quarters of groundwater monitoring. Subsequent monitoring reports will be prepared at milestones identified over the course of the groundwater monitoring. Milestones may include the following:

- Results indicating that a change in the monitoring schedule is warranted.
- Completion of a specified monitoring period (i.e., Ecology five year review period, etc.).
- Results indicating that groundwater concentrations are consistently less than cleanup and screening levels.

A data summary will be prepared for monitoring periods during which a monitoring report is not prepared. The data summary will be prepared upon completion of the groundwater monitoring event that will include the following:

- Date of groundwater monitoring activities and any notable observations or findings;
- Tabulated summary of the draft chemical analytical results for chlorinated solvents and degradation products and a comparison to the cleanup and screening levels; and
- Tabulated summary of the water quality and geochemical parameters.

The data summaries will be sent to Ecology by email within 30 days from receipt of the final laboratory data.

The groundwater monitoring reports will include the information provided in the data summaries for each of the monitoring events performed since the last report was prepared and will also include the following:

- Discussion of the results for all of the monitoring events that occurred since the last report was prepared;
- The laboratory analytical reports;
- A data quality review of the laboratory analytical results for the monitoring events that occurred since the last report was prepared; and
- Any conclusions and recommendations concerning groundwater monitoring of chlorinated solvents and degradation products and compliance with cleanup and screening levels for groundwater from the southeast portion of the property.

The groundwater monitoring reports will be submitted to Ecology within 30 days of completing the analytical data quality review including the data from the last monitoring event to be included in the groundwater monitoring report.

7.0 REFERENCES

GeoEngineers, 2009, "Final Draft Remedial Investigation, 318 State Avenue NE, Olympia Washington," February 19, 2009.

GeoEngineers, 2010a, "Remedial Action Construction Report, 318 State Avenue NE, Olympia Washington," January 5, 2010.

GeoEngineers, 2010b, "Groundwater Compliance Monitoring Plan, 318 State Avenue NE, Olympia Washington," April 16, 2010.

GeoEngineers, 2015, "Supplemental Site Investigation Report – Soil Gas and Temporary Monitoring Well Sampling and Analysis, 318 State Avenue NE Property, Olympia, Washington," For the City of Olympia, GeoEngineers File No. 0415-049-06, July 25, 2015.

Washington State Department of Ecology, 2015, Amendment Appendix B, Table B-1, Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action, Toxics Cleanup Program, April 6, 2015.

TABLE 1

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR MW-19

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

			Volatile Organic Compounds					
		Analyte	**Tetrachloroethene (PCE)**	**Trichloroethene (TCE)**	**1,1-Dichloroethene (1,1-DCE)**	**Cis-1,2-Dichloroethene (cis 1,2-DCE)**	**Trans-1,2-Dichloroethene (trans 1,2-DCE)**	**Vinyl Chloride (VC)**
		Unit	**(µg/l)**	**(µg/l)**	**(µg/l)**	**(µg/l)**	**(µg/l)**	**(µg/l)**
		MTCA Groundwater Cleanup Levels[1]	8.85	7	3.2	NE	4,000	1.6
		Groundwater Screening Level for Soil Vapor Intrusion[2]	22.9	1.55	130	NE	NE	0.347
Location	**Sample ID**	**Sample Date**						
MW-19	MW19-150723-W	07/23/15	0.50 U	0.47	0.10 U	0.20 U	0.20 U	0.89

Notes:

[1]MTCA groundwater cleanup levels based on the highest beneficial use of groundwater as marine surface water. The cleanup levels provided are the lowest of the available marine surface water criteria including MTCA Method B surface water (Chapter 173-340 WAC). Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC), National Recommended Water Quality Criteria (Clean Water Act Section 304) and National Toxics Rule (40 CFR 131).

[2]Groundwater Screening Level based on Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation on Remedial Action (Ecology, 2009) as updated in 2015 (Ecology, 2015) to revise screening levels in Appendix B.

MTCA = Model Toxics Control Act

NE = Not Established

µg/l = microgram per liter

U = The analyte was not detected at a concentration greater than the identified reporting limit

Bold indicates analyte was detected

Gray shading indicates concentration is greater than the cleanup/screening level.

TABLE 2

SUMMARY OF GROUNDWATER QUALITY AND GEOCHEMICAL PARAMETERS FOR MW-19

318 STATE AVENUE NE
OLYMPIA, WASHINGTON

Location ID	Sample Date	Ferrous Iron (mg/l)	Sulfate (mg/l)	Dissolved Oxygen (mg/l)	pH	Conductivity (mS/m)	Salinity (%)	Total Dissolved Solids (g/l)	Turbidity (NTU)	Temperature (C)	ORP[2] (mv)	Water Level (ft btoc)
MW-19	07/23/15	0.5	1.2 U	0.11	7.36	476.3	0.34	0.33	5.02	21.6	-144.5	4.66

Notes:

ORP = Oxidation/reduction potential

mg/l = milligrams per liter

g/l = grams per liter

% = percent

mv = Millivolts

mS/m = milliSiemens per meter

C = Celsius

U = The analyte was not detected at a concentration greater than the identified reporting limit

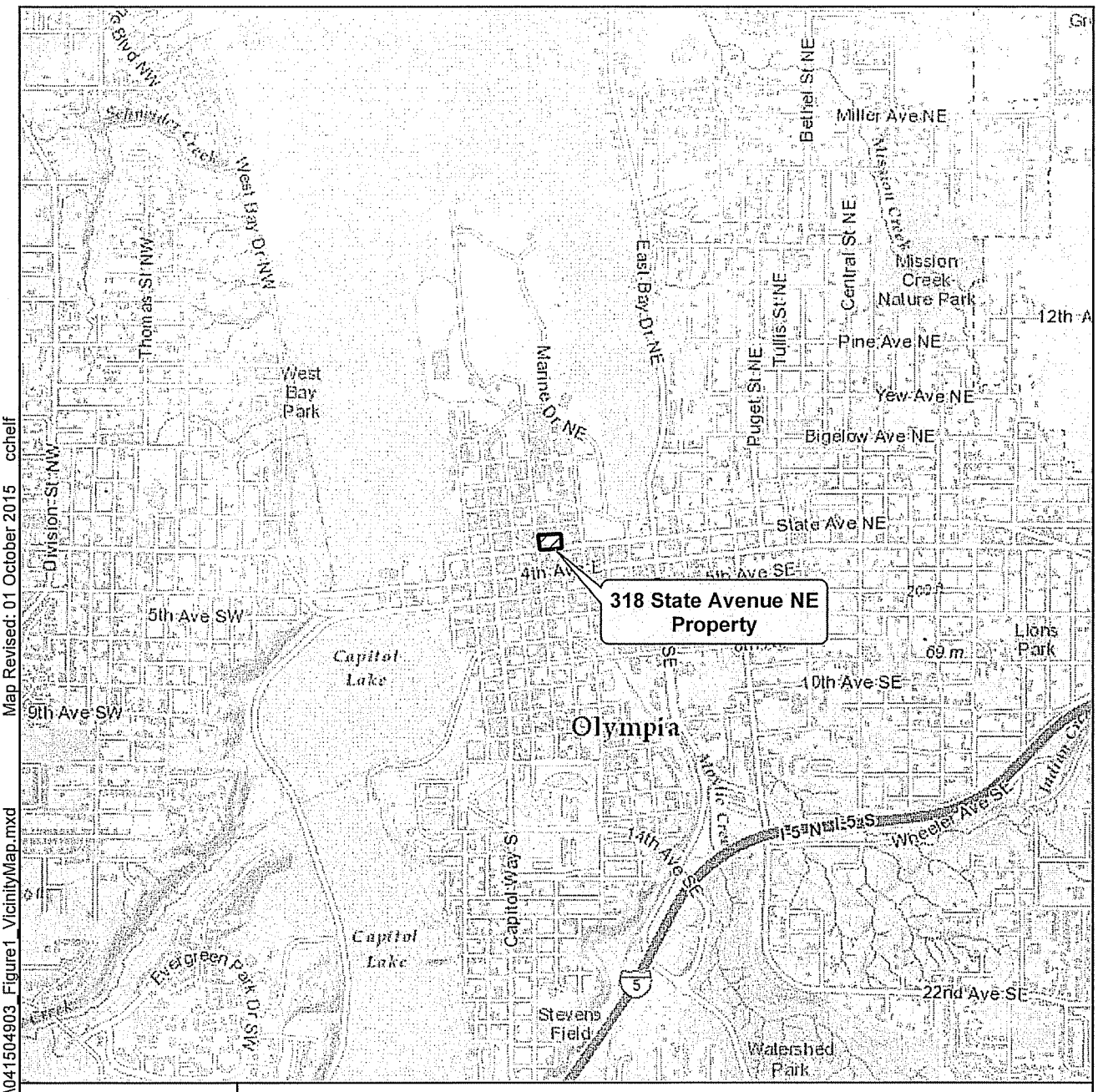
NTU = nephelometric turbidity unit

NC = Not Collected

Green shading indicates sample results for current quarter of monitoring.

ft btoc = feet below the top of monitoring well casing

J = Analyte concentration is estimated.



Notes:
1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. can not guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.
3. It is unlawful to copy or reproduce all or any part thereof, whether for personal use or resale, without permission.

Data Sources: 2008 Shaded Relief from ESRI, 2008 Topographic Maps from National Geographic Society
Projection: NAD_1983_StatePlane_Washington_North_FIPS_4601_Feet
Datum: D_North_American_1983

Vicinity Map

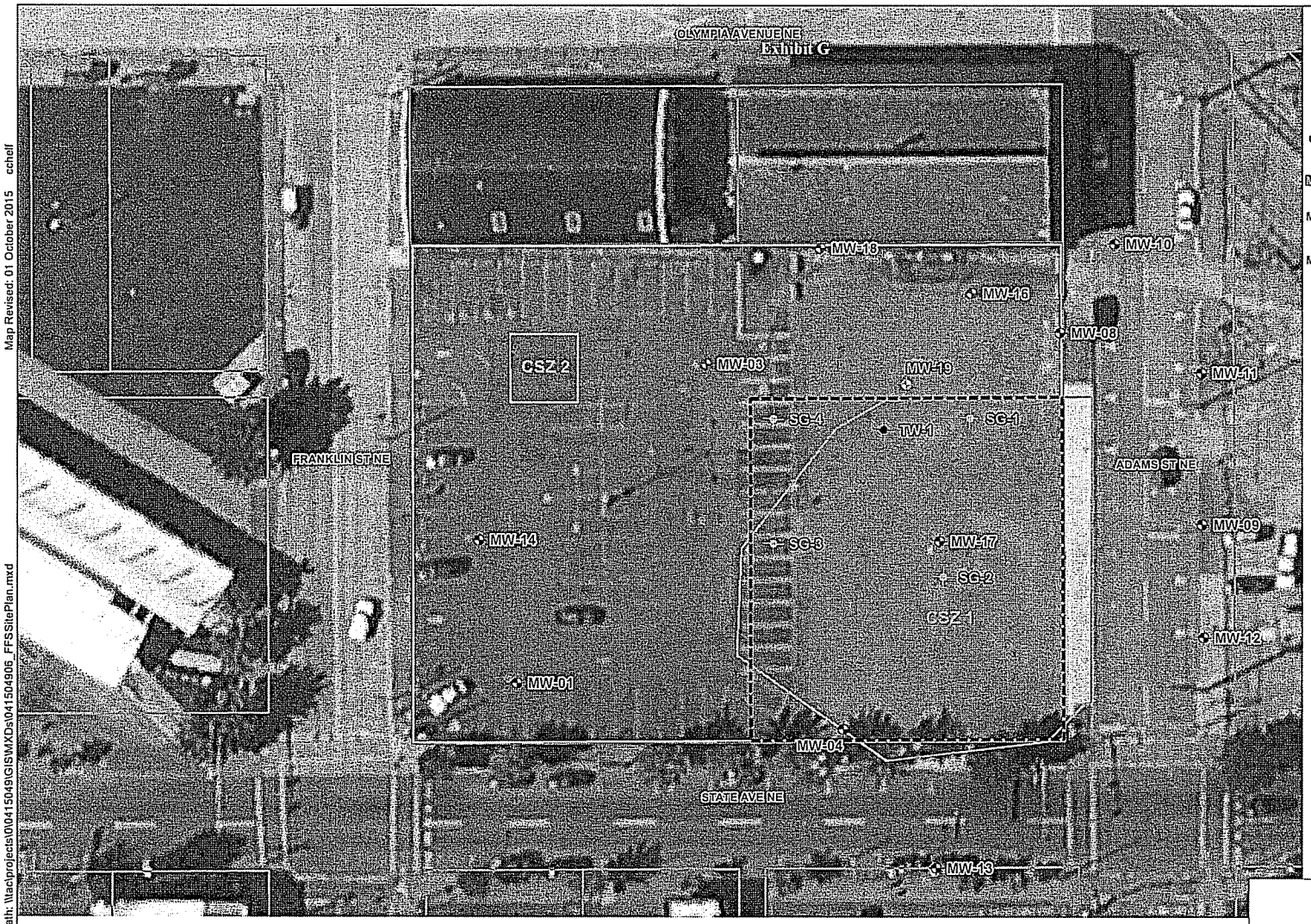
Southeast Portion of the 318 State Avenue NE Property
Olympia, Washington

GeoEngineers

Figure 1

Office: TAC Path: \\tac\projects\0\0415049\GISMXDs\0415049_Figure1_VicinityMap.mxd Map Revised: 01 October 2015 cchelf

Exhibit C



Legend

- Approximate 318 State Avenue NE Property Boundary
- Southeast portion of property proposed for redevelopment
- Parcel Boundary
- CSZ 1 — Contaminated Soil Zones (CSZ) Remediated in September-October 2009
- MW-19 — Monitoring well installed to monitor groundwater from the southeast portion of the property
- MW-03 — Monitoring well currently being monitored as part of semi-annual monitoring events
- MW-01 — Monitoring well that was previously monitoring as part of quarterly or semi-annual monitoring events
- TW-1 — Temporary Groundwater Monitoring Well Location
- SG-1 — Soil Gas Exploration Location

N W E S

40 0 40
Feet

Notes:
1. MTCA = Model Toxics Control Act, ug/L = micrograms per liter.
2. The locations of all features shown are approximate.
3. 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 Sources: Approximate Property Boundary from Thurston County parcels (revised by GeoEngineers). Aerial photograph 2013 from ESRI. Data Frame Rotated 356 degrees.

Projection: NAD_1983_StatePlane_Washington_South_FIPS_4602_Feet
Datum: D_North_American_1983

Site Plan

Southeast Portion of the 318 State Avenue NE Property
Olympia, Washington

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Figure 2

Map Revised: 01 October 2015 cchelf
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Office: TAC

APPENDIX A
Analytical Results From Previous Sample Analyses

TABLE A-1

SUMMARY OF GROUNDWATER COMPLIANCE MONITORING PARAMETERS[1] - FEBRUARY 2015

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

			Volatile Organic Compounds							Total Metals
		Analyte	Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Vinyl Chloride	Benzene	Arsenic
		Unit	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(mg/l)
		MTCA Method A Cleanup Level	5	5	4,000,000 [2]	800,000 [2]	1,600,000 [2]	0.2	5	0.005
Location	Sample ID	Sample Date								
MW-13 [11]	MW13-052510-W	05/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA	0.0041 J
	MW13-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.058 J
	MW13-112210-W	11/22/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0004 UJ
	MW13-022211-W	02/22/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0012
MW-04 [11]	MW4-052510-W	05/25/10	0.1 U	0.28	0.1 U	0.11	0.1 U	0.12	NA	0.0045 J
	MW4-082410-W	08/24/10	0.1 U	0.14	0.1 U	0.14	0.1 U	0.074	0.1 U	0.0051 J
	MW4-112210-W	11/22/10	0.1 U	0.34	0.1 U	0.1 U	0.1 U	0.065	0.1 U	0.00067 J
	MW4-022211-W	02/22/11	0.1 U	0.25	0.1 U	0.1 U	0.1 U	0.053	0.1 U	0.0023
MW-17 [14]	MW17-052410-W	05/24/10	0.1 UJ	0.26 J	0.1 UJ	0.1 UJ	0.1 UJ	0.084 J	0.17 J	0.0031 J
	MW17-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.11	0.1 U	0.025	0.1 U	0.002 UJ
	MW17-112210-W	11/22/10	0.1 U	0.22	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0016 J
	MW17-022211-W	02/22/11	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0012
	MW17-052511-W	05/25/11	0.1	0.21	0.1 U	0.1 U	0.1 U	0.02	NA[12]	NA[12]
	MW17-082411-W	08/24/11	0.1 U	0.18	0.1 U	0.1 U	0.1 U	0.02 U	NA[12]	NA[12]
	MW17-112911-W	11/29/11	0.1 U	0.12	0.1 U	0.1 U	0.1 U	0.02 U	NA[12]	NA[12]
	MW17-022812-W	02/28/12	0.1 U	0.10	0.1 U	0.1 U	0.1 U	0.02 U	NA[12]	NA[12]
	MW17-082312-W	08/23/12	0.1 U	0.14	0.1 U	0.1 U	0.1 U	0.02 U	NA[12]	NA[12]
	MW17-022813-W	02/28/13	0.1 U	0.1U	0.1 U	0.1 U	0.1 U	0.02 U	NA[12]	NA[12]
	MW17-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.020 U	NA[12]	NA[12]
MW-09 [11]	MW9-052510-W	05/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA	0.0016 J
	MW9-082410-W	08/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.002 UJ
	MW9-112210-W	11/22/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0004 UJ
	MW9-022211-W	02/22/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.00059
MW-03 [14]	MW3-052410-W	05/24/10	0.1 U	0.48	0.1 U	0.14	0.1 U	0.48	0.1 U	0.002 J
	MW3-082510-W	08/25/10	0.1 U	0.26	0.1 U	0.11	0.1 U	0.12	0.1 U	0.002 UJ
	MW3-112410-W	11/24/10	0.1 U	1.3	0.1 U	0.28	0.1 U	1.1	0.1 U	0.0004 UJ
	MW3-022311-W	02/23/11	0.1 U	1.6	0.1 U	0.59	0.1 U	0.92	0.1 U	0.0010
	MW3-052511-W	05/25/11	0.1 U	1.5	0.1 U	0.6	0.15	0.83	NA[12]	NA[12]
	DUP-052511-W[7]	05/25/11	0.1 U	1.2	0.1 U	0.36	0.12	0.69	NA[12]	NA[12]
	MW3-082411-W	08/24/11	0.1 U	0.64 J	0.1 U	0.31	0.11	0.37 J	NA[12]	NA[12]
	DUP-082411-W[4]	08/24/11	0.1 U	0.49 J	0.1 U	0.23	0.1 U	0.27 J	NA[12]	NA[12]
	MW3-112911-W	11/29/11	0.1 U	2.6	0.1 U	0.39	0.11	0.45	NA[12]	NA[12]
	DUP-112911-W[9]	11/29/11	0.1 U	2.7	0.1 U	0.41	0.10	0.52	NA[12]	NA[12]
	MW3-022812-W	02/28/12	0.1 U	0.99	0.1 U	0.63	0.18	1.4	NA[12]	NA[12]
	DUP-022812-W[10]	02/28/12	0.1 U	1.3	0.1 U	0.84	0.19	1.9	NA[12]	NA[12]
	MW3-082312-W	08/23/12	0.1 U	0.11	0.1 U	0.36	0.3	0.27	NA[12]	NA[12]
	DUP-082312-W[13]	08/23/12	0.1 U	0.11	0.1 U	0.34	0.33	0.26	NA[12]	NA[12]
	MW3-022813-W	02/28/13	0.1 U	0.70	0.1 U	0.34	0.14	0.72	NA[12]	NA[12]
	DUP-022813-W[15]	02/28/13	0.1 U	0.68	0.1 U	0.32	0.12	0.69	NA[12]	NA[12]
	MW03-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.24	0.28	0.15	NA[12]	NA[12]
	DUP01-82213-W[16]	08/22/13	0.1 U	0.1 U	0.1 U	0.23	0.32	0.16	NA[12]	NA[12]
	MW3-140227-W	02/27/14	0.1 U	2.5	0.10 U	0.75	0.12	0.79	NA[12]	NA[12]
	MW03-140825-W	08/25/14	0.1 U	0.1 U	0.1 U	0.35	0.36	0.25	NA[12]	NA[12]
	MW03-150225-W	02/25/15	0.5 U	0.58	0.1 U	1.8	0.2 U	3.6	NA[12]	NA[12]

			Volatile Organic Compounds							Total Metals
	Analyte		Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	Cis-1,2-Dichloroethene	Trans-1,2-Dichloroethene	Vinyl Chloride	Benzene	Arsenic
	Unit		(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(mg/l)
	MTCA Method A Cleanup Level		5	5	4,000,000 [2]	800,000 [2]	1,600,000 [2]	0.2	5	0.005
MW-05 [14]	MW8-052410-W	05/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.21	0.1 U	0.0027 J
	DUP-1-052410-W [3]	05/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.23	0.1 U	0.0027 J
	MW8-082510-W	08/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.29	0.1 U	0.0045 J
	DUP-1-082510-W [4]	08/25/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.29	0.1 U	0.0045 J
	MW8-112410-W	11/24/10	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.066	0.1 U	0.0004 UJ
	MW8-022311-W	02/23/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	0.1 U	0.0019
	MW8-052511-W	05/25/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.04	NA [12]	NA [12]
	MW8-082411-W	08/24/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.21	NA [12]	NA [12]
	MW08-112911-W	11/29/11	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW08-022812-W	02/28/12	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02 U	NA [12]	NA [12]
	MW08-082312-W	08/23/12	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.13	NA [12]	NA [12]
	MW08-022813-W	02/28/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.02U	NA [12]	NA [12]
	MW8-82213-W	08/22/13	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10	NA [12]	NA [12]
MW-16 [14]	MW16-052410-W	05/24/10	0.1 U	0.44	0.1 U	0.2	0.18	0.76	0.1 U	0.0019 J
	MW16-082510-W	08/25/10	0.1 U	0.46	0.1 U	0.32	0.34	1.0	0.12	0.002 UJ
	MW16-112410-W	11/24/10	0.1 U	0.49	0.1 U	0.17	0.19	0.33	0.1 U	0.0013 J
	DUP-1-112410-W [5]	11/24/10	0.1 U	0.50	0.1 U	0.16	0.21	0.38	0.1 U	0.0004 UJ
	MW16-022311-W	02/23/11	0.1 U	0.42	0.1 U	0.13	0.13	0.22	0.1 U	0.0014
	DUP-1-022311-W [6]	02/23/11	0.1 U	0.43	0.1 U	0.11	0.15	0.23	0.1 U	0.0015
	MW16-052511-W	05/25/11	0.1 U	0.47	0.1 U	0.1 U	0.16	0.18	NA [12]	NA [12]
	MW16-082411-W	08/24/11	0.1 U	0.41	0.1 U	0.26	0.24	0.70	NA [12]	NA [12]
	MW16-112911-W	11/29/11	0.1 U	0.35	0.1 U	0.10	0.12	0.15	NA [12]	NA [12]
	MW16-022812-W	02/28/12	0.1 U	0.40	0.1 U	0.1 U	0.13	0.17	NA [12]	NA [12]
	MW16-082312-W	08/23/12	0.1 U	0.52	0.1 U	0.21	0.2	0.47	NA [12]	NA [12]
	MW16-022813-W	02/28/13	0.1 U	0.28	0.1 U	0.1 U	0.1 U	0.086	NA [12]	NA [12]
	MW16-82213-W	08/22/13	0.1 U	0.26	0.1 U	0.22	0.13	0.44	NA [12]	NA [12]
	MW16-140227-W	02/27/14	0.1 U	0.24	0.1 U	0.1 U	0.1 U	0.093	NA [12]	NA [12]
	DUP01-140227-W [17]	02/27/14	0.1 U	0.26	0.1 U	0.1 U	0.1 U	0.090	NA [12]	NA [12]
	MW16-140825-W	08/25/14	0.1 U	0.37	0.1 U	0.25	0.18	0.52	NA [12]	NA [12]
	DUP01-140825-W [18]	08/25/14	0.1 U	0.36	0.1 U	0.25	0.19	0.51	NA [12]	NA [12]
	MW16-150225-W	02/25/15	0.5 U	0.24	0.1 U	0.2 U	0.2 U	0.16	NA [12]	NA [12]
	DUP01-150225-W [17]	02/25/15	0.5 U	0.23	0.1 U	0.2 U	0.2 U	0.15	NA [12]	NA [12]
MW-18 [14]	MW18-052410-W	05/24/10	0.1 U	0.62	0.1 U	0.28	0.16	2.3	0.2	0.0038 J
	MW18-082510-W	08/25/10	0.1 U	0.25	0.1 U	0.22	0.13	1.9	0.19	0.0028 J
	MW18-112410-W	11/24/10	0.1 U	0.81	0.1 U	0.34	0.23	1.7	0.11	0.0032 J
	MW18-022311-W	02/23/11	0.1 U	0.72	0.1 U	0.3	0.16	0.9	0.1 U	0.0045
	MW18-052511-W	05/25/11	0.1 U	0.63	0.1 U	0.21	0.14	1.2	NA [12]	NA [12]
	MW18-082411-W	08/24/11	0.1 U	0.4	0.1 U	0.39	0.24	2.3	NA [12]	NA [12]
	MW18-112911-W	11/29/11	0.1 U	0.57	0.1 U	0.30	0.15	0.86	NA [12]	NA [12]
	MW18-022812-W	02/28/12	0.1 U	0.49	0.1 U	0.20	0.16	1.20	NA [12]	NA [12]
	MW18-082312-W	08/23/12	0.1 U	0.62	0.1 U	0.43	0.29	2.7	NA [12]	NA [12]
	MW18-022813-W	02/28/13	0.1 U	0.34	0.1 U	0.1U	0.1U	0.15	NA [12]	NA [12]
	MW18-82213-W	08/22/13	0.1 U	0.61	0.1 U	0.45	0.28	2.1	NA [12]	NA [12]
	MW18-140227-W	02/27/14	0.1 U	0.57	0.1 U	0.26	0.26	1.3	NA [12]	NA [12]
	MW18-140825-W	08/25/14	0.1 U	0.48	0.1 U	0.51	0.43	2.7	NA [12]	NA [12]
	MW18-150225-W	02/25/15	0.5 U	0.68	0.1 U	0.23	0.20	1.5	NA [12]	NA [12]

Notes:

[1] The parameters presented are the groundwater compliance monitoring parameters specified in the Groundwater Compliance Monitoring Plan (GeoEngineers 2010) and benzene as requested by Ecology in an email from Eugene Radcliff, Ecology to Iain Wingard, GeoEngineers dated July 19, 2010. Analysis for benzene and arsenic were discontinued as benzene was never detected at a concentration greater than cleanup levels and arsenic concentrations are less than cleanup levels and appear to be associated with regional conditions. Ecology concurrence for discontinuing benzene and arsenic analysis was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 16, 2011.

[2] A MTCA Method A groundwater cleanup level has not been established; therefore, the MTCA Method B groundwater cleanup level has been provided.

[3] Sample DUP-1-052410-W is a field duplicate of sample MW8-052410-W.

[4] Sample DUP-1-082510-W is a field duplicate of sample MW8-082510-W.

[5] Sample DUP-1-112410-W is a field duplicate of sample MW16-112410-W.

[6] Sample DUP-1-022311-W is a field duplicate of sample MW16-022311-W.

[7] Sample DUP-052511-W is a field duplicate of sample MW3-052511-W.

[8] Sample DUP-082411-W is a field duplicate of sample MW3-082411-W.

[9] Sample DUP-112911-W is a field duplicate of sample MW3-112911-W.

[10] Sample DUP-022812-W is a field duplicate of sample MW3-022812-W.

[11] Groundwater sampling and analysis at this monitoring well location is no longer a part of the compliance monitoring program. Therefore, groundwater samples were not collected during the current monitoring event. Concurrence for discontinuing sampling and analysis at this monitoring well location was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 16, 2011.

[12] See Footnote 1.

[13] Sample DUP-082312-W is a field duplicate of sample MW3-082312-W.

[14] Groundwater sampling and analysis frequency at this monitoring well location has been reduced from quarterly monitoring to semi-annual monitoring. Concurrence for reducing the sampling and analysis frequency at this monitoring well location was provided in an email from Eugene Radcliff, Ecology, to Iain Wingard, GeoEngineers, dated May 8, 2012.

[15] Sample DUP-022813-W is a field duplicate of sample MW3-022813-W.

[16] Sample DUP01-82213-W is a field duplicate of sample MW03-82213-W.

[17] Sample DUP01-140227-W is a field duplicate of sample MW16-140227-W.

[18] Sample DUP01-140825-W is a field duplicate of sample MW16-140825-W.

[19] Sample DUP01-150225-W is a field duplicate of sample MW16-150225-W.

MTCA = Model Toxics Control Act

µg/l = microgram per liter

U = The analyte was not detected at a concentration greater than the identified reporting limit

UJ = The analyte was not detected at a concentration greater than the identified reporting limit and the reporting limit concentration is estimated

NA = Not analyzed

mg/l = milligram per liter

J = The analyte concentration is estimated

NC = Not Collected

Bold indicates analyte was detected

Green shading indicates sample results for the current monitoring event.

Gray shading indicates concentration is greater than cleanup level

TABLE A-2

SUMMARY OF GROUNDWATER ANALYTICAL RESULTS FOR TW-1

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

			Volatile Organic Compounds					
		Analyte	**Tetrachloroethene (PCE)**	**Trichloroethene (TCE)**	**1,1-Dichloroethene (1,1-DCE)**	**Cis-1,2-Dichloroethene (cis 1,2-DCE)**	**Trans-1,2-Dichloroethene (trans 1,2-DCE)**	**Vinyl Chloride (VC)**
		Unit	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)
		MTCA Groundwater Cleanup Levels[1]	8.85	7	3.2	NE	4,000	1.6
		Groundwater Screening Level for Soil Vapor Intrusion[2]	22.9	1.55	130	NE	NE	0.347
Location	**Sample ID**	**Sample Date**						
TW1	TW1-042115	04/21/15	0.5 U	0.2 U	0.1 U	0.2 U	0.2 U	**2.6**

Notes:

[1]MTCA groundwater cleanup levels based on the highest beneficial use of groundwater as marine surface water. The cleanup levels provided are the lowest of the available marine surface water criteria including MTCA Method B surface water (Chapter 173-340 WAC). Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC), National Recommended Water Quality Criteria (Clean Water Act Section 304) and National Toxics Rule (40 CFR 131).

[2]Groundwater Screening Level based on Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation on Remedial Action (Ecology, 2009) as updated in 2015 (Ecology, 2015) to revise screening levels in Appendix B.

MTCA = Model Toxics Control Act

NE = Not Established

µg/l = microgram per liter

U = The analyte was not detected at a concentration greater than the identified reporting limit

Bold indicates analyte was detected

Gray shading indicates concentration is greater than the cleanup level

APPENDIX B
Monitoring Well Log

SOIL CLASSIFICATION CHART

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

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

ADDITIONAL MATERIAL SYMBOLS

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

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Material Description Contact

Distinct contact between soil strata or geologic units

Approximate location of soil strata change within a geologic soil unit

Sampler Symbol Descriptions

2.4-inch I.D. split barrel

Standard Penetration Test (SPT)

Shelby tube

Piston

Direct-Push

Bulk or grab

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

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

Laboratory / Field Tests

%F	Percent fines
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PP	Pocket penetrometer
PPM	Parts per million
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen
NT	Not Tested

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

KEY TO EXPLORATION LOGS

GeoEngineers

FIGURE B-1

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	7/16/2015	7/16/2015	12	PR	IHW	Holt Services	Hollow Stem Auger

Hammer Data	Hydraulic Hammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Truck mounted B-60
Surface Elevation (ft) Vertical Datum	Undetermined	Top of Casing Elevation (ft)	
Latitude Longitude		Horizontal Datum	N/A

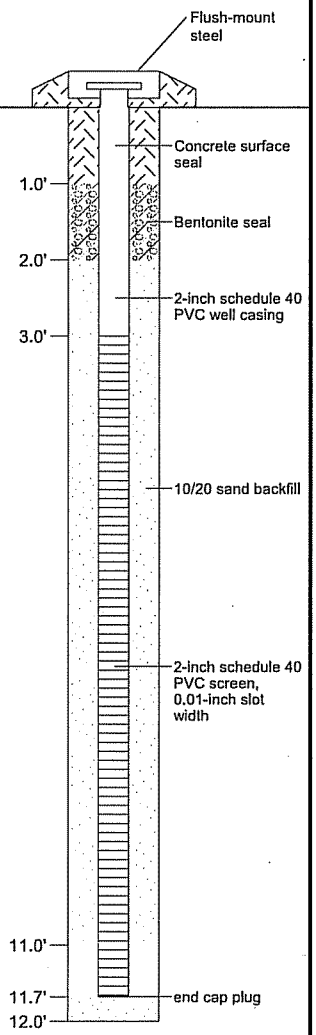
DOE Well I.D.: BIK-148
A 2 (in) well was installed on 7/16/2015 to a depth of 12 (ft).
Well was developed on 7/16/2015.

Groundwater	Depth to Water (ft)	Elevation (ft)
Date Measured		
7/16/2015	4.5	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0							GP	Gray fine to coarse gravel with fine to coarse sand and trace silt		
								SP	Brown fine to coarse sand with trace silt and occasional fine gravel (loose, moist)		
	5	12	7			▼			Brown fine to coarse sand with trace silt (loose, wet)	NS	<1
								SP-SM	Black fine to medium sand with silt (loose, wet)		
	10	6	7							NS	<1

WELL LOG



Note: See Figure B-1 for explanation of symbols.

Log of Monitoring Well MW-19

GeoEngineers

Project:	City of Olympia/Southeast 318 State Ave NE
Project Location:	Olympia, Washington
Project Number:	0415-049-06

Figure B-2
Sheet 1 of 1

APPENDIX C
Quality Assurance Project Plan (QAPP)

APPENDIX C
QUALITY ASSURANCE PROJECT PLAN

The Quality Assurance Project Plan (QAPP) serves as the primary guide for the integration of quality assurance (QA) and quality control (QC) functions into monitoring activities. The QAPP presents the objectives, procedures, organization, functional activities and specific QA and QC activities designed to achieve data quality goals established for the project. This QAPP is based on guidelines specified in Washington Administrative Code (WAC) Chapter 173-340-820 and Environmental Protection Agency (EPA) Guidelines (EPA, 1999, 2004).

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

C.1 Project Organization and Responsibility

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

C.1.1 Project Leadership and Management

The Project Manager's duties consist of providing concise technical work statements for project tasks, selecting project team members, determining subcontractor participation, establishing budgets and schedules, adhering to budgets and schedules, providing technical oversight, and providing overall production and review of project deliverables. Nick Rohrbach is the Project Manager for activities at the Property. The Associate-in-Charge is responsible to the City of Olympia for fulfilling contractual and administrative control of the project. Iain Wingard is the Associate-in Charge.

C.1.2 Field Coordinator

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

- Develops schedules and allocates resources for field tasks.
- Coordinates data collection activities to be consistent with information requirements.
- Collects field data and submits samples to the laboratory.
- Assures that data are correctly and completely reported.
- Implements field sampling in accordance with Groundwater Monitoring Plan requirements.
- Schedules sample delivery to the analytical laboratory.
- Assures that appropriate sampling, testing and measurement procedures are followed.
- Participates in QA corrective actions as required.

The Field Coordinator for activities at the Property will be John Deeds or Paul Robinette.

C.1.3 Quality Assurance Leader

The GeoEngineers project Quality Assurance Leader is Iain Wingard, who is responsible for the project's overall QA. The Project QA Leader is responsible for coordinating QA/QC activities as they relate to the acquisition of field data. The QA Leader has the following responsibilities:

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

C.1.4 Laboratory Management

The Laboratory's QA Coordinator administers the Laboratory QA Plan and is responsible for QC. Specific responsibilities of this position include:

- Ensures implementation of the QA Plan.
- Serves as the laboratory point of contact.
- Activates corrective action for out-of-control events.
- Issues the final QA/QC report.
- Administers QA sample analysis.
- Complies with the specifications established in the project plans as related to laboratory services.
- Participates in QA audits and compliance inspections.

The chemical analytical laboratory QA Coordinator will be determined by the laboratory (Test America, Tacoma, Washington).

C.1.5 Health and Safety

The Field Coordinator will be responsible for implementing safe work practices during sampling activities. The Field Coordinator will conduct a tailgate safety meeting the morning before beginning field activities. The Field Coordinator will terminate any work activities that are unsafe.

C.2 Data Quality Objectives

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

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

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

C.2.1 Analytes

The analytes for groundwater samples submitted to the laboratory during groundwater compliance monitoring are the following:

- Tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (1-1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride (VC) by EPA Method 8260; and
- Sulfate by EPA Method 300.0.

Iron will be measured in the field use field test kits.

C.2.2 Detection Limits

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

Achieving a stated detection limit for a given analyte is helpful in providing statistically useful data. Intended data uses, such as comparison to numerical criteria or risk assessments, typically dictate specific project target reporting limits (TRLs) necessary to fulfill stated objectives. For this project, the TRLs are values that are less than Model Toxics Control Act (MTCA) Method B cleanup levels for protection of surface water and the MTCA Method B groundwater screening level protective of indoor air provided in Ecology's Draft Guidance for Evaluating Soil Vapor Intrusion in Washington State (Ecology, 2009) as updated in April 2015 to revise the soil gas screening levels provided in Appendix B of the guidance document (Ecology, 2015). The project analytes, applicable cleanup and screening levels, and laboratory TRLs are shown in Table 2.

The TRLs were obtained from Test America, Tacoma, Washington. The analytical methods and processes selected will provide RLs less than the TRLs under ideal conditions. Therefore, a particular TRL is considered a target because several factors may influence final RLs. Data users must be aware that high non-detect values, although correctly reported, can bias statistical summaries. Careful interpretation is required to correctly characterize site conditions.

C.2.3 Precision

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

$$RPD = 100[(Xs - Xd)/(Xs + Xd)]/2, \text{ where}$$

RPD = relative percent difference
Xs = sample analytical result
Xd = duplicate sample analytical result

The RPD will be calculated for appropriate sample sets and compared to the applicable criteria. Precision can also be expressed as the percent difference (%D) between replicate analyses. Persons performing the evaluation must review one or more pertinent documents (USEPA, October 1999; USEPA, October 2004a) that address criteria exceedances and courses of action. The relative percent difference goal for this effort is 50 percent in analyses, unless the duplicate sample concentrations are less than 5 times the reporting limit.

C.2.4 Accuracy

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

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

$$PR = 100(Xss - Xs)/T, \text{ where}$$

PR = percent recovery
Xss = spike sample analytical result
Xs = sample analytical result
T = known spike concentration

Persons performing the evaluation must review one or more pertinent documents (USEPA, October 1999; USEPA, October 2004) that address criteria exceedances and courses of action. Accuracy criteria for surrogate spikes, matrix spikes and laboratory control spikes are found in Table 1.

C.2.5 Representativeness, Completeness and Comparability

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

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

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

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

C.2.6 Holding Times

Holding times are defined as the time between sample collection and extraction, sample collection and analysis, or sample extraction and analysis. Some analytical methods specify a holding time for analysis only. Holding times for the analyses to be performed as part of groundwater monitoring are shown in Table 3.

C.2.7 Blanks

According to the *National Functional Guidelines for Organic Data Review* (USEPA, 1999), "The purpose of laboratory (or field) blank analysis is to determine the existence and magnitude of contamination resulting from laboratory (or field) activities. The criteria for evaluation of blanks apply to any blank associated with the samples (e.g., method blanks, instrument blanks, trip blanks, and equipment blanks)." Trip blanks are placed with samples during shipment; method blanks are created during sample preparation and follow samples throughout the analysis process.

Analytical results for blanks will be interpreted in general accordance with *National Functional Guidelines for Organic Data Review* and professional judgment. Blanks are discussed further in Section C.6.

C.3 Sample Collection, Handling and Custody

C.3.1 Sampling Equipment Decontamination

Groundwater samples will be collected from each well using dedicated equipment. General decontamination procedures for any other equipment (e.g., the water level indicator) will consist of the following: 1) wash with non-phosphate detergent solution (Alconox and distilled water), 2) rinse with distilled water, and 3) second distilled water rinse. Field personnel will limit cross-contamination by changing gloves between sampling events or more frequently as needed. Wash water used to decontaminate the sampling equipment will be combined with well purge water in 55-gallon drums for proper off-site disposal.

C.3.2 Sample Containers and Labeling

The Field Coordinator will establish field protocol to manage field sample collection, handling and documentation. Samples obtained will be placed in appropriate laboratory-prepared containers. Sample containers and preservatives are listed in Table 3.

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

- project number,
- sample name, and
- date and time of collection.

Samples will be named according to the following example:

MW-19-072515-W, *Where:*

"MW-19" indicates monitoring well number 19,
"072515" indicates July 25, 2015 and,
"W" indicates the sample is a water sample

The sample collection activities will be noted on field logs. The Field Coordinator will monitor consistency between the Groundwater Monitoring Plan, sample containers/labels, field logs and the chain of custody.

C.3.3 Sample Storage

Samples will be placed in a cooler with "wet ice" immediately after they are collected. The objective of the cold storage will be to attain a sample temperature of 2 and 6 degrees Celsius. Holding times will be observed during sample storage.

C.3.4 Sample Shipment

The samples will be transported and delivered to the analytical laboratory in coolers. Field personnel will transport and hand-deliver samples to the laboratory or to a laboratory courier. All analyses for this project are anticipated to be performed using the Test America Tacoma laboratory, and sample shipping is not anticipated.

C.3.5 Chain-Of-Custody Records

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

- Project name and number.
- Sampler's name.
- Sample identification numbers.
- Date and time of sampling.
- Sample matrix and number of containers for each sample and preservatives used.
- Analyses to be performed.
- Names of personnel performing transfer of custody in transfer acknowledgment spaces.

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

C.3.6 Laboratory Custody Procedures

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

C.3.7 Field Documentation

Field documentation provides important information about sampling activities, sample characteristics, potential problems or special circumstances surrounding sample collection. Field personnel will maintain daily field logs while on site. The field logs will be prepared on field report forms. Entries in the field logs and associated sample documentation forms will be made in pencil on Rite-in-the-Rain logs or waterproof ink on standard paper and corrections will consist of line-out deletions that are initialed and dated. Individual logs will become part of the project files.

At a minimum, the following information will be recorded during the collection of each sample:

- Sample location and description
- Sampler's name
- Date and time of sample collection
- Type of sample
- Type of sampling equipment used
- Field instrument readings, as appropriate

- Field observations and details that are pertinent to the integrity/condition of the samples (e.g., weather conditions, performance of the sampling equipment, sample depth control, etc.)
- Sample preservation

In addition to the sampling information, the following specific information also will be recorded in the field log for each day of sampling:

- Names of field personnel
- Time of property arrival/departure
- Other personnel present at the property, as appropriate
- Summary of pertinent meetings or discussions with regulatory agency personnel
- Deviations from the Groundwater Monitoring Plan, Health and Safety Plan and QAPP procedures
- Changes in personnel and responsibilities with reasons for the changes
- Levels of safety protection
- Calibration readings for any equipment used and equipment model and serial number

The handling, use and maintenance of field logs are the field coordinator's responsibilities.

C.4 Calibration Procedures

C.4.1 Field Instrumentation

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

C.4.2 Laboratory Instrumentation

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

C.5 Data Reporting and Laboratory Deliverables

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

C.6 Internal Quality Control

Table 4 summarizes the types and frequency of QC samples to be collected, including both field QC and Laboratory QC samples. The following sections describe field and laboratory QC samples.

C.6.1 Field Quality Control

Field QC samples serve as a control and check mechanism to monitor the consistency of sampling methods. The following sections provide a description of field QC samples.

FIELD DUPLICATES

In addition to replicate analyses performed in the laboratory, field duplicates can serve as a measure for precision. Field duplicates can be used to evaluate the consistency of the sampling techniques used by field personnel. Additionally, field duplicates can be used to evaluate the precision and consistency of laboratory analytical procedures and methods.

Field duplicates are performed as part of semi-annual monitoring of groundwater at the 318 State Avenue NE property. The results for field duplicates performed as part of semi-annual monitoring have indicated relatively good precision in samples collected from the property as shown in the duplicate sample results presented in Table A-1 in Appendix A. The results of field duplicates collected at the 318 State Avenue NE property indicate consistency in the sample collection and analysis techniques that are being performed at the property. The sample collection and analysis techniques performed for the southeast portion of the 318 State Avenue NE property will be the same as the sample collection and analysis techniques (i.e., same sampling procedures, same sampling personnel, same laboratory, etc.) performed as part of semi-annual monitoring.

Field duplicates will continue to be collected and analyzed as part of semi-annual monitoring of groundwater at the 318 State Avenue NE property. However, as only one sample will be collected from the southeast portion of the property per sampling event, a field duplicate groundwater sample will not be collected. Collection of a field duplicate sample will be evaluated if the results for field duplicates collected as part of semi-annual monitoring of 318 State Avenue NE property indicate that precision doesn't meet the criteria presented in Section C.2.3.

TRIP BLANKS

One trip blank will be placed in each cooler that contains samples to be analyzed for volatile organic compounds (VOCs) (i.e., chlorinated solvents and degradation products). The blank samples will be analyzed for the same VOCs as the parent sample.

C.6.2 Laboratory Quality Control

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

- method blanks
- internal standards
- calibrations
- matrix spike/matrix spike duplicates (MS/MSD)

- laboratory control spikes/spike duplicates (LCS/LCSD)
- laboratory replicates or duplicates
- surrogate spikes

The following sections provide a description of the laboratory QC samples.

LABORATORY BLANKS

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

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

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

CALIBRATIONS

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

MATRIX SPIKE/MATRIX SPIKE DUPLICATES (MS/MSD)

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

MS/MSDs are performed as part of semi-annual monitoring of groundwater at the 318 State Avenue NE property. The results for MS/MSDs performed as part of semi-annual monitoring have indicated relatively good precision and no noticeable matrix interference in samples collected from the property.

MS/MSDs will continue to be collected and analyzed as part of semi-annual monitoring of groundwater at the 318 State Avenue NE property. However, as only one sample will be collected from the southeast portion of the property per sampling event, an MS/MSD sample will not be collected. Collection of an MS/MSD sample will be evaluated if the results for MS/MSDs collected as part of semi-annual monitoring of 318 State Avenue NE property indicate that precision doesn't meet the criteria presented in Section C.2.3.

LABORATORY CONTROL SPIKES/LABORATORY CONTROL SPIKE DUPLICATES (LCS/LCSD)

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

LABORATORY REPLICATES/DUPLICATES

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

SURROGATE SPIKES

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

C.7 Data Reduction and Assessment Procedures

C.7.1 Data Reduction

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

C.7.2 Field Measurement Evaluation

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

- Sample collection information
- Field instrumentation and calibration

- Sample collection protocol
- Sample containers, preservation and volume
- Field QC samples collected at the frequency specified
- Sample documentation and chain of custody protocols
- Sample delivery

Cooler receipt forms and sample condition forms provided by the laboratory will be reviewed for out-of-control incidents. If anything is found to be out-of-control the project manager will implement corrective actions to ensure that additional out-of-control incidents do not occur. The final report will contain what effects, if any, the out-of-control incident may have on data quality. Sample collection information will be reviewed for correctness before inclusion in a final report.

C.7.3 Field Quality Control Evaluation

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

C.7.4 Laboratory Data Quality Control Evaluation

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

- Holding times
- Method blanks
- Matrix spike/spike duplicates
- Laboratory control spikes/spike duplicates
- Surrogate spikes
- Replicates

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

C.7.5 Corrective Action

Any deviation from the established criteria will be documented, and the data will be qualified, as appropriate. If significant quality assurance problems are encountered, appropriate corrective action as determined by GeoEngineers' project manager, GeoEngineers' associate/principle and/or the analytical laboratory will be implemented as appropriate.

C.8. References

Model Toxics Control Act (MTCA) Cleanup Regulations, *Washington Administrative Code, Chapter 173-340.* Washington State Department of Ecology.

USEPA. October 1999. Contract Laboratory Program National Functional Guidelines for Organic Data Review.

USEPA. October 2004. Contract Laboratory Program National Functional Guidelines for Inorganic Data Review.

TABLE C-1

MEASUREMENT QUALITY OBJECTIVES

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

Laboratory Analysis	Reference Method	Check Standard (LCS) %R Limits[1]	Matrix Spike (MS) %R Limits[1]	Surrogate Standards (SS) %R Limits [2]	MS Duplicate Samples or Lab Duplicate RPD Limits[3]	Field Duplicate Samples RPD Limits[3]
VOCs	EPA 8260 B	60%-140%	60%-140%	60%-140%	≤30%	≤30%
Sulfate	EPA 300.0	50%-150%	50%-150%	35%-165%	≤30%	≤30%

Notes:

Method numbers refer to EPA SW-846 Analytical Methods.

[1] Recovery ranges are goals. Actual percent recovery limits are based on laboratory control limits. Limits will vary for individual analytes and may be outside of the limits shown.

[2] Surrogate standard limits are approximate. Actual percent recovery limits are based on laboratory control limits. Limits will vary for individual analytes and may be outside of the limits shown.

[3] RPD control limits are only applicable if the concentrations are greater than 5 times the method reporting limit (MRL). For results less than 5 times the MRL, the difference between the sample and duplicate must be less than the MRL.

VOCs = Volatile organic compounds including tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (DCE), cis-DCE, trans-DCE and vinyl chloride.

LCS = Laboratory Control Sample

%R = Percent Recovery

RPD = Relative Percent Difference

NA = Not Applicable

TABLE C-2

ANALYTES, CLEANUP LEVELS, AND TARGET REPORTING LIMITS

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

Analyte	MTCA[1] Cleanup Level	Laboratory Reporting Limit
Volatile Organic Compounds (µg/l)		
Tetrachloroethene	5	0.1
Trichloroethene	5[2]	0.1
1,1-Dichloroethene	400[3]	0.1
Cis-1,2-Dichloroethene	80[3]	0.1
Trans-1,2-Dichloroethene	160[3]	0.1
Vinyl Chloride	0.2[2]	0.1
Conventionals (mg/l)		
Sulfate	NA	1.2

Notes:

[1] Model Toxics Control Act (MTCA) Cleanup Regulation Chapter 173-340 WAC. MTCA Method A cleanup levels are presented for chemicals that have Method A criteria. Method B cleanup levels are presented for chemicals that do not have Method A criteria.

[2] MTCA Method A cleanup level.

[3] MTCA Method B cleanup level.

mg/l = milligram per liter

µg/l = microgram per liter

NA = Not applicable; cleanup level not established by Washington State Department of Ecology

TABLE C-3

TEST METHODS, SAMPLE CONTAINERS, PRESERVATION AND HOLDING TIME[1]

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

Analysis	Method	Minimum Sample Size	Sample Containers	Sample Preservation	Holding Times
VOCs	EPA 8260B	120 mL	Three - 40 mL VOA Vials (no headspace)	0 to 6 degrees C HCl - pH<2	14 days preserved 7 days unpreserved
Sulfate	EPA 300.0	250 mL	250 mL poly	0 to 6 degrees C	28 days

Notes:

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

VOCs = Volatile organic compounds including tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (DCE), cis-DCE, trans-DCE and vinyl chloride.

VOA = Volatile organic analysis

HCl = Hydrochloric Acid

HNO_3 = Nitric Acid

mL = milliliter

L = liter

TABLE C-4

QUALITY CONTROL SAMPLES TYPE AND FREQUENCY

318 STATE AVENUE NE

OLYMPIA, WASHINGTON

Parameter	Field Quality Control		Laboratory Quality Control			
	Field Duplicates	Trip Blanks	Method Blanks	LCS	MS / MSD	Lab Duplicates
VOCs	1 per round of monitoring	1/cooler	1/batch	1/batch	1 MS/batch	1/batch
Sulfate	1 per round of monitoring	NA	1/batch	1/batch	1 MS/batch	1/batch

Notes:

An analytical batch is defined as a group of samples taken through a preparation procedure and sharing a method blank, LCS, and MS/ MSD (or MS and lab duplicate).

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

LCS = Laboratory control sample

MS = Matrix spike sample

MSD = Matrix spike duplicate sample

VOCs = Volatile organic compounds including tetrachloroethene (PCE), trichloroethene (TCE), 1,1-dichloroethene (DCE), cis-DCE, trans-DCE and vinyl chloride.

APPENDIX D
Health and Safety Plan
(Included in Field Copy)